Thesis

On

the History

of some of the

Vegetable Tonics

by

William Robinson Hill
Before proceeding immediately to the subject of which I am to treat, it may perhaps be as well to give a short definition of the word Tonics, as applied to medicines. It is the name given to a class of remedies (from tonos, a tone) which heighten the tone of various structures of the body. Stimulants in some cases very much resemble Tonics in their action, such as Myrrh, Cascarilla &c, which are both stimulant & tonic, but they must not be confounded together. The main difference between them lies in the fact, that the action of stimulants is immediate & for the time, intense, but soon passes off, while that of Tonics is slower & more permanent. The effect of stimulants taken into the stomach is to quicken the digestive functions, whereas Tonics render them stronger by slow degrees & for a longer period. The muscles are excited to action to a great degree of strength & frequency for a short period by alcoholic or other stimulating draughts, but they are left in greater weakness & depression after the primary effect has passed off. Tonics, on the other hand, restore the muscular fibre to its wonted
(a) Principles of Medicine, p.92. 2nd edit.

(b) Ditto p.93.

(c) Ditto p.97.
degree of tension slowly, but more certainly and maintain it in that state. The following is the definition given by Billing: "Tonics are substances which neither immediately, nor sensibly, call forth actions, like stimulant, nor repress them, like sedatives, but give power to the nervous system to generate or secrete the nervous influence, by which the whole frame is strengthened. The action of tonics (which can be traced to their effect on the nervous system) is gradual. We must observe this difference; tonics give strength, stimulants call it forth; a man may be very strong without putting forth his strength. ------ Stimulants excite action, but action is not strength;" & again he says: "The term tonic is applied to all those medicines, which cure chronic inflammation, without being either stimulant or directly sedative or depleting." Tonics are included by Dr. Pereira under his 6th class of pharmacological remedies, these are Neurotics or remedies acting on the nervous system. This class he subdivides into two subclasses, Cerebro-spinal & Ganglonics. The Cerebro-spinal he divides into four orders; Phrenica, Psychatica, Cinetica & Hypnotica. The Cinetica or agents affecting the voluntary or reflex-spinal movements he again divides into sub-orders, of which the first, Tonia, agents which increase
The tone of the system, or, rather, the vegetable portion of it, is to be the subject of this paper. They are derived at most exclusively from this vegetable kingdom, and I now proceed to the history of those tonic remedies which are supplied by the vegetable kingdom.

The *Basilic Calombole* is the perennial root, consisting of several fasciculated, fleshy, fusiform tubers, of a plant called *Cocculeus palmatus* by De Candolle, or *Menispermum palmatum* of Lamarck, belonging to the Linnæan class Diccia, & order Hexandria, and to the natural order Menispermaceae. It takes its name from Colombo, a town in Ceylon, from whence it is exported. Its native habitat was supposed to be in Asia by Dr. Percival, but Dr. Pereira says it is now known to be the produce of the thick forests on the shores of Oibs & Mozambique, as well as inland for 15 or 20 miles. The root, as imported into England, is in slices cut transversely, being from a 4 to ½ an inch thick & from 1 to 3 inches in diameter, each surface being somewhat concave on account of the greater shrinking of the medulla, when drying, which is of a more porous & spongy texture than the ligneous portion. It is of a dusky yellow colour, covered with a dark-brown, slightly wrinkled bark. In many of the pieces small holes are found, which were
made for the purpose of drying them. It is bitter to the taste, possesses no astringency, & is considered to be one of the best tonic remedies.

**Botanical Characters.** Flowers unisexual, dioecious. Calyx of 12 sepals in 2 series, with 2, 3 or more bracteoles. Males: - stamens 6, or rarely 3, opposite to the inner sepals, distinct; anthers 2-celled, terminal, dehiscing vertically; filaments either filiform, with the anther-cell horizontal, approximate & each externally 2-lobed, or thickened at the apex, with the cells diverging downwards & separated by the connective. Females: - ovaries 3, 6 or numerous; drupes 1-6 or numerous, 1-celled, 1-seeded; peduncles axillary, or rarely lateral; leaves cordate at the base, 5-7 lobed, lobes entire, acuminate. Stems & ovaries clothed with glandular hair. (Lindley & De Candolle).

**Chemical Characters.** The salts of iron produce no effect on an infusion of calumba, but there is a root called American Calumba, which is sometimes mixed with the true calumba & from which it may be discerned by becoming dark green on the application of a salt of iron. An infusion of galls produces a copious grey precipitate with an infusion of true Calumba root & produces no effect on the American Calumba. The following is the
The true & false Columba may further be distinguished by the fact that the genuine root contains a large quantity of starch, about \( \frac{3}{5} \) of its weight, while the false contains none; this may be proved by touching them, when moistened, with tincture of iodine, by which the former becomes black, but the latter is not changed.

Uses. In Dr. Percival's experiments on this root he found that it was very useful in a languid state of the stomach, for restoring its vigour, & also in vomiting, especially bilious vomiting, & to this it is that he attributes the benefit that has been sometimes derived from its use in Cholera morbus. He also found it useful in diarrhœa & dysentery. "In Germany, it is denominated Dickwurzel, i.e. Dysenterie root." (Pereira)

Preparations and Doses. The root is given in powder in doses of from 3 \( \times \) to 3\( \times \) grains. The preparations are Infusum Columba & Tinctura Columba, of which the dose are 3\( \frac{1}{12} \) or
It is not a number.
3\(\frac{1}{2}\) of the former & 3\(\frac{1}{4}\) to 3\(\frac{1}{2}\) of the latter.

Radiis Prostambica. For the introduction of this root into medicine we are indebted to the celebrated Ruiz who discovered it in 1779 & during a journey in Peru made himself acquainted with its properties, in which he was confirmed shortly after by several French practitioners. (Fee). It was not however till the year 1808 that it was introduced into England by Dr. Reece. It grows in Peru in dry places on the sides of hills, especially near Cuenca, Caxatambo, Guadalies & Tarma, & takes its name from a Peruvian word signifying a climbing Plant. It is the root of a plant known by the botanical name Krameria Triandria, belonging to the Linnean class Triandria 2 order Monogynia, 2 to the natural order Polygalaæa. It is a woody, branching root, varying in size, the medium being that of a goosequill, in pieces generally about a foot in length. The ligneous part is hard & very tough, being of a paler colour than the bark, which is reddish-brown & contains the greatest amount of bitterness & astringency.

