

2. *JATROPHA CURCAS* is a native of South America and of Asia. Its fruit is the *nux cathartica americana* or *nux barbadensis* of some writers. Its seeds, which are occasionally met with in the shops, are called *physic nuts* (*semina ricini majoris*, or *gros pignon d'Inde*). Pelletier and Caventou analyzed them under the name of Croton seeds, (*Journ. de Pharm.* t. xv. p. 514,) and extracted from them a volatile acrid acid, called *jatrophic acid* (see p. 220). Mr. Bennett (*Lond. Med. Gaz.* ix. 8.) swallowed four seeds, and experienced a very unpleasant burning sensation in the stomach and bowels, with nausea, which, after an interval of nearly two hours, terminated in vomiting: their purgative effects followed soon afterwards, and were mild; the sickness had then nearly passed away, but the burning sensation continued for some time longer. In large doses they are energetic poisons.

The oil *Oleum Jatrophæ Curcædis seu Oleum infernale* is analogous in its properties to croton oil. It is occasionally used as a drastic purgative. In India it is used for lamps.

3. *EUPHORBIA LATHYRIS*, or *Caper Spurge*, is an indigenous biennial. It is mentioned as an officinal substance in the Paris *Codez*. Its milky juice is violently acrid. In a case of poisoning by the seeds, narcotic symptoms were also present. (Christison, *Treatise on Poisons*.) The oil *Oleum Euphorbiæ Lathyridis*, extracted from the seeds, may be employed as an indigenous substitute for croton oil. The dose of it is from three to ten drops. (Dierbach, *Neuest. Entd. in d. Mat. Med.* S. 76, 1837; Bailly, *Lancet*, June 10th, 1826.)

4. *EUPHORBIA IPECACUANIA* is a native of the United States of America, in whose Pharmacopœia, it is mentioned. It is emetic and purgative. As an emetic it is given in doses of from ten to fifteen grains. (*United States Dispensatory*.) [The root of the *E. corollata*, large flowering spurge, is also employed for the same purposes.]

5. The juice of *CROZOPHORA TINCTORIA* becomes, under the united influence of air and ammonia, blue. Linen impregnated with this blue dye is called *rag turnsole* (*bezetta carulea*): it is a test for acids, which redden it, but it is not used in this country. It must not be confounded with litmus. (*Vide p. 42.*)

#### ORDER XXX.—ARISTOLOCHIACEÆ, Lindley.—THE BIRTHWORT TRIBE.

##### ARISTOLOCHIÆE. Jussieu.

ESSENTIAL CHARACTER.—Flowers hermaphrodite. *Calyx* adherent to the ovary [i. e. superior], monosepalous; the limb three-lobed or tubular, and irregularly dilated at the upper part; valvate in æstivation. *Stamens* definite, generally in ternary numbers, free and distinct or adherent to the style and stigma, and epigynous. *Ovary* three to six-celled; *style* short; *stigma* divided. *Capsule* or *berry* coriaceous, three to six celled, many seeded; the *placentas* lateral. *Embryo* very small, at the base of a cartilaginous albumen.—Usually climbing *herbs* or shrubs, with alternate, simple, petiolated *leaves*. (*Bot. Gall.*)

PROPERTIES.—Not important. The roots possess stimulant properties, owing to the presence of volatile oil. Some of them are acrids. Bitter extractive renders them somewhat tonic.

#### ARISTOLOCHIA SERPENTARIA, Linn. L. E. D.—THE VIRGINIAN SNAKE-ROOT.

*Aristolochia officinalis*, Nees and Ebermaier.

*Sex. Syst.* Gynandria, Hexandria.

(*Radix*, L. D.—The Root, E.)

(*Serpentaria*, U. S.)

HISTORY.—The first writer who distinctly mentions *Virginian snake-root*, or *snake-weed*, is Thomas Johnson, an apothecary of London, in his edition of Gerarde's Herbal, published in 1633.

BOTANY.—*Gen. Char.*—*Calyx* tubular, ventricose at the base, dilated at the apex, and extended into a ligula. *Anthers* six, subsessile, inserted on the style. *Stigma* six-lobed. *Capsule* six-angled, six-celled. (*Bot. Gall.*)

*Sp. Char.*—*Stem* flexuous, ascending. *Leaves* cordate, acuminate, on both sides pubescent. *Peduncles* nearly radical, unifloral. Lip of the *calyx* lanceolate. (*Beschr. offic. Pflanzen*.)

*Hab.*—North America.

COLLECTION AND PROPERTIES.—The root (*radix serpentaria*) is collected in Western Pennsylvania and Virginia, in Ohio, Indiana, and Kentucky. (*United States Dispensatory*.) It is imported in bales, usually containing about 100 lbs. As met with in the shops, it consists of a tuft of long, slender, yellowish, or brownish fibres, attached to a long contorted head or caudex. The odour is aromatic, the taste warm and bitter.



COMPOSITION.—It was analyzed by Bucholz in 1807 (Gmelin, *Hand. d. Chim.*); by Chevallier in 1820, (*Journ. de Pharm.* vi. 365,) and by Peschier in 1823. (Gmelin, *op. cit.*)

Bucholz's Analysis.		Chevallier's Analysis.	
Volatile oil .....	0.50	Volatile oil.	
Greenish-yellow soft resin .....	2.85	Resin.	
Extractive matter .....	1.70	Extractive.	
Gummy extractive .....	18.10	Starch.	
Lignin .....	62.40	Ligneous fibre.	
Water .....	14.45	Albumen.	
		Malate and phosphate of lime.	
		Oxide of iron and silica.	
Serpentary root .....	100.00		Serpentary root.

1. VOLATILE OIL.—Grassman (quoted by Dr. W. C. Martius, *Pharmacogn.*) obtained only half an ounce from 100 lbs. of the root. Its colour is yellowish, its odour considerable, its taste not very strong. (Lewis, *Mat. Med.*) Grassman compares the odour and taste to those of valerian and camphor combined.

2. BITTER PRINCIPLE: *Extractive*, Bucholz and Chevallier.—This is very bitter and slightly acrid. It is soluble in both water and spirit. Its solution, which is yellow, is rendered brown by alkalis, but is unchanged by the feruginous salts.

PHYSIOLOGICAL EFFECTS.—These have been examined by Jörg and his pupils (Wibmer, *Arzneim. u. Gifte*, Bd. i. S. 221; also, *Journ. de Chim. Méd.* t. vii. p. 493).

In *small doses*, serpentary promotes the appetite. In *large doses*, it causes nausea, flatulence, uneasy sensation at the stomach, and more frequent but not liquid stools. After its absorption, it increases the frequency and fullness of the pulse, augments the heat of the skin, and promotes secretion and exhalation. Furthermore, it would appear, from the experiments before referred to, that it causes disturbance of the cerebral functions, and produces headache, sense of oppression within the skull, and disturbed sleep.

In these properties, serpentary bears some analogy to, but is much weaker than, camphor. It is more powerful than *contrayerva*.

USES.—Its employment is indicated in cases of torpor and atony. It was formerly termed *alexipharmic*, on account of its fancied power of curing the bite of the rattlesnake and of a mad dog. (Dale, *Pharmacologia*.) At the present time it is rarely employed. It has been much esteemed as a stimulant in *fevers*, both continued and intermittent. A scruple of serpentary, taken in three ounces of wine, is mentioned by Sydenham (*Works*, translated by Dr. Pechey, 4th ed. p. 233,) as a cheap remedy for tertians in poor people. Dr. Cullen (*Mat. Med.*) considered it as suited for the low and advanced stage of typhus only. In an epidemical affection of the throat (called the *throat-distemper*), it was given internally as a diaphoretic, and used with sumach berries, in the form of a decoction, as a gargle, with benefit. (*Med. Observ. and Inq.* vol. i. p. 211.)

ADMINISTRATION.—The dose of it in substance is from ten to thirty grains. The infusion is the best form for the administration of serpentary.

1. INFUSUM SERPENTARIÆ, L. E. (U. S.); *Infusion of Serpentary or Snake-root*.—Serpentary, ʒss.; Boiling Water, Oj. Infuse for four hours in a [lightly, L.] covered vessel, and strain [through linen or calico, E.]—Dose, ℥ʒj. or ℥ʒij. every two or three hours, according to the circumstances.

2. TINCTURA SERPENTARIÆ, L. E. D. (U. S.); *Tincture of Serpentary or Snake-root*.—Serpentary, bruised, [in moderately fine powder, E.] ʒijss. L. [ʒij. D.] (U. S.); Proof Spirit, Oij. [*wine measure D.*; and Cochineal, bruised, ʒj. E.]. Macerate for fourteen [seven D.] days, and filter. "Proceed by percolation or digestion as for the tincture of cinchona," E.)—used as an adjunct to tonic infusions.—Dose, from ℥ʒj. to ℥ʒij.



## 2. AS'ARUM EUROPE'UM, Linn. L. D.—COMMON ASARABACCA.

Sex. Syst. Dodecandria, Monogynia.

(Folia, L. D.)

**HISTORY.**—This plant was used in medicine by the ancients. Dioscorides (lib. i. cap. ix.) calls it *ἄσαρον*.

**BOTANY.** **Gen. Char.**—*Calyx* campanulate, three-lobed. *Stamens* twelve, inserted on the ovary; *anthers* adnate to the middle of the filaments. *Style* short. *Stigma* stellate, six-lobed. *Capsule* six celled. (*Bot. Gall.*)

**Sp. Char.**—*Leaves* two on each stem, kidney-shaped, obtuse, [somewhat hairy]. (Smith.) (*Eng. Flora.*)

The branching *root-fibres* arise from an underground stem or *rhizome*. The aerial *stems* are several from each rhizome. *Leaves* petiolated. From the axil of the two leaves springs a solitary, rather large, drooping *flower*, upon a short peduncle, of a greenish brown colour and coriaceous substance. Segment of the *calyx* incurved. *Capsule* coriaceous. *Seeds* ovate, with horny albumen.

**Hab.**—Indigenous. Perennial. Flowers in May.

**DESCRIPTION.**—The whole plant (root-fibres, rhizome, and aerial stems, with leaves and flowers) are kept in the shops under the name of *asarabacca* (*radix cum herbâ asari*), but the leaves only are directed to be used in the Pharmacopœia. Dr. Batty (*Eng. Flora.*) states that the plant is gathered for medicinal uses in the woods near Kirkby Lonsdale, Westmoreland. The *rhizome* is about as thick as a goose-quill, grayish, quadrangular, knotted. It has a pepper-like odour and an acrid taste. The *leaves* are almost inodorous, but have an acrid, aromatic, and bitter taste.

**COMPOSITION.**—Goerz, (Pfaff, *Mat. Med.* Bd. iii. S. 229,) published an analysis of the root in 1784; Lassaigne and Feneulle another in 1820 (*Journ. de Pharm.* t. vi. p. 561); Regimbeau a third in 1827 (*Journ. de Pharm.* t. xiv. p. 200); and Gräger a fourth in 1830. (Goebel and Kunze, *Pharm. Waarenk.*)

Gräger's Analyses.			
Root.		Herb.	
Volatile oil		Asarin.....	0.10
Asarum-camphor } .....	0.630	Tannin.....	0.04
Asarin (? Asarite) } .....		Extractive.....	5.49
Asarin.....	1.172	Chlorophylle.....	1.52
Tannin.....	1.072	Albumen.....	2.12
Extractive.....	3.972	Citric acid.....	0.54
Resin.....	0.156	Ligneous fibre.....	15.00
Starch.....	2.048	Water.....	74.84
Gluten and albumen.....	1.010	Loss.....	0.35
Citric acid.....	0.316		
Ligneous fibre.....	12.800	Fresh Herb of Asarabacca.....	100.00
Salts, (citrates, chloride, sulphate, and phosphates).....	3.042		
Water.....	74.600		
Fresh Root of Asarabacca.....	100.815		

1. **VOLATILE OILY MATTERS.**—By submitting asarabacca root to distillation with water, three volatile oily matters are obtained; one liquid and two solid, at ordinary temperatures.

*a. Liquid Volatile Oil (Oleum Asari).* It is yellow, glutinous, lighter than water, and has an acrid, burning taste, and a penetrating valerian-like odour. It is slightly soluble in water, more so in alcohol, ether, and the oils (volatile and fixed). Its constituents are  $C^9 H^4 O$ .

*β. Asarite of Gräger.*—In small needles, of a silky lustre. It is odourless and tasteless. It is fusible and volatilizable by heat; its vapour being white and very irritating. It is soluble in alcohol, ether, and the volatile oils, but not in water. Both nitric and sulphuric acids dissolve the crystals without the evolution of gas: if water be added to the sulphuric solution, the asarite is thrown down unchanged.

*γ. Asarum-camphor.*—Is distinguished from asarite by the following characters:—Water throws it down from its alcoholic solution in cubes or six-sided prisms, whereas asarite is precipitated in delicate flexible needles. It dissolves in nitric acid without effervescence. Water added to its sulphuric solution throws down a brown resin. After fusion it has the form of a crystalline, striated mass. Its composition is  $C^9 H^6 O^2$ . Blanchet and Sell regard it as the hydrate of the liquid volatile oil.

2. **BITTER PRINCIPLE OF ASARABACCA (Asarin of Gräger and of some other pharmacologists).**—Brownish, very bitter, soluble in alcohol.



**PHYSIOLOGICAL EFFECTS.**—Every part of the plant possesses acrid properties. Applied to the mucous membrane of the nose, it excites sneezing, increased secretion of the mucus, and even a discharge of blood. Swallowed, it causes vomiting, purging, and griping pains. It is said also to possess diuretic and diaphoretic properties. Dr. Cullen has enumerated it in his list of diuretics, but expresses his doubts whether it possesses any specific power of stimulating the renal vessels.

**USES.**—Asarabacca has been employed in medicine to excite vomiting, and as an errhine. As an emetic, it is now superseded by ipecacuanha and tartarized antimony. As an errhine, to excite irritation and a discharge of mucus from the nasal membrane, it has been used in certain affections of the brain, eyes, face, mouth, and throat, on the principle of counter-irritation: thus, in paralytic affections of the mouth and tongue, in toothache, and in ophthalmia.

**ADMINISTRATION.**—We may administer either the root or leaves, recollecting that the latter are somewhat milder than the former.—As an *emetic*, the dose is half a drachm to a drachm. As an *errhine*, one or two grains of the root, or three or four grains of the dried leaves, are snuffed up the nostrils every night.—The powder of this plant is supposed to form the basis of *cephalic snuff*.

**PULVIS ASARI COMPOSITUS, D.** *Compound Powder of Asarabacca.*—(Asarabacca leaves, dried, ℥i.; Lavender flowers, dried, ℥i. Reduce them together to powder).—Used as an errhine, in headache and ophthalmia.—Dose from grs. v. to grs. viii.

#### OTHER MEDICINAL ARISTOLOCHIACEÆ.

**ARISTOLOCHIA.**—The roots of *Aristolochia longa* and *A. rotunda* are found in the shops. The long aristolochia root is several inches in length, one or two inches broad, and has a more or less cylindrical form. The round aristolochia root has a more rounded and knobby form. Both kinds are bitter and acrid, and have, especially when powdered, a disagreeable odour. They contain extractive matter and starch. Lassaigne found ulmin in the long species. Their effects are stimulant and tonic. Their stimulant effects are supposed by some to be principally directed to the abdominal and pelvic viscera. They have been employed in amenorrhœa as an emmenagogue. Their dose is from ℥i. to ℥i. Round aristolochia root is a constituent of the Duke of Portland's powder for the gout, which consisted of equal quantities of the roots of *Gentian* and *Birchwort* (*Aristolochia rotunda*), the tops and leaves of *Germander* (*Chamædris*), *Ground Pine* (*Chamæpitys*), and lesser *Centaurium* (*Chironia Centaurium*), powdered and mixed together.<sup>1</sup>

**ASARUM CANADENSE.**—*Asarum*, U. S., *Canada Snake-root*, *Wild Ginger*, the *Root*.—This plant has been introduced into the secondary list of the U. S. Pharmacopœia. It has a creeping fleshy root, somewhat jointed; the leaves are kidney-shaped, pubescent on both sides, two in number, on longish, round, hairy, petioles; flower solitary, growing in the fork of the petioles on a pendulous hairy peduncle; calyx very hairy, consisting of three broad concave segments, of a dull purple colour; stamens twelve; germ inferior. It is found in all parts of the United States, from Canada to Carolina, in low moist woods and thickets; it flowers in June.

The root, alone officinal, is prepared by removal during the summer, cleansing and drying in the shade; in this process the radicles, from their delicacy, are separated; when fresh it has a yellowish colour. As found in the shops it is in long, more or less contorted pieces, about the thickness of a straw, or larger; the external covering is brownish and wrinkled; the internal substance is white, hard, and brittle; occasionally the fragments of the radicles are attached. It comes either in mass or in square packages from the Shakers; when it is connected with the leaves, and is subject to mouldiness, from the partially dry state necessary to packing by pressure. The taste is agreeably aromatic and slightly bitter; the smell is aromatic.

A chemical investigation of this root was made by Dr. Bigelow, which has been repeated by the late Mr. Richard Rushton, (*Amer. Journ. of Pharm.* vol. x. p. 186.) who found it to contain gum, starch, resin, fatty matter, chlorophylle, volatile oil, salts of lime and potassa, iron, and lignin.

The volatile oil has a light, greenish-yellow colour, a warm, fragrant, slightly bitterish, aromatic taste. It is soluble in all proportions in alcohol and ether, sp. gr. 4452. Wild ginger

<sup>1</sup> See Dr. Clephane's *Inquiry into the Origin of the Gout Powder*, in the *Med. Observ. and Inq.* vol. i. Lond. Dr. Clephane concludes that "Cælius Aurelianus's *diacentaurion* and Aëtius's *antidotus eadnobus centaurea generibus* were the same medicine, and are the old names for the Duke of Portland's Powder.



is spoken of by Cornutus as affording a grateful potion when the roots are steeped in wine. Lemery, in his *Dictionnaire Universel des Drogues Simples*, published in 1733, alludes to its substitution for ginger by the aborigines of America. Dr. B. S. Barton, in his *Collections*, states that the compressed juice of the leaves is emetic, and that the leaves are errhine. The best account of its properties are by Drs. Bigelow and William P. C. Barton. Like its congeners it is stimulant and tonic, but like all other articles of the same class, the effects on the animal economy must vary with the mode of exhibition; thus its sudorific power will be manifested by exhibition in warm infusion; and in large quantities, in this form, it will prove emetic; in cold infusion or tincture, it is cordially stimulating and tonic to the system. It may be employed as a succedaneum for serpentaria.—J. C.]

### ORDER XXXI.—LAURACEÆ, Lindley.—THE CINNAMON TRIBE.

LACRI, Jussieu.—LAURINEÆ, Vent. and Rob. Brown.

**ESSENTIAL CHARACTER.**—*Calyx* four to six-cleft, with imbricated aestivation, the limb sometimes obsolete. *Stamens* definite, perigynous opposite the segments of the calyx, and usually twice as numerous; the three innermost, which are opposite the three inner segments of the calyx, sterile or deficient; the six outermost scarcely ever abortive; *anthers* adnate, two to four-celled; the cells bursting by a longitudinal persistent valve from the base to the apex; the outer anthers valved inwards, the inner valved outwards [or both valved inwards, Lindl.] *Glands* usually present at the base of the inner filaments. *Ovary* single, superior, with one or two single pendulous ovules; *style* simple; *stigma* obtuse. *Fruit* baccate or drupaceous, naked or covered. *Seed* without albumen; *embryo* inverted; *cotyledons* large, plano-convex, peltate near the base; *radicle* very short, included, superior; *plumule* conspicuous, two-leaved.—*Trees*, often of great size. *Leaves* without stipules, alternate, seldom opposite, entire, or very nearly lobed. *Inflorescence* panicled or umbelled (Rob. Brown).

**PROPERTIES.**—The plants of this order owe their most important qualities to the presence of volatile oil, which is found, more or less abundantly, in all parts of the vegetable. This oil is sometimes liquid and highly aromatic, as oil of cinnamon; at others it is solid at ordinary temperatures, and is endowed with narcotic properties, as camphor. The acrid principle of some species is probably a volatile oil.

In the bark and leaves, the volatile oil is usually associated with tannic acid, which gives them astringency, as in cinnamon. In the fruit and seeds, on the other hand, it is usually combined or mixed with fixed oil, as in bay-berries.

#### I. CINNAMOMUM ZEYLANICUM, Nees, E.—THE CINNAMON.

*Laurus Cinnamomum*, Linn. L. D.

*Sex. Syst.* Enneandria, Monogynia.

(Cortex; et Oleum e cortice destillatum, L.—Bark; and Volatile oil of the bark, E.—Cortex et Oleum volatile, D.)

(Cinnamomum, the Bark; and Oleum Cinnamomi, the Oil, U. S.)

**HISTORY.**—Cinnamon (*Kinman*, Hebr.) is mentioned in the Old Testament, (*Exod.* xxx. 23,) about 1490 years before Christ. In all probability the Hebrews received it from the Arabians, who must, therefore, have had commercial dealings with India at this early period. (*Pictorial Bible*, vol. i. p. 222.) The first notice of Cinnamon (*κιννάμωμον*) by the Greek writers occurs in Herodotus, (*Thalia*, cvii. and cxi.) who died 413 years before Christ. Probably both the Hebrew and Greek names for this bark are derived from the Cingalese *cacynama* (*dulce lignum*), or the Malayan *kaimanis*. (Royle, *Essay on Hindoo Medicine*, pp. 84 and 141.) Hippocrates (pp. 265, 575, and 609, ed. Fœs.) employed cinnamon externally. Dioscorides (lib. i. cap. 13,) describes several kinds of cinnamon.

**BOTANY. Gen. Char.**—*Flowers* hermaphrodite or polygamous. *Calyx* six-cleft; with the limb deciduous. *Stamina* twelve, in four rows; the nine external ones fertile, the three inner ones capitate, abortive; the three most internal of the fertile stamina having two sessile glands at the base: *anthers* four-celled, the three inner turned outwards. *Ovary* one-celled, with one ovule. *Fruit* (a berry) seated in a cup-like calyx. *Leaves* ribbed. *Leaf-buds* naked. *Flowers* panicled, rarely fascicled. (Condensed from Endlicher.) (*Gen. Plant.*)

**Sp. Char.**—*Branches* somewhat four-cornered, smooth. *Leaves* ovate or ovate-oblong, tapering into an obtuse point, triple-nerved, or three-nerved, reti-



culated on the under side, smooth, the uppermost the smallest. *Panicles* terminal and axillary, stalked. *Flowers* hoary and silky; segments oblong, deciduous in the middle (Nees). (*Systema Laurinarum*.)

Botanists admit several varieties of this species: the most important are,—*a. Broad-leaved*, Moon (*Cat. of Ceylon Plants*): *Mu-pat* (Cingalese). The plant above described.

FIG. 190.

*Cinnamomum zeylanicum*.

*β. Narrow-leaved*, Moon. *Cinnamomum zeylanicum* var. *γ. Cassia*, Nees. *Heen-pat* (Cingalese). This variety, which I have received from Ceylon, under the name of *Bastard Cinnamon*, has oblong or elliptical leaves, much tapering to the point, and acute at the base.

Percival (*Account of the Island of Ceylon*.) mentions four varieties which are barked: 1st, *Rosse curundu*, or *honey cinnamon*, with broad leaves, yields the best bark; 2dly, *Nai curundu*, or *snake cinnamon*, also with large leaves, not greatly inferior to the former; 3dly, *Capuru curundu*, or *camphor cinnamon*, an inferior kind; 4thly, *Cabatte curundu*, or *astringent cinnamon*, with smaller leaves; its bark has a harsh taste.

**Hab.**—Cultivated in Ceylon and Java.

**PRODUCTION.**—The cinnamon bark of Ceylon is obtained by the cultivation of the plant. The principal *cinnamon gardens* lie in the neighbourhood of Colombo. (See Percival's *Account of Ceylon*, 2d ed. 1805.) The bark-peelers, or *choliahs*, having selected a tree of the best quality, lop off such branches as are three years old, and which appear proper for the purpose. Shoots or branches, much less than half an inch or more than two or three inches in diameter, are not peeled. The peeling is effected by making two opposite, or when the branch is thick three or four, longitudinal incisions, and then elevating the bark by introducing the peeling-knife beneath it. When the bark adheres firmly, its separation is promoted by friction with the handle of the knife. In twenty-four hours the epidermis and greenish pulpy matter (*rete mucosum*) are carefully scraped off. In a few hours the smaller quills are introduced into the larger ones, and in this way a congeries of quills formed, often measuring forty inches long. The bark is then dried in the sun, and afterwards made into bundles with pieces of split bamboo twigs. (Percival, *op. cit.*; and Marshall, in *Thomson's Ann. of Philosophy*, vol. x.)

**COMMERCE.**—Cinnamon is imported in bales, boxes, and chests, from Ceylon principally; but in part also from Madras, Tellicherry, and rarely from Canton. (*Trade List* for 1837 and 1838.) In 1830, 14,345 lbs.; and in 1831, 2,305 lbs. of cinnamon were imported from the Cape of Good Hope. (*Parliamentary Returns*.) The quantities of cinnamon on which the import duty of 6d. per lb. was paid, during the last six years, are the following (*Trade List*):

In 1835 .....	16,255 lbs.	In 1837 .....	13,697 lbs.	In 1839 .....	15,533 lbs.
1836 .....	17,398 lbs.	1838 .....	16,005 lbs.	1840 .....	16,515 lbs.

Cinnamon exported from the island of Ceylon is subject to the exorbitant duty of 3s. per lb. This has been put on as a substitute for the previous monopoly in the cultivation and sale of cinnamon, held by the government. (M'Culloch, *Commerc. Diction*.)

A few years ago it was the practice to sprinkle black pepper among the bales of cinnamon in stowing them, in order to preserve and improve the quality of the bark. (Percival, *op. cit.*, and Marshall, *loc. cit.*)

**DESCRIPTION.**—When cinnamon comes into dock, it is unpacked and examined; all the mouldy and broken pieces are removed from it. It is then re-



made into bales. These are cylindrical, 3 feet 6 inches long, but of variable diameter, perhaps 16 inches on the average. These bales are enveloped by a coarse hempen cloth, called *gunny*. The cinnamon in boxes and chests is usually the small, inferior, and mouldy pieces. The kinds of cinnamon which I have seen and examined are the *Ceylon*, the *Tellicherry*, and the *Malabar* or *Madras*.

**1. Ceylon Cinnamon.** (*Cinnamomum zeylanicum*, seu *Cinnamomum acutum*.)—This is the most esteemed kind. The fasciculi or compound quills, of which the bales are made up, are about 3 feet 6 inches long, slender, and shivery, and are composed of several smaller quills inclosed one within the other. The bark is thin (the finest being scarcely thicker than drawing paper), smooth, of a light yellow-brown, or brownish yellow (somewhat similar to that of Venetian gold), smooth, moderately pliable, with a splintery fracture, especially in the longitudinal direction. The inner side or *liber* is darker and browner, and contains, according to Ness, small medullary rays filled with a red juice, and which he regards as the peculiar bearers of the aroma. The odour of the bark is highly fragrant. The flavour is warm, sweetish, and agreeable. Inspection and tasting are the methods resorted to for ascertaining the qualities of cinnamon. (See Percival, *op. supra cit.*; also Marshall, *op. supra cit.*)

Ceylon cinnamon is characterised by being cut obliquely at the bottom of the quill, whereas the other kinds are cut transversely. In the London market three qualities of Ceylon cinnamon are distinguished, viz. *first*, *seconds*, and *thirds*. Inferior kinds are thicker, darker, browner, and have a pungent, succeeded by a bitter, taste.

**2. Tellicherry or Bombay Cinnamon** is grown on one estate only, at Tellicherry, by Mr. Brown, and is wholly consigned to Messrs. Forbes and Co. Only 120 or 130 bales are annually imported. In appearance it is equal to the Ceylon kind; but the internal surface of the bark is more fibrous, and the flavour is inferior. It is superior to the Malabar variety.

**3. Madras or Malabar Cinnamon** is of inferior quality. It is grown, I am informed, on the Coromandel coast. It is coarser and inferior in flavour to the other kinds. In thickness it approximates to Cassia lignea. Its quality has annually deteriorated since its introduction into the market. It does not meet with a ready sale, and it is expected that its importation will cease.

Besides the above three kinds of cinnamon, another has appeared in the market, from Java. I have not, however, had an opportunity of seeing it. *Java cinnamon* is said to be equal in quality to that from Ceylon,<sup>2</sup> over which it has the advantage of paying only a trifling export duty.

French pharmacologists describe a cinnamon cultivated at Cayenne.<sup>3</sup> *Cayenne cinnamon* is, however, unknown in the London market. Its volatile oil is more acrid and peppery than the oil from Ceylon cinnamon. (Vauquelin, *Journ. de Pharm.* t. iii. p. 434.)

**SUBSTITUTION.**—In commerce, Cassia lignea is frequently substituted for cinnamon. It is distinguished by its greater thickness, its short resinous fracture, its less delicacy but greater strength of flavour, its shorter quills, and its being packed in small bundles. The difference of flavour is best distinguished when the barks are ground to powder. The great consumers of cinnamon are the chocolate-makers of Spain, Italy, France, and Mexico, and by them the difference of flavour between cinnamon and cassia is readily detected. An extensive dealer in cinnamon informs me that the Germans, Turks, and Russians, prefer cassia, and will not purchase cinnamon, the delicate flavour of which is

<sup>1</sup> In the years 1839 and 1840, I examined above 1000 bales of cinnamon in the Dock warehouses. In 1840 I was kindly assisted in my examination by Mr. Carroll, of Mincing Lane, one of the most experienced London dealers, who attended with me, and from whom I derived much practical information.

<sup>2</sup> *Proceedings of the Committee of Commerce and Agriculture of the Asiatic Society*, p. 147.

<sup>3</sup> See Guibourt, *Hist. abrég. des Drogues*, ii. 14. French pharmacologists apply the term *Cannelle* to Cinnamon as well as to Cassia.



not strong enough for them. In illustration of this, I was told that some cinnamon (valued at 3s. 6d. per lb.) having been by mistake sent to Constantinople, was unsaleable there at any price; while cassia lignea (worth about 6d. per lb.) was in great request.

COMPOSITION.—In 1817, Vauquelin (*op. cit.* 433,) made a comparative analysis of the cinnamons of Ceylon and Cayenne. The constituents of both were found to be *volatile oil, tannin, mucilage, colouring matter* (partially soluble in water and in alcohol, but insoluble in ether), *resin, an acid, and ligneous fibre.*

OIL OF CINNAMON. See below.

CHEMICAL CHARACTERISTICS.—Sesquichloride of iron causes a greenish flocculent precipitate (*tannate of iron*) in infusion of cinnamon. Solution of gelatine also occasions a precipitate (*tannate of gelatine*) in the infusion.

PHYSIOLOGICAL EFFECTS.—Cinnamon produces the effects of the spices already described (vol. i. p. 181). *In moderate doses* it stimulates the stomach, produces a sensation of warmth in the epigastric region, and promotes the assimilative functions. The repeated use of it disposes to costiveness.

*In full doses* it acts as a general stimulant to the vascular and nervous systems. Some writers regard it as acting specifically on the uterus. (Sundelin, *Heilmittel*. Bd. ii. S. 199, 3<sup>te</sup> Aufl.; and Wibmer, *Wirk. d. Arzn. u. Gifte*. Bd. ii. S. 137.)

USES.—The uses of cinnamon are those of the species generally, and which have been before noticed (vol. i. p. 182). It is employed by the cook as an agreeable condiment. In medicine, it is frequently added to other substances; as, to the bitter infusions, to improve their flavour; and to purgatives, to check their griping qualities. As a cordial, stimulant, and tonic, it is indicated in all cases characterized by feebleness and atony. As an astringent, it is employed in diarrhoea, usually in combination with chalk, the vegetable infusions, or opium. As a cordial and stimulant, it is exhibited in the latter stages of low fever. In flatulent and spasmodic affections of the alimentary canal, it often proves a very efficient carminative and antispasmodic. It checks nausea and vomiting. It has also been used in uterine hemorrhage.

ADMINISTRATION.—The dose of it in substance is from ten grains to half a drachm.

I. OLEUM CINNAMOMI, L. E. D. (U. S.) *Oleum Cinnamomi veri offic.*; *Oil of Cinnamon*.—(Obtained in Ceylon, by macerating the inferior pieces of the bark, reduced to a gross powder, in sea-water for two days, when both are submitted to distillation.)—As imported the oil varies somewhat in its colour from yellow to cherry-red; the paler varieties are most esteemed: hence London druggists frequently submit the red oil of cinnamon to distillation, by which they procure two pale yellow oils; one lighter (amounting to about the quarter of the whole), the other heavier than water. The loss on this process is considerable, being near 10 per cent. Percival (*op. cit.*) says, that the oil obtained from the finer sorts of cinnamon is of a beautiful gold colour, while that from the coarser bark is darker and brownish. Its odour is pleasant, and purely cinnamonic. Its taste is at first sweetish, afterwards cinnamonic, burning, and acrid. The following is the composition of the oil according to Mulder (*Berlinisches Jahrbuch für die Pharmacie*, Bd. xxxviii. S. 176):

	Atoms.	Eq. Wt.	Per Cent.	Mulder.
Carbon.....	90	120	81.63	81.99
Hydrogen.....	11	11	7.48	7.29
Oxygen.....	2	16	10.89	10.82
Cinnamon Oil.....	1	147	100.00	100.00

By exposure to the air oil of cinnamon absorbs oxygen, becomes coloured, and produces cinnamic acid, two resins, and water. (*Pharmaceutisches Central Blatt für 1839*, S. 881.) The coloration depends on resinification.



Reagents.			Products.				
	C	H	O		C	H	O
Atoms Cinnamon Oil.....	60	33	6	1 Atom Cinnamic Acid.....	18	7	3
8 Atoms Oxygen.....	—	—	8	1 Atom beta Resin.....	12	5	1
				2 Atoms alpha Resin.....	30	15	4
				6 Atoms Water.....	—	6	6
Total.....	60	33	14	Total.....	60	33	14

*a. Cinnamic Acid.*—This acid is colourless and crystalline. It is sometimes formed by exposing oil of cinnamon for some time to the air. *Cinnamule* ( $C^{18} H^7 O^2$ ) is the hypothetical base of this acid.

*β. Resins.* Alpha resin has a reddish-brown colour. It is soluble in both cold and hot alcohol. Beta resin is soluble in hot, but very slightly so in cold, alcohol. Its colour is cinnamon-brown. To the latter resin Mulder ascribes the colour of cinnamon.

With nitric acid, oil of cinnamon forms a white crystalline substance, composed of  $C^{18} H^9 N O^7$ ; and a red oil.

The Edinburgh College gives the following characters of oil of cinnamon :

“Cherry-red when old, wine-yellow when recent: odour purely cinnamonic; nitric acid converts it nearly into a uniform crystalline mass.”

These characters, however, are not peculiar to this oil, as they are also possessed by oil of cassia.

Oil of cinnamon is sometimes employed as a powerful stimulant in paralysis of the tongue, in syncope, or in cramp of the stomach. But its principal use is as an adjuvant to other medicines. The dose of it is from one to three minims.

*Oil of Cinnamon Leaf* has been recently imported. I am informed by a gentleman on whose estate in Ceylon it was obtained, that it is procured by macerating the leaves in sea-water, and afterwards submitting both to distillation. It is a yellow liquid, heavier than water, and has an odour and taste analogous to those of oil of cloves.

2. *AQUA CINNAMOMI*, L. E. D. (U. S.); *Cinnamon Water.*—(Cinnamon, bruised, lb. iss. [ $\text{℥}xvii$ . *E.*, lb. j. *D.*; or Oil of Cinnamon,  $\text{℥}ij$ . *L.*]; Proof Spirit,  $\text{℥}xviij$ . [Rectified Spirit,  $\text{℥}xiiij$ . *E.* No Spirit, *D.*]; Water, *Cong.* ij. [as much as may be sufficient to prevent empyreuma, *D.*] Let a gallon distil. *The Dublin College* macerates the bark in the water for one day previous to distillation.)—This water is usually prepared in the shops, by diffusing the oil through water by the aid of sugar or of carbonate of magnesia. According to a formula given in the London Pharmacopœia,  $\text{℥}j$  of oil is to be carefully triturated with  $\text{℥}i$  of carbonate of magnesia, and afterwards with *Oij.* of distilled water, and the water subsequently filtered. [The U. S. Pharmacopœia employs this method, and directs, oil of cinnamon,  $\text{℥}ss$ .; carbonate of magnesia,  $\text{℥}ss$ .; distilled water, *Oij.*] Cinnamon water is principally employed as a vehicle for other medicines. It is aromatic and carminative. Gœppert says it is poisonous to plants. By dissolving iodine and iodide of potassium in cinnamon water, a crystalline compound is produced, consisting of iodide of potassium 12.55, iodine 28.14, oil of cinnamon 59.31. (Apjohn, *Athenæum*, No. 517, for 1837, and No. 559, 1838.)

3. *SPIRITUS CINNAMOMI*, L. E. D. *Spirit of Cinnamon.*—(Oil of Cinnamon,  $\text{℥}ij$ .; Proof Spirit, *Cong.* j.; Water, *Oj.* Mix them; then with a slow fire let a gallon distil, *L.*—Cinnamon, in coarse powder, lb. j.; Proof Spirit, *Ovij.* Macerate for two days in a covered vessel: add a pint and a half of water; and distil off seven pints, *E.*—Cinnamon bark, bruised, lb. j.; Proof Spirit, *Cong.* j. [*wine measure*]; Water sufficient to prevent empyreuma. Macerate for twenty-four hours, and distil a gallon, *D.*) Stimulant.—Dose,  $\text{℥}j$ . to  $\text{℥}iij$ .

4. *TINCTURA CINNAMOMI*, L. E. D. (U. S.) *Tincture of Cinnamon.*—(Cinnamon, bruised,  $\text{℥}iijss$ . ( $\text{℥}iij$ . U. S.) [in moderately fine powder, *E.*]; Proof Spirit, *Oij.* [*wine measure*, *D.*] Macerate for fourteen days and strain. [Proceed by percolation or digestion as directed for tincture of cassia, *E.*]—Commonly used as an adjuvant to cretaceous, astringent, tonic, or purgative mixtures. It



has also been employed in uterine hemorrhage. (Voigtels, *Arzneim*, Bd. ii. S. 465.)—Dose, ℥i. to ℥iv.

5. TINCTURA CINNAMOMI COMPOSITA, L. E. (U. S.) *Compound Tincture of Cinnamon*.—(Cinnamon bruised [in fine powder, if percolation be followed, *E.*] ℥j.; Cardamom, bruised, ℥ss. [℥j. *E.*]; Long Pepper, powdered [ground finely, *E.*], ℥ijss. [℥ij. *E.*]; Ginger, ℥ijss. [not used by the *Ed. College*]; Proof Spirit, Oij. Macerate for fourteen days, and strain, *L.* “This tincture is best prepared by the method of percolation, as directed for the compound tincture of cardamom. But it may also be made in the ordinary way by digestion for seven days, straining and expressing the liquor, and then filtering it.” *E.*)—Cordial and aromatic. Used in the same cases as the last.—Dose ℥℥j. to ℥℥ij. [The U. S. P. leaves out the pepper and orders ginger ℥ij.]

6. PULVIS CINNAMOMI COMPOSITUS, L. *Pulvis Aromaticus, E. D.* (U. S.); *Compound Powder of Cinnamon; Aromatic Powder*.—(Cinnamon, ℥ij.; Cardamom, ℥ss. [℥j. *D.*]; Ginger, ℥j.; Long Pepper, ℥ss. [℥j. *D.*] Rub them together, so that a very fine powder may be made. *L. D.*—The *Edinburgh College* employs cinnamon, cardamom seeds, and ginger, of each equal parts.)—[The U. S. P. directs Cinnamon, Ginger, of each two ounces; Cardamom seeds, Nutmeg, grated, each one ounce.]—Aromatic and carminative.—Dose, gr. x. to gr. xxx.—Principally employed as a corrigent of other preparations.

7. CONFECTIO AROMATICA, L. D. (U. S.); *Electuarium Aromaticum, E.*; *Aromatic Confection*.—(Cinnamon; Nutmegs, each ℥ij.; Cloves, ℥j.; Cardamom Seeds, ℥ss.; Saffron, ℥ij.; Prepared Chalk, ℥xvj.; Sugar, lb. ij. Rub the dry ingredients together to a very fine powder. The *Dublin College* orders this powder to be mixed by degrees with lb. j. of water, and the whole beaten to a pulp. The *London College*, on the other hand, directs the powder to be kept in a close vessel, and the water to be added when the confection is wanted.—The *Edinburgh College* orders of Aromatic Powder, *one part*; Syrup of Orange Peel, *two parts*. Mix and triturate them into a uniform pulp.)—The preparation of the *Edinburgh Pharmacopœia* differs essentially from the Aromatic Confection of the *London* and *Dublin Pharmacopœias*, in not containing chalk. The *London College* directs the water to be added when the preparation is wanted, with the view of preventing fermentation, to which the preparation is subject. Some druggists substitute a strong infusion of saffron for the solid saffron; and precipitated carbonate of lime for chalk. [The U. S. P. directs, Aromatic Powder, five ounces and a half; Saffron, in powder, half an ounce; Syrup of Orange Peel, six ounces; Clarified Honey, two ounces.] Aromatic confection, *Ph. L.* and *D.* is antacid, stimulant, and carminative. It is usually added to the ordinary chalk mixture in diarrhœa, and is employed on various other occasions where spices are indicated. Dose, grs. x. to ℥j.

8. EMPLASTRUM AROMATICUM, D.; *Aromatic Plaster*.—Frankincense [*Thus*], ℥ij.; Yellow Wax, ℥ss.; Cinnamon Bark, powdered, ℥vj.; Essential Oil of Allspice; Essential Oil of Lemons, of each, ℥ij. Melt the Frankincense and Wax together, and strain; when they are beginning to thicken by cooling, mix in the powder of cinnamon rubbed up with the oils, and make a plaster.)—By keeping, as well as by the application of heat in spreading, the volatile oils of this preparation are dissipated. “It is used as a stimulant, applied over the region of the stomach, in dyspepsia and increased irritability of that organ, to allay pain and nausea and expel flatus.” (Montgomery, *Observ. on the Dublin Pharm.*)

## 2. CINNAMOMUM CASSIA, Blume, E.—THE CINNAMON CASSIA.

*Cinnamomum aromaticum, Nees.*

*Sex. Syst.* Enneandria, Monogynia.

(Cassia-bark. Oil of Cassia, *E.*—Cassia lignea, and Cassia buds, *offic.*)

(*Cinnamomum*, the bark, U. S.)

HISTORY.—It is highly probable that the bark, now called *cassia-lignea*, was known to the ancient Greeks and Romans; but we cannot positively prove this.



The barks termed by the ancients cinnamomum (*κιννάμωμον*) and cassia (*Psalm*, xiv. v. 9) (*κάσσια*), as well as the trees yielding these substances, are too imperfectly described to enable us to determine with precision the substances referred to. The Cassia tree is called in Chinese *Kwei (Qui)*. Cassia lignea is called *Kwei Pe*, or Cassia skin; while Cassia buds are termed *Kwei Tsze*, or Cassia seeds. Cinnamon is called *Yuh Kwei* (vulgarly Yoke Qui), or Precious Cassia. It is not a product of China.

**BOTANY. Gen. Char.**—Vide *Cinnamomum zeylanicum*.

**Sp. Char.**—*Leaves* opposite, sometimes alternate, oblong-lanceolate, triple-nerved: the nerves vanishing at the point of the leaf. *Petioles* and younger branches silky-tomentose. *Stem* arborescent (Brown). (*Bijdrag.*)

**Hab.**—China; Cultivated in Java.

The tree known in Ceylon as the *Dawul Kurunda* was erroneously supposed by Linnæus to be the source of cassia bark, and hence he termed it *Laurus Cassia*. The Dublin College has been led into the same error. Many years since, Mr. Marshall (*Ann. of Phil.* vol. x. 1817,) stated that the bark of Dawul Kurunda was not aromatic like cinnamon, but had the bitter taste and the odour of myrrh. This tree is the *Litsæa Ceylanica* of recent botanists.<sup>1</sup> Mr. Marshall declares, (*Annals of Philosophy*, vol. x. 1817,) that in Ceylon it is never decorticated, and that the coarse cinnamon, i. e. cinnamon procured from thick shoots or large branches of *Cinnamomum Zeylanicum* "has been imported into England, and sold under the denomination of cassia." It has been erroneously inferred from this statement that the cassia-lignea of European commerce was merely coarse cinnamon; but if this were the case, it would be somewhat remarkable that cassia-lignea is not imported from Ceylon. It is not at all improbable that coarse Ceylon cinnamon may have been sold in the London market as cassia-lignea; but this by no means establishes the identity of the two barks. Such an occurrence can now scarcely happen, seeing that all cinnamon (coarse as well as fine) exported from Ceylon pays a duty of 3s. per lb., while the value here of cassia-lignea in bond is about 6d. per lb.

In the *Pun-tsauu* (a Chinese Herbal) is a drawing of the Cassia tree. It is represented growing on a hill, and as having a very crooked and knotted stem.

**DESCRIPTION.**—*Cassia-lignea (cortex cassie)* is imported in chests. It resembles cinnamon in many of its qualities. It is made up in bundles, which are tied with slips of bamboo. It has the same general appearance, smell, and taste, as cinnamon; but its substance is thicker, its appearance coarser, its colour darker, browner, and duller; its flavour, though cinnamonic, is much less sweet and fine than that of Ceylon cinnamon, but is more pungent, and is followed by a bitter taste; it is less closely quilled, and breaks shorter, than genuine cinnamon (see p. 237). It is imported from Singapore, Calcutta, Bombay, and Manilla.

*China cassia-lignea* (sometimes called *China cinnamon*) is the best kind. It is usually imported from Singapore, rarely from Canton direct. Mr. Reeves (*Trans. Med. Bot. Society*, for 1828, p. 26,) says vast quantities both of cassia buds and cassia-lignea are annually brought to Canton from the province of Kwangse, whose principal city (*Kwei Lin Too*) literally the city of the Forest (or Grove) of Cassia trees, derives its name from the forests of cassia around it. The Chinese themselves use a much thicker bark, (which they call *Kan Gwei Pe*) unfit for the European Market. Mr. Reeves informs me that they esteem it so highly as to pay nearly ten dollars per lb. for it. A very fine quality is occasionally met with, and commands the enormous price of 100 dollars per catty (1½ lb.). A specimen of it, with which he has kindly furnished me, is straight, semi-cylindrical, 11 inches long, rather more than an inch wide, and about one-sixth or one-eighth of an inch thick. Externally it is warted, and covered with crustaceous lichens. Internally it is deep brown. Its odour and flavour are those of cassia. Mr. Reeves also informs me that the best cassia-lignea is cut in the 3d or 4th moon, the second sort in the 6th or 7th moon.

<sup>1</sup> C. G. Nees ab Esenbeck *Syst. Laurinarum*, Berol. 1836; also Dr. Wight in Jameson's *Journal*, vol. xviii. Edinb. 1840.



*Malabar cassia-lignea* is brought from Bombay. It is thicker and coarser than that of China, and is more subject to foul packing; hence each bundle requires separate inspection. (Milburn's *Orient. Comm.*) It may perhaps be coarse cinnamon; for Dr. Wight states that the bark of the older branches of the genuine cinnamon plant are exported from the Malabar coast as cassia. *Mauritius cassia-lignea* I am acquainted with. *Manilla cassia-lignea*, I am informed, is usually sold in bond for continental consumption. I have received a specimen of bark ticketed "Cassia vera from Manilla," the epidermis of which was imperfectly removed.

**CASSIA BUDS** (*Flores Cassiæ immaturæ*; *Clavelli cinnamomi*) are not contained in any of the British Pharmacopœias. They are the produce of China, and are probably procured from the same plant which yields cassia-lignea. Mr. Reeves tells me that he always understood and has no doubt that both cassia buds and cassia-lignea are obtained from the same trees. The buds are gathered, he informs me, in the 8th or 9th moon. Dr. T. W. C. Martius (*Pharmacognosie*, S. 213.) says, that "according to the latest observations which the elder Nees has made known, cassia buds are the calyces (*Fruchtkelche*) of *Cinnamomum aromaticum*, about one-fourth of their normal size. It is also said that they are collected from *Cinnamomum dulce* Nees, which is found in China." Cassia buds bear some resemblance to cloves, but are smaller, or to nails with round heads; they have the odour and flavour of cassia-lignea or cinnamon. The exports from Canton in 1831 were 177,866 lbs., and the imports into Great Britain in 1832 were 75,173 lbs. (M'Culloch's *Dict. of Comm.*) In 1840, 6,406 lbs. paid duty (1s. per lb.) Cassia buds have not been analyzed; their constituents are similar to those of cassia-lignea; they yield a volatile oil by distillation, and contain tannic acid.

**COMMERCE.**—The quantity of cassia-lignea annually imported, and the countries from which it is brought, are as follows (*Parliam. Returns*, No. 50, Sess. 1829; No. 267, Sess. 1832; No. 550, Sess. 1833):

	1827.	1830.	1831.
	lbs.	lbs.	lbs.
East India Company's territories and Ceylon ....	408,192	799,715	358,413
Mauritius .....	4,117	5,305	—
Philippine Islands .....	3,393	25,586	34,376
Brazil .....	—	6,290	—
Netherlands .....	—	—	5,379
Cape of Good Hope .....	—	—	252
<b>TOTAL</b> .....	415,702	837,586	398,420

In 1838, duty (6d per lb.) was paid on 88,971 lbs. (*Trade List*.) Cassia-lignea is imported in chests, bales, and boxes. In 1840, 63,958 lbs. paid duty.

