

CONCERNING LOBELIA

Lobelia. Our work would be but partly accomplished did we not present something concerning the drug lobelia, with which the name of Thomson is so intimately connected. We therefore, from *Drugs and Medicines of North America*, by J. U. and C. G. Lloyd, September and December, 1886, present verbatim selections from the article on lobelia. This article carries, in foot notes, many references and much valuable information concerning Thomson, the Thomsonian remedies, and the history of lobelia outside of its use by Thomson and his disciples. Whilst no effort is made in any wise to revise the statements contained therein, or to review the subject from 1886 to the present time, the editor feels that he may, with propriety, make a few general remarks concerning the subject.

Lobelia, as shown by the article to follow, was employed in medicine before the date of Samuel Thomson, but not in amount sufficient to detract from the reputation of Thomson as the man who discovered and introduced the drug. (See page 88, *Drugs and Medicines of North America*, December, 1886, same page, this Bulletin.)

The alkaloid lobeline, described by us (pages 73-78) and physiologically investigated by Professor Roberts Bartholow, M. D. (pages 89-92), proved to us a subsequent disappointment in that the solution of whatsoever salt might be employed, or the alkaloid itself in substance, failed to give to physicians the value of representative galenic preparations of the whole drug. Consequently, within a moderate period from the time of its study and introduction in *Drugs and Medicines*, by reason of these facts, the use of either the alkaloid or of any of its salts was discontinued.

INFLATIN, pages 76-78, *Drugs and Medicines*, needs, in our opinion, to be further investigated. Its position has not, to our knowledge, been determined, and whether it be a fatty acid, a stearoptene, or a concrete wax, is yet problematical.

The medical history of lobelia has, in our opinion, been but superficially touched, even to the present day. The recent investigations of Dr. E. Jentzsch, of Chicago, and of others of the Eclectic school in medicine, in a hypodermic direction, leaves the subject of lobelia, in a therapeutic sense, no less graphically before the profession at this date than, nearly a century ago, it was in the days of Samuel Thomson. Lobelia is one of the most promising and most fruitful of the American drugs, and, in the hands of physicians who know how to use it in disease, it is one of the most useful.

JOHN URI LLOYD.

PLATE XXXIV.



LOBELIA INFLATA.
(NATURAL SIZE.)

LOBELIA.*

INDIAN TOBACCO.

PARTS USED.—The dried flowering plant and the seeds of *Lobelia inflata*, *Linnaeus*.

Natural Order Campanulaceæ, Tribe Lobeliæ.

BOTANICAL DESCRIPTION.—*Lobelia* is an annual herb growing in dry fields and pasture grounds and woodland pastures. In dry sunny places it attains a height of a few inches to a foot or two, the usual height in pasture lands being about a foot. In shady, rich soil, however, it is more luxuriant, growing two or three feet and becoming more slender and fewer branched. The plant flowers in August continuing until frost into September. When the time to flower arrives, each plant begins to bloom, no matter what its height or size. Often plants will be found in bloom only an inch or two high, and only bearing three or four small leaves and as many terminal flowers. Our figure 126 represents such a plant.

The roots of *Lobelia* are few and fibrous. The stem is erect, green, round, striate and covered with sparse white hairs, that are beautiful objects under a microscope. Each stem that attains the usual size is branched about the middle with several ascending branches, axillary from the leaves, and ending each in a spike of flowers. The branches are always much shorter than the main stem.

The leaves are alternate, mostly sessile, or the lower short stalked, and slightly decurrent down the stem; they are obvate or oblong, usually an inch to two long and half as wide, varying smaller till they merge on the upper part of the stem into flower bracts; they are of a



FIG. 126.
A small flowering plant of *Lobelia inflata*, (natural size.)

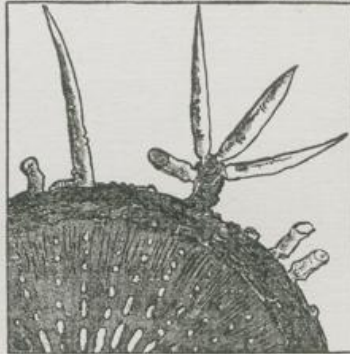


FIG. 127
Magnified portion of the stem showing branched hairs.

*The paging from this (63) conforms to that of the original article in "Drugs and Medicines of North America."
—J. U. L.

light green color, downy on both sides and soft to the touch. The veins are numerous, projecting below the leaf and impressed in the upper side of it. The margin is erosely blunt-toothed, the teeth tipped with small glandular white tips.

The flowers appear in August, the first to open axillary to the upper leaves which become successively smaller, passing into the bracts of a terminal raceme. The flowers themselves are rather inconspicuous being only about a quarter of an inch long. They are borne on short, erect peduncles about the length of the calyx lobes.



FIG. 128.

A flower of *Lobelia inflata*, (enlarged.)

of all the species of *Lobelia*; the upper lip consists of two erect, narrow lobes, the lower of three sub-equal, broad reflexed segments. The stamens are five and cohering together, both filament and anther, around the pistil, form a column the length of the corolla tube and slightly projecting from the split in this tube. The pistil consists of a two-celled, inferior ovary, containing numerous minute ovules attached to the large central spongy placentas, and completely filling the ovary when in flower. The style is enclosed in the tube formed by the stamens, and ends in a small two-lobed stigma.

The fruit-pod is a peculiar shape, as shown in our figure 129. It is about a quarter of an inch long, inflated, sub-globular, compressed laterally, and unequal at the base,



FIG. 130.

Transverse section of a pod of *Lobelia inflata*.

the cell opposite the stem being longer at the base than the inside cell. This is characteristic of the fruit.* The pod is prominently ten veined lengthwise with numerous, intermediate, net veins. It is crowned with the five persistent linear calyx segments, which on the unripe pods are nearly erect and slightly more than half the length of the pod; the sides are very thin and easily compressed. The pod is very much inflated, (whence the name of the plant,) and is divided lengthwise into two cells by a thin partition; it contains an axial two-lobed,



FIG. 129.

A fruit-pod of *Lobelia inflata*, (slightly enlarged.)

*Bentley & Trimen's illustration of the pod (fig. 6, plate 162, also of the pods on the stem) is inaccurate, as it represents the pod equal at the base, and large at the apex tapering to the base, (club shape,) which is not the case.

comparatively large, spongy placenta, which is densely covered with the numerous minute seeds. The description and illustration of the seeds are given in our description of the drug.

COMMON NAMES.—The drug is now known to the drug trade as Lobelia or Indian Tobacco.

A number of names have been applied to the plant, mostly in old works. The earliest botanists did not use a common name for it. Aiton, (1810,) calls it Bladder Pod, and this name with Inflated Lobelia and Bladder Pod Lobelia, are the natural translations of the specific name, hence, the ones used at first by botanists.

From its taste which resembles tobacco the plant began to be known as Wild Tobacco to the people, and this name was used in Eaton's first Manual of Botany, and carried through all the successive editions. From Wild Tobacco it is quite natural that it should acquire the name Indian Tobacco, as it would be presumed a tobacco that was wild would be used by the Indians. As a matter of fact, however, we have no record that the Indians ever made use of the plant in the manner of a tobacco. Dr. Carver, who spent a greater part of his life among Indian tribes, and, who wrote a list of the various economic plants used by them, does not mention the plant. Indian tobacco began to be applied about 1814, (Biglow,) but did not come into general use, outside of medicine, until adopted in the botanical class books; first, by Beck, 1833; then Wood, 1845, and Gray, 1848. At the present time it is the only common name applied to the plant, either in medicine or botany.

On the introduction of the plant to medicine a new series of common names, denoting its properties were originated.

Thomson and Cutler, who first brought the plant to general attention, called it Emetic weed, and from this name Puke weed, Vomit weed, and Gag root, have been suggested and used.

We find the name Asthma weed applied by a few writers, and in very old works, Eye-bright. In our article on the medical history will be found further remarks in connection with this subject.

BOTANICAL HISTORY.—GENERIC.—The genus *Lobelia* is a very large family of plants, distributed mostly in tropical and sub-tropical countries, and a few found in temperate and even frigid zones.

They are characterized by a uniformity in the structure of the flowers and fruit, but differ widely in general habits, which has given rise to a number of sections, considered distinct genera by various authors.

Plants of this genus have all milky juice, a five-lobed calyx, an irregular two-lipped corolla with the tube slit along the upper side, and five anthers united around the style. To a mere novice in botany, plants of this family can be recognized by the very peculiar split corolla and the united stamens.

The position of the genus in the natural system is obviously near the great family *Compositæ*, and has so been placed in all systems of classification. The genus agrees with the family in the trifid style, the anthers united around the stigma and the adherent ovary; with the tribe *Cichoraceæ* in having milky juice and the corolla split, the segments cohering together in one piece; with the

tribe Mutisiaceæ in having labiate flowers:* it differs in having the flowers not collected in an involucrate head, which at first makes them appear very different, and in the character of the ovary.

The genus *Lobelia* has always been considered a type of a natural order, Lobeliaceæ, established by Jussieu, 1811,† and maintained by Endlicher, De Candolle, and most systematists, including all writers on American botany, even Dr. Gray in his very recent work, 1878.‡ By Bentham and Hooker, however, 1876,§ these plants are included as a tribe Lobelieæ, of the natural order Campanulaceæ and we have followed these authors to give uniformity to our work, theirs being the last general work on plant classification that has been published.||

In old times plants of this genus were described in common with widely different ones under the family name of *Rapunculus*. It was Tournefort, who first clearly defined the genus in 1719,¶ giving it the name *Rapuntium* and as his genus is very natural and most of the species are still retained, it is unfortunate that the name has been replaced. The history of the present name of *Lobelia* is as follows: In 1703 Charles Plumier** in his work on plants of the West Indies,†† dedicated to his friend Matthias de Lobel,‡‡ a genus founded on a plant collected in the West Indies. Linnæus referred this plant to Tournefort's genus, *Rapuntium*, and adopted the name *Lobelia* for the genus, probably because it was the prior name. Afterwards, when his attention was directed to the fact, that under the name *Lobelia*, a large number of plants were included entirely distinct from the original plant described by Plumier, Linnæus deemed it best to retain the name for the plants to which it had become most generally known and to originate a new name for the genus of Plumier.‡‡

*It is a fact, not generally known to our botanists, because their attention is not directed to it by any common native plants, that a large section of the Composite, consisting of over fifty genera of South American and African plants, are chiefly characterized by having bilabiate corollas. We have in our Southern States a single species (*Chaptalia tomentosa*, Vent.) that belongs to this section.

†Memoire sur les Lobeliacées et les Stylidiées, nouvelles familles des plantes, A. L. de Jussieu, *Annals des Sciences Naturelles*, Paris, vol. xviii, 1811.

‡Synoptical Flora of North America, Asa Gray, New York, 1878, vol. ii., part 1, page 2.

Dr. Gray says on this subject: "Too near the Campanulaceæ and nearly passing into them, therefore united by recent authors; but as there are two dozen genera, agreeing in the indefinite inflorescence, irregular corolla and mostly in the syngenesious anthers, it seems best to retain the order."

§Genera Plantarum, Bentham and Hooker, vol. ii., (part 2, 1876,) p. 551.

¶We will state in this connection that we think the family a perfectly natural one, and distinct from the Campanulaceæ. Indeed, any one will have more trouble in finding points of resemblance than points of difference between the two sections.

While we would like to follow all American authority, the Pharmacopœia, all our medical works and our own views in considering the family distinct still, we think it better to adopt the classification of Bentham and Hooker, acknowledging them as the present botanical authority on the classification of the plants of the world.

¶Institutiones Rei Herbarior., J. P. Tournefort, Paris, 1719, p. 163, plate 51.

**See note †, p. 21. Plumier was the first to honor living persons by introducing their name into scientific nomenclature. The plan met with much opposition at first because it was liable to be abused, and names of persons selected, who's scientific labors do not entitle them to this distinction. It has been adopted by many of the most eminent botanists.

††Nova Plantarum Americanarum Genera, P. Carolo Plumier, Paris, 1703, p. 21 and plate 31.

‡‡Matthias de Lobel (Matthias de l'Obel as the name is originally spelled) should be classed among the early English botanists. He was born in 1538 at Lisle in the north of France and was educated at Montpellier in the south of France, and traveled over Italy, France, Germany, finally settling near London. By profession he was a physician, and at one time he was physician to William, Prince of Orange. His chief reputation, however, is as a botanist, this study seeming to occupy most of his time. In 1570 he published at London a small work entitled "*Stirpium Adversaria*" which professed to investigate the botany and materia medica of the ancients, especially of Dioscorides.

A second edition of this work in 1605 contained an addition on new remedies, rare plants, etc., and in this work the first glimpse of a natural system of classification can be seen. It was necessarily very crude and imperfect, and consisted merely in grouping together such plants as seemed to accord in appearances or habits, without however defining the groups, or making any allusion whatever to the system. Some of the groups such as leguminous, grasses, etc., are quite natural and have continued to the present day, others, as could be expected, are very incongruous.

The work was printed in Latin and on this account was little known to the common people.

For the times in which he lived, Lobel was a most learned man in botany and the leader in this science. He styled himself (on one of his title pages) "botanist to king James I.," which has no doubt been the source of the erroneous statement published in several encyclopædias that he was "physician to king James I."

Lobel died in 1616, aged 78 years.

‡‡This genus is *Scaevola*, established by Linnæus, and referred to the natural order Goodenovieæ. The genus has a cleft corolla tube, similar to *Lobelia*, which no doubt led Linnæus to originally place them together, but the

BOTANICAL HISTORY.—SPECIFIC.—The original collector of *Lobelia inflata* is not known, but it was evidently sent to Europe early in the last century. The first authentic mention we can find of it is by Linnæus (1737)* in his catalogue of the plants in the garden of George Clifford,† hence, it was evidently in cultivation at that time. It is probable that Tournefort also refers to this plant, (1719,‡) but we can not say with certainty.

Previous to the appearance of Linnæus's "Species Plantarum" (1753,) the plant was specified by a number of descriptive adjectives.‡ Linnæus named it *Lobelia inflata* from the inflated seed-pods which name it has retained to the present day with the single synonym of *Rapuntium inflatum* given to it by Miller, but used by no one else.

DESCRIPTION OF THE DRUG.—In commerce two products of the plant are found, the entire dried herb and the dried seed. The former only is officinal, but the seed is a distinct article of trade, and very largely used.¶

Lobelia Herb.—As found in commerce this drug consists of the stems, leaves, and inflated capsules of *Lobelia inflata*. Usually the plant is gathered after the lower leaves have changed to brown and often the seeds have fallen from the lower capsules, which are then also brown. The plant is cut off just above the ground and the lower portion of the stem is generally devoid of leaves even in the carefully selected recent drug. Sometimes the plant has been known to appear so abundantly over an old field as to permit of its being mown with a scythe,** then the drug consists of straight, few branched stalks, from six to twenty-four inches long. If culled from moist situations along the banks of streams, the plants are more robust, branched and bushy.

Farmers often gather little lots of lobelia and then the entire plant is sold. Root and herb collectors on the contrary understand that the seed commands a

fruit is very different, being in *Scævola* a fleshy drupe containing a single large seed. Plumier's plate shows quite plainly the nature of the fruit which would exclude his plant from the present genus *Lobelia*.

In thus transferring a generic name from the original species to which it was given, to a family to which it had become attached we find an analagous case in the name *Magnolia*. (See note,† page 21.)

**Lobelia caule erecto brachiato, foliis ovato-lanceolatis obsolete incis, capsulis inflatis.*—Linnæus, Hortus Cliffortianus, 1737, page 500.

It is not stated whether the plant was growing in Clifford's garden at that time, or whether it was merely preserved in his herbarium, as the Hortus Cliffortianus describes both plants of his garden and dried collection.

†George Clifford was a wealthy banker, who resided in Amsterdam in Holland at the time of Linnæus. He was not a close student of natural science, but having a liking in this direction and abundance of means he established an extensive private garden, obtaining the most rare and expensive exotics.

Becoming acquainted with Linnæus, who was at that time in straitened circumstances, and recognizing his talents, Clifford employed him to study and superintend his garden, giving him a liberal salary.

For the first time in his life, Linnæus had now leisure and means to pursue his studies, unembarrassed with the necessity of struggling for a living and the result was the great systematic works that have made his name famous.

For three years Linnæus remained at Amsterdam and published the Hortus Cliffortianus, a magnificent work, enumerating all the plants that were in the garden or collection of his patron. Some idea of the wealth and liberality of George Clifford may be obtained from the fact that this expensive work, of over 500 folio pages and numerous plates, was only distributed gratuitously to his friends and correspondents.

A genus of shrubs, *Cliffortia*, of the Cape of Good Hope, commemorates his name.

‡"*Rapuntium Americanum, Virgæ aureæ foliis, parvo flore subcæruleo.*"—Tournefort, Institutiones Rei Herbariæ, Paris, 1719, p. 163.

§Species Plantarum, 1st edition, 1753, page 931.

¶*Lobelia caule erecto, foliis ovatis subserratis, pedunculo longioribus, capsulis inflata.*—Linnæus, Hortus Upsaliensis, 1748, p. 276.

See also note ° above.

¶The powdered herb was known to Thomsonians as *green lobelia*. The powdered seed as *brown lobelia*.

**Prof. A. J. Howe relates to us an instance in which several tons were cut at one time from an old wheat field about a mile from Worcester, Mass., on the road to New Worcester.

better price than the herb, and they thresh out the seed, break or chop up the stalk, and sell the seed separately. Thus it happens that the larger part of the lobelia herb of commerce is devoid of seeds, and is in a broken condition. As a rule, the leaves and capsules are of a green color, the upper capsules being especially verdant.

No substitution for *Lobelia inflata* herb or adulterant is gathered, of which we are aware, nor is any probable. *Lobelia cardinalis* and *Lobelia syphilitica* are such different appearing plants they would be easily detected, and the other native and more closely allied species are so small and mostly rare that it would not be profitable to collect them.

According to the Pharmacographia the drug used in England is mostly imported packed in ounces.*

Some writers assert that the root of *Lobelia inflata* is employed. This is a mistake, and first made by confusing *Lobelia syphilitica* with this plant. The root of *Lobelia syphilitica* was employed before *Lobelia inflata* was known to medicine, but the root of *Lobelia inflata* has never been used.