**Botanical Characters.** Sepals 4 or 5, irregular, colored, spreading, deciduous, Petals 2 or 5 irregular, smaller than the calyx. Stamens 1, 3 or 4 hypogynous, unequal, ovary 1-celled, or incompletely 2-celled. Style terminal, stigma simple, style in pairs, suspended. Fruit between hairy &
Leathery, globose, covered with hooked prickles. Leaves alternate, simple, entire or 3-foliate. Racemes simple. Leaves oblong, somewhat acute, villous-silky. Pedicels somewhat longer than the leaf, forming a short raceme. (Lindley & De Candolle).

**Chemical Characters.** The analysis of this root by C.G. Lemoine is as follows:

<table>
<thead>
<tr>
<th>Tannin</th>
<th>3.83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet matter</td>
<td>6.7</td>
</tr>
<tr>
<td>Mucilage</td>
<td>8.3</td>
</tr>
<tr>
<td>Nitrogenous matter</td>
<td>2.3</td>
</tr>
<tr>
<td>Lignin</td>
<td>28.3</td>
</tr>
<tr>
<td>Loss</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

By this analysis it is seen that woody fibre exists in large quantity in this root, as also tannin, the presence of which in the form of tannic acid is indicated by the formation of a precipitate, which the infusion of rattanhy root forms with a solution of gelatin or with sesqui-chloride of iron. Peschier, of Geneva, in his analysis of the root, mentions an acid, bra-meric acid, to which it owes its astringency, but M. Chevalley says that he could not discover this acid, although pursuing the process indicated by Peschier. (See).

**Uses.** Rattanhy root is generally used in purgative discharges, as mucous discharges, or in hemorrhage; it is also
employed sometimes as a tooth powder to strengthen the gums, its astringency being of more importance than its tonic properties.

Preparations & Doses. It is given sometimes in powder, the dose being from \( x \) to \( y \) grains. The preparations are Infusum Krameria, dose 1 or 2 oz, & the Extractum Krameria, of which the dose is \( x \) or \( y \) grains.

Cortex Aquatilis, or Cusparia, was first brought from St Domingo in 1770 & was then supposed to be the bark of the Magnolia glauca. (Linné). Humboldt & Bonpland afterwards decided that it was obtained from a large tree, which forms immense forests, near the Orinoco, in South America. In 1802 it was called Bonplandia trifoliata by Willdenow; Humboldt named it Galipea Cusparia, but Dr. Hancock says it is obtained from another species of the same genus, viz: Galipea officinalis, which is a shrub never more than 2 feet high, growing south of the Orinoco, whereas the former grows to the north of that river. (Christian). It belongs to the Linnaean class Oenandra, order Monogynia, to the natural order Rutaceae. This bark is sometimes adulterated with another bark, long erroneously supposed to be the bark of Raucea ferruginea, but Dr. Christian & others ascertained it to be the bark of Strychnos Rux domia. At one time serious results from this adulteration were not
unfrequent on the continent. It is known by the little tubes on its surface & the peculiar ochraceous efflorescence it presents.


**Chemical Characters.** The true Angustura bark communicates its bitterness to water, alcohol, ether & the essential oils. Its infusion is precipitated by sulphate of iron, tartarate of antimony sulphate of copper, but not by gelatine nor ammonia. The following are the analyses of the true & false barks, the former by Fischer, the latter by M. M. Pelletier & Caventon.

<table>
<thead>
<tr>
<th>True Bark</th>
<th>False Bark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile Oil</td>
<td>0.3</td>
</tr>
<tr>
<td>Peculiar bitter principle</td>
<td>3.7</td>
</tr>
<tr>
<td>Bitter hard resin</td>
<td>1.7</td>
</tr>
<tr>
<td>Balsamic soft resin</td>
<td>1.9</td>
</tr>
<tr>
<td>Elastic resin</td>
<td>0.2</td>
</tr>
<tr>
<td>Gum</td>
<td>8.7</td>
</tr>
<tr>
<td>Lignin</td>
<td>89.1</td>
</tr>
</tbody>
</table>
Uses. It has been thought by some to be superior even to cinchona, in intermittent & remittent, especially those forms of bilious remittents which occur in hot climates; this supposition however is not fully established. It is also used in general debility of the stomach & intestinal tube, in chronic diarrhoea & dysentery.

Preparations & Doses. The powdered bark is given in doses of 2 grains to 3 gr. Its preparations are: The Infusion, Euphoria, dose from 3 gr. to 3 ij.; the Tincture.

Cortex Radicis Simarubae, or Simaruba bark is the root-bark of a tree called Simaruba officinalis by de Candolle, & S. amara by Aublet, Rees von Esenbeck & Lindley. This bark is brought to England in long, folded pieces, being light, fibrous, & very tough; it is brownish-yellow, lighter on the surfaces than in the middle, possesses no odour, but is very bitter to the taste. It comes from Jamaica, Cayenne, the Caribbeé Islands of America, its name being derived from an American word. It belongs to the Linnaean class Decandria, order Monogynia, of the natural order Simarubaceae.

Botanical Characters. Flowers unisexual; calyx small, cup-shaped, 5-toothed or parted; petals 5, longer spreading. Stems: - Stamens nearly equal to the petals
arranged around a receptacle bearing at its apex 5 very minute lobes (rudiments of ovaries). Females: ovaries 5 placed on an even disc surrounded at the base by 10 short hairy scales (rudiments of stamens). Styles 6, short; stamens 10; leaves abruptly pinnate; leaflets alternate, somewhat stalked, pubescent beneath. (Lindley & De Candolle).

Chemical characters. The analysis of this bark which Thesiger gives is by Morin. It contains resinous matter, volatile oil, having the odour of Benzoin, acetate of potash, an ammoniacal salt, malic acid, traces of gallic acid, malate & oxalate of lime, Quassine, some mineral salts, oxides of iron, silica, albumin & lignin. According to Pflauff mucilage constitutes ½ of the bark, but this is not noticed in Morin’s analysis. Quassine or Quassite is the active principle to which Sinamuba bark owes its medicinal properties.

Uses. Altogether not much used in the present day, it was formerly celebrated in the treatment of dysentery. It may be likewise employed in intermittents, dyspepsia & the advanced stages of diarrhoea. In large doses it proves an emetic, whence it was classed with emetics by Richet & Destris de Rochefort.

Preparations & Doses. The dose of this bark in powder in pill form it is difficult to obtain it on account of its exceeding toughness, is from X to XXX grains. The Infusium Sinamubae
is the only preparation. 3i or 3i are given as a tonic.