**COMPOSITION.**—*Cassia-lignea* was analyzed by Bucholz, (Gmelin, *Handb. d. Chem.*) who obtained the following results:—*Volatile oil* 0·8, *resin* 4·0, *gummy (astringent) extractive* 14·6, *woody fibre with bassorin* 64·3, *water* and *loss* 16·3.

2. **VOLATILE OIL OF CASSIA.**—(See below.)

2. **RESIN.**—Is peculiar, tasteless, yellowish-brown, soft (Bucholz).

3. **TANNIC ACID.**—Must have been contained in what Bucholz termed gummy (astringent) extractive.

**CHEMICAL CHARACTERISTICS.**—Sesquichloride of iron renders infusion of cassia-lignea dark green, and causes a precipitate (*tannate of iron*). Gelatine also produces a precipitate (*tannate of Gelatine*).

**PHYSIOLOGICAL EFFECTS.**—Similar to those of cinnamon. Sundelin (*Heil-mittell.* Bd. ii. S. 119, 3<sup>te</sup> Aufl.) regards it as being more astringent.

**USES.**—Are the same as those of cinnamon.

**ADMINISTRATION.**—Dose, gr. x. to ʒss.

1. **OLEUM CASSIÆ, E.**; *Oil of Cassia*; *Oil of Chinese Cinnamon*. (Obtained from Cassia-ligna by distillation with water.) Its properties and composition are similar to those of oil of cinnamon before described. Its odour and flavour, however, are inferior to those of the latter. Its colour is usually pale yellow. Nitric acid converts it into a crystalline mass (see p. 238). Its effects and uses



are similar to those of oil of cinnamon. It is employed in the preparation of *Aqua* and *Spiritus Cassiæ*.—Dose gtt. i. to gtt. iv.

2. **AQUA CASSIÆ, E.**; *Cassia Water*.—(Cassia-bark, bruised, ℥xviii.; Water, Cong. ii.; Rectified Spirit, ℥iii. Mix them together, and distil off one gallon.)—Used as an aromatic vehicle for other medicines. It is usually prepared from the oil in the same way that cinnamon water is commonly made.

3. **SPIRITUS CASSIÆ, E.**; *Spirit of Cassia*.—(Cassia, in coarse powder, lb. i.; Proof Spirit, Ovij. Macerate for two days in a covered vessel; add a pint and a half of water, and distil off seven pints.)—Dose, ℥i. to ℥iv. It is usually prepared by adding oil of cassia to proof spirit.

4. **TINCTURA CASSIÆ, E.**; *Tincture of Cassia*.—(Cassia, in moderately fine powder, ℥ijss.; Proof Spirit, Oij. Digest for seven days, strain, express the residuum strongly, and filter. This tincture is more conveniently made by the process of percolation, the cassia before being allowed to macerate in a little of the spirit for twelve hours before being put into the percolator.)—Dose, ℥i. to ℥ii. Used as an adjuvant to tonic infusions.

### 3. CAMPHORA OFFICINARUM, Nees, E.—THE CAMPHOR TREE.

*Laurus Camphora, Linn. L. D.*

*Sex. Syst. Enneandria, Monogynia.*

(Concretum sui generis sublimatione purificatum, *L.—Camphor, E.—Camphora, D.*) (U. S.)

**HISTORY.**—The Ancient Greeks and Romans do not appear to have been acquainted with camphor. C. Bauhin and several subsequent writers state that Aëtius speaks of it; but I have been unable to find any notice of it in his writings; and others (Alston, *Lect. on the Mat. Med.* vol. ii. p. 406,) have been equally unsuccessful in their search for it. Avicenna (lib. ii. tract. ii. cap. 134,) and Serapion (*de temp. Simpl.* cccxxxiv,) speak of it: the latter calls it *kaphor*, and erroneously cites Dioscorides. Simeon Seth, (*de aliment. facult.*) who lived in the 11th century, describes it; and his description is considered, both by Voigtels (*Arzneim.* Bd. i. S. 83,) and by Sprengel, (*Hist. de la Méd.* t. ii. p. 228,) to be the earliest on record.

**BOTANY.**—**Gen. Char.**—*Flowers* hermaphrodite, paniced, naked. *Calyx* six-cleft, papery, with a deciduous limb. *Fertile stamens* nine, in three rows, the inner with two, stalked, compressed glands at the base; *anthers* four-celled, the outer turned inwards, the inner outwards. Three *sterile stamens*, shaped like the first, placed in a whorl alternating with the stamens of the second row; three others stalked, with an ovate, glandular head. *Fruit* placed on the obconical base of the calyx.—*Leaves* triple-nerved, glandular in the axils of the principal veins. *Leaf-buds* scaly (Lindley).

**Sp. Char.**—*Leaves* triple-nerved, shining above, glandular in the axils of the veins. *Panicles* axillary and terminal, corymbose, naked.

*Flowers* smooth on the outside (Nees).

Young *branches* yellow and smooth. *Leaves* evergreen, oval, acuminate, attenuate at the base, bright green and shining above, paler beneath. *Petioles* from one inch to one and a half inches long. *Panicles* axillary and terminal, corymbose. *Flowers* small, yellowish-white. *Berry* round, blackish-red, size of a black currant. *Seed* solitary.

Every part of the tree, but especially the flower, evinces by its smell and taste that it is strongly impregnated with camphor.

**Hab.**—China, Japan, and Cochin-China. Introduced into Java from Japan.

FIG. 191.



*Camphora officinarum.*



**EXTRACTION.**—Kæmpfer (*Amœn. Exot.* p. 772,) and Thunberg (*Fl. Japonica*,) have described the method of extracting camphor in the provinces of Satzuma and the islands of Gocho in Japan. The roots and wood of the tree, chopped up, are boiled with water in an iron vessel, to which an earthen head, containing straw, is adapted. The camphor sublimes and condenses on the straw.

The method practised in China, appears, from the statements of the Abbé Grosier, (*Hist. Gén. de la Chine*, t. xiii. p. 335,) Dentrecolles, (quoted by Davies,) and Davies, (*The Chinese*, vol. ii. p. 355, 1836,) to be somewhat different. The chopped branches are steeped in water, and afterwards boiled, until the camphor begins to adhere to the stick used in stirring. The liquid is then strained, and, by standing the camphor concretes. Alternate layers of a dry earth, finely powdered, and of this camphor, are then placed in a copper basin, to which another inverted one is luted, and sublimation effected.

Two kinds of *unrefined* or *crude camphor* (*camphora cruda*) are known in commerce:

1. **Dutch Camphor; Japan Camphor.**—This is brought from Batavia, and is said to be the produce of Japan. It is imported in tubs (hence it is called *tub camphor*) covered by matting, and each surrounded by a second tub, secured on the outside by hoops of twisted cane. Each tub contains from 1 cwt. to  $1\frac{1}{4}$  cwt. or more. It consists of pinkish grains, which, by their mutual adhesion, form various-sized masses. It differs from the ordinary crude camphor in having larger grains, in being cleaner, and in subliming (usually) at a lower temperature. In consequence of these properties it generally fetches 10s. per cwt. more. There is not much brought to England, and of that which does come the greater part is re-shipped for the continent.

2. **Ordinary Crude Camphor; China Camphor; Formosa Camphor.**—This is imported from Singapore, Bombay, &c. in square chests lined with lead foil, and containing from  $1\frac{1}{4}$  to  $1\frac{1}{2}$  cwt. It is chiefly produced in the island of Formosa, and is brought by the Chin-Chew junks in very large quantities to Canton, whence foreign markets get supplied. (Reeves, *Trans. Med. Bot. Soc.* for 1828, p. 26; Gutzlaff and Reed, *China Opened*, vol. ii. p. 84, 1838.) It consists of dirty grayish grains, which are smaller than those of Dutch camphor. Its quality varies: sometimes it is wet and impure; but occasionally it is as fine as the Dutch kind.

**PURIFICATION.**—Crude camphor is refined by sublimation. Formerly this process was carried on only at Venice. Afterwards it was successfully practised in Holland. The method at present adopted in this metropolis is as follows:—

FIG. 192.



Bombolo.

The vessels in which this sublimation is effected are called *bomboloes* (*bombola*, *Ital.* *βουβουλιος*). They are made of thin flint glass, and weigh about 1 lb. each. Their shape is that of an oblate spheroid, whose shorter or vertical axis is about ten inches, and the longer or horizontal axis about twelve inches. They are furnished with a short neck. When filled with crude camphor, they are imbedded in the sandbath, and heated. To the melted camphor, lime is added, and heat raised so as to make the liquid boil. The vapour condenses on the upper part of the vessel. As the sublimation proceeds, the height of the sand around the vessel is diminished. In about forty-eight hours the process is usually completed. The vessels are then removed, and their mouth closed with tow; water is sprinkled over them by watering-pots, by which they are cracked. When quite cold, the cake of camphor (which weighs about eleven pounds) is removed, and trimmed by paring and scraping. In this process the lime retains the impurities and a portion of the camphor; hence, to extract the latter, the



lime is submitted to a strong heat in an iron-pot with a head to it, and the sublimed product refined by a second sublimation.

PROPERTIES.—*Refined Camphor* (*Camphora raffinata*; *Camphora*, officin.) is met with in the form of large hemispherical or convex-concave cakes, perforated in the middle. It is translucent, has a crystalline granular nature, a strong, peculiar, not disagreeable, aromatic odour, and an aromatic, bitter, afterwards cooling taste. It is solid at ordinary temperatures, soft, and somewhat tough, but may be readily powdered by the addition of a few drops of rectified spirit. A crystal of native camphor in the wood (? camphor of *Dryobalanops aromatica*, Gærtn.) in the collection of *Materia Medica* at the College of Physicians, appears as a flat octohedron, but its primary form is a right rhombic prism. (W. Phillips, in Paris's *Pharmacologia*.) It evaporates in the air at ordinary temperatures; but in closed vessels, exposed to light, sublimes and crystallizes on the sides of the bottle. It fuses at 347° F., and forms a transparent liquid, which boils at 400° F., and in close vessels condenses unchanged. It is lighter than water, its sp. gr. being 0.9867. Small pieces rotate when thrown on this liquid. Water dissolves a very minute portion only of camphor. Alcohol readily dissolves it; and if water be added to the solution, the camphor is precipitated. Ether, bisulphuret of carbon, the oils (both fixed and volatile), and the acids, also dissolve it. The liquid obtained by dissolving camphor in nitric acid is sometimes termed *camphor oil*: it is a *nitrate of camphor*. Camphor is insoluble in alkaline solutions. The vapour of camphor passed over red-hot lime is converted into a liquid called *camphrone* (composed of  $C^{30}H^O$ .)

COMPOSITION.—Camphor has the following composition:

	Atoms.	Eq. Wt.	Per Ct.	Dumas.	Blanchet and Sell.
Carbon.....	10	60	78.94	78.02	77.96
Hydrogen.....	8	8	10.53	10.39	10.61
Oxygen.....	1	8	10.53	11.59	11.43
Camphor.....	1	76	100.00	100.00	100.00

Dumas has suggested that camphor may be regarded as an oxide of a base (as yet hypothetical) which he calls *camphogen*, and whose composition is  $C^{19}H^9$ .

CHEMICAL CHARACTERISTICS.—Camphor is readily known by its odour. It does not blacken in burning. It agrees in many of its properties with the *volatile oils* (vol. i. p. 186). From these it differs, however, in its solidity at ordinary temperatures, and in its not being converted into resin by the oxygen of the air or by nitric acid. By repeatedly distilling nitric acid from camphor, the latter is converted into *camphoric acid* (composed of  $C^{40}H^{80}O^7$  in the anhydrous state). Before the whole of the camphor has been converted into camphoric acid, there are produced intermediate compounds of camphor and this acid, which we may regard as camphorates of camphor.

The above are the characters of the *Common or Laurel Camphor*.

*Borneo Camphor*, or the Camphor of the *Dryobalanops*, will be described hereafter.

*Artificial camphor* is a hydrochlorate of oil of turpentine or of some other volatile oil, having a similar composition. Its empirical formula is  $C^{20}H^{17}Cl$  or  $C^{20}H^{16} + HCl$ . According to Orfila (*Toxicol. Gén.*) it produces no lesion of the nervous system, but confines its action to the formation of a few small ulcers in the mucous membrane of the stomach.

PHYSIOLOGICAL EFFECTS. *a. On Vegetables*.—Gæppert (Poggendorff, *Ann. d. Phys. u. Chem.* 1828) has satisfactorily shown—1st, that solutions of camphor act in the same deleterious manner on plants as the volatile oils; 2dly, that they destroy the mobility of contractile parts without previously exciting them; 3dly, that they have no influence either on the germination of phanerogamia, or the vegetation of the cellular cryptogamia; and 4thly, that the vapour only is sufficient to destroy fleshy plants and ferns. Miquet (Meyen's *Rep. on the Prog. of Veg. Physiol. during the year 1837*, p. 139; trans. by W. Francis,) has confirmed these results.



β. *On Animals generally.*—The action of camphor on animals has been the subject of numerous experiments made by Hillefeld, (quoted by Wibmer, *Wirk. d. Arzneim u. Gifte*, Bd. iii. p. 215,) Monro, (*Essays and Obs. Phys. and Lit.* vol. iii. p. 351,) Menghini and Carminati, (Wibmer, *loc. cit.*) Viborg, Hertwich, (Wibmer, *loc. cit.*) Orfila, (*Toxicol. Gén.*) and Scudery. (Wibmer, *op. cit.*)

Air impregnated with the vapour of camphor proves injurious to insects (the *Tineæ*, which destroy wool, excepted). Sooner or later it causes frequent agitation, followed by languor, insensibility, convulsions and death (Menghini). To *amphibials* (frogs) the vapour also proves noxious. It produces preternatural movements, difficult respiration, trembling, and stupor (Carminati). Given to *birds and mammals*, in sufficient doses, camphor proves poisonous, but the symptoms which it gives rise to do not appear to be uniform. Indeed there are few remedies whose action on the animal economy is so variable as that of camphor. Three drachms dissolved in oil and given to a dog, the œsophagus being tied, caused violent convulsions, somewhat analogous to those of epilepsy, followed by insensibility and death (Orfila). When administered in substance, it inflamed the digestive tube, caused ulceration, and, after its absorption, gave rise to convulsions. (*Ibid.*) Given to horses, in doses of two drachms, it excites spasmodic movements, and quickens the pulse, but does not determine any serious result. (Moiroud, *Pharm. Vétér.*) Tiedemann and Gmelin (*Versuche u. d. Wege auf welchen Subst. aus d. Mag. u. Darmk. ins Blut gelang*, S. 24 and 25) detected the odour of camphor in the blood of the vena portæ and of the mesenteric vein of a horse, to whom they had given camphor; but they could recognize it neither in the chyle nor in the urine. It is evolved from the system principally by the bronchial surfaces; for the breath of animals, to which this substance has been administered, has a strong odour of camphor. Moiroud (*op. cit.*) observed that the skin of a horse, into whose jugular vein camphor had been injected, smelt of this substance.

The general sedative effects of camphor on animals are rarely well marked; however, when administered in a proper dose, and in cases really requiring its use, it sometimes causes a diminution in the force and frequency of the pulse, and seems to allay pain" (Moiroud).

Scudery (quoted by Dr. Christison) observed that the convulsions caused in animals by camphor were accompanied with a peculiar kind of delirium, which made them to run up and down without apparent cause. He also found the urinary organs generally affected, and for the most part with strangury.

γ. *On Man.*—No article of the materia medica has had more contradictory statements made respecting its effects and mode of action than camphor. These, however, have principally referred to its influence over the functions of circulation and calorification; for, with regard to the modifications which it induces in the other functions, scarcely any difference of opinion prevails.

*Its local action* on the mucous surfaces, the denuded dermis, and ulcers, is that of an *acid*. A piece of camphor held in the mouth for half an hour caused the mucous lining of this cavity to become red, hot, swollen, and painful; and it is highly probable that, had the experiment been persevered in, ulceration would have followed. (Trousseau and Pidoux, *Traité de Thérap.* t. i. p. 43.) The pain and uneasiness which camphor, when swallowed in substance, sometimes produces in the stomach, is likewise imputed to its local action as an acid. Rubbed on the skin covered with cuticle, Dr. Cullen says that it causes neither redness nor other mark of inflammation (*Mat. Med.* vol. ii. p. 298); but Dr. Clutterbuck (*Inquiry into the Seat and Nature of Fever*, 2d ed. p. 424) declares this to be "undoubtedly a mistake." When applied to the denuded dermis, or to ulcers, it produces pain, and appears to act as an irritant. These observations respecting the local action of camphor on man, are confirmed by the ascertained effects of this substance on other animals.

*Camphor becomes absorbed*, and is thrown out of the system by the bronchial



membrane principally, but also by the skin. Trousseau and Pidoux (*op. supra cit.* p. 49) recognized its odour in every case in the pulmonary exhalation, but failed to detect it in the cutaneous perspiration. Cullen, however, says (*op. cit.* p. 305) that "Mr. Lasonne, the father, has observed, as I have done frequently, that camphor, though given very largely, never discovers its smell in the urine, whilst it frequently does in the perspiration and sweat." The non-detection of it in the urine agrees with the observation of Tiedemann and Gmelin with regard to horses, already noticed.

*Camphor specifically affects the nervous system.*—Regarding the symptoms of this effect but little difference of opinion prevails. In moderate doses it exhilarates and acts as an anodyne. (Harrup, *On the Anodyne Effects of Camphor*, in *The Lond. Med. Rev.*, vol. iv. p. 200, Lond. 1800.) Its exhilarating effects are well seen in nervous and hypochondriacal cases. In large doses it causes disorder of the mental faculties, the external senses, and volition, the symptoms being lassitude, giddiness, confusion of ideas, and disordered vision, noise in the ears, drowsiness, delirium or stupor, and convulsions. These phenomena, which have been observed in several cases, agree with those noticed in experiments on brutes. In its power of causing stupor, camphor agrees with opium; but it differs from the latter in its more frequently causing delirium and convulsions. Epilepsy has been ascribed to the use of camphor.

*The quality of the influence which camphor exercises over the vascular system* has been a subject of much contention. From my own limited observations of its use in small or medium doses (from five to ten grains), I am disposed to regard its leading effect as that of a vascular excitant, though I am not prepared to deny that slight depression may not have preceded this effect. Combined with diaphoretic regimen (warm clothing and tepid diluents), I have seen camphor increase the fulness of the pulse, raise the temperature of the surface, and operate as a sudorific. If opium be conjoined, these effects are more manifest. (See vol. i. p. 277 for some remarks on the comparative operation of ammonia and camphor.)

In excessive doses it acts as a powerful poison. The best related case is that of Mr. Alexander (*Experimental Essays*, p. 128, 1768,) who swallowed two scruples in syrup of roses. In about twenty minutes he experienced lassitude and depression of spirits, with frequent yawnings: at the end of three-quarters of an hour his pulse had fallen from 77 to 67. Soon after he felt giddy, confused, and almost incapable of walking across the room. He became gradually insensible, and in this condition was attacked with violent convulsions and maniacal delirium. From this state he awoke as from a profound sleep: his pulse was 100, and he was able to reply to interrogatories, though he had not completely recovered his recollection. Warm water being administered, he vomited up the greater part of the camphor, which had been swallowed three hours previously; and from this time he gradually recovered.

In another case (*Lond. Med. Gaz.* vol. v. p. 635, from *Rust's Magazine*), a man swallowed four ounces of camphorated spirits containing 160 grains of camphor. The symptoms were burning heat of skin, frequent, full, and hard pulse, brilliancy of the eyes, redness of the face, heaviness of the head, anxiety, agitation, violent sense of heat in the stomach—then intense headache, giddiness, indistinctness of sight, and ocular hallucinations. The patient only complained of the heat, which he said was intolerable. In the night copious sweating came on, followed by sleep. The pulse continued full and frequent, and the voiding of urine difficult.

In some other well-reported cases, camphor, in large doses, caused depression of the vascular system. In the instances related by Fred. Hoffmann, (*op. omnia*, t. iv. p. 26, Geneva, 1748,) Pouteau, (Murray, *App. Med.* vol. iv.,) Griffin, (quoted by Alexander,) Cullen, (*Mat. Med.* vol. ii. p. 295,) Callisen, (Murray, *App. Med.*) Edwards, (Orfila, *Tox. Gén.*) and Trousseau and Pidoux, (*Traité*



*de Thérap.* t. i. p. 48,) sedation of the vascular system was observed. It was manifested by a languid, small, and slower pulse, coldness of the surface, and pallid countenance; in some cases with cold sweat. In some of these instances, symptoms of vascular excitement followed those of depression. The pulse became more frequent and fuller than natural, and the heat of the surface augmented. Trousseau and Pidoux (*op. cit.* p. 51,) ascribe the symptoms of sedation to the depressing influence which camphor exerts over the system by sympathy; while the sanguineous excitation they refer to the passage of camphor into the blood, and the efforts of the organism to eliminate this unassimilable principle. But in some of the cases in which excessive doses of camphor have been taken, no symptoms of depression were manifested; as in the instance mentioned by Dr. Eickhorn (in whom great heat, rapid but small pulse, copious sweating, and agreeable exhilaration), were produced by 120 grs. (*Lond. Med. Gaz.* vol. ix. p. 772,) by Dr. Wendt, (quoted in Dr. Christison's *Treatise on Poisons*, p. 810), by Scudery, (*Wibmer, op. supra cit.*) and by Bergondi, (*op. supra cit.*)

Camphor has long been celebrated as an anaphrodisiac; the smell of it even is said to be attended with this effect; hence the verse of the School of Salerno, "*Camphora per nares castrat odore mares.*" Trousseau and Pidoux (*op. cit.* p. 48,) experienced the anaphrodisiac property of 36 grains of camphor taken into the stomach.

Strangury has also been ascribed to this substance by Heberden, (*Comment. art. Stranguria.*) by Scudery, (*supra cit.*) and others.

Uses.—The discrepancy among authors as to the physiological effects of camphor has had the effect of greatly circumscribing the use of this substance. Indeed, until its operation on the system be more satisfactorily ascertained, it is almost impossible to lay down general rules which should govern its exhibition. The following are the principal maladies in which it has been found useful:

1. *Fever.*—Camphor has been employed in those forms of fever which are of a typhoid type. It is chiefly valuable by causing determination to the surface and giving rise to diaphoresis. Hence those remedies should be conjoined with it which promote these effects: such are ipecacuanha, emetic tartar, and the vegetable alkaline salts. Opium greatly contributes to the sudorific effects of camphor; and, when it is admissible, benefit is sometimes obtained by the administration of one grain of opium with five or eight of camphor. But in a great number of cases of fever the cerebral disorder forbids the use of opium. From its specific influence over the cerebral functions, camphor has been frequently used in fever to allay the nervous symptoms, such as the delirium, the watchings, the subsultus tendinum, &c.; but it frequently fails to give relief. Dr. Home (*Clin. Hist.* p. 36,) did not find any advantage from its use in the low nervous fever; and Dr. Heberden (*Comment. art. Febris.*) has seen one scruple of camphor given every six hours, without any perceptible effect in abating the convulsive catchings, or composing the patient to rest.

2. *In Inflammatory Diseases.*—In the latter stages of inflammation of internal important parts (as the serous and mucous membranes, the stomach, intestines, uterus, etc.) after proper evacuations have been made in the earlier periods of the disease, when great exhaustion is manifested by a small feeble pulse and a cold flaccid skin, small but repeated doses of camphor have been employed to determine to the skin, and to promote diaphoresis. It is particularly serviceable in rheumatic inflammation, and especially when produced by metastasis (*Sundelin, Handb. d. spec. Heilmittel.* Bd. ii. S. 145.)

3. *In the Exanthemata.*—Camphor has been employed in small-pox, as also in measles, scarlatina, and miliary fever; but it is admissible only when the circulation flags, and the temperature of the surface falls below the natural standard. In such cases it is sometimes employed along with a diaphoretic re-



gimen to determine to the skin. It is to be carefully avoided when inflammation of the brain or its membranes is feared. It has been asserted that if a camphorated ointment be applied to the face, no small-pox pustules will make their appearance there; but the statement is not correct.

4. *In Mania, Melancholia, and other forms of Mental Disorder.*—Camphor is occasionally taken to cause exhilaration. I am acquainted with two persons, (females,) both of nervous temperament, who use it for this purpose. To relieve despondency I have often found it serviceable. In mania and melancholia it has now and then proved serviceable by its narcotic effects; it induces mental quiet and causes sleep. It was used in these affections by Paracelsus and several succeeding writers, (Murray, *App. Med.* vol. iv. p. 499,) especially, in more modern times, by Dr. Kinneir, (*Phil. Trans.* vol. xxxv.,) and by Avenbrugger. (*Experim. de remed. specif. in mania virorum*, Vind. 1776.) The latter regards it as a specific in the mania of men, when accompanied with a small contracted penis, corrugated empty scrotum, or when both testicles are so retracted that they appear to be introduced into the abdominal cavity.

5. *In Spasmodic Affections.*—The narcotic influence of camphor has occasionally proved serviceable in some spasmodic or convulsive affections; viz. spasmodic cough, epilepsy, puerperal convulsions, hysteria, and even tetanus; its use, however, requires caution.

6. *In Irritation of the Urinary or Sexual Organs.*—A power of diminishing irritation of the urinary organs has long been assigned to camphor. In strangury and dysuria, especially when produced by cantharides, it is said to have been used with benefit—a statement apparently inconsistent with that more recently made of its producing irritation of the urinary organs. In satyriasis, nymphomania, and onanism, it is said to have proved advantageous by its anaphrodisiac properties. In dysmenorrhœa it sometimes proves serviceable as an anodyne.

7. *In Poisoning.*—Small doses of camphor (administered by the mouth or by the rectum) have been exhibited with apparent benefit in cases of poisoning by opium. (Orfila, *Toxicol. Gén.*) It has also been employed to mitigate the effects of cantharides, squills, and mezereon (Hahnemann, and Van Bavegem, in Marx's *Die Lehre v. d. Giften*, Bd. ii. S. 202 and 358); but toxicologists, for the most part, do not admit its efficacy; at any rate, further evidence is required to establish it. Nor does there appear any valid testimony for believing that camphor possesses the power of checking mercurial salivation, as some have supposed.

8. *In Chronic Rheumatism and Gout.*—A mixture of camphor and opium, in the proportions before mentioned, is useful in chronic rheumatism, by its sudorific and anodyne properties. Warm clothing and diluents should be conjoined. In chronic gout, also, camphor is said to have proved beneficial.

9. *In Cholera.*—The combination of camphor and opium above referred to, I have seen used with benefit in cholera.

10. *Externally*, camphor is employed in the form of vapour, in solution, or, more rarely, in the solid state. The vapour is occasionally inhaled in spasmodic cough; and is applied to the skin to alleviate pain and promote sweat, constituting the *camphor fumigations* (*fumigationes camphoræ*). Dupasquier (*Revue Méd.* t. ii. p. 218, 1826) recommended these fumigations in chronic rheumatism. The patient may be in bed or seated in a chair; and, in either case, is to be enveloped by a blanket tied round the neck. About half an ounce of camphor is then to be placed on a metallic plate, and introduced within the blanket (under the chair, if the patient be seated). In solution, camphor is used either as an anodyne or a local stimulant. The nitric solution of camphor is used to relieve toothache. A solution of camphor in oil has been used as an injection into the urethra, to relieve ardor urinæ in gonorrhœa, and into the rectum to mitigate tenesmus arising from ascarides or dysentery. The acetic and



alcoholic solutions of camphor are mostly employed as stimulants. In *substance*, camphor is not frequently used. A scruple or half a drachm "added to a poultice, and applied to the perineum, allays the chordee, which is a painful attendant upon gonorrhœa." (*United States Dispensatory*.) Powdered camphor is a constituent of some tooth-powders, to which it communicates its peculiar odour.

The foregoing are some only of the maladies in which camphor has been extensively used and lauded. I must refer to the works of Murray (*App. Med.* vol. iv.) for various other uses which have been made of this substance.—It is scarcely necessary to add, that camphor-bags possess no prophylactic properties against contagion.

**ADMINISTRATION.**—The medium dose of it is from five to ten grs.; but it is frequently exhibited in much smaller doses (as one grain); and occasionally a scruple has been employed. It is given in the form of a pill or emulsion. That of *pill* is said to be objectionable, "as in this state the camphor is with difficulty dissolved in the gastric liquors, and, floating on the top, is apt to excite nausea, or pain or uneasiness at the upper orifice of the stomach." (*United States Dispensatory*.) The *emulsion* is made by rubbing up the camphor with loaf sugar, gum arabic, and water; and the suspension will be rendered more complete by the addition of a little myrrh. (*United States Dispensatory*.)

**ANTIDOTE.**—In a case of poisoning by camphor, first evacuate the contents of the stomach. Hufeland (Marx, *Die Lehre von d. Gift*. Bd. ii. S. 202.) recommends the use of opium to relieve the effects of camphor. Phœbus (*Handb. d. Arzneiverord.* 2<sup>te</sup> Ausg.) directs chlorine water to be administered as the antidote, and afterwards purgatives and clysters. Vinegar and coffee, he states, promote the poisonous operation. Wine assists the patient's recovery.

1. **MISTURA CAMPHORÆ**, L. E. D.; *Aqua Camphoræ*; *Camphor Mixture*.—(Camphor, ℥ss.; Rectified Spirit, ℥x.; Water, Oj. First rub the camphor with the spirit, then with the water gradually poured in, and strain through linen, L.—The *Dublin College* employs of camphor, ℥j.; of Rectified Spirit, gtt. x.; of Refined Sugar, ℥ss.; of Hot Water, Oj. [*wine measure*]. The camphor is to be first rubbed with the spirit, then with the sugar; lastly, add the water during the trituration, and filter the mixture through bibulous paper, D.—The *Edinburgh College* employs camphor, ℥j.; Sweet Almonds, and Pure Sugar, of each, ℥ss.; Water, Oj. Steep the almonds in hot water, and peel them; rub the camphor and sugar well together in a mortar; add the almonds; beat the whole into a smooth pulp; add the water gradually, with constant stirring, and then strain, E.)—The *camphor mixture* kept in the shops is often prepared by suspending camphor in water without the intervention of any third body. The quantity of this substance dissolved is exceedingly small. The rectified spirit employed by the London and Dublin Colleges serves to promote the pulverization, and, very slightly perhaps, the solution of the camphor. Sugar also assists its diffusion through water. The preparation of the *Edinburgh Pharmacopœia* is, in fact, an emulsion. None of these artificial mixtures, however, are very permanent, and the quantity of camphor which remains in solution is so small, that the liquid can scarcely be said to possess more than the flavour and odour of camphor. Hence its principal value is as a vehicle for the exhibition of other medicines. Its usual dose is from fʒj. to fʒij.—[The **AQUA CAMPHORÆ** of the U. S. P. is thus prepared:—camphor, two drachms; alcohol, forty minims; carbonate of magnesia, a drachm; distilled water, two pints. Rub the camphor first with the alcohol, afterwards with the carbonate of magnesia, and lastly with the water gradually added; then filter through paper.]

2. **MISTURA CAMPHORÆ CUM MAGNESIÄ**, E. D. *Camphor Mixture with Magnesia*.—(Camphor, gr. x. [gr. xij. D.]; Carbonate of Magnesia, gr. xxv. [℥ss. D.]; Water, fʒv.) Triturate the camphor and carbonate of magnesia together, adding the water gradually.)—The carbonate of magnesia promotes the



solution of the camphor in water. This mixture, therefore, holds a larger quantity of camphor in solution than the previous one. A minute portion of magnesia is also dissolved. As the magnesian carbonate is not separated by filtration, it gives to the mixture antacid properties, in addition to those qualities which this preparation derives from the camphor. "In addition to the uses of the simple camphor mixture, this preparation has been found very beneficial in the uric acid diathesis, and also in irritations of the neck of the urinary bladder, particularly when given in combination with hyoscyamus." (Dr. Montgomery, *Observ. on the Dubl. Pharm.*) The dose is ℥ʒss. to ℥ʒj.

4. **TINCTURA CAMPHORÆ**, L. E. (U. S.); *Tinctura Camphoræ*, sive *Spiritus Camphoratus*, D.; *Spiritus Camphoræ*; *Spirit of Camphor*; *Camphorated Spirits of Wine*, offic.—(Camphor, ʒv. (ʒiv. U. S.) [ʒj. D.; in small fragments, ʒijss. E.]; Rectified Spirit, Oij. [Oss. wine measure, D.] Mix, that the camphor may be dissolved.)—The principal use of this preparation is as a stimulant and anodyne liniment in sprains and bruises, chilblains, chronic rheumatism, and paralysis. Water immediately decomposes it, separating the greater part of the camphor, but holding in solution a minute portion, thereby forming an extemporaneous camphor mixture. By the aid of sugar or mucilage, the greater part of the camphor may be suspended in water. Employed in this form, we may give tincture of camphor internally, in doses of from ℞x. to ℥ʒj.

3. **TINCTURA CAMPHORÆ COMPOSITA**, L.; *Tinctura Opii camphorata*, E. D.; *Elixir Paregoricum*; *Paregoric Elixir*, offic.—(Camphor, ʒijss. [ʒij. D.]; Opium, powdered, [sliced, E.] gr. lxxij. [ʒj. D. ʒiv. E.]; Benzoic Acid, gr. lxxij. [ʒiv. E. ʒj. D.] Oil of Anise, ℥ʒj.; Proof Spirit, Oij. [wine measure, D.] Macerate for fourteen [seven, E.] days, and filter.)—This is a very valuable preparation, and is extensively employed both by the public and the profession. Its active ingredient is opium. The principal use of it is to allay troublesome cough unconnected with any active inflammatory symptoms. It diminishes the sensibility of the bronchial membrane to the influence of cold air, checks profuse secretion, and allays spasmodic cough. Dose, ℥ʒj to ℥ʒij. A fluidounce contains nearly two grains of opium. The name given to this preparation by the London College, though less correct than that of the Edinburgh and Dublin Colleges, is, I conceive, much more convenient; since it enables us to prescribe opium, without the knowledge of the patient—no mean advantage in cases where a strong prejudice exists in the mind of the patient or his friends to the use of this important narcotic. Furthermore, it is less likely to give rise to serious and fatal errors in dispensing. In a case mentioned by Dr. M. Good, (*Hist. of Med.* 1795, App. p. 14.) laudanum was served, by an ignorant dispenser, for *tinct. opii camph.* The error proved fatal to the patient.—[For the formula of U. S. P. see prep. of Opium.]

5. **LINIMENTUM CAMPHORÆ**, L. E. (U. S.); *Oleum Camphoratum*, D.; *Camphor Liniment*, offic.—(Camphor, ʒj. [ʒj. D.]; Olive Oil, ℥ʒiv. [ʒj. D.] Shake them together until they are mixed, L. Rub them together [in a mortar, E.] until the camphor is dissolved, E. D.)—A stimulant and anodyne embrocation in sprains, bruises, and rheumatic and other local pains. In glandular enlargements it is used as a resolvent.

6. **LINIMENTUM CAMPHORÆ COMPOSITUM**, L. D.; *Compound Liniment of Camphor*.—(Camphor, ʒijss. [ʒij. D.]; Solution of Ammonia, ℥ʒvijss. [℥ʒvj. D.]; Spirit of Lavender, Oj. [wine measure, D.] Mix the solution of ammonia with the spirit; then let a pint distil from a glass retort, with a slow fire; lastly, dissolve the camphor in it.)—A powerful stimulant and rubefacient, producing, when freely used, considerable irritation and inflammation. It is applicable in the same cases as the simple *camphor liniment* and the *liniment of ammonia* (vol. i. p. 279). From both of these compounds it differs in not being greasy. "I have used," says Dr. Montgomery, (*op. supra cit.*) "a liniment composed of two parts of this and one of turpentine, with children, as a substitute for a



blister, and with good effect; or, with equal parts of the *anodyne liniment*, I have found it highly beneficial in the removal of those distressing pains in the back which so frequently annoy women about the close of their pregnancy."

#### 4. SASSAFRAS OFFICINALE, Nees, E.—THE SASSAFRAS TREE.

*Laurus Sassafras*, Linn. *L. D.*

*Sex. Syst.* Enneandria, Monogynia.

(*Radix, L.*—The Root, *E.*—Lignum, *Radix*, et *Oleum volatile, D.*)

[*Sassafras Medulla, Sassafras Radicis Cortem, U. S.*]

**HISTORY.**—Sassafras wood is mentioned by Monardes, (*Hist. Simpl. Med.* 1569-74,) who states that it had been recently introduced into Spain from Florida. It was, however, first brought to Europe by the French. (Alston's *Lect. on the Mat. Med.* vol. ii. p. 51.)

**BOTANY. Gen. Char.**—Dioecious. *Calyx* six-parted, membranous; segments equal, permanent at the base. *Males*: Fertile *stamens* nine, in three rows, the three inner with double-stalked distinct glands at the base. *Anthers* linear, four-celled, all looking inwards. *Females* with as many sterile stamens as the male, or fewer; the inner often confluent. *Fruit* succulent, placed on the thick fleshy apex of the peduncle, and seated in the torn unchanged calyx.—*Flowers* yellow, before the leaves. *Leaves* deciduous (Lindley).

**COMPOSITION.**—Neither the wood nor the bark of sassafras has been analyzed. Both contain volatile oil.

**VOLATILE OIL** (see below.)

**PHYSIOLOGICAL EFFECTS.**—The wood and the bark are stimulant and sudorific. Taken in the form of infusion, and assisted by warm clothing and tepid drinks, they excite the vascular system and prove sudorific. They owe their activity to the volatile oil, which possesses acrid properties.

**USES.**—Sassafras is employed as a sudorific and alterative in cutaneous, rheumatic, and venereal diseases. On account of its stimulant properties it is inadmissible in febrile or inflammatory conditions of the system. It is rarely or never used alone, but generally in combination with sarsaparilla and guaiacum.

**ADMINISTRATION.**—Sassafras is administered in the form of *oil* or *infusion*. The dose of the oil is from two to ten drops. *Sassafras tea*, flavoured with milk and sugar, is sold at day-break in the streets of London, under the name of *saloop*. Sassafras is a constituent of the *Decoctum Sarzæ Compositum*; but the volatile oil is dissipated by boiling (p. 131).

[The pith of the young shoots of sassafras contains a large amount of mucilage, which is readily yielded to water, by maceration. This solution is employed as a soothing collyrium in irritation of the eye or inflammation, or as an application to mucous surfaces, a drachm to three or four ounces of water may be directed.—J. C.]

**OLEUM SASSAFRAS, D. (U. S.); Volatile Oil of Sassafras officinale, E., Oil of Sassafras.**—(Obtained by submitting the wood [bark] to distillation with water).—It is colourless, but, by keeping, becomes yellow or red. Its smell is that of sassafras; its taste is hot. Sp. gr. 1.094. Water separates it into two oils, one lighter, the other heavier than water. By keeping, it deposits crystals (stéaroptène), which are readily soluble. Oil of sassafras is rendered orange-red by nitric acid. It is said to be adulterated with oil of lavender or oil of turpentine; (Bonastre, *Journ. de Pharm.* vol. xiv.) but the statement, I suspect, does not apply to the oil found in English commerce. Oil of sassafras is stimulant and diaphoretic. It may be employed in chronic rheumatism, cutaneous diseases, and venereal maladies. It is a constituent of the *Compound Extract of Sarsaparilla*, p. 122.



## 5. LAURUS NOBILIS, Linn. L. D.—THE SWEET BAY.

Sex. Syst. Enneandria, Monogynia.

(Baccæ. Folia. L. D.)

**HISTORY.**—The bay-tree is mentioned, though erroneously, in our translation of the Bible (*Psalms*, xxxvi. 35, 36); the Hebrew word, translated *bay*, meaning *native*. (Carpenter's *Script. Nat. Hist.*) Hippocrates (*opera*, pp. 267, 621, 623, &c. ed. Fæs.) used both the leaves and berries of the bay-tree (δάφνη) in medicine. Bay-leaf is analogous to the *Malabathrum* of the ancients. (Royle, *Hindoo Med.* pp. 32 and 85.)

**BOTANY. Gen. Char.**—Flowers dicecious or hermaphrodite, involucreted. *Calyx* four-parted; segments equal, deciduous. *Fertile stamens* twelve, in three rows; the outer alternate with the segments of the calyx; all with two glands in the middle or above it. *Anthers* oblong, two-celled, all looking inwards. *Female flowers*, with two to four castrated males, surrounding the ovary. *Stigma* capitate. *Fruit* succulent, seated in the irregular base of the calyx.—*Umbels* axillary, stalked. *Leaf-buds* with valvate papery scales. *Leaves* evergreen (Lindley).

**Sp. Char.**—The only species.

A bush or small tree. *Bark* aromatic, rather bitter. *Leaves* alternate, lanceolate, acute, or acuminate, wavy at the edge, somewhat coriaceous. *Flowers* yellowish. *Fruit* (called by Nees a one-seeded flesh berry, by De Candolle a drupe) bluish-black, oval, size of a small cherry. *Seed* pendulous; *funiculus* compressed, ascending from the base of the fruit, and attached at the top of the testa; *testa* papery; *tunica interna* very thin; *embryo* exalbuminous, composed of two large oleaginous *cotyledons* inclosing superiorly the *radicle*.

**Hab.**—South of Europe. Cultivated in gardens.

**DESCRIPTION.**—Bay leaves (*folia lauri*) have a bitter, aromatic taste, and a somewhat aromatic odour. Their infusion reddens litmus. Dried bay-berries (*baccæ lauri*, offic.) are covered externally by a dark-brown, brittle coat, which is produced by the epidermis and succulent covering of the fruit.

**COMPOSITION.**—In 1824 bay-berries were analyzed by Bonastre, (*Journ. de Pharm.* x. 30.) who found the constituents to be—*Volatile oil* 0.8, *laurin* 1.0, *fixed oil* 12.8, *wax* (stearin) 7.1, *resin* 1.6, *uncrystallizable sugar* 0.4, *gummy extractive* 17.2, *bassorin* 6.4, *starch* 25.9, *woody fibre* 18.8, *soluble albumen* traces, *an acid*, 0.1, *water* 6.4, *salts* 1.5.—The ashes (amounting to 1.2) consisted of carbonate of potash and the carbonate and phosphate of lime.

1. **VOLATILE OIL OF LAUREL BERRIES; Oil of Sweet Bay.**—Obtained from the berries by distillation with water. The crude oil is pale yellow, transparent, readily soluble in alcohol and ether. By re-distillation it yields two isomeric oils ( $C^{20}H^{16}O$ ), one having a sp. gr. 0.857, the other 0.885, while a brown balsamic matter remains in the retort. (Brandes, *Pharmaceutisches Central-Blatt für 1840*, S. 344.)

2. **LAURIN; Camphor of the Bay berry.**—A crystalline solid, fusible, and volatile. Has an acrid bitter taste, and an odour analogous to that of the volatile oil. It is soluble in ether and in boiling alcohol. Sulphuric acid renders it yellow; nitric acid liquefies it. Alkalis are without action on it. It is extracted from bay berries by rectified alcohol.

3. **FIXED OIL OF BAYS** (see below).

**PHYSIOLOGICAL EFFECTS.**—The berries, leaves, and oil, are said to possess aromatic, stimulant, and narcotic properties. The leaves, in large doses, prove emetic. (Merat and De Lens, *Dict. Univ. de Mat. Med.* t. iv. p. 62.)

**USES.**—Bay berries or leaves are rarely, if ever, used in medicine in this country. They might, therefore, with great propriety, be expunged from the Pharmacopœia. The leaves are employed by the cook on account of their flavour. Both leaves and berries have been used to strengthen the stomach, to expel flatus, and to promote the catamenial discharge.

**ADMINISTRATION.**—Both berries and leaves are used in the form of infusion. **OLEUM LAURI; Oleum Lauri expressum; Oleum Laurinum; Laurel Fat;**



*Oil of Bays.* This may be obtained from either the fresh or dried berries. Duhamel (*Traité des Arbres et Arbustes qui es cultivent en France en pleine Terre*, t. i. p. 351) states that it is obtained from the fresh and ripe berries by bruising them in a mortar, boiling them for three hours in water, and then pressing them in a sack. The expressed oil is mixed with the decoction, on which, when cold, the butyraceous oil is found floating. From the dried berries it is procured by exposing them to the vapour of water until they are thoroughly soaked, and then rapidly subjecting them to the press between heated metallic plates. By the latter method they yield one-fifth of their weight of oil. (Soubeiran, *Nouveau Traité de Pharmacie*, t. ii. p. 32, 2<sup>de</sup> éd.) Oil of bays is imported in barrels from Trieste. In 1839, duty (3*d.* per lb.) was paid on 1737 lbs. of it. It has a butyraceous consistence, and a granular appearance. Its colour is greenish, its odour is that of the berries. It is partially soluble in alcohol, completely so in ether. With alkalis it forms soap. It is occasionally employed externally as a stimulating liniment in sprains and bruises, and in paralysis. It has also been used to relieve colic, and against deafness. (Murray, *Apparatus Medicam.* vol. iv. p. 533.) Its principal use, however, is in veterinary medicine.

#### OTHER MEDICINAL LAURACEÆ.

1. CULILAWAN OR CLOVE BARK is obtained from *Cinnamomum Culilawan*, Blume, a native of the Indian islands. Its properties are analogous to those of *Cassia-lignea*. (See Pereira, in Lindley's *Flora Medica*, p. 331.) It is rarely met with in London.
2. I have received from Dr. Martiny of Hesse Darmstadt a bark marked CULILAWAN PAPUANUS. It is, I presume, the produce of *Cinnamomum zarthoneuron* of Blume.
3. MASOY BARK (in commerce *Miso*) is the *cortex oinus* of Rumphius. It is used in the cosmetics of the natives of India. (Crawford, *Hist. of the Ind. Archip.* vol. i. p. 510.) I have never found it in the London shops.
4. SINTOC BARK is the produce of *Cinnamomum Sintoc*, Blume. Its properties are analogous to those of Culilawan.
5. The FOLIA MALABATHRI of India are obtained from *Cinnamomum nitidum*, Hooker, and Blume; and from *C. Tamala*. They are aromatic tonics, but are not found in the London market.
6. SASSAFRAS NUTS are the seeds of some Lauraceous plant. "They were imported from Brazil into Stockholm in the middle of the last century, and were found a valuable tonic and astringent medicine: during the continental war they were used as a bad substitute for nutmegs." They are still to be found in some of the old drug houses of London. It is doubtful from what plant they are obtained. (Lindley's *Flora Medica*, pp. 335 and 336.)

#### ORDER XXXII.—MYRISTICACEÆ, Lindley.—THE NUTMEG TRIBE.

MYRISTICÆ, R. Brown.

ESSENTIAL CHARACTERS.—*Flowers* completely unisexual. *Calyx* trifid, rarely quadrifid; with valvular aestivation. *Males*:—*Filaments* either separate, or completely united in a cylinder. *Anthers* three to twelve, two-celled, turned outwards, and bursting longitudinally; either connate or distinct. *Female*:—*Calyx* deciduous. *Ovary* superior, sessile, with a single erect ovule; *style* very short; *stigma* somewhat lobed. *Fruit* baccate, dehiscent, two-valved. *Seed* nut-like, enveloped in a many-parted aril; *albumen* ruminant, between fatty and fleshy; *embryo* small; *cotyledons* foliaceous; *radicle* inferior; *plumule* conspicuous.—*Tropical trees*, often yielding a red juice. *Leaves* alternate, without stipules, not dotted, quite entire, stalked, coriaceous; usually, when full-grown, covered beneath with a close down. *Inflorescence* axillary or terminal, in racemes, glomerules, or panicles; the *flowers* often each with one short cucullate bract. *Calyx* coriaceous, mostly downy outside, with the hairs sometimes stellate, smooth in the inside (Lindley, from R. Brown chiefly).

PROPERTIES.—The bark and pericarp contain an acrid juice. The seed (!) and arillus abound in an aromatic volatile oil, which is mixed with a fixed oil.



## MYRISTICA OFFICINALIS, Linn., E.—THE NUTMEG TREE.

*Myristica moschata*, Thunberg, L. D.

Sex. Syst. Diœcia, Monadelphia.

(Nuclei; et oleum destillatum nuclei, L.—Kernel of the fruit; volatile oil from the kernel; concrete expressed oil from the kernel, E.—Nucleus. Oleum volatile et involucrem mace dictum, D.)

(Myristica, Nutmeg, U. S.)

**HISTORY.**—Both nutmegs and mace were unknown to the ancient Greeks and Romans; unless, indeed, the *κάρυον* of Theophrastus, (*Hist. Plant.* lib. ix. cap. 7,)—the *cinnamum, quod comacum appellant* of Pliny, (*Hist. Nat.* lib. xii. cap. 63, ed. Valp.) be our nutmeg, as some have suggested. Both mace and nutmegs are noticed by Avicenna. (Lib. ii. tract ii. cap. 436 and 503.)

**BOTANY.**—**Gen. Char.**—*Flowers* diœcious. *Calyx* urceolate, three-toothed. **Males:**—*Filaments* monadelphous: *anthers* six to ten, connate. **Females:**—*Ovary* simple; *style* none; *stigma* two-lobed. *Pericarp* fleshy, two-valved, one seeded. *Seed* enveloped in a fleshy aril (Lindley).

**Sp. Char.**—*Leaves* oblong, acuminate, smooth, whitish beneath, and with simple nerves. *Peduncles* one to four-flowered.

