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**Elements of materia medica**

The vegetable and animal materia medica

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Order 53.

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spherical mericarps, adherent by their concave surfaces. Each mericarp has five primary ridges, which are depressed and wavy; and four secondary ridges, more prominent and carinate. The channels are without vittæ, but the commissure has two. The odour of coriander is peculiar and aromatic.

COMPOSITION.—The odour, taste, and medicinal qualities of the fruit depend on volatile oil.

*Volatile Oil of Coriander (Oleum Coriandri).*—Yellowish; smells strongly and pretty agreeably of the coriander.

PHYSIOLOGICAL EFFECTS.—Aromatic stimulant, like the other carminative umbelliferous fruits (p. 72).

USES.—Dr. Cullen considered coriander as more powerfully correcting the odour and taste of senna than any other aromatic; and hence it was formerly a constituent of the compound infusion of senna, though now ginger is substituted for it. It is only employed in medicine as an adjunct or corrigent. It is used, however, by the confectioners and distillers. It is a constituent of the *confectio sennæ*. The dose of coriander is ʒss. to ʒj.

#### Other Umbelliferae, Dietetical or Poisonous.

All the important medicinal Umbelliferae have been noticed. It remains now to enumerate those plants in common use for dietetical purposes, or which are indigenous and poisonous.

Of the *Dietetical Umbelliferae* several have been already mentioned. To these may be added Parsley (*Petroselinum sativum*) and Chervil (*Anthriscus Cerefolium*), used as pot-herbs and garnishings; the Parsnip (*Pastinaca sativa*) and Skirret (*Sium Sisarum*), employed on account of their esculent roots; Celery (*Apium graveolens*), an acetarious plant, the blanched leaf-stalks of which are eaten raw as a salad; Common Samphire (*Crithmum maritimum*), which is pickled; Eryngo (*Eryngium campestre*), the root of which is preserved, and eaten as a candy (*Candied Eryngo*; *Radix Eryngii condita*); and Lovage (*Levisticum officinale*), used by distillers for preparing a liqueur termed *lovage*.

The *Poisonous Indigenous Umbelliferae* are acro-narcotics. When swallowed they cause gastric irritation, giddiness, delirium, convulsions, and coma. The most important (after Conium maculatum, before mentioned), are Fool's Parsley (*Aethusa Cynapium*), which contains a peculiar alkaloid called *cynapina*; Hemlock Water-dropwort (*Enanthe crocata*); Celery-leaved Water-dropwort (*Enanthe apiifolia*), and Water Hemlock (*Cicuta virosa*).

#### ORDER 53. CUCURBITACEÆ, Jussieu.—THE GOURD TRIBE.

ESSENTIAL CHARACTER.—Flowers usually unisexual, sometimes hermaphrodite. Calyx five-toothed, sometimes obsolete. Corolla five-parted, scarcely distinguishable from the calyx, very cellular, with strongly-marked reticulated veins, sometimes fringed. Stamens five, either distinct or cohering in three parcels; anthers two-celled, very long and sinuous. Ovary inferior one-celled, with three parietal placentæ; style short; stigmas very thick, velvety or fringed. Fruit fleshy, more or less succulent [occasionally dry, opening by valves], crowned by the scar of the calyx, one-celled [in some Momordicas three- or four-celled], with three parietal placentæ. Seeds flat, ovate, enveloped in an aril, which is either juicy, or dry and membranous; testa coriaceous, often thick at the margin; embryo flat, with no albumen; cotyledons foliaceous, veined; radicle next the hilum.—Roots annual or perennial, fibrous or tuberous. Stem succulent, climbing by means of tendrils formed by abortive leaves

(stipules, *St. Hil.*) *Leaves* palmated, or with palmate ribs, very succulent, covered with numerous asperities. *Flowers* white, red, or yellow (Lindley).  
 PROPERTIES.—Variable; suspicious. The roots and fruits of many species are drastic cathartics. The fruits of other species are employed as articles of food.

*Cucumis Colocyn'this*, Linn. L. E. D.—*The Bitter Cucumber, or Colocynth.*

*Sex. Syst.* Monœcia, Syngenesia\* (Linn.)

(*Peponum Pulpa Exsiccata*, L.—Pulp of the Fruit, E.—Fructus pulpa, D.)

HISTORY.—Colocynth is supposed to be the plant termed, in the Old Testament (2 Kings, iv. 39), the *wild vine* (literally *the vine of the field*), whose fruit the Sacred historian calls *pakkoth*, a word which in our translation is rendered *wild gourd*. To understand the passage referred to, it is to be remembered that different kinds of gourd are commonly used in the East for shredding into pottages (*Picture Bible*, ii. 226). Colocynth was employed by the Greeks at a very early period. Hippocrates (263 & 265, ed. Fœs.) employed *κολοκυνθίς ἄγρια* (*cucurbita sylvestris*, or *wild gourd*) only in pessaries for bringing on menstruation. Dioscorides (lib. iv. cap. 178) gives a good description of colocynth. Pliny (*Hist. Nat.* lib. xx. 8, ed. Valp.) calls it *colocynthis*.

BOTANY. *GEN. CHAR.*—*Calyx* tubular-campanulate, with subulate segments scarcely the length of the tube. *Petals* scarcely adherent to each other and to the calyx. *Males: stamina* five, triadelphous. *Females: stigmas* three, thick, bipartite. *Fruit (peponida)* three- to six-celled. *Seeds* ovate, compressed, not marginate.—*Flowers* monœcious or hermaphrodite, yellow (D. C.)

*SP. CHAR.*—*Stem* procumbent, somewhat hispid. *Leaves* cordate-ovate, many-lobed, white, with hairs beneath; the lobes obtuse; the petioles as long as the lamina. *Tendrils* short. *Flowers* axillary, solitary, stalked; *females* with the tube of the calyx globose, somewhat hispid, the limb campanulate, with narrow segments. *Petals* small. *Fruit* globose, smooth, yellow when ripe, with a thin solid rind and a very bitter flesh (D. C.)

*Root* annual, white, branched. *Stems* herbaceous, angular, branched. *Leaves* bright green on the upper side, paler and clothed with whitish hairs underneath. *Tendril* filiform, branching, opposite each leaf.