Sagnum Duassia is the wood of a tree called Picro-

Avena exelsa and is imported from Jamaica and Surinam in
large pieces several feet in length. Formerly it was obtained from
the Duassia amara of Limmae, by whom it was first made
known in Europe in the year 1760, its properties as a febrifuge
having been discovered & communicated to Dahlberg by a
Greek called Duassia; hence Limmae denominated the tree
Duassia. It belongs to the same Linnean class & order & to the same
next ord. as the Simaruba officinalis before described. The wood is of a whitish colour, slightly tinged
with yellow; it is light, hard & tough, covered with a thin
gale greyish-coloured bark.

Botanical Characters. Flowers polygamous. Sepals 5,
minute. Petals 5, longer than the sepals. Stamens 5, rather
shaggy; anthers roundish; ovaries 3; style 3-cornered, bifid.
Stigma simple, spreading. Fruit 3, 3-celled, bivalve
druses. (Lindley)

The Duassia amara or True Duassia is distinguished
from the Picroa exelsa by the following botanical cha-
acters. The flowers are hermaphrodite. Petals united. Sta-
mens 10. Ovaries 5.

Chemical Characters. There has been no perfect ana-
lysis as yet of this wood, but according to Dr. Pereira, its prin-
(m) Percvia, Materia Medica. vol. III, p. 1640. 2nd edit.
Principal constituents are: volatile oil, a bitter principle (guassia) gummy extractive, grecrin, woody fibre & various salts, as, oxalate, sulphate, tartrate of lime, chlorides of calcium & sodium, an ammoniacal salt & nitrate of potash. Guassia or Guassia ½ which both the Simaruba bark & this wood owe their bitterness & properties is obtained by adding lime water to a concentrated aqueous decoction of guassia (to separate the grecrin &c) evaporating & treating the residue with alcohol which takes up the guassia, a brown colouring matter & some salts. By repeated solution & evaporation in alcohol with a little ether, the guassia is obtained pure. It occurs in small white prismatic crystals, which are fusible, colourless, intensely bitter, readily soluble in alcohol, but very slightly so in water or ether.

Uses. Guassia is a fine bitter possessing no astrigency & such is used as a stomachic & tonic to promote digestion. It has also been employed in intermittents, but being inferior to cinchona & better tonics, it is seldom used as a febrifuge.

Preparations & Doses. The preparations of Guassia are the Infusion of Guassia, the Tincture Guassia & Tincture Guassia Composita. The dose of the Infusion being from 3j to 3iij, of the simple tincture 3f to 3ij, & of the compound tincture 3j to 3ij.

Lignum Lomatostyli, or Logwood, is the heart-wood of a tree called Lomatostylon Campechianum, its generic name
being derived from the words Eura, Blood, & Eudor, wood, on account of its red colour, and the specific name indicates its native country, viz. Campeachy in the Province of Yucatan, Central America. It is also imported from Jamaica & other islands of the West Indies, where it has been introduced & become naturalized. The Albumenum or sap-wood, which is white, is stripped off, & the heart-wood alone is sent to England, in bittes of about 3 feet in length, of a brownish colour outside & red in the interior. It is a hard, compact wood, of a fine polish, sweetish to the taste, but slightly styptic, & of a pleasant smell. It belongs to the Linian class Decandria, order Monozygia & to the nat. ord. Leguminosa.


(De Candolle).

Chemical Characters. A decoction of logwood yields a blue precipitate with acetate of lead & lime-water, a violet precipitate with alum. Its colour is changed to a deep violet by salts of iron & by the alkalies. Chevreul, who analysed the root in 1811, gives the following as its constituents: - Volatile oil, lignin, oxide of manganese, tannin, oxide of iron, alumina,
Uses. Logwood was introduced into medicine by Bingley Allen, as a tonic and astringent in diarrhoea and dysentery.

Preparations & Doses. The Decoctum Aematoxylci is given in doses of 3F to 3F, being mild in its action it is useful for children, for whom the dose should be from 3F to 3F. The dose of the Extractum Aematoxylci is from 3F to 3F.

Cortex Cinchonae. In consequence of the conflicting statements of authors and the vast discrepancies that exist in their writings with regard to the cinchona tribe, whether as to the discovery of the medicinal properties of their bark, or as to the number of distinct kinds of bark found in commerce, or as to the number of the distinct species of the cinchona family that yield those various kinds, it is a very difficult task to give an accurate, connected & methodical account of this the most important & most useful of febrifuge remedies.

As an example of the difficulties that I encounter, I may state that with regard to the number of species which produce cinchona bark, Pritius states that there are 7, Joe reduces them all to four, Hee mentions 23 well-known species, 15 which are less known and somewhat doubtful, De Candolle admits only 15 altogether, & Lindley describes 21 known species & 6 which are imperfectly known.
It is a pretty well established fact that the properties of cinchona were first known by the Europeans in the year 1640, but how they were discovered is by whom remains a mystery. Some maintain that the Indians were well acquainted with the bark as a febrifuge long before the Spaniards visited America, and they discovered its properties by an Indian afflicted with ague, who drank the water of a pool, in which some cinchona trees were lying, with relief, but from hatred to the Spaniards they kept it a secret. Others deny this; Lee asserts that the Indians, who called it Kina or Kincin, hardly ever made use of it as a febrifuge, but ranked it amongst poisons for a long while, thinking that we used it only as a dye. Humboldt thinks that it was discovered by the Jesuits who, according to their custom of distinguishing trees, chewed the cinchona bark, and seeing its bitterness, used an infusion of it in tertian agues. This tradition (he says) is still current in Loza, where agues are very common. Lee mentions another tradition, that the Countess of Chinchon, wife of the Viceroy of Peru, having experienced the good effects of the bark as a febrifuge in 1638, brought some of it to Europe in 1640. Hence it was called Pulvis Comitae (The Countess's Powder). Of the truth of this statement Lee does not seem to be quite convinced. Dr. Percival does not think it an improbable story, but Guibourt
asserts it as a fact concerning which he entertains no doubt, and he also says that the genus Anchoeia takes its name from that of the Countess of Chinchon.