A tree from 20 to 25 feet high, similar in appearance to a pear tree. *Bark* dark grayish-green, smooth, with a yellowish juice. *Leaves* aromatic. *Racemes* axillary. *Peduncles* and *pedicels* glabrous, the latter with a quickly deciduous ovate bract at its summit, often pressed close to the flower. **Male flowers:**—Three to five on a peduncle; *calyx* fleshy, pale yellow, with a reddish pubescence. **Female flowers** scarcely different from the males, except that the pedicel is frequently solitary.

**Fruit** pyriform, smooth externally, about the size of a peach, marked externally by a longitudinal groove. *Pericarp* fleshy, dehiscing by two nearly equal longitudinal valves. *Arillus* (*mace*) large, fleshy, branching, scarlet; when dry, yellow, brittle, and somewhat horny. **Nucleus** or *nut* (*nutmeg* in the shell, offic.) within the arillus, orval or ovate: its outer coat (*testa, tunica externa* or *shell*) is dark brown, hard, glossy, marked by the mace: its inner coat (*endopleura* seu *tunica interna*) closely invests the seeds and dips down into the substance of the albumen, giving it a marbled or *ruminated* appearance. The great body of the nutmeg consists of the oleaginous *albumen*; its so-called veins are processes of the endopleura, which have a reddish-brown colour, and abound in oil. **Embryo** at the base of the seed; *radicle* inferior hemispherical; *cotyledons* two, large, flat, foliaceous, fan-shaped; *plumule* two-lobed.

**Hab.**—Moluccas, especially the Isle of Banda. The Dutch have endeavoured to confine the nutmeg tree to three of the little cluster of the Banda isles, viz. Pulo Ay, Banda, and Nera.

**CURING.**—*Mace* is prepared for the market by separating it from the nutmeg, and drying it for some days in the sun, when its rich crimson changes to dusty yellow. *Nutmegs* require more care in curing, on account of the attacks of an insect (the *nutmeg-insect*). They are first sun-dried for three days: then laid on hurdles and smoke-dried by a slow wood-fire for three months, at the end of which time they are freed from their shells, and dipped twice or thrice in lime water, or rather a thick mixture of lime and water, to secure them from the depredations of insects. It is said that while the nutmegs are in their shells,

FIG. 193.

*Myristica officinalis.*

FIG. 194.

*Nutmeg in the shell surrounded by the Mace.*



they are secure from the attack of these insects. (Crawford, *Hist. of the Ind. Archip.*)

**DESCRIPTION. 1. Of Nutmegs.** (*Nuces moschata.*)—The ordinary nutmeg of commerce (formerly called the *female nutmeg*,—*nux moschata femina*, Clusius) rarely exceeds an inch in length. Its shape is roundish or elliptical, like that of the French olive. Externally it is marked with reticular furrows. The colour of the projecting parts is brownish; that of the depression sometimes whitish, from the lime used in curing (*limed nutmegs*), at other times brown (*brown nutmegs*). Internally it is pale reddish-gray, with red veins. The odour is strong, but pleasant, peculiar, and aromatic. The taste is agreeable and aromatic. Occasionally this kind of nutmeg is imported *in the shell*.

A long kind of nutmeg, called, in the shops, *the wild nutmeg in the shell* (the *male nutmeg*,—*nux moschata mas.* Clusius), is frequently met with. Its shape is oblong, like that of the date; its length about an inch and a half. Its shell is bony, somewhat brittle, externally shiny and brown, internally dull, grayish-white. The contained seed is paler coloured, less furrowed, and less aromatic, than in the preceding sort. Sometimes these nutmegs are imported with the mace dried around them (*wild nutmegs covered with mace*). Long nutmegs are said to be the produce of *Myristica officinalis* var. *sphenocarpa* (Dierbach). (Nees and Ebermaier, *Handb. der Med.-Pharm. Bot.*) A specimen of the fruit and leaves, preserved in spirit in the Banksian collection, is marked the *long nutmeg from Sumatra*.

**2. Of Mace.** (*Macis.*)—Mace, as met with in the shops, is a flat, irregularly slit, smooth, slightly flexible or brittle membrane, of a pale cinnamon yellow colour, and an odour and taste analogous to those of nutmegs.

Under the name of *False Mace* I have received from Dr. Martiny a red mace, with scarcely any flavour or odour. It is perhaps the mace of the long nutmeg just described.

**COMMERCE.**—Nutmegs and mace are imported from the Indian Archipelago either directly or indirectly by the Cape of Good Hope or Holland. In 1840, the duty of 2s. 6d. *per lb.* was paid on 114,160 lbs. of nutmegs, and on 16,333 lbs. of mace.

**COMPOSITION.**—Nutmegs were analyzed, in 1804, by Schrader (Pfaff, *Mat. Med.* Bd. iv. S. 210); and, in 1823, by Bonastre. (*Journ. de Pharm.* t. ix. p. 281.) In 1824 an analysis of mace was made by N. E. Henry. (*Journ. de Pharm.* t. x. p. 281.)

NUTMEG.		MACE.	
<i>Schrader's Analysis.</i>		<i>N. E. Henry's Analysis.</i>	
Light volatile oil.....	2.70	Volatile oil.....	6.0
Heavy ditto.....	0.52	Liquid fat.....	7.6
Expressed, reddish, soft oil.....	10.41	Solid fat.....	24.0
White solid oil.....	17.72	Acid (?).....	0.8
Gummy extract.....	25.00	Starch.....	2.4
Resin.....	3.12	Gum.....	1.2
Ligneous fibre.....	34.33	Ligneous fibre.....	54.0
Loss.....	6.25	Loss.....	4.0
Nutmeg.....	100.00	Mace.....	100.0

1. VOLATILE OIL OF NUTMEGS.  
2. VOLATILE OIL OF MACE.  
3. FIXED OIL OF NUTMEGS.
- } See p. 257.

**CHEMICAL CHARACTERISTICS.**—The presence of starch in both nutmegs and mace may be detected by a solution of iodine, which gives them a blue tint (*iodide of starch*). Both of these substances yield, by distillation with water, a *volatile oil*, characterized by its peculiar odour; and both yield, by expression, a *fixed butyraceous oil*.

**PHYSIOLOGICAL EFFECTS.**—The activity of both nutmegs and mace depends on the volatile oil which they contain. Swallowed *in moderate quantities*, they produce the before-described effects of the spices (see vol. i. p. 181). *In large doses* they prove narcotic, and cause giddiness, delirium, præcordial anxiety,



sleepiness, or actual stupor. Instances of this kind are mentioned by Bontius, (*De Med. Indor.*;) Rumphius, (*Herb. Amboyn.* vol. ii. p. 21,) Lobel, (quoted by Murray, *App. Med.* vol. vi. p. 145,) Schmid, (quoted by Murray, *App. Med.* vol. vi. p. 145,) and Cullen. (*Mat. Med.* vol. ii. p. 204.) In the case related by the last-mentioned authority two drachms of powdered nutmegs produced drowsiness, which gradually increased to complete stupor and insensibility. The patient continued for several hours alternately delirious and sleeping, but ultimately recovered. Purkinje (quoted by Wibmer, *Die Wirk. d. Arzneim. u. Gifte*, Bd. iii. S. 308) has confirmed these statements by experiments made on himself. I am acquainted with a case in which the narcotic effects of a whole nutmeg have been several times experienced.

USES.—The principal consumption of nutmegs and mace is for dietetical purposes. They serve to flavour, and, by their stimulant properties, to assist the digestive process. Food highly seasoned with these substances may prove injurious in cerebral affections (apoplexy, for example), on account of their narcotic properties.

Medicinally they are used, like other spices (see vol. i. p. 181), as stimulants, carminatives, and flavouring ingredients. Nutmeg is an important constituent in the *confectio aromatica* (see p. 240), so frequently employed as a cordial and antacid in bowel complaints. In mild cases of diarrhœa I frequently employ nutmeg as a substitute for opium. It may be taken in warm brandy and water, unless the use of spirit be contra-indicated.

ADMINISTRATION.—Either nutmeg or mace may be taken to the extent of a scruple or half a drachm, in powder obtained by grating; or the volatile oil of these substances may be used, in doses of ℥j. to ℥v.

1. OLEUM MYRISTICÆ, L. E. (U. S.); *Oleum Nucis Moschatae*; *Essential Oil of Nutmeg*. (Procured by submitting nutmegs and water to distillation.) It is usually imported. It is colourless or pale yellow, has the odour and taste of nutmegs, and a viscid consistence. By agitation with water it separates into two oils, one lighter, the other heavier than water. By keeping, it deposits crystals of stéaroptène (*myristicine*), which are fusible at 212° F. volatile, soluble in alcohol, in ether, and in boiling water; from the latter liquid myristicine separates in a crystalline form as the liquid cools. According to Mulder the stéaroptène consists of C<sup>8</sup> H<sup>16</sup> O<sup>3</sup>. Volatile oil of nutmeg is seldom employed medicinally. Its dose is ℥j. to ℥v., taken on sugar or dissolved in spirit.

2. OLEUM MACIDIS; *Essential Oil of Mace*. This is colourless or pale yellow, lighter than water, and has the flavour and odour of mace. Its composition, effects, and uses, are similar to those of nutmegs.

3. MYRISTICÆ ADEPS, E. *Myristica Oleum expressum*, L.;<sup>1</sup> *Butter of Nutmegs*; *Expressed Oil of Nutmegs*. In the shops it is usually denominated *Expressed Oil of Mace*. It is prepared by beating the nutmegs to a paste, which is to be inclosed in a bag, and then exposed to the vapour of water, and afterwards expressing by heated plates. It is imported in oblong cakes (covered by some monoctyledonous leaves, commonly called *flag leaves*), which have the shape of common bricks, but whose size is somewhat smaller. Its colour is orange, its consistence firm, its odour fragrant, like that of the seeds from which it is obtained. It is soluble in 4 parts of boiling alcohol. According to Schrader 16 parts of butter of nutmeg are composed of *Tallow-like Oil* 7, *Yellow Oil* 8½, and *Volatile Oil* ½. More recently it has been examined by Playfair, who states its composition to be *volatile oil, sericine, a fat oil, and colouring matter*. Cold alcohol dissolves the volatile oil, the fat oil, and the colouring matter, leaving from 25 to 30 per cent. of sericine.

<sup>1</sup> The London College have omitted it in their list of *Materia Medica*, though it is directed to be used in the preparation of *Emplastrum Picis*. The Edinburgh College has also committed an error respecting it; for while, in the list of *Materia Medica*, it is called *Myristica Adeps*, in the formula for the preparation of *Emplastrum Picis* it is termed *Oil of Mace*.



*Sericine* is a white crystalline fat, fusible at 87° F., and composed of *sericic* or *myristic acid* (C<sup>28</sup> H<sup>27</sup> O<sup>5</sup>) and glycerine. It is soluble in hot alcohol.

Expressed oil of nutmegs is occasionally employed externally in chronic rheumatism and palsy. It is a constituent of *Emplastrum Picis* (see p. 176).

4. SPIRITUS MYRISTICÆ, L. E. D. (U. S.) *Spirit of Nutmeg*.—Nutmegs, bruised, ℥ijss. [℥ij. D. (U. S.)]; Proof Spirit, conj. i. [wine measure D.]; Water, Oj. [sufficient to prevent empyreuma, D.] Mix them [macerate for twenty-four hours, D.], then, [with a slow fire, L.] let a gallon distil.—It is frequently prepared by mixing volatile oil of nutmegs with proof spirit. It is cordial and carminative; and is employed in doses of ℥ʒi. to ℥ʒiv., as a pleasant addition to stimulant, narcotic, or purgative draughts.

#### ORDER XXXIII.—THYMELACEÆ, Lindley.—THE MEZEREUM TRIBE.

THYMELEÆ, Jussieu.

ESSENTIAL CHARACTER.—*Calyx* inferior, tubular, coloured; the limb four-cleft, seldom five-cleft, with an imbricated æstivation. *Corolla* none, or sometimes scale-like petals in the orifice of the calyx. *Stamens* definite, inserted in the tube or its orifice, often eight, sometimes four, less frequently two; when equal in number to the segments of the calyx or fewer, opposite to them; *anthers* two-celled, dehiscing lengthwise in the middle. *Ovary* solitary, with one solitary pendulous ovule; *style* one; *stigma* undivided. *Fruit* hard, dry, and nut-like, or drupaceous. *Albumen* none, or thin and fleshy; *embryo* straight; *cotyledons* plano-convex; *radicle* short, superior; *plumule* inconspicuous.—*Stem* shrubby, very seldom herbaceous, with tenacious bark. *Leaves* without stipules, alternate or opposite, entire. *Flowers* capitate or spiked, terminal or axillary, occasionally solitary (R. Brown).

PROPERTIES.—The prevailing property of the plants of this order is acidity.

#### DAPHNE MEZEREUM, Linn. L. E. D.—COMMON MEZEREON OR SPURGE-OLIVE.

Sex. Syst. Octandria, Monogynia.

(Radicis cortex, L.—Root-bark, E.—Cortex, D.)

(Mezereum, the Bark, U. S.)

HISTORY.—Tragus (*Hist. Stirpium*. 1532.) is the earliest author who mentions this plant. (Sprengel, *Hist. Rei Herb.* Præf. xi.) He calls it *Thymelæa*. The *mezereon* of Avicenna, (lib. 2ndus. tract. 2ndus, cap. 464.) and of other Arabian authors, is declared, by C. Bauhin, to be *Chameleæa tricocca* (now called *Cneorum tricoccon*), a plant of the order Euphorbiaceæ; but it is probably identical with the χαμσλαία of Dioscorides, which is declared by Sibthorpe (*Prod. Fl. Græcæ*.) to be *Daphne oleoides*.

BOTANY. Gen. Char.—*Calyx* four-lobed. *Stamens* eight. *Styles* short, terminal. *Berry* one-celled, one-seeded. (*Bot. Gall.*)

Sp. Char.—*Flowers* naked on the stem, sessile, about three together. *Leaves* lanceolate, deciduous (Smith).

*Stem* bushy, four or five feet high, with upright, alternate, smooth, tough, and pliant branches; leafy while young. *Leaves* scattered, stalked, lanceolate, smooth, two inches long, appearing after the flowers, and soon accompanied by flower-buds for the next season. *Flowers* highly, and to many persons too powerfully, fragrant, seated in little tufts on the naked branches, with several brown, smooth, ovate bractæas underneath. *Calyx* like a corolla in texture, crimson all over; the tube, externally hairy. *Berries* scarlet.—There is a variety with white flowers, and the berries also vary to a yellow or orange hue.

Hab.—Indigenous. Plentiful near Andover. Flowers in March.

DESCRIPTION OF THE BARK.—The bark of the root (*cortex radice mezerei*) is alone employed in this country. It is tough, pliable, and fibrous; externally brown and corrugated; internally white and cottony. Its taste is at first sweetish, afterwards highly acrid: it has no odour. In Germany the bark of the stem and larger branches is removed in spring, folded in small bundles, and dried for medicinal use.

COMPOSITION.—The bark of the stem was analyzed by C. G. Gmelin and Bär, (L. Gmelin's *Handb. d. Chem.* Bd. ii. S. 1317,) and found to consist of



wax, an acrid resin, daphnin, a trace of volatile oil, yellow colouring principle, uncrystallizable but fermentable sugar, nitrogenous gummy matter, reddish brown extractive, woody fibre, free malic acid, and malates of potash, lime, and magnesia.

1. **ACRID RESIN.**—Obtained by boiling the bark in alcohol: when the solution cools, some wax is deposited. The supernatant liquid is to be evaporated, and the residual extract washed with water. The resin then left behind is dark-green, and soluble in both alcohol and ether. To this substance mezereon owes its acidity. There is, however, some reason to suspect that this resin is itself a compound of two principles, viz. an acrid, vesicating, fixed oil, and another substance. The resin is rendered soluble in water by means of the other constituents of the bark.

2. **DAPHNIN.**—A peculiar crystalline principle, having a bitter, slightly astringent taste. It is soluble in alcohol and ether, but possesses neither basic nor acid properties. Gmelin and Bar consider it to be analogous to asparagin. It is not the active principle of mezereon.

**PHYSIOLOGICAL EFFECTS.**—All parts of the plant, but more especially the bark and the fruit, are endowed with excessive acidity; in virtue of which they cause irritation and inflammation in tissues to which they are applied. When swallowed, therefore, in large quantities, they prove poisonous. The topical action of mezereon bark is that of an irritant, and, when the bark has been applied to the skin, vesicant.

A decoction of mezereon bark, taken in moderate quantities, sometimes appears to promote the action of the secreting and exhaling organs (especially the kidneys and the skin). But Dr. Alex. Russell (*Med. Observ. and Inq.* vol. iii. p. 194.) could not observe, upon the strictest inquiry, "that it sensibly increases any of the secretions, more than the same quantity of any small liquor would do." In some cases it proves laxative, where the patients are easily moved, and large doses disturb and irritate the stomach. Richter (*Ausführ. Arzneimittell.* Bd. ii. S. 193.) says, that under the long-continued use of mezereon, the saliva acquires a peculiar odour. In larger doses it causes dryness and heat in the throat, increased saliva, pain in the stomach and bowels, and sometimes vomiting and purging; the stools being occasionally bloody. The urinary organs are sometimes specifically affected by it; irritation, analogous to that produced by cantharides, being set up by it. An affection of the cerebro-spinal system (marked by great feebleness, giddiness, incapability of keeping the erect posture, and slight convulsive movements) is occasionally brought on (Vogt. *Pharmakodynamik*, Bd. ii. S. 305, 2<sup>te</sup> Aufl.) I am unacquainted with any cases which have proved fatal from the use of mezereon bark. Vicat (*Orfila, Toxicol. Gen.*) mentions the case of a dropsical patient, in whom the wood caused diarrhoea, pain, and vomiting, which continued for six weeks.

**USES.**—In this country mezereon is scarcely ever employed alone. It is usually administered in conjunction with sarsaparilla, (vide *Decoctum Sarzæ compositum*, p. 131.) and is employed as a sudorific and alterative in venereal, rheumatic, scrofulous, and chronic cutaneous diseases. Decoction of the root-bark of mezereon was recommended to the notice of the profession, by Dr. Alexander Russell, (*op. supra cit.* vol. iii. p. 189,) as a very efficacious remedy in cases of venereal nodes and nocturnal pains. Dr. Home (*Clin. Exper. and Hist.*) also speaks of it as "a powerful deobstruent in all venereal tumours, of the scirrhus kind, where mercury has failed." But Mr. Pearson, (*Observ. on the Effects of Various Articles of the Mat. Med.* 1800,) after many years observation of it, says, "I feel myself authorized to assert unequivocally, that the mezereum has not the power of curing the venereal disease in any one stage, or in any one form." Dr. Cullen (*Mat. Med.*) employed it with success in some cutaneous diseases.

As a topical remedy, it is sometimes applied to relieve toothache. It is occasionally used as a *masticatory*. Dr. Withering (*Arrangement of Brit. Plants*, vol. ii. p. 490, 7th ed.) cured a case of difficulty of swallowing (arising from a paralytic affection) by mezereon, which he directed to be chewed frequently.



In France the bark of both *Daphne Mezereum* and *D. Gnidium* is used as a vesicatory.<sup>1</sup> The mode of applying it is this:—First soften the bark by soaking it in hot vinegar and water, and then apply it to the part by a compress and bandage. The application is to be renewed night and morning, until vesication is produced.

ADMINISTRATION.—Mezereon is administered in the form of *decoction*. As a *masticatory*, two grains of the bark may be chewed.

ANTIDOTE.—In a case of poisoning by mezereon, evacuate the contents of the stomach as speedily as possible, and give emollient drinks, opiates, and the vegetable acids. To counteract inflammatory symptoms, the usual antiphlogistic treatment should be adopted.

DECOCTUM MEZEREI, E. D.; *Decoction of Mezereon*.—(Mezereon bark, in chips, ℥ij.; Liquorice root, bruised, ℥ss.; Water, Oij. [Oij. *wine measure*, D.] Mix them, and boil down with a gentle heat to a pint and a half [two pints *wine measure*, D.] and strain.)—Stimulant and sudorific. Used in chronic rheumatism, and secondary syphilis. Dose fʒiv. to fʒiij. three or four times a day.

#### OTHER MEDICINAL THYMELACEÆ.

1. DAPHNE GNIDIUM is the Θουμλαία, or *Thymelæa*, of Dioscorides, whose fruit is the κοκκος κνιδιος, or *Gnidian berry*, used by Hippocrates. Its properties are similar to those of *D. Mezereum*. In France the bark (called *garou*) is employed, in the way before described, as a vesicatory.

2. DAPHNE LAUREOLA is an indigenous plant, having yellowish-green flowers and black berries. Its effects are analogous to the last-mentioned species.

3. LAGETTA LINTEARIA, or the *Lace Bark Tree*, possesses the medicinal properties of mezereon, and has been used in the same cases (Wright, *Med. Plants of Jamaica*). Its bark may be separated into 20, 30, or more laminae, which are fine and white, like gauze: of these, caps, ruffles, and even whole suits of ladies' clothes, have been made (Sloane's *Nat. Hist. of Jamaica*, vol. ii. p. 22).

#### ORDER XXXIV.—POLYGONACEÆ, Lindley.—THE BUCKWHEAT TRIBE.

POLYGOÑÆ, Jussieu.

ESSENTIAL CHARACTER.—*Calyx* free, simple, persistent, monosepalous, deeply divided; the segments imbricate in aestivation, disposed in a double row; the inner opposite the sides of the ovary, the outer opposite the angles. *Stamens* definite, inserted into the base of the calyx. *Anthers* two-celled, four-furrowed, dehiscing laterally by a double chink. *Ovary* one, free. *Styles* numerous, or *stigmas* numerous, sessile. *Cariopsis*, or *nut*, one-seeded, generally triangular, more or less covered by the calyx. *Embryo* generally lateral, sometimes central, often curved. *Albumen* farinaceous. *Radicle* distinct from the hilum.—*Herbaceous* plants, rarely shrubs. *Stems* nodose. *Leaves* alternate, sheathing, or adnate to an intrafoliaceous sheath or *ochrea*: revolute when young. (*Bot. Gall.*)

PROPERTIES.—Oxalic acid is an abundant product of this order. In the free state, or rather in the form of a supersalt, it exists in the leaves and petioles, to which it communicates refreshing refrigerant qualities. In the root of rhubarb it is found in combination with lime. Tannic acid is another important principle of this order; it exists in the roots, the stems, and the leaves. Colouring matter, in considerable quantity, exists in the roots. In many species the roots are purgative. Some species of *Polygonum* contain a volatile acrid principle. Nutritive (mucilaginous) matters are yielded by several species.

##### 1. RHEUM, Linn.—ONE [OR MORE] UNDETERMINED SPECIES, E.

*Rheum palmatum*, L. D.—*R. Undulatum*, D.

*Sex. Syst.* Enneandria, Monogynia.

(*Radix*, L. E. D.)

(*Rheum*, *Rhubarb*, U. S.)

HISTORY.—Dioscorides (lib. iii. cap. 11.) speaks of a root which he calls *Rha*, or *Rheon* (ῥᾶ ῥῆον), and which has been regarded by some as identical

<sup>1</sup> Leroy, J. A. *Essai sur l'Usage de l'Ecorce du Garou, ou Traité des Effets des Exutoires employés contre les Maladies rebelles*. Paris, 1774.



with our rhubarb; but the description he has given of it does not apply to the latter substance, and it is therefore fair to presume some other root must be meant. "*Rha*, by some called *Rheon*, grows," says Dioscorides, "in those countries which are beyond the Bosphorus, and from which it is brought. It is a root which is black externally, like to great centaury, but smaller and redder, odourless, loose or spongy, and somewhat smooth internally." Pliny (*Hist. Nat.* lib. xxvi. cap. 105, ed. Valp.) gives a similar account of it, under the name of *Rhacoma*: it comes, he says, from the countries beyond Pontus, resembles the black costus, is odourless, and has a hot, astringent taste. Prosper Alpinus (*De Rhapontico*, 1612,) was of opinion that the *Rha* of Dioscorides was the root of *Rheum Rhaponticum*, which Alpinus obtained from Thracia, in 1608, A. D., and cultivated at Pavia. The later Greek writers are supposed to have been acquainted with our rhubarb. Alexander of Tralles (lib. viii. cap. 3,) is the first who speaks of it. He used it in weakness of the liver and dysentery. Paulus Aegineta seems to make a distinction between *Rha* and *Rheon*. For, he says, that in the crudities and vomiting of pregnant women, we may give "the blood-wort, boiled in water, for drink; and likewise dill, and the *Pontic root*, called *Rha* in the dialect of that country." (Adam's Translation of the *Med. Works of Paulus* bk. i. ch. 1.) In noticing the practice of the ancients, he says "Alvine discharges they promoted by giving turpentine to the extent of an olive, when going to rest; or, when they wished to *purge* more effectually, by adding a little *rhubarb*" [*Rheon*]. (Adam's Translation of the *Med. Works of Paulus*, ch. 43.) This is the first notice of the purgative properties of rhubarb.

In one of the Arabian authors (Mesue, the younger) we find three kinds of rhubarb mentioned:—The *Indian*, said to be the best: the *Barbarian*; and the *Turkish*, which is the worst of all.

**BOTANY. Gen. Char.**—*Calyx* petaloid, six-parted, withering. *Stamina* about nine, inserted into the base of the calyx. *Styles* three, reflexed. *Stigmas* peltate, entire. *Achenium* three-cornered, winged, with the withered calyx at the base. *Embryo* in the centre of the albumen (Lindley).

It is not yet ascertained what species of *Rheum* yields the officinal rhubarb. Several species, now cultivated in this country, have been at different times declared to be, partially or wholly, the source of it. Formerly, *Rheum Rhaponticum* was supposed to yield it. (Alston, *Mat. Med.* vol. i. p. 502.)

In 1732, *R. undulatum*, was sent from Russia to the Messrs. Jussieu at Paris, and to Rand of Chelsea, as the true rhubarb. This is the species which Linnæus described as *R. Rhubarbarum*. (*Op. cit.*) About 1750, at the desire of Kaaw Boerhaave, first physician to the Emperor of Russia, the senate commissioned a Tartarian merchant, a dealer in rhubarb, to procure them some seeds of the genuine plant. This he did, or pretended to do; and, on sowing them, two species of *Rheum* were obtained; namely, the *undulatum* and the *palmatum*. (Murray, *App. Med.* vol. iv. p. 363.) In 1762, seeds of the latter species were received by Dr. Hope, of Edinburgh, from Dr. Mounsey, at Petersburg: they were sown, and the plants cultivated with success. (Hope, *Phil. Trans.* vol. lv. for the year 1765, p. 290.) The root of this species being found to agree, in many of its characters, with that of genuine rhubarb, led to the belief that the *palmatum* was the true species. The inquiries of Pallas, however, raised some doubts about the correctness of this opinion; for the Bucharrians declared themselves unacquainted with the leaves of the *palmatum*, and described the true plant as having round leaves, with a few incisions only at the margin. This description agreed best with *Rheum compactum*, the roots of which were declared, by Millar, who cultivated the plant, to be as good as foreign rhubarb. (Murray, 365-6.) Georgi says, that a Cossack pointed out to him the leaves of the *R. undulatum* as the true species. (Murray, p. 360.) These accounts were not satisfactory to the Russians; and in consequence, in 1790, Sievers, an apothecary, went to Siberia, under the auspices of Catharine II., with a view of settling the question; but, after four years of persevering attempts to reach the country where the true rhubarb grew, or even to obtain the seeds, he was obliged to be satisfied with negative results only. "My travels," says he, "as well as acquaintance with the Bucharrians, have satisfied me that as yet nobody—that is, no scientific person—has seen the true rhubarb plant. All that is said of it, by the Jesuits, is miserable, confused stuff; all the seeds procured under the name of true rhubarb are false; all the plantations, from those of the Knight Murray down to the flower-pot of a private individual, will never yield true rhubarb. Until further determination, I hereby declare all the de-



scriptions in all the Materia Medicas to be incorrect." (Duncan, *Suppl. to the Edinb. New Disp.* p. 89.)

Himalayan rhubarb is obtained from several species of Rheum: viz. *R. Emodi*, Wallich (*Bot. Mag.* t. 3508); *R. Webbianum*, Royle (*Illustr. of the Bot. of the Himal. Mount.*); *R. spiciforme*, Royle; and *R. Moorcraftianum*, Royle. But there are no reasons for supposing that they yield any of the rhubarb of European commerce. It is not improbable that the species yielding the officinal rhubarb is yet undescribed. Dr. Royle, (*op. cit.*) after referring to the accounts of different authors, as to the precise locality of the country yielding Russian rhubarb, concludes that it is within 95° of E. long. in 35° of N. latitude—that is, in the heart of Thibet. And he adds, "as no naturalist has visited this part, and neither seeds nor plants have been obtained thence, it is as yet unknown what species yields this rhubarb." Further, it is probable, I think, that the Russian and Chinese rhubarbs are procured from different species.

Mr. Anderson, of the Apothecaries' Botanic Garden, Chelsea, has kindly furnished me with the fresh roots of thirteen species of Rheum: viz. *R. palmatum*, *undulatum*, *compactum*, *Rhaponticum*, *Emodi*, *crassinervium*, *capsicum*, *tataricum*, *hybridum*, *confluens*, *Fischeri*, *bardani-folium* and *bullatum*. Having carefully dried these by artificial heat, I found that one species only, viz. *R. palmatum*, closely resembled Asiatic rhubarb in the combined qualities of odour, colour, and marbling: *R. undulatum* agreed tolerably well in colour and marbling, but not in odour. It deserves, however, to be noticed that the specimens examined were of unequal ages,—some forming the root-stock, others root-branches of the respective plants,—a circumstance which considerably diminishes the value of a comparative examination of them. Furthermore, all the samples were probably injured by the wet season. The root-branches of *R. crassinervium* (from a strong plant of six or seven years old, but which had not flowered) did not resemble Asiatic rhubarb in either colour or odour.

**Species.**—1. Rheum palmatum, Linn. L. D.—"Leaves roundish-cordate, half palmate; the lobes pinnatifid, acuminate, deep dull green, not wavy, but uneven, and very much wrinkled on the upper side, hardly scabrous at the edge, minutely downy on the under side; sinus completely closed; the lobes of the leaf standing forwards beyond it. Petiole pale green, marked with short purple lines, terete, obscurely channelled quite at the upper end. Flowering stems taller than those of any other species" (Lindley).—Perennial. Grows spontaneously in the Mongolian empire, on the confines of China. (Murray, *App. Med.* vol. iv. p. 363.) Extensively cultivated near Banbury, in Oxfordshire, for the supply of *English rhubarb* to the London market. Its leaf-stalks make excellent tarts and puddings. Prof. Guibourt (*Hist. des Drog.*) observes "that of the roots of *R. palmatum*, *undulatum*, *compactum*, and *Rhaponticum*, those of the first species only possess the exact odour and taste (grittiness excepted) of the China rhubarb. But rhubarb procured from this species cultivated in England is distinguished by several characters from Asiatic rhubarb. How far these may be the result of climate I am not prepared to say.

2. Rheum undulatum, Linn. D.—"Leaves oval, obtuse, extremely wavy, deep green, with veins purple at the base, often shorter than the petiole, distinctly and copiously downy on each side, looking as if frosted when young, scabrous at the edge; sinus open, wedge-shaped, with the lower lobes of the leaves turned upwards. Petiole downy, blooded, semicylindrical, with elevated edges to the upper side, which is narrower at the upper than the lower end" (Lindley).—Perennial. Grows in Siberia (Georgi and Pallas, cited by Murray), (*App. Med.*) and China (Ammann, quoted by Lindley). Cultivated in France, and yields part of the *French rhubarb*. (Guibourt, *Hest. des Drog.*) It was formerly cultivated in Siberia as the real officinal plant; but, as genuine rhubarb could not be procured from it, its cultivation has been given up. (Guibourt, *Hist. des Drog.*)

3. Rheum Compactum, Linn.—"Leaves heart-shaped, obtuse, and wavy, deep green, of a thick texture, scabrous at the margin, quite smooth on both sides, glossy and even on the upper side; sinus nearly closed by the parenchyma. Petiole green, hardly tinged with red, except at the base, semicylindrical, a little compressed at the sides, with the upper side broad, flat, bordered by elevated edges, and of equal breadth at each end" (Lindley).—Perennial. Grows in Tartary and China. Cultivated in France, and yields part of the *French rhu-*



*barb.* (Guibourt, *supra cit.*) This rhubarb is a very fair imitation of that from China; but is distinguished by its reddish tint, its different odour (common to it, to *R. undulatum*, and *R. rhaponticum*), its close and radiated marbling, its not tinging the saliva, and its not grating under the teeth.

FIG. 195.

*Rheum palmatum.*

FIG. 196.

*Rheum compactum.*

4. *Rheum Emodi*, Wallich; *R. australe*, Don.—“*Leaves cordate, acute, dull green, but little wavy, flattish, very much wrinkled, distinctly rough, with coarse short hairs on each side; sinus of the base distinctly open, not wedge-shaped, but diverging at an obtuse angle, with the lobes nearly turned upwards. Petioles very rough, rounded angular, furrowed; with the upper side depressed, bordered by an elevated edge, and very much narrower at the upper than the lower end*” (Lindley).—Perennial. Grows on the Himalays. Its stalks make excellent tarts and puddings.

5. *Rheum Webbianum*. (Royle, *Illustr. of the Bot. of the Him. Mountains*, p. 318.)

6. *Rheum spiciforme*. (Royle, *Illustr. of the Bot. of the Him. Mountains*, p. 318.)

7. *Rheum Moorcroftianum*. (Royle, *Illustr. of the Bot. of the Him. Mountains*, p. 318.)

These three are Himalayan species. *R. Emodi* and *Webbianum* furnish *Himalayan rhubarb*, whose properties are very different to those of officinal rhubarb.

8. *R. Rhaponticum*, Linn.—Grows in Thrace; borders of the Euxine sea; north of the Caspian; Siberia, &c. Cultivated in this country for the leaf-stalks, which are used for tarts and puddings. Cultivated also in France, and yields part of the *French rhubarb*.

9. *R. Crassinervium*, Fischer.—Habitation unknown. Its roots possess, according to Mr. Anderson, of the Apothecaries' Garden, Chelsea, the colour and odour of Turkey rhubarb. (Lindley, *Fl. Med.*)

10. *R. leucorrhizum*, Pallas; *R. nanum*, Sievers.—Said to yield *White or Imperial rhubarb*.

PREPARATION.—The method of curing or preparing Asiatic rhubarb for the market varies somewhat in different localities. In China it is as follows:—The

FIG. 197.

*Rheum Emodi.*



roots are dug up, cleansed, cut in pieces, and dried on stone tables heated beneath by a fire. During the process the roots are frequently turned. They are afterwards pierced, strung upon cords, and further dried in the sun. (Du Halde, *Descrip. Géograph. et Hist. de la Chine*, t. iii. p. 492.) In Tartary the Moguls cut the roots in small pieces, in order that they may dry the more readily, and make a hole in the middle of every piece, through which a cord is drawn, in order to suspend them in any convenient place. They hang them, for the most part, about their tents, and sometimes on the horns of their sheep. (Bell, *Travels from St. Petersburg to divers parts of Asia*, vol. i. p. 311.) Sievers, however, states that the roots are cut in pieces, strung upon threads, and dried under sheds, so as to exclude the solar rays; and the same author tells us, that sometimes a year elapses from the time of their collection until they are ready for exportation. (Duncan, *Suppl. to the Edinb. New Disp.* p. 88.)

DESCRIPTION.—I am acquainted with six kinds of rhubarb, namely, *Russian*, *Dutch-trimmed*, *Chinese*, *Himalayan*, *English*, and *French*.

1. **Russian or Bucharian Rhubarb; Turkey Rhubarb**, offic. (*radix rhei russici seu muscovitici, s. bucharici, s. sibirici, s. turcici*).—This kind of rhubarb is imported from St. Petersburg. It is said formerly to have been brought by way of Natolia: hence the name of *Turkey rhubarb*, which it ordinarily bears in the shops. (Murray, *App. Med.* vol. iv. p. 379.)

According to the treaty entered into between the Russians and Chinese, the commerce between the two nations takes place at the frontiers. Kiachta is the Russian, Maimatschin the Chinese, frontier town. All the so-called Russian rhubarb is brought to Kiachta by Bucharian merchants, who have entered into a contract to supply the government with that drug in exchange for furs. It is collected on that long chain of mountains of Tartary, destitute, for the most part of woods, and which arises not far from the town of Selin, and extends to the south as far as the lake Kokonor, near Thibet. It is conveyed in woollen sacks, on camels, to Kiachta, where it is examined with much care, in the presence of the Bucharians, by the apothecary stationed at Kiachta for the purpose. The worm-eaten pieces are rejected, the others bored to ascertain their soundness, and all the damaged or decayed parts are cut away. In accordance with the terms of the contract, the pieces which do not pass the examination are burned; the remainder is then transmitted to Petersburg, and from thence to us. (Pallas, *Voyages en différ. Prov. de l'Empire de Russie*, t. iv. p. 216, et seq.)

It is imported in boxes or cases, covered with a pitched cloth, on the outside of which is a hide. The size of the pieces is various; but, in commerce, the small ones are preferred, and they are, therefore, picked out, and sold as *radix rhei turcici electa*—the larger pieces and the dust being employed for powdering. Their shapes are various, being angular, rounded, irregular, &c. The external appearance of many of the pieces seem to show that the cortical portion of the root had been shaved off longitudinally by successive strokes of a knife; hence the angular appearance of the external surface. Holes are observed in many of the pieces: some of them extend completely, others only partially, through. Those which extend only to the centre have been evidently made for the purpose of examining the condition of the interior of the pieces.

Externally the pieces are covered with a bright yellow-coloured powder, usually said to be produced by the mutual friction of the pieces in the chests, during their passage to this country; though many druggists believe it is derived from the process of *rouncing* (that is, shaking in a bag with powdered rhubarb), before its exportation. The odour is strong and peculiar, but somewhat aromatic; it is considered by druggists to be so delicate, that in all wholesale drug-houses a pair of gloves is kept in the Russian rhubarb drawer, with which only are the assistants permitted to handle the pieces. When chewed it feels gritty under the teeth, from the presence of numerous crystals of oxalate of lime: it commu-



nicates a bright yellow colour to the saliva, and has a bitter, slightly astringent taste.

Beneath the dust with which the pieces are covered, the surface has a reddish-white tint, owing to the intermixture of white and red parts. The yellowish-white parts have the form of lines or veins, which, by their union with each other, assume a reticular form. Irregularly scattered over the surface we observe small star-like spots and depressions, of a darker colour. The transverse fracture is uneven, and presents numerous brownish-red or dark carmine-coloured undulating veins. The longitudinal fracture is still more uneven, and shows the longitudinal direction of the veins, which are often interrupted with white. The surface obtained by cutting is more or less yellow, and often exposes the veins, disposed in groups.

By boiling very thin slices of the root in water, and then submitting them to the microscope, we observe the cellular tissue, annular ducts, and numerous *conglomerate raphides* (clumps of crystals of oxalate of lime). From 100 grs. of Russian rhubarb, Mr. Quekett procured between 35 and 40 grs. of these raphides. (Lindley's *Introduction to Botany*, 3d ed. p. 553.) Turpin considered the presence of these crystals sufficient to distinguish Russian and Chinese rhubarb from that grown in Europe; but in some specimens of English rhubarb I have met with these crystals in as great abundance as in foreign rhubarb. According to Raspail (*Chim. Organ.*) they are situated in the interstices of the elongated cellular tissue; but this statement is erroneous, the situation of the crystals being in the interior of the cells.

The powder of Russian rhubarb is of a bright yellow colour, with a reddish tint; but, as met with in the shops, it is almost invariably mixed with the powder of English rhubarb.

*White or Imperial Rhubarb.*—When Pallas was at Kiachta, the Bucharian merchants who supplied the crown with rhubarb, brought some pieces of rhubarb as white as milk, with a sweet taste, and the same properties as rhubarb of the best quality. (*Voyages*, t. iv. p. 218.) It is not met with in English commerce as a distinct kind; and it is almost unknown in Russia. (Grassmann, *Pharm. Central-Blatt für 1831*, S. 584.) But in the chests of Russian rhubarb there are occasionally found pieces having an unusually white appearance: these, I presume to be the kind alluded to. (Consult Gœbel and Kunze, *Pharm. Waarenkunde.*) White rhubarb is said to be the produce of *R. leucorrhizum*, Pallas (*R. nanum*, Sievers).

2. *Dutch-trimmed or Batavian Rhubarb*, offic. (*Rhubarbe de Perse*, Guibourt.) This kind of rhubarb is closely allied to, if it be not identical with, the preceding in its texture. In commerce, however, it is always regarded as distinct. It is imported from Canton and Singapore in chests, each containing from 130 to 140 lbs. It is probably Bucharian rhubarb of less fine quality, sent by way of Canton, as mentioned by Murray, (*App. Med.* vol. iv. p. 379,) and which, in consequence, has been usually confounded, by pharmacological writers, with Chinese rhubarb. In shape, size, and general appearance, it resembles the Russian kind; for the cortical portion of the root seems to have been separated by slicing, and hence the pieces have the same angular appearance on the surface that the Russian rhubarb has. The pieces are frequently perforated, and in the holes are found the remains of the cord by which the root has been suspended. In the drug-trade this kind of rhubarb is said to be *trimmed*, and, according to the shape of the pieces, they are called *flats* or *rounds*. The colour and weight of the pieces are variable.

3. *China or East Indian Rhubarb*, offic. (*radix rhei chinensis, seu indicæ*).—

FIG. 198



Crystals of Oxalate of  
Lime in Russian  
Rhubarb.



This kind is imported either directly from Canton, or indirectly by Singapore and other parts of the East Indies, and is probably the produce of China (especially of the province of *Se-tchuen*; Du Halde: of *Hoo-nan* and *Hoo-pih*, as well as other provinces; Gutzlaffe and Reed). It is imported in chests. The pieces are frequently cylindrical or roundish, but sometimes flattened; in trade they are distinguished as *rounds* and *flats*. They appear to have undergone a different process of preparation to that of Russian rhubarb. Thus the cortical portion of the root seems rather to have been scraped than sliced off, and hence the surface is not so angular; and on the worst pieces we observe the remains of the greenish-brown or blackish cortex. Among druggists this kind of rhubarb is frequently termed *half-trimmed* or *untrimmed rhubarb*. The pieces are generally perforated with holes, in many of which we find portions of the cords by which the pieces were suspended. These holes are smaller than those observed in Russian rhubarb, and that portion of the root forming their sides is usually dark-coloured, decayed, and of inferior quality. The best pieces are heavier and more compact than that of the Russian kind; they are covered with an easily separable yellow dust. When this is removed we observe that the surface is not so regularly reticulated, is more of a yellowish-brown than reddish-white colour, and has coarser fibres than Russian rhubarb. On the finer pieces we notice numerous star-like spots or depressions. The fracture is uneven; the veins, especially towards the middle, have a less determinate direction, and are of a duller or reddish-brown colour, and, in very bad pieces, of an umber-brown colour, with a gray substance between the veins.

The odour of this species is much less powerful than that of Russian rhubarb, and is somewhat less aromatic. The taste, grittiness when chewed, and microscopic appearances, are similar to those of Russian rhubarb. The colour of the powder is of a more dull yellow or brownish cast.

**4. Himalayan Rhubarb.**—This is the produce probably of *Rheum Emodi*, and *Webbianum*. The roots of *R. spiciforme*, and *Moorcroftianum*, are lighter coloured and more compact in structure. My specimens were furnished by Dr. Wallich, who obtained them from the inhabitants of the Himalayas, who had strung the pieces around the necks of their mules. It has scarcely any resemblance to the officinal rhubarb. The pieces are cylindrical, and are cut obliquely at the extremities; the cortex of the root is not removed; the colour is dark brown, with a slight tint of yellow; they are without odour, and have a coarse fibrous texture. Dr. Royle (*Illustr. of the Bot. of the Himal. Mount.* p. 316,) says that the Himalayan rhubarb makes its way into the plains of India through Kalsee, Almora, and Butan: it has, he adds, a spongy texture, and sells for only one-tenth of the price of the best rhubarb, resembling in quality the Russian, and which is found in India. Dr. Royle has kindly supplied me with the dried roots of *R. Webbianum*, the same as those referred to in the experiments of Mr. Twining. (*Trans. Med. and Phys. Soc. of Calcutta*, vol. iii. p. 441.) They are short, transverse segments of the rootbranches, of a dark brownish colour, odourless or nearly so, with a very bitter astringent taste, and do not essentially differ from the roots given me by Dr. Wallich.

**5. English Rhubarb (*radix rhei anglici*).**—Two kinds of rhubarb are met with in the shops under the name of English rhubarb: one is *dressed* or *trimmed*, so as to resemble the Russian kind, and is, I believe, the produce of *Rheum palmatum*; the other is sometimes called *stick* rhubarb, and is said by Messrs. Stephenson and Churchill (*Med. Bot.* vol. i.) to be obtained from *Rheum undulatum*; but I suspect this statement to be erroneous.

The *dressed English rhubarb* is the produce of Banbury, in Oxfordshire.<sup>1</sup>

<sup>1</sup> The cultivation of rhubarb in Britain was long since recommended by Sir Wm. Fordyce, in a work entitled *The Great Importance and proper Method of Cultivating and Curing Rhubarb in Britain, for Medical Purposes*, Lond. 1784.



It is the kind frequently observed in the show-bottles of druggists' windows, and was formerly sold in Cheapside and the Poultry for "*Turkey rhubarb*," by persons dressed up as Turks. It occurs in various-sized and shaped pieces, which are trimmed and frequently perforated, so as to represent Russian rhubarb: some of the pieces are cylindrical in their form, and are evidently segments of cylinders; others are flat. This kind of rhubarb is very light, spongy (especially in the middle of the pieces), attractive of moisture, pasty under the pestle, and has a reddish or pinkish hue not observed in the Asiatic kinds. Internally it has usually a marbled appearance; the streaks are pinkish, parallel, and have a radiated disposition; and in the centre of some of the larger pieces the texture is soft and woolly, and may be easily indented by the nail. Its taste is astringent and very mucilaginous; it is not at all, or only very slightly, gritty under the teeth: its odour is feeble, and more unpleasant than either the Russian or East Indian kinds. The microscope discovers in it, for the most part, very few crystals of oxalate of lime.

The *common stick English rhubarb* is sold in herb shops. It occurs in angular or roundish pieces, of about five or six inches long, and an inch thick. When fractured it presents the radiated appearance, and the red-coloured streaks, of the kind last mentioned. Its taste is astringent, but very mucilaginous: it is not gritty under the teeth; it breaks very short.

English rhubarb is extensively employed by druggists to adulterate the powder of Asiatic rhubarb.

**6. French Rhubarb** (*radix rhei gallici*).—This kind of rhubarb is procured from *Rheum rhaponticum*, undulatum, and especially compactum. (Guibourt, *Hist. des Drog.* t. i. p. 569.) These are cultivated at Rheupole, a place not far from Lorient, in the department of Morbihan. *Rheum palmatum* is no longer cultivated there. Through the kindness of Professor Guibourt, I possess two kinds of French rhubarb. One of these he calls *flat*, and is probably the produce of *R. rhaponticum*; the other he terms *round*, and is the produce of *R. compactum*.

COMMERCE.—In 1831, the quantity of rhubarb imported from Russia was 6,901 lbs.; from the East Indies, 133,462 lbs. (*Parl. Ret.* No. 550, for 1833.) The quantities of rhubarb on which duty (1s. per lb.) has been paid during the last six years, are as follows (*Trade List*):

	East Indian.	Foreign.
	lbs.	lbs.
In 1835.....	32,515	10,647
1836.....	36,836	7,752
1837.....	44,669	5,946
1838.....	37,026	7,402
1839.....	22,575	12,525
1840.....	16,745	22,203

COMPOSITION.—The most important analyses of rhubarb are those of Schrader, (*Pfaff's Mat. Med.* Bd. iii. S. 39,) N. E. Henry, (*Bull. d. Pharm.* vi. 87,) Brande, (*Quart. Journ. of Science*, vol. x. p. 288,) Hornemann, (*Berl. Jahrb.* Bd. xxiii. 8, 252, 1822,) Peretti, (*Journ. de Pharm.* xiv. 536,) Buchner and Herberger, (*Pharm. Central-Blatt für 1831*, S. 789,) Lucae, (*Pharm. Central-Blatt für 1834*, S. 78,) O. Henry, (*Journ. de Pharm.* xxii. 402,) and Brandes, (*Pharm. Central-Blatt für 1836*, p. 482.)

One hundred grains of the finest Russian Rhubarb, according to Mr. Brande, lost 44.2 grs. by being repeatedly digested in alcohol (sp. gr. 0.815). By evaporation the alcoholic solution yielded a residue of 36 grains (the loss 8.2 grs. may be ascribed to water), of which 10 grains (resin?) were insoluble in water.

The rhubarb left after the action of alcohol weighed when dried at 212° F., 55.8 grs. It yielded to water 31 grains (gum?). The insoluble residue, weighing 24.8 grs., must have consisted of woody fibre, oxalate of lime, &c. It has been already stated (p. 265) that Mr. Quekett obtained from 35 to 40 per cent. of oxalate of lime from Russian rhubarb.