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\* The followers of Linnæus are by no means agreed with their great master, or among themselves, as to the true order of Cucumis, and some other cucurbitaceous genera. The male flowers have, apparently, three stamina; but of these two have an anomalous structure, and are regarded by some botanists as stamina with doubly-folded anthers; by others, as being composed each of two adherent stamina. Hence some have regarded the flowers as *triandrous*, some as *pentandrous*; the latter, taking into account the adhesion of the stamina, consider them to be *syngenesious, triadelphous (polyadelphous)*, or *monadelphous*. So that while Linnæus adopted *Monœcia, Syngenesia*, as the class and order, Turton placed Cucumis in *Monœcia, Triandria*; Smith in *Monœcia, Pentandria*; or *Mon. Polyadelphia* (see his *Introd. to Botany*, p. 363, 4th ed.); Willdenow, Persoon, Loudon, &c. in *Monœcia, Monadelphia*; while Sprengel, in conformity with his modification of Linnæus's sexual system, places it in *Monadelphia, Monandria*.

*Calyx* five-toothed. *Corolla* yellow with greenish veins. *Males*: *stamens* three, short, free; two of which have doubly bent anthers, or consist of two anthers; in which case the number of stamens is really five. *Females*: *ovarium* round, smooth, inferior; *style* short, cylindrical; *stigmas* three; *filaments* without anthers. *Fruit (pepo)* about the size of an orange, with a thin but solid rind.

*HAB.*—Japan, the sandy lands of Coromandel, Cape of Good Hope, Syria, Nubia, Egypt, Turkey, and the islands of the Grecian Archipelago. Cultivated in Spain.

*PREPARATION OF THE FRUIT.*—The fruit is gathered in autumn, when ripe and yellow, and in most countries is peeled and dried, either by the sun or by stoves.

*COMMERCE.*—Colocynth is imported from Spain (Almeria, Gibraltar, Cadiz, Malaga, &c.), Trieste, Malta, Smyrna, Alexandretta, Mogadore, &c. It comes over in cases, casks, boxes, &c. In 1839, duty (2d. per lb.) was paid on 10,417 lbs.

*DESCRIPTION.*—The fruit called *colocynth* or *colocynthida* (*colocynthis*; *poma colocynthidis*) is imported either *peeled* (generally), or sometimes *unpeeled*. Its *pulp (pulpa colocynthidis exsiccata)* is nearly white, inodorous, light, spongy, porous, tough, intensely and nauseously bitter. The *seeds (semina colocynthidis)* are smooth, either white or yellowish white (*white colocynth seeds*), or brownish (*black colocynth seeds*), bitter (especially the dark-coloured ones) and inodorous. By digesting them in repeated portions of boiling water, and afterwards well washing them, the greater part of the bitterness may be extracted. Two kinds of colocynth, distinguished as *Turkey* and *Mogadore colocynth*, are known in commerce.

*a. Turkey Colocynth: Peeled Colocynth.*—This is imported from the Levant, Spain, &c. The usual size of each pepo is about two or three inches in diameter; the shape is more or less globular, according to the evenness with which the rind has been removed, and the degree of contraction in drying; the colour is white, or pale yellowish white. One hundred parts by weight are said to consist of 28 parts pulp, and 72 parts seeds.

*β. Mogadore Colocynth: Unpeeled Colocynth.*—The pepo of this kind is larger than the preceding, and is covered with a yellowish smooth, firm rind. It is imported from Mogadore in small quantity only, and is principally used by druggists for shew-bottles.

The seeds of colocynth are usually described as white, perfectly bland, and highly nutritious. Captain Lyon (Duncan, *Edinb. Dispens.*) states they constitute an important article of food in Northern Africa. "The seeds of Cucurbitaceæ," says DeCandolle (*Essai sur les Prop. Méd. des Plantes*, 191), "do not participate in the qualities of the pulp which surround them; they are bland, demulcent, of an oily nature, and susceptible of easily taking the form of an emulsion." These statements do not apply to Colocynth seeds of commerce, which I never found devoid of bitterness; and Hillefeld (Marx, *Lehre v. d. Giften*. ii. 27) says a scruple of them purged a dog. Heise (*Ibid.* 34) found them poisonous.

*COMPOSITION.*—In 1817, Braconnot (*Journ. de Phys.* lxxxiv. 337) analyzed the watery extract. The pulp was analyzed in 1818 by Meissner (Pfaff's *Syst. d. Mat. Med.* vi. 365). Vauquelin (*Journ. de Pharm.* x. 416) examined the active principle.

*Meissner's Analysis.*

Bitter matter ( <i>Colocynthin</i> )	14.4
Extractive	10.0
Bitter fixed oil	4.2
Resin insoluble in ether	13.2
Gum	9.5
Bassorin	3.0
Gummy extract (obtained from the ligneous fibre by potash)	17.0
Vegetable jelly	0.6
Phosphate of lime and magnesia	5.7
Ligneous fibre	19.2
Water	5.0

Colocynth Pulp..... 101.8

*Braconnot's Analysis.*

Bitter matter ( <i>Colocynthin</i> ), with some resin	41.4 4.3
Resin	18.6
Vegetable jelly ( <i>pectin</i> )	21.4
Azotic matter	5.7
Acetate of potash	
Deliquescent salt of potash not soluble in alcohol	7.1
Watery Extract of Colocynth	98.5

*Colocynthin*; *Colocynthite*; *Bitter* or *Purgative Principle of Colocynth*.—By digesting the watery extract of colocynth in alcohol, and evaporating the tincture thus prepared, we obtain a mass, composed, according to Vauquelin, of a bitter principle and acetate of potash. A little water readily dissolves the latter, leaving the bitter resinoid matter, to which the name of *Colocynthin* has been applied. It is a yellowish brown, translucent, brittle substance, dissolving in water, but much more readily in alcohol. The aqueous solution is precipitated by the tincture of galls, and by some metallic solutions (protosulphate of iron, sulphate of copper, and nitrate of mercury).

**CHEMICAL CHARACTERISTICS.**—The cold infusion is pale yellow, and very bitter; nitrate of mercury, sulphate of copper, and acetate of lead, cause in it gelatinous-flocculent precipitates, (*pectates*?) ; sesquichloride of iron and tincture of nutgalls do not render it turbid. Powdered colocynth gives scarcely any evidence of the presence of starch, on mixing it with tincture of iodine and water.