It was not however till the year 1649, eleven years after the above-mentioned occurrence, that it came into general use in Europe, at which time the Jesuits in Rome received a large quantity from their brethren in Peru, and distributed it always in powder in order to keep its origin a secret; it was therefore called Jesuit's powder. It was afterwards taken up again by Sir Robert Talbot or Talbot, who likewise made a secret of it and used it first in England, afterwards in Paris, with great success. It was from him called Talbot's Powder. Louis XIV. having heard of the celebrated powder, bought it of Talbot at a great price & made it known to the world. Little was known however of this tree which produced the bark, until La Condamine, who was sent to Peru for scientific purposes, made himself acquainted with it & published an account of it in 1738. The barks which are found in commerce are arranged according to their colour under three heads: Grey, Yellow & Red Anchoeias, of each of which I shall give a short description. The Grey Anchoeias are those in which the epidermis is of a greyish colour, generally covered with cyanogenic parasites. They occur always in quills more or less rolled upon themselves, fibrous in structure, being very
astringent & moderately bitter to the taste, yielding a pale, yellowish-greensh powder. They contain a large quantity of cinchonine, but little or no quinine. The quills of the Yellow Cinchona are generally larger than those of the grey. They occur sometimes in flat pieces. The epidermis is yellow, otherwise covered with lichens, mosses, etc. Their texture is more fibrous & possess more bitterness & less astrigency than the pale bark. The yellow bark contains a large quantity of quinine & a little cinchonine; it contains likewise a large amount of tannin in the form of salts, which is immediately precipitated by sulphate of soda. The Red Cinchona bark seems to occupy a middle place between the grey & yellow bark. The structure is more fibrous than the grey & less so than the yellow. It contains both quinined cinchonine & is astrigent and bitter to the taste. Under the head of grey bark are included three sorts in English commerce, the Cinchona Cocora, Crown or Luzon bark; the Cinchona Guanicoe, the Grey or silver cinchona; & the Cinchona Jaen, ash cinchona. Guinchoot includes likewise under this head. The Cinchona Guanicoe, Cinchona Buxarensis, Cinchona Malacis, & Cinchona Vicuñy bark.

Crown bark or Cinquina gris brun de Luzon, is the bark of Cinchona Constantimine. It occurs always in quills varying in size from 6 to 10 inches in length & from 1/2 to 3 of an inch in thickness. The epidermis is wrinkled with transverse
fevers, of grayish-brown colour, generally whitened by cryptogams. The Loco bark was the first kind which was known in Europe. Condorcime says that "the best Quinquina, at least the most celebrated, is gathered in the mountains of Cayamuna, situated 2 leagues south of Lora, and it was from thence that the first which was brought to Europe was derived." It received the name of Crown bark from the fact of its being used by the royal family of Spain. Packets of it were found in a Spanish galley taken in 1804 marked "Para de la real familia;" i.e. "for the royal family." (Pereira). Doubts have been entertained by some as to whether the bark now known in commerce by the name Lora or Crown is the same as that which was thus formerly distinguished; Dr. Pereira says that Blayney has pointed out some difference between the Lora bark of commerce & a bark found in Humboldt's collection marked "Quina de Lora," which has been collected from the Cinchona Condorcime.

The Cinchona Euxanica, grey or silver cinchona, called Quinquina de Lima by Guittout, & Cinchona cinerea by the Edinburgh Pharmacopoeia, is the produce of the Cinchona micrantha, according to Pereira, the E. lenticulosa of Mutis, according to Dr. the E. lenticulosa according to Guittout, & by some others said to be the produce of E. glandulifera."
The description of this bark is very similar to Carolinian bark, the quills being a little larger & the bark itself thicker. It is also more bitter, on which account it is superior to it, but since the year 1815 it has almost ceased to be distinguished on account of the negligence of collectors and merchants in keeping them distinct. The edges of the perfect quills may be seen to be cut obliquely, done, probably in stripping it from the tree (Pereira). M. Guibourt distinguishes four varieties of this bark, the Dunquinina gris-fon de rima, of which the quills are small & the epidermis thin, The Dunquinina Lima blane, The Dunquinina gris d'or Duquinina gris simulant le jaune vif.

The Cinchona Jacon or ash Cinchona was called by Guibourt, Dunquinina de Loxa Conrad, who supposed it to be a variety of Loxa bark. It occurs always in quills which are never larger than the little finger, characterized by their remarkable crookedness, being more or less arched and twisted, & by the number of lichens which cover them. This bark is said by Mr. J. Howard to be obtained from the C. cordifolia, var. B. rotundifolia of Ravon.

Two kinds of ash bark are described by Bergen, the pale ten barks (ten being a corruption of Jacon) which he says is produced by the C. ovata of Ruiz & Pavon & C. pubescens of Vahl, and the dark ten bark or China Pseudo-Loxa.
produced by C. nitidae of Ruiz & Pavon & C. lancefolia of others. The pale ten bark is ash grey with brown spots, the dark ten bark is quite white, but the lichens which cover it in great quantity give it a dark appearance; this is often passed off for true Loxa bark. Guanamalies, or rusty bark, C. Guanamalies, so called from a province in Peru, is known in France by the name C. havane. It is not used in England as a distinct kind, but Dr. Pereira says that he has frequently found pieces of the grey, corky Guanamalies bark mixed with the true Loxa bark of commerce. It is very apt to be confounded with this bark on account of its great similarity, but may be distinguished by its pale colour & by being wrinkled generally longitudinally & seldom transversely. The kind of Guanamalies bark, called by Guibourt Guayquina Guanamalies ferruginus, is distinguished by its ochre-red colour & warty epidermis. The Guanamalies bark is said by Guibourt to be produced by the C. Humboldtiana. Dr. Pereira says that the bark of C. purpurea (Ruiz & Pavon) brought from South America by Kopfmi, was found by Keichel to be identical with the Guanamalies bark. W. J. Howard, in the Pharmaceutical Journal for Aug. 1852, proves from both chemical & microscopic examination that Keichel was mistaken in his opinion. He says: - "I conclude, therefore, on
the whole that Reichel must have been misled by some superficial resemblance. The bark of C. purpurea, in Pavo's collection, has some few want to do has the Guanamalies; but in comparison this apparent coincidence disappears. The wanty excrescences are wholly unlike. The barts are altogether markedly distinct.—— It follows then that this must be left as one of the unsolved problems, and I cannot but think the C. Chaharguera of Pavo's is very near to (if not identical with) the Guanamalies bark. Erythrina caliaca, a rare regia, royal yellow barks, sometimes called Colicalla, is called Erythrina caliaca or guaime royal by Guibourg. It received its name Caliaca from a province in Peru, whence it is obtained. This barks is met with both in quills & in flat pieces, this is the only distinction made in commerce. The quills are marked with transverse figures, for the most part long, being from 1 ½ inches in diameter. The flat yellow barks is subdivided into coated & uncoated, the greater number of pieces being uncoated. It is less esteemed than the quills, being thicker & more woody. The origin of this barks is unknown; many have referred it to the C. cordifolia; this mistake originated from Mutis, who called the barks of this species Guaina jaime. But Guibourg & Herzen state that the Guaina jaime of Mutis is that which
in England & France is known by the name Barel Carthagena bark. Ruiz and Lindley both referred the Calinga-bark to C. lanceolata (Ed. Peruv.) others have thought it was obtained from the C. lancifolia or Dunquina orange of Mutis, but Berger states that he found a great difference between these barks and our yellow cinchona. There are three varieties of yellow bark mentioned by Guiton,
the Dunquina Pitaya or Dunquina de la Colombie sur de l'Antioquia & the Dunquina de Colombie ligneuse, woody Carthagena bark, which are closely allied to are considered by Pereira merely as varieties of another. The third is the Dunquina orange de Santa Fe or Dunquina de Carthagène Spongique, which was met with only once by Dr. Pereira in England under the name of new spurious yellow barks. Its origin was discovered by Guiton or who found in the Natural History Museum of Paris a specimen, which had been deposited there by Humboldt as the Dunquina orange of Mutis, the bark of his C. lancifolia.