	Horneman's Analyses.			Lucae's Analysis.	Brandes' Analysis.
	Russian.	English [Chinese?]	Sicilian [English?]	Rheum Emodi.	
Bitter principle of Pfaff	16.042	14.375	10.156	4.220	Pure rhabarberic acid..... 2.0
Yellow colouring matter of Henry.....	9.583	9.166	2.187	7.500	Impure ditto..... 7.5
Astringent extractive..	14.687	16.458	10.417	6.458	Galic acid, with some rhabarberic acid..... 2.5
Oxidized tannin.....	1.458	1.249	0.833	0.469	Tannin..... 9.0
Mucilage.....	10.000	8.333	3.542	6.250	Colouring extractive..... 3.5
Substance extracted by potash ley.....	28.333	30.416	41.042	55.833	Uncrystallizable sugar with tannin..... 11.0
Oxalic acid.....	1.042	0.833	...	1.302	Starch and pectic acid..... 4.0
Woody fibre.....	14.583	15.416	8.542	16.364	Gummy extractive taken up by caustic potash..... 14.4
Moisture.....	3.333	3.125	6.042	...	Pectic acid..... 4.0
Rhaponticin.....	...	...	1.042	...	Malate and gallate of lime.... 1.1
Starch.....	...	...	14.583	...	Oxalate of lime..... 14.0
Loss [water and odorous matter?].....	0.939	0.629	1.614	1.604	Sulphate of potash, and chloride of potassium..... 1.5
					Phosphate of lime with oxide of iron..... 0.5
					Silica..... 1.0
					Woody fibre..... 25.0
					Water..... 2.0
Rhubarb.....	100.000	100.000	100.000	100.000	.....100.0
The woody fibre being incinerated, yielded			The quantities of		
Potash.....	trace	trace	potash,	..	
Charcoal.....	0.208	0.203	lime, alu-	0.208	
Silica.....	2.416	0.416	mina, and	0.155	
Carbonate of magnesia.....	0.208	0.203	magnesia,	0.208	
Alumina with oxide of iron.....	0.208	0.208	were too	0.572	
Carbonate of lime.....	5.833	7.083	small to be	3.854	
Ashes.....	8.873	8.123	accurately	4.997	
			determin'd		

1. ODOROUS MATTER OF RHUBARB (*Volatile oil?*)—In none of the analyses of rhubarb is any mention made of an odorous principle; yet such must exist. Professor Guibourt, (*Hist. des Drog.* t. ii. p. 569, 3<sup>me</sup> ed.) however, ascribes the odour, colour, and taste of rhubarb to one and the same principle; but this opinion can scarcely be correct, since the degrees of colour and odour bear no proportion to each other in different kinds of rhubarb. The odorous principle is probably a volatile oil, but it has not hitherto been isolated. Dr. Bressy announced, a few years since, to the *Académie de Médecine*, that he had separated it, but the committee appointed to repeat his experiments was unable to procure it by his process. (*Dict. des Drog.* t. iv. p. 425.) Zenneck (*Pharm. Central-Blatt für 1832*, S. 237) says that the rhubarb odour is imitated by a mixture of nitric acid, aloe, and chloride of iron.

2. YELLOW COLOURING MATTER OF RHUBARB (*Rhabarberic acid*, Brandes; *Rheumin*, Hornemann; *Rhabarberin*, Geiger; *Rhein*, Auctor).—Extracted from rhubarb in powder by means of ether, and obtained by distilling off the greater part of the ether from the tincture thus procured, and leaving the residue to spontaneous crystallization. The crystals are purified by repeated solutions and crystallizations in alcohol. When dry, they assume the form of a powder, having an intensely yellow colour, but being without any remarkable taste. Rhabarberic acid is unchanged in the air; heated, it fuses into a yellow fluid, which, by a continuance of the heat, becomes reddish-brown, evolves dense yellow vapours [*pyro-rhabarberic acid?*], and carbonizes. It requires more than 1000 parts of cold water to dissolve it, but is twice as soluble in boiling water. It is more soluble in alcohol and in ether: the solutions redden litmus. In cold oil of almonds and in oil of turpentine it is slightly soluble; but is much more so when these liquids are hot. It dissolves, with a dark-red colour, in sulphuric and in nitric acids: water precipitates it from these solutions unchanged. Nitric acid attacks it with great difficulty. Alkaline solutions make it dark red, and generally (lime-water excepted) dissolve it. Alum renders it dark-red. The alkaline solutions of it form, with acetate of lead, chloride of calcium, and chloride of barium, yellow precipitates; with sulphate of copper, violet, which, after some time, becomes blue. (Brandes and Geiger, *op. cit.* 1834, S. 607.) Brandes regards rhabarberic acid as the active principle of rhubarb. Six grains of the pure acid given to a strong young man caused griping, but did not purge. (*Op. cit.* 1836, S. 498.) Dulk is of opinion that the active principle of rhubarb is a difficultly crystallizable substance, which he terms *Rhein*, and which, by oxidation, becomes *Rhabarberic acid*. This acid, according to Brandes and Leber, consists of  $C^{25} H^{19} O^{19}$ . (*Op. cit.* 1839, S. 102-105.)

3. ASTRINGENT MATTER (*Tannic and Gallic Acids*).—The red veins are the seat of the astringent matter. This is proved by brushing the cut surface of rhubarb with a weak solu-



tion of a ferruginous salt: the red veins only undergo a change of colour. From the observations of Brandes, it appears that rhubarb contains gallic, as well as tannic, acid.

4. BITTER PRINCIPLE.—Rhubarb contains a bitter principle; but most of the substances which have been announced as the bitter principle of rhubarb, under the name of *caphopicrite* (? from *καφάρα*, *I exhale*, and *πικρός* bitter), or *rhabarberin*, are themselves compounded of two or more principles. Thus, *Pfaff's rhabarberin* consists of uncrystallizable sugar, extractive, resin, rhabarberic acid, and tannin. *Henry's rhabarberin* consists of resin and rhabarberic acid. *Buchner and Herberger's rhabarberin* is a mixture of extractive, uncrystallizable sugar, and rhabarberic acid. *Carpenter's rhabarberin* contains some rhabarberic acid (*op. cit.* 1836, S. 498). It would appear from the analysis of Brandes that the bitter principle is of the nature of resin; but *Buchner (op. cit.* S. 821,) admits the existence of a bitter extractive (caphopicrite), which is soluble in water and alcohol, but is insoluble in ether. This extractive, he says, is in intimate combination with rhabarberic, tannic, and gallic acids; the compound thus formed being the resin of some chemists. It is obvious, therefore, that a further examination of the bitter matter is required to make out satisfactorily its nature.

5. RHAPONTICIN.—A yellow, crystallizable, odourless, tasteless substance, obtained from the root of European [English?] rhubarb. It is insoluble in cold water, ether, and the volatile oils, but soluble in 24 times its weight of boiling water, and twice its weight of absolute alcohol. (*Berzelius, Traité de Chim.* vi. 205.)

6. OXALATE OF LIME.—The conglomerate raphides before noticed (p. 265) are crystals of oxalate of lime. They may be separated in great abundance by boiling Russian or China rhubarb in water until the cohesion of the tissue is completely destroyed. When the decomposed tissue is well shaken with water, the crystals fall to the bottom of the vessel. Heated to redness, they are changed into carbonate of lime. A solution of them in diluted nitric acid, or a solution obtained by boiling the crystals with a solution of carbonate of soda, forms, with nitrate of silver, a white precipitate (*oxalate of silver*), which explodes when heated.

CHEMICAL CHARACTERISTICS.—If the powder of rhubarb be heated in a glass capsule over a lamp, an odorous yellow vapour (*rhabarberic* or *pyro-rhabarberic acid*) is obtained, which communicates a red colour to a solution of caustic potash. The aqueous infusion of rhubarb forms, with the sesquichloride of iron, a green compound (*tannate of iron*); with a solution of gelatin, a copious yellow precipitate (*tannate of gelatin*), which is dissolved on the application of heat, or by the addition of an excess of gelatin; with a solution of sulphate of quinia, a yellowish precipitate (*tannate of quinia*); with the alkalis (potash, soda, and ammonia) a red-coloured solution (*soluble alkaline rhabarberates*); with lime-water, a reddish precipitate (*rhabarberate of lime*); with the acids (the acetic excepted), precipitates (composed of *rhabarberic acid* and the precipitant); and with various metallic solutions (as of acetate of lead, protochloride of tin, protonitrate of mercury, and the nitrate of silver), precipitates (principally *metallic rhabarberates* and *tannates*).

Paper coloured by rhubarb is not affected by boracic acid, or by the borates rendered acid, whereas turmeric paper is reddened by these agents. (*Faraday, Quart. Journ. of Science*, vol. vi. p. 152.) A decoction of Russian, Dutch-trimmed, or of China rhubarb, becomes, with a solution of iodine, greenish-blue (*iodide of starch*): after a few minutes the colour disappears, and no iodine can be detected in the liquor by starch, unless nitric acid be previously added. A decoction of English rhubarb is rendered, by a solution of iodine, intensely blue (*iodide of starch*), the colour not completely disappearing by standing.

PHYSIOLOGICAL EFFECTS. *a. On Animals.*—On the *Solipedes* rhubarb acts as a tonic, confining its action principally to the stomach, whose digestive power it augments. On the *Carnivora* it operates, in doses of half a drachm, in the same way; but, in doses of several drachms, as a purgative. On the larger *Herbivora* it may be given to the extent of several ounces without causing purgation. (*Moiroud, Pharm. Vétér.* p. 260.) *Tiedemann and Gmelin (Versuche u. d. Wege auf welch. Subst. aus. d. Magen. u. Darmk. gelang.* S. 10-12,) detected it by its yellow colour in the serum of the blood of the mesenteric, splenic, and portal veins, and in the urine of dogs, to which rhubarb had been administered by the mouth. They failed to recognise it in the chyle.

*β. On Man.*—In small doses (as from four to eight grains) it acts as an astringent tonic, its operation being principally or wholly confined to the diges-



tive organs. In relaxed conditions of these parts it promotes the appetite, assists the digestive process, improves the quality of the alvine secretions, and often restrains diarrhœa. *In large doses* (as from a scruple to a drachm) it operates, slowly and mildly, as a purgative, sometimes causing slight griping. It never inflames the mucous membrane of the alimentary canal, as jalap, scammony, colocynth, and some other drastic purgatives, are capable of doing. The constipation which follows its cathartic effect has been ascribed to the operation of its astringent matter. In febrile complaints and inflammatory diseases it sometimes accelerates the pulse, and raises the temperature of the body, whence the impropriety of its use in these cases. Its yellow colouring matter (rhabarberic acid) becomes absorbed, and may be recognised in the urine, by the yellow stain which this secretion produces on linen, and by the red colour which it assumes on the addition of potash. By a more prolonged use of rhubarb the sweat (especially of the armpits) becomes tinged yellow. The milk of nurses who have taken it, acquires a purgative property. Rhubarb has for a long period been considered to possess a specific influence over the liver, to promote the secretion of the bile, and to be useful in jaundice. These opinions, which, as Dr. Cullen (*Mat. Med.*) correctly observed, have no foundation either in theory or practice, arose from the absurd doctrine of signatures.

Considered in relation to other medicinal agents, rhubarb holds an intermediate rank between the bitter tonics on the one hand, and the drastics on the other. From the first it is distinguished by its purgative properties; from the latter, by its tonic operation and the mildness of its evacuent effects. As a purgative it is perhaps more closely allied to aloes than to any other cathartic in ordinary use; but is distinguished by its much milder operation, and its want of any specific action on the large intestines.

The comparative power of the several kinds of rhubarb has scarcely been ascertained with precision. The remarks above made apply to the Russian and Chinese varieties, whose power is about equal. From experiments made by Dr. Parry, at the Bath Hospital, it appears that the purgative qualities of the English rhubarb are scarcely so strong as those of the Russian and Chinese varieties; but the difference is not great. (Stephenson and Churchill, *Med. Bot.*) Himalayan rhubarb is, according to Dr. Twining, (*Trans. Med. and Phys. Soc. of Calcutta*, vol. iii. p. 441.) almost equal to Russian rhubarb in its purgative effects; but it is less aromatic, though more astringent.

USES.—The remedial value of rhubarb depends on the mildness and safety of its operation, and on its tonic and astringent influence over the alimentary canal.

1. *As a purgative.*—There are many cases in which the above mentioned qualities render rhubarb peculiarly valuable as a purgative. In mild cases of *diarrhœa* it sometimes proves peculiarly efficacious; by first evacuating any irritating matter contained in the bowels, and afterwards acting as an astringent. Given at the commencement of the disease, it is a very popular remedy; and though doubtless it is often employed unnecessarily (since, as Dr. Cullen has justly observed, in many cases no further evacuation is necessary or proper than what is occasioned by the disease) yet it rarely if ever does harm. Sulphate of potash is a very useful adjunct to it, and promotes its purgative operation. Antacids (as chalk or magnesia) are frequently conjoined with it. It is not fitted for inflammatory or febrile cases. As *an infant's purgative* it is deservedly celebrated. It is well adapted for a variety of children's complaints; but is peculiarly adapted to scrofulous subjects and those afflicted with enlargement of the mesenteric glands, accompanied with tumid belly and atrophy. Magnesia, sulphate of potash, or calomel, may be associated with it according to circumstances. For *an ordinary purgative in habitual costiveness* it is scarcely adapted, on account of the constipation which follows its purgative effect.



2. *As a stomachic and tonic.*—In *dyspepsia*, accompanied with a debilitated condition of the digestive organs, small doses of rhubarb sometimes prove beneficial, by promoting the appetite and assisting the digestive process. In *scrofulous* enlargement of the lymphatic glands, in children, rhubarb, in small doses, is often combined with mercurial alteratives (as the *hydrargyrum cum cretâ*), or with antacids (as magnesia or chalk), and frequently with apparent advantage.

3. *As an external application.*—Sir Everard Home (*Pract. Observ. on the Treatment of Ulcers*, p. 96, 1801) used it as a topical application to promote the healing of indolent, non-painful ulcers. The powder is to be lightly strewed over the ulcer and a compress applied. In irritable ulcers an eighth part of opium is to be added. When applied to large ulcers it has produced pretty active purging. (Arnemann, *Chirurg. Arzneim.* 6<sup>te</sup> Aufl. S. 224.) The powder of rhubarb, incorporated with saliva and rubbed on the abdomen, proves purgative. (Alibert, *Nouv. Elém. de Thérap.* t. ii. p. 275 et seq. 5<sup>me</sup> ed.)

ADMINISTRATION.—The powder of Russian or China rhubarb may be exhibited, as a stomachic and tonic, in doses of from five to ten grains; as a purgative, from a scruple to a drachm. The dose of indigenous rhubarb should be about twice as much as the above.

“By roasting it with a gentle heat, till it becomes friable [*Rheum torrefactum*], its cathartic power is diminished, and its astringency supposed to be increased” (Lewis).

1. INFUSUM RHEI, L. E. D. (U. S.) *Infusion of Rhubarb.*—(Rhubarb, sliced [in coarse powder, E.] ʒij. [ʒj. E., ʒj. D.] [ʒi. U. S.]; Boiling [distilled, L.] Water, Oj. [Oss. (U. S.) wine measure, D.; f̄xviiij. E.] [Spirit of Cinnamon, f̄ʒij. E.] Macerate for two hours in a lightly-covered vessel, and strain [through linen or calico, E.]—Boiling water extracts from rhubarb, rhabarberic acid, resin, tannin, gallic acid, sugar, extractive, and starch. As the liquor cools it becomes turbid, owing to some rhabarberic acid, resin, tannin, gallic acid, and tannate of starch being deposited (Brandes). Infusion of rhubarb is stomachic and gently purgative. It is usually employed as an adjunct to, or vehicle for, other mild purgatives or tonics. The alkalis or magnesia are sometimes conjoined. The stronger acids and most metallic solutions are incompatible with it.—Dose, f̄ʒj. to f̄ʒij.

2. TINCTURA RHEI, E. (U. S.); *Tincture of Rhubarb.*—(Rhubarb, in moderately fine powder, ʒijss. (ʒij. U. S.); Cardamom Seeds, bruised, ʒss.; Proof Spirit, (Diluted Alcohol, U. S.) Oij. Mix the rhubarb and cardamom seeds, and proceed by the process of percolation, as directed for tincture of cinchona. This tincture may also be prepared by digestion.)—The alcoholic tincture of rhubarb contains rhabarberic acid, impure rhabarberic acid (resinous yellow colouring matter of rhubarb), tannin, semi-resin, and uncrystallizable sugar (Brandes). Cordial, stomachic, and mildly purgative.—Dose, as a stomachic, f̄ʒj. to f̄ʒij.; as a purgative, f̄ʒss. to f̄ʒj.

3. TINCTURA RHEI COMPOSITA, L. D.; *Compound Tincture of Rhubarb.*—(Rhubarb, sliced, ʒijss. [ʒij. D.]; Liquorice, bruised, ʒvj. [ʒss. D.]; Saffron, ʒij. [ʒij. D.], [Ginger, sliced, ʒij. L.; Cardamom Seeds, ʒss. D.], Proof Spirit, Oij. [wine measure, D.] Macerate for fourteen [seven, D.] days, and strain.)—Cordial, stimulant, stomachic, and mildly purgative. A popular remedy in various disordered conditions of the alimentary canal, especially at the commencement of diarrhœa, also in flatulent colic. It is a very useful adjunct to purgative mixtures, in cases in which the use of a cordial and stomachic cathartic is required.—Dose, as a stomachic, f̄ʒj. to f̄ʒij.; as a purgative, f̄ʒss. to f̄ʒjss.

4. TINCTURA RHEI ET ALOES, E. (U. S.); *Tincture of Rhubarb and Aloes.*—(Rhubarb, in moderately fine powder, ʒiss. (Rhubarb, bruised, ʒx. U. S.); Socotrine or East Indian Aloes, in moderately fine powder, ʒvj.; Cardamom Seeds, bruised, ʒv. (ʒss. U. S.); Proof Spirit, (Diluted Alcohol, U. S.) Oij. Mix the



powders, and proceed as for the tincture of cinchona.)—A cordial and stomachic purgative, in doses of from ℥ss. to ℥j.

5. TINCTURA RHEI ET GENTIANÆ, E. (U. S.); *Tincture of Rhubarb and Gentian*.—(Rhubarb, in moderately fine powder, ℥ij.; Gentian, finely cut or in coarse powder, ℥ss.; Proof Spirit, (Diluted Alcohol, U. S.) Oij. Mix the powders, and proceed as directed for tincture of Cinchona.)—Stomachic, tonic, and feebly purgative.—Dose, as a tonic, ℥j. to ℥iij.; as a very mild purgative, ℥ss. to ℥j.

6. VINUM RHEI, E. (U. S.); *Wine of Rhubarb*.—(Rhubarb, in coarse powder. ℥v.; Canella, in coarse powder, ℥ij.; Proof Spirit, ℥v.; Sherry, Oj. and ℥xxv. Digest for seven days, strain, express strongly the residuum, and filter the liquors.)—[Rhubarb, bruised, ℥ij.; Canella, bruised, ℥i.; Diluted Alcohol, ℥ij.; Wine, Oj. Macerate for fourteen days, with occasional agitation, then express and filter through paper, U. S.]—Cordial, stomachic, and mildly purgative. Used in the same cases as the *compound tincture of rhubarb*.—Dose, as a stomachic, ℥j. to ℥iij.; as a purgative, ℥ss. to ℥j.

7. EXTRACTUM RHEI, L. E. D.; *Extract of Rhubarb*.—(Rhubarb, powdered, ℥xv. [lb. j. D.]; Proof Spirit, Oj. [*wine measure*, D.]; Distilled Water, Ovij. [*wine measure*, D.] Macerate for four days with a gentle heat, afterwards strain, and set by, that the dregs may subside. Pour off the liquor, and evaporate it, when strained, to a proper consistence, L. D.—The process of the *Edinburgh College* is as follows:—Take of Rhubarb, lb. j.; Water, Ov. Cut the rhubarb into small fragments; macerate it for twenty-four hours in three pints of the water; filter the liquor through a cloth, and express it with the hands or otherwise moderately; macerate the residuum with the rest of the water for twelve hours at least; filter the liquor with the same cloth as before, and express the residuum strongly. The liquors, filtered again, if necessary, are then to be evaporated together to a proper consistence in the vapour-bath. The extract, however, is obtained of finer quality by evaporation in a vacuum with a gentle heat.)

The principles extracted from rhubarb by water and spirit have been already noticed (p. 267-68). The *Edinburgh College*, it will be observed, employ no spirit in the above process. Great care is required in the preparation of this extract, as both the purgative and tonic properties of rhubarb are very apt to become deteriorated by the process. I have some extract prepared *in vacuo* more than twenty years ago, which still preserves the proper odour and flavour of rhubarb.—The dose of extract of rhubarb, as a purgative, is from gr. x. to ℥ss.

8. PILULÆ RHEI, E. (U. S.); *Rhubarb Pills*.—Rhubarb, in fine powder, *nine parts*; Acetate of Potash, *one part*; Conserve of Red Roses, *five parts*. Beat them into a proper mass, and divide it into five-grain pills.)—[Rhubarb, powdered, ℥vi.; Soap, ℥ij. Make a mass with water, and divide into 120 pills. The soap renders them antacid, U. S.]—Stomachic and purgative. The acetate of potash is employed, I presume, to prevent the pills becoming hard by keeping. Each pill contains nearly three and a half grains of rhubarb.

9. PILULÆ RHEI COMPOSITÆ, L. E. (U. S.); *Compound Pills of Rhubarb*.—(Rhubarb, powdered, ℥j. [*twelve parts*, E.]; Aloes, powdered, ℥vj. [*nine parts*, E.]; Myrrh, powdered, ℥ss. [*six parts*, E.]; Soap, ℥j. [*six parts*, E.]; [Oil of Caraway, ℥ss, L., Oil of Peppermint, *one part*, E.] [℥ss. U. S.]; Syrup, q. s. [Conserve of Red Roses, *five parts*, E.], [Syrup of Orange Peel, q. s. U. S.] Mix them, and beat them into a proper mass [and divide this into five-grain pills. This pill may also be made without oil of peppermint, when so preferred, E.]—Tonic and mildly purgative.—Dose ℥j. or four pills.

10. PILULÆ RHEI ET FERRI, E.; *Pills of Rhubarb and Iron*.—(Dried sulphate of Iron, *four parts*; Extract of Rhubarb, *ten parts*; Conserve of Red Roses, about *five parts*. Beat them into a proper pill mass, and divide it into five-grain pills.)—Tonic.—Dose, two to four pills.

11. PULVIS RHEI COMPOSITUS, E.; *Compound Powder of Rhubarb*.—(Magne-



sia, lb. j.; Ginger, in fine powder, ℥ij.; Rhubarb, in fine powder, ℥iv. Mix them thoroughly, and preserve the powder in well-closed bottles.)—A very useful antacid and mild stomachic purgative, especially adapted for children.—Dose, for adults, ℞j. to ʒss.; for children, gr. v. to gr. x.

2. RUMEX ACETO'SA, Linn. L. D.—COMMON SORREL.

Sex. Syst. Hexandria, Trigynia.

(Folia, L. D.)

**BOTANY. Gen. Char.**—*Calyx* six-parted; the three outer segments somewhat cohering at the base; the three inner becoming enlarged after flowering. *Stamens* six. *Styles* three, reflexed. *Stigmas* three, cut. *Nut* with three sharp angles. *Embryo* on one side. *Radicle* superior (*Bot. Gall.* for the most part).

**Sp. Char.**—*Flowers* diœcious. *Leaves* oblong, arrow-shaped. *Permanent petals* tuberculated (Smith).

**Hab.**—Indigenous. Woods and pastures common. Perennial. Flowers in June.

**DESCRIPTION.**—Sorrel leaves have an agreeable, acid, slightly astringent taste.

**COMPOSITION.**—I am unacquainted with any analysis of this plant. The leaves are composed of *binoxalate of potash*, *tartaric acid*, *mucilage*, *fecula*, *chlorophylle*, *tannic acid*, and *woody fibre*.

**PHYSIOLOGICAL EFFECTS.**—Slightly nutritive. Refrigerant and diuretic. Esteemed antiscorbutic.

**USES.**—Employed as a pot-herb and salad: from the latter use of it, it has been termed *green-sauce*. (Withering, *Bot.* vol. ii.) Rarely applied medicinally. A decoction of the leaves may be administered in whey, as a cooling and pleasant drink in febrile and inflammatory diseases. In some parts of Scandinavia, bread is made of it in times of scarcity. (Clarke, *Travels in Scandinavia*, Part III. S. ii. p. 90, 1823.) Laugier has suggested that the use of aliments containing oxalic acid may, under some circumstances, dispose to the formation of mulberry calculi.

3. RUMEX HYDROLAP'ATHUM, Hudson.—GREAT WATER DOCK.

Rumex aquaticus, D.

Sex. Syst. Hexandria, Trigynia.

(Radix, D.)

**BOTANY. Gen. Char.**—See *Rumex Acetosa*.

**Sp. Char.**—*Permanent petals* ovate-oblong, nearly entire, unequally tuberculated. *Leaves* lanceolate, acute at each end. *Whorls* rather crowded, almost entirely leafless (Smith).

**Hab.**—Indigenous. Ditches and river sides. Perennial. Flowers in July and August.

**DESCRIPTION.**—The herb and root were formerly used under the name of *herba et radix britannica*. The root is inodorous, but has an acrid bitter taste.

**COMPOSITION.**—I am unacquainted with any analysis of the plant. The root contains *tannic acid*.

**PHYSIOLOGICAL EFFECTS.**—The root is astringent, and is reputed anti-scorbutic.

**USES.**—Scarcely employed. Has been exhibited internally in scurvy, skin diseases, and rheumatism. The powdered root has been used as a dentrifice; the decoction of the root as an astringent gargle for ulcerated or spongy gums.



## 4. POLYGONUM BISTORTA, Linn. D.—GREAT BISTORT OR SNAKE-WEED.

Ses. Syst. Octandria, Trigynia.

(Radix, D.)

**BOTANY. Gen. Char.**—*Calyx* four to six-partite, persistent. *Stamens* five to nine, generally eight. *Ovary* with two to three *styles*, and as many *stigmas*. *Cariopsis* or *nut* ovate or triangular. *Embryo* lateral or central; the *radicle* superior. (*Bot. Gall.*)

**Sp. Char.**—*Stem* simple, with a single, spiked, cluster of flowers. *Leaves* ovate, wavy, running down into the footstalks (Smith).—*Flowers* rose-coloured.

**Hab.**—Indigenous. Meadows. Perennial. Flowers in June.

**DESCRIPTION.**—Bistort root (*radix bistortæ*) is twice bent on itself: hence its name from *bis*, twice; and *torta*, twisted or bent. It is rugose and brown externally; reddish internally; almost inodorous; it has an austere, strongly astringent taste.

**COMPOSITION.**—This root has not been analyzed. The principal constituents are *tannic acid*, *starch*, *oxalate of lime*, *colouring matter*, and *woody fibre*.

**PHYSIOLOGICAL EFFECTS.**—The local effect is that of a powerful astringent, depending on the tannic acid which it contains; its remote effects are those of a tonic (vide vol. i. p. 189). The presence of starch renders the root nutritive: hence in Siberia it is roasted and eaten.

**USES.**—It is but little employed. A decoction of the root is sometimes applied as an astringent injection in leucorrhœa and gleet; as a gargle in spongy gums and relaxed sore throat; and as a lotion to ulcers attended with a profuse discharge.

Internally it has been employed, in combination with gentian, in intermittents, It has also been used as an astringent in passive hemorrhages and chronic alvine fluxes.

**ADMINISTRATION.**—The dose of the powder is from ℥j. to ʒss. The decoction (prepared by boiling ʒij. of the root in Ojss. of boiling water) may be administered in doses of from fʒj. to fʒij.

## OTHER MEDICINAL POLYGONACEÆ.

An extract prepared from the bark of COCCOLOBA UYIFERA, or the *Sea-side Grape*, a native of the West Indies, has been used under the name of *Jamaica Kino*.

## ORDER XXXV.—CHENOPODIACEÆ, Lindley.—THE GOOSE-FOOT TRIBE.

ATRIPLICES, Jussieu.—CHENOPODEÆ, Ventenat.

The substance called *BARILLA* (impure carbonate of soda), is obtained by the combustion of plants belonging to the genera *Salicornia*, *Salsola*, and *Chenopodium*.<sup>1</sup> None of the Chenopodiaceæ are employed in medicine in this country. Some few are used as pot-herbs or salads, as Spinach (*Spinacia oleracea*) and Beet (*Beta vulgaris*).

## (CHENOPODIUM ANTHELMINTICUM, Linnaeus.)

Ses. Syst. Pentandria, Digynia.

(CHENOPODIUM, U. S. Wormseed. The fruit of the plant.)

**[Gen. Char.]**—*Calyx* five-parted, with five angles. *Corolla* none. *Style* bifid, rarely trifid. *Seed* one, lenticular, horizontal, covered by the closing calyx. (*Nuttall.*)

**Sp. Char.**—*Leaves* oblong, lanceolate, sinuate and dentate, rugose. *Racemes* naked. *Style* one, three cleft (Elliot).

<sup>1</sup> See Goebel's analyses of the ashes of many species of this order in the *Pharmaceutisches Central-Blatt*, für 1839, S. 377. Also Guibourt's analysis of the ashes of *Salsola Tragus* in the *Journ. de Pharm.* t. xxvi. p. 264.



The common names by which this plant is known in the United States are Jerusalem Oak, Wormseed, Goosefoot, and Stinkweed.

**DESCRIPTION.**—The root of the plant is perennial and branched. Stem upright, herbaceous, much branched, deeply grooved, from two to four feet high. Branches fastigiate, giving to the plant a shrubby appearance. Leaves sessile, scattered, and alternate, attenuate at each end, with strongly marked nervures, oval or oblong, deeply sinuate, studded beneath with small globular, oleaginous dots. Flowers small, numerous, of a yellowish-green colour, and collected in long, axillary, dense, leafless spikes.

**Hab.**—This species of chenopodium is found in most parts of the United States. It grows in old fields, along road sides, in moist and sandy situations. It flowers in June and July; and from August until cold weather the seeds may be collected.

The seeds are small, not larger than the head of a common sized pin, irregularly spherical, very light, of a dull greenish-yellow colour, approaching to brown, and having a bitterish, somewhat aromatic, pungent taste. The odour and taste are due to the volatile oil that they contain; this is found in other parts; in fact, the whole plant contains it, and hence the uniform flavour possessed by them.

The properties of the seeds are vermifuge, which appears to have been known soon after the establishment of the British Colonies in America, especially in Virginia, where they were first used for this purpose. The herb is spoken of by Schoepf and Kalm, with others, in terms of commendation. The vermifuge power, by long trial, has been decidedly proved. As an antispasmodic it has also been used. Plenck employed it with success in five or six cases of chorea, (Griffith, *On Chen. Anthel. in Am. Journ. of Pharmacy*, vol. v. p. 180,) and this success has been confirmed by other writers.

The *Chenopodium anthelminticum* has sometimes been confounded with the *C. ambrosioides*, which is a smaller plant, and distinguished by the leafy spikes of flowers. The sensible properties are similar.

The seeds are given in the form of an electuary, pulverized and mixed with molasses or syrup; but the quantity required to be taken is liable to produce nausea and sickness. Dose ℞j. to ℞ij. given twice or thrice daily.

The expressed juice is sometimes administered, the dose is ℥ss.; or a decoction of the leaves may be employed; this is best prepared with milk, in the proportion of ℥j. leaves, to Oj. of milk or water. It may be flavoured with aromatics.

**OLEUM CHENOPODII, U. S.** *Oil of Wormseed.*—This oil is of a light yellow colour when distilled, but its colour deepens by age and exposure. It has in a high degree the flavour of the plant. Its sp. gr. is 0.908. It is obtained by distilling the seeds; but the whole plant may be used for this purpose, as the oil is abundant in the glands. Sometimes it is adulterated with spirits of turpentine, or other inferior volatile oils; this must be determined by the odour. From the readiness with which it may be given it is the best form for exhibition, as it possesses the vermifuge properties in the smallest possible compass. The dose is from 10 to 20 drops on a lump of sugar, or in emulsion. After several doses have been given, a purgative, as castor oil, may be interposed.—J. C.]

ORDER XXXVI.—LABIATEÆ, *Jussieu.*—THE MINT TRIBE.

LAMIACEÆ, *Lindley.*

**ESSENTIAL CHARACTER.**—*Calyx* tubular, inferior, persistent, the odd tooth being near the axis; regular five or ten-toothed, or irregular bilabiate or three to ten-toothed. *Corolla* monopetalous, hypogynous, bilabiate; the lesser lip undivided or bifid, overlapping the lower, which is larger and three-lobed. *Stamens* four, didynamous, inserted upon the corolla, alternately with the lobes of the lower lip, the two upper sometimes wanting; anthers two-celled; sometimes apparently unilocular in consequence of the confluence of the cells at the apex: sometimes one cell altogether obsolete, or the two cells separated by a bifurcation of the connective.



*Ovary* deeply four-lobed, seated in a fleshy hypogynous disk; the lobes each containing one erect ovule; *style* one, proceeding from the base of the lobes of the ovary; *stigma* bifid, usually acute. *Fruit* one to four small nuts, inclosed within the persistent calyx. *Seeds* erect, with little or no albumen; *embryo* erect; *cotyledons* flat.—*Herbaceous* plants or *undershrubs*. *Stem* four-cornered, with opposite ramifications. *Leaves* opposite, divided or undivided, without stipules, replete with receptacles of aromatic oil. *Flowers* in opposite, nearly sessile, axillary cymes, resembling whorls; sometimes solitary, or as if capitate (Lindley).

**PROPERTIES.**—The medicinal activity of the plants of this family depends on volatile oil, bitter extractive, and astringent matter.

The *volatile oil* resides in small receptacles (by some called *globular glands*) contained in the leaves. "These glands are placed quite superficially, or rather in depressed points, and are commonly of a shining yellow colour. We may regard them as oleo-resinous matter separated from glands lying on the under surface. When macerated in strong spirit of wine they remain unchanged, and appear under the microscope as transparent, probably cellular vesicles, filled with a yellow granular matter." (Nees and Erbermaier, *Handb. de Med. Pharm. Bot. Th. i. S. 524.*) The oils of labiate plants, like other volatile oils, consist of *éléoptène* and *stéaroptène*: it is the latter substance which is described by some chemists as camphor.

The *bitter extractive* is found, in greater or less quantity, in all the Labiate. It is this principle which communicates the bitterness to the watery infusion of these plants.

The presence of *astringent matter* is shown by the green colour produced when a ferruginous salt is added to the infusion of some of the Labiate.

The volatile oil gives to these plants aromatic, carminative, and slightly stimulant properties. The bitter extractive renders them tonic and stomachic. The astringent matter is usually in too small a quantity to communicate much medicinal activity, though it must contribute to the tonic operation.

The perfumer uses some labiate plants on account of their fragrant odour; the cook employs others for their flavour and condimentary properties; the medical practitioner administers them to relieve nausea and colicky pains, to expel wind, to cover the taste of nauseous medicines, and to prevent or relieve griping pains.

### 1. LAVAN'DULA VE'RA, De Cand. E.—COMMON OR GARDEN LAVENDER.

*Lavandula angustifolia*, Ehrenberg.—*Lavandula Spica*, L. D.

*Sex. Syst.* Didynamia, Gymnospermia.

(Flores, L. D.—The flowering heads; and volatile oil of ditto, E.)

(*Lavandula*, U. S.)

**HISTORY.**—No plant is mentioned under the name of Lavender, by Hippocrates, Theophrastus, Dioscorides, or Pliny. It is not improbable, however, that lavender may be alluded to, under some other name, by one or more of these authors; but it is impossible now to identify it with any certainty. Sprengel (*Hist. Rei. Herb. t. i. p. 96.*) declares, on the authority of Hesychius, that the *ἰσσοῦν* of Theophrastus (*Hist. Plant. lib. vi. cap. 6.*) is *Lavandula Spica*.

**BOTANY.** **Gen. Char.**—*Calyx* tubular, nearly equal, thirteen or rarely fifteen-ribbed, shortly five-toothed, with the four lower teeth nearly equal, or the two lower narrower; the upper either but little broader than the lateral ones, or expanded into a dilated appendage. Upper lip of *corolla* two-lobed; lower three-lobed; all the divisions nearly equal. *Stamens* didynamous, declinate. *Filaments* smooth, distinct, not toothed. *Anthers* reniform, one-celled (condensed from Bentham; Lindley).

**Sp. Char.**—*Leaves* oblong-linear or lanceolate, quite entire, when young hoary and revolute at the edges. *Spikes* interrupted. *Whorls* of six to ten flowers. *Floral leaves* rhomboid-ovate, acuminate, membranous, all fertile, the uppermost shorter than the calyx. *Bracts* scarcely any (Bentham).—*Shrub*, one to two feet high. *Flowers* purplish-gray.

**LAVANDULA SPICA**, De Cand. (*L. latifolia*, Villars) or *French Lavender*, formerly considered as a variety only of the preceding species, is not used in medicine. It is distinguished by its lower habit, whiter colour, the leaves more congested at the base of the branches, the spike denser and shorter, the floral leaves lanceolate or linear, and the presence of bracts (Bentham). It yields by distillation *oil of spike* (*oleum spicæ*) sometimes called *foreign oil of lavender*, or in order to distinguish it from the oil of *Lavandula Stæchas*, the *true oil of spike* (*oleum spicæ verum*). This oil is distinguished from the genuine oil of *Lavandula vera* by its darker green colour, and its less grateful odour. It is used by painters on porcelain, and by artists in the preparation of varnishes.



**Hab.**—South of Europe. Extensively cultivated at Mitcham, in Surrey, from which place the London market is principally supplied.

**PROPERTIES.**—Lavender flowers have a bluish-gray colour, a pleasant odour, and a pungent bitter taste. The flowering stems are collected in June or July, dried in the shade, and made up into bundles for sale. A cold infusion of the flowers is deepened in colour (*tannate of iron*) by sesquichloride of iron.

**COMPOSITION.**—The principal constituents of the flowers are *volatile oil*, *resin?*, *tannic acid*, a *bitter principle*, and *woody fibre*.

**VOLATILE OIL** (see below).

**PHYSIOLOGICAL EFFECTS.**—The flowers are carminative, mildly stimulant, and somewhat tonic. Kraus (*Heilmittell*, p. 473,) says, that when taken internally, they cause *tormina ventris*.

**USES.**—Lavender flowers are sometimes employed as errhines. They enter into the composition of the *pulvis asari compositus*, D. (p. 234.) The following are the official preparations, with their uses, of lavender flowers:

1. **OLEUM LAVANDULÆ**, L. E. D. (U. S.); *Oleum Lavandulae verae*: *English Oil of Lavender*, offic.—(Prepared by submitting lavender flowers to distillation with water.) It has a pale yellow colour, a hot taste, and a very fragrant odour. Its sp. gr. varies from 0.877 to 0.905; the lightest oil being the purest. It boils at 397° F.; and is composed, according to Dr. Kane, of C<sup>15</sup> H<sup>14</sup> O<sup>2</sup>. One pound of oil is obtained from fifty to seventy pounds of the flowers. When the stalks and leaves are distilled with the flowers, the odour of the oil is considerably deteriorated. (Brande, *Dict. of Mat. Med.*, p. 337-8.) It is a stimulant and stomachic, and is sometimes given in hysteria and headache; but is more commonly employed as a perfume for scenting evaporating lotions, ointments, liniments, &c.—Dose, gtt. ij. to gtt. v.

2. **SPIRITUS LAVANDULÆ**, L. E. D. (U. S.); *Spirit of Lavender*.—(Fresh Lavender, lb. ijss. [lb. ij. D. (U. S.)]; Rectified [Proof, D.] Spirit, Cong. j. [wine measure, D.]; [Water, Oij. L. (U. S.) sufficient to prevent empyreuma, D.] Mix them [macerate for twenty-four hours, D.]; then, with a slow fire, [the heat of a vapour bath, E.] let a gallon [seven pints, E. five pints, D.] distil.)—The dried flowers may be substituted for the fresh ones. Druggists frequently prepare this compound by dissolving a few drops of oil of lavender in a fluid-ounce of rectified spirit. Employed only in the preparation of the *Linimentum Camphoræ compositum* (p. 251) and the *Tinctura Lavandulae composita*.

**LAVENDER WATER.**—The fragrant perfume sold in the shops, under the name of *Lavender Water*, is a solution of the oil of lavender and of other odoriferous substances in spirit. There are various formulæ for its preparation, scarcely two manufacturers adopting precisely the same one. The following yields a most excellent product:—Oil of Lavender, Oil of Bergamot, aa. fʒij.; Otto of Roses, Oil of Cloves, aa. gtt. vj.; Musk, gr. ij.; Oil of Rosemary, fʒj.; Honey, ʒj.; Benzoic Acid, ʒij.; Rectified Spirit, Oj.; Distilled Water, ʒij. Mix, and, after standing a sufficient time (the longer the better), filter. This agreeable perfume may be employed for scenting spirit washes, &c. but is principally consumed for the toilette.

3. **TINCTURA LAVANDULÆ COMPOSITA**, L.; *Spiritus Lavandulae compositus*, E. D. (U. S.); *Lavender Drops* or *Red Lavender Drops*, offic.—(Spirit of Lavender, Ojss. [Oij. E. Oij. (U. S.) wine measure, D.]; Spirit of Rosemary, Oss. [fʒxij. E. Oj. (U. S.) wine measure, D.]; cinnamon, bruised, ʒijss. [ʒj. E. (U. S.)]; ʒjss. D.); Nutmeg, bruised, ʒijss. [ʒss. E. (U. S.)]; D.); [Cloves, bruised, ʒij. E. (U. S.) D.] Red Sandal [Saunders, offic.] Wood, raspings, ʒv. [ʒij E. (U. S.) ʒj. D.] Macerate for fourteen [seven, E. ten D.] days, and filter [through calico, E.]—Stimulant, cordial, and stomachic. Employed to relieve gastric uneasiness, flatulence, low spirits, languor, faintness, &c. A favourite remedy with hysterical and hypochondriacal persons—Dose, from fʒss. to fʒij. administered in water or on sugar. The red Saunders wood is merely a colouring ingredient.



## 2. MENTHA VIRIDIS, Linn. L. E. D. (U. S.)—SPEARMINT.

Sex. Syst. Didynamia, Gymnospermia.

(Herba, D.—Herb, E.)

**HISTORY.**—Hippocrates employed in medicine a plant which he terms *Μίνθη*, (p. 359, &c. ed. Fœs.); but it is uncertain what particular species he referred to. On account of its agreeable odour it was also called *Ἡδίστη* (from *ἡδύς*, *sweet*; and *ἴσθη*, *smell*), a name by which Dioscorides (lib. iii. cap. 41,) designates it. Strabo tells us that *Minthe* was a concubine of Pluto, and that she was changed by Proserpine into a plant, which was called after her. Ovid (*Metamorph.* lib. x. ver. 729,) also alludes to this fable.

**BOTANY. Gen. Char.**—*Calyx* campanulate or tubular, five-toothed, equal or somewhat two-lipped, with the throat naked inside or villous. *Corolla* with the tube inclosed, the limb campanulate, nearly equal, four-cleft: the upper segment broader, nearly entire or emarginate. *Stamens* four, equal, erect, distant; *filaments* smooth, naked; *anthers* with two parallel cells. *Style* shortly bifid, with the lobes bearing stigmas at the points. *Achenia* dry, smooth (Bentham).

**Sp. Char.**—*Stem* erect, smooth. *Leaves* sessile, ovate lanceolate, unequally serrated, smooth; those under the flowers are all bract-like, rather longer than the whorls; those last and the calyxes hairy or smooth. *Spikes* cylindrical, loose. *Whorls* approximated, or the lowest or all of them distant (Bentham).—Creeping-rooted.

**Hab.**—Marshy places. Indigenous. A native of the milder parts of Europe; also of Africa and America. Perennial. Flowers in August. Selected for medicinal use when about to flower.

**PROPERTIES.**—The whole herb, called *green-mint* or *spearmint* (*herba menthae viridis*), is employed in medicine. It has a strong but peculiar odour, and an aromatic, bitter taste, followed by a sense of coldness when air is drawn into the mouth. Sesquichloride of iron communicates a green colour (*tannate of iron*) to the cold watery infusion.

**COMPOSITION.**—Its odour and aromatic qualities depend on *volatile oil*. It also contains *tannic acid*, *resin?* a *bitter principle*, and *woody fibre*.

**VOLATILE OIL.** (S. e below.)

**PHYSIOLOGICAL EFFECTS.**—Aromatic, carminative, mildly stimulant and tonic. Feebler than Peppermint. Said, though without sufficient foundation, to check the secretion of milk, and to act as an emmenagogue. (Linnæus, in Murray's *App. Med.* vol. ii. p. 180-1.)

**USES.**—Employed as a salad and sweet herb. In medicine it is principally used as a flavouring ingredient, and to alleviate or prevent colicky pains. The following are its officinal preparations, with their uses:

1. **INFUSUM MENTHÆ SIMPLEX, D.** *Infusion of Spearmint; Spearmint Tea.*—(Spearmint leaves, dried, ʒij.; Boiling water, a sufficient quantity to afford six ounces of strained liquor.)—Stomachic and carminative. Used in irritable conditions of the stomach; but is ordinarily a vehicle for other remedies.—Dose, fʒj. to fʒij. or *ad libitum*.

2. **INFUSUM MENTHÆ COMPOSITUM, D.** *Compound Infusion of Spearmint.*—(Spearmint leaves, dried, ʒij.; Boiling water a sufficient quantity to afford six ounces of strained liquor. Digest for half an hour in a covered vessel, and, when the liquor has grown cold, strain; then add Refined Sugar, ʒij.; Oil of Spearmint, gt. iij. dissolved in Compound Tincture of Cardamoms, ʒss. Mix.)—A grateful stomachic, slightly stimulant, and diaphoretic. Employed to allay nausea and vomiting, and to cover the taste of disagreeable medicines.—Dose, fʒj. to fʒij.

3. **OLEUM MENTHÆ VIRIDIS, L. E. D. (U. S.)** *Oil of Spearmint.*—(Obtained by submitting the fresh herb to distillation with water.) It is of a pale yel-



lowish colour, but becomes reddish by age. It has the odour and taste of the plant, and is lighter than water; sp. gr. 0.914. It boils at 320° F.; and is composed, according to Dr. Kane, of C<sup>35</sup> H<sup>28</sup> O. The average produce of the essential oil is not more than 1-500th of the fresh herb. (Brande, *Dict. Mat. Med.* p. 328.) It is carminative and stimulant. Dose, gtt. ij. to gtt. v. rubbed with sugar and a little water.

4. SPIRITUS MENTHÆ VIRIDIS, L. D. *Spirit of Spearmint*.—(Oil of Spearmint, ℥ij. [by weight, ℥ss. D.]; Proof [Rectified, D.] Spirit, Cong. j. [wine measure, D.]; Water, Oj. [as much as may be sufficient to prevent empyreuma, D.] Mix them; then, with a slow fire, let a gallon distil.)—Dose, f℥ss. to f℥ij.—This preparation has no advantage over, while it is much weaker than, the more simple and elegant preparation, the *essence of spearmint* of the shops.

ESSENCE OF SPEARMINT.—Dissolve f℥j. of Oil of Spearmint in f℥j. of Rectified Spirit. It may be coloured green by spearmint or spinach leaves. Dose, gtt. x. to gtt. xx. taken on sugar or in water. [This is the same as the TINCTURA OLEI MENTHÆ VIRIDIS (U. S. P.), for which the formula is, Oil of Spearmint, f℥ij.; Alcohol, Oj. Dissolve the oil in the alcohol.]

5. AQUA MENTHÆ VIRIDIS, L. E. D. (U. S.) *Spearmint Water*.—(Spearmint leaves, if dried, lb. ij.; if fresh, lb. iv. [or Oil of Spearmint, ℥ij. L.]; Proof Spirit, ℥vij. [Rectified Spirit, f℥ij. E.]; Water, Cong. ij. Mix. Let a gallon distil. The *Dublin College* employs no spirit; and distils a gallon of water from lb. jss. of herb.)—Spearmint water is usually made extemporaneously by suspending or dissolving a drachm of the oil in four pints of distilled water, by means of a drachm of rectified spirit and a lump of sugar, [or by means of magnesæ carb. (U. S.) without the alcohol.] Spearmint water is carminative and stomachic. It is commonly used as a vehicle for other medicines. Its dose is f℥j. to f℥ij.

### 3. MENTHA PIPERITA, Linn. L. E. D. (U. S.)—PEPPERMINT.

*Ser. Syst. Didynamia, Gymnospermia.*

(Herba, D.—Herb: Volatile Oil, E.)

HISTORY.—This plant was probably introduced into medicine in the last century; at least Hill, (*Hist. of the Mat. Med.* p. 358,) in 1751, says that it “has lately got into great esteem;” and Geiger (*Handb. d. Pharm.* Bd. iii. S. 1230) says, it was introduced into Germany as a medicine, through the recommendations of the English, in the latter half of the last century.

BOTANY. Gen. Char.—See *Mentha viridis*.

Sp. Char.—Stem smooth. Leaves petiolated, ovate-oblong, acute, serrate, rounded-crenate at the base, smooth. Spikes lax, obtuse, short, interrupted at the base. Pedicels and calyx at the base smooth; teeth hispid (Bentham).—Creeping-rooted.

Hab.—Watery places. Indigenous. Extensively cultivated at Mitcham, in Surrey, from whence the London market is principally supplied. Found in various parts of Europe; also in Asia, Africa, and America.

