United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

A BIBLIOGRAPHY OF QUASSIA

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INTRODUCTION

The term "quassia," as employed in the entomological and medical literature, may refer to either of two plants, both members of the family Simaroubaceae. Quassia amara L. is a small branching tree or shrub native to Surinam and found in Brazil, Guiana, Colombia, Panama, and the West Indies and also in some tropical countries. About the middle of the eighteenth century, a negro of Surinam, named Quassi, acquired a reputation for treating the malignant fevers of that country by a secret remedy, which he was induced to disclose to Rolander, a Swede, for a valuable consideration. Specimens were taken to Stockholm by the latter in 1756 and the medicine soon became popular in Europe. The generic name of the plant is derived from the name of the negro. This Surinam quassia has now been largely replaced in use by Jamaica quassia (Aeschrion excelsa (Swartz) Kuntze)^{1/}, a closely related plant, which occurs in much greater abundance. A. excelsa is a lofty tree, sometimes attaining a height of 100 feet or more, inhabiting Jamaica and the Caribbean Islands.

The water extract of the wood of these two species is employed medicinally as a bitter tonic in the treatment of dyspepsia and also finds some use in agriculture as an aphicide. Where any distinction is made between the two, it is usually in favor of the Surinam quassia. The Jamaica quassia comes on the market usually in the form of chips, raspings, or billets; the Surinam quassia generally is obtained in billets. When the wood is prepared for use, it is turned into small chips and kiln dried.

The active bitter principles of the two species are not identical but are very similar. The principle occurring in Quassia amara, which is spoken of in the literature as quassin or quassiin, is believed to be a mixture of several closely related compounds. The principle in Aeschrion excelsa, which has been variously called quassin, quassiin, and picrasmin, is also thought to be a mixture of substances which appear to be related to those occurring in Q. amara. In many instances the literature speaks merely of quassin or quassiin without specifying the plant from which it is derived.

^{1/} Synonyms: Quassia excelsa Swartz, Simarouba excelsa DC., Picraena excelsa Lindl., and Picrasma excelsa Planch.

ANONYMOUS.

(1)

TEST OF THE QUASSINE OF A. V. ZEIDEL.

Kiev Soc. Agr. and Agr. Indus. Rept. 1913: 106. 1914. [In Russian. Abstract in Rev. Appl. Ent. (A) 3: 104. 1915.]

The importation of quassine from abroad being prohibited in Russia, it has been prepared by A. V. Zeidel and the tests conducted by a special committee of the Kiev Society showed that this preparation is one of the most effective remedies against Hyponomeuta malinellus and aphids. The composition of this substance is not given, but the proportion used for spraying during the tests was 2 pounds of potash soap and 2 tubes of quassine (their size being constant) in about 108 gallons of water; the sprayings were carried out on firs against aphids and on apple trees against aphids and H. malinellus.

(2)

THE PRINCIPAL QUERIES RECEIVED AT THE CENTRAL PHYTOPATHOLOGICAL STATION DURING 1914. Diseases of Plants 9(1-2): 44-66. 1915. [In Russian. Abstract in Rev. Appl. Ent. (A)4: 23-24. 1916.]

Spraying with quassia solution is suggested as a remedy for leaves of oak (Quercus mongolica) injured by Phylloxera coccinea Heyden.

(3)

REPORT ON THE WORK OF THE RIGA BRANCH OF THE IMPERIAL RUSSIAN SOCIETY OF HORTICULTURE FOR 1914. Messenger Hort., Fruit Growing and Market Gard., 11-12: 793-817. 1915. [In Russian. Abstract in Rev. Appl. Ent. (A)4: 215. 1916]

A decoction of quassia was effective against Aphis pruni.

(4)

DE BESSENBLADWESP, PTERONUS RIBESII, SCOP. (NEMATUS VENTRICOSUS, LATR.) Inst. v. Phytopatologie, Wageningen, Vlagschr. 17, 6 pp. 1917.

Quassia-soap solution may be used for spraying against Pteronus ribesii Scop.

(5)

REPORT ON THE OCCURRENCE OF INSECT AND FUNGUS PESTS ON PLANTS IN ENGLAND AND WALES IN THE YEAR 1917. Bd. Agr. Fisheries [London] Misc. Pub. 21, 32 pp. 1918.

Phyllotreta nemorum L., on turnips, was successfully controlled by spraying with a quassia and soap mixture.

(6)

THE CABBAGE FLY. Rural Econ. Com. Sub-Dept. (for Control of Pests) [Petrograd], 4 pp. 1919. [In Russian. Abstract in Rev. Appl. Ent. (A)9: 553. 1921.]

Watering with emulsions of quassia and soap is advocated as a remedy for the cabbage fly (Phorbia brassicae) on cruciferous plants.

ADRIAN and MOREAUX

(7)

DE LA QUASSINE, SA PRÉPARATION SOUS FORMES AMORPHE ET CRISTALLISÉE. Répert. Pharm. [n. s.] 11: 246-50. 1883. [Abstract in Amer. Jour. Pharm. 56: 98-100. 1884.]

Thin shavings of Quassia amara wood are exhausted with boiling water, with the addition of 5 g. of potassium carbonate per kilogram of quassia. The liquor is concentrated to a soft extract and the extract suspended in hot 90° alcohol. After standing for a short time, the alcohol is decanted, and the process repeated twice. The alcoholic liquor is allowed to stand 24 hours, the liquid then decanted, and sulphuric acid diluted with 90° alcohol (1: 10) added until a precipitate is thrown down. The liquor is filtered, milk of lime added (12 to 15 g. per kilogram of wood or 4 to 5 g. of caustic lime), and after some hours the liquor is again filtered. It is neutralized by a current of carbon dioxide and again filtered. The alcohol is then distilled off, leaving about 8 g. of the amorphous quassiin of Adrian per kilogram of wood.

If crystalline quassiin is desired, the distillation is stopped while some alcohol remains, the liquid filtered to remove resin, and the rest of the alcohol then removed. The quassiin, which crystallizes on cooling, is purified by recrystallization from alcohol. About 1.25 to 1.5 g. of quassiin per kilogram of quassia is obtained.