The Cinchona rubra or red cinchona, is, like the yellow, met with in quills or in flat pieces. Pieces of the true red bark are now seldom met with, but inferior kinds are not uncommon. Some pieces are covered with warts, others are free from them; the former are called by Guiton...
Quinquina succulens, the latter Quinquina verna succulens. The botanical source of the red bark is unknown, as Rezig, Paron & Humboldt have declared, but some other French writers state that it is the produce of C. oblongipolia of Mutis (C. magnipolia of Rezig & Paron). This mistake arose because Mutis called the bark of C. oblongipolia Quinquina rouge, it was discovered, however, by Berger that this bark is that which in Europe is known by the name Quinquina von. Thus, says Guibourt, "nothing is better proved to this day than this fact, that the C. oblongipolia produces the Quinquina von a not the red cinchona bark." And he goes on to state that "according to La Condamine, the yellow cinchona and the red cinchona present no remarkable difference in the leaf, flower, fruit, etc., that it is only by the color of the interior of the bark that they can be distinguished. Thus it must be either the same tree which is described by La Condamine, or a species nearly allied, which produces the red Cinchona." With this statement the opinion of Mr. J. Howard, who ranks it amongst those barks produced by C. Condaminia var. vera, coincides. The quills of this bark are from 5 to 6 lines to 2 lines in thickness, varying in color from the outside from greyish-brown to chestnut-brown, according to the size of the piece. The inner surface varies likewise from a light brown to a deep purplish brown, being finely fibrous in the smaller quills.
coarse in the large ones which do not exceed 1/2 inch in diameter. The flat pieces are frequently curled, from 1 to 5 inches in breadth, and from 1/2 to 2 inches in thickness. The varieties of this bark mentioned by Guibourt are the Quinaigua, or Quinaigua de Lima, called by Léon de Pröschl Quinaigua, or Quinaigua de Santa Fé; the Quinaigua, or Quinaigua de París, distinguished by being less bitter to the taste and by the surface being covered with small warts. The Quinaigua, or Quinaigua de París, very similar to the former, but differing by its paler epidermis, is lastly the Quinaigua, or Quinaigua de París, with a whitish scabrous epidermis.

The Cinchona de Carthagène dura, or hard cinchona bark, called by Guibourt Quinaigua de Carthagène, is produced by the Chinchona pubescens of Münster. It occurs in quills, but more generally in flat pieces, which become twisted during the process of drying. The quills are small, about 1/4 inch in diameter, from 1/2 to 1 1/2 lines in thickness. The outer surface is a yellowish-grey colour, wrinkled longitudinally; the inner surface is smooth.

The Cinchona de Cauco, or Cauco cinchona, is said by Guibourt to be the Cinchona pubescens of Bergen; this is doubted by Persea. The oldest and largest pieces of this bark are very similar to the yellow Caleasaya bark, and are very apt to be mistaken for it; they can be readily distinguished by
testing with sulphate of soda, which gives a copious precipitate with the Calicaya bark, but does not affect an infusion of Eucos bark.

The Cinchona nove, or Quinquina nova of Guibourt, I have before noticed when treating of the cinnchona rubia, with which it has often been confounded. It is the Quinquena corage of Geutis, the produce of his C. oblongifolia (C. magnificia of Ruiz & Pavon). The large juices are almost flat, whilst the smaller ones are quilled, being often perfectly cylindrical. Hence, says Guibourt, is the name Quinquina chandelle, (candle Cinchona) given to it.

Botanical Characters. The characters by which the genus Cinchona is distinguished are as follows. It belong, to the Linian class Pentandria, order Monogynia, to the Nat. Ord: Rubiaceae. Tube of the calyx top-shaped, with a permanent 5. leaf limb. Corolla with a tapering tube a 5. parted limb. Filaments short, inserted into the middle of the tube. Stigma 2. leaf, a little clavate. Capsule ovate or oblong, 2. celler, crowned by the calyx, dividing to its dissepiments into two halves. Placenta long; seeds numerous, erect, with a broad, membranous winged border, albumen fleshy. Leaves shortly stalked with plate edge. Stipules ovate or oblong, leafy, deciduous, interpetiolar, having oil-secreting glands at their base. Flowers
in terminal panicled corymbs, white, or of a rosy-purple colour.

Of the numerous species which are included under the genus Cinchona, I shall give the distinctive characters only of this which I have above mentioned, that is, of those which produce the barks found in English commerce. I shall quote principally from the descriptions of Tée and de Candolle.

Cinchona Condaminea. Leaves oblong, acute at both ends, very smooth, shining, with pits on the under surface in the axils of the veins, which are not purged with rain. It secretes a transparent bitter fluid. PANicle much branched, calyx urn-shaped, capsule oblong. This is the C. officinalis of Linnæus.

C. Lanzilolica. Leaves obviate-lanceolate, very smooth, not pitted; PANicle branching; calyx campanulate, with acute teeth; corolla silky on the outside; capsule oblong. This species is called by Krüig & Pavaron, C. nitida lanceolata.