All parts of *Lobelia inflata* contain an acrid alkaloid (see Constituents, page 73,) which produces a painful irritation upon inhaling the dust of any portion of the plant. All parts of the herb, and the seed, produce an acrid biting sensation on the tongue, and a sharp tobacco-like impression in the throat and fauces. The milky juice of the green plant is intensely acrid, owing perhaps to the more soluble condition of the alkaloid. This juice is so violent that an amount so small as to refuse to affect a balance sensible to the one-thousandth part of a grain, produces a sharp tingling sensation upon the tip of the tongue. Upon drying, this juice becomes very much modified, but not by the escape of a volatile alkaloid.

The first published description of *Lobelia inflata*† states that the leaves if chewed "produce giddiness and pain of the head, with a trembling agitation of the whole body," and this sentence with little variation has passed through a multitude of works on materia medica.‡ It has not been our experience to note a giddiness of the head, the sensation with us is simply a tobacco-like irritation until nausea, headache and vomiting occur, and this is the report of others, who we know to be familiar with the drug.

Lobelia Seed.—This drug presents a deep brown color in mass. It consists of minute, almost microscopic seed. Their actual size is about 1-60 of an inch in length by 1-240 of an inch in diameter. The typical seed is oblong, rounding at the ends, and cylindrical. Sometimes they are nearly round, however.

*"The herb found in commerce is in the form of rectangular cakes, 1 to 1½ inches thick, consisting of the yellowish green chopped herb, compressed as it would seem while still moist, and afterwards neatly trimmed. The cakes arrive wrapped in paper, sealed up and bearing the label of some American druggist or herb-grower."—Pharmacographia, 1879, p. 399.

†Account of Indigenous Vegetables.—Cutler, 1785.

‡The original description of a drug seems to be authority with many writers who neglect to give proper credit to the real author, and, who seem not to display much personal knowledge of the subject.

The average number of seeds in a capsule is between 450 and 500. It requires 2500 seed to make one grain in weight.* Upon microscopic examination, each seed is shown to be a beautiful object, bright and glistening, the surface being a corrugated ridge-like network, of which figure 131 is a representation.

Lobelia seeds are odorless, but upon handling them a fine dust rises that is very irritating when inhaled. They possess the acidity of the plant in an intensified degree, and were considered by the Thomsonians to possess one-half more strength (emetic) than the powdered leaves.

Lobelia seed have never been officinal, but are in good demand in the American drug market, and, extensively employed by Eclectic physicians who consider that the preparations of the seed are more uniform and reliable than those of the herb. Our experience is to the same effect.

No adulterations or sophistications are known to us, although often fragments of the leaves and capsules are present, not being separated by sifting through fine enough sieves. The commercial term for the drug free from this chaff is "clean lobelia seed."

The corrugated surface of the seed is a characteristic of the species of *Lobelia*, and would serve to individualize them. It would be possible to substitute the seed of other species, *Lobelia syphilitica*, and perhaps *Lobelia cardinalis*. We made a careful comparison under a microscope of the seed of *Lobelia syphilitica* and *Lobelia inflata* and were unable to note any difference either of size or marking.

We are not aware that the substitution is ever made by collectors, but it could be done with profit to them as the *Lobelia syphilitica* produces seed in abundance and is a common plant and easily collected.

Fortunately, however, the plants are so different in all appearances that ignorant collectors have no idea that they are at all similar and the substitution is not suggested to them.

MICROSCOPIC STRUCTURE OF LOBELIA INFLATA.—(Written for this publication by Robt. C. Hefebower, M. D.)—Transverse and longitudinal sections of the stem of the plant show first the epidermis. (See fig. 132, plate xxxv. and fig. 136 following page.) This consists of a single layer of cells, and supports the hairs found upon the surface of the stem. Beneath this layer are several other layers of cells, (*a.* figures 132 and 136,) mostly oval upon transverse, and elongated upon longitudinal section. The cells of this layer are not all closely approximated, but there is a small space existing between some of them, whilst others are intimately joined. The latter is usually the case.



FIG. 131.
Seed of *Lobelia inflata*.
(Magnified.)

*Thus, a pound will contain 17,500,000 seed. The business firm with which the writers are connected, purchased recently in one lot 2000 pounds of lobelia seed. By our calculation this amount contains the enormous number of 35,000,000,000 individual seed.

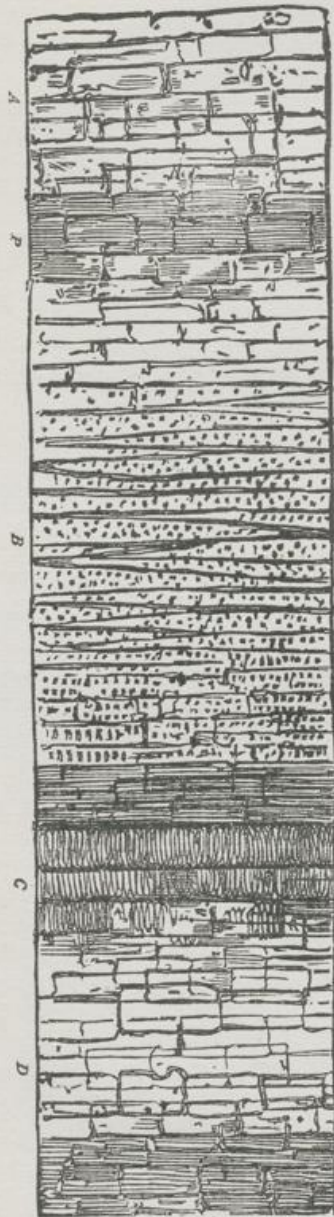


FIG. 136.
Longitudinal section (parallel with diameter) of one side of a stem of *Lobelia inflata*. *a*, epidermis; *b*, parenchyma; *c*, medullary ray of wood; *c*, tracheae; *d*, pith; (magnified 300 diameters.)

Lying to the inner side of these outermost strata is the parenchyma of this portion, (*p*, figures 132 and 136.) It consists of numerous cells, elliptical in outline, arranged in from five to seven layers around the entire stem. In many places these cells appear irregular in form, this irregularity being caused by pressure from adjoining cells.

The woody structure of the plant (*b*, figures 132 and 136) is comparatively thick, and forms distinct medullary rays and interspaces.

Towards the pith, at the center of the stem, are the different vessels of the plant, the lactiferous tubes (*c*, figures 132 and 136) and the tracheae. The structure at this portion is complicated, but the tracheae are easily seen. They consist chiefly of spiral and annular vessels, the markings of which are very beautiful. Some pitting of the cell walls is also present. The lactiferous tubes are of the articulated variety, and by means of branches extending from one longitudinal tube to another, form a reticulated anastomosis.

The pith, (*d*, figures 132 and 136,) situated at the center of the stem, consists of a mass of loosely arranged cellular tissue, formed of numerous elongated cells, which, by transverse section, give an oval, a polygonal or a round outline.

There are also other epidermal structures besides those already mentioned. These are the hairs found upon both the stem and the leaf, the stomata of the leaf and the arrangement of the epidermal cells around such hairs and stomata.

The hairs upon the stem are simple and compound. The simple hairs project directly from the epidermis of the stem, and are unicellular of an elongated conical shape, having a base or attached portion, and an apex or free portion. The compound hairs (see fig. 127, page 63) arise by a single trunk, from which project several branches. These branches resemble the simple hairs.

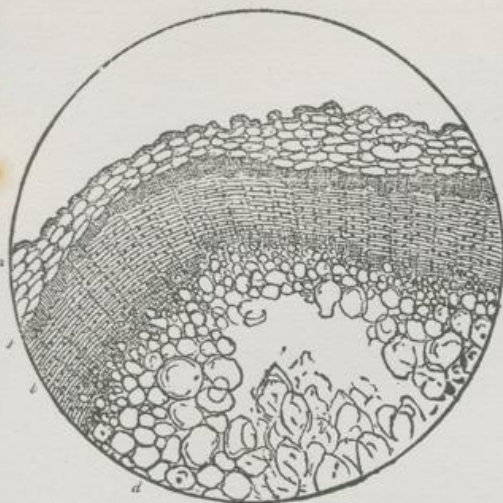


FIG. 132.

Transverse section of the stem of *Lobelia inflata*.—*a*, epidermis; *b*, parenchyma; *c*, woody portion, containing medullary rays; *c*, tracheae and lactiferous tubes; *d*, pith. (Magnified 108 diameters.)

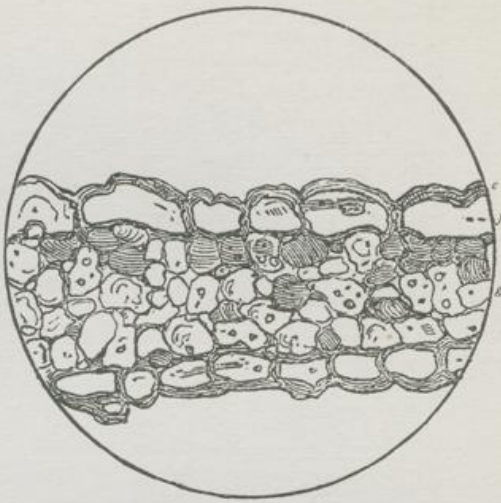


FIG. 135.

Transverse section of a leaf of *Lobelia inflata*.—*c*, cuticle; *f*, epidermal cells; *g*, parenchyma. (Magnified 300 diameters.)

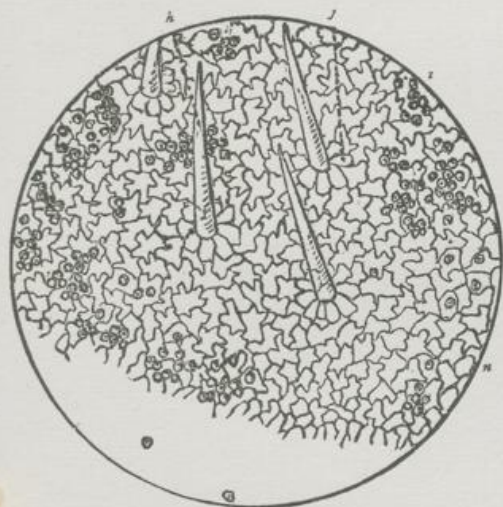


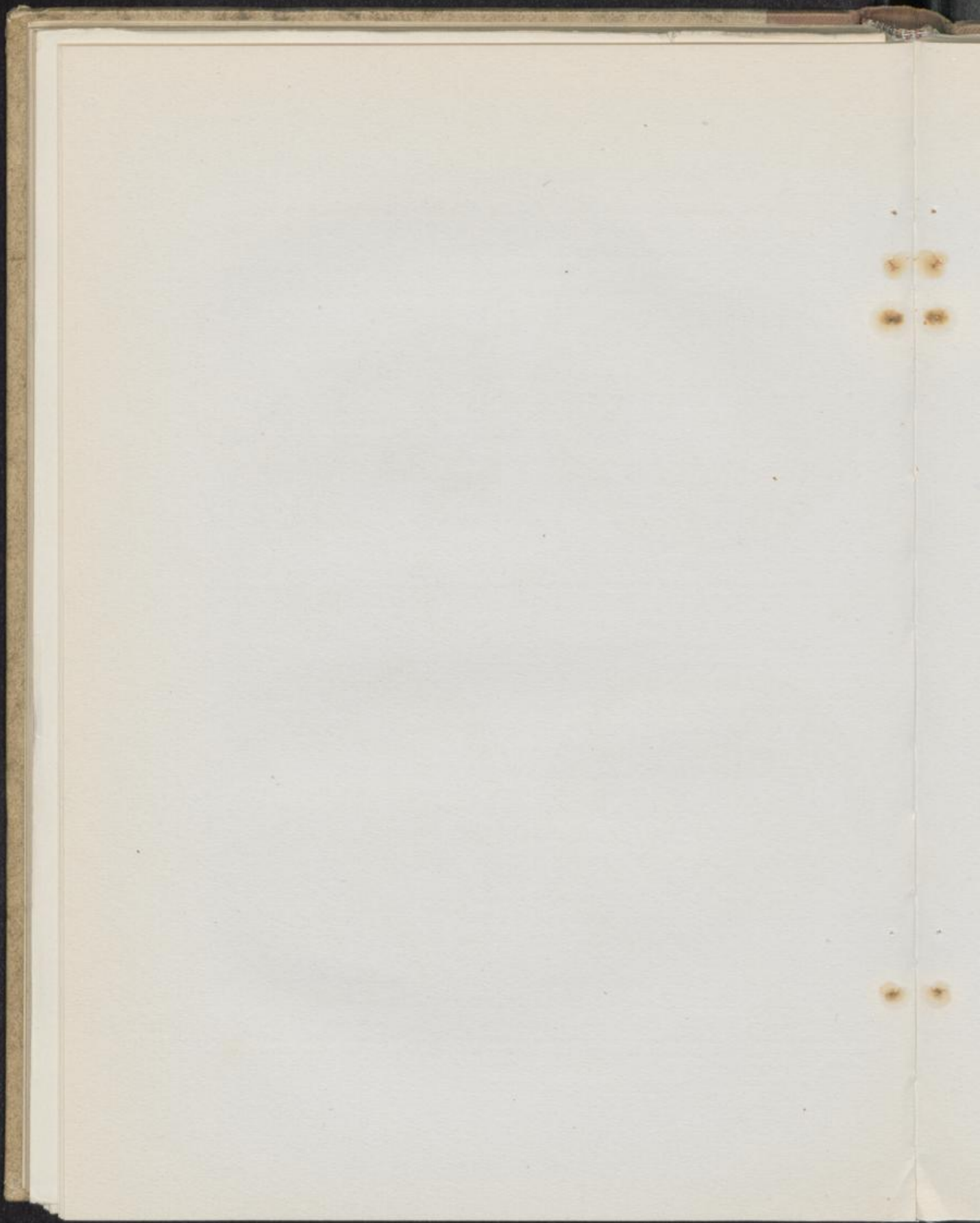
FIG. 133.

Upper surface of a leaf of *Lobelia inflata*.—*h*, unicellular hair; *j*, subsidiary cells at base of hair; *i*, chlorophyll granules; *n*, epidermal cells. (Magnified 108 diameters.)



FIG. 134.

Lower surface of a leaf of *Lobelia inflata*.—*k*, epidermal cells; *s*, stomata; *h*, hair; *j*, subsidiary cells at base of hair. (Magnified 300 diameters.)



The epidermes of both surfaces of the leaf present cells bounded by irregular outlines and hair structures. The cells of the upper surface (see figure 133) are larger, and their walls thicker, than those of the under surface. The same is also true of the hairs of this surface.* The under surface (see fig. 134) presents in connection with the simple epidermal hairs and cells, numerous stomata, (see s. fig. 134.) Each stoma is widely elliptical in shape, and consists of a pore or longitudinal slit, and the guard or stomatal cells which bound the pore. Outside of the guard cells are several epidermal cells surrounding the stoma, the subsidiary cells of the stoma. The base of the hair is likewise surrounded by a similar cluster of cells, the subsidiary cells of the hair.

A transverse section of a leaf of *Lobelia inflata* (see fig. 135) presents the epidermis of each surface beneath the cuticle, and the parenchymatous structure between the two epidermal layers. The cells of the parenchyma are filled to a greater or less extent by chlorophyll granules.

The pollen grains are ovoidal in form and resemble a wheat grain, having a longitudinal slit on one side dividing the grain into lateral halves.

CONSTITUENTS.—*Lobeline*.—The characteristic principle of *Lobelia inflata* is an acrid, irritating alkaloid, that pervades all parts of the plant; most easily obtained from the seed. It is known as lobeline.

It exists in combination with an unimportant vegetable acid. If freed while in contact with other constituents of the plant the alkaloid decomposes in a short time. If heat is applied to an aqueous solution of the natural constituents, this decomposition occurs rapidly and the alkaloid soon disappears.† Heat applied even to an alcoholic tincture accomplishes the rapid destruction of the alkaloid.

In a recent experiment whereby we evaporated in a close still the alcoholic tincture of fifty pounds of *Lobelia* seed, and extracted the residue with acid-



FIG. 137.

Pollen of *Lobelia inflata*, (magnified 650 diameters.)

*The apparent contradiction to this statement of our figures, number 133 and 134, is from the latter being more highly magnified.

†This fact was well known to the Thomsonians. They used but little heat, and throughout their literature we find constant reference to the loss of strength by boiling. Indeed, they wisely preferred to give both the herb and seed *in substance*. Empiricism demonstrated what chemistry supports.

ulated water, having neglected to add the acid to the alcohol, most of the lobeline perished. In another experiment, by an oversight, heat was applied to an aqueous solution of the alkaloid, while it was associated with other constituents of the plant and the alkaloid entirely disappeared.*

History of Lobeline.—Prof. S. Cohoun, 1834,† made the first examination of *Lobelia inflata*. He obtained by means of acidulated alcohol, a colored liquid that he took to be the characteristic principle, which however was simply a crude extract containing a salt of the alkaloid. He described it as follows: "The active principle of this plant is a brown, molasses-like fluid."

Prof. Wm. Procter, jr., 1838,‡ made *Lobelia inflata* the subject of his thesis. This was the first creditable chemical investigation of the plant. By a number of experiments he fairly demonstrated the presence of a volatile oil destitute of acrimony (exp. 4,) an alkaline body, soluble in ether, (exp. 10 and 11,)§ which is capable of forming salts with acids, (exp. 12.)||

Again, 1841,¶ Prof. Procter reconsidered the subject and obtained the alkaloid lobeline as a yellow, oily liquid, but he states, "if the process of purification were repeated, there is little doubt but that the lobeline would be obtained perfectly colorless."

Reinsch, 1843,** obtained a substance that he called *lobeliin*, but which was not a definite body.

W. Bastick, 1851,†† attempted to clear up the *lobeline* record, but was far from being successful, and added little if anything thereto. He obtained Mr. Procter's impure alkaloid by employing Liebig's process for making hyoscyamine.

Mayer, 1865,‡‡ in considering the "Principal Reactions of the Medicinal Volatile Bases" records the action of lobeline, classing it with the volatile alkaloids known at that day. In our opinion lobeline is not a member of the class (volatile) he investigated.