**PHYSIOLOGICAL EFFECTS.**—(a.) *On animals generally.*—The animals on whom the action of colocynth has been examined, are horses, dogs, sheep, and pigs. On dogs its operation appears to be analogous to that on man. Thus Viborg (Wibmer, *Wirk. d. Arzneim. u. Gifte*. ii. 230), states that two drachms caused in a dog violent vomiting and purging; and Orfila (*Toxicol. Gén.*) has shown that three drachms introduced into the stomach (the œsophagus being tied) are capable of causing death. It is remarkable, however, that its operation on horses is comparatively slight, at least according to the testimony of Viborg, Bourgelat, and Moiroud (*Pharm. Vét.* 274). The last-mentioned writer says he has given four drachms to a small horse without exciting the least disorder; and he adds that another cucurbitaceous plant (briony) has likewise very little effect on the horse.

(b.) *On Man.*—Thunberg (*Travels*, ii. 171) tells us that, at the Cape of Good Hope, the colocynth fruit is said to be eaten when pickled, both by the natives and colonists, although it is very bitter. This statement, however, is, *à priori*, so improbable, that we may fairly suspect some error, especially as Thunberg does not assert it on his own authority.

Colocynth taken in *small* or *moderate* doses acts as a very safe and useful purgative. Its operation is not limited to the acceleration of the vermicular movements, but is extended to the secreting and exhaling vessels of the alimentary canal, whose functions it promotes. Moreover, it stimulates the other abdominal organs; and after the absorption of its bitter acrid principle, it not unfrequently proves diuretic. *In full doses*, it operates as a very active or drastic cathartic and hydragogue; but I have never seen any ill effect from its use. These remarks apply to the

compound extract, the only preparation of colocynth of which I have personal experience. It would appear, partly from observation in the human subject, and also from the experiments of Orfila on dogs, that colocynth is one of those purgatives which exert a specific stimulant influence over the large intestines.

In *excessive doses*, colocynth, both in powder and decoction, has on several occasions operated as a mortal poison, causing violent vomiting and purging, griping pain, and other symptoms of gastro-intestinal inflammation. A tea-spoonful and a half of the powder (about ʒiiss.) has proved fatal (Christison, *On Poisons*). In a case related by Orfila (*Toxicol. Gén.*) there were, besides the preceding symptoms, dimness of sight and slight delirium. In M. Carron d'Ancey's case (*Ibid.*) the purging was followed by extreme tension and tenderness of belly, suppression of stools and urine, retraction of the testicles, and priapism. On a post-mortem examination there were found, besides the usual evidences of inflammation of the bowels, traces of inflammation of the liver, kidneys, and the bladder.

Considered in relation to other cathartics, colocynth will be found to rank near gamboge, from which it is distinguished by at least two circumstances: first, its cathartic effect is not the mere result of its topical acrid operation, but, in part, of its specific influence over the bowels; secondly, its action on the large intestine is more manifest than that of gamboge. In the latter property, colocynth approximates to aloes; but while it greatly exceeds the latter in its cathartic and hydragogue effects, it is devoid of the tonic influence possessed by aloes, when used in small doses.

USES.—Besides being useful as an ordinary purgative, colocynth is adapted for acting as a stimulus to the abdominal and pelvic vessels and nerves in cases of torpor or inactivity, and, on the principle of counter-irritation already explained (p. 45), for determining from other organs. The objections to its use are acute inflammatory affections of the alimentary canal, diseases of the large intestine, &c. The following are the principal cases in which it is employed.

1. *In Habitual Constipation.*—As an ordinary purgative for keeping the bowels regular, the compound extract of colocynth is in common use both among the public and medical men. It operates mildly, certainly, and effectually. I am acquainted with individuals who have taken this substance for years, without suffering any inconvenience therefrom. The simple extract is sometimes employed as a substitute, but is less advantageous.

2. *In Alvine Obstruction.*—In some cases of obstinate constipation, with sickness and other symptoms of an extremely irritable stomach, the compound extract of colocynth occasionally proves invaluable. Occupying but a small bulk, it is retained on the stomach, and succeeds in producing alvine evacuations, where the ordinary liquid purgatives fail, in consequence of being vomited up. Doubtful cases of intus-susception and hernia, even with stercoraceous vomiting, I have seen completely relieved by it. More than once have I known an operation averted by its use, in those who, in addition to the above symptoms, had old herniæ, which led the surgeon to suspect strangulation. A slight degree of abdominal tenderness is not to be considered as absolutely prohibiting its

use. Occasionally the extract is rubbed down with soap and water, and administered as an enema (see *Enema Colocynthisidis*.)

3. *In Diseases of the Brain*.—In apoplexy, or a tendency thereto, in paralysis, insanity, violent headache, &c. colocynth is sometimes employed with good effect, on the principle of revulsion or counter-irritation.

4. *In Dropsy*.—In dropsical affections, colocynth has been used as a *hydragogue*. But in this country it is less frequently employed for this than for other purposes: various other hydragogues (especially elaterium and jalap) being usually preferred. It is sometimes employed as a *diuretic*, being given in the form of decoction. Hufeland regarded it as a most effectual diuretic in persons of a cold and sluggish habit of body (Eberle, *Mat. Med.* i. 119, 2nd ed.)

5. *In Amenorrhœa and Chlorosis*.—In some cases of obstructed menstruation, benefit is obtained by the use of drastic purgatives, like colocynth, which act on the rectum, and, by contiguous sympathy, affect the uterus.

ADMINISTRATION.—The *powder*, which is rarely used, may be administered in doses of from two to eight or ten grains, intimately mixed with some mild powder (gum, or starch). The *decoction* (prepared by boiling ʒij. of colocynth in Oj. of water for six minutes, and, according to Hufeland, adding to the strained liquor, fʒij. of the spirit of sulphuric ether, and fʒj. of syrup of orange peel) is given in doses of fʒss. three times a day. The *tincture* (prepared according to the Prussian Pharmacopœia, by digesting ʒj. of colocynth pulp and ʒj. of star-anise in lb. j. of rectified spirit) is given in doses of twenty drops. Colocynth has been employed iatroleptically (see p. 48) by Dr. Chrestien (*Méth. Iatral.* p. 172). The tincture of colocynth, or twenty grains of the powder mixed with hog's-lard, were used by way of friction on the abdomen and inner side of the thighs, in disorders of the intellectual functions. Diuresis was a common effect. The following are the officinal preparations of colocynth.