Additional uncrystallizable quassiin may be obtained from the mother liquor and wash alcohol of the first crystallization by extracting with chloroform.

Crystallized quassiin is white, very soluble in chloroform, soluble in about 90 parts of cold absolute alcohol, in 35 to 40 parts of 90° alcohol, scarcely soluble in ether, and soluble in about 300 parts of hot water, from which it crystallizes on cooling. Uncrystallizable quassiin is very soluble in absolute alcohol, more soluble in ether than crystallized quassiin, and less soluble in water.

AHLBERG, O.

(8)

"ARTTRIPSEN (KAKOTHRIPS ROBUSTUS UZEL). Meddel. Centralanst.
Försöksv. Jordbruksområdet [Sweden] 406 Landbruksentom Avd. 63,
11 pp. 1932

The life history and control of the pea thrips (kakothrips pisivorus Westw. (robustus Uzel)) are discussed. In hot or sunny weather when the pods are developing, some larvae remain exposed on the free surface of the pods, where they could be killed by quassia or nicotine sprays, but these are few compared with those in the flowers, etc.

AINSLIE, W.

(9)

MATERIA INDICA. 2 v. London. 1826.

The bark of Ailanthus excelsa has a pleasant and somewhat aromatic taste, and is prescribed by Hindu native practitioners in infusion, in dyspeptic complaints (v. 2, p. 302)

AMERICAN PHARMACEUTICAL ASSOCIATION

(10)

THE NATIONAL FORMULARY. Ed. 5, 546 pp. Baltimore. 1926

Directions are given for the preparation of Fluidextractum quassiae (p. 95) and of Tinctura quassiae (p. 258).

ANTONIBON, A.

(11)

AZIONE COMPARATA DELLA QUASSINA NEI VERTEBRATI E NEGLI INSETTI.
Arch. Internatl. Pharmacodyn. et Théor. 33: 77-84. 1927.

The minimum lethal dose of quassia for the rabbit is four times as great when introduced by way of the stomach as when administered intravenously. It is only slightly soluble (1 percent) and is dissolved in and absorbed from the stomach with difficulty. The lethal doses for insects such as the silkworm and for the rabbit are much the same. The supposed greater toxicity for insects is due to an error in calculating the dose absorbed. The seat of action is the nervous system, torpor and muscular relaxation with rapid apparent death being produced in insects, whereas in rabbits there is muscular tremor and later paralysis

ARKHIPOV, P.

(12)

THE INDUSTRIAL CULTIVATION OF ROSE TREES FOR GRAFTING.

Orchard and Market Gard. 32(10-12): 210-223. 1916.

[In Russian. Abstract in Rev. Appl. Ent. (A)5: 255. 1917.]

The rose aphid can be controlled by spraying with quassia decoction, for which an extract of Quassia amara, not of Picraena excelsa, should be used.

ATHERTON, D. I.

(13)

EXPERIMENTS WITH BAITS FOR THE CONTROL OF CERTAIN COTTON PESTS.
Queensland Agr. Jour. 40: 183-190. 1933.

Baiting experiments were commenced with a view to obtaining a practicable method for the control of the corn earworm on cotton. One of the baits used was composed of honey and water (1:7), quassia chips having been soaked previously in the water at the rate of 1 pound to 2 gallons for 18 hours. None of the baits were effective.

AVERIN, V. G.

(14)

ON THE EXPECTED APPEARANCE OF PESTS IN 1913. Pests of Agriculture and Methods of Fighting Them, Bull. 1, 6 pp. 1913.
Issued by the Entomological and Phytopathological Bureau of the Zemstvo of Charkov. [In Russian. Abstract in Rev. Appl. Ent. (A)1: 491-492. 1913.]

Timely spraying is recommended against *Psylla mali* with the following decoction of quassia: 3 pounds boiled in about 5 gallons of water; half of the water evaporates, when another 2.7 gallons is added and the liquor is racked off; 2 pounds of green soap is then added, and the whole made up to 16 to 17 gallons with water.

B., A. C.

(15)

THE CELERY FLY AND PARSNIPS. Gard. Chron. (3) 61: 261. 1917.

Spraying of parsnip foliage with quassia extract is recommended to prevent oviposition by the celery fly.

BAKER, J. L.

(16)

MALT AND MALT LIQUORS. In Allen's Commercial Organic Analysis. Ed. 4, v. 1, pp. 133-164. Philadelphia. 1912.

A. C. Chapman (Analyst 25: 35. 1900) has devised a method for distinguishing between hops and quassia, which is based upon the production of valeric acid when the ether extract of hops is oxidized with an alkaline solution of potassium permanganate. The valeric acid can be identified by its odor. In the case of quassia the acid liberated is chiefly acetic. This method is applicable to the examination of hop-bitter preparations (of a medicinal character), hop extracts, and similar products.

BAUDON, A.

(17)

CONTRIBUTION À L'ÉTUDE DES PLANTES OLÉAGINEUSES DE L'AFRIQUE
ÉQUATORIALE. Ann Mus. Colon. Marseille. (4) 7 (1): 5-56.
1928.

The seeds of Quassia gabonensis Pierre (Odyendyea gabonensis Pierre), which occurs in the Cameroon and in the Congo, are consumed by the natives, who boil them to eliminate the bitter principle which they contain, and then dry them and keep them. These seeds are of potential interest because of their abundance and their large content of oil.

BAUER, A.

(18)

EINIGE BEITRÄGE ZUR LEBENSWEISE UND BEKÄMPFUNG DER HOPFENBLÄTTLAUSE.
Arb. Deut. Sekt. Landeskult. Böhmen 34, 28 pp. 1925.

Solutions of quassia are recommended for the control of the hop aphid (Phorodon humuli).

BAUNACKE

(19)

EIN ARGER FEIND DER STACHEL- UND JOHANNISBEERSTRÄUCHER.
Kranke Pflanze 2: 95-97. 1925.

Quassia-soap emulsion is useful in combating Nematus ribesii Scop., a pest of currants and gooseberries. The spray may be prepared by boiling 2 kilogram of quassia chips in 50 liters of water and mixing the filtered decoction with a solution of 3 kilograms of soft soap in 50 liters of water.