PROPERTIES.—The whole herb (*herba menthæ piperitæ*) is officinal. It has a peculiar aromatic odour, and a warm, burning, bitter taste, followed by a sensation of coolness when air is drawn into the mouth. Sesquichloride of iron communicates a green colour (*tannate of iron*) to the cold infusion of peppermint.

COMPOSITION.—The principal constituents are *volatile oil*, *resin?*, *a bitter principle*, *tannic acid*, and *woody fibre*.

VOLATILE OIL (see p. 280).

PHYSIOLOGICAL EFFECTS.—Peppermint is an aromatic or carminative, stimulant, and stomachic. It is the most agreeable and powerful of all the mints.

USES.—It is employed in medicine for several purposes, but principally to expel flatus, to cover the unpleasant taste of other medicines, to relieve nausea,



gripping pain, and the flatulent colic of children. The following are the official preparations, with their uses:

1. *OLEUM MENTHÆ PIPERITÆ*, L. E. D., (U. S.) *Oil of Peppermint*.—(Obtained by submitting the fresh herb to distillation with water.)—It is colourless, or nearly so, sometimes having a pale yellow or greenish tint, and becoming reddish by age. It has a penetrating odour like that of the plant, and a burning aromatic taste, followed by a sensation of cold. The vapour of it applied to the eye causes a feeling of coldness. *English Oil of Peppermint* is superior to the foreign kind. Its sp. gr. is 0.902. It boils at 365° F.; and consists, according to Dr. Kane, of C<sup>21</sup> H<sup>20</sup> O<sup>2</sup>. The stéaroptène or camphor of oil of peppermint is isomeric with the liquid oil. By the action of oil of vitriol it yields a light oil called *menthen* (C<sup>21</sup> H<sup>18</sup>). The stéaroptène of American oil of peppermint is said to consist of C<sup>10</sup> H<sup>10</sup> O or C<sup>20</sup> H<sup>20</sup> O<sup>2</sup>. In a warm, dry, and favourable season, the produce of oil, from a given quantity of the fresh herb, is double that which it yields in a wet and cold season. The largest produce is three drachms and a half of oil from two pounds of fresh peppermint, and the smallest about a drachm and a half from the same quantity. (Brande, *Dict. of Mat. Med.* p. 356.) I was informed by a distiller at Mitcham, that twenty mats of the herb (each mat containing about 1 cwt.) yields about seven lbs. of oil. It is carminative and stimulant, and is used occasionally as an antispasmodic. It is taken on sugar, in doses of from gtt. ii. to gtt. v.

2. *SPIRITUS MENTHÆ PIPERITÆ*, L. D.; *Spiritus Menthæ*, E.—(Prepared with the Oil of Peppermint, in the same way as the *Spiritus Menthæ viridis*, L. D. before described. The *Edinburgh College* prepares it thus:—Peppermint, fresh, lb. iss.; Proof Spirit, Oviij. Macerate for two days in a covered vessel; add a pint and a half of water; and distil off seven pints.)—A solution of the oil of peppermint in spirit may with great propriety be substituted for the preparation of the *Pharmacopœias*. The spirit of peppermint is given in doses of from fʒss. to fʒij.

*ESSENCE OF PEPPERMINT*.—Dissolve fʒj. of Oil of Peppermint in fʒj. of Rectified Spirit. Some persons add peppermint or spinach leaves to communicate a green colour.—[This is the *Tinctura Olei Menthæ Piperitæ*, U. S. P. See formula for *Tr. Ol. Menthæ viridis*, p. 279.]—The dose of this essence is from gtt. xx. to gtt. xxx. on sugar.

3. *AQUA MENTHÆ PIPERITÆ*, L. E. D. (U. S.)—(Prepared with the herb or the oil of peppermint in the same way as the *Aqua Menthæ viridis*.)—Carminative and stimulant. Used to relieve flatulency, and as a vehicle for other medicines. Dose, fʒj. to fʒiij.

Besides the above, there are several popular preparations of peppermint extensively used. *a. Infusum Menthæ piperitæ* (*Peppermint Tea*) is prepared in the same way as spearmint tea.

*β. Elaosaccharum Menthæ piperitæ*, Ph. Bor., is prepared by mixing ʒj. of the whitest sugar, in powder, with gtt. xxiv. of the oil of peppermint.

*γ. Rotule Menthæ piperitæ* (in plano-convex masses, called *peppermint drops*,—in flattened circular disks, termed *peppermint lozenges*,) should consist of sugar and oil of peppermint only, though flour is sometimes introduced.

The *liqueur* sold at the spirit-shops as *mint* or *peppermint* is used as a cordial.

#### 4. *MENTHA PULEGIUM*, Linn. L. E. D.—PENNYROYAL.

*Sec. Syst. Didynamia, Gymnospermia.*

(Herba, D.—Herb, E.)

*HISTORY*.—This plant was employed in medicine by the ancient Greeks and Romans. It is the *Πύλλος* of Hippocrates (p. 359, &c. ed. Fœs.) and Dioscorides, (lib. iii. cap. 36.) and the *Pulegium* of Pliny. (*Hist. Nat.* lib. xx. cap. 54, ed Valp.)

*BOTANY. Gen. Char.*—See *Mentha viridis*.

*Sp. Char.*—*Stem* very much branched, prostrate. *Leaves* petiolated, ovate.



*Whorls* all remote, globose, many-flowered. *Calyxes* hispid, bilabiate, villous in the inside of the throat (Bentham).—Creeping-rooted.

**Hab.**—Wet commons and margins of brooks. Indigenous. A native of most parts of Europe, of the Caucasus, Chili, and Teneriffe.

**PROPERTIES.**—The herb with the flowers (*herba seu summitas pulegii*) is employed in medicine. It has a strong but peculiar odour; a hot, aromatic, bitter taste, followed by a feeling of coolness in the mouth. Sesquichloride of iron causes a green colour (*tannate of iron*) with the cold infusion of pennyroyal.

**COMPOSITION.**—Its principal constituents are *volatile oil*, a *bitter matter*, *resin*?, *tannic acid*, and *woody fibre*.

**VOLATILE OIL** (see below).

**PHYSIOLOGICAL EFFECTS.**—Its effects are analogous to the other mints. Emmenagogue and antispasmodic properties are ascribed to it by the public, and formerly by medical practitioners.

**USES.**—A popular remedy for obstructed menstruation, hysterical complaints, and whooping-cough. Rarely employed by the professional man. The following are its official preparations, with their uses:

1. **OLEUM MENTHÆ PULEGII**, L. E. D.; *Oleum Pulegii*, offic.; *Oil of Pennyroyal*.—(Obtained by submitting the herb to distillation with water.)—It has a pale colour, a warm taste, and the peculiar odour of the herb. It boils at 395° F. Its sp. gr. is 0.925; and is composed, according to Dr. Kane, of C<sup>10</sup> H<sup>8</sup> O. The fresh herb yields from 1-120th to 1-100th of its weight of oil. (Brande, *Dict. Mat. Med.* p. 357.) It is stimulant and carminative, and is used, as an antispasmodic and emmenagogue, in doses of from gtt. ij. to gtt. v. taken on sugar.

2. **SPIRITUS MENTHÆ PULEGII**, L.; *Spiritus Pulegii*. *Spirit of Pennyroyal*.—(Prepared with Oil of Pennyroyal as the *Spiritus Menthæ viridis*).—Usually prepared by dissolving the oil in spirit. Stimulant and carminative. Employed as an antispasmodic and carminative.—Dose, f ʒss. to f ʒij.

**ESSENCE OF PENNYROYAL** (prepared by dissolving f ʒj. of the volatile oil in f ʒj. of rectified spirit) may be given in doses of from gtt. x. to gtt. xx.

3. **AQUA MENTHÆ PULEGII**, L. E. D.; *Aqua Pulegii*, offic.; *Pennyroyal Water*.—(Prepared with the herb or oil like *Aqua Menthæ viridis*).—Carminative and stomachic.—Dose, f ʒj. to f ʒiij.

The liquid sold in the shops as **PENNYROYAL AND HYSTERIC WATER** is prepared by adding f ʒss. of the *compound spirit of bryony* to Oss. of pennyroyal water.

5. **ROSMARINUS OFFICINALIS**, Linn. L. E. D.—COMMON ROSEMARY.

*Ser. Syst.* Diandria, Monogynia.  
(Cucumina, L. D.—Tops, E.)  
(Rosmarinus, U. S.)

**HISTORY.**—The Λιβανωτὶς στεφανωματικὴ, or *Libanotis coronaria* of Dioscorides, (lib. iii. cap. 89,) is supposed to be our officinal rosemary, which received its name, Λιβανωτὶς (from Λιβανος, *Thus*) on account of its odour, and στεφανωματικὴ (στεφανωματικός, *coronarius*) from its use in making garlands. Pliny (*Hist. Nat.* lib. xix. cap. 62, ed Valp.) calls it *Rosmarinum*. The flowers are termed *anthos* (from ἄνθος, *a flower*), signifying they are *the flowers* par excellence; just as we call cinchona *the bark*, and the inspissated juice of the poppy, *opium* (i. e. *the juice*).

**BOTANY. Gen. Char.**—*Calyx* ovate-campanulate, two-lipped; the upper lip entire, the lower bifid, the throat naked within. *Corolla* with a protruding tube, smooth and not ringed in the inside, somewhat inflated in the throat; limb bilabiate; lips nearly equal, the upper one erect and emarginate, the lower spreading, trifid, with the lateral lobes erect, somewhat twisted; the middle lobe very large, concave, and hanging down. No rudiments of the superior *stamina*:



fertile (inferior) ones, two, ascending, protruding: *filaments* inserted in the throat of the corolla, shortly-toothed near the base: *anthers* linear, subbilocular; the cells straggling, confluent, connate at the margin. Upper lobe of the *style* very short. *Stigmas* minute, terminal. *Achenia* dry, smooth (Bentham).

**Sp. Char.**—The only species.—*Leaves* sessile, linear, revolute at the edge, hoary beneath. *Calyx* purplish. *Corolla* white or pale purplish-blue.

**Hab.**—South of Europe; also Asia Minor.

**PROPERTIES.**—The flowering tops (*cacumina rosmarini*) are the officinal parts. They have a strong and remarkable odour, and a warm, bitter taste.

**COMPOSITION.**—The peculiar odour and flavour of this plant depend on *volatile oil*. Besides this, the tops contain *tannic acid*, a *bitter matter*, *resin*? and *woody-fibre*.

**VOLATILE OIL** (see below).

**PHYSIOLOGICAL EFFECTS.**—Carminative and mildly stimulant, analogous to the other labiate plants.

**USES.**—Rarely employed medicinally. *Infusion of rosemary* (*rosemary tea*) is sometimes used as a substitute for ordinary tea by hypochondriacal persons. The admired flavour of Narbonne honey depends on the bees collecting this substance from rosemary plants which abound in the neighbourhood of Narbonne: hence sprigs of rosemary are sometimes added to the honey of other places, in order to imitate the flavour of Narbonne honey.

1. **OLEUM ROSMARNII**, L. E. D. (U. S.); *Oleum Anthos*, offic.; *Oil of Rosemary*.—(Prepared by submitting the rosemary tops to distillation with water.)—This oil was first procured by Raymond Lully. (Thomson's *Hist. of Chem.* vol. i. p. 41.) It is transparent and colourless, with the odour of rosemary, and a hot, aromatic taste. Its sp. gr. is 0.897; and it boils at 365° F. It consists, according to Dr. Kane, of C<sup>45</sup> H<sup>98</sup> O<sup>2</sup>. One pound of the fresh herb yields about one drachm of the oil. (Brande, *Dict. of Mat. Med.* p. 466.) It is rarely taken internally, but is not unfrequently used externally, in conjunction with other substances, as a stimulating liniment; for example, in alopecia or baldness, and also as a perfume.—Dose, *git. ij. to gtt. v.*

2. **SPIRITUS ROSMARINI**, L. E. D. (U. S.); *Spirit of Rosemary*.—(Oil of Rosemary, ℥ij.; Rectified Spirit, Cong. j.; Water, Oj. Mix them; then with a slow fire let a gallon distil, L. (U. S.)—The *Edinburgh* and *Dublin Colleges* submit the tops [lb. ijss. E. lb. jss. D.] to distillation with a gallon of Spirit [Rectified, E.; Proof, wine measure, D.], so as to obtain seven [five, D.] pints of the distilled spirit.—It is usually prepared merely by dissolving the oil in spirit, distillation being superfluous. Seldom employed internally. Its principal use is as an odoriferous adjunct to lotions and liniments. It is a constituent of the *Linimentum Saponis*, and *Tinctura Lavandulæ composita* (p. 277).

**AQUA HUNGARICA**; *Aqua Rosmarini seu Anthos composita*; *Hungary Water*.—Various formulæ for the preparation of this perfume have been given. The following is from the *Pharm. Wurtem. and Bavar.*:—Take of fresh Rosemary, in blossom, lbs. iv.; fresh Sage, in blossom, ℥vj.; Zingiber, ℥ij. Cut into pieces, and add Rectified Spirit, lb. xij.; Common Water, Oij. Let eleven pints distil by a gentle heat. A hermit is said to have given the formula for the preparation of this perfume to a queen of Hungary; whence this water has been called the *Queen of Hungary's water* (*Aqua Reginae Hungariæ*). Hungary water is frequently imitated by mixing Spirit of Lavender, f℥xij. with Spirit of Rosemary, f℥iv.—This liquid is employed principally as a perfume for the toilette; also as an excitant and restorative in fainting. Externally it is used as a stimulating liniment.

#### 6. ORIGANUM VULGARE, L. E. D.—COMMON MARJORAM.

*Sex. Syst. Didynamia. Gymnospermia.*

(Herb, E.—Oleum ex herba, D.)

(Origanum, U. S.)

**HISTORY.**—Several kinds of Ὠρίγανος are mentioned by the Greek and Latin writers, but their descriptions are too vague to enable us to determine with precision the particular plants referred to.



**BOTANY. Gen. Char.**—*Calyx* ovate, tubular, ten to thirteen-nerved, striated, with five equal or three superior scarcely longer teeth: throat villous within. Tube of the *corolla* almost the length of the calyx, or scarcely longer; limb sub-bilabiate; upper limb nearly erect, emarginate; the lower spreading, trifid, with nearly equal lobes. *Stamina* four, protruding, distant, somewhat didynamous, the lower ones longer. *Style* cleft at the point into two nearly equal parts. *Achenia* dry, somewhat smooth (Bentham).

**Sp. Char.**—Erect, villous. *Leaves* petiolate, broad-ovate, obtuse, subserrate, rounded at the base, green on both sides. *Spikes* oblong or cylindrical, clustered in corymbose panicles. *Bracts* ovate, obtuse, coloured, half as long again as the calyx (Bentham).—Creeping-rooted. *Flowers* light purple.

**Hab.**—In bushy places, on a limestone and gravelly soil. Indigenous. A native of several parts of Europe; also of Asia. Flowers in July and August.

**PROPERTIES.**—The whole herb (*herba origani*) is officinal. It has a peculiar aromatic odour, and a warm, pungent taste. Sesquichloride of iron produces a green colour (*tannate of iron*) with the cold infusion of origanum.

**COMPOSITION.**—*Volatile oil*, *resin?*, *tannic acid*, *a bitter principle*, and *woody fibre*, are the principal constituents of this plant.

**PHYSIOLOGICAL EFFECTS.**—Stimulant and carminative, like the other labiate plants.

**USES.**—Principally employed to yield the volatile oil. The dried leaves have been used as a substitute for China tea. (Murray, *App. Med.* vol. ii. p. 173.) The infusion of origanum has been administered in chronic cough, asthma, and amenorrhœa.

**OLEUM ORIGANI, L. E. D. (U. S.); Oil of Common Marjoram; Oil of Thyme, offic.**—(Obtained by submitting the herb to distillation with common water.) As imported it has a red colour, of which it may be deprived by redistillation. Mr. Whipple has shown me a sample, obtained by him, which was as colourless as water. The taste of this oil is acrid, its odour that of the plant. It boils at 354° F., and is composed, according to Dr. Kane, of C<sup>90</sup> H<sup>40</sup> O. Its sp. gr. is 0.867. The average produce of essential oil from the herb is one pound from two hundred weight; but it varies exceedingly with the season and culture of the plant. (Brande, *Dict. Mat. Med.* p. 401.)—It is a powerful acrid and stimulant; and is applied to carious teeth by means of lint or cotton, to relieve toothache. Mixed with olive oil, it is frequently employed as a stimulating liniment against alopecia or baldness, rheumatic or paralytic affections, sprains, bruises, &c.

#### 7. MAJORANA HORTENSIS, Mœnch.—SWEET MARJORAM.

*Origanum Majorana*, Linn. D.

*Sex. Syst.* Didynamia, Gyranospermia.

(Herba, D.)

**HISTORY.**—Some botanists regard the ἀμάρακος of Hippocrates, (page 585 and 645, ed. Fœs.) the σαμύχρον of Dioscorides, (lib. iii. cap. 47.) the *Amaracum* or *Sampsuchum* of Pliny, (*Hist. Nat.* lib. xxi. cap. 35, ed. Valp.) as being the *Majorana hortensis*. (Dierbach, *Arzneimittell. d. Hippokrat.* p. 179.)

**BOTANY. Gen. Char.**—*Calyx* very shortly campanulate at the base; the limb cleft superiorly, flattened and dilated, quite entire, orbicular; the margin rolled in beneath the base; fauces naked. Tube of the *corolla* as long as the calyx; limb sub-bilabiate, the upper lip nearly erect, emarginate, the lower one spreading, trifid, with almost equal lobes. *Stamens* four, protruding, distant, didynamous, the inferior ones longest. *Anthers* two-celled; the cells parallel, diverging or becoming straggling. *Style* cleft into two nearly equal parts. *Stigmas* minute (Bentham).

**Sp. Char.**—*Branches* smoothish, racemose-paniculate. *Leaves* petiolate, ob-



long-ovate, obtuse, quite entire, on both sides hoary-tomentose. *Spikelets* oblong, on sessile, crowded branchlets (Bentham).—*Flowers* purple or white.

**HAB.**—Africa and Asia. Cultivated in kitchen-gardens.

**PROPERTIES.**—The whole plant (*herba majoranæ*) has a warm aromatic flavour, and a peculiar savoury smell. Its watery infusion is deepened in colour (*tannate of iron*) by sesquichloride of iron.

**COMPOSITION.**—By distillation the plant yields *volatile oil*. The other constituents are *tannic acid*, *resin?*, *bitter matter*, and *woody fibre*.

**OIL OF SWEET MARJORAM** (*Oleum Majoranæ*) is pale yellow or brownish, with the strong odour and taste of marjoram.

**PHYSIOLOGICAL EFFECTS.**—Tonic and mild stimulant.

**USES.**—Principally employed as a sweet herb by the cook (see vol. i. p. 181). Its powder is sometimes used, either alone or mixed with some other powder, as an errhine. *Marjoram tea* is occasionally employed as a popular remedy for nervous complaints.

#### 8. MELISSA OFFICINALIS, Linn. E. D.—COMMON BALM.

*Sex. Syst.* Didynamia, Gymnospermia.

(Herba, D.—Herb, E.)

(Melissa, U. S.)

**HISTORY.**—Sprengel (*Hist. Rei. Herb.* t. i. p. 100,) considers this plant to be the *μελισσόφυλλον* or *μελιττανα* of Dioscorides. (Lib. iii. cap. 118.)

**BOTANY. Gen. Char.**—*Calyx* tubular, thirteen-nerved, generally striated, bilabiate; upper lip spreading, three-toothed; lower bifid; fauces naked or villous. Tube of *corolla* straight or bent, naked within, generally protruding; fauces inflated; limb bilabiate; the upper lip erect, flat; the lower spreading. *Stamina* four, didynamous, generally approximated in pairs; upper ones sometimes sterile; *filaments* toothless: *anthers* free, two-celled: *connective* often thickened. *Achenia* dry, smooth (condensed from Bentham).

**Sp. Char.**—Herbaceous, erect, branching. *Leaves* broad-ovate, crenate, truncate or cordate at the base. *Whorls* axillary, loose, one-sided. *Bracts* few, ovate. *Corolla* longer by half than the calyx (Bentham).

**HAB.**—South of France.

**PROPERTIES.**—The fresh herb (*herba melissæ*) has a strong, peculiar odour, which is somewhat similar to that of lemons. By drying, this is, for the most part, lost. The taste is aromatic, bitter, and somewhat austere. Sesquichloride of iron gives a greenish colour (*tannate of iron*) to the cold infusion.

**COMPOSITION.**—The principal constituents of balm are *volatile oil*, *resin*, *bitter matter*, *gum*, *tannic acid*, and *woody fibre*. (Pfaff, *Mat. Med.* Bd. iv. S. 270.)

**OIL OF BALM** (*Oleum Melissæ*) is pale yellow, and has the peculiar odour of balm. Its sp. gr. is 0.975. Oil of lemon is said to be frequently substituted for it.

**PHYSIOLOGICAL EFFECTS.**—The effects of balm are similar to, though milder than, those of the labiate plants already described. The mildness of its operation arises from the small portion of volatile oil which the plant contains.

**USES.**—*Balm tea* is sometimes employed as a diaphoretic in fevers, as an exhilarating drink in hypochondriasis, and as an emmenagogue in amenorrhœa and chlorosis.

#### 9. MARRUBIUM VULGARE, Linn. L. D.—WHITE HOREHOUND.

*Sex. Syst.* Didynamia, Gymnospermia.

(Herba.)

(Marubium, U. S.)

**HISTORY.**—This is the plant which is called *Πράσιον* by Hippocrates, (pp. 686 874, and 878, ed. Fœs.) Theophrastus, and Dioscorides (lib. iii. cap. 119); and *Marrubium* by Pliny. (*Hist. Nat.* lib. xx. cap. 89, ed. Vaip.)



**BOTANY.**—**Gen. Char.**—*Calyx* tubular, five to ten-nerved, equal, with five to ten acute, spiny teeth. *Corolla* with the upper lip erect, the lower spreading and trifid, with the middle lobe broader and generally emarginate. *Stamens* didynamous, inclosed; *anthers* with divaricating, somewhat confluent lobes, all nearly of the same form. *Style* with short obtuse lobes (condensed from Bentham).

**Sp. Char.**—*Branches* white-woolly. *Leaves* ovate or rounded, softly villous, greenish or white-woolly beneath, crenate. *Whorls* many-flowered. *Calyx* villose, woolly, with ten subulate, recurved-spreading teeth. *Corolla* with an oblong helmet, bifid at the point (Bentham). *Flowers* white.

**Hab.**—Dry waste grounds. Indigenous. Grows in most parts of Europe; also in Asia and America.—Flowers in July.

**PROPERTIES.**—The whole herb (*herba marrubii*) is used in medicine. It has an aromatic odour, and a bitter taste. Sesquichloride of iron communicates an olive green tint (*tannate of iron*) to the cold watery infusion.

**COMPOSITION.**—Its bitterness depends on *extractive*: its aromatic properties on *volatile oil*. Besides these principles it contains *resin*, *tannic acid*, *bitter matter*, and *woody fibre*.

**PHYSIOLOGICAL EFFECTS.**—Horehound is tonic, mildly stimulant, and, in large doses, laxative. Taken in the form of infusion, it promotes the secretions of the skin and kidneys. It was formerly supposed to possess emmenagogue properties.

**USES.**—It is rarely employed by medical practitioners. As a domestic remedy it is used in chronic pulmonary complaints, especially catarrh. It was formerly given in uterine and hepatic affections.

**ADMINISTRATION.**—*Horehound tea* (prepared by infusing an ounce of the herb in a pint of boiling water) is taken in the dose of a wineglassful. *Syrup of horehound* (prepared with the infusion and sugar) is a popular remedy, and is kept in the shops. *Candied horehound* ought to be made of the same ingredients.

#### OTHER MEDICINAL AND DIETETICAL LABIATÆ.

The following species, enumerated by Loudon, (*Encyclop. of Gardening*, p. 871.) are cultivated in this country as *sweet herbs* (see vol. i. p. 181):—Common or Garden Thyme (*Thymus vulgaris*, Linn.), Lemon Thyme (*T. citriodorus*, Schreb.), Sage (*Salvia officinalis*, Linn.), Clary (*S. Sclarea*, Linn.), Peppermint (*Mentha piperita*, Linn.), Spearmint (*M. viridis*, Linn.), Pennyroyal (*M. Pulegium*), Common Marjoram (*Origanum vulgare*, Linn.), Winter Sweet Marjoram (*O. heracleoticum*, Linn.), Sweet Marjoram (*Majorana hortensis*, Moench.), Pot Marjoram (*M. Onites*, Benth.), Winter Savory (*Satureja montana*, Linn.), Summer Savory (*S. hortensis*, Linn.), Sweet or Larger Basil (*Ocimum Basilicum*, Linn.), Bush or Least Basil (*O. minimum*, Linn.), Rosemary (*Rosmarinus officinalis*, Linn.), and Garden Lavender (*Lavandula vera*, De Cand.) Some of these species have been, or are, used in medicine, and several of them are officinal. The general effects and uses of the *sweet* or *savoury* herbs have been before pointed out.

Besides the labiate plants above described, and which are the only officinal ones in the British pharmacopœias, a considerable number of other species have been at different times introduced into medicinal use. Some of these are deficient in volatile oil, but abound in a bitter principle, on which account they have been employed as stomachics and tonics: such are Water Germander (*Teucrium Scorodium*, Linn.), Wall Germander (*T. Chamædrys*, Linn.), and Ground Pine (*Ajuga Chamæpitys*, Smith); the two last of which have been used, as I have before mentioned, as anti-arthritic remedies (p. 234). Others abound in essential oil, and are consequently more aromatic, stimulant, and carminative: such are Cat-Thyme (*Teucrium Marium*, Linn.), Common Hyssop (*Hyssopus officinalis*, Linn.), Dittany of Crete (*Amaraeus Dictamnus*, Benth.), &c.

#### ORDER XXXVII.—SCROPHULARIACEÆ, Lindley.—THE FIGWORT TRIBE.

PERSONATE, De Cand.—SCROPHULARINEÆ, R. Brown.

**ESSENTIAL CHARACTER.**—*Calyx* free, five-divided, or more generally (by abortion) four-divided; the *sepals* more or less united, or sometimes free, unequal; the upper one largest; the late-



ral ones smallest; imbricated in aestivation. *Corolla* monopetalous, five-divided or (by the cohesion of the two upper petals to the apex) four-divided; the tube short, or elongated; the limb expanded or erect, nearly equally partite or bilabiate; imbricated in aestivation. *Stamens* simple, opposite the sepals; the upper stamens entirely wanting, or sterile, very rarely fertile; shorter than the others; the two lateral equal, rarely abortive; the two lower equal to, or longer than, the lateral ones; sometimes wanting. *Anthers* two or one-celled, dehiscing longitudinally. *Ovary* free, two-celled; the cells two or many-seeded. *Style* simple, rarely slightly bifid. *Fruit* capsular, rarely baccate, two-celled, two-seeded, dehiscing by valves or pores. *Dissepiment* parallel, or opposite to the valves, becoming loose in the centre, or altogether free. *Placenta* adhering to the dissepiments; sometimes separating when ripe. *Seeds* generally indefinite. *Embryo* variously placed in the albumen.—Inodorous or fetid *herbs or shrubs* (Maacricht).

PROPERTIES.—Not uniform; suspicious.

### 1. DIGITALIS PURPUREA, Linn. L. E. D.—PURPLE FOXGLOVE.

*Ser. Syst.* Didynamia, Angiosperma.  
(Folia; Semina, L.—Folia, D.—Leaves, E.)  
(Digitalis, U. S.)

HISTORY.—It appears very improbable that the ancients should have overlooked so common and elegant a plant as foxglove; yet in none of their writings can we find any plant whose description precisely answers to the one now under examination. Fabricius Columna (quoted by Mentzelius, *Index Nom. Plant.* p. 104) thought that it was the Ἐφῆμερον of Dioscorides, (lib. iv. cap. 85,) but the description of the latter does not at all agree with foxglove. The Βάχχαρις (lib. iii. cap. 51) of the same writer has also been referred to, but with little more probability of correctness. The term Foxe-glove occurs in a MS., *Glossarium Ælfrici*, probably written before the Norman Conquest (A.D. 1066), and in a MS. Saxon translation of L. Apulius; both of which are among the Cottonian manuscripts in the British Museum. (Lye, *Dict. Saxon.*) Fuchsius (*Hist. Stirp.* 1542) is usually regarded as the earliest botanist who mentions this plant, which he named Digitalis (from *Fingerhut*, a finger-stall, on account of the blossoms resembling the finger of a glove). Fuchsius states, that until he gave it this appellation, the plant had no Greek or Latin name.

BOTANY. *Gen. Char.*—*Calyx* five-partite, unequal. *Corolla* campanulate; the limb obliquely four-lobed; the lobes unequal. *Stamens* four, didynamous; no vestige of the fifth apparent. *Stigma* simple or bilamellate. *Capsule* ovate-acuminate. (*Bot. Gall.*)

*Sp. Char.*—*Segments of the calyx* ovate, acute. *Corolla* obtuse; its upper lobe scarcely cloven. *Leaves* downy (Smith).

Herbaceous. *Root* of numerous long and slender fibres; biennial. *Stem* erect, three or four feet high, commonly simple, roundish with several slight angles, downy. *Leaves* alternate, ovate-lanceolate or elliptic-oblong crenate, downy, rugged, and veiny, of a dull green; tapering at the base into winged footstalks; lower ones largest. *Raceme* terminal, erect, one-sided, long, simple, of numerous, large, pendulous, odourless flowers. *Corolla* crimson, elegantly marked with eye-like spots, as well as hairy, within.

A variety with white flowers, spotted with shades of cream-colour or pearl, is met with in gardens: it remains tolerably constant from seed.

*Hab.*—Indigenous: in pastures and about hedges or banks, on a gravelly or sandy soil.

DESCRIPTION.—The officinal parts are the leaves and seeds; the latter, however, are rarely employed. As some doubts have been expressed as to the equal activity of cultivated specimens, wild or native plants are to be preferred.

1. *Foxglove leaves (Folia Digitalis).*—The leaves should be gathered when the plant is in the greatest perfection,—that is, just before or during the period of inflorescence; and those are to be preferred which are full-grown and fresh. As the petioles possess less activity than the laminæ or expanded portions of the leaves, they ought to be rejected. Dr. Withering (*Account of the Foxglove*, p.



181, 1785,) directs the leaves to be dried either in the sunshine, or in a tin pan or pewter dish before the fire; but the more usual, and, I believe, better mode of proceeding, is to dry them in baskets in a dark place, in a drying stove. Both dried leaves and powder should be preserved in well-stoppered bottles, covered externally by dark-coloured paper, and kept in a dark cupboard. As both undergo changes by keeping, whereby their medicinal activity is considerably diminished, they ought to be renewed annually. Dried foxglove leaves have a dull green colour, a faint odour, and a bitter nauseous taste.

2. *Foxglove seeds (Semina Digitalis).*—The seeds of the foxglove are small, roundish, and of a grayish-brown colour.

COMPOSITION.—The chemistry of digitalis is in an unsatisfactory state. This arises from the inconclusive and discordant results obtained by those who have submitted this plant to chemical examination. Analyses of it have been published by Destouches, (*Bull. de Pharm.* t. i. p. 123,) Bidault de Villiers, (*Essai sur les Propr. méd. de la Digit. pourp.* 3<sup>e</sup> édit. 1812,) Rein and Haase, (*Diss. de Digit. purp.* 1812, quoted in Schwartze's *Pharm. Tabell.*) Le Royer, (*Bibl. Univers. des Sciences*, t. xxvii. p. 102, 1824, Genève,) Welding, (*Journ. of the Philadelphia Coll. of Pharm.* July, 1833,) Radig, (*Pharm. Central-Blatt für 1835*, S. 209,) and Brault and Poggiale. (*Journ. de Pharm.* t. xxi. p. 130. 1835.) Schlesinger, (*Pharm. Central-Blatt. für 1839*, p. 632,) in 1839, analyzed the leaves of a *Digitalis (folia Digitalis ambiguae)*.

<i>Radig's Analysis.</i>	<i>Brault and Poggiale's Analysis.</i>		
Picrin (Digitalin of Le Royer).....	0.4	Resin.	
Digitalin (of Lancelot).....	8.2	Fatty matter.	
Sceptin (acid extractive).....	14.7	Chlorophylle.	
Chlorophylle.....	6.0	Starch.	
Oxide of iron.....	3.7	Gum.	
Potash.....	3.2	Lignin.	
Acetic acid.....	11.0	Tannin.	
Vegetable albumen.....	9.3	Salts of lime and potash.	
Woody fibre.....	43.6	Volatile oil.	
		Fixed oil.	
		Oxalate of potash.	
Foxglove leaves.....	100.1	Foxglove leaves.	

1. *DIGITALINA* of Lancelot (*Pharm. Central-Blatt. für 1833*, p. 620,) and of Radig. (*Op. supra cit.*) This substance has been obtained by Radig in small crystals, whose forms were not accurately determined. It is colourless, has an acrid taste, is unchanged in the air, renders syrup of violets green, and restores the blue colour of reddened litmus. It is soluble in alcohol and in acids: the solutions were very bitter, and were decomposed by water, by diacetate of lead, and by infusion of nutgalls. Concentrated sulphuric acid first reddens digitalina, and then makes it olive-green. By distillation it does not evolve ammonia. Dr. David found that, when from  $\frac{1}{2}$  to  $1\frac{1}{2}$  grains were injected into the veins of an animal, death speedily ensues without convulsions, and with the same effect upon the pulse which characterizes digitalis.

2. *PICRIN* (from *πικρὸν*, bitter).—The substance which Radig calls picrin, and which he says is identical with the digitalin of Le Royer, is bitter, hygrometric, soluble in water, alcohol, and ether, and precipitable from its watery solution by bichloride of mercury, ferro-cyanide of iron, and acetate of lead. Brault and Poggiale, however, declare the digitalin of Le Royer to be a compound of chlorophylle resin, a fatty matter, and some traces of salts of lime and potash; and they ascribe the activity of foxglove to the combination of all the principles of which this plant is composed, but especially to the resin.

3. *SCAPTIN*—Radig has applied the term scaptin to a brown, almost tasteless extractive, which leaves an acrid sensation in the throat.

4. *EMPHYREUMATIC OIL OF FOXGLOVE (Pyrodigitalina).*—By the destructive distillation of the dried leaves of foxglove, Dr. Morris (*Ed. Med. and Surg. Journ.* vol. xxxix. p. 377,) obtained a coloured, disagreeable, emphyreumatic oil, which was semi-solid at 60° F. and soluble in boiling alcohol and ether: the solution, on cooling, let fall a flocculent precipitate composed of two substances, one crystalline, the other globular. Given to a rabbit, it caused paralysis of the hind legs, convulsions, laborious and rapid breathing, and accelerated action of the heart. It does not contain the sedative principle of foxglove.

CHEMICAL CHARACTERISTICS.—Sesquichloride of iron causes a dark precipitate (*tanno-gallate of iron*) with decoction of foxglove leaves, as well as with the tincture diluted with water. A solution of gelatine, added to the decoction, causes, after some time, a scanty precipitate (*tannate of gelatine*). Tincture of



nutgalls has scarcely any effect (perhaps a slight turbidness) when added to the decoction or to the tincture diluted with water.

PHYSIOLOGICAL EFFECTS. *a. On Vegetables.*—Marcet (*Ann. de Chim. et de Phys.* vol. xxix. p. 200.) found that a solution of the watery extract of foxglove killed a haricot plant (*Phaseolus vulgaris*) in twenty-four hours.

*β. On Animals generally.*—The effects of foxglove have been tried on dogs, (Orfila, *Toxicol. Gén.*) horses, rabbits, (Le Roger, *Bibl. Univ.* June 1824,) turkeys, (Salerno, *Hist. de l'Acad. des Scien.* 1748, p. 84,) the domestic fowl, and frogs; and on all it has been found to act as a poison. One drachm of the powder may be given to horses as a sedative in inflammation. (Youatt, *The Horse, in Libr. of Usef. Knowledge.*) Two ounces have produced death in twelve hours. (Moiroud, *Pharm. Vétér.* p. 354.) According to the experience of Orfila, the first symptoms of poisoning observed in [carnivorous] animals is vomiting. The influence of the poison over the heart does not appear to be uniform; for in some cases he found the pulsations of this viscus unaltered, in others accelerated, while occasionally they were retarded. In the horse killed by two ounces of foxglove, the pulse was 130 per minute, a short time before death (Moiroud): the standard pulse of the horse being 40 or 42 per minute. The cerebro-spinal symptoms observed in animals, are diminished muscular power, convulsive movements, tremors, and insensibility. The powder acts as a local irritant, giving rise to inflammation of parts to which it is applied (Orfila).

*γ. On Man.*—We may, for convenience, establish three degrees of the operation of foxglove.

*In the first degree*, or that produced by *small and repeated doses*, foxglove sometimes affects what are termed the organic functions, without disordering the animal or cerebro-spinal functions. Thus we sometimes have the stomach disordered, the pulse altered in frequency, and sometimes also in fulness and regularity, and the secretion of urine increased, without any other marked symptoms. The order in which the symptoms just mentioned occur is not uniform: sometimes the diuresis, at others nausea, and occasionally the affection of the circulation, being the first obvious effect.

The influence of foxglove over the circulation is not at all constant. In some cases the frequency of the pulse is augmented, in others decreased, while in some it is unaffected. Lastly, in a considerable number of instances, the pulse becomes irregular or intermittent under the use of foxglove. (See the statistical *resumé* of Sandras, *Bull. de Thérap.* t. vi.) A few drops of the tincture will, in some cases, reduce the frequency of the pulse, and render it irregular and intermittent, while in other instances much larger doses may be taken without any obvious effect on it. Dr. Withering (*Account of the Foxglove*, p. 73, 1785) mentions one case in which the pulse fell to 40, and I have several times seen it reduced to 50. In some cases the slowness of the pulse is preceded by an increased activity of the vascular system. From Sandras's (*op. cit.*) reports this would appear to occur more frequently after small than large doses of foxglove. Dr. Sanders (*Treat. on Pulm. Consumption*, ed. 1808,) indeed asserts, that foxglove invariably excites the pulse, and refers to an experience of 2000 cases in proof. He says, that he has seen the pulse rise from 70 to 120 under the use of foxglove, and at the end of twenty-four hours, or sooner, fall with greater or less rapidity to forty, or even below this. But an experience of the use of foxglove in only twenty cases, will, I believe, convince most persons that Dr. Sanders has fallen into an error in the sweeping assertion which he has made. A great deal, however, depends on the position of the patient. If it be desired to reduce the frequency of the pulse, the patient should be kept in a recumbent posture. The important influence of posture was first pointed out, I believe, by Dr. Baidon. (*Ed. Med. and Surg. Journ.* vol. iii. p. 270.) His own pulse, which had been reduced by this plant from 110 to 40 beats per



minute while he was in the recumbent position, rose to 70 when he sat up, and to 100 when he stood. We have a ready explanation of this fact. In a state of health the pulsations of the heart are more frequent (usually to the extent of five or six in the minute) in the erect than in the horizontal position; and it is very obvious that greater force is required to carry on the circulation in the former than in the latter, since, in the erect position, the heart and arteries have to send blood to the head against gravity. Now, the power of the heart being enfeebled by foxglove, when a demand is made on this viscus for an increase in the force of contractions by the change from the recumbent to the standing attitude, it endeavours to make up for its diminished force by an increase in the frequency of its contractions. I need scarcely add that the sudden change of position in those who are much under the influence of this medicine, is attended with great danger, and in several instances has proved fatal; for, in consequence of the heart not having sufficient power to propel the blood to the head against gravity, fatal syncope has been the result.<sup>1</sup> The influence of digitalis over the pulse is more marked in some individuals or cases than in others; thus the reduction of the frequency of the pulse is in general more readily induced in weak and debilitated constitutions than in robust and plethoric ones. Occasionally no obvious effect on the number, force, or regularity of the pulse is produced, though the foxglove may be given to an extent sufficient to excite vomiting and cerebral disorder. Shrock (quoted by Wibmer, *Wirk. d. Arzneim. u. Gift.* Bd. ii. S. 311.) experienced, from two grains of foxglove, nausea, headache, small, soft, and quick pulse, dryness of the gums and throat, giddiness, weakness of limbs, and increased secretion of saliva. Some hours after he observed sparks before the eyes, his vision became dim, and he experienced a sensation of pressure on the eyeballs.

Almost important fact connected with the repeated uses of small doses of it, is the *cumulative effect* sometimes observed. It has not unfrequently happened that, in consequence of the continued use of small doses of this medicine, very dangerous symptoms, in some cases terminating in death, have occurred. The most prominent of these were great depression of the vascular system, giddiness, want of sleep, convulsions, and sometimes nausea and vomiting.<sup>2</sup> A knowledge of its occasional occurrence impresses us with the necessity of exercising great caution in the use of this remedy, particularly with respect to the continuance of its administration and increase of dose; and it shows that after the constitutional effect has become obvious, it is prudent to suspend from time to time the exhibition of the remedy in order to guard against the effects of this alarming accumulation. I may add, however, that I have used it, and seen others employ it, most extensively, and in full doses, and have rarely seen any dangerous consequences; and I believe, therefore, the effects of accumulation to be much less frequent than the statements of authors of repute would lead us to expect. The experience of Dr. Holland (*Med. Notes and Reflections*, p. 544) is to the same effect. "Though employing the medicine somewhat largely in practice," he observes, "I do not recollect a case in which I have seen any injurious consequences from this cause."

The diuretic operation for which we employ foxglove is very inconstant. Dr. Withering stated, that this medicine more frequently succeeds as a diuretic than any other, and that if it fail, there is but little chance of any other remedy succeeding. My experience, however, is not in accordance with Dr. Withering's. I have frequently seen foxglove fail in exciting diuresis, and have found the infusion of common broom (*Cytisus scoparius*) subsequently succeed. It has been asserted by some, that the diuretic effect of foxglove was only observed in dropsical

<sup>1</sup> For some interesting remarks on the *Effects produced on posture by the pulse*, by Dr. Graves, consult *Dubl. Hosp. Rep.* vol. x. p. 561.

<sup>2</sup> See the cases published by Dr. Withering, *op. cit.*; also a fatal case recorded by Dr. Blackall, *On Dropsy*, p. 175. 4th ed.



cases, and that it, therefore, depended on the stimulus given to the absorbent vessels, and not to any direct influence exerted over the kidneys; but the statement is not true, since foxglove is sometimes found acting as a diuretic even in health. In some cases the bladder has appeared more irritable than usual, the patient having a frequent desire to pass his urine.

An increased flow of saliva is an occasional consequence of the continued use of moderate doses of foxglove. Dr. Withering (*op. cit.* S. 184) first noticed this effect. Dr. Barton (*Beck's Med. Jurisprudence*) has also seen it produced from ordinary doses.

2. The *second degree of operation* of digitalis, or that ordinarily resulting from the use of too large or too long-continued doses, is manifested by the disordered condition of the alimentary canal, of the circulating organs, and of the cerebro-spinal system. The more ordinary symptoms are nausea or actual vomiting, slow and often irregular pulse, coldness of the extremities, syncope or tendency to it, giddiness, and confusion of vision. Sometimes the sickness is attended with purging, or even with diuresis; at other times the patient is neither vomited nor purged; and the principal disorder of system is observed in the altered condition of the nervous and vascular organs. External objects appear of a green or yellow colour; the patient fancies there is a mist, or sparks, before his eyes; a sensation of weight, pain, or throbbing of the head, especially in the frontal region, is experienced; giddiness, weakness of the limbs, loss of sleep, occasionally stupor or delirium, and even convulsions, may also be present. The pulse becomes feeble, sometimes frequent, sometimes slow; there may be actual syncope, or only a tendency to it, and profuse cold sweats. Salivation is sometimes induced by poisonous doses of foxglove. It was observed in a case, narrated by Dr. Henry, (*Ed. Med. and Surg. Journ.* vol. vii. p. 148,) and has been known to last three weeks. (*Rust's Magazin*, xxv. 578.)

The quantity of digitalis that may be given to a patient without destroying life, is much greater than is ordinarily imagined. In one instance I saw twenty drops of the tincture given to an infant labouring under hydrocephalus, three times daily for a fortnight, at the end of which time the little patient was completely recovered, without one untoward symptom. I have frequently given a drachm of the tincture (of the best quality) three times daily to an adult, for a fortnight, without observing any marked effect. I know that some practitioners employ it in much larger doses (as an ounce or half an ounce of the tincture), with much less effect than might be imagined. The following communication on this subject, from my friend Dr. Clutterbuck, illustrates this point:—"My first information on this subject was derived from an intelligent pupil, who had been an assistant to Mr. King, a highly respectable practitioner at Saxmundham, in Suffolk, who, on a subsequent occasion, personally confirmed the statement. This gentleman assured me, that he had been for many years in the habit of administering the tincture of digitalis, to the extent of from half an ounce to an ounce at the time, not only with safety, but with the most decided advantage, as a remedy for acute inflammation,—not, however, to the exclusion of blood-letting, which, on the contrary, he previously uses with considerable freedom. To adults he often gives an ounce of the tincture (seldom less than half an ounce), and awaits the result of twenty-four hours, when, if he does not find the pulse subdued, or rendered irregular by it, he repeats the dose; and this, he says, seldom fails to lower the pulse in the degree wished for; and when this is the case, the disease rarely fails to give way, provided it has not gone the length of producing disorganization of the part. He has given as much as two drachms to a child of nine months. Sometimes vomiting quickly follows these large doses of the digitalis, but never any dangerous symptom, as far as his observation has gone, which has been very extensive. In less acute cases he sometimes gives smaller doses, as thirty drops, several times in a day.

"Such is the account I received from Mr. King himself, and which was con-



firmed by his assistant, who prepared his medicines. I do not see any ground for questioning the faithfulness of the report. I have myself exhibited the tincture to the extent of half an ounce (never more), in not more than two or three instances (cases of fever and pneumonia). To my surprise there was no striking effect produced by it; but I did not venture to repeat the dose. In numerous instances I have given two drachms; still more frequently one drachm; but not oftener than once in twenty-four hours, and not beyond a second or third time. Two or three exhibitions of this kind I have generally observed to be followed by slowness and irregularity of pulse, when I have immediately desisted." Dr. T. Williams (*Lond. Med. Gaz.* vol. i. p. 744) states, that a man, in a state of intoxication, took two ounces of tincture of foxglove in two doses, in quick succession, without the slightest inconvenience.

3. The *third degree* of the operation of foxglove, or that resulting from the use of *fatal doses*, is characterized usually by vomiting, purging, and griping pain in the bowels; slow, feeble, and irregular pulse, great faintness, and cold sweats; disordered vision; at first giddiness, extreme debility; afterwards insensibility and convulsions, with dilated insensible pupils.

If we compare the effects of foxglove with those of other medicinal agents, we find they approximate more closely to those of tobacco than of any other cerebro-spinant. Those two agents especially agree in their power of enfeebling the action of the heart and arteries (vol. i. p. 178). Green tea agrees with foxglove in its property of preventing sleep. Considered as a diuretic, foxglove is, in some respects, comparable with squills. I have already pointed out the peculiarities attending the operation of each of these.

USES.—We employ foxglove for various purposes, as—1stly, to reduce the frequency and force of the heart's action; 2dly, to promote the action of the absorbents; 3dly, as a diuretic; and 4thly, sometimes on account of its specific influence over the cerebro-spinal system.

In the following remarks on the uses of foxglove in particular diseases, I refer to the administration of this remedy in the doses in which it is ordinarily employed. I have no experience of its therapeutical effects, when given in the enormous quantities mentioned by Dr. Clutterbuck.

1. *In fever.*—Digitalis is occasionally useful in fever to reduce the frequency of the pulse, when the excitement of the vascular system is out of proportion to the other symptoms of fever, such as the increased temperature, and the cerebral or gastric disorder. It cannot, however, be regarded, in the most remote way, as a curative means; on the other hand, it is sometimes hurtful. Thus, not unfrequently it fails to reduce the circulation; nay, occasionally, it has the reverse effect, accelerates the pulse, while it increases the cerebral disorder, and perhaps irritates the stomach. In estimating its value as a remedial agent for fever, we must not regard it as a sedative means (I refer now to the vascular system) merely; it is an agent which exercises a specific influence over the brain; and, therefore, to be able to lay down correct indications and contra-indications for its use in disordered conditions of this viscus, we ought to be acquainted, on the one hand, with the precise nature of the influence of the remedy, and, on the other, with the actual condition of the brain in the disease which we wish to ameliorate. Now as we possess neither of these data in reference to fever, our use of foxglove is, with the exception of the sedative influence over the circulation, empirical; and experience has fully shown us it is not generally beneficial. But, I repeat, where the frequency of pulse bears no relation to the local or constitutional symptoms of fever, foxglove may be serviceable.

2. *Inflammation.*—Foxglove has been employed in inflammatory diseases, principally on account of its power of reducing the frequency of the pulse, though some have referred part of its beneficial operation to its influence over the absorbent system. Inflammation, of a chronic kind, may be going on in one part of the body, to an extent sufficient to produce complete disorganization,



and ultimately to cause the death of the patient, without the action of the larger arterial trunks (*i. e.* of the system generally) being remarkably increased. In such cases, digitalis is, for the most part, of little use. Again, in violent and acute inflammation, accompanied with great excitement of the general circulation, especially in plethoric subjects, foxglove is, in some cases, hurtful; in others, it is a trivial and unimportant remedy; and we, therefore, rely, in our treatment, on blood-letting, and other powerful antiphlogistic measures; and foxglove, if serviceable at all, can only be used after the other means.