In 1871,§§ Enders extracted lobelia with alcohol and distilled the liquid in presence of charcoal, washed the charcoal with water and extracted it with alcohol which yielded warty tufts, slightly soluble in water, brown, acrid, and uncrystallized. Soluble in chloroform and ether. He gave it the name *Lobelacrin*, but we find it to contain the substance we designate as inflatin and a little of the alkaloid lobeline.

W. D. Richardson, 1872,||| found that upon exposure, lobeline underwent a change whereby it became insoluble in water and refused to form salts, but the nature of the alteration was undecided.

Mr. W. H. D. Lewis, 1878,¶¶ reviewed the literature on the lobeline subject, and suggested a modification of preceding processes, whereby he obtained lobeline of a honey-like consistence and light yellow color, but evidently impure, as it had "a somewhat aromatic odor." He decided that lobeline exists in the plant in combination with lobelic acid, and affixed to this salt the name *lobeliate of lobeline*, but, this substance, (whatever it may be,) had previously been obtained by Procter.

Dr. H. Rosen, 1886,*** obtained lobeline by making a benzin solution from the acrid infusion, and another alkaloid as he thought by after treatment of this liquid with chloroform. He decided

*Here again the Thomsonians learned from experience. They used *acetic acid* to make their most stable preparations.

†Prof. S. Calhoun, M.D., was Professor of Materia Medica in Jefferson Medical College, Philadelphia, at the time he wrote this paper.

‡Am. Journ. Pharm., 1838, p. 98, illustrated.

§He erroneously gives to this a strong odor. The odor was due to impurities.

||In 1840, (Am. Journ. Pharm., p. 280,) Prof. Procter examined *Lobelia cardinalis*, obtaining an impure alkaloid, of a bitter taste. It formed salts with acids.

¶Am. Journ. Pharm., 1841, p. 1.

**Pharmacographia, p. 400.

††Pharmaceutical Journ. and Trans., 1851, p. 270.

‡‡Proceedings of the American Pharmaceutical Association, 1865, p. 211.

§§Pharmaceutischer Central-Blatt, No. 31, July 5, 1843.

|||Inaugural Address, Am. Journ. Pharm., 1872, p. 292.

¶¶Pharm. Journ. and Trans., London, 1878, p. 561. Mr. Lewis was a member of the Pharmacy class of the University of Michigan at the time he wrote the paper.

***An Inaugural Dissertation, University of Dorpat, 1886, communicated to the Am. Journ. Pharm., 1886, p. 392. His paper was on *Lobelia nicotianaefolia*, but he states, "the same two alkaloids were also obtained from *Lobelia inflata*."

that the latter alkaloid presented striated prisms. His investigations were evidently performed with small quantities from which possibly he failed to separate impurities.

Résumé.—Thus it is that, although much time and attention have been given to the lobelia constituents, the result is far from satisfactory. In our opinion, the chemistry of the subject is yet obscure. We have followed the various processes and obtained the acrid alkaloid, amorphous, colorless, intensely active, one drop of its solution immediately vomiting a strong man, but we have not crystallized either the pure alkaloid or a salt of it. We obtained crystals from the impure alkaloid *lobeline*, as others had and for some time accepted that they were the corresponding salts, but further (recent) examinations enabled us to eliminate the crystalline material entirely, leaving the alkaloid as an amorphous product.* That we were for a while deceived is evident, that others may also have been misled is possible. For the present we shall simply call this crystalline substance *inflatin*,† and are led to make this introduction before referring to the preparation of lobeline.

Preparation of Lobeline.—Extract the oil from powdered lobelia seed, by means of benzine, and dry the residue. Then acidulate the dry powder with a mixture of acetic acid one part, alcohol nine parts, and pack firmly in a glass percolator. Exhaust with a menstruum made of acetic acid one part, alcohol twenty parts. Evaporate the liquid, and when cold, add water enough to make a thin syrup, and extract the alkaloid from it by means of ether, adding cautiously ammonia‡ to slight alkaline reaction. The ethereal liquid is then to be decanted, evaporated in presence of water that has been previously acidulated with acetic acid to excess. The watery layer is cooled, separated from overlying oil, filtered, and again extracted with ether to which ammonia is again cautiously added to slight excess. This ethereal liquid will be colorless (if not so repeat the operation) and it contains the alkaloid *lobeline*. It has been supposed to contain *only* the alkaloid, but, in addition there is a volatile oil and inflatin.

If this ethereal solution is evaporated, a colorless glassy layer remains, of a strong odor, and which turns yellow and even brown upon exposure. It is partly soluble in acidulated water,‡ yielding the alkaloid, mixed with various amounts of the associated impurities. It dissolves in alcohol, ether and chloroform, but only incompletely in benzol and carbon disulphide.

If the ethereal solution is evaporated in contact with acids (excepting acetic acid) an amorphous layer usually interspersed with crystalline formations remains. These crystals we formerly took to be *salts of lobeline*, even drawing fig. 138 under the impression that it was a sulphate. If this crystalline layer be extracted with carbon disulphide,§ the crystals disappear¶ and the acrid material remains. If now, the residue (a salt of lobeline) be exposed to the dry atmosphere for a few days, it becomes odorless from escape of the volatile oil. Then, it will dissolve in water, especially if slightly acid, and after filtration can be extracted colorless and as we now believe pure, by sulphuric ether in connection with a slight excess of ammonia.**

Properties of Lobeline.—Lobeline is alkaline in reaction, colorless, odorless, soluble in alcohol, chloroform, ether,†† benzol, carbon disulphide, and somewhat soluble in water. We have not suc-

*We simply state that we were misled. The crystals that we obtained were not of lobeline, but an impurity that intimately accompanies it and crystallizes more easily under the influence of acid liquids. Our crystals compare too, with Procter's description.

†We dislike to affix a name to a body that is so obscure in its classification as this now is. We find also that the various forms of the word *lobelia* is entirely monopolized. Hence, we reluctantly select *inflatin* for want of a better name.

‡Some use magnesia, thinking that ammonia decomposes the alkaloid. Any alkali and heat will do so, but dilute ammonia in presence of ether does not alter it in appreciable amounts. Magnesia does not entirely decompose the salt (acetate) and a free alkali is necessary.

§It does not necessarily follow that because this body was once entirely dissolved in acidulated water, it will completely redissolve after being dried.

¶We think that former investigators failed to brake up this mixture by using ether and alcohol only as solvents. These liquids dissolve the entire associated products, and acid water will also do so to an extent, although pure inflatin is insoluble in water.

¶¶See inflatin, p. 76.

**We make no claim to originality in the method of making lobeline. Our process differs somewhat from others it is true, but, perhaps not materially. The aim is to divest the seeds of their oil, extract the alkaloid in stable condition and eliminate impurities without the application of more chemistry than is necessary.

††Wittstein in his *Organic Constituents of Plants* states that lobeline is insoluble in ether. This is a mistake.

ceeded in crystallizing it. It is not hygroscopic (Wittstein contra.) In pure condition lobeline can be exposed to the air for days, and is probably permanent. We evaporated by exposure, a solution in water rendered strongly alkaline by ammonia,* which changed to yellow, showing some decomposition, but which retained all the sensible properties of the alkaloid, remaining very acrid and being a violent emetic.

Lobeline turns red with sulphuric acid, yellow with nitric acid and dissolves colorless in hydrochloric acid. Heated with sulphuric acid it turns black; with nitric acid evolves the usual vapors of nitric oxide, with formation of a yellow liquid; and hydrochloric acid evaporates from it unchanged.

Salts of lobeline are very soluble in water and those we have examined dissolve in alcohol and ether, but very slightly (excepting the acetate) in carbon disulphide.†

From moderately strong aqueous solutions of the salts of lobeline, alkali precipitates the alkaloid, white, flocculant, amorphous and odorless. This precipitate dries to a glassy layer that will powder white,‡ but this must be cautiously performed as minute amounts of the dust excite violent irritation of the nostrils, air passages and lungs, equal to, if not more intense than veratrine.

All the alkaloidal reagents precipitate lobeline from aqueous solution of its salts.

We have as yet failed to crystallize salts of pure lobeline, but we think that such a positive alkaloid will furnish crystals under proper conditions.§

Lobeline and its salts are among the most powerful of emetics, and extremely small amounts of the solution of the colorless alkaloid, (one drop being placed on the tongue) *immediately* vomited those to whom we administered it. There was no unpleasant after effect (see medical properties.) In the crude condition, as former investigators have obtained it from ethereal solution (even colorless as we made it) decomposition occurs and it rapidly darkens.

Résumé.—The alkaloid lobeline has evidently been impure as heretofore described, and may not be pure as we obtain it. Others state that it is yellow and has an odor; this certainly is erroneous for we produced it colorless and odorless. Others have obtained what was considered crystalline salts; we also formerly thought this easy, but found the crystalline material to be an impurity, to which we can find no previous reference. It has never been analyzed, but, if our present line of manipulation is successful, further remarks will follow, and a combustion made by recognized authority.

Having considered the most prominent constituent of lobelia, we shall now pass to the most characteristic principle which as before stated we have for descriptive purposes designated as inflatin.

Inflatin.—This substance exists ready formed in lobelia herb and seed, and may be extracted together with the fixed oil and chlorophyll by means of carbon disulphide. Since the oil passes with the inflatin through most solvents and holds it in solution when the other solvents are evaporated, it is not feasible to separate inflatin from the extracted oil, although, we have obtained it by saponifying the oil and separating the soap.

Inflatin has certainly been obtained by the investigators who produced crude lobeline, beginning with Prof. Procter, but owing to its intimate association with that alkaloid, and with the volatile oil of the plant, and to its refusal to crystallize while associated in this manner it has been overlooked.]

The glassy layer first obtained in the evaporation of lobeline from the ethereal liquid, if moistened with acid solutions will upon drying assume a partly crystalline condition. This led us

*It is stated that alkalies destroy lobeline at once. This is incorrect.

†This solvent which seems to have been overlooked by others enabled us to purify the crude lobeline as already stated and as further explained under inflatin.

‡This differs from statements of others, who describe it as an oily liquid.

§Sulphate of lobeline is quoted in commerce. We see no reason for presuming that if demanded in quantities it should not be crystallized. We also think that manufacturers who have a demand for the alkaloid should have been able to exclude the crystalline substance that we have found to accompany it.

]Even if it has crystallized, the solvents formerly employed redissolve both it and the associated principles.

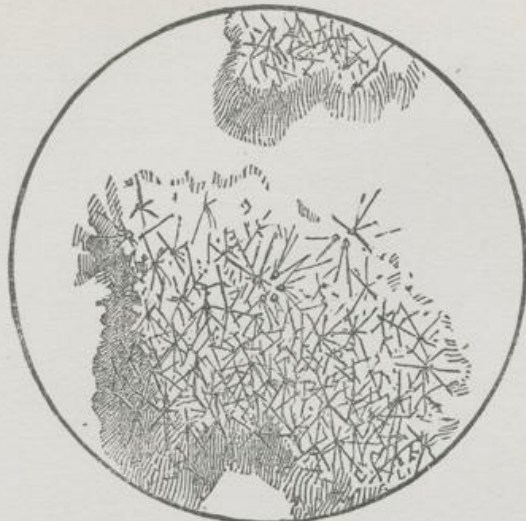


FIG. 138.

Inflatin (at first supposed to be sulphate of lobeline) crystallized from ethereal liquid.

imbedded in a viscid, tenacious, more or less yellow semi-liquid. These globules are *inflatin*, destitute often of crystalline form because of the pressure of the surrounding medium. Occasionally an isolated globule like *a*, fig. 139 will resolve itself into a fragment like *b*, fig. 139, and we have seen these globules under the microscope become crystalline strata without change of shape.



FIG. 139.
Globules of inflatin; *a*, the ordinary crude form; *b*, same, partly crystalline.

Carefully drop carbon disulphide on this layer and decant it at once into a clean glass as soon as it has taken up the globules, which will be before the yellow substance dissolves. As the carbon disulphide evaporates crystalline nodules will form. The crystals do not form as distinct, however, as if the product is redissolved in pure benzol and evaporated.

Thus purified the crystals may appear like figures 140, 141, 142 and 143, dependent on the rapidity of the evaporation and depth of the liquid.

Where the liquid is very thin, we observe a display like figure 140; if deep they will appear like figure 141; if deep enough to permit the typical crystal to form, they will mostly be diamond shaped† as shown in figure 142.

Since we have discovered the characteristics of this material, we have obtained it easily as follows: Abstract the greenish oil from powdered lobelia seed by benzine, stopping the percolation

(see page 75) to conclude that the salt of lobeline had crystallized, and figure 138, as before stated was drawn under the supposition that it was a sulphate of lobeline. These crystals with varying conditions assume different forms, and hence, we were more easily misled when we used the several acids.

Preparation of Inflatin.—Evaporate in thin layers the ethereal solution of crude lobeline (obtained by process on page 75) adding hydrochloric acid to slight excess. To the sticky product before completely dry, add a few drops of carbon disulphide,* and after flowing it about decant the solution into a shallow vessel. Repeat the operation with successive portions of carbon disulphide, and mix the liquids. It is best, if working small amounts, to allow the preceding portion to evaporate each time before adding the other.

The final product will resolve itself in a few hours into small white warty aggregations, perhaps (if very impure)



FIG. 140.

Crystals of inflatin from a thin layer of benzol solution.

*This leaves the hydrochlorate of lobeline.

†The goniometer must be used to determine their exact crystalline form. They appear to us as our artist represents them.



FIG. 141.

Crystals of inflatin from benzol solution.

does not affect it, even the smallest crystals remaining sharp and distinct. Hot sulphuric acid decomposes it with formation of a black liquid.

Cold nitric acid has no action upon it, but develops the forms and angles of a crystalline layer under the microscope in magnificent distinctness, the centers of each crystal being pure white, and the ends jet black as shown by figure 143 *a*, developed from a slide of which 143 *b* is a part without the nitric acid. Upon heating with nitric acid inflatin melts without change of color, and upon evaporation of the acid, and resolution in benzol, crystallizes as before.

Upon boiling inflatin with Fehling's solution it turns brown, then black, but does not reduce the copper and does not dissolve.

Inflatin melts at 225° F., and at a lower temperature cools to a mass of crystalline structure.

Résumé.—From the preliminary examination that we have given this substance, we conclude that it is either a stearoptene or a vegetable wax, probably the former. Perhaps in mechanical suspension it produces the milky juice of the plant, but we did not discover it in time to examine the juice of the herb during its season. It is evidently of no medicinal importance, and, is of interest we think simply because of its association with the other constituents of lobelia.

Volatile Oil of Lobelia.—Lobelianin.—All parts of the herb of fresh lobelia are pervaded by a volatile oil of a strong pungent odor, but with little taste and no acidity. It was described by Procter, (see p. 74,) 1838, who found that the tincture of lobelia, or the herb, distilled with water gave a distillate of a peculiar odor. Pareira, 1840, gave it the name *Lobelianin*, and stated that it had an *acid* taste, but, Procter, 1842, decided that he was mistaken on this point, and, our investigations support Prof. Procter.*

*We made a careful examination, distilling water from quantities of the herb, both fresh and dry, and we used the utmost care to avoid the passing over of spray with the vapor. The product gave simply (from the green herb) a volatile oil that could be separated by sulphuric ether, but it does not accumulate in amount sufficient to separate from the distillate unless the temperature be very low.

when the percolate ceases to pass of a green color, (this abstracts much inflatin also.) Dry the magma and extract it by means of carbon disulphide. Evaporate the carbon disulphide and cool the residue. It will crystallize to a magma of inflatin and a fixed oil. Place on bibulous paper and warm it, the oil is absorbed and the inflatin can be purified by crystallization.

Properties of Inflatin.—Inflatin is pure white and from carbon disulphide tends to form nodules of a crystalline structure or in great crystalline plates. The various modifications of the crystals are shown by figures 140, 141, 142 and 143. The typical crystal is diamond shaped and perfectly transparent.

Inflatin is odorless, tasteless and refuses to unite with acids or alkalis. It is insoluble in water or glycerin, but soluble in carbon disulphide, benzol, chloroform, ether and alcohol in the order we have given. Sulphuric acid



FIG. 142.

Crystal of inflatin, typical form.



FIG. 143.

Crystals of inflatin, *b*, before; *a*, after action of nitric acid.

It slowly evaporates upon exposure to the air and disappears.

Sulphuric and nitric acids dissolve it and upon heating a slide of crystals to which a drop of nitric or sulphuric acids had been respectively added, the nitric acid evaporated without apparent change, while the sulphuric acid blackened and evolved empyrematic vapors. It retains its crystalline form in ammonia water and liquor potassa.

We could not determine if more than one oil is obtained by the act of distillation, but, it is probable that such is the case.

We endeavored to obtain the substance we have called *inflatin*, by oxidation of this oil, but failed, although it is apparent that some constitutional difference exists in the volatile oil of fresh lobelia and that of dry. The oil of fresh lobelia did not crystallize in our hands.

Has Lobelia a Volatile Alkaloid?—

Prof. Procter, 1838,† found that both tincture of lobelia and the herb, with water, upon distillation gave a distillate of a peculiar odor,

†Perhaps this name is inappropriate and should not be applied to a concrete volatile oil. However, it was first given by an authority we all respect and it has precedence.

†American Journal of Pharmacy, 1838, p. 104, experiments 4, 5 and 6.

If a small amount of water be distilled from a large quantity of the dry herb, (Pereira and Procter used the dry,) and the distillate be reduced to about the freezing point of water, it deposits groups of transparent crystals, which do not redissolve when the water is warmed. Upon dissolving them in appropriate solvents (any of the usual solvents for volatile oils) and evaporating the menstruum, this oil crystallizes in large groups of flat, transparent plates that do not often radiate from a common center. They cover the slide and are nearly parallel connected by oblique plates, but not often in stellar groups, (see fig. 144.)

Upon heating crystals of lobelianin* suspended in water it melts at a temperature of 160° F., and if melted on a glass surface it quickly evaporates without residue, evolving the pungency familiar to those who know the recent distillate.



FIG. 144.

Crystals of concrete volatile oil of lobelia, from benzol solution.

but destitute of acrimony. Pereira, 1840,* stated that it had in addition an *acid* taste, which Procter, 1842,† decided was a mistake. Bastick, 1851,‡ states that "lobeline is volatile."