BLOM, C. M.

(20)

LIGNUM QUASSIAE. Amoenitates academicae 6: 416-429. 1764.

An inaugural dissertation. The first full account of Quassia amara published.

BOAS, J. E. V.

(21)

AEDELGRANSLUSENE. Dansk Skovforenings Tidskr. 3: 191-276. 1918.

Spraying with quassia is suggested for the control of Chermes piceae and Mindarus abietinus damaging silver fir in Denmark.

BOERICKE AND TAFEL, Publishers

(22)

THE AMERICAN HOMOEOPATHIC PHARMACOPOEIA. Ed.9. 549 pp.
Philadelphia. 1911.

Both Quassia amara and Picrasma excelsa are given as sources of quassia. The tincture is prepared as follows: The dried wood of the branches and trunk of the tree is coarsely powdered, covered with 5 parts by weight of alcohol, and allowed to remain 8 days in a well-stoppered bottle, in a dark, cool place, being shaken twice a day. The tincture is then poured off, strained, and filtered (p. 384).

A tincture of Simaruba officinalis is similarly prepared from the bark of the root (p. 413).

BOGDANOV-KATKOV, N. N.

(23)

CABBAGE APHIS AND ITS CONTROL. All Russian Union of Rural-Economic Co-operation [Petersburg], 22 pp. 1922. [In Russian. Abstract in Rev. Appl. Ent. (A)10: 233. 1922.]

Instructions are given for the preparation of quassia sprays for combating the cabbage aphid, Brevicoryne (Aphis) brassicae L.

(24)

THE CABBAGE FLY. Ed.2. 35 pp. Leningrad. 1929. [In Russian. Abstract in Rev. Appl. Ent. (A)17: 646-647. 1929.]

One of the remedial methods advocated for use against Phorbia (Hylemia) brassicae is watering infested plants with emulsions of quassia at intervals of 4 or 5 days.

BORODIN, D. N.

(25)

THE FIRST REPORT ON THE WORK OF THE ENTOMOLOGICAL BUREAU AND A REVIEW OF THE PESTS OF THE GOVERNMENT OF POLTAVA IN 1914. Ent. Bure. Govt. Zemstvo of Poltava. 87 pp. 1915. [In Russian. Abstract in Rev. Appl. Ent. (A)4: 329-331. 1916.]

Carbolic or kerosene emulsion and quassia soap proved successful against Hyalopterus arundinis L. (pruni F.).

BOURCART, E.

(26)

INSECTICIDES, FUNGICIDES, and WEEDKILLERS. English ed.2. London. 1925.

BLOWNE, P.

(27)

THE CIVIL AND NATURAL HISTORY OF JAMAICA. 503 pp. London. 1789.

Of terebinthus, the birch or turpentine tree, the author says that the bark of the root is thought to be the Sima-rouba of the shops, which is the most effective remedy yet known in bloody fluxes (p.345).

CARIMINI, M.

(28)

GLI AFIDI DELLE PIANTE DA FRUTTO E I MEZZO PER COMBATTERLI.

Note Fruttic.3(5): 90-98. 1931. [Abstract in Rev. Appl. Ent. (A)20: 438. 1932.]

The aphids infesting fruit trees in spring in Italy are Hyalopterus arundinis F. (pruni F.) on plum, peach, apricot, and almond; Myzus cerasi F. on cherry; Anuraphis amygdali Buckt. (persicae Boy.) on peach, which is also attacked by A. persicae-niger Smith; and Aphis pomi DeG. (mali F.) which occurs on apple and pear without doing much harm. Sprays of quassia and soap are recommended.

CARLOS, A. S.

(29)

THE MANUFACTURE OF INSECTICIDES AND FUNGICIDES. V. MATERIALS USED. Fert. Feed. Stuffs, and Farm Supplies Jour. 16: 302-303. 1931.

Quassia wood, which consists of the trunks and branches of Picraena excelsa and Quassia amara, imported from Jamaica, is white or yellowish, not hard, and has a bitter taste but no odor. The wood of Q. amara (Surinam quassia) is deep yellow and is harder and heavier than the other variety. Quassia wood is easily cleft and is usually met with in commerce in the form of splintery raspings or coarse chips. The method of making the chips and drying the wood is outlined. The chips are sold for use in making home-made washes or are used in the manufacture of quassia extract for the production of insecticides. A simple commercial method of extracting quassia is described.

The active principle is quassine, a crystalline alkaloid slightly soluble in water, but more so in alcohol or other organic solvents. It is present in the chips to the extent of about 0.75 percent. It is a powerful insecticide but non-poisonous to higher animals.

CARSON, J.

OF QUASSIA AMARA, LINNAEUS. Amer. Jour. Pharm. (n.s.14) 20:
257-260. 1848.

The Quassia amara belongs to the family Simarubeae (Richard) or Simarubaceae (Lindley), the essential characters of which are briefly given. This is a small family, and a remarkable analogy exists among all its members. They have been found to contain a bitter, toxic principle, upon which their medical properties depend. This is the same in all, and has been called quassin from the generic name Quassia.

The generic and specific characteristics of Quassia amara are discussed. It is a small tree 6 to 10 feet high straight, irregularly branched, with ash-colored, smooth bark. The leaves are sparse, smooth pinnate; the leaflets sessile, in pairs, usually two with an odd one, entire, elliptical, acute, reticulated, a little revolute on the margin, of a deep green, with a reddening of the veins above, and lighter beneath; petiole winged, with the joints cuneate. Racemes long, simple, terminal. Flowers large, scarlet, with short pedicles and a recurved bract at base. The fruit is black and ovoid, drupaceous. This plant is a native of Surinam, Guiana, and other parts of South America and is cultivated in the West Indies.

At the time of the sojourn of Rolander, a Swedish naturalist, in Surinam, a negro by the name of Quassi was in the habit of treating the fevers of the country with the root. The naturalist procured some of this and took it to Europe about 1756. He supposed it to be derived from Zygophyllum aestivans (family Rutaceae). However, Dahlberg, a military officer, had the tree pointed out to him and after cultivating it in his garden transmitted specimens of the organs of fructification to Linnaeus, who determined the true position under the name Quassia amara. The first full specific account, with a drawing, was published by Blom, in an inaugural essay, in the Amoenitates Academiae for 1763, v. 6.