As a remedy for inflammation, foxglove is principally useful in less violent cases, particularly when accompanied with increased frequency of pulse, and occurring in subjects not able to support copious evacuations of blood. Moreover, it has more influence over inflammation of some parts of the body (as the arachnoid membrane, the pleura, the pericardium, and the lungs) than of others. In gastric and enteritic inflammation, it would appear to be objectionable on account of its irritant properties; while its specific influence over the brain would make it a doubtful remedy in phrenitis. In arachnitis of children it is certainly a most valuable agent.

In conclusion, then, it appears that digitalis, as a remedy for inflammation, is principally valuable where the disease has a tendency to terminate in serous effusion. But in no case can it be regarded as a substitute for blood-letting. Its powers as an antiphlogistic remedy have, I suspect, been greatly over-rated.

3. *Dropsy*.—Of all remedies for dropsy none have gained more, and few so much, celebrity as foxglove. It has been supposed to owe its beneficial operation to its repressing arterial excitement (a frequent cause of dropsical effusion), to its promoting the functions of the absorbent vessels, and particularly to its diuretic effects. Whatever may be its *modus operandi*, its powerful and salutary influence in many dropsies cannot be a matter of doubt. Dr. Withering has correctly observed, that “it seldom succeeds in men of great natural strength, of tense fibre, of warm skin, of florid complexion, or in those with a tight and cordy pulse.” “On the contrary, if the pulse be feeble or intermitting, the countenance pale, the lips livid, the skin cold, the swollen belly soft and fluctuating, or the anasarca limbs readily pitting under the pressure of the finger, we may expect the diuretic effects to follow in a kindly manner.” In those with a florid complexion, blood-letting and purgatives will often be found useful preparatives for foxglove. In some forms of dropsy foxglove is more serviceable than in others. Thus, anasarca, ascites, hydrothorax, and phlegmasia dolens, are sometimes benefitted by it; whereas ovarian dropsy and hydrocephalus are not relieved by it. Its diuretic effect is greatly promoted by combining other diuretics with it, especially squills (as in the *Pilula Digitalis et Scilla*, Ph. Ed.), calomel, or the saline diuretics (as the acetate of potash). A combination of vegetable bitters (as infusion of gentian or calumba) with foxglove, forms, I think, a valuable form of exhibition in many old dropsical cases. Infusion of common broom (*Cytisus scoparius*) might probably be advantageously conjoined with foxglove, where a powerful diuretic is required. In old cases of general dropsy, in œdematous swellings from debility, and in anasarca following scarlet fever, where, together with weakness, there is still left an excited and irritable state of the arterial system, chalybeates (as the *vinctura ferri sesquichloridi*) may be conjoined with foxglove, with the happiest effects. (Holland, *Med. Notes and Reflect.* p. 546.)

4. *In Hemorrhages*.—In active hemorrhages from internal organs, accompanied with a quick, hard, and throbbing pulse, foxglove as a sedative is oftentimes serviceable. Epistaxis, hæmoptysis, and menorrhagia, are the forms of hemorrhage more frequently benefitted by the use of foxglove.

5. *Diseases of the Heart and Great Vessels*.—An important indication in the treatment of many diseases of the heart and great vessels is to reduce the force and velocity of the circulation. The most effectual means of fulfilling this indi-



cation are,—the adoption of a low diet, repeated blood-letting, and the employment of foxglove. There are, perhaps, no diseases in which the beneficial effects of foxglove are more marked, than in those of the heart and great vessels. In *aneurism of the aorta*, our only hope of cure is by the coagulation of the blood in the aneurismal sac, and the consequent removal of the distensive pressure of the circulation. To promote this, we endeavour to retard the movement of the blood within the sac, by diminishing the quantity of blood in the system generally, and by reducing the force and velocity with which it circulates. Blood-letting and digitalis are, in these cases, very important agents: and under their use cases now and then recover. Again, in *simple dilatation* of the cavities of the heart, our objects are to remove, if possible, the cause (usually obstruction in the pulmonic or aortic system), to strengthen the muscular fibres of the heart, and to repress any preternatural excitement of the vascular system. Digitalis is useful to us in attaining the latter object. In *simple hypertrophy* or *hypertrophy with dilatation*, we have to reduce the preternatural thickness of the heart's parietes, and this we do by removing, when it can be done, any obstruction to the circulation, by using a low diet, by repeated blood-letting, and by the employment of foxglove. No means, says Dr. Davies, (*Lond. Med. Gaz.* vol. xv. p. 790,) excepting the abstraction of blood, diminishes the impulsion of the heart so completely and so certainly as digitalis. "I have been," adds he, "in the habit of using it for several years for these affections, and have rarely seen it fail in producing at least temporary relief." "The enlarged and flaccid heart," observes Dr. Holland, (*Med. Notes and Reflect.* p. 574,) "though, on first view, it might seem the least favourable for the use of the medicine, is, perhaps, not so. At least we have reason to believe, that, in dropsical affections, so often connected with this organic change, the action of digitalis, as a diuretic, is peculiarly of avail." In some disordered conditions of innervation of the heart and great vessels—as in *angina pectoris*, nervous palpitation of the heart, and augmented arterial impulsion, foxglove is also at times beneficial. In patients affected with an intermittent or otherwise irregular pulse, I have several times observed this medicine produce regularity of pulsation;—a circumstance also noticed by Dr. Holland. Besides the preceding, there are various other affections of the heart in which foxglove may be found serviceable, either by its sedative influence over the circulation, or by its power of relieving dropsical effusion through its diuretic property.

6. *In Phthisis.*—Digitalis has been declared capable of curing pulmonary consumption, and numerous cases of supposed cures have been published. Bayle (*Bibl. Thérap.* t. iii. p. 362,) has collected from the writings of Sanders, (*op. ante. cit.*) Kinglake, Fowler, Beddoes, (*Observ. on the Management of the Consumptive*, 1801,) Drake, Mossman, (*Essay to elucidate the Nat. Orig. and Connex. of Scroph. and Gland. Consumption.*) Maclean, Ferriar, (*On Digitalis.*) Magennis, Moreton, and others, reports of 151 cases treated by foxglove. Of these, 83 are said to have been cured, and 35 relieved. But a more accurate and extended experience has fully proved, that this medicine possesses no curative, and very slightly palliative, powers in genuine phthisis; it is totally incapable of preventing or of causing the removal of tubercular deposits, and has little, if any influence, in retarding the progress of consumption. Its power of diminishing the rapidity of the circulation cannot be doubted; but this effect is, as Dr. Holland (*op. cit.* p. 551,) justly remarks, "of less real moment than is generally supposed."

7. *In Insanity and Epilepsy.*—In these maladies foxglove may prove occasionally serviceable by repressing excessive vascular excitement, which sometimes accompanies them. Furthermore, the specific influence of this remedy over the cerebro-spinal system may now and then contribute to the beneficial operation of foxglove. But the precise nature of this influence not having as yet been accurately ascertained, while the pathology of the above-mentioned diseases is



involved in considerable obscurity, it follows that the therapeutic value of this influence can only be ascertained empirically. In insanity, Dr. Hallaran (*Inq. &c., with Observ. on the Cure of Insanity*, 1810,) recommends foxglove to reduce vascular action after the employment of depletion and purgation. It has been used in this disease, with success, by Dr. Currie, (*Mem. of the Med. Soc. of London*, vol. iv.) and by Fanzago. (Quoted by Bayle, *Bibl. Thérap.* t. iii. p. 320.) In epilepsy it is, I conceive, less likely to be serviceable, because this disease is less frequently accompanied with the vascular excitement, against which foxglove is most successful. Accordingly, while in some few cases it has proved serviceable, (Scott, *Ed. Med. and Surg. Journ.* Jan. 1827,) in others it has either been unsuccessful, (Percival, *op. cit.* vol. ix. p. 274,) or has only given temporary relief. (Currie, *op. supra cit.*)

8. *In various other diseases.*—Besides the preceding, there are several other maladies against which foxglove has been employed with occasional benefit, as *scrofula* (Haller, Merz, Schiemann, and Hufeland, quoted by Bayle, *Bibl. Thérap.* t. iii. p. 369,) and *asthma*.<sup>1</sup> For other diseases relieved by foxglove I must refer the reader to the works of Murray (*App. Med.* vol. i.) and Bayle, (*op. supra cit.*)

ADMINISTRATION.—The ordinary dose of foxglove, *in powder*, is from gr. ss. to gr. iss. repeated every six hours.

ANTIDOTES.—In a case of poisoning by foxglove, or its preparations, expel the poison from the stomach by the stomach-pump or by emetics, if vomiting should not already have commenced; assist the vomiting, when it is established, by the use of diluents; and counteract the depressing influence of the poison on the circulation by the use of ammonia and brandy; and keep the patient in a recumbent posture, to guard against syncope. I am unacquainted with any chemical antidote for foxglove; perhaps infusion of nutgalls or green tea might prove serviceable, especially if the active principle of this plant be an alkali.

1. INFUSUM DIGITALIS, L. E. D. (U. S.) *Infusion of Foxglove.*—(Foxglove leaves, dried, ʒj. [ʒij. E.]; Spirit of Cinnamon, fʒj. [fʒij. E.; ʒss. D.]; Boiling, [distilled, L.]; Water, Oj. [fʒxviiij, E.; Oss. wine measure, D.] Macerate the foxglove leaves in the water for four hours, in a vessel lightly covered, and strain [through linen or calico, E.]; then add the spirit of cinnamon.)—I believe this, when properly made, to be the most effectual of the preparations of foxglove. The dose of it is from fʒss. to fʒj. repeated every six hours. I have known it given to the extent of fʒij.

2. TINCTURA DIGITALIS, L. E. D. (U. S.) *Tincture of Foxglove.*—Foxglove leaves [rejecting the larger ones, D.] dried [in moderately fine powder, E.; coarsely powdered, D.] ʒiv. [ʒij. D.]; Proof Spirit, [Diluted alcohol, U. S.] Oij. [Oj. wine measure, D.] Macerate for fourteen days [seven, D.] and strain. “This tincture is best prepared by the process of percolation, as directed for the Tincture of Capsicum. If forty fluid ounces of spirit be passed through, the density is 944 [0.944], and the solid contents of a fluid ounce amount to twenty-four grains. It may also be made by digestion,” E.)—The usual dose of this preparation, for an adult, is from ℞x. cautiously increased to ℞xl., repeated every six hours. I usually begin with ℞xx. The largest dose I have employed is fʒj.; but, as I have already stated, it has been given to the extent of one ounce! The colour of this preparation is somewhat affected by exposure to strong solar light.

SUCCUS DIGITALIS.—The preserved juice of foxglove may be employed as a substitute for the tincture. The mode of preparing it has been already explained (see vol. i. p. 325.) Mr. Bentley informs me, that from 1 cwt. 2 qrs. 26 lbs. of digitalis gathered in May, he procured 49 pints of juice.

<sup>1</sup> Ferriar, *On Digitalis*, 1799; Fogo [asthma cured by an overdose of foxglove], *Ed. Med. and Surg. Journ.* vol. xviii. p. 345.



3. *EXTRACTUM DIGITALIS*, L. E. *Extract of Foxglove*.—(Fresh Foxglove leaves, lb. j. Bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence, L.—This extract is best prepared from the fresh leaves of digitalis, by any of the processes indicated for extract of Conium," E.)—Recently introduced into the pharmacopœias of London and Edinburgh. Its preparation requires very great care and attention, or the virtues of the plant may be destroyed during the process.—Dose, gr. j. cautiously increased.

4. *PILULÆ DIGITALIS ET SCILLÆ*, E. *Pills of Foxglove and Squill*.—(Digitalis; Squill, of each, *one part*; Aromatic Electuary, *two parts*. Beat them into a proper mass with conserve of red roses; and divide the mass into four-grain pills.)—A valuable diuretic compound. Used in dropsies.—Dose, one or two pills.

2. *VERBASCUM THAPSUS*, Linn. D.—GREAT MULLEIN OR HIGH TAPER.

*Sex. Syst.* Pentandria, Monogynia.

(Folia, D.)

**HISTORY.**—This plant is, according to Sprengel, (*Hist. Rei Herb.* vol. i. p. 161.) the *φλόμας Ἰγγλεια* of Dioscorides (lib. iv. cap. 104).

**BOTANY.** *Gen. Char.*—*Calyx* campanulate, five-partite, nearly equal. *Corolla* with a very short tube; the limb flat, expanded, somewhat rotate, five-partite; the lobes rounded, nearly equal, or the lower ones equal. *Stamens* five, inclining; the lower ones longer; all fertile; the *filaments* either all, or the three upper, barbate; *anthers* generally adnate, and (by the confluence of the cells) unilocular. *Style* simple, thick at the apex. *Stigma* entire or bifid. *Capsule* ovate or somewhat globose; the valves bifid at the apex (Macreight).

*Sp. Char.*—*Leaves* decurrent, crenate, woolly on both sides. *Stem* simple. *Cluster* dense. *Flowers* almost sessile (Smith).—*Corolla* golden-yellow; *stamens* red; *stigma* green.

*Hab.*—Indigenous: on banks and waste ground. Biennial. Flowers in July and August.

**DESCRIPTION.**—The leaves (*folia verbasci*) have a mucilaginous, bitterish taste, and a very slight odour. They communicate their virtues to water.

**COMPOSITION.**—Morin (*Journ. de Chim. Méd.* t. ii. p. 223) analyzed the flowers of *Verbascum Thapsus*, and obtained a *yellow volatile oil*, a *fatty acid*, *free malic and phosphoric acids*, *malate and phosphate of lime*, *acetate of potash*, *uncrystallizable sugar*, *gum*, *chlorophylle*, and *yellow resinous colouring matter*.

**PHYSIOLOGICAL EFFECTS.**—Emollient, demulcent, and, supposed to be, feebly narcotic. Fishes are stupified by the seeds of *Verbascum*. (Bergius, *Mat. Med.*)

**USES.**—In the form of decoction (prepared of ℥ij. of the leaves and Oij. of water) mullein has been used in catarrhs and diarrhœas: the dose is ℥iv. Dr. Home (*Clin. Exp. and Hist.*) found it serviceable in the latter complaint only. Fomentations and cataplasms made of great mullein have been used as applications to hemorrhoidal tumors and indurated glands.

3. *SCROPHULARIA NODOSA*, Linn. D.—KNOTTY-ROOTED FIGWORT.

*Sex. Syst.* Didynamia, Angiospermia.

(Folia, D.)

**HISTORY.**—The earliest notice of this plant occurs in the work of Brunfels. (Sprengel, *Hist. Rei Herb.* Præf. xi.)

**BOTANY.** *Gen. Char.*—*Calyx* five-parted or more frequently five-cleft, nearly equal. *Corolla* globose, with a short five-lobed limb, the segments of which are rounded, and the uppermost united into an upper lip. *Stamens* didynamous, inclining, with one-celled, transverse anthers; a fifth rudimentary stamen with a lamelliform anther often present. *Stigma* emarginate. *Capsule* roundish, often acuminate, with the valves entire, or just bifid (Lindley).



**Sp. Char.**—Leaves heart-shaped, acute; three-ribbed at the base. Stem sharp-edged. Root tuberous (Smith).—Corolla dull green, with a livid purple lip.

**Hab.**—Indigenous: hedges, woods, and thickets. Perennial. Flowers in July.

**DESCRIPTION.**—The fresh leaves (*folia scrophulariæ nodosæ*) have, when bruised, a fetid odour: their taste is bitter, and somewhat acrid. Water extracts the virtues of the plant: the infusion is darkened by the sesquichloride of iron, but is unchanged by tincture of nutgalls.

**COMPOSITION.**—The whole plant (root and herb) was analysed in 1830 by Grandoni. (*Pharm. Central-Blatt, für 1831, S. 446.*) He obtained brown bitter resin 0.31, extractive with gum 4.84, extractive having the odour of benzoic acid 0.88, chlorophylle 1.58, starch, 0.23, greenish fecula 0.18, mucilage 0.27, inulin 0.16, malic acid, 0.15, pectic acid, 0.15, acetic acid 0.13, woody fibre 19.80, water 70.31, sulphate and carbonate of potash 0.59, alumina 0.20, oxalate and carbonate of lime 0.46, magnesia 0.26, silica 0.07, odorous matter and loss 0.31.

**PHYSIOLOGICAL EFFECTS.**—But little known. Judging from their taste, the leaves possess acrid properties. When swallowed they occasion vomiting and purging. They are said to be diuretic and narcotic.

**USES.**—Rarely employed. In the form of a fomentation the leaves are sometimes applied to piles and other painful tumors. The ointment is used in skin diseases. The tuberous root was formerly esteemed in scrofula. (*Murray, App. Med. vol. ii. p. 224.*)

**UNGUENTUM SCROPHULARIÆ, D.; Ointment of Scrophularia.**—(Fresh leaves of *Scrophularia nodosa*; Prepared Hog's Lard, of each, lb. ij.; Prepared Mutton Suet, lb. j. Boil the leaves in the fat until they become crisp, then strain by expression.) Recommended by Dr. W. Stokes (*Dubl. Med. Essays, p. 146*) for the cure of a disease of children, commonly termed *burnt-holes*, but which he calls *Pemphigus gangrenosus* [*Rupia escharotica*?]. It has also been used in tinea capitis, impetigo, and other cutaneous affections. (Dr. Montgomery, *Observ. on the Dubl. Pharm.*)

#### OTHER MEDICINAL SCROPHULARIACEÆ.

1. *GRATIOLA OFFICINALIS*, or *Hedge Hyssop*, is cathartic, diuretic, and emetic, acting in large doses as an acrid poison. It has been used in visceral obstructions, liver affections, dropsics, scrofula, and venereal diseases.—Dose of the powder, gr. xv. to ʒss. : of the infusion (prepared with ʒij. of the dried herb and Oss. of boiling water), fʒss. to fʒj. three times a day. (*Thomson, London Dispensat.*)

2. *VERONICA BECCABUNGA*, or *Brooklime*, is considered antiscorbutic. It may be eaten as a salad.

3. *EUPHRASIA OFFICINALIS*, or *Common Eye-bright*, is nearly inert, though it is a popular remedy for diseases of the eyes.

#### ORDER XXXVIII.—SOLANACEÆ, Lindley.—THE NIGHT-SHADE TRIBE.

SOLANÆE, Jussieu.

**ESSENTIAL CHARACTER.**—Calyx five-parted, seldom four-parted, persistent, inferior. Corolla monopetalous, hypogynous; the limb five-cleft, seldom four-cleft, regular or somewhat unequal, deciduous; the aestivation plaited or imbricated. Stamens inserted upon the corolla, as many as the segments of the limb, with which they are alternate; anthers bursting longitudinally, rarely by pores at the apex. Ovary two-celled, rarely four or many-celled, with two polyspermous placentæ; style continuous; stigma simple. Pericarp with two or four or many cells, either a capsule with a double dissepiment parallel with the valves, or a berry with the placentæ adhering to the dissepiment. Seeds numerous, sessile; embryo straight or curved, often out of the centre, lying in a fleshy albumen; radicle next the hilum.—Herbaceous plants or shrubs. Leaves alternate, undivided, or lobed, sometimes collateral; the floral ones



sometimes double, and placed near each other. *Inflorescence* variable, often out of the axil; the *pedicels* without bracts (Lindley).

PROPERTIES.—Not uniform. 1. *Narcotics* (*cerebro-spinants*, Pereira, p. 177) are obtained from the genera *Hyoscyamus*, *Atropa*, *Datura*, *Nicotiana*, *Solanum*, and *Mandragora*: of these some are also *acrids* (*acro-narcotic solanææ*). 2. *Acro-aromatics* are procured from the genus *Capsicum*. 3. *Bitter tonics* are found in the genera *Solanum* (as *S. Pseudoquina* and *crispum*), and *Cestrum* (*C. diurnum*). 4. *Nutrients* are obtained from the genus *Solanum* (as *S. Lycopersicum*, *Melanzena*, and *tuberosum*). The heat used in preparing some of these for the table may, perhaps, volatilize or decompose any noxious matter which they contain. The generalizations of some late French writers (vide Trousseau and Pidoux, *Traité de Thérap.* t. i. p. 206,) with respect to the identity of the operation of the narcotic *Solanææ*, do not appear to me to be founded in fact. *Hyoscyamus*, *Belladonna*, and *Stramonium*, agree in causing dilatation of the pupil, and in producing delirium. *Hyoscyamus*, given in moderate doses, sometimes occasions sleep, though this has been denied. Tobacco depresses the muscular and vascular systems.

#### 1. HYOSCYAMUS NIGER, Linn. L. E. D.—COMMON HENBANE.

*Sex. Syst.* Pentandria, Monogynia.

(Folia et Semina, L.—Leaves, E.—Folia, D.)

[*Hyoscyami Folia*.—*Hyoscyami Semen*, U. S.]

HISTORY.—This plant is the *Ἰοσκίαμος μέλας* of Dioscorides. (Lib. iv. cap. 69.) The *Ἰοσκίαμος* of Hippocrates is probably *Hyoscyamus albus*. (Dierbach, *Arzneim. d. Hippokrates*, p. 233.)

BOTANY. *Gen. Char.*—*Calyx* tubular, five-cleft. *Corolla* funnel-shaped; limb spreading, oblique, five-lobed, unequal. *Stamina* five. *Stigma* capitate. *Capsule* ovate, compressed and furrowed on each side; apex circumscissile or operculate. (*Bot. Gall.*)

*Sp. Char.*—*Leaves* sinuated, clasping the stem. *Flowers* sessile (Smith).

*Root* spindle-shaped. *Stem* bushy. *Leaves* sessile, soft and pliant, sharply lobed, downy, and viscid, exhaling a powerful and oppressive odour, like all the rest of the plant. *Flowers* numerous from the bosoms of the crowded upper leaves, almost entirely sessile, of an elegant straw colour, pencilled with dark purple veins.

*Hab.*—Indigenous: waste ground, banks, and commons. Flowers in July.

There are two varieties of this species; one biennial, the other annual. Both are cultivated at Mitcham.

Botanists are not agreed as to the duration of *Hyoscyamus niger*. Linnæus, Andr. Murray, Persoon, Woodville, Lindley, and T. F. L. Nees von Esenbeck, Weyhe, Wolter, and Funke (editors of the *Beschreibung officineller Pflanzen*) declare it to be biennial; whereas Hudson, Withering, Smith, Hooker, Richard, and T. F. L. Nees von Esenbeck<sup>1</sup> and Ebermaier (*Handb. d. Med. Pharm. Botanik.*) state that it is annual. Loudon, Geiger, and J. L. Wheeler, on the other hand, regard it as both annual and biennial. Herbalists are well acquainted with two kinds of *Hyoscyamus*, grown for the London market, and distinguished as the annual and biennial varieties. On carefully comparing them I cannot discover any essential specific difference between them. The biennial variety is usually branched, and is a stronger plant than the annual one.

*Hyoscyamus agrestis* Kitaibel is distinguished from the common *Hyoscyamus niger* by the following characters:—it is annual, has a simple stem, its leaves are less deeply incised and less hairy, and its corolla is not so strongly marked with violet veins, or even is entirely yellow. The last-mentioned character belongs also to *Hyoscyamus pallidus* Kitaibel. It would appear, however, from the observations of Brandt and Ratzburg, (*Deutschlands phanerogamische Giftegewächse*, S. 60, Berlin, 1834,) who have carefully examined Kitaibel's original specimens in Willdenow's herbarium, that *H. agrestis* is only a variety,  $\beta$  minor of *Hyoscyamus niger*, and that *H. pallidus* belongs also to the same species. *Hyoscyamus albus* has petiolated leaves, which are subcordate, ovate, and bluntly toothed.

Since the two preceding paragraphs were in type, I have received a letter from Sir W. J. Hooker, in which he states that he has native specimens of *H. agrestis* and *pallidus* in his Herbarium; and he adds, "I have no hesitation in saying that they are identical with *H. niger*; and *niger* ought to be marked 'annual or biennial.'"

<sup>1</sup> It is somewhat remarkable, that in the two works above quoted, of which T. F. L. Nees von Esenbeck was part editor, the statements with regard to the duration of this plant should be so discordant.



DESCRIPTION.—Mr. Houlton (*Lond. Med. Gaz.* vol. vii. p. 509,) says the plant is fit for medicinal purposes in the second year only of its duration. It should be gathered when in full flower. The herb (*herba hyoscyami*), when fresh, has a strong, unpleasant narcotic odour, a mucilaginous, slightly acrid taste, and a clammy feel. By drying it almost wholly loses these properties. One hundred pounds of the fresh herb yield about fourteen pounds when dried. (Martius, *Pharmakogn.*) The leaves (*folia hyoscyami*), when fresh are pale, dull green. The seeds (*semina hyoscyami*) are small, compressed, uniform, roundish, finely dotted, of a yellowish gray colour, and have the odour of the plant, and an oleaginous, bitter taste.

COMPOSITION.—The seeds of *Hyoscyamus niger* were analyzed in 1816, by Kirchof (*Berl. Jahrb.* Bd. xvii. S. 144); and, in 1820, by Brandes. (*Berl. Jahrb.* Bd. xxi. S. 280.) The extract of the herb was analyzed by Lindbergson. (Gmelin, *Handb. d. Chem.* ii. 1303.)

## Brandes's Analysis.

Fatty oil.....	24.2
Waxy fat.....	1.4
Resin insoluble in ether.....	3.0
Malate of hyoscyamia with malates of lime and magnesia, and a salt of potash and ammonia.....	6.3
Uncrystallizable sugar.....	a trace
Gum 1.2, Bassorin 2.4, and Starch 1.5.....	5.1
Albumen.....	4.5
Vegeto-animal matter.....	3.4
Malate, phosphate, sulphate, and muriate of potash.....	0.4
Malates of lime and magnesia.....	0.6
Phosphates of lime and magnesia.....	2.4
Woody fibre.....	26.0
Water.....	24.1

Seeds of *Hyoscyamus*.....101.4

The ashes contained carbonate, phosphate, sulphate, and muriate of potash, carbonate and much phosphate of lime, much silica, manganese, iron, and minute traces of copper.

## Lindbergson's Analysis.

Narcotic extractive soluble in water and alcohol.  
Bitter extractive.  
Gummy extractive.  
Malates, phosphates, sulphates, and muriates of magnesia.

## Extract of the herb.

1. **HYOSCYAMIA OR HYOSCYAMINA.**—This term has been applied to a vegetable alkali procured from the seeds and herbs of *Hyoscyamus niger* by Brandes, (*Pharm. Central-Blatt für 1822*, S. 497,) whose statements have been confirmed by Geiger and Hesse, as well as by Mein. (*Journ. de Pharm.* t. xx. p. 87, and *Pharm. Central-Blatt für 1835*, S. 83.) However, Chevallier, as well as Brault and Poggiale, (*Journ. de Pharm.* t. xxi. p. 134,) have failed to procure it. The properties assigned to it are almost identical with those of Atropina, from which it differs in being more soluble in water. It is crystallizable, has an acrid taste, and, when volatilized, yields ammonia. Reisinger (*Arch. Gén. de Méd.* t. xviii. p. 301) says, that a drop of a solution of one grain of this substance in ten grains of water caused dilatation of the pupil, but did not give rise to irritation of the eye. A solution of double this strength acted as an irritant.

2. **EMPYREUMATIC OIL OF HENBANE (*Pyro-Hyoscyamia*?).**—This was obtained by Dr. Morries (*Ed. Med. Surg. Journ.* vol. xxxix. p. 379) by the destructive distillation of henbane. Its chemical properties are identical with those of the empyreumatic oil of foxglove. It proved a powerful narcotic poison.

**PHYSIOLOGICAL EFFECTS.** *a. On Vegetables.*—Water holding in solution extract of henbane proved poisonous to *Hyoscyamus niger*.<sup>1</sup>

*β. On Animals.*—Its effects on herbivorous animals are slight. Given to horses in large quantities, it causes merely dilatation of the pupils, spasmodic movements of the lips, and frequency of pulse.<sup>2</sup> On dogs its effects appear to be analogous to those on man. (Orfila, *Tox. Gén.*) It does not cause any local irritation. Its constitutional effects are, dilatation of pupil, weakness of the posterior extremities, staggering, and insensibility.

*γ. On Man.*—In small and repeated doses henbane has a sedative and tranquillizing effect. This is especially observed in persons suffering with great

<sup>1</sup> Macaire, quoted by De Candolle, *Phys. Vég.* p. 1354; also Miguel, quoted in Meyen's Report on the Progress of Veget. Physiology during the year 1837, translated by W. Francis, p. 139.

<sup>2</sup> Moiroud, *Pharm. Vét.* p. 349; see also Viborg, in Wibmer's *Wirk. d. Arn. u. Gift.* Bd. iii. S. 156.



nervous irritability, and with a too active condition of the sensorial functions. In such it frequently causes calmness, with a tendency to sleep. It frequently allays irritation and preternatural sensibility existing in any organ. It does not quicken the pulse, check secretion, or cause constipation. *Large doses* sometimes induce quietude and sleep. Fouquier, (*Arch. Gén. de Méd.* t. i. p. 297,) however, denies this. He says, henbane causes headache, giddiness, dimness of sight, dilatation of pupil, a greater or less tendency to sleep, and painful delirium. In some cases these symptoms are followed by thirst, nausea, griping, and either purging or constipation; and, in a few instances, febrile heat and irritation of skin are induced. But I have frequently seen sleep follow its use, though its hypnotic properties are neither constant nor powerful. It more frequently fails to occasion sleep in those accustomed to the use of opium. Very large doses are apt to be followed by delirium rather than by sleep. Its power of alleviating pain and allaying spasm is greatly inferior to that of opium. *In poisonous doses* it causes loss of speech, dilatation of pupil, disturbance of vision, distortion of face, coma, and delirium (the *typhomania* of some authors) generally of the unmanageable, sometimes of the furious kind, and paralysis, occasionally with convulsive movements. Irritation of the stomach and bowels (manifested by nausea, vomiting, pain, and purging) is occasionally induced.<sup>1</sup> One author (Hühnerwolf, quoted by Wibmer, *op. cit.* S. 148) says hyoscyamus renders the hair gray, while another<sup>2</sup> states that it darkens it.

In its operation on the body, henbane presents several peculiarities. From opium it is distinguished by the sedative, rather than stimulant, effects of small doses; by its not confining the bowels; by the dimness of sight; and, when swallowed in large doses, by its producing dilatation of the pupil, and by its being more apt to occasion delirium. The last-mentioned peculiarity is noticed by Dr. Cullen. (*Mat. Med.* ii. p. 272.) Furthermore, in some individuals, opium causes headache, and other distressing symptoms, which henbane is not so apt to produce. From belladonna and stramonium, to which it is in several respects closely allied, it is distinguished by the very rare occurrence of any symptoms of gastro-intestinal irritation after the ingestion of large doses of it. Sundelin (*Handb. d. sp. Heilm.* Bd. i. S. 463, 3<sup>te</sup> Aufl.) says, "that it wants the resolvent operation and the stimulant influence over the vascular system which belladonna possesses." Vogt (*Lehrb. d. Pharmakod.* Bd. i. S. 170, 2<sup>te</sup> Aufl.) ranks hyoscyamus between belladonna and hydrocyanic acid. But, with every respect for the opinions of so profound a writer, I cannot concur in the propriety of this arrangement. I have never seen, from the use of hydrocyanic acid, the same tranquillizing and soothing influence over the mind and external senses which I have repeatedly witnessed from the use of small doses of hyoscyamus; and the effects of poisonous doses of these two agents more strikingly display the difference of their operation; for, while hydrocyanic acid causes insensibility and convulsion, henbane produces delirium and paralysis.

Uses.—Hyoscyamus is said to alleviate pain and irritation in various organs, to promote sleep, to procure quietude, and to obviate spasm. For any of these objects it is greatly inferior to, and less confidently to be relied on than, opium. Yet it is, on various occasions, preferred to the latter; as where opium causes headache, or other distressing cerebral symptoms, or where it occasions constipation. Again, the stimulant influence of small doses of opium over the vascular system, and the tendency of this narcotic to lock up the secretions and excretions, form objections to its use in the maladies of children; in such, therefore, hyoscyamus is frequently preferred. Fouquier, whose observations with respect to the effects of henbane I have already had occasion to refer to, can

<sup>1</sup> For abstracts of cases illustrative of these effects, consult Orfila, *Toxicol. Gén.* and Wibmer, *Wirk. d. Arznetm. u. Gift.*

<sup>2</sup> Most, *Encykl. der gesamm. med. u. Chir. Praxis:* art. *Cosmetica* Bd. i. S. 498. Leipzig, 1836.



find in this narcotic no useful property; and he thinks it ought to be banished from the *Materia Medica*. (*Op. cit.* p. 312.)

The following are the principal purposes for which it is ordinarily employed in this country:

1. *As an anodyne* where opium disagrees, or is from any circumstance objectionable. It may be used in neuralgia, rheumatism, gout, periostitis, the milk abscess, painful affections of the urino-genital organs, scirrhus, and carcinoma.

2. *As a soporific* it is available in sleeplessness, accompanied with great restlessness and mental irritability, and where opium, from its stimulant or other properties, proves injurious. Sometimes, where it fails to cause actual sleep, it proves highly serviceable by producing a calm and tranquil state conducive to the well-doing and comfort of the patient.

3. *As an antispasmodic* it occasionally proves serviceable in spasmodic affections of the organs of respiration (*e. g.* spasmodic asthma), and of the urino-genital apparatus (*e. g.* spasmodic stricture and spasm of the sphincter vesicæ). Notwithstanding the favourable reports of Storck to the contrary, it is rarely calculated to be of any service in epilepsy.

4. *As a sedative*, to allay irritation and preternatural sensibility. In troublesome cough it sometimes proves useful by dulling the sensibility of the bronchial membrane to the influence of the cold air. In nephritic and vesical irritation, and in gonorrhœa, it is sometimes a useful substitute for opium. In the irritation of teething it is valuable from its power of relieving pain and convulsion. Its advantages over opium, in the disorders of children, have been already pointed out.

5. *To dilate the pupil* the extract may be used as a substitute for extract of belladonna, than which it is less powerful.

6. *As a topical sedative and anodyne*, fomentations of the herb, or the extract, are sometimes applied to painful glandular swellings, irritable ulcers, hemorrhoids, and parts affected with neuralgia. In irritation of the rectum or bladder it is sometimes used per anum.

**ADMINISTRATION.**—The *powder* of the leaves is rarely employed: the dose is from three to ten grains. The *extract* and *tincture* are the preparations commonly used.

**ANTIDOTES.**—The treatment of a case of poisoning by henbane is the same as that by opium.

1. **TINCTURA HYOSCYAMI, L. E. D. (U. S.)** *Tincture of Henbane.*—(Henbane leaves, dried, [in moderately fine powder, *E.*] ℥v. [℥iv. U. S.]; Proof Spirit, [Diluted Alcohol, U. S.] Oij. [*wine measure*, D.] Macerate for fourteen [seven, *D.*] days, and strain. “This tincture is best prepared by the process of percolation, as directed for tincture of Capsicum; but it may also be obtained, though with greater loss, by the process of digestion,” *E.*)—Dose, ℥ss. to ℥ij.

**SUCCUS HYOSCYAMI.**—The *Preserved Juice of Henbane* (see vol. i. p. 325) may be substituted for the tincture. Mr. Bentley informs me that he obtained the following quantities of juice from henbane leaves:

			<i>Imperial Quarts of Juice.</i>
July 24th.	3 cwt. of leaves.....		42
" 25th.	2 cwt. " .....	"	22
Aug. 3d.	2 cwt. " .....	"	25

2. **EXTRACTUM HYOSCYAMI, L. E. (U. S.);** *Succus spissatus Hyoscyami, D.* *Extract of Henbane.*—(Fresh Henbane leaves, lb. j. Bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence, *L.*—“This extract is to be prepared from the fresh leaves of hyoscyamus by any of the processes directed for Extract of Conium,” *E.*—The *Dublin College* orders it to be prepared from the fresh plant of henbane, in the manner directed for the *Succus spissatus Aconiti.*)—The average produce of extract is stated by Mr. Brande (*Dict. Mat. Med.* p. 312)



to be from 4 to 5 lbs. from 112 lbs. of the fresh herb. Mr. Squire (*Pharmaceutical Transactions*, p. 97) states the following as the products (obtained by a common screw press and water-bath) from 112 lbs. of matured hyoscyamus, gathered dry and in good order; the season, however, being rather more rainy than the average:

	Weight. lbs.	Yielded of	
		Juice.	Yielded of Extract.
		lbs.	lbs. oz.
The leaves, the very fine summits of the stalks, the } flowers and seed-vessels already formed, weighed }	70	42	— 4 10
The stalks weighed .....	35	17½	— 0 15
Waste leaves and dirt .....	3½	—	—
Lost by evaporation, during the two hours occupied } by picking .....	3½	—	—
	112	59½	— 5 9

The quality of the extract met with in the shops is extremely variable. This arises principally from the unequal care with which it has been prepared. The dose is from gr. v. to ℥j. Occasionally very much larger doses have been taken without any injurious effects. It is said to be a valuable addition to the compound extract of colocynth, whose operation it renders milder, though not less efficacious. It is sometimes used as a topical application to inflamed or tender parts: thus, alone, or in the form of ointment, it is applied to painful hemorrhoids; spread on linen it forms a plaster, which has been used in neuralgia, rheumatic pains, painful glandular swellings, &c.

My friend Dr. William Lobb and nearly a dozen other persons in 1841 experienced symptoms like those of poisoning by belladonna, from the employment of several grains of an extract sold by a most respectable country chemist as that of hyoscyamus. The greater part of the extract sold by this chemist had been most carefully prepared by himself, but not having made sufficient for the year's consumption, he purchased some in London, and the extract used on these occasions *might have been* that which was bought. The extract employed had an unusually greenish colour, and the hyoscyamus odour. The effects produced were difficulty of swallowing, a sensation as if the parts about the throat had been powdered with tow dust, impaired vision, eyes bloodshot, pupils dilated, feeling of suffocation, strangury, cessation of cough and expectoration which had been previously troublesome. The vision was greatly improved by the use of a magnifier. The third day the symptoms had disappeared, but great prostration of strength supervened. In some of the patients an eruption like that of scarlatina appeared, with intense redness of the palms of the hands.

## 2. AT'ROPA BELLADON'NA, Linn. L. E. D.—COMMON DWALE; DEADLY NIGHTSHADE.

Sex. Syst. Pentandria, Monogynia.

(Folia, L.—Leaves, E.—Folia et radix, D.)

(Belladonna. The Leaves, U. S.)

**HISTORY.**—Some persons have suggested that this plant may be the *μανδραγόρας* of Theophrastus, (*Hist. Pl.* lib. vi. cap. 2,) the fruit of which, this ancient botanist says, "is black, racemed, and, to the taste, vinous." But the plant noticed under this name by Dioscorides, (lib. iv. cap. 76,) had yellow fruit, and is universally admitted to be the *Mandragora officinalis*. The earliest undoubted notice of belladonna occurs in the work of Tragus (A. D. 1532), who calls it *Solanum hortense nigrum*. (Bauhin, *Pinax*.) It has been supposed that it was this plant which produced such remarkable and fatal effects on the Roman soldiers, during their retreat from the Parthians. (See Plutarch's *Life of Antony*.) Buchanan (*Rerum Scot. Hist.* lib. vii.) relates, that the Scots mixed the juice of this plant with the bread and drink, which, by their truce, they were to supply the Danes, which so intoxicated them, that the Scots killed the greatest part of Sweno's army while asleep. Shakspeare (*Macbeth*, Act i. Scene 3d) is supposed to allude to it under the name of the *insane root*.

**BOTANY. Gen. Char.**—*Calyx* campanulate, five-cleft. *Corolla* campanulate, twice the length of the calyx, five-lobed, equal. *Filaments* five, filiform. *Berry* globose, seated in the calyx. (*Bot. Gall.*)



**Sp. Char.**—*Stem* herbaceous. *Leaves* ovate, undivided. *Flowers* solitary (Smith).

*Root* fleshy, creeping. Whole plant fetid when bruised, of a dark and lurid aspect, indicative of its deadly narcotic quality. *Stems* herbaceous, three feet high, round, branched, leafy, slightly downy. *Leaves* lateral, mostly two together of unequal size, ovate, acute, entire, smooth. *Flowers* imperfectly axillary, solitary, stalked, drooping, dark full purple in the border, paler downwards, about an inch long. *Berry* of a shining violet black, the size of a small cherry, sweetish, and not nauseous (Smith).

**Hab.**—Indigenous: hedges and waste ground, on a calcareous soil. Flowers in June.

**DESCRIPTION.**—The root (*radix belladonnae*), when fresh, is one or more inches thick, and sometimes a foot or more long: it is branching, fleshy, internally white, externally grayish or brownish-white. Its taste is slight, sweetish: its odour is feeble. It may be collected in the autumn or early in the spring. The flowering stems (*herba belladonnae*) are collected in June or July; they are then deprived of leaves (*folia belladonnae*), which are to be carefully dried. The leaves, when fresh, have a feeble, bitterish, sub-acid taste.

**COMPOSITION.**—The leaves of belladonna were analyzed, in 1808, by Melandri (*Ann. de Chim.* lxx. 222); the expressed juice, in 1809, by Vauquelin (*Ann. de Chim.* lxxii. 53); and the dried herb, in 1819, by Brandes. (Gmelin's *Handb. d. Chem.* ii. 1305.) Besides these there have been several less complete examinations of this plant by other chemists, which have yielded more or less interesting results.

*Brandes's Analysis.*

Supermalate of Atropia.....	1.51
Pseudo-toxin with malate of atropia and potash salts.....	16.05
Wax.....	0.70
Chlorophylle.....	5.24
Phytocolla (a nitrogenous substance insoluble in alcohol).....	6.00
Gum.....	8.33
Starch.....	1.25
Albumen.....	10.70
Lignin.....	13.70
Salts.....	7.47
Water.....	25.50
Loss.....	2.05
Dried herb of Belladonna.....	100.00

1. **ATROPIA** (*Atropina* seu *Atropium*).—The most improved processes for extracting this vegetable alkali are those of Mein (*Pharm. Central-Blatt für 1833*, S. 771) and Thomson (*Org. Chem.* p. 274), and Richter. (*Pharm. Central-Blatt für 1837*, S. 613.) By the first, 12 oz. of belladonna root yielded not quite 12 grains of pure atropia. This vegetable alkali crystallizes in transparent silky prisms. It is odourless, soluble in alcohol, ether, and very slightly so in water. The solution is bitter, restores the blue colour of reddened litmus paper, is precipitated white by infusion of nutgalls, yellow by chloride of platinum, and yellow by chloride of gold: the precipitate caused by the latter assumes a crystalline appearance. At a temperature above 212° F. it is converted into vapour, which is deposited like a coat of varnish. Heated in the open air, it readily becomes empyreumatic. It dissolves in acids, with which it unites to form salts. The *hydrochlorate* and *sulphate* are crystallizable. (Geiger and Hesse, *Pharm. Central-Blatt für 1825*, S. 81.) Three analyses of it have been made by Liebig: according to the latest, (*Ann. d. Pharm. Bd. vii.*) its composition is  $C^{34} H^{23} O^6$ ; hence its atomic weight is 289. (*Ann. d. Pharm. Bd. vii.*) Atropia is a powerful poison. An imponderable quantity is sufficient, when applied to the eye, to cause dilatation of the pupil. Given to dogs and cats it caused vomiting, dilatation of the pupil, and stupor. A tenth of a grain caused, in the human subject, dryness of the mouth, constriction of the throat, difficulty of swallowing, stupor, dilatation of pupil, and headache. (*Ann. d. Pharm. Bd. vii. für 1833*, S. 775.)

2. **PSEUDOTOXIN.**—A substance obtained by Brandes from the watery extract of belladonna. It is brownish-yellow, soluble in water, insoluble in absolute alcohol and ether, is coloured green by the salts of iron, and is totally precipitated from its watery solution by the salts of lead and by tincture of galls. (Gmelin, *Handb. d. Chem.* ii. 1032.)

3. **BELLADONNIN.**—Under this name, Luebeckind (*Pharm. Central-Blatt für 1839*, S. 448) has described a volatile vegetable alkali, which, he says, is distinct from atropia. It is crystallizable, and has an ammoniacal odour. It consists of carbon 28.5, hydrogen 22.4, nitrogen 32.1, oxygen 17.0. The crystals contain three equivalents of water. Two grains caused extreme heat in the throat and constriction of the larynx.



4. **ATROPIC ACID.**—This name has been given by Richter (*Pharm. Central-Blatt für 1837*, S. 614) to a volatile, crystallizable acid, distinguished from benzoic acid by its not precipitating the salts of iron.

**PHYSIOLOGICAL EFFECTS.** *a. On Vegetables.*—An aqueous solution of extract of belladonna is poisonous to plants.<sup>1</sup>

*β. On Animals generally.*—Belladonna proves poisonous to animals and birds: but much less so to herbivorous than to carnivorous animals. Eight pounds (Troy) of the leaves have been eaten by a horse without any ill effects. (Moiroud, *Pharm. Vét.* p. 344.) Mr. Anderson tells me that the blackbirds eat the seeds at the Chelsea Garden. A pound of ripe berries has been given to an ass with very little effect. (Viborg, in Wibmer, *Wirk. d. Arz. u. Gift.* Bd. i. S. 366.) Given to dogs, belladonna causes dilatation of pupil, plaintive cries, efforts to vomit, weakness of the posterior extremities, staggering, frequent pulse, a state like intoxication, and death. (Orfila, *Toxicol. Gén.*) Forty or fifty grains of the watery extract, injected into the jugular vein of dogs, have proved fatal. (Orfila, *Toxicol. Gén.*) Flourens (*Rech. Expér.* 1824,) thinks that the *tubercula quadrigemina* are the parts of the nervous centres on which this poison specifically acts. His inferences were drawn from experiments made on birds. The topical action of belladonna is that of an acrid, though not a very violent one. (Orfila, *supra cit.*)

*γ. On Man.*—In the first degree of its operation, belladonna diminishes sensibility and irritability. This effect (called by some *sedative*) is scarcely obvious in the healthy organism, but is well seen in morbid states, when these properties are preternaturally increased. A very frequent and sometimes the earliest obvious effect of belladonna is dryness of the mouth and throat, frequently attended with thirst. The other secretions and the circulation are oftentimes not affected, though occasionally they are augmented. Mr. Bailey (*Observ. relative to the Use of Belladonna*, p. 9, 1818,) “asserts that belladonna affects neither the stomach nor bowels, nor any of the secretions nor excretions, those of the salivary glands excepted.” The asserted influence of belladonna over the organic functions is said to be shown by its power of inducing, in some cases, resolution of swellings and tumours of various kinds, as will be presently noticed.

In the second degree of its operation belladonna manifests, both in healthy and morbid conditions, its remarkable influence over the cerebro-spinal system. It causes dilatation of the pupils, obscurity of vision, or absolute blindness (amaurosis), visual illusions, suffused eyes, occasionally disturbance of hearing (as singing in the ears, &c.) numbness of the face, confusion of head, giddiness, and delirium, which at times resembles intoxication, and may be combined with or followed by sopor. These symptoms are usually preceded by a febrile condition, attended with a remarkable affection of the mouth, throat, and adjacent parts. Besides dryness of these parts, it causes difficulty of deglutition and of articulation, a feeling of constriction about the throat, nausea, and sometimes actual vomiting and, now and then, swelling and redness of the face. The pulse is usually hurried and small. The cutaneous, renal, and mucous secretions are frequently augmented. An exanthematous eruption, like that of scarlet fever, has been noticed; and irritation of the urinary organs has in some instances occurred. (Jolly, *Nouv. Med.* 1828, iii.; and *Lancet*, 1828-9, vol. i. p. 45.)

In some cases very severe effects have been induced by the application of the extract to abraded surfaces.<sup>2</sup> The continued application of it to the sound skin has also been attended with similar effects. (Bacot, *Lond. Med. and Phys. Journ.* vol. xxiv. p. 383, 1810.)

<sup>1</sup> Marcet, *Ann. Chim. et Phys.* vol. xxix. p. 200; and Schübler and Zeller, *Schweigger's Journ. f. d. Chem.* 1827, B. 50, S. 54-66.

<sup>2</sup> Wade, *Med. and Phys. Journ.* vol. lvii. p. 286, 1827; Davies, *Lectures on Diseases of the Lungs and Heart*, p. 496.



*In the third degree* of its operation, belladonna produces effects similar to the preceding, but in a more violent form. The following are the symptoms experienced by above 150 soldiers, who were poisoned by the berries of belladonna, which were gathered at Pirna near Dresden:—"Dilatation and immobility of the pupil; almost complete insensibility of the eye to the presence of external objects, or at least confused vision; injection of the conjunctiva with a bluish blood; protrusion of the eye, which in some appeared as if it were dull, and in others ardent and furious; dryness of the lips, tongue, palate, and throat; deglutition difficult or even impossible; nausea not followed by vomiting; feeling of weakness, lipothymia, syncope; difficulty or impossibility of standing; frequent bending forward of the trunk; continual motion of the hands and fingers; gay delirium, with a vacant smile; aphonia or confused sounds, uttered with pain; probably ineffectual desires of going to stool; gradual restoration to health and reason, without any recollection of the preceding state." (Gaultier de Claubry, in Orfila's *Toxicol. Gén.*)

In comparing the operation of belladonna with that of other cerebro-spinants (narcotics, *auct.*), the most remarkable symptoms which attract our attention are the dilatation of the pupils, with insensibility of the irides to light, disturbance of vision, diminished feeling, giddiness, staggering, the delirium (extravagant, pleasing or furious), followed by sopor, and the remarkable affection of the mouth and throat (dryness of the throat, difficulty of deglutition and of articulation). Convulsions are rare, and, when they occur, are slight. Lethargy or sopor occurs subsequently to the delirium. Local irritation is not well-marked.