1. *EXTRACTUM COLOCYNTHIDIS*, L. E. D. (Colocynth pulp [in pieces, L.] lb. j.; Water [Distilled, L.] Cong. ij. [Cong. j. D.] Mix and boil with a slow fire for six hours, frequently adding distilled water, that it may always fill the same measure. Strain the liquor while hot; lastly, evaporate it to a proper consistence, L.—The directions of the *Edinburgh College* are essentially the same, except that the evaporation is directed to be effected by the vapour bath.—The *Dublin College* directs the mixture to be boiled down to four pints, and the liquor filtered while hot; then evaporated to a proper consistence.)—When the decoction is very concentrated, it readily gelatinizes on cooling; hence it is necessary to strain it while hot. At Apothecaries' Hall, the produce of 100 lbs. of pulp is about 65 lbs. of extract (Barker and Montgomery, *Observ. on the Dub. Pharm.*) Extract of colocynth is an objectionable preparation, as it is very apt to become either mouldy or tough and hard by keeping. The dose of it is grs. v. to ʒj.

2. *EXTRACTUM COLOCYNTHIDIS COMPOSITUM*, L. D. *Pilule Colocynthisidis*, E. (Colocynth pulp, cut in pieces, ʒvj.; Purified Extract of Aloes [Hepatic Aloes, D.] ʒxij.; Scammony, powdered, ʒiv.; Cardamom Seeds, powdered, ʒj.; Soap, ʒiij.; Proof Spirit, Cong. j. [wine measure, D.]

Macerate the colocynth in the spirit, with a gentle heat, for four days. Strain the spirit, and add to it the aloes, scammony, and soap; afterwards evaporate to a proper consistence, the cardamom being mixed towards the end, *L.*—The process of the *Dublin College* is essentially the same.—The process of the *Edinburgh College* is as follows:—"Socotrine or East Indian Aloes, and Scammony, of each, eight parts; Colocynth, four parts; Sulphate of Potash, and Oil of Cloves, of each, one part; Rectified Spirit, a sufficiency. Pulverize the aloes, scammony, and sulphate of potash together; mix with them the colocynth previously reduced to fine powder; add the oil of cloves; and, with the aid of a small quantity of rectified spirit, beat the whole into a proper pill mass, which is to be divided into five-grain pills."—Compound extract of colocynth, made according to the London Pharmacopœia, is an exceedingly valuable preparation; but owing to carelessness, inattention, fraud, or ignorance, the preparation of the shops is very unequal in its powers. The aloes used in the process should be purified (by straining) as directed by the London College: the necessity of this will be obvious to any one who has ever seen a *cwt.* of aloes melted. Should the Cape variety be substituted for the finer kind of aloes, the odour would detect the fraud. The scammony employed should be of the best quality (see p. 883). If the common (*i. e.* adulterated) kinds be used, the activity of the preparation is thereby deteriorated. If the compound extract, rolled into a ball and dropped into water, effervesce on the addition of hydrochloric acid, we may infer that the scammony employed was adulterated with chalk. If the filtered decoction, slightly acidified, become blue or purplish on the addition of tincture of iodine, the presence of some starchy substance (as jalap or adulterated scammony) may be inferred. The mode of detecting gamboge will be described hereafter (see *Gamboge*). If colocynth seeds have been employed as a substitute for the pulp, the tenacity of the extract, I am told, is greatly deteriorated. Some druggists substitute oil of cardamoms for the powder of the seeds, and by this means increase the odour of the preparation; but unless some inert powder be added, to compensate for the powder of the seeds omitted, the strength of the preparation would be somewhat greater than that intended in the pharmacopœia.

Compound extract of colocynth is a powerful, sure, yet safe cathartic. Its uses are the same as those of colocynth before described. The dose of it is from five grains to a scruple. Calomel is frequently given in combination with it. The *pilule cathartice composite*, U. S. (before noticed, p. 472) contains the compound extract of colocynth, extract of jalap, and calomel. Extract of hyoscyamus is frequently given in conjunction with the compound extract of colocynth. (See *pilule colocynthidis et hyoscyami*, E.)

In the shops a cheap substitute for the compound extract of colocynth is often sold under the name of *pill cochia* (*pilule coccia*, or *pilule cochie minores* of Galen). The substance sold under this name at Apothecaries' Hall, London, is the *pilule colocynthidis*, Ph. Ed. without the sulphate of potash.

Colocynth is a constituent of *Morison's Pills*. (See Frazer's report of the *Trial of Joseph Webb*, at York Summer Assizes, 1834, p. 53.)

3. *PILULÆ COLOCYNTHIDIS ET HYOSCYAMI*, E. (Colocynth-pill mass,

ʒij. ; Extract of Hyoscyamus, ʒj. Beat them well together, adding a few drops of rectified spirit, if necessary ; and divide the mass into thirty-six pills.)—Extract of hyoscyamus diminishes the pain and griping frequently experienced from the use of colocynth, but does not injure its evacuant properties. Both Sir H. Halford and Dr. Paris (*Pharmacologia*, i. 299, 6th ed.) bear testimony to this. The dose of this pill is grs. v. to grs. xv.

4. *ENEMA COLOCYNTHIDIS*, L. (Compound Extract of Colocynth, ʒij. ; Soft Soap, ʒj. ; Water, Oj. Mix, and rub them together.)—A useful cathartic enema in obstinate constipation, whether arising from colic, or from other non-inflammatory conditions.

ANTIDOTE.—See *Elaterium*.

*Momordica Elaterium*, Linn. L. E. D.—*Squirting Cucumber*.

*Ecballium officinale*, Nees & Ebermaier.

*Ser. Syst.* Monœcia, Syngenesia. Linn.\*

(Pepones recentes, L.—Feculence of the juice of the fruit, E.—Fructus ; Fæcula, Folia ; D.)

HISTORY.—The term *ἐλατήριο* (from *ἐλαυνω*, *I impel* or *urge forward*) was employed by the Greeks to signify, not merely a medicine prepared from the *αἶκος ἄγριος*, or *wild cucumber* (*Momordica Elaterium*), but also any purgative substance (Fæsius, *Æconom. Hipp.*) Hippocrates (*Opera*, ed. Fæs. pp. 418, 547, and 877) employed the root and leaves of the plant, as well as *ἐλατήριο*, in medicine. Dioscorides (lib. iv. cap. 155) minutely describes the method of preparing *ἐλατήριο* by drying the feculence of the expressed juice of the fruit, and making it into troches. Pliny (*Hist. Nat.* lib. xx. cap. 1 & 2, ed. Valp.) calls the plant *cucumis sylvestris*, and gives a short account of the method of making elaterium. C. Bauhin (*Pinax*, 314) terms the plant *cucumis asininus*, or *ases' cucumber*.