We made a careful examination, distilling water from quantities of the fresh herb. We used the utmost care to avoid the passing of undistilled liquid with the vapor, and failed to obtain either an alkaloid or an acid distillate.§ The product was of strong odor, from it sulphuric ether dissolved the oil, but there was no trace of acidity or of an alkaloid. Then we used dry fresh lobelia in ten pound lots, with water, and with water that was made alkaline with caustic potash. In both cases the distillate was free from acidity and refused to affect any alkaloidal reagent.

We made a solution of pure sulphate of lobeline, rendered it alkaline with caustic potash, and distilled it to one-third. The distillate gave evidence of decomposition products, but no lobeline came over.||

We therefore conclude that lobelia does not contain a volatile alkaloid, and that lobeline is not volatile. There is no reason that we can see to suppose that the alkaloid lobeline is chemically related to the alkaloid nicotine. That they have been associated is probably from the unfortunate name for lobelia, Indian tobacco, and the fact that the plants and alkaloids resemble in taste, and that both are emetic.

LOBELACRIN. (SO CALLED.)—Enders, 1871,¶ obtained a substance that he named *lobelacrin*. It was produced by exhausting lobelia with alcohol, adding charcoal and distilling. The charcoal was washed with water, treated with boiling alcohol, the alcohol evaporated and the residue extracted with chloroform. Upon evaporation of the chloroform "wartlike tufts" of a brown color were obtained. This, Enders named *lobelacrin*. Lewis considered it perhaps a *lobeliate of lobeline*. We consider it a mixture of the oil (fixed) of lobelia, the substance that we have called *infatin*, a brown resin, some lobeline and coloring matter. According to our examination, it is really a mixture of such substances as are extracted from lobelia by alcohol, and having refused to dissolve in water are soluble in chloroform. It will be evident to the reader that this process certainly cannot separate the oils, wax and like bodies. That an organic acid is present is also probable.

Fixed Oil of Lobelia.—Lobelia seed contains thirty per cent. of non-volatile oily matters. The true fixed oil of lobelia is bland and non-acrid. As usually obtained, even by expression, it is acrid from contaminations. Menstruums that dissolve the oil also dissolve the chlorophyll, hence it has a green color as extracted from powdered seed. Pure fixed oil of lobelia has never been used in medicine and would be of little value.

An impure oil is a favorite with Eclectic physicians, who use it alone and associated with other substances. It is a constituent of Compound Stillingia liniment,** an excellent remedy, which in our opinion depends mainly upon this impure oil, which is simply a syrupy extract of lobelia seed, made with stronger alcohol acidulated with acetic acid.

Other Constituents of Lobelia.—There is a characteristic brown resin, coloring matters, and the usual constituents of plants. If the resin in alcoholic solution be precipitated by water even in presence of acid water, it carries with it a large amount of lobeline. This we thought to be a distinct alkaloid, but became assured after purification, that it was simply lobeline.††

COMMERCIAL HISTORY OF LOBELIA.‡‡—Since the day of Thomson, lobelia herb has been an important American drug. Growing abundantly in the Eastern States the first supply came from that section, but collectors in other parts subsequently gave it attention, and in domestic use and otherwise it is now a

*Elements of Materia Medica, vol. ii., 1846, p. 385, (and preceding edition.)

†American Journal of Pharmacy, 1842, p. 4.

‡Phar. Journ. and Trans., 1851, p. 270.

§The herb for these experiments was gathered to order and selected plant by plant. There was no foreign substance present and the lobelia was prime.

||The neck of the retort was plugged near the retort with a strainer of linen to retain the spray. The neck was inclined to throw the condensed liquid back into the retort. Thus only the vapor passed to the condenser. In the large still with the herb, the exit for vapor extended upward 25 feet to the condenser and a spray could not pass over.

¶Pharmacographia, p. 400.

**See unofficinal pharmaceutical preparations of lobelia, to follow.

††Many resins have strong affinities for alkaloids and other constituents of plants. They act somewhat like animal charcoal, carrying them from solution and holding them tenaciously.

‡‡This article should properly follow our description of the drug, p. 67.

drug collected over most of the country in which it abounds. The mountainous part of North Carolina furnishes large amounts.

During its early record when Thomsonism made unexpected demands, and collectors were few, the drug occasionally became scarce, or entirely out of market. Thomson was accustomed to warn his followers of this fact and advise them to secure a supply of "No. 1,"* the first opportunity. He states that in 1807 an offer of one thousand dollars per pound would have failed to procure the drug, and that at another season, two dollars an ounce could not purchase it.† However, at present, it is plentiful and the steady demand is easily supplied.‡

Lobelia seed, however, often becomes exhausted and occasionally out of market. After an unusually dry season it is scarce. Two years ago it could not be collected. This year (1886) the market is glutted. The demand is small, and, few dealers care to procure more than is necessary for use in one year. Besides, the general drug trade consumes but little, the demand being almost exclusively from a limited number of specialists, who as a rule obtain their stocks from the collectors and do not depend upon the dealer in drugs.

The "Herbalists,"§ of England, now regard lobelia with much favor, as is evidenced by their action in consequence of an endeavor, recently made by the Law and Parliament Committee of the Pharmaceutical Society, to have lobelia placed on the "English Poison Schedule."|| They state that they use the herb freely, probably some hundreds of pounds yearly.

PHARMACOPŒIAL HISTORY.—The Pharmacopœia of the Massachusetts Medical Society, 1808, under the name *lobelia*, recognized "the root" of *Lobelia syphilitica*. The first edition of the U. S. Pharmacopœia, 1820, as *lobelia* introduced "the herb" of *Lobelia inflata*, using as a synonym the common name Indian tobacco. This was accepted by the New York, (1830,) and the Philadelphia, (1830) editions. In 1840 the term Indian tobacco was dropped and has not since been recorded, although lobelia has been officinal in each successive revision.

The fact that the Massachusetts Pharmacopœia recognized *the root* of *Lobelia syphilitica*, doubtless aided in perpetuating the mistake of so many medical writers who have stated that the root and top of *Lobelia inflata* is employed in medicine.

Every revision of the U. S. Pharmacopœia has recognized the herb of *Lobelia inflata* as "lobelia" and in no instance has *Lobelia syphilitica* been accepted or the root of any species of *Lobelia* recognized.

*See note † page 85.

†Thomson's Guide and Narrative.

‡Thomson asserts that an abundant crop one season is followed by failure the next. We have also observed this, but, we find that it is often scarce for a series of seasons, owing to climatic influence probably, and occasionally is unusually plentiful.

§In the "Year Book and Transactions of the Society of United Medical Herbalists of Great Britain," 1885, we find 111 members recorded.

||English Poison Schedule, see note § p. 88.

PHARMACOPEIAL PREPARATIONS.—The first (1820) edition of the U. S. Pharmacopœia gave a process for making tincture of lobelia, two ounces of the herb to sixteen fluid ounces of diluted alcohol. This proportion was continued through each succeeding revision to 1880, at which time the strength was made two parts of lobelia to ten parts of tincture.

Acetum Lobeliæ, introduced in 1860, was made two parts of lobelia to diluted acetic acid, enough to produce sixteen fluid ounces, and in 1880 it was changed, one part of lobelia producing ten parts of the finished vinegar.

It will be observed that the strength of the tincture was increased about one-half in 1880, while the strength of the vinegar was decreased nearly forty per cent. We think that they should have been made identical in strength.

In 1880 the fluid extract of lobelia herb was introduced, diluted alcohol being employed in making it after the usual process for fluid extracts.

UNOFFICIAL PHARMACEUTICAL PREPARATIONS.—Scattered throughout medical and pharmaceutical literature we find many formulas for lobelia preparations. These preparations are still in more or less demand, and occasionally in considerable local use. We reproduce them with as little alteration as possible. The uses and doses are as we find them recorded, and in many cases would be considered inordinate at present.

Cataplasma (Poultice) of Lobelia.—Powdered lobelia herb, two ounces; powdered slippery elm, one ounce. Wet with whiskey; apply to rheumatic part.—(Sick Man's Guide, Lukens, p. 115.) This original compound was evidently followed by Prof. King in the following:

Cataplasma of Lobelia.—To equal parts by weight of powdered lobelia and elm bark add a sufficient quantity of weak lye to form a cataplasm. Used for painful swellings, inflammation of the breast, stings of insects, etc.—Am. Disp.

Enema of Lobelia.—Take of compound tincture of lobelia and capsicum, half a fluid drachm; water, half a fluid ounce; mix them together. A relaxant and antispasmodic clyster. Used in convulsions of infants.—Am. Disp.

Aqueous Extract of Lobelia inflata.—Lobelia seed, powdered, eight ounces; diluted alcohol, four pints; acetic acid, one ounce. Mix the acid and diluted alcohol and percolate the lobelia seed. Then evaporate to a soft extract.—(Prof. W. Procter,) American Journal of Pharmacy, 1842, p. 108.

Fluid Extract of Lobelia, Compound.—Blood root, skunk cabbage root, lobelia herb, of each four ounces. Make a fluid extract in the usual manner. An emetic, expectorant and antispasmodic. Used as a substitute for acetated tincture of blood root. Dose, from 10 to 60 minims.—Am. Disp.

Lotion of Lobelia, Compound.—Bayberry bark, lobelia herb, yellow dock, of each two drachms; vinegar, one pint; macerate for seven days and filter. Used for local applications in cutaneous diseases, such as erysipelas, inflammation, etc.—Am. Disp.

Liniment of Lobelia.—Stew the seeds of Lobelia inflata in animal oil. This is used to relax rigid muscles and contracted limbs by rubbing it in the skin.—Western Medical Reformer, 1837, p. 206.

Liniment of Stillingia, Compound.—Oil of stillingia, one fluid ounce; Oil of cajuput, half a fluid ounce; Oil of lobelia, two fluid drachms; alcohol, two fluid ounces; mix them together. Used in chronic asthma, croup, spasmodic diseases of the throat and lungs. Apply to the parts affected and take a few drops internally on a lump of sugar.—(Am. Disp.) The Lobelia we think is the chief constituent.—L.

Lobelia Seed with Sugar.—Powdered lobelia seed, powdered white sugar, of each four parts; rub well together and add one part of nerve powder; two parts of capsicum, and add the mixture to thirty-two parts of number six.—Thomsonian, Materia Medica, 1841, p. 699.

Syrup of Lobelia—Vinegar of Lobelia, six fluid ounces; sugar, twelve troy ounces. Dissolve by heat, skim, add a little acetic acid, and strain.—Prof. W. Procter, American Journal of Pharmacy, 1842, p. 109.

Oxymel of Lobelia.—Add one part of strained honey to two parts of sour tincture; heat to boiling point, skim and bottle.—Kost's Domestic Medicine, p. 309.

Syrup of Lobelia, Compound.—Lobelia, four parts; blood root, two parts; macerate in thirty-two parts of vinegar for one week; strain with pressure. Pleurisy root, four parts; solomon's seal, two parts; cover with boiling water and keep hot one day, adding water to produce thirty-two parts of infusion. Mix the two liquids, bring to a boil and add forty-eight parts of sugar. Relieves cough; efficient in croup; used in all cases where it is desirable to increase secretion from the air passages. An excellent diaphoretic, used in all cases of cold.—Domestic Medicine, (Scudder,) p. 230.

Syrup, Well's Vegetable.—Onions, sixteen parts; Spikenard, eight parts; Horehound, four parts; Lobelia, two parts; Pleurisy, two parts; Skunk Cabbage, two parts; Water, forty parts. Mix, boil, strain; evaporate to eight parts. Add thirty-two parts of honey; sixteen parts vinegar, and sixteen parts gin. Dose, one tablespoonful.—Improved System Botanic Medicine, 1832, p. 386.

Pills of Aloes and Lobelia, Compound.—Extract of boneset, mandrake, ginseng, of each two drachms; aloes, eight drachms; gamboge, castile soap, of each four drachms; capsicum and lobelia seed, of each one drachm; oil of cloves, two minims; make into a pill mass, and divide into four grain pills. Cathartic. Useful in dyspepsia, constipation, jaundice, etc. Dose, from two to four.—Am. Disp.

Pills, Emetic.—Extract of peach leaves, poplar or butternut bark, one ounce; capsicum, one teaspoonful; powdered lobelia seed, half an ounce; nerve powder, two teaspoonful, and a few drops of oil of peppermint. Mix and make into pills.—(Thomsonian, *Materia Medica*, 1841, p. 699.) (Very indefinite.—L.)

Pills of Lobelia.—Lobelia seeds, capsicum, and scullcap, each, equal amounts. Make two grain pills. Dose, one to two, every two hours. Three to five at bed time, with composition tea. Uses: coughs, hoarseness, croup, asthma, etc.—Botanic Physician, (Elisha Smith).

Powder, Expectorant.—Powdered skunk cabbage root, four ounces; powdered unicorn root, two ounces; powdered lobelia seeds, one-half ounce; mix. Dose, half to a teaspoonful.—*Improved System Botanic Medicine*, 1832, p. 385.

Powder of Lobelia, Compound.—Lobelia, six drachms; blood root, and skunk cabbage, of each, three drachms; ipecac, four drachms; capsicum in powder, one drachm; mix them together. Used in all cases where an emetic is indicated. It vomits easily and promptly without causing cramps or excessive prostration. Dose, half a drachm every fifteen minutes in an infusion of boneset, until two drachms have been taken, or the patient vomits.—Am. Disp.

Third Preparation.—One ounce of powdered lobelia seed; one ounce of capsicum; one tablespoonful of nerve powder; mix; add to half a pint of Number Six, (No. 6). This is Thomson's great remedy, known also as Rheumatism drops and Hot drops.

Antispasmodic Tincture.—Tincture lobelia, tincture capsicum, of each, sixteen fluidounces; tincture nerve, twelve fluid ounces. Dose, from half a teaspoonful to a tablespoonful. Used as an antispasmodic, and in large doses as an emetic.—(*Improved System of Botanic Medicine*, Howard, 1832, p. 379.) This is the original formula from which Prof. King devised:

Tincture of Lobelia and Capsicum, Compound. (King's Expectorant).—Lobelia, capsicum and skunk cabbage, of each, two ounces; diluted alcohol, a sufficient quantity to make two pints of tincture by percolation. This tincture is a powerful antispasmodic and relaxant. Used in cramps, spasms, convulsions, tetanus, etc. Dose, half a teaspoonful as the case may require.—Am. Disp.

Tincture Lobelia herb.—Bruise fresh lobelia, press firmly into a jar, cover with alcohol, after a few days strain and press. To each quart add one ounce of essence of sassafras. Used as an emetic, and for external application to wounds, bruises, inflammations, ulcers, eruptions, etc. Dose, one to ten teaspoonfuls.—(*Improved System Botanic Medicine*, 1832, p. 384.) The original tincture of lobelia. Dose, now heroic.

Tincture Lobelia seeds.—Digest four and one-half ounces of powdered lobelia seed in a pint of alcohol.—*Improved System Botanic Medicine*, Howard, 1832, p. 379.

Tincture of Lobelia, Compound. (King's Expectorant).—Lobelia, blood root, skunk cabbage, wild ginger and pleurisy root, each in moderately fine powder one part; water, sixteen parts; alcohol, forty-eight parts; make a tincture in the usual manner. An excellent remedy for children and infants. Used as an expectorant, as a nauseant in coughs, asthma and where expectorants are indicated.—Am. Disp.

Tincture of Lobelia, Ethereal.—Lobelia herb, five ounces; spirits of sulphuric ether, two pints. Make a tincture by percolation.—*Edinburgh Dispensatory*, 1848.

Tincture of Lobelia and Hydrastis.—Hydrastis, lobelia seed, of each, two parts; diluted alcohol, sixteen parts. Make a tincture by percolation. A valuable local application.—Am. Disp.

Tincture of Sanguinaria, Compound.—Blood root, lobelia, skunk cabbage, of each, two parts; distilled vinegar, thirty-two parts; alcohol, two parts. Make two pints of tincture by percolation. Used as an emetic and expectorant. Dose, twenty to sixty drops.—Am. Disp.

Tincture of Viburnum Opulus, Compound.—Lobelia seed, skunk cabbage, stramonium seed, capsicum, blood root, of each, one part; diluted alcohol, one hundred and twenty-eight parts. Make a tincture by percolation. Stimulant and antispasmodic. Used in asthma, hysterics and nervous diseases. Dose, twenty to sixty drops.—Am. Disp.

Well's Cough Drops.—Tincture lobelia, one ounce; anodyne drops, two ounces; antispasmodic tincture, one ounce. Dose, half to a teaspoonful.—*Improved System Botanic Medicine*, 1832, p. 382.

Sour (Acid) Tincture of Lobelia.—Made the same as the ordinary tincture, vinegar being used instead of the alcoholic menstruum.—(Kost's Domestic Medicine, p. 309.) This is the original of the official Vinegar of Lobelia.

MEDICAL HISTORY.—Several annoying features in connection with the history of this plant are considered by us, and an endeavor is made to study them in chronological order.

The first printed record of the emetic properties is by Rev. Manasseh Cutler,* who named it emetic weed.

*Account of Indigenous Vegetables.—Am. Acad. Sciences, 1785, p. 484.

Manasseh Cutler, LL.D., was born in Killingly, Conn., May 3, 1742. First he engaged in the whaling business, then in merchandise in Edgertown; studied law and was admitted to the bar in 1767; removed to Dedham, studied theology, was licensed in 1770 and ordained minister of Hamilton, September, 1771. He became chaplain of Col. Francis' regiment, September, 1776, fought in the action in Rhode Island, and for his bravery received a present of a

Schoepf, 1787,* next incorrectly ascribed astringent properties to *Lobelia inflata* and stated that it was used in ophthalmia. He had confused the two species and affixed the properties of *Lobelia inflata* to *Lobelia syphilitica*.

Then came Samuel Thomson,† who introduced the plant into medicine

fine horse. He also studied medicine and other branches of science. He became a member of the American Academy in 1781, contributing a series of scientific papers to its memoirs in 1785; his botanical paper being the first attempt at a scientific description of the plants of New England. In this paper we have the reference to the emetic properties of lobelia, which is the first printed notice of the nature of the plant, but he did not use it in medicine.