According to Pereira, Fermin mentions that about 1714 the flowers were highly valued in Surinam for their stomachic properties. In 1730 the root is said to have been found in the collection of Seba, a celebrated spice dealer of Amsterdam. Haller refers to it as having been well known in 1742. That Quassia was known as a remedy long before the tree was described is evident from the statement of Blom that Linnaeus lectured on the virtues of the wood. But whether this knowledge dates farther back than the return

of Rolander is not easily settled. In his *Materia Medica*, Cullen mentions it as a bitter tonic and refers to Murray's *Apparatus Medicaminum* for an account of the drug.

All parts of the tree are intensely bitter because of the quassin present. Although this plant does not afford the article now used, a more fruitful source having been discovered in the Jamaica tree, it is of great interest as having produced the originally introduced article.

(31)

ON QUASSIA EXCELSA. *Amer. Jour. Pharm.* (n.s. 15) 21: 1-4. 1849.

This plant has been made the basis of a new genus by Lindley and DeCandolle. The absence of generic characters which would place it with *Quassia* are apparently due to abortion, and the author has preferred to retain the old name of Swartz. The synonymy is given thus:

Quassia excelsa. *Picraena excelsa*-Lindley. *Picrania amara*-Wright. *Simaruba excelsa*-DeCandolle. *Quassia polygama*-Lindsay. The generic and specific characters are briefly discussed.

In Jamaica, where it is abundant, the plant is called bitter ash and bitterwood. The wood is imported in billets, covered with smooth, grayish, sometimes silvery bark. It is white, light and even in texture but darkens on exposure. It contains the bitter principle quassin as well as a trace of volatile oil, gummy extractive, pectin, woody fiber, and salts.

Quassin was first isolated by Thomson of Glasgow. It occurs in small, white, prismatic crystals, fusible, odorless, intensely bitter, readily soluble in alcohol, but only slightly so in water or ether. Its solubility in water is increased by several salts and vegetable principles. Its aqueous solution is precipitated white by tannin, not by iodine, chlorine, corrosive sublimate, salts of iron, acetate or diacetate of lead. It is a neutral body, though soluble in sulphuric and nitric acids. Its composition is indicated by the formula $C_{10}H_6O_3$.

The medical effects are those of a pure, bitter, tonic and roborant, and as such quassia wood is used in convalescence, dyspepsia, etc. The mode of exhibition is in cold infusion, made from the chips or raspings, in tincture or extract. In France it is a practice to have cups turned from the wood, and to allow water to stand in them until it becomes imbued with the active principle.

The wood is excellent timber and is used in flooring. It is so obnoxious to insects that it is sometimes used for furniture, e.g., bedsteads, and clothespresses.

CHEVALIER, A., and RUSSELL, W.

(32)

SUR UN QUASSIA AFRICAÏN UTILISÉ PAR LES NOIRS COMME PLANTE
MÉDICINALE. Rev. Bot. Appl. et Agr. Trop. 16: 364-367. 1936.

The authors have recently received branches and racemes of Quassia africana Baillon. This shrub, known as Simigala in the Eshira idiom and Isindu igala in Pumu, is employed medicinally by the natives, an extract of the root in cold water being administered for ailments of the stomach.

The structure of the leaves and stem is described. Quassia amara differs considerably from Q. africana morphologically, but anatomically the chief differences are in the epidermis of the leaves and in the palisade tissue.

CHRISTENSEN, A.

(33)

UEBER QUASSIIN. Arch. Pharm. [3] 220: 481-492. 1882. [Abstract in Jour. Chem. Soc. [London] 42: 1302. 1882]

The author exhausted quassia with water and precipitated the quassiin by tannin, after neutralization with sodium carbonate. The tannate was mixed with lead carbonate (or calcium hydroxide), dried, and the quassiin was extracted by alcohol. The author found the amount of quassiin in the quassia to vary largely, some specimens yielding scarcely any. Pure quassiin, purified by recrystallization from hot alcohol, crystallizes in very thin rectangular plates, which are biaxial and doubly refracting. It is bitter, odorless, permanent in the air and its solutions are neutral. It melts at 205°, swelling up slightly to a resinous mass of unchanged quassiin. It is readily soluble in alkalies and is reprecipitated by acids. It is soluble in boiling alcohol, less so in cold. Ether and light petroleum dissolve it with difficulty, chloroform very easily. It is dextrorotatory, its specific rotatory power for $[\alpha]_D$ being 37.8. Its formula is $C_{31}H_{42}O_9$. It is precipitated by tannin. It is not a glucoside, but by the prolonged action in the water-bath of 5 percent sulphuric acid, a body, $C_{31}H_{38}O_9$, is formed, which dissolves sparingly in water, giving no precipitate with tannin. Unlike quassiin, its aqueous or alcoholic solution reduces silver nitrate. A resin is simultaneously formed by the action of the dilute acid. A bromo-derivative of quassiin (m. p. 75°) was formed by the action of bromine in chloroform solution. Contrary to the statements of Bennerscheidt, the author found free fatty acids in quassia wood, but no essential oil.

CLARK, E. P.

(34)

QUASSIN. I. THE PREPARATION AND PURIFICATION OF QUASSIN AND NEOQUASSIN WITH INFORMATION CONCERNING THEIR MOLECULAR FORMULAS. Jour. Amer. Chem. Soc. 59:787-789. 1937.