These characters distinguish the effects of belladonna from those of any other substance, except henbane (see p. 299), stramonium (see p. 309), and perhaps from some other solanaceous species.

When applied to the eyebrow, belladonna causes dilatation of the pupil, without necessarily affecting the other eye or disturbing vision. Segalas (*Lancet*, 1826-27, vol. xii. p. 170.) has rendered it probable that absorption or imbibition is essential to this effect. But the action on the iris depends, according to Müller, (*Physiology*, vol. i. p. 630,) not on the operation of the belladonna on the central organs of the nervous system, but on its topical, paralyzing influence on the ciliary nerves. When, however, belladonna is swallowed, it is obvious that the irides can become affected through the general system only, and in this case the dilatation of the pupil is accompanied with disturbance of vision.<sup>1</sup> The pneumogastric nerve is obviously concerned in producing the affection of the mouth and the difficulty of deglutition and articulation.

The disorder of the intellect and of the external senses caused by belladonna proves that the influence of this agent is not limited to the excito-motory system, but is extended to those portions of the nervous centres which are the seat of the intellect and of sensibility.

Uses.—Belladonna has been employed to allay pain and nervous irritation (*erethismus nervosus* of some authors); to diminish the sensibility of the retina to the impression of light; to produce dilatation of the pupil; to counteract that condition of brain which is accompanied with contraction of the pupil; and to lessen rigidity and spasmodic contraction of muscular fibres. These uses obviously arise out of the ascertained physiological effects of the remedy. There are others, however, which may be regarded as altogether empirical: such as its employment to resolve or discuss scirrhus tumours.

The indications and contra-indications for its use are not sufficiently established to induce us to place much confidence in them. My own experience leads me to believe that it is not a remedy fitted for plethoric constitutions, or for febrile and acute inflammatory cases; and I am not disposed to admit the

<sup>1</sup> For some interesting observations on the associated functions of the retina and iris, consult Grainger's *Observations on the Structure and Functions of the Spinal Cord*, p. 72, et seq.



observations of Dr. Graves, hereafter to be mentioned, as offering any valid objections to these statements.

1. *To allay pain and nervous irritation.*—As an anodyne in most internal pains no remedy hitherto proposed is equal to opium; but this agent totally fails us in many of those external pains known as *neuralgia*, *prosopalgia*, or *tic douloureux*. In such, belladonna occasionally succeeds in abating, sometimes in completely removing, pain; while it totally fails to give relief in the internal pains for which experience has found opium so efficacious. It is remarkable, therefore, that while both these cerebro-spinants (narcotics, *auctor.*) agree in lessening pain, they totally disagree as to the cases in which they succeed, and for which they are individually applicable. In the treatment of neuralgia, belladonna is employed both internally and externally. I believe that, to be successful, it requires, in many cases, to be persevered in until dryness of the throat, dilatation of pupil, and some disorder of vision, are produced. Just as in many diseases for which mercury has been found a most efficient remedy, it is necessary to continue the use of this mineral until the mouth be affected, and often even to use it for some time afterwards. Of the success of belladonna in the treatment of neuralgia, we have abundant evidence in the published cases of Mr. Bailey, (*Observ. relat. to the Use of Belladon. in painful Disord. of the Head and Face*, 1818,) and of several other practitioners. (Bayle, *Bibl. Thérap.* t. ii.) My own experience of the use of this remedy leads me to regard it as very much inferior to aconite as a local remedy for this disease.

Besides neuralgia there are many other painful affections against which belladonna is used as a local anodyne. Such are arthritic pains, painful ulcers, glandular enlargements which are tender to the touch, &c. Dr. Osborne (*Lond. Med. Gaz.* Feb. 21, 1840,) says, that given internally it causes an immediate cessation of the migratory or flying pains of rheumatism, without producing any effect on the fixed pains.

2. *As an antispasmodic.*—To relieve rigidity and spasmodic contraction of muscular fibres, belladonna sometimes proves serviceable as a topical remedy. In *rigidity of the os uteri*, during lingering labours or puerperal convulsions, the extract or an ointment of belladonna (see *unguentum belladonnae*) has been applied to the part by way of friction. Though the practice has been lauded by Chaussier, (*Consid. sur les Convuls. qui attaquent les Femmes enceintes.*, 2d. ed. 1824,) and adopted by Velpeau (*Traité compl. des Accouchem.*), Conquest, (*Outlines of Midwifery*), and others, yet it has not found much favour with British practitioners. It cannot be regarded as a substitute for, but only an adjuvant to, depletion; and its use is not devoid of danger: for, not to insist on the possibility of absorption, and the consequent injurious effects therefrom, it is obvious that the long-continued friction of the tender womb, and the removal of the lubricating mucus, may dispose to inflammation. In *spasmodic stricture of the urethra*, and of the *sphincters of the bladder and rectum*, and in *spasmodic contraction of the uterus*, the topical use of the extract (smearred on a bougie, applied to the perineum or other parts, or employed by way of a clyster) has in some cases appeared to give relief. (*Brit. and For. Med. Rev.* vol. ii. p. 261.) In *strangulated hernia* it has been employed to produce relaxation of the abdominal muscles.<sup>1</sup>

In a case of *angina pectoris*, unconnected with organic disease, the application of a belladonna plaster to the chest (before the ulcerations caused by tartar emetic ointment had healed) produced alarming signs of poisoning; but when these had subsided, all symptoms of the angina had totally disappeared. (Davies, *Lect. on Diseases of the Lungs and Heart*, p. 496.)

Considerable relief has been gained in several cases of *hooping-cough* by the

<sup>1</sup> Van Looth, Köhler, and Pages, quoted by Bayle, *Bibl. Thérap.* t. ii., and *Brit. and For. Med. Rev.* vol. ii. p. 262-3.



use of belladonna.<sup>1</sup> Its occasional efficacy depends in part, probably, on its lessening the necessity of respiration, (Laennec, *Treat. on Dis. of the Chest*, by Forbes, pp. 77 and 99,) as well also on its power of obviating spasm of the bronchial tubes, and of decreasing the susceptibility of the bronchial membrane to the influence of the exciting causes of the paroxysms. But like all other vaunted specifics for this peculiar disease, it frequently fails to give the least relief.

3. *In Maladies of the Eyes.*—Belladonna is applied to the eye for two purposes: the first, and the most common, is to dilate the pupil; the other is to diminish the preternatural sensibility of the retina to the impression of light. *Dilatation of the pupil* is sometimes produced, in certain diseases of the eye, in order to enable us to examine the condition of the refractive humours, and thereby to ascertain the nature and extent of the malady; as in cases of incipient cataract, which might otherwise be occasionally confounded with glaucoma or amaurosis. In the operation of cataract by solution or absorption (*keratonyxis*), the full dilatation of the pupil by belladonna is essential. (Lawrence, *Lect. in Lancet*, for Sept. 9, 1826.) In *iritis*, dilatation of the pupil is important, in order to prevent, or in recent cases to rupture, adhesions of the uvea to the capsule of the crystalline lens. Some surgeons consider it an objectionable remedy during the early stage of the disease. In *prolapsus iridis* benefit is, under some circumstances, gained by the use of belladonna; as, where there is opacity of the cornea covering the pupil, the dilatation of the aperture, so as to get its circumference beyond the opaque spot, is attended with an improvement of vision. These are some of the cases in which dilatation of the pupil by belladonna is advisable. It is usually effected by applying the extract (see *extractum belladonnae*) to the parts around the eye, or to the conjunctiva. The dilatation usually takes place within a few minutes, and sometimes continues for twenty-four hours.

Belladonna is sometimes employed in inflammatory and other affections of the eye, to diminish the morbid sensibility of this organ to the influence of light (Lisfranc, *Rev. Med.* t. i. 1826, p. 17; and t. ii. p. 384.)

4. *As a resolvent or discutient.*—In enlargement and induration of the lymphatic glands, in scirrhus and cancer (or diseases which have been supposed to be such), belladonna has gained no slight repute from its supposed resolvent or discutient properties. That it may give relief by its anodyne powers we can easily understand, but that it has any real resolvent or discutient properties in the diseases just enumerated, may be reasonably doubted, notwithstanding the favourable reports of Gataker, (*Observ. on the Intern. Use of the Solanum*, 1757,) Cullen, (*Mat. Med.*), Blackett, (*Essay on the Use of Atropa Belladonna*, 1826,) and others. (See Bayle, *Bibl. Théor.* t. ii.) Bromfield (*Account of the English Nightshades*, 1757,) and others have reported unfavourably of it, and no one, I think, now places any reliance on it.

5. *As a prophylactic against Scarlatina.*—The introduction of belladonna into practice as a preventive of scarlet fever, is owing to the absurd homœopathic axiom of "*similia similibus curantur*:" for as this plant gives rise to an affection of the throat, and sometimes to a scarlet rash on the skin, its power of guarding the system against the reception of scarlet fever has been assumed; and the assumption has been endeavoured to be established by an appeal to experience. Bayle (*Bibl. Thérap.* t. ii. p. 504,) has collected from various publications 2,027 cases of persons who took this medicine, and were exposed to the contagion; of these 1,948 escaped. Oppenheim (*Lond. Med. Gaz.* vol. xiii. p. 814,) gave it to 1,200 soldiers, and only twelve became affected. To the authorities here referred to may be added Hufeland (*Lancet*, May 2, 1829,) and Koreff, (*Lond. Med. Gaz.* vol. iv. p. 297,) who admit, from their own personal observations, the efficacy of the remedy, though they have not specified the number of cases in which they have tried it. But bearing in mind the well-known capriciousness evinced by scarlet fever (as indeed by other contagious

<sup>1</sup> See the Observations of Schaeffer and Wetzler, of Meglin, and of Raisin, quoted by Bayle, *Bibl. Théor.* t. ii.



disorders) in regard to the subjects of its attacks, and the large number of those who, though exposed to its influence, escape, the best evidence hitherto adduced in favour of the notion must be admitted to be inconclusive. While, therefore, the facts brought forward in favour of the existence of this prophylactic power are only negative, those which can be adduced against it are positive. For I conceive twenty cases of failure are more conclusive against the opinion here referred to, than one thousand of non-occurrence are in favour of it. Now Lehman, (Bayle, *Bibl. Thérap.* t. ii. p. 417,) Barth, (*Ibid.*) Wendt, (Rust and Casper's *Krit. Repert.* Bd. xxii. S. 27,) Muhrbeck, (Rust's *Magaz.* Bd. xxiv. S. 495.) Hoffmann, (*Ibid.* Bd. xxv. S. 115.) Bock, (*Ibid.* S. 80,) and many others that I could refer to, declare it has failed in their hands to evince its prophylactic powers. In this country we have no extended series of observations to quote; but the cases which I am acquainted with are decidedly against the efficacy of the remedy. A remarkable failure is mentioned by Dr. Sigmond, (*Lancet*, 1836-7, vol. ii. p. 78,) of a family of eleven persons who took the supposed specific, yet every individual contracted the disease.

6. *In Fever, with contraction of the pupil.*—Dr. Graves (*Dubl. Journ. of Med. Science*, July 1, 1838,) has recently proposed the use of belladonna in those cases of fever with cerebral disease which are attended with contraction of the pupil. It is not unreasonable, he observes, "to suppose that the state of the brain which accompanies dilatation of the pupil is different from that which accompanies contraction; and if belladonna has an effect in producing that cerebral state which is attended with dilatation, it is not going too far to infer, that its administration may do much towards counteracting the opposite condition; neither is it unphysiological to conclude, that if a remedy be capable of counteracting, or preventing one very remarkable effect of a certain morbid state of the brain, it may also counteract other symptoms connected with the same condition." This line of argument, it must be admitted, is ingenious and plausible, and is supported by reference to several apparently successful cases treated on the principles here laid down. But I would observe, if the above reason be valid, opium should be serviceable in cerebral diseases attended with dilatation of pupil, since it causes contraction of this aperture. Now this is in direct opposition to our every-day experience of the uses of this important narcotic.

7. *In other diseases.*—Cruveilhier (*Lancet*, 1828-9, vol. i. p. 520,) has found belladonna-smoking relieve some cases of *phthisis*. The fresh leaves were infused in a strong solution of opium, and then dried like tobacco: the patients began by smoking two pipes a day, and the quantity was gradually increased to six pipes. Perhaps this practice would be beneficial in spasmodic asthma and old catarrhs. In *hydrophobia*, notwithstanding the asserted prophylactic powers of this medicine, (see the authorities quoted by Bayle, *Bibl. Thérap.* t. ii.; and Richter, *Ausf. Arzneim.* Bd. ii.), there is no valid ground for believing in its efficacy. I tried it in one case without success. In *epilepsy*, *mania*, *hysteria*, *chorea*, and some other maladies of the centro-spinal system, occasional benefit has resulted by the use of belladonna. In *ileus* (*Brit. and For. Med. Rev.* vol. iv. p. 223,) it has been most successfully used in the form of clyster, as a substitute for tobacco, which is objectionable on account of the horrible sickness and great depression which it causes.

**ADMINISTRATION.**—The dose of the *powder* for an adult is one grain, which should be gradually increased until dryness of the throat, dilatation of pupil, or some head symptoms, are produced. For children the dose at the commencement should be one-eighth of a grain. For internal as well as external use the *extract* or *tincture* is, however, commonly employed. For external use an *infusion* of the leaves is sometimes used as a fomentation, or is made into a poultice with bread or linseed meal.

**ANTIDOTES.**—Similar to those for opium. After the use of evacuants the vegetable acids have appeared to give great relief. Decoction of nutgalls or green tea might probably prove serviceable.



1. **EXTRACTUM BELLADONNÆ**, L. E. (U. S.); *Succus spissatus Belladonnæ*, D.; *Extract of Belladonna*.—(Fresh Belladonna leaves, lb. i. Bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence, L.—The *Edinburgh College* directs the expressed juice to be filtered, and then to be evaporated, in the vapour-bath to the consistence of firm extract, stirring constantly towards the close.—The *Dublin College* prepares it as the *Succus spissatus Aconiti*, D.)—1 cwt. of fresh belladonna yields from 4 to 6 lbs. of extract. (Brande, *Man. of Pharm.* 3d ed. p. 401.) Dose gr. i. to gr. v. cautiously increased. As the strength of the extract is extremely variable, some writers recommend only one-quarter or one-half of a grain to be given at the commencement of its use, and to be repeated three times a day; and the dose to be increased until the well-known effects of the remedy are produced. Mr. Bailey observes, that he at first began with one grain, and repeated it every four hours until relief followed; but further experience induced him to commence with three times that quantity, and, if a repetition were necessary, to give it in diminished doses afterwards. Spread upon leather the extract is frequently used as a plaster to relieve neuralgic and other pains (see *Emplastrum Belladonnæ*). Diluted with water to the consistence of cream, it is applied to the eyebrow to produce dilatation of the pupil; or an aqueous solution of the extract is dropped between the lids. Mixed with lard or spermaceti ointment it is used as a topical anodyne and antispasmodic in various diseases (see *Unguentum Belladonnæ*). A bougie smeared over with the extract and oil, is sometimes used with benefit in the stricture. (*Lond. Med. Gaz.* vol. v. p. 735). A drachm or two of the extract, either alone or in the form of ointment, may be applied to the os uteri to diminish rigidity. In irritation of the bladder, urinary organs, or rectum, clysters holding in solution the extract are sometimes used. Rubbed into the perineum or over the track of the urethra, the extract or ointment is useful in preventing chordee, and alleviating spasm of the neck of the bladder.

[As the fresh leaves of Belladonna are with difficulty procured in the United States, as a substitute for the above extract, the Pharmacopœia directs an extract to be made from the dried leaves by means of diluted alcohol. The formula is, Belladonna, in coarse powder, lb. j.; Diluted Alcohol, Oij. Moisten first with half a pint of the fluid, and allow to stand for 24 hours. Then transfer to a percolator and displace, driving over the last quantity of fluid with water. Evaporate the solution to the proper consistence. This constitutes the **EXTRACTUM BELLADONNÆ ALCOHOLICUM**, U. S. A similarly prepared extract is directed from Hyoscyamus.]

2. **EMPLASTRUM BELLADONNÆ**, L. E. D. (U. S.); *Plaster of Belladonna*.—(Extract of Belladonna, ℥iss. [℥j. D.] Plaster of Resin, ℥iij. [Soap Plaster, ℥ij. D.] Add the extract to the plaster, melted by the heat of a water-bath, and mix.)—Anodyne and antispasmodic. Applied for the relief of neuralgic, rheumatic, and other pains. It is said to relieve the pain of dysmenorrhœa when applied to the sacrum. In spreading it, care must be taken not to employ a very hot spatula, or the properties of the extract will be injured.

3. **UNGUENTUM BELLADONNÆ**, *Ointment of Belladonna*.—(Spermaceti Ointment [or Lard] ℥j.; Extract of Belladonna, ℥j. to ℥ij. Mix.)—Though not contained in any of the British pharmacopœias, it is a very useful preparation; and may be used as an anodyne and antispasmodic in some of the before-mentioned cases.

4. **TINCTURA BELLADONNÆ**, (U. S.) *Tincture of Belladonna*.—(Belladonna leaves, dried ℥ij. [℥iv. U. S.]; Proof Spirit, f ʒxvj. [Diluted Alcohol, Oij. U. S.] Macerate for twenty [fourteen] days, and strain. *Bailey*.)—Is not contained in the British pharmacopœias. Mr. Bailey's formula here given contains the same proportions of leaves and spirit as those used in the preparation of *Tinctura Hyoscyami*, L.—Dose, ℥xx. to ℥xl. Mr. Blacket (*Lond. Med. Rep.* vol. xix. p. 458,) prepared a saturated tincture of belladonna by macerating, for



fourteen days, 3x. of extract of belladonna in lb. j. of proof spirit; then straining. The dose of this is ℥ij. or ℥iij. gradually increased: in the form of lotion, a drachm of it was added to eight ounces of liquid.

**SUCCUS BELLADONNÆ.**—The Preserved Juice of Belladonna (see vol. i. p. 325) may be substituted for the tincture. Mr. Bentley informs me that from 2 *cwt.* of belladonna leaves gathered towards the end of June he procured 36 imperial quarts of juice.

### 3. DATURA STRAMONIUM, L. E. D.—COMMON THORNAPPLE.

*Sex. Syst.* Pentandria, Monogynia.

(Folia et Semina, L.—Herb, E.—Herba et Semina, D.)

(Stramonii Folia, Stramonii Radix, Stramonii Semen, U. S.)

**HISTORY.**—Some writers consider this plant to be the *σπερμακον μακρον* of Dioscorides, (lib. iv. cap. 74,)—an opinion scarcely tenable, as this ancient pharmacologist describes his plant as having a black flower and black fruit. *Datura Stramonium* is mentioned by Fuchsius in 1542, (Sprengel, *Hist. Rei Herb.* t. ii. p. 326.)

**BOTANY.** *Gen. Char.*—*Calyx* large, tubular, ventricose, five-angled; apex five-cleft, caducous; base orbiculate, peltate, persistent. *Corolla* large, funnel-shaped; tube long; limb five-angled, five-plicate, five-acuminate. *Stamens* five. *Stigma* two-lamellar. *Capsule* bristly or smooth, ovate, two-celled; cells two or many-parted with a prominent dissepiment. (*Bot. Gall.*)

*Sp. Char.*—*Fruit* spinous, ovate, erect. *Leaves* ovate, smooth, sinuated (Smith).

A bushy, smooth, fetid herb. *Stem* much branched, forked, spreading, leafy. *Leaves* from the forks of the stem, large, unequal at the base, variously and acutely sinuated and toothed, simple-ribbed, veiny, of a dull-green. *Flowers* axillary, erect, white, sweet-scented, especially at night, about three inches long. *Fruit* as big as a walnut, in its outer coat very prickly. *Seeds* black (Smith).

**Hab.**—Indigenous: in waste ground and on dunghills. Annual. Flowers in July.

**DESCRIPTION.**—The herb (*herba stramonii*) should be collected when the plant is in flower. The leaves (*folia stramonii*) are then to be carefully dried. In the fresh state their odour, when bruised, is unpleasant and narcotic; their taste nauseous and bitter. By drying the odour is lost, but the bitter taste remains. The seeds (*semina stramonii*) are small, compressed, kidney-shaped, roughish, dark-brown or blackish, dull, and odourless: they have a bitter, nauseous, somewhat acrid taste.

**COMPOSITION.**—The herb was analyzed, in 1815, by Promnitz; (Gmelin's *Handb. d. Chem.* Bd. ii. S. 1305,) the seeds, in 1820, by Brandes. (*Op. cit.*)

<i>Promnitz's Analysis.</i>		<i>Brandes's Analysis.</i>	
Resin .....	0.12	Malate of daturia with some uncrystallizable sugar.....	1.80
Extractive [containing the Daturia].....	0.60	Fixed oil with some chlorophylle.....	16.05
Gummy extractive.....	0.58	Wax.....	1.40
Green fecula.....	0.64	Resin insoluble in ether.....	9.90
Albumen.....	0.15	Extractive.....	0.60
Phosphatic and vegetable salts of lime and magnesia.....	0.23	Gummy extractive.....	6.00
Water.....	91.25	Gum and Bassorin with some salts.....	11.30
Woody fibre.....	5.15	Albumen and phytocolla.....	6.45
Loss.....	1.22	Glutenoin.....	5.50
		Malates of daturia, potash, and lime, and acetate of potash.....	0.60
Fresh Herb of Stramonium.....	100.00	Woody fibre.....	23.35
		Water.....	15.10
		Loss.....	1.95
		Seeds of Stramonium.....	100.00

1. **DATURA** (*Daturina* or *Daturium*).—A vegetable alkali said to exist in stramonium. The properties assigned to it by Geiger and Hesse (*Pharm. Central-Blatt für 1835*, p. 85,) are the following—It crystallizes in colourless, odourless, brilliant prisms, which have at first a bitterish, then a tobacco-like flavour. It requires 280 parts of cold, or 72 parts of boiling water, to dissolve it: it is very soluble in alcohol, less so in ether. In most of its properties it agrees with hyoscyamina. It strongly dilates the pupil, and has a poisonous action on animals.

2. **EMPYREUMATIC OIL OF STRAMONIUM** (*Pyrodaturia*?)—Resembles tar and the aqueous fluid which distils along with its acid. This arises from the woody part of the plant having been



employed. The oil itself does not differ, in its physical and chemical properties, from the empyreumatic oil of foxglove, before (p. 287) described. (Morries, *Ed. Med. and Surg. Journ.* vol. xxxix. p. 379.)

**PHYSIOLOGICAL EFFECTS.** *α. On Vegetables.*—A branch of stramonium was killed by immersing it in a watery solution of the extract of its own species. (Macaire, quoted by De Candolle, *Phys. Vég.* p. 1354.)

*β. On Animals generally.*—Its influence on herbivorous animals is much less than that on man. Five ounces of the expressed juice given to the horse causes merely a slight drowsiness and gaping. (Moiroud, *Pharm. Vét.* p. 350.) Two pounds and a half of the seeds killed a horse in fifty-two hours. (Viborg, in Wibmer's *Wirk. d. Arzneim u. Gifte*, B. ii. S. 292.) From Orfila's experiments with it on dogs (*Toxicol. Gén.*) it does not appear to act powerfully as a local irritant. Its effects were very similar to those caused by belladonna.

*γ. On Man.*—The symptoms produced on man closely resemble those caused by belladonna. *In small but gradually increased doses* it diminishes sensibility, and thereby frequently alleviates pain. It does not usually affect the pulse; it slightly and temporarily dilates the pupil, and has no tendency to cause constipation, but rather relaxation. Though it allays pain it does not usually produce sleep. *In larger doses* it causes thirst, dryness of the throat, nausea, giddiness, nervous agitation, dilatation of the pupil, obscurity of vision, headache, disturbance of the cerebral functions, perspiration, occasionally relaxation of bowels, and in some cases diuresis. It has no direct tendency to induce sleep, and hence it cannot be called *soporific*. But indirectly, by alleviating pain, and thereby producing serenity and ease, it often disposes to sleep. *In fatal doses* the leading symptoms are flushed countenance, delirium (usually maniacal), dilatation of the pupil, dryness of the throat, loss of voice, difficulty of deglutition, convulsions, and, in some cases, palsy. A very interesting fatal case of poisoning by 100 seeds, is related by Mr. Duffin. (*Lond. Med. Gaz.* vol. xv. p. 194.) The patient (his own child) was two years and a quarter old. In addition to the preceding symptoms there were a hot, perspiring skin, flushed, slightly swollen face, pulse almost imperceptible, but as far as it could be felt, it was natural in regard to frequency, and coldness of the inferior extremities. The anterior fontanelle was neither tense, hot, nor in the slightest degree raised by the cerebral pulsations; so that there did not seem to be any active determination of blood to the brain. During the continuance of the coma the pulse became extremely rapid. Death occurred twenty-four hours after swallowing the seeds.

Vogt (*Pharmakodyn.* Bd. i. S. 164,) says stramonium is distinguished from belladonna by the following peculiarities:

1. Its effects are more similar to those of acrid vegetables, especially of *Helleborus*.
2. It operates more strongly, but more in the manner of the acrid substances, on the nervous system, especially on the central organs, viz. the ganglia, spinal cord, and brain.
3. Its secondary effects on the irritable system are not so marked; for most observers have failed to detect any alteration of pulse, and a slow pulse is more frequently mentioned than a quick one.
4. It operates on the organic life more strongly. It more strongly and directly promotes all the secretions, especially the secretion of the skin.
5. Marcet, (*Med.-Chir. Trans.* vols. vii. and viii.) and Begbie (*Trans. of the Med. Soc. Edinb.* t. i.) have inferred, from numerous observations, that it possesses an anodyne property, which it frequently evinces where opium and belladonna fail.

**USES.**—A more extended experience of this plant is requisite to enable us to speak with much confidence of its employment. The similarity of its effects with those of belladonna would lead us to expect a similarity of uses. Like the last-mentioned plant it has been successfully employed to diminish sensibility, and thereby to relieve external pain. Some of the other uses made of it require a more impartial examination ere we can form any just estimate of their value. The indications and contra-indications for its employment are probably similar to those of belladonna. In persons disposed to apoplexy it is a very dangerous remedy.



In *neuralgia*, (*tic douloureux, sciatica, &c.*) it has been employed with considerable success, by Lentin, (Bayle, *Bibl. Thér.* t. ii.) Marcet, (*Med.-Chir. Trans.* vols. vii. and viii.) and Begbie. (*Trans. Med.-Chir. Soc. of Edinb.* vol. i.) It was given internally in the form of extract. Its external application has scarcely been tried. In *rheumatism* it has frequently proved serviceable from its anodyne qualities. (See the reports of Kirckhoff, Engelhart, Van-Nuffal, and Amelung; in Bayle, *op. cit.*; also Eberle, *Mat. Med.*) In *enterodynia* (that is, spasmodic pain of the bowels unconnected with inflammatory action or the presence of irritating substances), Dr. Elliotson (*Lancet*, 1826-7, vol. xii.; and 1827-8, vol. ii.) found it most successful.

In some cases of *spasmodic asthma*, smoking the herb has given at least temporary relief (English, in *Ed. Med. and Surg. Journ.* vol. vii.; and Dr. Sims, *Ibid.* vol. viii.): but the practice requires very great caution, as it has proved highly injurious, and in some instances fatal. Dr. Bree (*Lond. Med. and Phys. Journ.* vol. xxvi. p. 51,) tried it in 82 asthmatic cases: in 58 of these it had no permanent effect, and in the remaining 24 it acted injuriously. General Gent, who was instrumental in introducing the practice, fell a victim to it. (*Lond. Med. and Phys. Journ.* vol. xxvi. p. 49.) Aggravation of the dyspnoea, paralytic tremblings, epilepsy, headache, and apoplexy, are some of the evils said to have been induced in the cases above referred to. In persons disposed to head affections, and in aged persons, it is, therefore, a highly dangerous practice.

The diseases in which stramonium has been principally used are *mania* and *epilepsy*. Bayle (*Bibl. Thér.* t. ii.) has collected from the works of Storck, Schemalz, Razoux, Reef, Meyer, Odhelius, Durandé, Maret, Bergius, Greding, Schneider, Bernard, and Amelung, fifty-five cases of the first, and forty-five of the latter malady, treated by stramonium: in both diseases a considerable majority of cases are said to have been either cured or relieved by it. Without denying the occasional benefit of stramonium in these diseases, I believe the cases in which it is serviceable to be very rare, while those in which it is calculated to be injurious are very common. Dr. Cullen (*Mat. Med.*) observes, that he has no doubt that narcotics may be a remedy for certain cases of mania and epilepsy; but he very justly adds, "I have not, and I doubt if any other person has, learned to distinguish the cases to which such remedies are properly adapted."

Stramonium has been used to *dilate the pupil* and to *diminish the sensibility of the retina to the influence of light*; but for both of these purposes belladonna is preferred by British oculists. Wendt (*Rust's Magaz.* Bd. xxiv. S. 302,) used it to *lessen venereal excitement*, as in nymphomania. An ointment (made with ℥j. of the powdered leaves, and ℥iv. of lard) has been used as an anodyne application to *irritable ulcers* and to *painful hemorrhoids*. The application of the leaves to *burns* has been attended with dangerous results. (*Journ. de Chim. Méd.* t. vi. p. 722.)

ADMINISTRATION.—The dose of the powdered *leaves* is one grain; of the *seeds* half a grain. These doses are to be repeated twice or thrice a day, and to be gradually increased until some obvious effect is produced.

I. EXTRACTUM STRAMONII, L. E. D.; (*Extractum Stramonii Seminis*, U. S.) *Extract of Thornapple*.—(Thornapple seeds, ℥xv. [lb. j. D.]; Boiling distilled Water, Cong. j. Macerate for four hours in a vessel slightly covered, near the fire; afterwards take out the seeds, and bruise them in a stone mortar: return them, when bruised, to the liquor. Then boil down to four pints, and strain the liquor while hot. Lastly, evaporate to a proper consistence. L. D.—The directions of the *Edinburgh College* are as follows:—Take of the seeds of stramonium, any convenient quantity; grind them well in a coffee-mill. Rub the powder into a thick mass with proof spirit; put the pulp into a percolator, and transmit proof spirit till it passes colourless; distil off the spirit, and evaporate what remains in the vapour-bath to a proper consistence.)—Of the above modes of pre-



paration, that of the Edinburgh College is doubtless the best, as yielding a more efficient preparation. [The U. S. P. directs Stramonium seed, in powder, lb. i.; Diluted Alcohol, q. s. Displace with the alcohol, and evaporate to the proper consistence.] The product, according to the London and Dublin process, is about 12 per cent. (Barker, *Observ. on the Dub. Pharm.*), Recluz (*U. S. Dispensatory*), states, that 16 ozs. of the seeds yield 2 ozs. 2drs. by maceration in dilute alcohol: this is about 14 per cent. The dose of extract of stramonium, at the commencement, is about a quarter of a grain, which should be gradually increased until some obvious effect is produced.

2. TINCTURA STRAMONII, Ph. United States. *Tincture of Thornapple*.—(Stramonium seeds, bruised. ℥iv.; Proof Spirit, ℥xxxij. Macerate for fourteen days, and filter through paper.)—Dose ℥x. to ℥xx. twice or thrice a day, gradually increased until it occasions some obvious effect on the system. This preparation is applicable to all the cases for which stramonium is used.

ANTIDOTES.—The same as for belladonna.

#### 4. NICOTIANA TABACUM, L. E. D.—VIRGINIAN TOBACCO.

*Sex. Syst.* Pentandria, Monogynia.  
(Folia exsiccata, L.—Leaves, E.—Folia, D.)  
[Tabacum, U. S.]

HISTORY.—The inhalation of the fumes of burning vegetable substances, both for causing inebriation and for medicinal purposes, seems to have been very anciently practised. Herodotus (*Clio*, ccii.) tells us, that the Babylonians intoxicated themselves by this means; and both Dioscorides (lib. ii. cap. 126) and Pliny (*Hist. Nat.* lib. xxvi. cap. 16, ed. Valp.) declare the efficacy of smoking Tussilago in obstinate cough.

Humboldt (*Personal Narrative*, vol. v. p. 666) says, that the tobacco plant has been cultivated, from time immemorial, by the natives of Oronoko. It does not appear, however, to have been known to Europeans prior to the discovery of America; though it is not improbable that the Asiatics were acquainted with it long before that time, as Pallas, Rumphius, and Loureiro, have supposed. But it is not probable, I think, that Europeans learned the use of it from the Asiatics, as Ulloa has endeavoured to show.

When Columbus and his followers arrived at Cuba, in 1492, they, for the first time, beheld the custom of smoking cigars.<sup>1</sup> Hernandez de Toledo introduced the plant into Spain and Portugal; and, from the latter place, Jean Nicot sent the seeds or the plant to France, about 1559-60. (Bauhin's *Pinax*.) In 1586, on the return of Sir Francis Drake, with the colonists, from Virginia, the practice of smoking was introduced into England; and, being adopted by Sir Walter Raleigh and other courtiers, soon became common. (*Biograph. Brit.* vol. v. p. 3471; and Clusius, *Exotic*. p. 310.)

Various attempts, by writings, imposts, or bodily punishments, were made in Europe to restrict or put down its use.<sup>2</sup> It is said, that upwards of a hundred volumes were written to condemn its employment; and not the least curious of these is the celebrated "*Counterblaste to Tobacco*" of James I. (*Works*, p. 214, fol. 1616.) Despite, and partly, perhaps, as a consequence of these attempts, the use of tobacco rapidly spread, and is now universal throughout the world. (*Asiatic Journal*, vol. xxii.)

The generic appellation *Nicotiana* is obviously derived from Nicot, the name of an individual above referred to. The origin of the specific name *Tabacum* is less satisfactorily ascertained. It is probable, however, that the word is derived from *tabac*, an instrument used by the natives of America in smoking this herb, though some derive it from *Tobago*, others from *Tabasco*, a town in New Spain.

<sup>1</sup> W. Irving, *Hist. of the Life and Voyages of Columbus*, vol. i. p. 287; also the Narrative of Don Fernando Colon, son-in-law of Columbus, *Hist. del Amir*. cap. 27, in Barcia. *Hist. prim. de las Indias occid.* vol. i. p. 24.  
<sup>2</sup> Adam Clarke, *Dissert. on the Use and Abuse of Tobacco*, 1797; *Med. and Phys. Journ.* vol. xxiv. p. 451; and C. C. Antz, *Tabaci Hist. Diss. Inaug.* Berol. 1836.



**BOTANY. Gen. Char.**—*Calyx* urceolate, five-cleft. *Corolla* much longer than the calyx, funnel-shaped, five-cleft, regular. *Stamens* five. *Stigma* emarginate. *Capsule* two-valved. (*Bot. Gall.*)

**Sp. Char.**—*Leaves* sessile, oblong-lanceolate, acuminate, the lower ones decurrent. Throat of the *corolla* inflate-ventricose; limb with acuminated segments. (*Bot. Gall.*)

A viscid herb. *Root* branching, fibrous. *Stem* three to six feet high, erect, round, hairy, branching at the top. *Leaves* very large, pale green, with glandular short hairs. *Bracts* linear, acute. *Flowers* panicled on the end of the stem and branches. *Calyx* hairy. *Corolla* rose-coloured. *Ovarium* ovate; *style* long and slender; *stigma* capitate, cloven. *Capsule* two-celled, opening cross-wise at the top, loculicidal. *Seeds* numerous, small, somewhat reniform, brown.

**Hab.**—America. Extensively cultivated in most parts of the world, especially the United States of America, Virginia is the most celebrated for its culture. North of Maryland the plant is rarely seen. (*United States Dispensatory.*) In England the cultivation is restricted; not more than half a pole being allowed "in a physic or university garden, or in any private garden for physic or chirurgery." (*Loudon's Encyclopædia of Agriculture.*)

*NICOTIANA RUSTICA*, *Common Green Tobacco*, is cultivated in several parts of the world. It yields a milder tobacco, and is said to have been preferred by Sir W. Raleigh. *Syrian* and *Turkish Tobaccos* are prepared from it. (*Royle, Illust.* p. 283; *Lindley, Fl. Med.*) "Mr. D. Don informs me," observes Dr. Royle, "that it also affords the tobacco of Salonica (the ancient Thessalonica); probably also that of Latakia (Laodicea), which is much esteemed."

*NICOTIANA REPANDA* is said to yield the small *Havannah cigars* (Royle).

*NICOTIANA PERSICA* yields the delicate and fragrant tobacco of *Shiraz* (Lindley).

**CULTURE.**—In Virginia and Maryland the seeds are thickly sown in beds of finely-prepared earth. When the young plants have five or six leaves, exclusive of the seminal leaves, they are transplanted into fields during the month of May, and set three or four feet apart, in rows. During the whole period of growth the crop requires constant attention; and to promote the development of leaves, the tops are pinched off, by which the formation of flowers and seed is prevented. The harvest is in August. The ripe plants are cut off above their roots, dried under cover, stripped of their leaves, tied in bundles, packed in hogsheads, &c. (*Loudon's Encycl. of Agricult.*; *Carver, Treat. on the Cult. of the Tobacco Plant*, 1779.)

**COMMERCE.**—The duty (besides an additional 5 per cent. on the duty) on tobacco, the produce of British possessions in America, is 2s. 9d. per lb.; of other parts, 3s.—on snuff, 6s. per lb.—on cigars, and other kinds of manufactured tobacco, 9s. These exorbitant duties lead to extensive smuggling. In 1840 120,884 cwts. of tobacco, and 169,777 lbs. of cigars, paid duty.

An extensive manufacturer of Tobacco has supplied me with the following facts as to the consumption of tobacco in this country:

"In the year 1839, the revenue on tobacco was about £3,600,000. Of this it has been estimated  $\frac{1}{3}$ ths are drawn from the working classes,  $\frac{1}{2}$ th from the richer classes. Of the latter, one half (or  $\frac{1}{4}$ th of the whole amount) is contributed by Foreign and British manufactured cigars."

*Consumption of Tobacco per Head of Population, calculated from the number of lbs. on which duty was paid.*

Year.	Rate of Duty.	Consumption per Head.
1801.....	$\left\{ \begin{array}{l} 1 \frac{7}{10} \text{ England.} \\ 1 \frac{7}{10} \text{ Ireland.} \end{array} \right.$	oz. $17 \frac{2}{3}$
1811.....	$2 \frac{1}{2}$	$19 \frac{1}{2}$
1821.....	4 0	$11 \frac{1}{2}$
1831.....	3 0	$12 \frac{3}{5}$
1841.....	$1 \frac{8}{10}$	say $12 \frac{4}{5}$



Hence the consumption is materially affected by the rate of duty.

**DESCRIPTION.**—Tobacco (*folia tabaci seu nicotiane*) as met with in commerce, has a brownish colour, a strong narcotic but peculiar odour, and a bitter, nauseous taste. The darker-coloured tobaccos are the strongest. For medicinal purposes Virginian tobacco in leaf should be employed. When this cannot be procured, shag may be substituted. The following are the principal commercial kinds:

**AMERICAN.**—The *Virginian* is one of the strongest kinds, and is, therefore, not fit for cigars, but is adapted for pipes and snuff, and for medicinal use. It is imported in leaves or heads contained in hogsheds. Its colour is deep mottled brown; the leaves feel unctuous. The *Maryland* is paler, yellower, weaker, and adapted for smoking: the *pale cinnamon* is the best, the *scrubs* the commonest. The *Kentucky* is intermediate between the two preceding; it is paler and weaker than the *Virginian*. The *Carolina* is less frequently met with, and is of inferior quality. The *Havannah* is most esteemed for smoking: its colour is yellowish-brown: its odour is musky or spicy. It is imported in heads. The *Cuba* is an excellent kind; it is darker than the *Havannah*. Both these kinds, as well as the *Columbian*, are remarkable for the light yellow spots on the leaves. The *Columbian* is imported in heads and leaves, and is much esteemed for cigars; for which it is more used than any other kind. It is dark brown, but not mottled like the *Virginian*. The *Varinas* is brought over in rolls and in hands. It is spotted like the preceding. It is a mild tobacco, suitable for smoking only. The *Porto Rico* is allied to the *Varinas*. It comes in rolls. The *St. Domingo* is imported in leaves; it is deficient in flavour. *Orinoko* comes in leaves.

**2. EUROPEAN.**—The only European tobacco extensively consumed in this country is *Amersfoort*, a Dutch tobacco. It is very mild and deficient in flavour. The darker kind is the strongest, and is much esteemed for snuff; while the lighter and weaker kind is employed in the manufacture of the commonest cigars. Several *German*, *Hungarian*, and *Ukraine* tobaccos are occasionally met with. (Sinsheim, *Die Rauch. u. Schnupftabaks-Fabrikation*, 1826.)

**3. ASIATIC.**—*East Indian* tobacco has never obtained a high repute, doubtless from the inattention to its cultivation. (Royle, *Illustrations*, p. 285.) The *Manilla* is dark-coloured, and is much esteemed for cheroots. The *Shiraz*, the *Salonica* (the ancient Thessalonica), the *Latakia* (Laodicea), are other valued Asiatic kinds. *Turkey* tobacco is pale and yellowish. It occurs in small, short, broad leaves. It is a weak tobacco, and is cut for smoking.

**MANUFACTURED TOBACCO.**—Under this head are included the different forms of tobacco prepared for chewing and smoking, and for taking as snuff.

**1. Chewing and Smoking Tobaccos.**—Manufacturers distinguish chewing tobaccos and those used in pipes into two kinds, called respectively cut and roll tobacco. For smoking in the pipe cut tobacco is principally used in England,—the roll, in Scotland and Ireland. Cigars and cheroots form a third kind.

**a. Cut Tobaccos.**—Among these *Shag* deserves the first notice. It is prepared by moistening (with liquor) and compressing leaves of tobacco (*Virginian* and *Kentucky* kinds principally) deprived of their midribs, then cutting the compressed mass with knife-edged chopping stamps. *Returns* is a lighter coloured and milder smoking tobacco. It derives its name from its being formerly prepared by returning shag for re-cutting. *Bird's-eye* is prepared like shag, with the exception that it contains the midribs of the leaves, the slices of which have been compared to the eyes of birds. *Maryland* is another kind of cut tobacco. *Canaster* or *Kanaster* is a favourite kind. It received its name from *canastra* (a Spanish word, signifying a basket), because it was imported in baskets. It is prepared from *Varinas* tobacco. *Oronoko*, *Turkey*, *Persian*, and *Varinas*, are also cut tobaccos.

**β. Roll or Twist Tobaccos.**—These are prepared by twisting tobacco into a kind of rope, which is moistened with liquor, and is usually made up into cylindrical or barrel-shaped rolls, which are subjected to pressure before they are considered fit for sale. *Pigtail*, *Negro-head*, *Bogie*, *Alloa*, *Cavendish*, and *Irish Twist*, are roll tobaccos for chewing and smoking.

**γ. Cigars.**—These are small rolls of tobacco, permeable to air, and adapted for smoking. *Cigars* were originally derived from the New World. They are distinguished from *Cheroots* by their pointed extremity called the *curl* or *twist*. The *Havannah Cigars* are in great request by smokers. Cigars, however, are extensively made in London. *Cheroots* were originally derived from the East.



They are characterized by their truncated extremities. *Manilla Cheroots* are much valued by smokers. Cheroots, however, like cigars, are extensively manufactured in London.

2. *Snuffs*.—In the manufacture of snuff, tobacco, cut in small pieces, is first fermented by placing it in heaps and sprinkling it with water or a solution of salt; the latter prevents the tobacco becoming mouldy. The heaps soon become hot and evolve ammonia. The extent to which this process is allowed to proceed, varies with different kinds of snuff. The usual time is two or three months,—seldom less than one month. The fermented tobacco is then ground in mills, or powdered with a kind of pestle and mortar. The Scotch and Irish are prepared for the most part from the midribs; the Strasburgh, French, and Russian snuffs, from the soft part of the leaves. The siftings, sometimes termed *thirds*, are usually reground. Sal ammoniac is occasionally added to snuffs.

The immense varieties of snuffs found in the shops are reducible to two kinds, dry and moist snuffs.

*a. Dry Snuffs*.—These derive their characteristic property from being dried at a high temperature. *Scotch, Irish, and Welsh*, are well known high-dried snuffs. The latter contains lime, the particles of which may be usually distinguished by the naked eye; hence its desiccating effect on the pituitary membrane. *Spanish snuff* is also a dry snuff.

*β. Moist Snuffs; Rappées*. It is sometimes said that pearlash is added to these snuffs to keep them moist, but several respectable manufacturers assure me this is not usual. The *rappées* of the shops may be divided into three classes:

*αα. Simple Rappées*.—Ex. *Brown, Black, Cuba, Carotte, and Bolangero*.

*ββ. Mixed Rappées*.—Ex. *Hardham's Genuine No. 37*.

*γγ. Scented Rappées*.—Ex. *Prince's Mixture and Princeza, &c.*

It is said that tobaccoists employ, in the preparation of tobacco, a solution of sea-salt, (sp. gr. 1.107,) which is termed the *sauce* or *liquor*, but I am assured that this is not generally the case. This liquor, it is further stated, is sometimes coloured by treacle or liquorice.

**COMPOSITION**.—The juice of the fresh leaves of tobacco was analyzed in 1809 by Vauquelin. (*Ann. de Chim.* lxxi. 139.) Subsequently this chemist analysed manufactured tobacco. (*Annal. du Mus. d'Hist. Nat.* t. xiv.) In 1821 Hermbstädt (Schweigger's *Journ. fur Chem.* xxxi. 441) discovered *nicotianin*. In 1827 the leaves were analyzed by Posselt and Reinmann, (Gmelin, *Handb. d. Chem.* ii. 1303,) and in 1831 by Dr. Conwell. (*Silliman's Journ.* xvii. 369.)

*Vauquelin's Analysis.*

An acrid volatile principle (*nicotina*).  
Albumen.  
Red matter, soluble in alcohol and water.  
Acetic acid.  
Supermalate of lime.  
Chlorophylle.  
Nitrate of potash and chloride of potassium.  
Sal ammoniac.  
Water.

Expressed juice of the leaves.

The leaves contained, in addition to the above, *woody fibre, oxalate and phosphate of lime, oxide of iron, and silica*. The two latter substances were obtained from the ashes.

Manufactured tobacco contained the same principles; and in addition, *carbonate of ammonia and chloride of calcium*, perhaps produced by the reaction of sal ammoniac and lime, which are added to tobacco to give it pungency.

*Posselt and Reinmann's Analysis.*

Nicotina.....	0 06
Concrete volatile oil ( <i>nicotianin</i> ).....	0 01
Bitter extractive.....	2 87
Gum with malate of lime.....	1 74
Chlorophylle.....	0 267
Albumen and gluten.....	1 308
Malic acid.....	0 51
Lignin and a trace of starch.....	4 969
Salts (sulphate, nitrate, and malate of potash, chloride of potassium, phosphate and malate of lime, and malate of ammonia).....	0 734
Silica.....	0 068
Water.....	88 230

Fresh leaves of tobacco..... 100 836

1. **NICOTINA** (*Nicotin*).—Exists not only in the leaves, but also in the root (E. Davy, *Lond. and Ed. Phil. Mag.* vol. vii. p. 393,) and in the seeds (Buchner, *Repert. Bd.* xxxii.) of tobacco.



It is obtained by infusing the leaves in water acidulated with sulphuric acid, concentrating the infusion, and distilling with lime or magnesia. The distilled product is a solution of ammonia and nicotina, and is to be saturated with sulphuric acid, and evaporated to dryness: the sulphate of nicotina is then to be dissolved out by ether, and decomposed by hydrate of baryta. The nicotina is obtained by spontaneous evaporation. To obtain it pure, it should be distilled by an oil-bath at the temperature of 288° F. The following are its leading properties:—It is a colourless, liquid, volatile alkali, with the odour of tobacco, and an acrid, burning taste. It restores the blue colour of reddened litmus, and renders turmeric brown. At 375° F. it boils, and at the same time undergoes decomposition. By exposure to the air it becomes brown and thick. It is readily combustible with the aid of a wick. It is soluble in water, ether, alcohol, and the oils (fixed and volatile). It combines with acids and forms salts: the *sulphate*, *phosphate*, *oxalate*, and *tartrate*, are crystallizable; the *acetate* is not. Its atomic weight is 210. The acetate of nicotina yields a white flocculent precipitate with a solution of bichloride of mercury, and a yellow granular precipitate with chloride of platinum. The precipitates (which are double salts) lead to a suspicion that ammonia was present in the nicotina salt. Heated with water the yellow precipitate obtained by chloride of platinum is converted into the platinum-bichloride of ammonium. (Gail, *Pharm. Central-Blatt für 1836*, S. 499.) Mr. E. Davy found that nicotina acted as a narcotic poison on insects. The following are the quantities of nicotina yielded by 1000 parts of various kinds of tobacco (Thomson, *Org. Chem.* p. 286):—*Cuba*, 8.64; *Maryland*, 5.28; *Virginia*, 10.00; *Ile de Vilain*, 11.20; *Lot*, 6.48; *North*, 11.28; *Lot et Garonn*, 8.20; for *smoking*, 3.86.