With Dr. Beck he prepared the chapter on trees in Belknap's history of New Hampshire, became a member of the Philosophical Society of Philadelphia, 1784; as agent for the Ohio Company he purchased 1,500,000 acres of land, northwest of the Ohio river, 1787, and started the first emigrants to that section, who settled at Marietta, Ohio, April 7, 1788. He accompanied them in a sulky, returning to New England in 1790. Gen. Washington appointed him Judge of the Supreme Court of Ohio Territory, 1795, which honor he declined. He was member of Congress from 1800 to 1804.

In the prosecution of Samuel Thomson, 1809, Cutler was called as an expert to identify the remedies Thomson used. It was about this time that he (Cutler) became interested in the use of lobelia as a remedy for asthma, (see Thacher's Dispensatory, 1820,) and there is reason to believe that his attention was drawn to it by Thomson and his followers, as before this Thomson had used the herb in that disease and his followers were numerous throughout all of New England. Cutler died in Hamilton, Mass., July 28, 1823.

*Materia Medica Americana, 1787, p. 128.

†Samuel Thomson was born in the town of Alstead, State of New Hampshire, February 9, 1769. His early life was spent in hard labor upon a farm, and his education was limited. He commenced medical experiments when about ten years of age by vomiting his playmates with lobelia, and afterward became as is known, the champion of this herb. He married Susanna Allen, of Surrey, New Hampshire, July 7, 1790. His medical investigations commenced in the treatment of his own family, and then he began to gather roots, herbs and barks and to practice empirically in the families of his neighbors. That he also studied the medical literature of his day is evident from his publications, although he delighted in believing himself entirely independent, and was very caustic and aggressive towards the Regular Medical Profession.

In due course of time, Thomson became known outside his immediate neighborhood. Thus, in 1805, he made a professional trip to Richmond, in 1806 was called to New York City to use his "treatment" on Yellow Fever, and in 1807 to Vermont. After this he traveled considerably over the New England States, and eventually through the West in the practice of his peculiar theory.

During these trips his combative nature led him continually into heated arrangements of members of the Regular Medical Profession, who bitterly denounced his treatment, resulting finally in an open charge of murder against him in 1808, for "sweating (see note ², p. 85) two children to death," and again, in 1809 for killing a certain Captain Trickey, who Thomson declared that he had not treated at all. Finally, in 1809, a Dr. French, between whom and Thomson there had long existed an intense animosity, preferred charges, and Thomson was arrested for the wilful murder of a young man named Lovel, who had died under his attention. Dr. French charged that he "did kill and murder the said Lovel with lobelia, a deadly poison."

Thomson was thrown into prison at Newburyport, Massachusetts, November 10, 1809, where he remained suffering the severe cold of that country without fire or comfort until December 10th, when he was taken to Salem, Mass., for trial, his friends having succeeded in inducing Judge Theophilus Parsons to hold a special session of the court. However, owing to sickness of the Judge, his trial did not occur until December 20th. The prosecution seemed to base their charges on the fact that the powder given Lovel was lobelia, a Dr. Howe testifying to that effect. The defense showed, however, that Howe was not acquainted with lobelia, and also that the powder Drs. Howe and French thought to be lobelia was marsh rosemary root. (Thomson asserts that this was what he administered). Finally the court acquitted Thomson, without, as he claims, an examination of his witnesses. However, Tyng's Reports, vol. vi., states that on the claim of ignorance only did the Judge instruct the jury to acquit Thomson, and our view of the treatment as shown by the report is to the effect that both lobelia and the marsh rosemary were administered.

This was the memorable "Trial of Thomson," but it did not end the assaults of his adversaries. Thomson entered suit for damages against Dr. French, March, 1810, and failed in his prosecution, losing much time and more than six hundred dollars of costs.

In 1811 a doctor in Eastport, Me., while Thomson was passing his office door, tried to kill him with a scythe, and it seems that even Thomson now became discouraged, for he writes: "I found I had enemies on every hand, and was in danger of falling by some of them. Everything seemed to conspire against me."

In March, 1813, he obtained a patent to protect on his system of medicine, known thereafter as "Thomson's Patent."

We find that although Thomson was very bitter regarding the Regular Profession generally, he spoke in the highest terms of Drs. Rush and W. P. C. Barton, of Philadelphia, with whom he had several interviews.

Dr. Thomson died in Boston, Mass., 1843, after a tedious application of his own medicine, known as Thomson's Course, (see note ¹ p. 85).

We have consumed considerable space in recording the principal points in the life of an exceedingly, energetic

about 1793 under a peculiar system of practice or theory,* in which he used classes† of crude drugs in a system of courses,‡ lobelia being the first class and

and zealous man, who boasted of his illiteracy, never attended a college, or received a lecture in medicine, but who created a lasting excitement in the medical world of America, and who still has many earnest followers under the name Thomsonians, although his methods of treatment are very much modified.

His life was marred by sufferings and quarrels. He was in a constant turmoil and fearlessly attacked his opponents, however high their positions. Defeat did not dishearten him, success nerved him to greater aggressions. Enemies arose within his camp towards his latter days and he met them as fearlessly as he did the "Regulars." We cannot, but admire the tenacity with which he adhered to his views and practice. If he had been permitted to receive a thorough education, and had been led to systematize his labors, his indomitable spirit and tenacity of purpose would have doubtless made him conspicuous among the pioneers of America, either within the medical profession or otherwise. It will yet be our duty to review Thomson's Theory in the practice of which it was claimed (1834) that thirty thousand persons were enrolled. They were then generally known as "Lobelia Doctors" "Heaters," "Steamers," and "Sweaters."

*Samuel Thomson believed, "that all diseases are the effect of one general cause and may be removed by one general remedy, is the foundation upon which I have erected my fabric." This is a positive statement, showing the views he held of the various disease expressions. The reader must not however, infer (as antagonists to Thomson misstated) that by the term "one general medicine" he meant a single drug. Upon the contrary, he used many drugs and he states, "all diseases might be cured by one general remedy or principle, applied in a great many forms as medicine."

Origin of Disease.—"I found that all diseases to which the human family were subject, were, however various the symptoms and different the names by which they were called, produced directly from obstructed perspiration."

Cause of Obstructed Perspiration.—"If there is a natural heat, there must be a natural perspiration." Obstructed perspiration "is always produced by cold or the absence of a suitable degree of natural vitality."

Heat is Life.—Arguing from the foregoing, Thomson announced the axiom that has since become attached to his followers: "Heat is life and cold is death." He did not perhaps mean this in a literal sense, but, he believed that a low temperature (cold) caused disease, and that fever a friend was an effect of cold. "The cold causes an obstruction and fever arises to remove it." This view is not peculiar. Perhaps, the religious of the Sun worshippers may be considered about the same. "Coffinism" of England was similar.

Canker.—In all Thomsonian works the name is conspicuous. Dr. Thomson believed that a "white feverish coat" was caused by cold and attached itself to the mucous membranes of the stomach and bowels. This he called canker. "Canker and putrefaction are caused by cold. If this growth of canker is not checked and removed, it will communicate with the blood, when death will end the contest between heat and cold." Dysentery is caused by canker in the bowels. The piles is canker below the reach of medicine in the usual way. What is called bearing down pains in women is from the same cause.

Object of Medication.—According to Thomson should be to produce a great internal and external heat to prevent the formation of canker and throw it to the stomach, and then to remove it from the stomach by emetics. Astringent in Thomson's opinion, combined with this secretion (bayberry and other like bodies); stimulants promote perspiration (capsicum, steam, etc.); emetics remove the canker from the stomach.

‡Thomson arranged his remedies into classes and numbered them, often individualizing a drug by making it the conspicuous member of a class. Thus, Emetics made Class No. 1, and lobelia being his great emetic was simply called "No. 1." He would say, "then administer No. 1."

The classes were as follows:—Class No. 1, "Emetics, to cleanse the stomach, remove obstructions and promote perspiration," lobelia being typical.—Class No. 2, "Stimulants, to raise and retain the vital heat of the body, and promote free perspiration," capsicum being typical.—Class No. 3, "Astringents, to scour the stomach and bowels and remove the canker," bayberry and composition being typical.—Class No. 4, "Bitters, to restore digestion, and correct the morbid secretions of the blood and bile," hydrastis, populus, etc., being typical.—Class No. 5, "Restorative Tonic, compounded to correct digestion, and strengthen the stomach and bowels," wild cherry being typical.—Class No. 6, "Antiseptics, to give tone to the stomach and bowels, and prevent mortification," myrrh and a compound tincture of myrrh being his favorite. The familiar No. 6 of the present day, is modified from Thomson's formula.

The enemies of Thomson have asserted that he first administered No. 1, if that failed, used No. 2, and so on until through with the list if the patient still lived.

‡The following condensed accounts of the system of Thomson's Courses is taken from the American Vegetable Practice, by Mattson. In Thomson's works the directions are not so explicit as herein given, as it seems that he depended to an extent upon the personal instruction of himself or his agents.

Thomson's Course of Medicines.—1st. Give the patient a teacupful of hot bayberry tea, (No. 3,) then an injection of a cup and a half of an infusion of bayberry and a teaspoonful of lobelia. Sometimes the lobelia of this injecting fluid is increased and a teaspoonful of capsicum added.

2nd. When the injection has operated, a steam bath is to be applied to the patient and a second teacupful of bayberry tea. If he does not perspire freely, in ten minutes, give a third teacupful of tea, and add to this last a teaspoonful of capsicum. In about twenty minutes, remove the patient from the bath, and, into a warm bed (sometimes a cup of ice water was dashed over the person upon removal of sweat bath) with a hot stone to his feet.

his principal remedy. He met the opposition of most Regular physicians, who bitterly decried the indiscriminate use he made of drugs, and he eventually was arrested (1809) and tried for killing a patient with lobelia. This trial brought lobelia before the public, and from that time to the present, lobelia has been in more or less demand and has come into use by all schools of medicine. Accounts of its uses and accepted medical properties in the different schools have been written for this work by authorities of these schools.

In studying the history of the introduction of lobelia into medicine the following questions have at various times arisen and attracted more or less attention and discussion by our medical writers.

1st. *Did the North American Indians use Lobelia inflata?*—In our next article on Lobelia syphilitica it will be seen that Sir William Johnson, preceding 1800, bought a cure for syphilis from the Indians, which turned out to be the root of Lobelia syphilitica. It is asserted in most medical works that the American Indians used Lobelia inflata, but this assertion is not supported by the testimony of any writer we can find who was acquainted with the medicines employed by the Indians, and the pioneer travelers of America (Shoepf excepted, see p. 84,) failed to refer to the plant. We, therefore, conclude that these writers have confused the Lobelia syphilitica of Johnson with Lobelia inflata.

Carver, who spent many years of his life among the Indians, and described the plants, trees and medicines of the tribes among whom he traveled, does not mention it.

Lewis and Clark speak of the use of the vapor bath, but do not mention that Lobelia inflata was used by the Indians of the Upper Missouri. Speaking of syphilis among the Indians they say:* "When once a patient is seized, the disorder ends with his life only." They state of the Chippewa Indians, (p. 136,) that, "their specifics are the root of the lobelia and that of a species of sumach." It is evident that this is not from observation, as the Chippewas, (also known as the Ojibwas,) were not the Western Indians. They embraced many formidable tribes about the great lakes. Into their country Sir William Johnson extended his treaties, and his statement regarding Lobelia syphilitica, is evidently the source of the statements by Lewis and Clark.

The book of the Indians, 1837,† gives no instance of its use by the Indians, or of any other emetic.

The paper on "Indian Medicine,"‡ by Browne, does not refer to any substance that can be identical with lobelia.

Major Long, 1819, in his account of the medicines and practice of the Indians of the West, evidently knew nothing of Lobelia inflata.

Professor Nuttall informed Dr. Mattson that in his excursions among the Indians he had never known them to use Lobelia inflata.

3rd. Add a heaping teaspoonful of powdered lobelia herb to a cupful of the capsicum and bayberry tea, give at one dose, or, infuse five teaspoonfuls of lobelia in a cup and a half of hot water and take in three doses even if each dose vomits.

4th. After the vomiting ceases, a second steaming is administered, giving the patient a cup of hot ginger or composition tea while in the bath. Then if the patient "has sufficient strength" he may dress, and if not he must be put into a warm bed. This concludes the "course."

5th. Bitters and tonics are then administered. If the malady is not cured the course must be repeated. "Miss B—, of Lynn, Mass., took twenty-seven courses for a malignant disease of the stomach." "I knew a gentleman with dropsy to whom a course was administered once a week for nine months," etc.

This severe method of treatment gave rise to the dogeral once applied to Thomsonians:—

"I puke, I purge, I sweat 'em,
And if they die, I let 'em."

*The Expedition to the Sources of the Missouri, Lewis & Clarke, vol. ii., pp. 135 and 136.

†Book of the Indians, Boston, S. G. Drake, 1837. A very interesting and unique publication.—L.

‡Indian Medicine, J. M. Browne, in Indian Miscellany, p. 74. (Edited by W. W. Beach, 1877).

The interesting narratives in "Indian Captivities," contain no record of *Lobelia inflata*, although rich in the experiences of persons, who passed many years among the Indian tribes east of the Mississippi.

Samuel Stearns, M.D., 1772, in his American Herbal, mentions other species of lobelia, but not *Lobelia inflata*, and he makes no reference to the Indians using an emetic. Dr. Stearns was a native of Massachusetts and traveled among the Indians of that State with intent to study their remedies, and would not have omitted this plant if it had come under his observation. Neither Schoepf, Barton, nor Rafinesque mentions *Lobelia inflata* as an Indian remedy from personal experience, and none of these authors would have neglected it, if aware of its being in use.

Catlin,* in his explicit descriptions of Indian customs omits it.

However, Mattson, 1841,† states that, "There is abundant traditional evidence that it was used by the Penobscot Indians long before the time of Dr. Samuel Thomson, its reputed discoverer, but with the exception of that tribe, I have not been able to discover by any researches I have made, that the American aborigines had any knowledge of its properties or virtues."‡ Mattson, however, neglects to give any positive testimony, or refer to any authority.

Dr. G. A. Stockwell, in a very recent article§ omits it, and thus helps to confirm the fact that lobelia was not used by the Indians.

Therefore, from authorities quoted, and numbers of other works searched without avail, we conclude that the evidence is altogether against the reiterated assertion that *Lobelia inflata* is a drug handed down to us from the American Indians. We cannot find proof of a single instance where it was employed by them. If the Penobscot Indians used the plant, as Dr. Mattson believed, (from tradition) it is possible that the adjacent settlers learned of its properties from them, but we would more rationally accept that the early use of *Lobelia inflata* in domestic medicine was an accidental discovery of the whites. Those were days of heroic remedies; bleeding, emetics and blisters were the methods of treatment, and it is not to be presumed that so remarkable and common an emetic as lobelia could remain unknown. That Thomson and Cutler learned of its emetic properties by independent personal experience is undeniable we think, Thomson especially insisting that he stumbled upon it.

It is a common belief with some persons that the Indians used the lobelia in connection with their "Sweat Baths" to clear their minds, and remove their ailments, but our endeavors to find the authority for such statements have resulted in failure. The "Medicine Men," it is true, pretended sometimes to vomit bones, by which the future was foretold, but, this if not a deception had no connection with the medical uses of lobelia, and there is no evidence at our command to support the supposition that the whites learned of its properties from the Indians, or that the Indians used it in medicine.

2nd. *Did Samuel Thomson discover the Properties of Lobelia indepently of others?*—Thomson asserts that,|| sometime in early life (1773) I discovered a plant which had a singular branch and pods. The taste and operation produced were so remarkable that I never forgot it. I afterwards used to induce other boys to chew it, merely for sport to see them vomit. I tried this herb in this way for nearly twenty years without knowing anything of its medical virtues. This plant is what I have called the *emetic herb*.¶

*Manners, Customs and Condition of the North American Indians, Catlin, vol. i., p. 186.

†Mattson's American Vegetable Practice.

‡Thomson believed that the reference to the use of lobelia by the Indians was an intentional mistatement in order to rob him of the discovery, he writes:

"It is said by Thacher, that it was employed by the aborigines, and by those who deal in Indian remedies; and others, who are attempting to rob me of my discovery, affect to believe the same thing; but this is founded altogether upon conjecture, for they cannot produce a single instance of its having been employed as medicine, until I made use of it. The fact is, it was a new article, wholly unknown to the medical faculty, till I introduced it into use; and the best evidence of this is, that they are now ignorant of its powers, and all the knowledge they have of it has been obtained from my practice.—Thomson's "New Guide to Health," 1822, p. 53.

§Popular Science Monthly, "Indian Medicine," G. A. Stockwell, M.D., Sept., 1886, p. 649.

||New Guide to Health, p. 16.

¶Ibid, p. 27. We must not forget that this was written after the trial of Thomson, and then it seems, there was an intense feeling between Thomson and Cutler.

Thus it seems that Thomson understood the emetic nature of *Lobelia inflata* before 1793, but, he asserts that, "I tried this herb in this way for nearly twenty years without knowing anything of its medical virtues." He further admits this by saying, "It had never occurred to me that it was of any value in medicine until about this time (1793). I have since found by twenty years' experience in which time, I have made use of it in every disease I have met with, to great advantage, that it is a discovery of the greatest importance."

Thus Thomson admits that he knew nothing of the use of lobelia in medicine preceding 1793, and the first record we have of his making use of it in asthma is in 1807, to wit: "In the fall of 1807, I introduced lobelia, tinctured in spirit, as a remedy in asthma."

Mattson, 1841,* states however, that "it was used as a remedy by many people in New England, long before his (Thomson's) time." He recounts as follows:†

"Mr. Phillip Owen, now eighty years old, relates that when a boy he was sent into the field by his mother to collect some lobelia for a child, sick with the quinsy, and that the herb, administered in the usual manner, afforded speedy and entire relief." This would show a use of it at about 1770.

"Mr. William Coburn, who also reached his eightieth year, says that lobelia has been used as a medicine in the state of Maine, both by the people, and the Penobscot Indians, ever since he can remember, which is a period of not less than seventy years." This also carries us back to 1770.

Dr. John A. Hyde, of Freeport, Maine, a very old physician states that, the people in that vicinity were in the habit of using lobelia under the name colic weed, when he first settled in the town, which was about fifty years ago. He says they employed it in various complaints, but particularly in colic, and considered it perfectly safe and harmless." This carries the use back to 1790, and antedates Thomson again.