A method is described for the preparation of "quassin" from quassia (Quassia amara L.) chips by extracting with hot water and adsorbing from this solution with active charcoal. The substance is removed from the dried carbon with chloroform, the chloroform extract evaporated to dryness under reduced pressure, the residue dissolved in methanol, and hot water added. Crystallization of crude quassin from the filtered liquid was completed in 2 days. The crude material consisted principally of two isomers which were separated by fractional crystallization from methanol. One crystallizes in thin colorless rods and micaceous plates, which melt at 205-206°C. It is proposed to retain the name quassin for this. The other, which the author calls neoquassin, separates as dense, colorless, six-sided prisms and quadrilateral plates, melting at 225-226°. The molecular formula of these two compounds is $C_{22}H_{30}O_6$. Their optical properties are discussed. The action of concentrated hydrochloric acid on quassin in acetic acid yielded quassinol, $C_{20}H_{24}O_6$, m.p. 262°. By acetylation of quassinol with acetic anhydride in pyridine, acetyl quassinol, $C_{22}H_{26}O_7$, m.p. 232°, was obtained. The action of acetic anhydride and sodium acetate upon quassin produced an anhydroquassin, $C_{22}H_{28}O_5$, m.p. 196°, a dehydroquassin, $C_{22}H_{28}O_6$, m.p. 254°, and a third substance, $C_{22}H_{30}O_6$, melting at 214°, which when mixed with picrasmin, m.p. 215-216°, gave no depression of the melting point. Treatment of quassin with chromic acid yielded a product, $C_{22}H_{30}O_6$, melting at 221°. Treatment of this material with acetic and hydrochloric acids gave just twice the yield of quassinol that was obtained from quassinol itself.

CLAUDEL, L.

(35)

SUR LE QUASSIA AFRICANA BAILLON ET SUR LE PANCOVIA
HECKELI CLAUDEL QUI LUI EST SUBSTITUÉ. Ann. Inst.
Colon. Marseille 3(2). 3d mémoire. 49 p. 1895. [Published
separately 1894.]

Quassia africana, a plant indigenous to the east coast of Africa, was pointed out for the first time by Baillon, but his description was not complete, as he lacked the fruit and seed. The present author gives the results of his study of the plant, which are presented under the following divisions: 1. Morphology; 2. Histology; 3. Chemical study; 4. Physiological and therapeutic study.

On the basis of a rather extensive chemical examination of the bitter principles present in the plant, and of a comparative study with quassin, it is stated that this principle appears to be identical with quassin. The organoleptic and therapeutic properties also support this assumption. The plant is almost identical histologically and very similar morphologically to the American species, Quassia amara.

CLEARE, L. D., Jr.

(36)

REPORT OF THE ENTOMOLOGICAL DIVISION FOR THE YEAR 1930.,
Admin. Rept. Dir. Agr. Brit. Guiana 1930. p. 87-90.
1931. [Abstract in Rev. Appl. Ent. (A) 19: 629. 1931.]

The locust Tropidacris latreillei Porty, the nymphs of which attacked coconuts, had been feeding on Quassia.

CULLEN, W.

(37)

A TREATISE OF THE MATERIA MEDICA. 2 v. Dublin. 1789.

Quassia is an excellent bitter and will do what any pure and simple bitter will do, but probably no more. The extraordinary commendations given of it are to be ascribed to the partiality so often shown to new medicines.

Simaruba [Aeschrion] is a genus of the same family as Quassia and seems to be very nearly of the same qualities. The virtues ascribed to it in dysentery have not been confirmed by the author's experience (v. 2, pp. 61-62).

CUNLIFFE, N., and HYLE, G. B.

(38)

THE CONIFER SPINNING MITE ON SITKA SPRUCE, OLIGONYCHUS
(PARATETRYCHUS) UNUNGUIS JACOBI. Quart. Jour. Forestry
17(1): 359-362. 1923. [Abstract in Rev. Appl. Ent. (A) 11:
110. 1923.]

Quassia-nicotine emulsion has been successfully used in Sweden for the control of this mite in nurseries.

CUSHNY, A. R.

(39)

A TEXTBOOK OF PHARMACOLOGY AND THERAPEUTICS. Ed. 8,
707 pp. Philadelphia and New York. 1924.

Quassia, the wood of Picraena excelsa or of Quassia amara, is listed as a simple bitter. Quassia infusion (10 percent) is also injected as an enema for roundworms in children.

DAJI, N.

(40)

A NEW INDIAN REMEDY. Pharm. Jour. and Trans. [London] [3] 1: 154-156, 175-176, 193-194. 1870.

The bark of the Indian tree Ailanthus excelsa Roxb. has been chemically examined by the author, who states that it possesses medicinal virtues which depend upon an azotized bitter principle of an acid nature, which he names ailanthic acid. This substance he obtained as follows: Exhaust the bark by boiling repeatedly with water and concentrate the combined decoctions. Cool and add sufficient strong oxalic acid solution to precipitate the lime. Add strong basic lead acetate solution, which precipitates gum, extractive matter, colouring matter, and excess oxalic acid and filter. Concentrate the filtrate and when cold treat with hydrogen sulphide to precipitate the lead, boil, filter, and evaporate. The chemical properties of the ailanthic acid thus obtained and of its lead and lime salts are discussed.

This tree possesses the characteristic medicinal and physiological properties of the family (Simarubaceae) to which it belongs. They resemble so closely those of Picraena excelsa, or Jamaica quassia tree, that the Indian plant may safely be considered a substitute for it. These properties are discoursed at some length.

The synonymy is given thus: Ailanthus excelsa Roxb.; W. and A. Prod. 1. p. 150; Roxb. Fl. Ind. ii. p. 450; De Cand. Prod. ii. p. 89; Spr. Syst. i. p. 939; Willd. iv. 974; Roxb. Cor. P. t. 23; Wight's Ill. Ind. Bot. i. t. 67. In the vernaculars of India it is known by the following names: Aralu (Sanskrit); Araduso (Gujarati); Maharukha; Mahadunga, Mahanimba, (Marathi); Peru maram (Tamil); Pedda non chettu, Pedda man, Pedda manu (Telugu); Arar madara (Hindi, Allahabad). The botanical characteristics are given.

DESSIATOV, G.

(41)

ROSE CULTIVATION IN SOIL AND UNDER GLASS. Prog.

Fruit Growing and Market Gard., Sup. 128 p. 1914.

[In Russian. Abstract in Rev. Appl. Ent. (A) 2:

719-720. 1914.]