2. CONCRETE VOLATILE OIL OF TOBACCO (*Nicotianin*, Hermbstädt; *Tobacco-camphor*, Gmelin).—Obtained by submitting tobacco leaves, with water, to distillation. Six pounds of the leaves yielded eleven grains of oil, which swims on the surface of the liquor. This oil is solid, has the odour of tobacco, and a bitter taste. It is volatile, insoluble in water and the dilute acids, but soluble in ether and caustic potash. According to Landerer, (*Pharm. Central-Blatt für 1835*, S. 890.) fresh tobacco leaves yield no nicotianin, which, therefore, would appear to be developed by the drying of the leaves under the influence of air and water. Nicotianin excites, in the tongue and throat, a sensation similar to that caused by tobacco smoke. Hermbstädt swallowed a grain of it, and experienced, soon after, giddiness, nausea, and inclination to vomit. Applied to the nose, it causes sneezing.

3. EMPYREUMATIC OIL OF TOBACCO.—Is rather less solid than the empyreumatic oil of foxglove (see p. 287); but it is undistinguishable from the latter by either taste or smell. (Morries, *Ed. Med. and Surg. Journ.* vol. xxxix. p. 379.) It is produced, in part at least, by the decomposition of some of the constituents of tobacco. It has been suggested, that this oil is "the juice of cursed hebenon," alluded to by Shakspeare, (*Hamlet*, Act I. Scene 5.) who also calls it a "distilment."

4. TOBACCO SMOKE.—The constituents of tobacco smoke, according to Raab, (*Zenker and Schenk, Naturgesch. d. vorzüg. Handelspfl.* Bd. ii. S. 75.) are much *carbonate of ammonia*, *acetate of ammonia*, *nicotianin*, *empyreumatic oil*, *carbonaceous matter* (soot), *moisture*, and several *gases*. Unverdorben obtained, (*Poggendorff's Annalen*, viii. 399.) by the distillation of tobacco, water, oil, and resin. These products consisted of, a *volatile oil*, an *oleaginous acid*, an *empyreumatic acid* (Brandsäure), *resin*, traces of a *powder insoluble in potash and acids*, a small quantity of *odorin*, a *base soluble in water* (nicotin?), *fuscin*, *red matter* soluble in acids, and *two extractive matters*, one forming a soluble, the other an insoluble, compound with lime.

PHYSIOLOGICAL EFFECTS. *a. On Animals generally.*—In the *carnivora* tobacco causes nausea, vomiting, sometimes purging, universal trembling, staggering, convulsive movements, and stupor. Five drachms and a half of rappee introduced into the stomach of a dog, and secured by a ligature on the œsophagus, caused death in nine hours. In another experiment, two drachms applied to a wound killed the animal in an hour. (Orfila, *Tox. Gén.*) Sir B. Brodie (*Phil. Trans.* for 1811, p. 178) found that the infusion of tobacco, thrown into the rectum, paralysed the heart, and caused death in a few minutes. But if the head of the animal be previously removed, and artificial respiration kept up, the heart remains unaffected; proving that tobacco disorders this organ through the medium of the nervous system only. In the *herbivora* the effects of tobacco, as of other vegetable poisons, are much less marked: vomiting does not occur. Schubarth (Wibmer, *Wirk. d. Arzneim. u. Gift.* Bd. iii. S. 336) gave four ounces of the leaves to a horse, at three times, within two hours. The pulse became irregular, then slower, afterwards quicker: respiration and the pupils were scarcely affected. For two days the stools and urine were more frequent. Moiroud (*Pharm. Vét.* p. 364) observed no remarkable effect from the exhibition of four ounces of tobacco to a horse.

It is remarkable that the *empyreumatic* (oil of tobacco) does not possess the



same power of paralysing the heart. (Applied to the tongue of a cat, one drop caused convulsions, and in two minutes death: on opening the body, the heart was beating regularly and with force. (Brodie, *op. cit.*) Its operation, therefore, is analogous to that of hydrocyanic acid. Dr. Morries (*Ed. Med. and Surg. Journ.* vol. xxxix. p. 383) says, it has less tendency to induce convulsions than the empyreumatic oils of foxglove, henbane, or the thornapple.

β. *On Man.*—*In small doses*, tobacco causes a sensation of heat in the throat, and sometimes a feeling of warmth at the stomach; these effects, however, are less obvious when the remedy is taken in a liquid form, and largely diluted. By repetition it usually operates as a diuretic, and less frequently as a laxative. Accompanying these effects are oftentimes nausea and a peculiar feeling usually described as giddiness, but which scarcely accords with the ordinary acceptation of this term. As dropsical swellings sometimes disappear under the use of these doses, it has been inferred that the remedy promotes the operation of the absorbents. *In larger doses* it provokes nausea, vomiting, and purging. Though it seldom gives rise to abdominal pain, it produces a most distressing sensation of sinking at the pit of the stomach. It occasionally acts as an anodyne, or more rarely promotes sleep. (But its most remarkable effects are languor, feebleness, relaxation of muscles, trembling of the limbs, great anxiety, and tendency to faint. Vision is frequently enfeebled; the ideas confused, the pulse small and weak; the respiration somewhat laborious; the surface cold and clammy, or bathed in a cold sweat; and, in extreme cases, convulsive movements are observed. *In excessive doses* the effects are of the same kind, but more violent in degree. The more prominent symptoms are nausea, vomiting, and, in some cases, purging, extreme weakness and relaxation of the muscles, depression of the vascular system (manifested by feeble pulse, pale face, cold sweats, and tendency to faint), convulsive movements, followed by paralysis and a kind of torpor, terminating in death.)

(Taken in the form of *snuff* its principal effect is topical. It causes increased secretion of nasal mucus, and, in those unaccustomed to its use, sneezing. Getting into the throat it produces a feeling of acidity and sometimes nausea. From some kinds of rappee I have experienced giddiness and great prostration of strength. Lanzoni (Christison, *On Poisons*) states, that an individual fell into a state of somnolency, and died lethargic on the twelfth day, in consequence of taking too much snuff.) Reasonable doubt, however, may be entertained, I think, whether these accidents really arose from snuff. The habitual use of this substance blunts the sense of smell, and alters the tone of voice; but I am unacquainted with any other well-ascertained effects, though Cullen (*Mat. Med.* ii. 274) ascribes loss of appetite and dyspepsia to it; and Dr. Prout (*On the Nature and Treatment of Stomach and Urinary Diseases*, p. 25, Lond. 1840) observes, that "the severe and peculiar dyspeptic symptoms sometimes produced by inveterate snuff-taking are well known; and I have more than once seen such cases terminate fatally with malignant diseases of the stomach and liver." I have known several inveterate snuff-takers who, after many years' use of this substance, have discontinued it with impunity; but Dr. Cullen thinks that when the discharge of mucus is considerable, the ceasing or suppression of it, by abstaining from snuff, is ready to occasion the very disorders of headache, toothache, and ophthalmia, which it had formerly relieved. There does not appear to be any good grounds for the supposed baneful effects of the manufacture of snuff on the workmen. (Christison, *op. cit.*) Sir W. Temple (*Letters*, p. 286, fol. 1720) recommends the introduction of a tobacco leaf into the nostrils for the relief of affections of the eyes and head.

† The *smoking* of tobacco by those unaccustomed to it, gives rise to all the before-described effects of large and excessive doses. A very interesting case, which had almost terminated fatally, is related by Dr. Marshall Hall. (*Edinb. Med. and Surg. Journ.* vol. xii. p. 11.) It was that of a young man, who, for



his first essay, smoked two pipes. Gmelin (quoted by Christison,) mentions two cases of death from smoking, in the one of seventeen, in the other of eighteen, pipes at a sitting.

In habitual smokers, the practice, when employed moderately, provokes thirst, increases the secretion of saliva and buccal mucus, and produces a remarkable soothing and tranquillizing effect on the mind, which has made it so much admired and adopted by all classes of society, and by all nations civilized and barbarous. I am not acquainted with any well-ascertained ill effects resulting from the habitual practice of smoking. A similar observation is made by Dr. Christison. (*Op. cit.* p. 774.) Yet Dr. Prout says it "disorders the assimilating functions in general, but particularly, as I believe, the assimilation of the saccharine principle. I have never, indeed, been able to trace the developement of oxalic acid to the use of tobacco; but that some analogous and equally poisonous principle (probably of an acid nature) is generated in certain individuals by its abuse, is evident from their cachectic looks; and from the dark, and often greenish yellow tint of their blood." (*Op. supra cit.* p. 25.) There do not appear to be any good grounds for supposing that smoking is a prophylactic against contagious and epidemic diseases—an opinion at one time entertained.

The practice of *chewing* tobacco is principally confined to sailors, and is less frequently submitted to our observation, so that we are not so competent to speak of its effects, which, probably, are similar to those caused by smoking.

The application of tobacco to abraded surfaces is a very dangerous practice, and has in some instances been attended with violent or even fatal results. Mr. Weston (*Med. and Phys. Journ.* vol. xiv. p. 305,) has related a case, in which the expressed juice of tobacco was applied to the head of a boy, aged eight years, for the cure of tinea capitis. Death took place three hours and a half after the application.

In the form of *clyster*, tobacco has frequently proved fatal, sometimes from the use of inordinate doses by ignorant persons, (Christison, *op. cit.*) and occasionally in the hands of the well-informed practitioner. Desault (*Œuvres Chir.* t. ii. p. 344,) has witnessed the smoke prove fatal. Sir A. Cooper (*Anatomy and Treatment of Hernia*, p. 24,) has seen two drachms, and even one drachm, destroy life. In a case related by Sir Charles Bell (*Surgical Observations*, part 2, p. 189,) death probably occurred from the same cause. Dr. Copland (*Dict. of Pract. Med.* art. *Colic*, vol. i. p. 371,) saw half a drachm in infusion prove fatal. More recently (*British and Foreign Medical Review*, vol. xii. p. 562,) a decoction of 12 grs. of tobacco in six ounces of water used as an enema proved fatal.

The operation of tobacco resembles that of *Lobelia inflata* (see LOBELIACEÆ). With foxglove tobacco agrees in several circumstances, especially in that of enfeebling the action of the vascular system (vol. i. p. 178); though its power in this respect is inferior to that of foxglove. In its capability of causing relaxation and depression of the muscular system, and trembling, tobacco surpasses foxglove; as it does also in its power of promoting the secretions. From belladonna, stramonium, and hyoscyamus, it is distinguished by causing contraction of the pupil, both when applied to the eye and when taken internally in poisonous doses; and also by the absence of delirium and of any affection of the parts about the throat. Vogt (*Pharmakodyn.*) and Sundelin (*Handb. d. spec. Heilmittel*,) have considered the effects of tobacco as closely allied to those of aconite; but to me the resemblance appears very slight (see RANUNCULACEÆ). The power possessed by the last mentioned substance of paralyzing the sentient nerves, sufficiently distinguishes it from tobacco.

USES.—The principal remedial value of tobacco consists in its power of relaxing muscular fibres, whereby it becomes a valuable antispasmodic. As a purgative, but especially as an antispasmodic and purgative conjoined, it is exceedingly serviceable in alvine obstructions. As a sedative to the vascular



system it has not been much used. I tried it somewhat extensively a few years since, as a substitute for blood-letting in inflammatory affections. But, while it produced such distressing nausea, and depression, that it was with difficulty I could induce patients to persevere in its use, I did not find its antiphlogistic powers at all proportionate, and eventually I discontinued its employment. As an anodyne, diuretic, or emetic, it is much inferior to many other articles of the *Materia Medica*.

1. *In Colic, Ileus (Volvulus), Strangulated Hernia, and Constipation.*—The efficacy of tobacco in these diseases depends principally on its power of relaxing muscular fibres and on its purgative properties. These effects are usually accompanied by nausea and giddiness. The remedy is applied in the form of clyster, consisting either of the infusion, or of the smoke. The latter was at one time supposed to be more efficacious. Heberden (*Comment. on the Hist. and Cure of Diseases*, p. 270, 3d ed. 1806,) says, it causes less giddiness than the infusion. It probably extends farther up the intestines than the liquid enema, and, therefore, acts on a larger surface. But the difficulties and inconvenience of applying it, and the uncertainty of its effects, have led, for the most part, to the discontinuance of its use. In *ileus* the tobacco clyster has been recommended by Sydenham, (*Whole Works*, 4th ed. by Peechey, p. 428,) by Heberden, (*op. cit.*) by Abercrombie, (*On Diseases of the Abdominal Viscera*,) and by several other distinguished authorities. The earlier it is resorted to, the more successful it is likely to prove. Indeed, when employed in the last stage of the disease, it sometimes hastens the fatal termination by exhausting the already depressed vital powers. As it is occasionally necessary to repeat the injection, it is of importance to begin cautiously. Dr. Abercrombie uses only fifteen grains of tobacco infused in six ounces of boiling water for ten minutes; and he repeats this in an hour if no effect has been produced. I have generally employed a scruple, and have not experienced any dangerous effects from its application; and it is possible that, in persons long accustomed to the use of tobacco, a somewhat larger dose might be required; but I have never met with any case in which a scruple did not produce the full effect on the system that was desired. In *strangulated hernia* the tobacco clyster has frequently effected the return of the protruded parts when the operation appeared almost inevitable; and every surgical writer speaks in the highest terms of its use. A tense hernial tumour sometimes becomes soft and relaxed by the diminished force of circulation produced by tobacco. Notwithstanding these facts, this remedy is much less frequently resorted to than formerly. Three circumstances have, I suspect, led to the infrequency of its use: first, the dangerous, if not fatal, consequences which have resulted from its employment; secondly, the frequency of its failure and the consequent loss of time, by which the chance of recovery is diminished; thirdly, the operation for hernia being much less dreaded now than formerly, for experience has fully proved that death rarely (Mr. Pott says only once in fifty times) results from it. In *colic* from lead, and in *obstinate constipation* from spasmodic constriction, the tobacco clyster has sometimes proved most beneficial. Of the application in lead colic, of compresses, soaked in a strong decoction of tobacco to the abdomen, as recommended by Dr. Graves, (*Dublin Hospital Reports*, vol. iv.) I have no experience. The practice is, of course, calculated to be beneficial, but is less certain and speedy in its effect than tobacco clysters.

2. *In Ischuria and Dysury.*—When retention of urine arises from spasm of the neck of the bladder or from spasmodic stricture, tobacco, by its powerfully relaxing properties, is an agent well calculated to give relief. Mr. Earle (*Med. Chir. Trans.* vol. vi. p. 82.) has published several cases illustrative of its efficacy. In dysury, also, tobacco proves serviceable; it abates pain, relaxes the urinary passages, promotes the secretion of urine, and, by diminishing the sensibility of the parts, facilitates the expulsion of the calcareous matter. (Fowler, *Med. Rep. of the Effects of Tobacco*, 1785.)



3. *Tetanus*.—The relaxing influence over the muscular system possessed by tobacco, suggested the employment of this remedy in tetanus. Its effects have been, like those of most other medicines in this disease, unequal. Sir J. Macgrigor (*Med.-Chir. Trans.* vol. vi. p. 456,) says, that, in the advanced stage of the malady the tobacco clyster had no effect. Mr. Earle, (*op. cit.* p. 92,) however, thought it afforded temporary alleviation in a case in which he tried it. Since then several cases have been successfully treated by tobacco. Dr. O'Beirne (*Dubl. Hosp. Rep.* vol. iii.) obtained most marked relief by its use. He employed it in the form of clyster (containing a scruple of tobacco), which was repeated twice or thrice or oftener daily during eighteen days; and it was observed, that if by design or accident the remedy was discontinued, the spasms recurred with force. Mr. Anderson (*Edinb. Med.-Chir. Trans.* vols. i. and ii.) employed a decoction of the fresh leaves in the form of enema, and both with good effect. Mr. Curling (*Treat. on Tetanus*, p. 168, 1836,) has collected accounts of nineteen cases (including those of Earle, O'Beirne, and Anderson, above referred to) treated by tobacco; of these nine recovered; and, in seven of the fatal cases, the remedy had not a fair trial; while in the eighth organic disease of the brain was found. Mr. Curling observes, that "more has now been advanced in proof of the efficacy of tobacco than can be adduced in favour of any other remedy yet resorted to. I have not," he adds, "succeeded in finding a single case, in which, being fully and fairly tried before the constitution had given way, it has been known to fail. (*Op. cit.* p. 177.)

4. *Other Spasmodic Diseases*.—The success attending the use of tobacco in tetanus, has led to its employment in *hydrophobia*, but hitherto without avail. In a case of periodical *epilepsy*, Dr. Currie (*Med. Rep.* vol. i. p. 163,) prevented the return of the disease by the application of a tobacco cataplasm to the scrobiculus cordis, half an hour before the expected paroxysm. In a very bad case of *spasm of the rima glottidis*, which resisted powerful depletion by the lancet, Dr. Wood (*U. S. Disp.*) applied with success a tobacco cataplasm to the throat. In *spasmodic asthma*, tobacco, either smoked or taken internally, in nauseating doses, has been found occasionally to give relief. My own observation is unfavourable to the use of tobacco smoke, which I have repeatedly found to bring on convulsive cough and spasmodic difficulty of breathing in persons afflicted with chronic catarrh. Dr. Sigmond (*Lancet* for 1836-7, vol. ii. pp. 253-4,) says, the tincture of tobacco has been sold and used to a great extent, under the name of tincture of lobelia, and that it proved successful in spasmodic asthma. In *rigidity of the os uteri*, a tobacco clyster failed to produce relaxation, while it caused alarming constitutional symptoms. (Dr. Dewees, *Comp. Syst. of Midwif.* p. 378, 1825.)

5. *In Dropsy*.—Tobacco was recommended, as a diuretic in dropsy, by Dr. Fowler, (*op. supra cit.*) who published a number of cases of anasarca and ascites which had been relieved by it. (See also Garnett, in *Duncan's Med. Comment.* for 1797, Dec. 11, vol. vi.) Whatever benefit may have been obtained, in these cases, by the use of tobacco, should be ascribed, I suspect, rather to the sedative powers of this agent, than to its influence over the kidneys. In small doses it is an uncertain diuretic, and in larger doses it causes such distressing nausea and depression, that practitioners have long since ceased to use it in dropsical cases. The ashes of the tobacco plant have also been used in dropsy. (Garden, in *Duncan's Med. Comment.* Dec. 1, vol. iii.)

6. *As a topical remedy*.—Dr. Vetch (*Med.-Chir. Trans.* vol. xvi. p. 356) recommends the infusion, as an anodyne and sedative topical application, in gouty and rheumatic inflammation of the joints, testicle, and sclerotic coat of the eye, and in erysipelatous inflammation. Bergius (*Mat. Med.* i, 222) recommends a fomentation of tobacco leaves in phimosi and paraphimosi. An infusion or ointment of tobacco has been used in porrigo and other skin diseases, as well as in some obstinate ulcers. The smoke, applied to the hair, is a popular



means of destroying pediculi, and has been used in the form of clyster, to destroy ascarides. Dr. Sigmond (*Lancet*, 1836-7, vol. ii. p. 249) says, tobacco promotes the growth of the hair. Toothache has been relieved by tobacco smoke.

In addition to the preceding, there are various other diseases against which tobacco has been employed. Thus in *soporose affections* and *asphyxia*, tobacco clysters have been employed; but they are more likely to do harm than good. Tobacco has also been used as an *anthelmintic*.

**ADMINISTRATION.**—Tobacco is rarely administered *in substance*. Five or six grains of snuff have been taken as an emetic, and are said to have operated as effectually as two grains of emetic tartar. For internal administration the *wine of tobacco* is generally employed. Dr. Fowler used an *infusion* (prepared with an ounce of Virginian tobacco to a pound of boiling water), which he gave in doses of from sixty to a hundred drops. The best time for administering it he found to be two hours before dinner, and at bed-time. The usual *tobacco enema* is the infusion prepared according to the Pharmacopœia. The *tobacco-smoke clyster* (*clyster e fumo tabaci*) is applied by means of a proper apparatus, formerly kept by the instrument-makers. Various extemporaneous methods of employing it have been devised. (Murray, *App. Med.* t. i.) For external use tobacco is used in the form of *cataplasm* (made of the leaves and water and vinegar), *infusion* (the *tobacco water* of the shops), *smoke*, and *ointment*: all these, however, require great caution in their use, especially when applied to abraded surfaces.

**ANTIDOTES.**—If the poison have been swallowed, let the contents of the stomach be withdrawn as speedily as possible. No chemical antidote has as yet been demonstrated; but the vegetable astringents (infusion of nutgalls, green tea, &c.) deserve examination. As antinarcotics, the vegetable acids and coffee may be administered. The other parts of the treatment must be adapted to circumstances. When the depression of the vascular system is extreme, ammonia and brandy may be administered with good effect, and frictions employed: even acupuncture of the heart (!) has been suggested. (Stephenson and Churchill, *Med. Bot.*) Artificial respiration should not be omitted, when other means have failed. If apoplectic symptoms present themselves, blood-letting may, perhaps, be requisite, as in the case related by Dr. M. Hall.

1. **ENEMA TABACI**, L. E. *Infusum Tabaci*, D. (U. S.) *Tobacco Clyster*.—(Tobacco, ʒj. [gr. xv. to ʒss., E.]; Boiling Water, Oj. [Oj., *wine measure*, D.; ʒviiij. E.] Macerate for an hour [half an hour, E.], and strain.)—The want of uniformity in the formulæ of the British Colleges is greatly to be regretted; and I cannot but think that the latitude permitted by the Edinburgh College, in the quantity of tobacco employed, is highly objectionable, and calculated to lead to serious errors in dispensing. The tobacco clyster is used, as I have already stated, in ileus (volvulus), strangulated hernia, obstinate constipation, retention of urine, &c. It is not to be forgotten that two drachms, one drachm, and even half a drachm of tobacco,—nay twelve grains only—infused in water, have proved fatal, as I have before mentioned. The cautious practitioner, therefore, will not use more than 15 or 20 grains.

2. **VINUM TABACI**, E. (U. S.); *Wine of Tobacco*.—(Tobacco, ʒiijss. [ʒi. U. S.]; Sherry, Oj. [Wine, Oj. U. S.] Digest for seven [fourteen, U. S.] days, strain, express strongly the residuum, and filter the liquors.)—Sedative and diuretic. Employed in dropsy, dysury, &c. Rarely used.—Dose from ℞x. to ℞l.

3. **UNGUENTUM TABACI**, Ph. United States; *Ointment of Tobacco*.—(Fresh Tobacco, cut in pieces, ʒj.; Lard, lb. j. Boil the tobacco in the lard, over a gentle fire, until it becomes friable; then strain through linen.)—Employed as an application to irritable ulcers and skin diseases, especially *tinea capitis*; but its use requires great caution.

An *ointment*, prepared with twenty drops of the empyreumatic oil of tobacco and an ounce of simple ointment, has been applied with advantage by American



practitioners, to indolent tumours and ulcers; but, like all other preparations of tobacco, when employed externally, must be used with great caution. (*United States Dispensatory*.)

5. SOLANUM DULCAMARA, Linn. L. E. D.—WOODY NIGHTSHADE;  
BITTER-SWEET.

*Sex. Syst.* Pentandria, Monogynia.

(Caulis, L.—Twigs, E.—Caulis, D.)

(Dulcamara, U. S.)

**HISTORY.**—Sprengel (*Hist. Rei Herb.* vol. i. p. 227,) considers this plant to be the *Citocatia* of the Abbess Hildegard, of Bilgen, who died A. D. 1180. But the derivation of the word *Citocatia* (*cito* and *cacare*) negatives, in my opinion, this supposition. The first undoubted notice of Dulcamara occurs in the work of Tragus. (Sprengel, *op. cit.* p. 319.)

**BOTANY.** **Gen. Char.**—*Calyx* permanent, five to ten-parted. *Corolla* rotate; the tube very short; the limb four to six-divided, spreading. *Anthers* four to six, oblong, dehiscing at the apex by two pores. *Berry* roundish, two to six-celled. *Embryo* spiral. (*Bot. Gall.*)

**Sp. Char.**—*Stem* shrubby, zigzag, without thorns. *Upper leaves* hastate. *Clusters* cymose (Smith).

*Root* woody. *Stem* twining, branched, rising (when supported) to the height of many feet. *Leaves* acute, generally smooth; the lower ones ovate, or heart-shaped; upper more or less perfectly halbert-shaped; all entire at the margin. *Clusters* either opposite to the leaves or terminal, drooping, spreading, smooth, alternately subdivided. *Bracts* minute. *Flowers* elegant, purple, with two round green spots at the base of each segment. *Berries* oval, scarlet, juicy.

**Hab.**—Indigenous. In hedges and thickets, especially in watery situations. Flowers in June and July.

**DESCRIPTION.**—The annual stems (*caules seu stipites dulcamaræ*) are collected in the autumn, after the leaves have fallen. When fresh they have an unpleasant odour, which they lose by drying. Their taste is at first bitter, afterwards slightly acrid and sweet. The epidermis is greenish-gray, the wood light, and the pith very light and spongy.

**COMPOSITION.**—The stems have been analysed by Pfaff. (*Syst. d. Mat. Med.* Bd. vi. S. 506.) 100 parts of air-dried stems lost 17.4 parts of water when completely dried. From 100 parts of perfectly dried stems, Pfaff obtained—*bitter sweet extractive (picroglycion)* 21.817, *vegeto-animal matter* 3.125, *gummy extractive* 12.029, *gluten with green wax* 1.4, *resin containing benzoic acid* 2.74 *gummy extractive, starch, sulphate and vegetable salts of lime* 2.0, *oxalate and phosphate of lime with extractive* 4.0, and *woody fibre* 62.0. (Excess 9.111.) Desfosses (*Journ. de Pharm.* t. vii. p. 414,) discovered *solanina* in the stems.

1. **PICROGLYCION**, Pfaff (*Dulcarin*, Desfosse).—Crystalline, has both a bitter and a sweet taste, is fusible, soluble in water, alcohol, and acetic ether, and is not precipitated from its solution by either infusion of nutgalls or metallic salts. (Souberian, *Traité de Pharm.* t. ii. p. 52.) Pelletier (*Journ. de Pharm.* vii. 416,) thinks that it is sugar combined with solanina.

2. **SOLANINA**.—Resembles sulphate of quinia, but its needle-like crystals are finer and shorter. It restores the blue colour of litmus paper reddened by an acid. It dissolves in acids, and is precipitated from its solution by the caustic alkalis. Some of the salts (as the acetate and hydrochlorate) have a gummy appearance when evaporated to dryness: others (as the phosphate and sulphate) are crystallizable. According to Blanchet it consists of *Carbon* 62.11, *Hydrogen*, 8.92, *Nitrogen* 1.64, *Oxygen* 27.33. If this analysis be correct, solanina differs from the other vegetable alkalis in the small quantity of nitrogen which it contains. A grain of solanina, dissolved in dilute sulphuric acid, killed a rabbit in six hours: four grains of the sulphate caused, in an hour, paralysis of the hind legs, and in eight hours, death. (Otto, *Pharm. Central-Blatt für* 1834, S. 455.) Soubeiran says it does not dilate the pupils, like the other alkalis of Solanaceæ.

**PHYSIOLOGICAL EFFECTS.**—Not very obvious. Its decoction operates as a



diaphoretic and diuretic. It is said also to promote secretion from the mucous surfaces, and to diminish sensibility. In excessive doses dulcamara is stated to have acted as an acro-narcotic. (Murray, *App. Med.* t. i. p. 60; and Schlegel, *Hufeland's Journ.* Bd. liv. St. 2, S. 27.) Chevallier (*Dict. des Drog.* t. ii. p. 228,) says, a young man experienced narcotism from carrying a bundle of the plant on his head. But the accuracy of all these observations has been called in question by Jos. Frank; (*Handb. d. Toxicol.* S. 61, 1803,) by Dunal, and by Fages. (Orfila, *Toxicol. Gén.*) The first gave the decoction, the latter the extract and fruit, in very large doses, without any very obvious effects.

Uses.—Dulcamara has been thought serviceable in chronic pulmonary catarrhs, in rheumatic and gouty complaints, in chronic skin diseases, and in various cachectic conditions of the system, in which sarsaparilla has been found beneficial. As a remedy for lepra, it was introduced to the notice of British practitioners by Dr. Crichton. For this disease it has been declared a most effectual remedy by Bateman (*Synopsis of Cutan. Diseases*); while Rayet (*Treat. on Dis. of the Skin*, by Dr. Willis, p. 91,) speaks of its good effects in eczema and psoriasis. In the few cases in which I have tried it, it proved useless.

DECOCTUM DULCAMARÆ, L. E. D. (U. S.); *Decoction of Bittersweet*.—(Dulcamara, sliced [chopped down, *E.*], ʒx. [ʒj. *E.* (U. S.)]; Water [distilled, *L.*], Ojss. [ʒxxiv. *E.*; wine measure, *D.*] Boil down to a pint, and strain.)—Diaphoretic and diuretic. The usual dose, stated in books, is ʒss. to ʒj. But I have given ʒiv. for a dose. Rayet has given four ounces of the root in decoction in twenty-four hours.

#### 6. CAPSICUM ANNUUM, Linn. L. E. D.—COMMON CAPSICUM; CHILLY.

*Ser. Syst.* Pentandria, Monogynia.

(Bacca, *L.*—Fruit of *Capsicum annuum* and other species; *Capsicum* or *Chillies*, *E.*—*Capsula cum seminibus*, *D.*) (*Capsicum*, U. S.)

HISTORY.—The *Piperitii* or *Siliquastrum* of Pliny (*Hist. Nat.* lib. xix. cap. 62, and lib. xx. cap. 66, ed. Valp.) is declared by Sprengel (*Hist. Rei Herb.* vol. i. p. 201) to be undoubtedly *Capsicum annuum*. But confidence in this opinion is greatly diminished by the doubt entertained as to this plant being a native of Asia. (Roxburgh, *Fl. Ind.* vol. i. p. 573; Royle, *Illustr.* p. 27.) Of course, if it be exclusively a native of America, there is no reason for supposing that Pliny could have been acquainted with it. The term *capsicum* (καπίσκον) occurs first in Actuarius.

BOTANY. *Gen. Char.*—*Calyx* five-toothed, persistent. *Corolla* rotate, five-cleft. *Anthers* converging, two-celled, dehiscing by fissures. *Berry* juiceless, papery, hollow, two to four-celled, many-seeded, naked. *Seeds* naked. (*Trans. Linn. Soc.* vol. xvii. part i. p. 62.) (Nees von Esenbeck.)

*Sp. Char.*—*Peduncles* solitary. *Fruit* oblong, pendulous. *Petioles* smooth. *Stem* herbaceous. (Willdenow.)

*Herbaceous* annual, one to two feet high. *Leaves* ovate or oblong, acuminate, long-stalked, almost entire, sometimes hairy on the veins underneath. *Flowers* white. *Berry* either scarlet or yellow, variable in shape, being oblong, round, or cordate.

*Hab.*—America. A doubtful native of the East Indies. Cultivated in England.

DESCRIPTION.—The dried fruit, sold by druggists as *chillies*, is flat, more or less shrivelled, oblong, blunt or pointed at one end, while the calyx or stalk is usually attached at the other end. The length of the berry (independent of the stalk) is two or three inches, the breadth one-half to three-quarters of an inch, the colour yellowish or reddish-brown, the taste hot and pungent, the odour none. The epidermis is tough and leathery; the seeds are flattened and whitish. The recent fruit, called *capsicum* or *chillies*, grown in this country, and sold for



pickling, is, when ripe, yellow or red, but it is frequently gathered green: its size and shape are variable: the *oblong* varieties are from one to three or four inches long: the *round* variety (*cherry chilly*) is about as large as a cherry.

COMPOSITION.—The fruit was analysed in 1816, by Maurach (*Berl. Jahrb.* Bd. xvii. S. 63); in the same year by Bucholz (Gmelin, *Handb. d. Chem.* ii. 1310); and in the following year by Braconnot. (*Ann. de Chim. Phys.* vi. 122.)

<i>Bucholz's Analysis.</i>		<i>Braconnot's Analysis.</i>	
Acrid soft resin ( <i>capsicin</i> ).....	4.0	Acrid oil.....	1.9
Wax.....	7.6	Wax with red colouring matter.....	0.9
Bitter aromatic extractive.....	8.6	Brownish starchy matter.....	9.0
Extractive with some gum.....	21.0	Peculiar gum.....	6.0
Gum.....	9.2	Animalized matter.....	5.0
Albuminous matter.....	3.2	Woody fibre.....	67.8
Woody fibre.....	28.0	Salts (citrate of potash 6.0, phosphate of potash, and chloride of potassium 3.4).....	9.4
Water.....	12.0		
Loss.....	6.4		
Fruit of <i>Capsicum annum</i> without seeds.....	100.0	Fruit of <i>Capsicum annum</i> .....	100.0

CAPSCICIN, Bucholz (*Acrid Soft Resin*; *Acrid Oil*, Braconnot).—Obtained by digesting the alcoholic extract in ether, and evaporating the ethereal solution. It is a thick liquid, of a yellowish-red or reddish-brown colour, which becomes very fluid when heated, and, at a higher temperature, is dissipated in fumes. Half a grain of it, volatilized in a large room, causes all who respire the air of the room to cough and sneeze. By exposure to air and light it solidifies. It is decolorized by chlorine. It is slightly soluble in water and in vinegar; but very much so in alcohol, ether, oil of turpentine, and the caustic alkalis. With baryta it forms a solid acrid combination.

PHYSIOLOGICAL EFFECTS.—Capsicum belongs to the spices (see vol. i. p. 183), and is more closely allied, by its effects, to the peppers (see p. 183) than to any other article of the *Materia Medica*. Sundelin, (*Handb. d. sp. Heilm.* Bd. ii. S. 44, 3<sup>te</sup> Aufl.) however, considers it to be more related to pyrethrum. Its active principle is more fixed, and its operation is more permanent and violent, than mustard or horse-radish.

Its hot and fiery taste is familiar to every one. Applied to the skin, capsicum proves rubefacient and vesicant. Swallowed in small doses, it creates a sensation of warmth in the stomach, and in torpid and languid habits proves a valuable stimulant, and a promoter of the digestive functions. Taken in somewhat larger quantities, it produces a glow over the body, excites thirst, and quickens the pulse: the latter effect, however, is not in proportion to its local effect. Like the peppers, it is said to exercise a stimulant influence over the urino-genital organs. In excessive doses, we can easily believe that vomiting, purging, abdominal pain, and gastric inflammation, ascribed to it by Vogt, (*Pharmakodyn.* Bd. ii. S. 581, 2<sup>te</sup> Aufl.) may be induced by it, though I am not acquainted with any cases in which these effects have occurred. Richter (*Ausf. Arzneim.* Bd. ii. S. 179) mentions, in addition to the symptoms just mentioned, a paralysed and altered condition of the nervous influence, an affection of the head, drunkenness, and giddiness, as being produced by large doses.

USES.—Capsicum is more employed as a *condiment* than as a medicine. It is added to various articles of food, either to improve their flavour, or, if difficult of digestion, to promote their assimilation, and to prevent flatulence. The inhabitants of tropical climates employ it to stimulate the digestive organs, and thereby to counteract the relaxing and enervating influence of external heat (vol. i. pp. 47, 48).

As a *medicine* it is principally valuable as a local stimulant to the mouth, throat, and stomach. Its constitutional not being in proportion to its topical effects, it is of little value as a general or diffusible stimulant. Administered internally capsicum has long been esteemed in cases of *cynanche maligna*. It was used, in 1786, with great success, by Mr. Stephens (*Duncan's Med. Comment.* Dec. 2d, vol. ii. 1788) and by Mr. Collins. (*Med. Communications*, vol. ii. p. 372, 1790.) It promoted the separation of the sloughs, and soon improved the constitutional symptoms. Mr. Headby (*Lond. Med. and Phys.*



*Journ.* vol. v. p. 425, 1801) also employed it both internally and by way of gargle. Its use has been extended to *scarlatina anginosa*. (Kreysig, *U. d. Scharlachfieber*, 1803, in Voigtel's *Arzneim.*) As a gargle, in relaxed conditions of the throat, its efficacy is undoubted. The powder or tincture may be applied by means of a camel's-hair pencil to a relaxed uvula. It is a very useful gastric stimulant in enfeebled, languid, and torpid conditions of the stomach. Thus, in the dyspepsia of drunkards, as well as of gouty subjects, it has been found useful. (Chapman, *Elem. of Therap.* vol. ii.) In various diseases, attended with diminished susceptibility of stomach, capsicum is an exceedingly useful adjunct to other powerful remedies, the operation of which it promotes by raising the dormant sensibility of this viscus: as in cholera, intermittents, low forms of fever, dropsies, &c. Dr. Wright (*Med. Facts and Observ.* vol. viii.) speaks in high terms of it as a remedy for obviating the black vomit—a symptom of the fever of tropical climates, at one time considered fatal. A capsicum cataplasm may be used with advantage to occasion rubefaction, in any cases in which a rubefacient counter-irritant is indicated; as in the coma and delirium of fever, in chronic rheumatism, &c.: unless kept on for a long period it does not vesicate.

**ADMINISTRATION.**—The powder of capsicum is usually given in doses of from gr. v. to gr. x., made into pills with crumbs of bread. The dose of the tincture will be mentioned presently. The infusion (prepared by digesting ʒij. of capsicum in fʒx. of boiling water for two hours) may be administered in doses of fʒss. But, in malignant sore throat and scarlatina, capsicum has been employed in much larger doses. *Stephen's pepper medicine* consisted of two table-spoonsful of small red pepper [*Capsicum frutescens*], or three of the common Cayenne pepper, and two teaspoonsful of fine salt, digested in half a pint of boiling water. To the liquor, strained when cold, half a pint of very sharp vinegar is added. A table-spoonful of this mixture is given to an adult every half hour. The capsicum gargle is prepared by infusing ʒss. of capsicum in a pint of boiling water; or by adding fʒvj. of the tincture to fʒviiij. of the infusion of roses; or, in some cases, *Stephen's pepper medicine* may be used as a gargle.

**TINCTURA CAPSICI, L. E. D. (U. S.); Tincture of Capsicum.**—(Capsicum, bruised [or, if percolation be followed, in moderately fine powder, *E.*], ʒx.; Proof Spirit, Oij. [*wine measure*, *D.*] Digest for fourteen [seven, *E.*] days, and strain [squeeze the residuum, and filter the liquors. (Cayenne Pepper, ʒi; Diluted Alcohol, Oij. U. S.) This tincture is best prepared by percolation, which may be commenced as soon as the capsicum is made into a pulp with a little of the spirit, *E.*])—Dose ʒxx. to fʒj. Employed in the low stage of typhus and scarlet fevers, and in gangrenous sore throat, and to prevent the nausea which oil of turpentine is apt to occasion (see p. 169). Properly diluted, it may be used as a gargle, as above mentioned.

#### OTHER DIETETICAL, MEDICINAL, OR POISONOUS SOLANACEÆ.

1. **HYOSCYAMUS ALBUS** is endowed with properties similar to those of *H. niger*; for which it has sometimes been employed in medicine. (Fouquier, *Archiv. Gén. de Méd.* Mars 1823; Chevallier, *Journ. de Chim. Méd.* t. ii. p. 36.)

2. **MANDRAG'ORA OFFICINA' LIS**, the *Mandrake*, is an acro-narcotic poison: when swallowed it purges violently. (Brandt and Ratzeburgh, *Deutsch. phan. Giftpflanzen*, S. 79.) The roots, from their fancied resemblance to the human form, were called *anthropomorphon*, and were supposed to prevent barrenness. (Matthioli, *Comm. Dioscor.*) The root of *Bryonia dioica* is sold at the herb-shops as a substitute for mandrake.

3. Several species of **DATU'RA** are employed in the East: their effects and uses are analogous to those of *D. Stramonium*. In 1802 General Gent introduced *D. ferax* into this country as a remedy for asthma. It was employed by smoking it. (*Ed. Med. and Surg. Journ.* vol. viii. p. 365.) Waitz (Wibmer, *Wirk. d. Arzn. u. Gift.* Bd. ii. S. 286) says, that half an upright capsule acted violently on a girl. In 1811 Dr. Christie (*op. cit.* vol. vii. p. 158) di-



rected attention to *D. fastu'osa*. Mr. Skipton (*Trans. Med. and Phys. Soc. Calcutta*, vol. i. p. 121) administered the decoction of the root of this plant; and Dr. Adams (*op. cit.* p. 370) used a tincture (prepared as tincture of digitalis, *Ph. L.*) *D. Mel'el* and *D. Tat'ula* appear to possess similar properties. Both species have been employed, especially in the East, to cause intoxication for criminal and licentious purposes. (*Lond. Med. and Phys. Journ.* vol. xxv. p. 383-384; and vol. xxvi. p. 22.) Schubarth (Wibmer, *op. cit.* p. 300) gave half a pound of the bruised leaves of *D. Tatula* to a horse without effect; twenty-one ounces of the half-ripe fruit caused dejection, increased secretion, and loss of appetite. *D. arbo'rea* operates like stramonium. (*Op. cit.* p. 285.)

4. *SOLA'NUM NIGRUM*, or *Black Nightshade*, possesses narcotic properties, but its activity is not very great. It contains *solanina*. (Brandt and Ratzeburgh, *Deutschl. phan. Giftgewächse*, S. 83; Orfila, *Toxicol. Gén.*) It has been employed in medicine as a resolvent. (Gataker, *Obs. on the Use of Solanum*, 1757; Bromfield, *Account of the English Nightshades*, 1757.)

FIG. 199.

*Solanum tuberosum*.

5. *SOLA'NUM TUBEROSUM*, or the *Potatoe*, is, next to the *Cerealia*, the most important vegetable for dietetical purposes. It was introduced into England, from America, in 1586, by Sir Walter Raleigh. The part employed as food is produced by the subterranean stems, and is called a *tuber*: the parts on it, called *eyes*, are buds, which, with another portion of the tuber, are used for multiplying the species, under the name of *sets*. The tissue of potatoe is cellular; each cell containing from ten to twelve grains of starch.\* Both in the cells and in the intercellular spaces is an albuminous liquid. By boiling, the cells are separated, the starch grains absorb the albuminous liquid, swell up, and completely fill the cells; while the albumen coagulates, and forms irregular fibres, which are placed between the starch grains.

FIG. 200.



Cells of the Potatoe.

- a, Cell before boiling containing the starch particles.  
b, Cell of a mealy potatoe after boiling.

Potatoes in which these changes are complete, are called *mealy*, while those in which the liquid is only partially absorbed, and the coagulation imperfectly effected, are denominated *doughy* or *watery*. (Fritzsche, in *Poggendorff's Ann. d. Phys. u. Chem.* Bd. xxxii. S. 159.) Potatoe has been repeatedly subjected to chemical examination. The most important labours are those of Einhof, Lampadius, and Vauquelin. (Gmelin's *Handb. d. Chem.* Bd. ii.; and Thomson's *Org. Chem.*) The principal constituents of potatoe are *starch*, *starchy fibrin*, *albumen*, *gum*, *acids*, *salts*, and *water*. The relative proportions vary with the season, the varieties of the potatoe, &c. Otto has discovered *solanina* in the potatoe, especially in the bud—a fact which explains the cause of the ill effects which have been observed to arise from the use of germinated potatoe by cattle. (*Pharm. Central-Blatt für 1834*, S. 455.) Payen and Persoz (Thomson, *Org. Chem.* p. 666.) found *diastase* in the neighbourhood of the bud of the potatoe. *Potatoe starch* (*English Arrowroot*, offic. *Amylum Solani tuberosi*) consists of particles of varied shapes and sizes; the normal form is probably ovate. Their size varies from one six-hundredth to one-thirtieth of a line in diameter. They are characterized by concentric rings observed on their surface, and which Fritzsche (*op. cit.*) regards as indications of concentric layers, of which he asserts these grains to be composed. The hilum is circular. The cracks observed on some of the larger grains proceed usually from the hilum (see p. 81, fig. 136). The particles of the fecula of *Canna coccinea* (see p. 141, fig. 152) present similar rings, but are much larger. *Sago* is made of potatoe starch. It has already been described (see p. 81). Potatoe starch has been analyzed by Berzelius and Guérin-Vary. According to the latter, (*Journ. de Pharm.* t. xxii. p. 210.) one hundred parts consist of 2.12 parts of matter insoluble in water (*tegumentary amylin*), of 38.13 of *soluble amidin*, and 59.75 of *amylin*: the

FIG. 201.



Particles of Potatoe starch seen by the microscope.

- a, Normal starch particle (Fritzsche).  
b, Irregular ditto.  
c, d, Particles each having two hila.  
e, f, g, Particles broken by pressure and water; the internal matter remains solid (Payen).

*amidin* consists of  $C^{14} H^{10} O^3$ ; the *amylin* of  $C^{10} H^2 O^2$ . The quantity of starch obtained from potatoe varies with the kind used, as well as with the season: one hundred pounds of

\* See Turpin's *Mémoire sur l'Organisation intérieure et extérieure des tubercles du Solanum tuberosum* in the *Mémoires du Muséum d'Hist. Naturelle*, t. xix. Paris, 1830.



potatoes yield in August about 10 lbs., in September 14½ lbs., in October 14½ lbs., in November 17 lbs., in March 17 lbs., in April 13½ lbs., in May 10 lbs. (De Candolle, *Phys. Vég.* p. 181.) Sugar is sometimes manufactured from potatoes. By fermentation potatoes yield a vinous liquid (*potatoe wine*) of good quality. (Loudon's *Encycl. of Agriculture*, p. 853.) By distillation this yields *potatoe spirit*, (Donovan, in Lardner's *Cyclopedia*), from which a volatile oil (*oil of potatoes*) has been extracted (see vol. i. p. 312). An *extract*, obtained from the stalks and leaves of potatoes, was declared by Dr. J. Latham (*Med. Trans.* vol. i. p. 92.) to possess narcotic properties, in doses of two or three grains; but the cases adduced are not satisfactory. Furthermore, his experiments were repeated by Dr. Worsham (*United States Dispensatory*), with very different results; for 100 grains produced no sensible effects. The observations of Nauche, however, tend to confirm Latham's statements. The tubers (potatoes), when boiled, are a valuable article of food, both for men and animals. Those of good quality are not only perfectly innocuous, but highly nutritious, and easy of digestion. In the raw state they have been found less nutritive for animals, while on man they are said to prove laxative and diuretic, and to excite, slightly, the nervous system. (Nauche, *Journ. de Chim. Méd.* t. vii. p. 373.) The process of cooking is probably useful in two ways; by rendering the starch digestible, and, secondly, by extracting some noxious matter. Nauche (*Journ. de Chim. Méd.* t. vii. p. 373), found the decoction of potatoes endowed with medicinal properties; and Otto, as already mentioned, detected solanina in them. Potatoes have been praised as useful antiscorbutics. (Julia-Fontenelle, *Ibid.* t. ii. p. 129.)

6. *CAP'SICUM FRUTESCENS*, Linn. yields the capsules sold by Druggists as *Guinea pepper* or *bird pepper* (*bacca capsici*), as I have satisfied myself by comparing the commercial article with the East Indian *Solanaceæ* belonging to the Linnean Society. These capsules do not exceed an inch in length, and are about two or three lines broad: their colour is orange red; their odour aromatic and pungent. Their properties are similar to those of chillies (see p. 324), than which they are much hotter and more fiery. Their powder is *Cayenne Pepper*, so extensively employed as a condiment. *Cayenne Lozenges* and *Essence of Cayenne* (an alcoholic tincture) are kept in the shops.

#### ORDER XXXIX.—BORAGINACEÆ, Lindley.—THE BORAGE TRIBE.

BORAGINÆ, Jussieu.

The plants of this order are harmless, and, for the most part, inert. Their prevailing constituent is mucilage. Nitre is also found in some species. The colouring principle (*anichusic acid* C<sup>17</sup> H<sup>10</sup> O<sup>6</sup>) of *Anchusa tinctoria*, or *Alkanet*, dissolves in fatty substances, and hence is employed to colour unguents and oil (as *lip salve* and *hair oil*). It becomes blue on the addition of an alkali.

#### ORDER XL.—CONVOLVULACEÆ, R. Brown.—THE BINDWEED TRIBE.

CONVOLVULI, Jussieu.

ESSENTIAL CHARACTER.—*Calyx* five-sepaled. *Sepals* persistent, equal, or unequal, in one- three rows; often becoming enlarged. *Corolla* monopetalous, hypogynous, regular; the limb five-plicate, or five-lobed; contorted in æstivation. *Stamens* five, inserted into the corolla. *Antthers* often contorted after the injection of the pollen. *Nectary* annular, often conspicuous. *Ovary* single, two to four-celled; or two to four ovaries. *Cells* one to two-seeded. *Style* one, entire or bifid. *Stigma* bilobed. *Fruit* dehiscing by the valves; rarely transversely. *Seeds* inserted into the base of the ovaries; *testa* black. *Cotyledons* foliaceous, corrugated. *Radicle* incurved, inferior.—Generally twining plants, with alternate, simple, entire, or lobed leaves. *Pedicels* bibracteate. *Stem* often filled with a milky purgative juice.

PROPERTIES.—The roots contain a milky purgative juice, which owes its essential properties to resin.

#### 1. CONVULVULUS SCAMMONIA, Linn. L. E. D.—THE SCAMMONY.

Sex. Syst. Pentandria, Monogynia.

(Gummi-resina, L. D.—Gummy-resinous exudation from incisions into the root, E.)

(Scammonium, U. S.)

HISTORY.—A purgative substance called *σχαμμώνια*, was known to the Greeks long before the time of Hippocrates. (Voigtels, *Arzneimittell.* Bd. i. S. 17; Bischoff, *Handb. d. Arzneimittell.* Bd. i. S. 40.) The father of medicine, who frequently employed it, says that it evacuates, both upwards and downwards, bile and mucus, and expels flatus. (*De Morb. Mul.* p. 597, ed. Fæs.) There is, however, some reason to believe that the ancients did not procure their scam-