Dr. E. Harlow, of New Lebanon, Conn., writes under date of May 15, 1835, to a gentleman in Boston: "I commenced the vegetable or botanic practice of medicine about 1796, under the instruction of Dr. Root, of Canaan, Conn., who was esteemed as an able botanic physician. He made use of lobelia under the name Indian tobacco, and taught me the use of it; and from that period to the present, I have continued to employ it in my practice. I may also state that Dr. Forbes, of Lebanon, used it when I was a boy, and from that circumstance it received the name of "Forbes weed." And lastly, "Doctress Charity Shaw Long, of Albany, N. Y., secured a patent for the use of *Lobelia inflata*, in 1812, which was one year in advance of Thomson's patent."

Thus from evidence that is entitled to credence it seems that lobelia was somewhat known as a domestic medicine, when Thomson was one year old, and there is little doubt that its use in household practice long antedated any positive information that can be found in print at this late day. Nevertheless, Thomson introduced it to medicine, and none will dispute that Samuel Thomson made lobelia a familiar name to hundreds of thousands of Americans; that he made it notorious none can deny. Whether the domestic uses of lobelia (by a few persons) could have served to give Thomson a start with his "Practice" is a question of little moment. He distinctly asserts that such was not the case, and that he discovered and introduced lobelia independently of all others. In our opinion his statement is entitled to credence. He was intensely enthusiastic on the lobelia subject, and when writers on medicine ignored his claims, to give credit to Cutler and Drury, he considered it an act of injustice, and he expresses himself on the subject as follows: "They cannot produce a single instance of its having been employed as a medicine till I made use of it."

This tendency to neglect him, and, as he believed to persecute him for opinions sake, finally induced Thomson to seek Government protection, both for legal and monetary considerations, resulting in "Thomson's Patent."

Is Lobelia a Poison?—A recent endeavor has been made in England to place lobelia on the "Poison Schedule",‡ and in studying the record we find that in several instances legal steps have

*The American Vegetable Practice, Mattson, vol. i.

†Mattson and Thomson were at first friends, but afterward were enemies. It seems to us that Mattson makes it a point to show that Thomson was not first to use lobelia.

‡Thomson's Mat. Med. and Anat., 13th edition, p. 585.

§English Poison Schedule, (1868). This is an English law, designed to protect the public against intentional and accidental poisoning. Among the omissions are such energetic bodies as sulphuric, nitric and hydrochloric acids,

been taken to punish persons, who, it was claimed had destroyed life by the injudicious use of this drug. The trials of Dr. Thomson* and Dr. Frost† have attracted the most attention.

In reviewing the cases we find few convictions resulted, and, even then the sentences were light. It seems to us that the prosecution failed because as a rule the evidence did not show that lobelia was really a poison. The members of the Regular Medical Profession were usually the aggressors and seemed anxious to convict, but evidently had at that time but little personal acquaintance with the drug. Their statements in court were usually based upon the papers in Thacher's and Cox's Dispensatories, whereas, the Thomsonians would produce abundance of testimony to show that lobelia in immense doses, far beyond the amounts named as poisonous by the prosecution was continually taken without fatal effects. They would bring as witnesses those who had taken the drug, and they evidently impressed the court with the fact that the Thomsonians were more familiar with lobelia, than were the members of the Regular Medical Profession.

There was another factor in this case, that we cannot underestimate. The cry of oppression and persecutions was raised and the sympathies of many people enlisted in behalf of the Thomsonians from this stand. The Thomsonians of that day were not altogether uneducated as some now suppose. Upon the contrary, we find that many highly cultivated persons adopted their methods and bought the "right." Prof. Benj. Watterhouse, (Professor of Theory and Practice of Medicine in Harvard,) was zealous, also Prof. Tully, of Yale, and throughout New England Thomson numbered his followers by thousands, from among the best informed families. Thus it is, that Thomsonism did not meet the popular disfavor that it held with the Medical profession. To sum up we may be pardoned for observing,

We believe that lobelia is not an active poison, but that injudicious use might result fatally, as is true of other moderately energetic remedies. No doubt more fatal effects would result from its use if it were not so violently emetic that the effect of a poisonous dose of the drug is first to expel it from the stomach.

The physiological investigations of Prof. Roberts Bartholow following, show conclusively that the alkaloid lobeline is poisonous and will produce death in animals.

THE ACTIONS AND USES OF HYDROBROMATE OF LOBELINE.—(Written for this publication by Prof. Roberts Bartholow, M. D., LL. D., Professor of Materia Medica, General Therapeutics and Hygiene, in the Jefferson Medical College, of Philadelphia.)—*Preliminary*.—This research consists, for the most part, of my own experiments and observations. Facts obtained from other sources have been adopted when my own experiences were in harmony with them. The preparations used were furnished me by Prof. J. U. Lloyd, whose name is a

(the English Journals often give records of death by them). We presume that the commerce of that country would render it useless to attempt to control these substances. Ergot and oil of savin are listed, and it seems that to these should be added oil of cedar, oil of tansy, oil of pennyroyal, and perhaps gossypium bark, if the unborn are to be considered. Oxalic acid is named, but binosalate of potassium (a common drug here) omitted. These and other features seem to us to indicate that the list should be revised, and certainly twenty years in our country would demand a revision.

In the recent excitement in England over a death after taking lobelia, many writers urged that lobelia be placed on the poison schedule. In our opinion, this could not be consistently accomplished without adding ipecac, turpeths mineral, and perhaps other like substances. Doubtless, English pharmacists generally agree that a careful revision of their poison schedule is desirable, but, we doubt if it will ever be possible to include all moderately energetic drugs that by abuse may produce death, as is perhaps true of lobelia. In our country lobelia is not considered to our knowledge in any list of poisons. Our hillsides are covered with the herb, its properties are well known, and it is never used as a poison by those inclined to produce death, but is freely employed as an emetic by country people.

*See note † p. 84.

†Dr. R. K. Frost, of New York City, was arrested and tried December 13, 1837, for killing Mr. T. G. French by putting "him into a vapor bath" and administering "poisonous concoctions of lobelia" and "giving deleterious herbs which no reasonable man would administer to a dog." This trial, next to that of Thomson, exhibited the intensity of feeling that existed at that time, and from over the entire country it attracted the attention of persons who were the least interested in medicine. It lasted ten days and the jury returned a verdict of "guilty of manslaughter in the fourth degree," and recommended the accused to the mercy of the court. He was sentenced to three months imprisonment. The history of this trial was issued in pamphlet form (104 pp.) and used by the Thomsonians over the country to show that they were persecuted.

sufficient guarantee of their genuineness. They consisted of one per cent., and one-tenth per cent. solutions of the hydrobromate of lobeline. The investigation includes the physiological and clinical actions of this remedy.

General Result of the Action in Cold and Warm-blooded Animals.—Given in sufficient quantity, an increasing failure of muscular power, staggering and incoordination, retching and salivation, are observed in from five to fifteen or twenty minutes after it is administered. First occurring in the hind extremities the evidences of muscular paresis, then extend to the fore members. The frog becomes less and less able to jump and to turn over from a position on the back, and the rabbit yields in the hind legs, reels, and at length can no longer control these members, and the forearms and arms soon after are disabled in the same manner; sensibility and the brain functions remain unimpaired. Before the paralysis has become complete, if the amount given has not been too large, the receptivity and response to peripheral impressions is for a short period somewhat more ready, and this is, more especially true of frogs. The respiratory function is embarrassed in proportion to the general paralyzing action. After a period of rather slower respiration it becomes quicker and increasingly shallow and laborious. With the lessening supply of oxygen, carbonic acid narcosis comes on, and death ensues with complete muscular resolution and without convulsions in frogs, and usually with clonic convulsions in rabbits the failure of respiration being the immediate cause.

Action on Nerve and Muscle.—When the sciatic nerve is isolated, the limb ligatured, and a merely paralyzing dose is administered, the nerve when excited by a faradic current at the earliest period of the action responds feebly, for the muscles of the limb below the ligature contract but slightly. When the paralysis is complete at length the strongest excitation of the nerve causes no response in any degree of muscular contraction. When this occurs the muscles are found to be readily excitable on direct electrical stimulation. It follows hence that lobeline destroys the excitability of the motor nerve endings, and does not impair the contractility of muscle.

There is a stage in the action of small doses, however, when the irritability of motor nerve and muscle is actually heightened: when the paralyzing effect is just beginning to manifest itself after the administration of one minim of the one per cent. solution, a slight tap on the skin of the back causes an immediate response in general muscular movement of a tetanic character. From this it must be concluded that when the first impression of lobeline is making, the nervous tissue is irritated by the medicament, but as the action continues and increases, the irritation is succeeded by loss of function. Furthermore, when the effect of lobeline in small quantity is such as to cause general muscular contractions on irritation of the skin (heightened cutaneous reflex) it is obvious that the physiological effect is not limited to the motor-nerve endings, but includes the spinal cord as well. It may be suggested, that the paralyzers, whose action is first felt by the intra-muscular nerve elements really act through the spinal

cord and not as is now supposed on the nerve endings only at the beginning.

Sensibility remains unimpaired, certainly, up to the period of the cessation of all muscular contractility, for the corneal and other reflexes are preserved until then. When the action of lobeline has attained its maximum, the paralysis is complete, and there is no response to any form of irritation.

Effects on the Circulation and Respiration.—When the fullest effect of lobeline is attained in the frog, if the chest be opened the heart will be found still in action at about 28 per minute, but the contractions are not energetic, although rhythmical. If the medulla be previously divided, the heart will be found at a standstill, its cavities distended. If in action, electrical stimulation increases it; if at rest, a strong faradic current will start the auricle in active movement, and the ventricle in feeble and irregular contractions chiefly of the basic portion.

The most important of the effects of lobeline on the heart, is its action on the vagus. At first, and with a small dose, the vagus is briefly stimulated, then depressed in function, but, it is completely paralyzed at the period of maximum effect, and no strength of current will then stop the heart. With a minute dose, the effect first produced is irritation of the vagus, with slowing of the heart, but as the effect deepens, the heart grows more rapid with lessening of the inhibition. It is probable that every first dose given, causes some slowing of the heart's movements, but this effect is so transient and slight that it escapes detection. With the decline in the inhibition there ensues increased action of the heart and lowering of the vascular tension. The body temperature rises somewhat *pari passu* with the increased rapidity of the circulation. As the respiratory muscles fail in power, the breathing becomes more and more labored, panting and shallow. The oxygenation of the blood is progressively diminished carbonic acid accumulates, the lips are cyanosed, and stupor is succeeded ultimately by coma. Up to this point the mental processes are not disordered, and the sensibility remains unimpaired.

Therapeutical Applications of Lobeline.—To avoid all subjects of controversy, I confine my observations to facts personally ascertained, and give the results of my own therapeutical uses of this remedy:

Having ascertained that lobeline possesses the power to lessen the reflex action of the spinal centres, I have administered it in those maladies characterized by irritability or exaltation of this function. In *epilepsy* it appears to be a most promising remedy if right conditions exist. It is the less useful, the more decidedly the convulsive seizures approach the epileptiform character; and it is more effective, the nearer the cases are to the true or essential type. The bromides may be quite successful in arresting convulsions due to coarse lesions of the brain, although not acting on the structural changes in any way. Now lobeline does not act favorably in such conditions.

In nocturnal epilepsy, which, as is now well known, does not usually yield

to the bromides, and in the cases not arising from an obvious peripheral irritation or accompanied by a defined aura, in the pale-anæmic and lymphathic type of subject, the best results obtainable from this remedy may be expected. As, however, definite conclusions can be formed only after sufficient length of observations the real value of the hydrobromate of lobeline must be ascertained by comparative trials through several years. Now, it can be asserted merely that this remedy promises well.

More definite results can be given from the administration of lobeline in certain neuroses of the respiratory organs, as *asthma*, *whooping-cough*, *pseudo-angina pectoris*, in the *spasmodic cough* of emphysema, the *cough* of habit, renal and other *reflex asthmas*. Somewhat more specific statements can be made as respects its utility in all these cases.

In that form of asthma, which is merely a functional disorder, the best results may be expected from it. The dose at the outset should be about 1-60 grain, and this can be repeated in a half hour when the attack is acute and severe, and afterwards *pro re nata*. When the attacks are recurring and persistent, the lobeline should be given three times a day from 1-60th to 1-30th grain, in persons having the ordinary susceptibility to its action, and 1-20th grain in those with less. When desirable or circumstances require, it may be combined with morphine, or cocaine, or both. The asthmatic seizures which attend emphysema are often quite promptly relieved by it. When in the course of chronic bronchitis, the mucous membrane furnishes but little secretion and the cough is dry and harrassing, lobeline acts very efficiently. It has also appeared to do great good in cases of pseudo-angina pectoris, with weak action of the heart and embarrassed respiration. By lowering the vascular tension and lessening the work of the heart by relaxing the inhibition, the pulmonary circulation is carried on with greater ease, and hence the distress of breathing subsides. There is here, as I conceive, a most important sphere of usefulness—for this morbid complexus is by no means uncommon, and we have not many agents capable of affording the direct relief given by lobeline.

THE HOMŒOPATHIC USES OF LOBELIA INFLATA.—(Written for this publication by Prof. Edwin M. Hale, M. D., Emeritus Professor Materia Medica and Therapeutics in the Chicago Homœopathic College).—I consider that the sphere of action of this species lies midway between tobacco and veratrum album, or their active principles, nicotine and veratrine. It acts upon the motor-nervous system and upon the respiratory centre in the medulla.

The nauseous effects of this drug are far more intense than tobacco, and this is the principal reason why it is not used for the same purpose as tobacco. Another reason is that the system does not tolerate the drug, as it does tobacco. I have, however, seen habitues of lobelia, who, from taking it for asthma and dyspepsia, came to tolerate it to a degree which seemed surprising.

Lobelia inflata was first introduced into our school in this country at the same time and in the same manner as the Lobelia syphilitica, (1838). In 1841 it was in-

roduced into homœopathic practice in Europe by Dr. A. Arac, of Leipsic, in the 15th volume of "Hygiea." Since that time it has been used to a considerable extent in our practice, but although a powerful drug, its curative sphere is limited.

We find it useful principally in asthmatic affections. It is useful in two varieties, namely, the nervous, which arises from paresis of the respiratory centre, and the catarrhal or "humid asthma." In the first, it is strictly homœopathic, and has been found curative in very minute doses. In the latter, when the mucus rales are loud, and the sense of suffocation is due to a mechanical obstruction by the mucus, and the coincident spasm of the bronchi, larger doses must be used, for this condition is similar to the secondary effects of the drug. I have seen almost magical relief follow doses of $\mathfrak{z}\text{i}$ repeated every hour, without nausea or vomiting follow its use.

Permanent cures of asthma of many years, have been made by larger doses. Sometimes these large doses (half an ounce) have not caused vomiting. At other times smaller doses vomit violently, leaving the patient much prostrated, but with disappearance of the asthma. I have cured asthmatic attacks by small doses of veratrum, when lobelia seemed indicated but had failed.

In some cases of asthma, the patient complains of a "dreadful sinking sensation" in the epigastrium with violent distressing efforts at inspiration. This is a clear indication for the use of lobelia, and it will promptly relieve such cases in doses of 1-10 or 1-100 of a drop frequently repeated.

In cough, lobelia is very useful. The cough may be caused by accumulation of mucus in the pharynx or bronchi, or a tickling in the larynx, or it may be "croupy," or attended by dyspnoea. In purely nervous coughs, like whooping cough, or from irritation of the laryngeal nerves, motor and sensory. In spasmodic croup, it is a prompt and excellent specific, and I have found it useful in carpo-pedal spasms, attended by laryngismus.

In some gastric disorders, lobelia does excellent service. In the so-called nervous dyspepsia, when the patient complains that nausea, oppression of the stomach, and dyspnoea follow each meal, when there is constant "faintness" at the stomach, as bad after meals as before eating, lobelia in doses of a drop of the one-tenth dilution before and after eating has a very happy effect.

This "faintness" at the pit of the stomach is an unfailing guide to its use. It is caused by a paresis of the sympathetic nerve; other drugs cause this symptom; ignatia, cimicifuga, digitatis, and veratrum, all cause it by their depressing action on the same system of nerves. The primary effect of lobelia on the heart is to paralyze its motor nerves, like tobacco or aconite, hence it is a prominent remedy in primary cardiac weakness and irritation. The "sinking faintness" at the epigastrium is here the symptom most complained of. Small doses must be used to combat this condition. Some patients will bear doses of one or two drops of the tincture, others are made worse by it, and only find relief from the second or third dilutions.

The secondary or reactionary effects of lobelia, is to cause violent spasmodic palpitations, or symptoms closely resembling angina pectoris. In such cases I have found quick and good results from 5 to 10 drops of the tincture.

Primarily, lobelia paralyzes the various sphincter muscles, and can be used in physiological doses, for spasmodic retention of urine, or faeces, or rigidity of the os and perineum. Its use in labor in facilitating the expulsion of the foetus is as old as the aborigines. It has been adopted by midwives and many physicians. I have seen a rigid and undilatable os rapidly give way after a single dose of 20 drops. It will allay and regulate those violent pains in the loins during labor, which seem to arise from the rigidity of the genital passages. In dysmenorrhœa, due to this same cause, small doses give prompt relief. In this respect it resembles gelsemium and belladonna.

In hysteria, lobelia is frequently indicated. The case of spasm of the larynx reported by Dr. Knowles, of Avoca, Iowa, in my "Therapeutics of New Remedies," is an apt example of a manifestation of hysteria, rapidly cured by this remedy. I have controlled the most violent hysterical convulsions by injecting into the rectum a teaspoonful of the tincture.

In gall stone or renal colic, in incarcerated hernia and in spasmodic gastralgia, lobelia often relieves promptly. This may be said to be antipathic, but I do not believe it. The secondary effect of all paralyzants is spasm and convulsions. Lobelia is as homœopathic to spasm, as to paralysis.

MEDICAL USES OF LOBELIA IN THE ECLECTIC SCHOOL.—(Written for this publication by Prof. John M. Scudder, M. D., Professor of the Practice of Medicine in the Eclectic Medical Institute, Cincinnati).—We use lobelia for its emetic, its relaxant and its stimulant influence. It is a fair example of the common fact that the action of a drug depends upon its dose. Emesis may be called its poisonous action, and stimulation its medicinal action. In poisonous doses the drug would prove fatal to life were it not that it is expelled from the stomach and exhausts itself in the act of emesis.