Rose bushes attacked by Aphis rosae should be sprayed with quassia extract prepared from chips of Quassia amara, not of Picraena excelsa. When the bushes are badly infested, a vigorous syringing with water before spraying is very useful.

DEY, K. L.

(42)

THE INDIGENOUS DRUGS OF INDIA. Ed. 2, 387 pp. Calcutta. 1896.

The wood of Picrasma quassioides, a small tree belonging to the subtropical Himalayas, has been advocated as a substitute for the true quassia, Picraena excelsa, of the West Indies. The wood might be employed as a bitter tonic and stomachic in the same way as the imported drug (p. 236).

DIXON, W. E.

(43)

A MANUAL OF PHARMACOLOGY. Ed. 6, 479 pp. London. 1925.

Among the drugs listed as simple bitters is quassia, the wood obtained from Picraena excelsa.

DOEROVLIANSKY, V. V.

(44)

REPORT OF THE ENTOMOLOGICAL SECTION. Report on the work of the Kiev station for the control of pests and plants of the South-Russian Agricultural Syndicate for 1914. Husbandry 1915: 532-539, 564-568, 594-599, 621-626, 655-660, 697-702 and 763-766. [In Russian. Abstract in Rev. Appl. Ent. (A) 3: 638-641. 1915.]

Quassia soap, 1 pound in 11 or 12 gallons of water, proved less effective against Aphis pomi Degeer than quassia soap decoction containing 3 pounds of quassia shavings and 2 pounds of green soap in 25 gallons of water.

ENDERS, L.

(45)

UEBER DIE ERMITTELUNG FREMDER BITTERSTOFFE IN DEM
BIERE, NAMENTLICH DERJENIGEN DER QUASSIA, DES BITTER-
KLEE'S UND WERMUTH'S. Arch. Pharm. 185: 209-225. 1868.

The author prepared quassiin from quassia wood by extracting with hot water, precipitating with tannic acid, removing the tannic acid from the precipitate with lead carbonate, and taking up the bitter substance in alcohol. The tannic acid-lead carbonate treatment was repeated, the resulting alcoholic solution evaporated, water added and then lead acetate, which caused a slight precipitate. The filtrate was freed of lead with hydrogen sulphide and the filtered liquid warned to remove excess hydrogen sulphide. Evaporation gave an amorphous mass, which was dissolved in alcohol and water added and evaporated slowly. The residue was taken up in chloroform and filtered, the solution evaporated, and the residue recrystallized from alcohol and water.

The quassin thus obtained is almost insoluble in water, readily soluble in alcohol and chloroform, insoluble in ether. It is not a glycoside, but reduces ammoniacal silver oxide, dissolves without color in concentrated nitric acid and with a brown coloration in sulphuric acid. Solutions of quassiiin are not affected by lead acetate, sugar of lead, or iron chloride, but are precipitated by tannic acid.

EVERS, N.

(46)

THE CHEMISTRY OF DRUGS. 247 pp. London. 1926.

"Quassia Wood is obtained from Picrasma excelsa, a tree growing in Jamaica. It is used in medicine as a bitter. The bitter principles may be extracted by the following method: An aqueous infusion of the wood is prepared, neutralized, and precipitated with tannic acid. The tannate is decomposed with lead carbonate, and on extraction with alcohol crude quassin is obtained.

"Quassin, when purified, crystallizes in slender, colourless needles, melting at 210 to 211°. It consists of a mixture of two substances: α -picrasmin melting at 204°, and β -picrasmin melting at 209° to 212°. By the action of hydrochloric acid α -picrasmin yields picrasmic acid. Surinam quassia from Quassia amara yields similar but not identical bitter principles. On hydrolysis with hydrochloric acid the quassin obtained gives a dibasic acid, quassic acid, and two molecules of methyl chloride, so that quassin is probably the dimethyl ether of quassic acid (p. 215).

FLUCKIGER, F. A.

(47)

PHARMAKOLOGIE DES PFLANZENREICHES. 1049 pp. Berlin. 1883.

Lignum quassiae surinamense and Lignum quassiae jamaicense are discussed. The weak narcotic action of quassiiin is well known to be distinctly exhibited toward insects (flies) (pp. 493-500).

FRENCH, C., jr.

(48)

INSECT PESTS OF THE FRUIT, FLOWER, AND VEGETABLE GARDEN AND HOW TO TREAT THEM. Victoria Dept. Agr. Jour. 14: 213-218, 214-317, 433-438, 495-498, 604-611. 1916.

Quassia is recommended for the control of the following pests: green peach aphid (Myzus sp.), metallic tomato fly (Lonchaea splendida), thrips (Thrips tabaci Lind.), and rose aphid.

To prepare quassia water, soak 1 pound of quassia chips in 1 gallon of cold water over night, and boil gently for 4 hours. Strain off the chips and dissolve 1/2 pound of soft soap in the solution. This will make 10 gallons of spray.

FRYER, J. C. F.

(49)

PLUM APHIDES. Jour. Bd. Agr. [London] 23: 661-664. 1916.

The leaf-curling plum aphid (Aphis pruni Réaumur) may be controlled by means of contact insecticides such as nicotine and soft soap, quassia and soft soap, or paraffin emulsion, the spray being applied just before the blossom opens or after the petals have fallen, but, in the latter case, before the leaves have curled.

GEOFFROY.

(50)

TRAITÉ DE LA MATIÈRE MÉDICALE. 9^e v. Paris. 1743.

Simarouba is the bark of a tree which grows in Guiana. It is yellowish white, odorless, slightly bitter tasting, composed of pliant fibers attached to the white, light, insipid wood of the racemes, shoots, and trunk, from which it is readily separated. Simarouba is composed of resinous gum of a not unpleasant taste. It fortifies the stomach by its slight bitterness, appeases pains and cramps by its balsamic and unctuous properties, and arrests hemorrhages and flux [dysentery] by its astringent and vulnerary virtue.

This bark was first brought to France in 1713 from Guiana, where it is used for dysentery. In 1718 de Jussieu employed it successfully in the treatment of dysentery following fever. Some directions are given for its use (v. 2, sec.1, pp. 363-367).

GINTZENBERG, A. A.