BOTANY. *GEN. CHAR.*—*Flowers* monœcious, yellow, or white ; with a filiform peduncle having one bract (always ?). *Males* : *calyx* five-cleft, with a very short tube. *Corolla* five-parted. *Stamens* triadelphous ; *anthers* connate. *Females* : *filaments* three ? (rather five, triadelphous) sterile. *Style* three-cleft. *Ovarium* bilocular. *Fruit* often (always ?) muricate, opening with elasticity when ripe. *Seeds* compressed, reticulated when ripe (always ?). (D. C.)

*SP. CHAR.*—Hispid, rough, glaucous. *Stem* short, without tendrils. *Leaves* cordate, somewhat lobed, crenate-dentate, very rugose on long stalks. *Fruit* ovate, obtuse, hispid-rough, with long peduncles. *Seeds* chestnut-brown (D. C.)

*Root* annual. *Stem* thick, round, trailing, and branching. *Leaves* obtuse, grayish and strongly reticulated on the under side ; petioles long and bristly. *Flowers* axillary, the males form racemes of five or six flowers. *Calyx* adherent, with five, lanceolate, acute teeth. *Corolla* campanulate, yellow, reticulated with green veins. *Males* : *Stamina* three, two of which bear doubly-folded anthers [or five, four

\* See the note to *Cucumis Colocynthis*, p. 1074.

FIG. 197.

*Momordica Elaterium.*

- a. Pepo expelling its seeds.  
 b. Stalk.  
 c. Transverse section of the pepo.

of which cohere, so as to form two bundles of two anthers each]. *Females*: filaments three, sterile; *ovarium* inferior, one-celled (spuriously three-celled); *style* simple; *stigmas* three, bifid. *Pepo* small, elliptical, pedunculated, grayish-green, covered with soft prickles; when ripe separating from its stalk, and expelling, with considerable violence, its brown seeds, and a thin mucus through the aperture at the insertion of the stalk.

The phenomenon of the expulsion of the seeds of this plant has acquired, of late years, increased interest, from the circumstance of Dutrochet (*Nouv. Rech. sur l'End.* p. 66, 1828) having adduced it as one of the effects of *endosmosis*. It is well known that when two fluids of unequal density are separated from each other by membrane (animal or vegetable), a double permeation of fluids takes place,—that is, each fluid passes through the membrane, and mixes with the other fluid: the current in one direction is called *endosmosis*, that in the opposite direction *exosmosis*. The instrument employed by Dutrochet in conducting his experiments he called an *endosmometer*: it consists of a bell-shaped glass vessel (a bottomless bottle, for example), closed at the lower end by bladder, at the neck by a cork, through which passes a straight tube; or we may have a curved tube issuing from the side of the neck (as in Fig. 198).

If syrup be put into the bell, and the bell then immersed in water, a portion of syrup will exude through the bladder, while a larger quantity of water will pass in; and if mercury be placed in the curved portion of the tube (as in Fig. 198), the liquid metal is pushed up. If, on the other hand, the bell contain water, and be immersed in syrup, the stronger current is from within outwards. In other words, the stronger current is, in general, from the lighter towards the denser fluid. Hence we comprehend why cherries and plumbs shrivel when preserved in syrup, but remain plump in brandy: in the first place *exosmosis* preponderates because the syrup is denser than the juice of the fruit,—in the second, *endosmosis*, because the juice is denser than the brandy: the separating membrane is, of course, the skin or epicarp of the fruit.

Now to apply these facts to the phenomena of the *Elaterium* apple. In the centre of this fruit, and surrounding the seeds, is a very singular variety of organic matter, which appears like thick mucus. It is called by some botanists *placental matter* (see Fig. 197, c). More external to this, that is, in the tissue of the pericarp, there is another organic liquid, whose density is less than that of the placental matter. Now these two fluids being separated from each other by membrane, are in the exact condition for the operation of *endosmosis*; consequently the central cell gradually becomes very much distended (at the expense of the liquid in the tissue of the pericarp), and ultimately gives way at the weakest point—namely, where the peduncle is articulated with the fruit,

FIG. 198.

*Endosmometer.*

and the contents of the cells are expelled with great violence, from the sudden contraction of the distended tissues.

*Seat of elaterium.*—Some years since Dr. Clutterbuck (*Lond. Med. Rep.* vol. xii.) ascertained that the active substance, elaterium, “is neither lodged in the roots, leaves, flowers, nor stalks, in any considerable quantity; nor is it to be found in the body of the fruit itself, or in the seeds contained within it; it was only in the juice around the seeds therefore, that it could be looked for,” and here it was found.

The precise situation of it will be readily comprehended by inspecting a transverse section of the elaterium pepo (see fig. 197, c.) We observe that the external portion of the pericarp (namely, the epicarp) is furnished with rigid hairs; within the epicarp is a whitish sarcocarp, forming what Dr. Clutterbuck terms the body of the fruit. The centre of the fruit is divided into three cells, by projections of the three parietal placentaë to which the seeds are attached. Between these projections, and surrounding the seeds, is the *pulp, the placental matter, or the juice around the seeds* (Clutterbuck). It is paler than the sarcocarp, and is composed of a very lax tissue, which, as the fruit matures, takes on, says Aug. St.-Hilaire, a gelatinous consistence, becomes disorganized, and melts into water.

“The centre of the fruit of *Memordica Elaterium*,” says Dutrochet (*op. cit.* p. 69) “contains a very singular organic substance, and which has no resemblance to any other vegetable tissue. It seems to be a green very thick mucus. Viewed by the microscope, it appears to consist of an immense quantity of very small globules, agglomerated sometimes confusedly, sometimes so as to form irregular striae. This substance is penetrated by a whitish liquid, by a sort of emulsion, which is so much the more dense as we observe it at an epoch nearer maturity. This aqueous liquid escapes immediately we open the green fruit. By the microscope we see some almost imperceptible globules which swim in this liquid. At the epoch of maturity this whitish liquid is much more abundant, and at the same time much denser; the globules, which it holds in suspension, have become much larger.”

*HAB.*—South of Europe. Common on rubbish in the villages of Greece and the Archipelago. A few acres are annually cultivated at Mitcham.