C. cordifolia. Leaves subobviate, acute, hairy beneath, smooth above; PANicle branched, diffuse. Teeth of the calyx round, acuminate. Stigma 2-lobed; capsule oblong-ovate. It has been called, C. hirsuta by Krüig & Pavaron.

C. Humboldtiana. Leaves oval, rather obtuse, shining on the upper side, silky and downy beneath. PANicle brachiate

C. glandulosa. Leaves ovate-lanceolate, with gland on the upper surface. Panicle sub-eorymbose, corolla velvety on the tube, wholly within the limb, pale rose colour. Capsule oblong.

C. purpurea. Leaves ovate, nearly convolute on both sides; panicle eorymbose, pubescent; anthers shorter than the filaments, exerted; stigma 2-lobed, included; capsule ovate, oblong, longitudinally ribbed.

C. magnifolia. Leaves oval, acuminate, smooth; panicle brachiata, sub-eorymbose; capsule oblong, 7 times as broad as long.

C. micrantha. Leaves ovate, obtuse, glabrous; panicle bi or trichotomous; capsule oblong, 3 times as long as broad.

C. pubescens. Leaves ovate, elongated at the base; panicle brachiata; corolla downy outside, limb hairy inside; capsule ovate, oblong. This is the C. ovata of Brugliera.

Chemical Characters. The most important constituents of cinchona bark are cinchonine, quina & tannin, the two former existing in combination with tannic acid. Cinchonine was first obtained in 1810 by Gomery. It was not known to be an alkaloid until the year 1820, when Peltier
Covington discovered cinchonina & quina. Cinchonina or cinchonine is obtained in the form of white transparent crystal by precipitation from one of its salts by ammonia and then crystallizing from its alcoholic solution. Quina or quinin is obtained in the same way. Cinchonina is itself arsined & the equal in value to quina as its salts, as therapeutic agents, although the former are very seldom used any. The different kinds of bark contain different quantities of cinchonine and quininine as will be seen in the analysis below. It is upon this that their commercial value depends, several tests of the goodness of the bark have been proposed. The following is the one given in the Edinburgh Pharmacopeia: "A filtered decoction of 100 grains in two fluid ounces of distilled water gives, with a fluid ounce of concentrated solution of carbonate of soda, a precipitate which, when heated in the fluid, becomes a fused mass, weighing when cold two grains or more & easily soluble in solution of oxalic acid."

<table>
<thead>
<tr>
<th>Cinchonine</th>
<th>Quininine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey</td>
<td>30</td>
</tr>
<tr>
<td>Lect.</td>
<td>24</td>
</tr>
<tr>
<td>Pred.</td>
<td>32</td>
</tr>
</tbody>
</table>

One pound of brown bark contains 5 grains 0 grains (Van Santen)

32 (Richards)

12 (Do)

64 (Do)

From 1 lb of yellow bark Pelletier obtained 0.05 of disulphate of quina. An ounce has been obtained from 2 lb
The following analyses of the grey, yellow and red barks have been made by Pelletier and Caventou.

<table>
<thead>
<tr>
<th>Grey cinchona</th>
<th>Yellow cinchona</th>
<th>Red cinchona</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinine</td>
<td>Quinine</td>
<td>Quinine</td>
</tr>
<tr>
<td>Tannin</td>
<td>Red cinchonic</td>
<td>—— Lime</td>
</tr>
<tr>
<td>Yellow colouring matter</td>
<td>Tannin</td>
<td>Tannin</td>
</tr>
<tr>
<td>Kinnate of Lime</td>
<td>Kinnate of Lime</td>
<td>Yellow colouring matter</td>
</tr>
<tr>
<td>Gum</td>
<td>Yellow colouring matter</td>
<td>Lignin</td>
</tr>
<tr>
<td>Starch</td>
<td>Starch</td>
<td>Starch</td>
</tr>
<tr>
<td>Lignin</td>
<td>Lignin</td>
<td>—— Starch</td>
</tr>
<tr>
<td>Fatty matter</td>
<td>Fatty matter</td>
<td>Fatty matter</td>
</tr>
</tbody>
</table>

**Uses.** The uses of cinchona barks are very varied, but it has been found to be chiefly beneficial in intermittent diseases, in which it surpasses all other tonics. It is also useful according to Periera in (1) continued fever, (2) inflammatory diseases, when they assume an intermittent or remittent form, (3) in maladies characterized by chronic debility, (4) in the convalescence of either acute or chronic lingering diseases, (5) as a topical astringent or antiseptic.

**Preparations & Doses.** The bark is seldom given in powder but is administer in the infusion or decoction; the latter are given.
in doses of from \( \frac{3}{4} \) to \( \frac{3}{2} \). The other preparations are
Tinctura Cinchonae 2 Tinctura Cinchonae composite, of
which the doses are from \( \frac{3}{4} \) to \( \frac{3}{2} \); The Extractum Cin-
chonae, which is given in pills from \( 9:5 \) to \( 9:20 \), and
the Quinina Sulfat, or sulphate of Quinina, in which
form it is generally administered. Its dose is from
\( \frac{1}{2} \) to \( \frac{1}{3} \).

The Artemisia Absinthium, or common Wormwood,
gets its specific name from two Greek words  

\( \alpha \_\delta _{v} \_\nu _{d} \_\alpha _{z} \_\upsilon _{e} \) sweetness, having been termed by the Greeks
\( \delta _{v} \_\upsilon _{d} \_\alpha _{z} \_\upsilon _{e} \). It belongs to the Linnaean class Syngenesia or
It is the tops of the Plant that are used in medicine.

Botanical Characters. Heads discoidal, homogamous
or heterogamous. Florets of the ray in one row, usually fe-
male \( 3 \)-toothed, with a long bifid protruding style; of
the disc \( 3 \)-toothed, hermaphrodite or by the absorption of
the ovary, sterile or male. Involucral scales imbricated,
dry, scarious at the edges. Receptacle without Paleae, naked
or fringed with hairs. Achene obovate, cald, with a minute
spiny or disc.