Without discussing the advantages of thorough emesis, as compared with other treatment, it may be remarked that the indications and contra-indications for emetics are as distinct as for other remedies. If the patient has full tissues, full pulse, full tongue, heavily coated at base, with sense of fullness and oppression in the epigastrium, lobelia will act kindly. Conversely if the tissues are contracted, the pulse small or hard, and the tongue contracted and red, an emetic should not be used.

In the early part of the century lobelia in substance (usually the powdered seed) was given as an emetic. From this use came the extreme prostration, with cold clammy perspiration and enfeebled respiration and circulation, a condition known as the "alarming symptoms." There is no doubt, but that lobelia has occasionally caused death, but this result has been rare as compared with the large number of cases in which the drug has been used.

It was not long before it was determined that an acid preparation of lobelia acted more kindly than the crude article, or indeed any other preparation. The acetous tincture was easily and cheaply prepared by simply macerating the herb and seed with vinegar, and whether as an emetic or a nauseant expectorant its influence was certain and kindly.

The relaxant influence of lobelia was twofold, as it was exerted on the voluntary and involuntary muscles. For the first, it was the result of more or less profound nausea, induced by large doses just short of emesis. This effect was frequently called "antispasmodic," and was that desired in infantile convulsions, puerperal convulsions, hysteria, tetanus and some cases of asthma. This protracted nausea was also thought necessary to the establishment of mucous secretion from bronchial tubes, the so-called expectorant action.

Its action on the involuntary muscular fiber was not dependant upon nausea. Probably its best and most certain action was in cases of difficult labor from rigidity of the os uteri. In this case an alcoholic tincture from the seed was employed, twenty drops being added to two ounces of water, a teaspoonful was given every fifteen minutes until dilatation was accomplished.

With a full and oppressed pulse and a sense of oppression in the chest lobelia is one of our most certain remedies. The small doses (tincture of the seed) not nauseant, gives relief and a better circulation of blood.

In neuralgia of the heart, and in angina pectoris, no remedy that I have used gives such prompt relief. Frequently a single dose of ten or fifteen drops of a tincture of the seed will give almost immediate relief.

Before the use of belladonna to remove congestion of the brain (patient being comatose) nothing was deemed so certain as a lobelia emetic. In the eruptive fevers with tardy appearance or retrocession of the eruption, nothing was so effective in relieving the nervous system and bringing the eruption to the surface as a lobelia emetic properly given.

When remedies are used in combination it is almost impossible to determine the action of a single agent. Thus many compounds containing lobelia have been highly commended, and have done good service, but what part should properly be credited to this agent we cannot say. Among these combinations none has acquired a greater reputation than the compound *stilingia* liniment, composed of oils of lobelia, *stilingia* and cajuput, with alcohol.* This has certainly a wonderful action in croup, and I have satisfied myself by experiment that a principal action is from the oil of lobelia.

PHARMACEUTICAL AND MEDICAL REFERENCES TO LOBELIA.

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| <p>1785.—Indigenous Vegetables, Cutler, p. 484, from Am. Journal Science and Arts.</p> <p>1787.—Materia Medica Americana, David Schoepf, Erlanger, (Germany,) p. 128.</p> <p>1792.—Medical Botany, Woodville, Vol. II., p. 249, (<i>Lobelia syphilitica</i>).</p> | <p>1793.—Domestic Medicine, William Buchan, Edinburgh, p. 513.</p> <p>1798.—Collections for a Materia Medica of the United States, B. S. Barton, part first, (3rd edition, 1810) p. 36.</p> |
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*See formulæ, p. 82.—L.

- 1808.—The Pharmacopœia of the Massachusetts Medical Society, Boston, 1808.
- 1810.—The American New Dispensatory, Thacher, p. 146, (and other editions).
- 1811.—The American Lexicon, (Author not named) New York. This is simply an imitation of Quincy; this paper being copied verbatim.
- 1817.—Therapeutics and Materia Medica, Chapman, p. 272, (and other editions).
- 1817.—Vegetable Materia Medica, W. P. C. Barton, Vol. I., p. 181.
- 1818.—The American Dispensatory, Coxé, p. 309, (and other editions).
- 1820.—The House Surgeon and Physician, Hand.
- 1820.—Pharmacopœia of the United States, p. 40.
- 1820.—Medical Dictionary, Hooper, (and other editions).
- 1821.—A Supplement to the Pharmacopœia, London, p. 73.
- 1822.—Materia Medica and Therapeutics, Eberle, Vol. I., p. 63.
- 1826.—A Materia Medica of the United States, Zollickofer, pp. 155, 167, 194, 198, 209, 212.
- 1828.—Materia Medica and Pharmacy, Murray, p. 183, (and other editions).
- 1829.—Manual of Materia Medica and Pharmacy, Edwards & Vavasour, pp. 262, 362.
- 1830.—The Botanic Physician, Smith, p. 475.
- 1830.—Introduction to the Natural System of Botany, Lindley, p. 187.
- 1830.—Pharmacopœia of the United States, Philadelphia, p. 15.
- 1830.—Pharmacopœia of the United States, New York, p. 43.
- 1832.—An Improved System of Botanic Medicine, Howard, Vol. II., p. 337, (and other editions).
- 1833.—A Narrative of the Life and Medical Discoveries of Samuel Thomson, (various references).
- 1833.—Prodrome of a work to aid the teaching of the Vegetable Materia Medica, W. P. C. Barton, p. 60.
- 1833.—New Guide to Health, Samuel Thomson, p. 46, (various other references). This is the tenth edition. The copyright was obtained in 1822.
- 1833.—American Journal of Pharmacy, p. 282.
- 1833.—United States Dispensatory, (and subsequent editions).
- 1833.—The American Practice of Medicine, Beach, Vol. III., p. 120.
- 1833.—The Eclectic and Medical Botanist, (a Journal printed in Columbus, Ohio,) p. 340.
- 1833.—The Thomsonian Recorder, Vol. I., pp. 254, 316.
- 1834.—American Journal of Pharmacy, p. 300.
- 1834.—The Thomsonian Recorder, Vol. II., pp. 119, 199, 200.
- 1834.—Medical Botany, Sanborn, p. 105.
- 1835.—The Thomsonian Recorder, pp. 3, 4, 91, 150, 155, 177, 209, 253, 283, 284, 288, 318, 380, 422, 414.
- 1836.—General Therapeutics, Dunglison, pp. 229, 230, (and other editions).
- 1836.—The Thomsonian Recorder, pp. 145, 205, 247, 283, 359, 405.
- 1836.—The Western Medical Reformer, pp. 104, 207, 374.
- 1837.—The Thomsonian Recorder, pp. 192, 199, 252, 292, 315, 330, 334, 384, 388, 402.
- 1837.—The Western Medical Reformer, pp. 126, 189.
- 1838.—American Journal of Pharmacy, p. 98.
- 1838.—The Botanico-Medical Reformer, pp. 26, 61, 72, 80, 100, 102, 118, 128, 134, 138, 142, 163, 189, 206, 211, 227, 234, 236, 238, 299, 305, 400.
- 1838.—The Southern Botanic Journal, pp. 36, 77, 133, 248, 253, 354.
- 1839.—Lobelia Advocate and Thomsonian Medical Recorder, by Rev. John Rose.*
- 1840.—Pharmacopœia of the United States, pp. 25, 214.
- 1840.—American Journal of Pharmacy, p. 280.
- 1840.—Pharmacopœie Universelle, Jourdan, p. 802.
- 1840.—Elements of Materia Medica, Pereira, Vol. II., p. 385.
- 1841.—The Thomsonian Materia Medica, Thomson, p. 581.
- 1841.—American Journal of Pharmacy, p. 1.
- 1841.—The Botanico-Medical Reformer, p. 168.
- 1841.—New Remedies, Dunglison.
- 1841.—American Vegetable Practice, Mattson, Vol. I., pp. 160 to 174, 312, 317, 404.
- 1842.—The Botanico-Medical Reformer, pp. 47, 88, 177, 198, 203.
- 1842.—American Journal of Pharmacy, p. 4.
- 1842.—A Treatise of the Materia Medica and Therapeutics, Eberle, pp. 67.
- 1842.—Botanic Theory and Practice of Medicine, Worthy, p. 594, 611, 620, 627.
- 1843.—Pharmaceutischer Central-Blatt, No. 31, July 5th.
- 1843.—General Therapeutics and Materia Medica, Dunglison, Vol. I., p. 121; Vol. II., p. 197.
- 1843.—American Journal of Pharmacy, p. 108.
- 1844.—The Sick Man's Friend, Sanborn, pp. 96, 243.
- 1844.—Medicines, Their Uses and Mode of Administration, Neligan, p. 215.
- 1844.—Botanico-Medical Recorder, pp. 252, 237, 372.
- 1845.—Botanico-Medical Recorder, p. 162.
- 1845.—The Practice of Medicine on Thomsonian Principles, Comfort, p. 441.
- 1845.—Elements of Materia Medica and Therapeutics, Harrison, Vol. II., p. 447.
- 1846.—The Medical Formulary, Ellis, p. 46.
- 1846.—Botanico-Medical Recorder, p. 74, 77, 259.
- 1847.—Materia Medica and Therapeutics, Royle, (by Carson,) p. 456.
- 1847.—Family Flora and Materia Medica Botanica, Good, plate 27.
- 1847.—Botanico-Medical Reference Book, Biggs, pp. 500, 586, 588.
- 1847.—The American Practice, Beach, (and other editions,) p. 661.
- 1847.—Medical Botany, Griffith, p. 418.
- 1848.—Medicinal Plants of New York, Lee, p. 35.
- 1848.—Mayne's Dispensatory and Formulary, pp. 56, 159, 204.
- 1848.—Medicinal Plants of South Carolina, p. 785.
- 1849.—Elements of Materia Medica and Therapeutics, Kost, pp. 78 to 86, 198, 227, 487.
- 1850.—Pharmacopœia of the United States, pp. 29, 250.
- 1850.—Pharmaceutical Journal and Transactions, (Vol. X.) p. 270.

*This unique publication was issued monthly in the interest of the lobelia practice, during the year 1839. It was not supported, and only one volume appeared. We are indebted to Dr. Charles Rose for the volume complete, probably the only copy in existence. In its front is bound the "Trial of Dr. Frost." We do not refer to pages in this work, its title showing that the entire subject is connected with lobelia.

- 1850.—The Physio-Medical Recorder and Surgical Journal, p. 183.
 1850.—Medicinal Plants of the United States, Clapp, (Am. Med. Report,) pp. 807 to 809.
 1851.—Pharmaceutical Journal and Transactions, pp. 270, 561.
 1852.—The Eclectic Dispensatory, King and Newton, p. 246.
 1853.—Principles of Scientific Botany, Bickley, p. 175.
 1854.—Eclectic Medical Journal, Cincinnati, p. 312.
 1854.—An Improved System of Botanic Medicine, Howard, pp. 328 to 338.
 1854.—The Elements of Materia Medica or Therapeutics, Pereira, (Carson's edition,) Vol. II., p. 583 to 587.
 1855.—The Middle States Medical Reformer, pp. 1 to 4, 44.
 1857.—Druggist's Circular, p. 158.
 1857.—Materia Medica and Therapeutics, Mitchell, p. 567.
 1859.—Domestic Medicine, Kost, pp. 307, 362, 366, 380, 383, 437.
 1860.—Pharmacopoeia of the United States, pp. 34, 331.
 1861.—Book of Formulae, Tilden & Co., p. 73.
 1864.—Therapeutics and Materia Medica, Stillé, p. 280.
 1864.—Eclectic Medical Journal, Cincinnati, p. 141.
 1865.—American Journal of Pharmacy, p. 211.
 1865.—Proceedings American Pharmaceutical Association, p. 211.
 1866.—American Eclectic Materia Medica and Therapeutics, Jones & Scudder, pp. 13, 112, 113, 235, 675.
 1867.—Eclectic Medical Journal, Cincinnati, p. 269.
 1869.—Eclectic Medical Journal, Cincinnati, p. 237.
 1870.—Pharmacopoeia of the United States, pp. 36, 63, 313.
 1870.—Eclectic Medical Journal, Cincinnati, pp. 206, 400, 445, 476.
 1871.—Botanical Survey of Louisiana, Featherman, p. 96.
 1871.—Eclectic Medical Journal, Cincinnati, pp. 10, 145.
 1872.—American Journal of Pharmacy, p. 293.
 1872.—Pharmacopoeia Homœopathica Polyglotta, pp. 106, 190.
 1872.—Druggist's Circular, p. 160.
 1873.—Dictionary of Pharmaceutical Science, Sweringen, p. 253.
 1873.—Druggist's Circular, p. 56.
 1874.—Eclectic Medical Journal, Cincinnati, p. 46.
 1875.—Hale's New Remedies, Vol. II., p. 416.
 1875.—On Poisons, Taylor, p. 735.
 1875.—American Journal of Pharmacy, p. 127.
 1875.—Boston Medical and Surgical Journal, Feb. 4th.
 1875.—Druggist's Circular, p. 66.
 1876.—New Remedies, Wm. Wood & Co.
 1876.—Eclectic Medical Journal, p. 125.
 1876.—Journal of Materia Medica, Bates & Tilden, p. 103.
 1877.—Encyclopædia of Pure Materia Medica, Allen, Vol. V, p. 611.
 1877.—American Journal of Pharmacy, p. 588.
 1877.—The Pocket Formulary, Beasley, p. 237.
 1877.—Pharmaceutical Journal and Transactions, p. 958.
 1877.—New Remedies, Wm. Wood & Co., p. 366.
 1877.—The New Materia Medica and Therapeutics, Goss, pp. 17, 31.
 1877.—Eclectic Medical Journal, Cincinnati, pp. 290, 578, 579.
 1878.—American Journal of Pharmacy, p. 254.
 1878.—Eclectic Medical Journal, Cincinnati, p. 78.
 1878.—Pharmaceutical Journal and Transactions, London, p. 561.
 1878.—Organic Constituents of Plants, Wittstein, p. 122.
 1878.—Dispensatory and Pharmacopoeia of North America and Great Britain, Buchanan & Siggins, pp. 194, 196, 574.
 1878.—New Remedies, Wm. Wood & Co., pp. 21, 84.
 1879.—Pharmacographia, Fluckiger & Hanbury, p. 400.
 1879.—National Dispensatory, (and subsequent editions,) p. 859.
 1880.—Pharmacopoeia Homœopathica, Polyglotta, p. 222.
 1880.—Pharmacopoeia of the United States, pp. 8, 131, 211, 349.
 1880.—Therapeutic Gazette, pp. 34, 94.
 1882.—New Remedies, Wm. Wood & Co., p. 240.
 1882.—Druggist's Circular, p. 158.
 1884.—Plant Analysis, Dragendorff, (Greenish's Translation,) pp. 50, 202.
 1885.—Materia Medica and Therapeutics, Bartholow, p. 583.
 1886.—American Journal of Pharmacy, p. 392.

We do not consider it necessary to mention all the works that refer to this plant and its compounds. Since 1809 medical publications of every description have continually mentioned the plant, and medical references are innumerable. In order to arrive at a correct understanding of the subject, we made comparative studies of the record as found in the preceding works, and have found other publications to present no additional facts. We may safely say that the lobelia history can be as intelligently studied in these as by the aid of additional numberless works that mention the plant.

LOBELIA SYPHILITICA.

BLUE LOBELIA.

PART USED.—The entire flowering plant* *Lobelia siphilitica*, *Linnaeus*.
Natural Order, Campanulaceæ, Tribe Lobeliæ.

BOTANICAL DESCRIPTION.—Blue Lobelia is generally found in damp, low grounds, wet meadows, and especially near streams. The stem is usually unbranched and grows erect from one to two feet high. It is angular below and smooth for the most part, or with a few scattered hairs. It has numerous horizontal leaves and late in summer a terminal showy spike-like raceme of large blue flowers.

The leaves are ovate-lanceolate, tapering to both ends, sessile or the lower with a margined petiole, and are three to five inches long, veiny, soft, dark green above, and lighter beneath. The margins are irregularly, crosely serrate. The leaves are very numerous, and as they are gradually shorter from the bottom up they give the plant a pyramidal aspect.

The flowers appear the later part of August, lasting till frost. They have the same general structures as those of *Lobelia inflata*, the same characteristic corolla tube, but are much larger, being about one inch long. They are borne on short thick hairy peduncles in a terminal raceme.

The flowers are subtended at their base with leafy bracts which are large and leaf-like below and smaller above. The bracts have margins ciliate with white hairs, and when the plant is just beginning to develop its inflorescence, these bracts form a dense, roseate, terminal cluster, the numerous marginal hairs giving it a glandular appearance.

The calyx segments are five and are triangular, and have recurved margins which are prolonged at the base forming an ear-like appendage at each angle between the segments.† The segments are about three-quarters the length of the corolla tube.

The corolla tube is from one-half to three-quarters of an inch long, split to the base on the upper side, and prominently five pliate beneath, the interior angles



FIG. 138.
A flower of *Lobelia siphilitica*.
(Natural size).



FIG. 139.
The staminate and pistillate columns of *Lobelia siphilitica*; a, front (under) view of a column; b, side view of same; c, pistil, stamens being removed. (Enlarged).

*The Homœopaths who are the only school of medicine that use the plant employ a tincture of the entire plant. When introduced into medicine the root was the part employed.

†These ear-like appendages are not found on all species of *Lobelia* and form an artificial means of dividing the genus.



LOBELIA SYPHILITICA.
(FLOWERING SPIKE, NATURAL SIZE.)



being of a brighter (almost white) color. The three lobes forming the lower lip of the corolla are reflexed, broadly triangular and subequal.

The five stamens are united together around the pistil, forming a column about the length of the corolla and protruding through its slit. This column is three-sided at the base and curved downward at the summit as shown in figure 139, p. 98. The five united anthers are not equal, the lower two being slightly shorter and tipped with a cottony tuft; they are of deep purple color and open with shallow slits down the back.