*EXTRACTION OF ELATERIUM.*—The following directions are given by Dr. Clutterbuck for obtaining elaterium:—“The cucumbers should be gathered when nearly as ripe as possible, and without violence they might endanger their bursting. They should then be wetted by the affusion of cold water, that less of the juice when they are cut may adhere to the external surface. In this state they should be cut through longitudinally, and the juice allowed to strain through a fine sieve, placed in a large earthenware vessel. The seeds and surrounding pulp should be scooped out upon the sieve, and washed with repeated affusions of cold water, by which they will be freed from all adhering juice. Something will be saved also by afterwards rinsing the split cucumbers themselves in cold water, from which a portion of elaterium may be collected.

“After standing a few hours a sediment is formed, from which the clear liquor is to be poured off; it is then to be thinly spread on fine linen, and exposed to the air to dry; a gentle warmth may be employed without injury; but the access of sunshine destroys the fine green colour which the substance otherwise acquires.” From forty fruits, Dr. Clutterbuck obtained only six grains of elaterium. The elaterium thus procured is of the finest quality; but the product is very small. Hence, to increase the quantity, slight pressure is employed.

The directions of the British colleges are less explicit than these. The London and Dublin Colleges direct the fruit to be gathered when ripe. The Edinburgh College, “before it is quite ripe.” All direct gentle pressure to be employed. But, as Dr. Clutterbuck has justly observed, “pressure is not at all necessary in order to obtain the elate-



COMPOSITION.—Braconnot (*Journ. Phys.* lxxxiv. 292) analyzed the expressed, boiled, filtered, and evaporated juice of the plant. Soon after Dr. Clutterbuck's experiments on elaterium, Dr. Paris (*Pharmacologia*) analyzed this substance. In 1831, Mr. Hennell (*Journ. of the Royal Institution*, i. 532) published an analysis of it. In 1835, Landerer (*Pharm. Central-Blatt. für 1835*, 154) examined the juice of the fruit growing in Nauplia (Napoli). Furthermore, the active principle of elaterium was examined in 1831 by Dr. Morris (*Ed. Med. and Surg. Journ.* xxxv. 339), and afterwards by Marquart (*Pharm. Central-Blatt. für 1833*, S. 850).

## Dr. Paris's Analysis.

Elatin .....	}	1·2
Bitter matter .....		
Extractive .....		2·6
Fecula .....		2·8
Gluten .....		0·5
Woody matter .....		2·5
Water .....		0·4
Elaterium .....		10·0

## Mr. Hennell's Analysis.

Crystallizable substance ( <i>Elaterin</i> )	44
Green resin .....	17
Starch .....	6
Woody fibre .....	27
Saline matters .....	7
Elaterium .....	101

1. *Elaterin* (*Elaterine*; *Momordicine*). Dr. Clutterbuck shewed, in 1819, that the active principle of elaterium was insoluble in water, but soluble in alcohol; for he found a watery infusion of eight grains had no effect, whereas the alcoholic extract in the dose of one-sixteenth of a grain produced considerable purging, and often vomiting; and when the dose was increased to a quarter of a grain the effect was more considerable, and often took place in a very few minutes. The action of these liquids on elaterium led Dr. Clutterbuck to believe that the active principle was of a resinous nature. But the alcoholic tincture of elaterium contains three principles: elaterin, the green resin, and a bitter matter. By treating this alcoholic extract with boiling distilled water, the bitter matter is dissolved: the residue (elaterin and green resin) was termed by Dr. Paris *elatin*. Dr. Morris, in 1831, separated the green resin and isolated elaterin; though Mr. Hennell seems to have discovered it about the same time. Dr. Morris obtained it by evaporating the alcoholic tincture of elaterium to the consistence of thin oil, and then throwing it into boiling distilled water, a white crystalline precipitate was formed, which increased as the liquor cools. This precipitate was afterwards purified by a second solution in alcohol and subsequent precipitation by water. Mr. Hennell's process was different. He separated the resin from the crystalline matter of the alcoholic extract of elaterium by ether, which took up the resin and left the elaterium; the latter was then purified by solution in hot alcohol and subsequent crystallization. Marquart's process is less likely to yield pure elaterium, since he procured it from an extract prepared by evaporating the expressed juice. Another method (founded I presume on the directions of the Edinburgh College, for the determination of the goodness of elaterium, see p. 1085) is to treat the alcoholic extract of elaterium with a solution of potash, which takes up the bitter matter and the resin, and leaves the elaterin. The quantity of elaterin in elaterium is thus stated by different authorities:

100 parts of *Elaterium*.Quantity of *Elaterin*.

Prepared according to the London College ( <i>Hennell</i> ) .....	44
Best British <i>Elaterium</i> ( <i>Morris</i> ) .....	26
Worst ditto ( <i>Morris</i> ) .....	15
French <i>Elaterium</i> ( <i>Morris</i> ) .....	5 or 6
<i>Elaterium</i> ( <i>Edinburgh Pharmacopœia</i> ) .....	14·3 at least.
Best specimens ( <i>Balmer</i> , Lond. Med. Gaz. xxv. 909) .....	33
Fine sample, prepared at Apothecaries' Hall in 1839, and dried by steam heat ( <i>Pereira</i> ) .....	26

These discrepancies must arise principally from the different degrees of goodness of samples examined; but partly also from different modes of proceeding. I found that 30 grs. of fine elaterium prepared at Apothecaries' Hall in 1839, lost by drying on a steam bath 1·5 grs. Boiled in repeated portions of rectified spirit, the dried mass lost

18 grs. The concentrated green tincture poured into diluted liquor potassæ (see process of the *Edinburgh Pharmacopœia*, below) deposited crystals which dried by steam heat weighed 7.5 grs.