Chemical Characters. The following analysis of
Wormwood has been made by Bracinnot:

<table>
<thead>
<tr>
<th>Chemical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wormwood</td>
</tr>
<tr>
<td>Bracinnot</td>
</tr>
<tr>
<td>Ingredient</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Volatile Oil</td>
</tr>
<tr>
<td>Green resin</td>
</tr>
<tr>
<td>Bitter resin</td>
</tr>
<tr>
<td>Albumen</td>
</tr>
<tr>
<td>Starch</td>
</tr>
<tr>
<td>Azotized matter</td>
</tr>
<tr>
<td>Lignin</td>
</tr>
<tr>
<td>Absintheate of Polish</td>
</tr>
<tr>
<td>Nitrate of D.</td>
</tr>
<tr>
<td>Sulphate of D.</td>
</tr>
<tr>
<td>Water</td>
</tr>
</tbody>
</table>

Tannate of iron is formed on the addition of quick chlorine of iron to an infusion of wormwood. Absinthin, its bitter principle, has been obtained by Carston from its infusion by forming a precipitate with acetate of lead.

Uses. Wormwood was at one time in great repute in medicine, having been much used in intermittent, dyspepsia, & sometimes as a vermifuge; but of late years more powerful remedies have been used in preference.

Preparations & Doses. The dose of the powder is from ¼ to ¾; of the infusion from ¾ to 3 ⅓.

Chamomile flowers are the produce of a plant named Anthemis nobilis, belonging to the Linnean class Syngeneica, order Polygama superflua, & to the Nat. Ord. Compositae. This
is one of the most important of our indigenous plants; on account of its great utility it has received its specific name. Its English name "chamomile" is derived from the words Xaros (Kumi) and μύξλον (malmum) signifying a dwarf or creeping apple.

**Botanical Characters.** Heads many-flowered, heterogamous; flowers of the ray female, ligulate, white; of the disc hermaphrodite, tubular, yellow. Receptacle convex, covered with membranous paleae. Involucre imbriated. Achene tapering or acutely deformed.

**Chemical Characters.** Chamomile flowers contain volatile oil, which is obtained by distilling the flowers with water, a bitter principle, soluble in water and alcohol, a tannic acid, the presence of which is proved by its infusion being rendered dark with sesquichloride of iron. No analysis has yet been made of this plant, although its near ally, the Matricaria chamomilla has been analysed by Freundenthal.

**Uses.** An infusion of chamomile is much used in domestic practice as a tonic, stomachic, under the familiar name of chamomile tea. It has been also celebrated in the cure of intermittents, but is much inferior to other febrifuge remedies. The infusion is sometimes taken warm as an emetic.

**Pradice Gentiana.** Gentian root, is said to have been introduced into medicine by Gerhardus Hering of Lillegranda about 160 or 170 years before Christ, by Gentius, King of Illyria,
from whom also it takes its name (Pereira). It grows in different places on the mountains of Central & Southern Europe, more especially on Mount Jura. The root is generally about 1 inch in thickness, is branched & much wrinkled with transverse & longitudinal furrows. It is a yellowish-brown colour on the outside, passing to reddish-yellow internally, having an intensely pure bitter taste. The plant from which it is derived, is named Gentiana lutea, of the Linnean class Pentandra, order Dipsacaceae, & of the Nat. Ord: Gentianaceae. The roots of Gentiana purpurea et junctata are sometimes mixed with it, with no great detriment, as they possess much the same properties.

**Botanical Characters.** Calyx 4-5 parted or slit, valvate, yellow. Corolla yellow, withering: the limb 2-5 parted or spurning 10-parted. Stamina 2-3, inserted in the tube of the corolla. Discary 1-celled. Stigmas 2 Terminal, revolute. Style 0. Leaves oval or ovate (Goebel). 

**Chemical Characters.** The following analyses by Henry Leaverton, a volatile, odorous matter, a bitter yellow crystalline principle, matter identical with bird'slime, a green fixed oil, a free organic acid, uncrystallizable sugar, gum, yellow colouring matter, lignin. It is owing to the sugar mentioned in the analysis, that the Swiss are enabled to extract an alcohol from the gentian root, after subjecting it to a fermentation in.
in lukewarm water (ōke). In an infusion of gentian a precipitate is formed by salts of lead, iron & mercury.

Uses. Gentian is a pure simple bitter & as such is used as a stomachic & tonic in dyspepsia & other diseases of the digestive organs. In intermittent diseases it is very beneficial having occupied the first rank among febrifuge remedies before the discovery of cinchona. Dr. Cullen says that "joined with galls or tormentil in equal parts a given in sufficient quantity, it has not failed in any intermittents in which he tried it."

Preparations & Doses. The dose of the powdered root, in which form it is seldom administered, is from 3 to 6 drachms. The Infusion Gentianae Compositum is given in doses of 3 to 5 fluidrams. The dose of the Tinctura Gentianae Composita is from 3 to 5 minims, of the Vinum Gentianae 3 to 5 minims. The Extractum Gentianae is given in the form of pills in conjunction with chalk, from 3 to 6 grains.

Belonging to the same natural order is the Agathos Cherasia or Gentiana Chiasa of Fleming. It comes under the Linnaean class Tetrandria & order Monogynia. Guibourt says it is the same as the ἄλκανος ἄγωπαλκος of Dioscorides, but Recerra & Christison are of a contrary opinion.

Botanical Characters. The capsule of the flowers. The general characters of the plant are similar to those of Gentiana Cutea, but
They may be distinguished from one another by the following characters. Leaves coriaceous, ovate, acuminate, sessile, 5-7 nerved. Corollas few-flowered. Corolla 1-parted, the segments ovate-lanceolate, acuminate.

Chemical Characteristics. The analysis of the stalks of this plant by Lassaigne and Borrut is as follows. Resin, yellow bitter matter, brown colouring matter gum, malic acid, malate of potash, chloride of potassium, sulphate of potash, phosphate of lime, silica, a trace of oxide of iron.

Uses. It has been much employed in India as a febrifuge, but is inferior to other species of the gentian tribe.

Preparations & Doses. It is sometimes administered in powder in doses of 3g. The Infusions Cascarilla is given in doses of 3g, or 3½.

Cortex Cascarillae, the Cascarilla bark, is derived from a shrub belonging to the family class Monocot, order Monadel phyceae, to the Nat. Ord. Euphorbiaceae. Its generic name is Croton, but the specific name is not so easily decided, as there is a diversity of opinion, whether it is the Croton Cascarilla, or the C. Eleutheria. See the latter it is the C. cascarilla, states as his reason that the C. eleutheria is still little known; it is abundant in the Indies, but he says, as we derive all our Cascarilla from America & Antilles we must refer it to the C. cascarilla, a plant well known, & which is known positively to furnish the bark of commerce. On the other
(p) Materia medica, vol. 11, p. 1118, 2nd edit.
and Perciva says that he was at one time inclined to believe that
the C. Cascarilla produces the bush of the shops, but that "Dr. Lindley
adduced several reasons for believing that the C. Eleutheria was the
ture species, as Dr. Wright & Woodville had already asserted, the
subsequent receipt by Dr. Lindley of specimens of the plant from the
Dons of J. G. Lees, chief judge in the Bahamas, has fully confirmed
the accuracy of Dr. Lindley's opinion." It is in the form of short,
thin, fragile quills; the epidermis is covered with a large number
of lichens.