(51)

THE CHERRY AND ITS CULTIVATION. Fruit Growing Sup. pt. 1, 108 pp., 1914; pt. 2, 111 pp., 1915. [In Russian. Abstract in Rev. Appl. Ent. (A) 3: 604-605. 1915.]

One of the best remedies against Myzus cerasi F. is spraying with quassia decoction, Lignum quassi surinamensis, L. quassi rospatum, the Java quassia, not being effective.

GLÜCKSMANN, C.

(52)

UEBER EINE NEUE IDENTITÄTSREAKTION DES QUASSIINS.

Pharm. Monatsh. 1: 176-180. 1920.

If a quassia extract is prepared by the use of a menstruum consisting of equal parts of water and spirits, the dry extract obtained therefrom displays the following properties:

A trace of the dry extract dissolved in water and diluted until colorless still tastes distinctly bitter.

If a trace of phloroglucin and about 5 cc. of fuming hydrochloric acid are mixed with about 5 cc. of a filtered, alcoholic solution of the extract (prepared from 1 part extract to 50 parts strong spirits) a rose-red color develops in a short time. This reaction is based on Wiesner's lignin reaction, quassia being closely related to lignin. It may serve for the identification of Tinctura quassiae.

GORIAINOV, A. A.

(53)

THE PESTS OF AGRICULTURAL PLANTS IN THE GOVERNMENT OF RIAZAN. Published by the Zemstvo of the Government of Riazan, 67 pp. 1914. [In Russian. Abstract in Rev. Appl. Ent. (A) 3: 203-206. 1915.]

A remedy against the nymphs of *Psylla mali* is spraying with quassia when they have not yet penetrated into the buds.

(54)

EXPERIMENTS WITH SOME VEGETABLE AND MINERAL INSECTICIDES. Protect. of Plants from Pests. Friend of Nature, Sup. No. 1-2 (28-29); pp. 1-28. 1916. [In Russian. Abstract in Rev. Appl. Ent. (A) 5: 24-26. 1917.]

Decoctions of quassia (Quassia surinamensis) are well known as contact poisons, and experiments showed that they are also effective as stomach poisons. Quassia decoction (3 pounds of quassia in 6 gallons of water boiled down to half the original volume, strained and mixed with 2 pounds of soft soap and, before use, diluted in about 8 gallons of water) produced a death rate of about 60 percent among the caterpillars of *P. [ieris?] rapae* and Barathra (Mamestra) brassicae.

GRANDI, G.

(55)

DI ALCUNI AFIDI COMUNEMENTE DANNOSI ALL' AGRICOLTURA. R. Scuola Super. Agr., Portici, R. Lab. Ent. Agr. Cir. 3, 22 pp. 1921. [Abstract in Rev. Appl. Ent. (A) 9: 343-344. 1921.]

Among the sprays mentioned for combating aphids is an infusion of quassia (Picrasma excelsa) which is especially suited for use on peach because there is no danger of injuring the delicate leaves.

G[RIFFITH], R. E.

(56)

SIMARUBA. Amer. Jour. Pharm. 8: 21-22. 1836.

The first account of Simaruba is that some of the bark was sent to Europe in 1713 by the Count of Porchartrain, as an article used by the natives with signal success in the cure of diseases of the bowels. In 1741 little additional information appears to have been acquired, as Geoffroy (50) says: "est cortex radice arboris ignotae in Guiana nascentis, et ab incolis simaruba nuncupatae." Jussieu, however, used it with benefit in 1718 in an epidemic dysentery prevalent in Paris.

In 1753 Linnaeus, who had not yet seen specimens of the tree, ascribed it to a species of Pistacia, or Terebinthus major betulae cortice fructu triangulari. In 1756 Browne (27) described a terebinthus, or turpentine tree, the roots of which he was of opinion furnished the Simaruba bark.

In 1763 Linnaeus had changed his opinion and stated that the bark was furnished by the Bursera gummifera, referring to the Pistacia of former editions and to Browne and Sloane, and in his appendix also to Terebinthus americana polyphylla and to the Gum elemi tree of Catesby. Jacquin, on a visit to the West Indies some years later, found that the roots of this Bursera furnished a bark much different from Simaruba.

In 1773 Wright, in Jamaica, found that it was derived from a species of Quassia and sent specimens of fruit and root bark to Hope of Edinburgh and also the next year to Fothergill of London. The latter transmitted them to Linnaeus, who acknowledged the correctness of Wright's observations by adopting this name in the supplement to his Systema Vegetabilium.

The synonymy of this species appears to be as follows: "Quassia simaruba Lin. Supplem. 234; Willd. Spec. ii. 568. Poiret. Dict. Method. vi. 35. Lamarck. Illustrat. t. 343, f. 2. Woodville. Med. Bot. ii. p. 211, t. 76. Simarouba. Aublet, Act. Paris. 1776. Simarouba amara Aubl. Guian. ii, 859, t. 331, 332? S. officinalis. Decandolle. Syst. S. Guyanensis. Richard. Elem. Hist. Nat. ii. 786, etc."

GRIPPO, N.

(57)

MEZZI PER COMBATTERE LE MALATTIE DELLE PIANTE NEL PERIODO
PRIMAVERILE. Picentino 14(3-4): 53-55, 1925.
[Abstract in Rev. Appl. Ent. (A)13: 322. 1925.]

Myzus persicae and M. amygdali infesting the peach require a solution of carbolic tobacco extract or a decoction of quassia (4 or 5 percent) for their control.

HARE, H. A., CASPARI, C., and RUSBY, H. H.

(58)

THE NATIONAL STANDARD DISPENSATORY, Ed. 3, 2,081 pp.
Philadelphia and New York. 1916.

Quassia consists of the wood of Picrasma excelsa (Swz.) Planch. (Quassia e. Swz.; Q. polygama Lindsay; Picraena e. Lindl.; Simaruba e. DC.), Jamaica quassia, or Quassia amara L., and Surinam quassia. "Quassia is official in all pharmacopoeias, though most of them do not specify the first-named variety. Those which do, for the most part, employ the synonym 'Picraena.' Many specify instead the second-named, or Surinam variety. The Portuguese permit the use of both, while others expressly forbid the use of the Jamaica variety."