*Elaterin* possesses the following qualities: it is crystalline, and has a silky appearance; the crystals viewed by a magnifying glass, are observed to be rhombic prisms with striated sides; it is very bitter, but odourless; is neither acid nor alkaline, and is, insoluble in water, but soluble in hot alcohol. Mr. Hennell says it is only very slightly soluble in ether; whereas Dr. Morries states it to be readily soluble in both ether and fixed oil. It is fusible, according to Mr. Hennell, at 350° F. The latter chemist states that it is composed of Carbon 36.9, Hydrogen 23.9, and Oxygen 39.2, which nearly corresponds to the formula  $C^6 H^{12} O^5$ . Dr. Morries says, that at a high temperature it is dissipated in a thick, white, pungent vapour, having an ammoniacal odour: if so, nitrogen must be a constituent. But neither by the odour, nor by turmeric, can I detect ammonia in this vapour. The late Dr. Duncan, of Edinburgh, ascertained that in doses of one-twelfth or one-sixteenth of a grain it had all the effects of a dose of elaterium. "A tenth of a grain," says Dr. Christison, "as I have myself witnessed, will sometimes cause purging in man; and a fifth of a grain, in two doses, administered at an interval of twenty-four hours to a rabbit, killed it in seventeen hours after the second dose." Dr. Golding Bird thinks one-sixteenth of a grain a fair dose to commence with: he repeats it every two hours until some effect is produced. It may be taken dissolved in spirit, and by this diffused through an aqueous vehicle.

2. *Green Resin (Chlorophylle?)*—Is insoluble in water, but dissolves in alcohol, ether, and caustic potash. It does not redden litmus, though from its ready solubility in caustic potash its acid nature might be suspected. Some of it prepared by Mr. Hennell was tried at St. Bartholomew's Hospital, and found to act powerfully as a purgative in doses of less than a third of a grain. Perhaps this might have arisen from the presence of elaterin; for twenty-one grains of the resin yielded four grains of elaterin.

3. *Bitter matter*.—This is soluble both in water and alcohol. Its taste is intensely bitter: its colour is brownish yellow.

**CHARACTERISTICS.**—Good elaterium is friable, has a pale greenish-gray colour, and an animal odour. Digested in rectified spirit it yields a fine green tincture. Thrown into water it swims. It does not effervesce in diluted hydrochloric acid: the acid liquor being digested on elaterium, and subsequently rendered nearly neutral by ammonia, gives scarcely any cloudiness on the addition of oxalate of ammonia. Touched with tincture of iodine, it gives no evidence of the presence of starch; though if it be boiled in water, the decoction, when cold, gives traces of starch by the blue colour developed on the addition of iodine. If the cinder formed by the burning of elaterium in the air be ignited in the outer cone of the flame of a candle, the presence of potash is indicated by the bluish or violet tinge.

Maltese elaterium has no odour, and scarcely any green tinge. Examined by the microscope, it is found to contain globules of wheaten starch. It sinks in water, effervesces with diluted hydrochloric acid, yielding a solution which, when nearly neutralized by ammonia, gives a copious white precipitate (*oxalate of lime*) on the addition of oxalate of ammonia. Tincture of iodine stains it bluish or greenish black (*iodide of starch*). If the cinder obtained by burning Maltese elaterium in the air be ignited in the outer cone of the flame of the candle, it communicates an orange tint to the flame. The adulteration of elaterium by starch was known to Dioscorides. The *Edinburgh College* gives the following characteristics of good elaterium:—

"Colour pale-gray: when exhausted by rectified spirit, the solution, concentrated, and poured into hot diluted aqua potassæ, deposits, on cooling, minute silky, colourless crystals, weighing at least a seventh of the elaterium."

But these characteristics are not sufficiently accurate. Good elaterium

is pale *greenish*-gray; and when treated as the College directs, should yield 26 per cent. of crystals (*i. e.* elaterin).

PHYSIOLOGICAL EFFECTS. (*a.*) *On Vegetables.*—Macaire found a branch of the *Momordica Elaterium* was speedily destroyed by immersing it in a solution of the extract of this plant (*Mém. de la Soc. de Phys. de Genève*, vol. iv.)

(*b.*) *On Animals*—Viborg (*Wibmer, Wirk. d. Arzneim. ü. Gifte*. Bd. iii. S. 296) gave a pound of the fruit of *Momordica Elaterium* to the horse without any effect. Two and a half pounds of the whole plant (roots, leaves, and stem) also appeared inert.

The only experiments made with the extract of elaterium that I am acquainted with, are those of Orfila (*Tox. Gén.*) on dogs. They are three in number, and prove that this substance is a powerful local irritant, producing death even when it has been applied to the cellular tissue of the thigh, in consequence, as he supposes, of the nervous system being sympathetically affected. Moreover, he concludes, from his observations, that elaterium exerts a special action on the rectum.

(*c.*) *On Man.*—The acridity of elaterium in its local operation is well shown by various facts. Pliny truly observes that the juice of the elaterium apple is dangerous when applied to the eye; and Dr. Clutterbuck mentions that some of it “getting accidentally into the eye in one instance, it occasioned severe pain and inflammation, with an erysipelatous swelling of the eyelids, that continued till the following day.” We have a further proof of its irritant properties in the inflammation and ulceration of the fingers of those employed in its preparation.

When swallowed, therefore, it irritates the gastro-intestinal membrane, and occasions vomiting and violent purging; hence it is called a *drastic purgative*. Fine elaterium, in the dose of 1-8th of a grain, seldom fails to purge violently, and sometimes to vomit. This was long since noticed by Dr. Clutterbuck, and I can verify his statement from repeated observations. Even 1-16th of a grain will generally excite considerable purging.

The elaterium of the shops, however, is rarely so active as this, and I have known two grains given with no more effect than the pure elaterium would excite in the dose of 1-8th of a grain. Elaterium powerfully excites the secreting and exhaling vessels of the alimentary canal, and thereby occasions very watery stools; hence the term *hydragogue* applied to it. In some dropsical cases I have known a single dose discharge several pints of fluid by the bowels. The gripings and the increased number of evacuations prove that the irritation is not confined to the mucous coat, but is extended to the muscular coat. Under the influence of a full dose, the pulse is excited, the tongue becomes dry, and sometimes furred, and great thirst is produced. Occasionally the skin becomes damp under the operation of elaterium.

Elaterium has been supposed to exert a specific influence over the uterus. Thus Dioscorides and even later writers state that it provokes the menses, and is apt to produce the death of the fœtus in utero. Its uterine influence, however, is probably not greater, in proportion to its cathartic property, than that of other violent drastics, which act powerfully on the large intestines.

Does elaterium become absorbed? We have no stronger evidence to

offer in favour of the affirmative of this question than that mentioned by Hippocrates (Επιδημιον, lib. vi. sect. 5) that the milk of women and goats who have eaten elaterium, or the wild cucumber, possesses purgative properties. Furthermore, the accident which occurred to Dr. Robert Dickson, Lecturer on Botany at St. George's Hospital, seems to prove that absorption must have taken place by the skin (see *Journ. de Chim. Méd.* iv. 61). Dr. Dickson carried a specimen of the plant in his hat to his lodgings, in Paris, from the Jardin-du-Roi. In half an hour he experienced violent headache, which was followed by colicky pain, violent purging, vomiting, and fever.