**Botanical Characters.** Flowers monoecious. Calyx 5-parted.
Males: petals 5, white. Stamens 10-12 distinct. Females:
Petals 0, ovary roundish, styles 3, bifid, stigma obtuse, capsule
trisecund, with one seed in each shive cell.

**Chemical Characters.** Analysis of Cascarilla bark by
Frommedorf. Volatile oil, 1.6. Bitter resin, 15.1. Gum and a
bitter principle, 18.7. Woody fibre, 65.6. A peculiar alkaline
substance is also said to have been discovered by Brandes.

**Uses.** This bark is said by Lee to be deserving of more notice,
than is now bestowed upon it. It has been, like many other tonic
superseded by Cinchona bark, but is sometimes preferable, in
when the defective organs are in an irritate state.

**Preparations & Doses.** The dose of this bark in powder is
from 0.5 to 2 gr. XV, but the Tinctura Cascarilla is given in
conjunction with other tonics in doses of 3j or 3ij. The dose of
The Cortex Quercis is obtained from the Quercus pedunculata, the common oak, Quercus Robur of Linnaeus belonging to his class Quarceae or order Fagandria, a to the Nat. Ord. Fagaceae or Cupuliferae of Richard. A description of this bark is hardly necessary, as the oak and its barks are familiar to everyone.

Botanical Characters. Monoeccious; Males: - catkins cap. pendulous. Stamens 5-10. Females: - Involucr nearly; the scales numerous, imbricated, combined with acornaceous, hemispherical cup; every 3-celled, 2 of the cells abortive; stigmas three, not one-celled, one-seeded. Leaves deciduous, shortly stalked (k3).

Chemical Characters. The constituents of oak barks according to Baccornal are: - Phenolic acid, tannates of lime, magnesia & potash, gallic acid, uncrystallizable sugar, pectin and lignin. The barks contain the greatest proportion of tannin in spring; 80 parts of tannin were obtained by Kiezingo from the barks of a tree felled in winter, whereas 100 parts were obtained from the same quantity of one felled in spring.

Uses. Oak barks is chiefly used as an astringent in diarrhea & dysentery, also in a gouty, as a wash or as an enema. It has been used with success in intermittent, but is much inferior to Cinchona.

Preparations & Doses. The dose of the powder is from £s. to £s. of the Decorum Quercis £s. to £s.
(2) Gregory, Outlines of Chemistry, p. 374. 2nd ed.
Cortex Salicis, Willow bark, is obtained from several species of Salix. It was made use of by the ancients & having fallen into disuse, was brought into notice as a remedy for gout in 1763. The species which are considered to produce the best bark are, Pseudoeliana, alba, Capria, fragilis, pentandra & purpuresa. The genus Salix belongs to the binomial class Dioclea, order Diandria & into the Nat. Ord. Salicaceae.

Botanical Characters. The generic characters are: flowers dioecious, amethystous; scales imbricated. Males: - Stamine 2-8, Females: - seeds cornose, the radical inferior. (Bot: Gall)

Chemical Characters. Analysis of the bark of Salix alba by Pelletier & Caventon: Bitter, yellow, coloring-matter, green fatty matter, tannin, resinous extract, gum, wax, woody fibre, a salt of magnesium: Salicin, the active principle of this bark, was first obtained by M. Leroux. It is a white, bitter, crystallizable substance. It is extracted by boiling the bark with water, decolorizing the decoction with litharge, removing the lead dissolved by a sulphuric acid & sulphurate of Barium, & evaporating to a syrup. The Salicin crystallizes on standing, in fine scale of a silky lustre, which have a very pure bitter taste & are highly febrifuge.

Uses. Salicin is said by some to be a good substitute for Cinchona, for although its properties are inferior, it irritates the stomach less. Mr. Guibourt says it is a feeble febrifuge & not to be compared
with Cineraria; its base is from \( \sqrt{x} \) to \( \sqrt{xxx} \).

Iceland Moss, Cetraria Islandica, is said to have been known in Europe in 1673. The thallus is large and of a greyish-white color. In the Linnaean system it is included under the class Cryptogamae, order Algae. Its Nat. Red. is Lichenes.

**Botanical Characters.** Thallus foliaceous, on each side smooth, raised, erect, tufted, olive-brown, paler on one side, channelled. Apothecia orbicular, brown, flat, with an elevated border; the disc coloured, plano-concave, with a border formed of the thallus 2 reflexed. (Houter.)

**Chemical Characters.** The analysis obtained by Bergelius is as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter principle</td>
<td>3.0</td>
</tr>
<tr>
<td>Uncrystallizable sugar</td>
<td>3.6</td>
</tr>
<tr>
<td>Salts of potash &amp; lime</td>
<td>1.9</td>
</tr>
<tr>
<td>Green wax</td>
<td>1.6</td>
</tr>
<tr>
<td>Gum</td>
<td>3.7</td>
</tr>
<tr>
<td>Yellow extractive matter</td>
<td>7.0</td>
</tr>
<tr>
<td>Starchy skeleton</td>
<td>36.6</td>
</tr>
<tr>
<td>Starch</td>
<td>24.6</td>
</tr>
<tr>
<td>Total</td>
<td>102.0</td>
</tr>
</tbody>
</table>

Its active principle is cetrarim or cetraric acid occurring in the form of small acicular crystals, soluble in boiling alcohol slightly, in ether or water.

**Uses.** Iceland Moss is a very mild tonic and is generally...
given when a light diet & a weak tonic are required.

Preparations & Doses. The only form in which it is admin-
istered is as a decoction, Decoctum Lichenis Islandicii,
of which the dose is from $\frac{3}{4}$ to $\frac{3}{4}$.

In treating of the History of Vegetable Tonics
I have selected for discussion those which are
most familiar, being well known in common
practice. I might have increased the pages of
this essay to an almost unlimited extent, both
by giving a fuller and more particular account
of those remedies which I have before mentioned
and also by describing other tonics which, however,
I deem of insufficient importance to merit par-
ticular notice.

W. R. Hill.