The pistil is enclosed in the tube formed by the stamens. This is a provision of nature that insures cross-fertilization. When the flower first opens and the stamens shed their pollen, the stigma is completely enclosed by the anthers and thus is prevented from receiving any of the pollen; afterwards when the pollen has been scattered, the style elongates, pushing the stigma a line or two beyond the tube, and is then fertilized by pollen from other flowers, mostly through the agency of bees and other insects.

Blue Lobelia is a very showy plant when in bloom, the deep blue color of the large flowers making it conspicuous. This color is well preserved when the plant is pressed carefully with frequent change to dry papers, but fades out in course of several months from the dried specimens. Sometimes, very rarely however, albinos are found with pure white flowers.*

After blooming the corollas do not fall off, but turn brown, wither up, and remain attached to the ripening seed-pods.

COMMON NAMES.—The most common name and the one most generally used for this plant is Blue Lobelia. While there are other species of Lobelia with blue flowers, (in fact all but a few have this color), still, the flowers of this plant are so much larger, conspicuous and brighter blue than any other, the name properly belongs to it. In most books it is called Blue Cardinal flower, sometimes incorrectly abbreviated to Blue Cardinal, but in our opinion the name is not appropriate. Cardinal flower is a name applied to *Lobelia cardinalis*, not from any resemblance of form to a Cardinal's cap, but from the bright scarlet color of its flowers. *Lobelia cardinalis*, the first species introduced into Europe was very properly called Cardinal flower ("Cardinale couleur de feu"—Tournefort, 1719), and when a second species, but with blue flowers was introduced, it was quite naturally called *Blue* Cardinal flower. We think that this is contradictory, the name Cardinal as applied to the flower refers exclusively to the color, and it is manifestly wrong to speak of Blue Cardinal in the same sense.

It is said that among the more ignorant classes who used this plant in domestic practice, it was known as High Belia, the supposition being that as the other kind (*Lobelia inflata*) was called *Low* Belia this must be the *High* Belia.

BOTANICAL HISTORY.—This plant was in cultivation in England as early as 1665, as it was mentioned in Rea's Flora published in London in that year, and it was cultivated in France no doubt a number of years earlier, it being mentioned by Lobelius in 1591.†

*These were noticed and described as a distinct species as early as 1680 by Morrison. Tournefort, 1719, calls them by the common name "Cardinale blanche." They are according to our observation of a rare occurrence. Although the plant is a common one around Cincinnati, we have seen but a single albino. This was growing in a patch of the ordinary blue flowers, and it was *pure white* without a trace of coloring.

†Lobelius Icones Stirpium, Antwerp, 1591, mentioned under the name *Trachelium Americanum, flore ca-*

In most early works it was described under the generic name *Rapunculus*.^{*} When Linnæus was preparing his *Species Plantarum*, Peter Kalm† had just returned (1751) from America with wonderful accounts of the virtues of this plant as a certain cure for syphilis,‡ (see Medical History,) and Linnæus gave the name *syphilitica* as the specific name for the plant.§

Although its reputation as a cure for this disease has long been disproved, still the name remains, and probably always will, a monument of an early error. It has never had but one synonym, *Rapuntium syphiliticum*, by Miller.

DESCRIPTION OF THE DRUG.—All parts of *Lobelia syphilitica* are devoid of prominent characteristics. The plant is insipid and herb-like, the fresh root has simply a turnip-like taste. The root is the portion that was directed to be used when the plant was introduced, but at present no portion of the plant is an article of commerce.

According to Rafinesque|| it was once analyzed in France, but the result did not show it to contain a characteristic constituent. We did not consider it necessary to make any investigation.

Lobelia syphilitica has never been officinal, but was recognized by the Pharmacopœia of the Massachusetts Medical Society, 1808. It is not found in commerce and is not used in domestic medicine.

MEDICAL HISTORY.—We have stated above that Peter Kalm in his travels through North America was informed by Sir William Johnson¶ that the Indians used this plant to cure

ruleo. (Linnæus' citation to this in *Species Plantarum*, 2nd and later editions, [not 1st,] is "Rob. ic." and Barton copies the error).

**Rapunculus Americanus*, flore dilute cœruleo.—Dodart, *Mémoires pour servir à l'Histoire des Plantes*, Paris, 1676, p. 297.

Same—Tournefort, *Institutiones Rei Herbariæ*, Paris, 1719, p. 163.

Rapunculus galeatus Virginianus, flore violaceo majore.—Morrison, *Plantarum Historia universalis*, Oxoniensis, 1680, vol. ii., p. 466.

†Peter Kalm was a Swedish naturalist who traveled three years in the northeastern portion of this country from the fall of 1747 to the spring of 1751. He was a pupil of Linnæus, and it was at his advice that the journey was made. On return to Sweden he wrote a detailed account of his travels, which was published in three volumes in 1753, 1756 and 1761, and was translated into German, French and English, the latter translation by J. R. Forster was printed in London in 1770-71.

‡It was Kalm who furnished the most of the specimens of North American plants described in the *Species Plantarum* of Linnæus. These plants are marked with the letter K, in the Linnæan herbarium, and constitute the greater part of the plants from this country that are in the collection.

¶When Kalm was in this country he learned from Sir William Johnson of the reputation of *Lobelia syphilitica* among the Indians for the cure of syphilis, and on his return wrote an account which was published in Latin.

§Kalm published his account in the *Act. Acad. Scient. Holmæ*, under the title "*Lobelia ut efficacæ remedium contra lœum venerum, a Petro Kalmio descripta.*"

And another account in Latin was written in 1756, by Peter Engstroem, a pupil of Linnæus, and published in the *Amœnitates Academicæ*, vol. iv., p. 524.

§*Species Plantarum*, Linnæus, 1753, page 931. Described in the Class "*Syngenesia Monogamia*" and with the following specific description.

"*Lobelia caule erecto, foliis ovato-lanceolatis crenatis, calycum sinibus reflexis.*"

||*Medical Flora of the United States*, vol. ii., p. 25.

¶Sir William Johnson was born in Smiltown, Ireland, 1715. In 1738 he came to America and located in the south side of Mohawk Valley, about twenty-four miles from Schenectady, N. Y., and embarked in traffic with the Indians whose friendship he managed to secure. He learned their language, studied their customs and won their confidence. He possessed greater influence over them than any other white man, and was adopted into the Mohawk tribe and chosen sachem. In the French war, 1743 to 1748, he was the sole superintendent of the Indians of the frontier; occupied positions of trust in Colonial affairs and embarked with the Indian allies in the wars between England and France. He engaged in the capture of Fort Niagara, 1750, where he had command after Prideaux was killed, and he assisted in the capture of Montreal, 1760. For his service he was awarded a good salary by George II., a baronetcy and \$25,000 by Parliament, and a tract of 100,000 acres of land, north of the Mohawk, known as "Kingsland" or the "Royal Grant." This tract of land is now in Herkimer Co., N. Y.

He published a paper on "Customs, Manners and Languages of the Indians." (*Phil. Trans.* Nov. 1772, p. 142). In 1774 he died.

At some period of his life, (date unknown to us, but before 1751 as he communicated it to Kalm) he purchased from the Indians (or a trader) an asserted remedy for syphilis, which proved to be a species of *Lobelia*, and the plant was exported to Europe to cure that disease. From this reason the plant received its name *Lobelia syphilitica*. In this

syphilis,* and upon his return to Europe, published an account of it. This introduced the drug to Europe, and it came into immediate demand, and it was illustrated in Woodville's Medical Botany, which was published in the beginning of this century. We cannot find that Johnson made any written reference to the drug, and we have searched his manuscripts upon file in Albany, which comprise a voluminous correspondence on all matters connected with Indian life on the frontier.† We cannot find a reference in European literature to any statement beside that of Kalm and we therefore conclude that this information derived personally by Kalm, introduced the plant.

Schoepf, 1787,‡ mentioned *Lobelia siphilitica*, but erroneously described to it, nauseating, cathartic and emetic properties, stating that it is acrid, milky, and used in syphilis. He confused the sensible properties of *Lobelia inflata*, with which he was evidently familiar, with the reputed medical properties of *Lobelia siphilitica*. Thus, his statements regarding the uses of *Lobelia siphilitica* agreed with Kalm, but there is no evidence to show that he did not derive his information from Kalm's writings.

From the return of Kalm (1751) to Europe, until the introduction of *Lobelia inflata* by Thomson,§ the drug known as *lobelia* was the root of *Lobelia siphilitica*. This is shown by the fact that the decoctions were freely administered, which could not have been the case with a violent emetic like *Lobelia inflata*. Thus, we quote from Buchan, 1793,|| "The patient takes a large draught of the decoction early in the morning and continues to use it for his ordinary drink through the day." This name *lobelia*, led subsequent writers (after *Lobelia inflata* appeared) to confuse the two plants, and the result is sometimes evidenced at present.

Statements have been made to the effect that *Lobelia siphilitica* has diuretic properties, but Prof. W. P. C. Barton, 1802,¶ found that the plant then used by the settlers under the name *lobelia* was *Liatris spicata*.

Thatcher, 1810,** states on Pearson's word that *Lobelia siphilitica* has cathartic properties, but it is questionable as to the drug employed.

Rafinesque, 1830,†† accepts that *Lobelia siphilitica* is a potent drug, but his views were framed from previous statements. Investigations in Europe demonstrated that *Lobelia siphilitica* was of no value in the treatment of syphilis and it eventually became obsolete. Neither, the Regular, nor the Eclectic sections of American practitioners of medicine employ it at all, and that it is but little employed in Homœopathy is evident from the following article:

THE HOMŒOPATHIC USES OF LOBELIA SYPHILITICA.—(Written for this publication by Edwin M. Hale, M.D., Emeritus Professor of Materia Medica and Therapeutics in the Chicago Homœopathic College.)—This plant was introduced into our practice by the late Dr. Hering. His provings and observations were published in the Trans. Amer. Hom. Institute.

Drs. Jeanes, Williamson and Neidhard, only the latter now living, contributed their experience with this drug. Dr. Jeanes reports a cure of "melancholia" in a woman. He supposed the spleen was affected, for she had "pains under the short ribs of the left side, from front to back." These symptoms are

connection we are led to say upon information received from a gentleman, familiar in the neighborhood of "Johnson's Castle," New York, that by tradition the moral standing of Sir William Johnson was not of the highest, and that possibly he may have had use for the plant himself.

*Johnson purchased the information from the Indians and its announcement was considered of the greatest importance by the medical world. He was imposed upon, however, and it seems strange that a man so versed in Indian customs should have been thus deceived.

†These manuscripts in the State's Dep't Albany show the interest and influence Johnson possessed in early Colonial affairs. His aid was solicited by those high in power and he must have had the unbounded confidence of the Indians.

‡Materia Medica Americana, p. 128.

§See medical history of *Lobelia inflata*, p. 83.

||Domestic Medicine, William Buchan, Edinburgh, p. 513.

¶Collections for a Vegetable Materia Medica, part 2nd, p. 37.

**American New Dispensatory, p. 149.

††Medical Flora of the United States, vol. ii., p. 25.

in its provings, and nearly identical symptoms have often been cured by *cimicifuga*. Dr. Neidhard reported a cough of four weeks duration, day and night, with "dryness of the back part of the throat." He also cured cases appearing to be a species of spinal irritation with *sciatica*.

Many of its symptoms remind one strongly of *cimicifuga*, but its chief sphere of action seems to be upon the mucous surfaces of the upper respiratory tract. It causes catarrhal headache, acute nasal catarrh, and much irritation with dryness of the throat. The posterior nares, palate, eyes, nose and mouth are all irritated, much as in hay fever. I would advise it in such cases, and in epidemic influenza, especially in the young. Catarrhal conditions caused by this species, it continued, would readily run into humid asthma.

Rafinesque asserts that its properties are similar to *Lobelia inflata*, but milder. It resembles arsenious iodide, *sticta*, *hepar sulphur*, *cistus* and *cimicifuga*. Our tincture is made from the leaves.

LOBELIA CARDINALIS.

CARDINAL FLOWER.

PARTS USED.—The entire plant, *Lobelia cardinalis*, *Linnaeus*.

Natural Order, Campanulaceæ, Tribe Lobeliæ.

BOTANICAL DESCRIPTION.—There is no difficulty in recognizing this plant without a detailed botanical description. Having the peculiar flower structure of the *Lobelia* genus (described on page 64) it is at once known by its bright scarlet flowers, so brilliant indeed as to attract immediate attention from anyone who sees it in bloom.

In this country we have but two red flowered species of this genus. *Lobelia cardinalis*, which is common over most of the territory east of the Mississippi, and *Lobelia splendens*, very similar in appearances, but confined to the extreme southwest near the Mexican border, and hence, not liable to be confused.

In size, habit and general appearances, the plant resembles *Lobelia syphilitica*, (described and illustrated on page 98,) but strongly distinguished from it by the color. The flowers of the *Lobelia cardinalis* are more slender, the column longer, and the calyx destitute of the reflexed auricles between the segments. Over the greater portion of this country, the two species *Lobelia cardinalis* and *Lobelia syphilitica* are all of the genus that have large enough flowers, (over an inch long) to attract attention; the former having red, the latter blue flowers, they are readily distinguished from each other and from all other species.



FIG. 140.
Flower of *Lobelia cardinalis*.
(Natural size.)

The peculiar bright red color of the large flowers of *Lobelia cardinalis* is so bright as to pale almost any comparison we can make. No colored illustra-

tion we have ever seen of the plant does it justice, and the usual fault of colored work is the over-coloring of plants. When the plant is dried carefully the color is preserved as bright as when fresh, and it is very permanent, remaining a beautiful herbarium specimen for a number of years.

As so much space has been given in this work describing the botanical characters of *Lobelia inflata* and *Lobelia syphilitica*, we do not deem it necessary to give a further description of this plant.

BOTANICAL HISTORY.—The richness of coloring of the bright scarlet flowers of this plant attracted the attention of early settlers and travelers, and it was sent to Europe very soon after the discovery of this country. It was first sent to France by the French settlers in America.

Over 250 years ago, (1629,) Parkinson* described and figured it from plants in cultivation in his garden at London and informs us that he received it from France.† He states, "it groweth neere the river of Canada, where the French plantation in America is seated." It soon became common in cultivation in Europe, especially in botanical gardens, and is mentioned in most of the earliest works on American plants.‡

In the very early works it was described under the generic name *Trachelium* or later *Rapunculus*, (see generic history of *lobelia*, p. 66,) and it was called "*Planta Cardinalis*," Cardinal plant, by the earliest French.

Parkinson, the first to describe it, calls it, "the rich, crimson Cardinal's flower," stating, "this hath his name in the title, as it is called in France from whence I received plants for my garden with the Latin name; but I have given it in English."

Tournefort (1719) says, "Cardinale, couleur de feu" (Cardinal flower, color of fire). The name is in allusion to the bright, scarlet color of the flowers, which are the same hue as the scarlet hat worn by a cardinal, and not from the shape of the flower. Linnæus adopted this for the specific name of the plant, calling it *Lobelia cardinalis* by which name it has always been described with the single synonym of *Rapuntium cardinalis* by Miller.

MEDICAL HISTORY AND PROPERTIES.—Schœpf, 1785,§ first referred to this plant, describing it as milky and acrid, and possessing properties similar to those of *Lobelia syphilitica*. It is evident that he knew but little of it.

Barton, 1802,|| refers to the Cherokee Indians using an infusion of *Lobelia cardinalis*, and the powder of the plant, for worms. This is agreed to by Rafinesque, 1830,¶ who also makes very brief mention of the drug. These statements have furnished the foundation for subsequent writers to class the plant with anthelmintics, as is usually done. However, the Indians made but little use of it, if any, preferring *spigelia*, and even Prof. Barton gives but little attention to the drug. The plain facts are that absolutely nothing is known regarding the medical action of the plant.

*John Parkinson was an apothecary of London in the sixteenth century when botany was in its infancy. He wrote two very extensive works, which remain to this day as monuments of his perseverance and labor; the first, *Paradisi in Sole Paradisus Terrestris*, a description of the different species and varieties of plants in cultivation in English gardens and the first work describing and figuring these plants; the second, *Theatrum Botanicum*, a description of all the then known plants of the world, about 3800.

†*Paradisi in sole Paradisus terrestris*, John Parkinson, London, 1629, page 356 and plate 355.

‡Described under the name "*Trachelium Americarum, flore ruberrimo, sive Planta Cardinalis*."

§1629.—Parkinson *Paradisi*, p. 356.—*Trachelium Americarum flore ruberrimo, sive Planta Cardinalis*.

¶1718.—Ruppius, *Flora Jenensis*, p. 201.—*Cardinalis rivini*.

||1644.—*Columna, Notis et Additionibus ad Rerum Medicarum, Recho.*—*Rapuntium maximum coccineo spicato flore*.

¶1719.—Tournefort, *Institutiones Rei Herbariæ*, p. 163.—Same.

§1680.—Morrison, *Historia Plantarum*, part 2, page 466.—*Rapuntium galeatum, virginianum seu americanum, coccines flore majore*.

||1737.—Linnæus, *Hortus Cliffortianus*, p. 426.—*Lobelia caule erecto, foliis lanceolatis obsolete serratis, racemo terminatrici*.

¶1739.—Gronovius, *Flora Virginica*, p. 124.—Same.

§1740.—Royer, *Flora Leydensis*, p. 241.—*Lobelia caule erecto, foliis lanceolatis serratis, spica terminale*.

¶1748.—Linnæus, *Hortus Upsaliensis*, p. 276.—Same.

§*Materia Medica Americana*, p. 128.

||*Collections for a Materia Medica*, part 1st, p. 40, and part 2nd, p. xiv.

¶*Medical Flora of the United States*, vol. ii., p. 26.

CONSTITUENTS.—Prof. William Procter, Jr., 1839,* made an analysis of *Lobelia cardinalis*, obtaining an alkaloidal-like body as follows. The herb was dried, macerated with water that had been acidulated with acetic acid, the watery product neutralized with magnesia and then exhausted with sulphuric ether. The ethereal solution was evaporated, yielding an aromatic-like oily thick liquid of a brown color. It was soluble in turpentine, ether, and alcohol; was of alkaline reaction, neutralized acids, and formed crystalline salts with acids. Its taste was bitter and acrid. This body was doubtless a mixture of an alkaloid with impurities dissolved by the ether. There has been no subsequent analysis.

Lobelia cardinalis is not a commercial drug and is not used in medicine.