Considered with respect to other cathartics, we find it pre-eminently distinguished by the violence of its purgative effect. Croton oil alone approximates to it. Its hydragogue operation exceeds that of most, if not all other, ordinarily used drastics.

USES.—The principal use of elaterium is to excite watery evacuations in *dropsy*, by which a two-fold effect is to be hoped for; viz. *first*, absorption of the effused fluid; *secondly*, the stoppage of any further effusion in consequence of the metastasis of vital action from the seat of the dropsy to the intestinal membrane. In dropsies dependent on, or accompanied with, disease of the kidney, the evacuation of water by the bowels is much to be preferred to the employment of stimulating diuretics which may add to the severity of the renal malady. Of the violent hydragogue purgatives, elaterium I believe to be the most useful in dropsy. It evacuates more watery fluid than the others; while, if it be good, its operations may be relied on. It is objectionable where there is great debility, and where any inflammatory or other disease of the bowels exists. I have seen the fatal termination of dropsy apparently accelerated by the use of elaterium. A dropsical patient, much debilitated, took, by order of his physician, a dose of elaterium, which caused excessive alvine evacuations, great exhaustion, sinking of the pulse, syncope and death. Where no contra-indication to the use of elaterium exists, one or two doses of it should be given every other day, for a week or ten days. If continued longer than this, it might perhaps bring on an inflammatory condition of the bowels. Dr. Darwall (*Cyclop. Pract. Med.* art. *Anasarca*, vol. i. p. 79) mentions a case in which hypercatharsis and maniacal delirium were produced by the prolonged use of elaterium; the delirium, however, went off in a few hours. Some tonic (usually gentian) is commonly conjoined with elaterium. Thus a pill composed of elaterium and extract of gentian is frequently employed; or we may exhibit infusion of gentian on alternate days with the elaterium. Where there is a febrile condition of system, and also where there is an irritable or inflammatory condition of the alimentary canal, elaterium is inadmissible. It is best adapted for cold phlegmatic constitutions. Sydenham (*Works* by Dr. Pechey, p. 393, 4th ed. 1705) recommended elaterium in dropsy. Afterwards Lister (*De hydrope*), Heberden (*Comment. art. Dropsy*), Ferriar (*Med. Hist. et Reflex.* vol. iv.), Clutterbuck (*Lectures in Lancet* for May 6th, 1826, p. 170), and other experienced practitioners, bore testimony to its exceeding great efficacy. But judging by the doses recommended, all of them, except the last-mentioned writer, seem to have been unaware of the great activity of the medicine when pure.

2. In cerebral affections, such as apoplexy, or a tendency to it (manifested by sleepiness, stupor, or giddiness), mania, &c., elaterium, as a

drastic purgative, sometimes proves serviceable on the principle of counter-irritation or revulsion (see p. 45).

3. *In obstinate constipation* from sluggishness of the intestinal tube, elaterium is occasionally useful. But care must be taken to ascertain that the constipation does not depend on any mechanical impediment (as hernia, intersusception, &c.) to the passage of the fæces.

4. *In gout*.—A combination of elaterium and opium has been found serviceable in gout (see p. 623. Also Sutton, *Tracts on Gout*, p. 201).

ADMINISTRATION.—The dose of good elaterium is from one-sixteenth to one-half of a grain. I hear and read of practitioners giving this substance to the extent of one, two, or even three grains; but this can only be from the bad quality of the drug. I have repeatedly employed, and seen others exhibit elaterium, and have always observed that a quarter of a grain of good elaterium acted very powerfully, sometimes bringing away several pints of fluid; and half a grain usually occasioning vomiting, as well as violent purging. I confess I should not venture to exhibit a grain of the same preparation. It is usually given in the form of pills. The basis of the pills may be extract of gentian.

As elaterin (the active principle of elaterium) is soluble in rectified spirit, a *tincture of elaterium* (*tinctura elaterii*) may be employed. It contains, besides elaterin, a bitter principle and green resin. Elaterin has been given either in powder (mixed with sixty-four times its weight of bitartrate of potash), or in solution in rectified spirit (*solutio elaterine*) by Dr. Golding Bird (*Lond. Med. Gaz.* xxv. 908) in doses of one-sixteenth to one-eighth of a grain (see p. 1085).

ANTIDOTES.—In the event of a case of poisoning by elaterium, the remedies would be demulcent drinks and clysters, opium, the warm bath, and fomentations to the abdomen; stimulants (such as ammonia and brandy) if the circulation fail; bloodletting to subdue the inflammatory symptoms, should the state of the general system not contra-indicate it.

#### *Other Cucurbitacea, Dietetical, Medicinal, or Poisonous.*

The fruits of several cucurbitaceous plants are employed as articles of food. The Cucumber (*Cucumis sativus*), the Melon (*Cucumis Me'lo*), the Water Melon (*Cucumis Citrul'lus*), the Vegetable Marrow (*Cucur'bita ovif'era*), the Pumpkin or Pumpion (*Cucur'bita Pe'po*), and the Melon-Pumpkin or Squash (*Cucur'bita Melo'pepo*), are those in most frequent use. They contain a watery, sweet or acidulous cooling pulp, which is slightly nutritious when taken raw, and in some habits proves laxative.

The fresh root of *Bryonia dioica* is sold by herbalists under the name of *white briony* and *mandrake root*.\* Fashioned into a rude representation of the human figure, I have seen it exhibited at an herb-shop as a sign. Bryony root contains a peculiar bitter matter called *bryonin*. The root operates as a violent emetic and purgative. I have seen one case of poisoning by it. The symptoms were those of cholera. As the accident occurred at the time when this disease was raging here, the practitioner who was called in, concluded it was a case of cholera, and mistook a piece of briony root shewn him as being part of what the patient had eaten, for a piece of turnip. The patient (a woman) recovered. Bryony root is employed as a topical application to bruised parts.

\* At p. 880, I stated, on the authority of an herb-dealer, that the root of Black Briony (*Tamus communis*) is occasionally sold as Mandrake; but I have reason to believe the information to be erroneous.