Quassia is a bitter tonic, employed in the treatment of dyspepsia and anorexia following acute fevers. An infusion of quassia is used as an enema for the removal of thread worms or seat-worms (Oxyuris vermicularis).

Under "Allied Drugs" it is stated that the barks of the two quassias are used separately. The wood of P. quassioides (Buch.-Ham.) Benn. (Nima q. Buch.-Ham.) is used in an exactly similar way in India. P. silantoides (Bunge) Planch., a Japanese species there known as nigaki (bitter-wood), was found to contain in the bark a principle very similar to quassin. The bark of P. javanica, a large tree, is used in Borneo as a bitter tonic and febrifuge, under the name Napawsaw. An African quassia which can be scarcely distinguished from Surinam quassia and contains a principle apparently identical with quassin has been reported from the Congo region. Under the name ironwood or Ostrya (also leverwood and hop hornbeam), the heartwood and bark of Ostraya virginiana (Mill.) W. (Carpinus v. Mill.; O. virginica W.) are used as quassia substitutes. In the Philippines and the East Indies the wood of samadera indica Gaertn. (called Manungal in the Tagala dialect) is used as a quassia substitute. The important bitter principle of Jamaica quassia is a neutral, crystalline substance, commonly known as quassin, but determined by Massute, to be a mixture of two crystalline bodies, which he denominated α - and β -picrasmin. Quassin is extracted by neutralizing the aqueous infusion with soda, precipitating with tannin, and decomposing the precipitate with lead oxide or lime. It crystallizes in needles or prisms and is soluble in alcohol and chloroform and in 1200 parts of cold water. It is very bitter. The α -picrasmin ($C_{35}H_{46}O_{10}$) melts at 204° C. and the β -picrasmin ($C_{36}H_{48}O_{10}$) at 209-212° C. The bitter principle of Surinam quassia is closely related but not identical. To it the name quassin is commonly applied (pp. 1353-1354).

HOOPER, D.

(59)

BARK OF AILANTHUS EXCELSA. Pharm. Jour. and Trans. [London]
55: 345. 1895.

The bark and leaves of Ailanthus excelsa are considered to have medicinal value in Madras and have received favorable notice from Ainslie and Wight. In the Telugu country the bark is regarded as a powerful febrifuge and tonic in cases of debility. It is also good for dyspepsia and bronchial and asthmatic complaints.

The only previous notice of a chemical examination of the bark appeared in 1870 when Narayan Daji read a paper on the subject (Pharm. Jour. and Trans. [London] [3] 1: 154. 1870.). He separated an acid principle, which he called ailanthic acid, and also found a bitter, noncrystallizable principle, but he attributed the medicinal virtue to the former.

The present author has examined a sample of the bark supplied by Watt of Calcutta. The powdered bark was macerated and percolated with rectified spirit and the percolate evaporated to dryness. An aqueous solution of the residue was extracted with ether and other solvents, which removed a waxy, brown, nonbitter substance. The aqueous solution was treated with tannin, the precipitate filtered and mixed with fresh lead hydrate and dried. The dried tannin compound was powdered and boiled with successive portions of alcohol, and the blue fluorescent fluid was evaporated. The residue was a light brown granular substance, not distinctly crystalline, intensely bitter, neutral in reaction, soluble in water and spirit with a fluorescence, not readily soluble in ether, but distinctly so in chloroform. It gave a purplish color with sulphuric acid and yellow with nitric acid. Its solution was precipitated by iodine in potassium iodide, potassium-mercuric iodide, and tannin. The bitter principle was not shaken out of acid neutral or alkaline solutions by ether or chloroform. From this examination it would seem that the bitter principle of Ailanthus excelsa bark should not be called an acid, but rather belongs to a neutral class of substances related to quassia. The cedrin obtained by Lewy in the seeds of Sinaba cedron, the principles separated by Warden from the wood of Picrasma quassioides, and by Shimojama and Hirano from P. ailanthoides, and the samaderin from Samadera indica may on more complete analysis prove to be one and the same active principle, quassia.

ILIUCHIN, N.

(60)

THE WORK OF THE CHIEF INSTRUCTOR IN HORTICULTURE IN THE
PROVINCE OF SAMARKAND IN 1914, Agr. of Turkestan 11(7):
pp. 620/619. 1916. [In Russian. Abstract in Rev. Appl. Ent.
(A)5: 251-252. 1917.]

Aphids were controlled by spraying with soap quassia emulsion (2 pounds of quassia and 3 pounds of soft soap in about 18 gallons of water).

JATZENTKOVSKY, E. V.

(61)

EXPERIMENTS ON THE CONTROL OF ERIOSOMA (SCHIZONEURA) LANIGERUM,
HAUSM., IN THE PROVINCE OF TEUK. Agr. Gaz. (Petrograd)
no. 42(158): 1101-1102. 1916. [In Russian. Abstract in Rev.
Appl. Ent. (A)5: 395-396. 1917.]

Quassia emulsion (5 pounds of quassia and 6 pounds of
grey soap in 25 gallons water) was of no use against Eriosoma
lanigerum.

JEGEN, G.

(62)

DIE ROTE SPINNE. Schweiz. Ztschr. Obst- u. Weinbau 27:
177-182. 1918. [Abstract in Rev. Appl. Ent. (A)6: 381. 1918.]

A mixture of equal parts of 1 percent soft soap and 2
percent quassia solutions is one of the best sprays against
Tetranychus (red spider).

KITCHUNOV, N. I.

(63)

CULTIVATION OF BUSH-FRUIT. Prog. Fruit Growing and Market-
Gard., Sup. 139 pp. 1916. [In Russian. Abstract in Rev.
Appl. Ent. (A)4: 333. 1916.]

Pests of currants include Aphis pomi (mali), which can be
controlled by spraying with quassia.

KONDRATIEV, P.

(64)

ON THE QUESTION OF FIGHTING INSECT PESTS. Prog. Fruit Growing
and Market Gard. 30: 933-934. 1914. [In Russian. Abstract
in Rev. Appl. Ent. (A)2: 615. 1914.]

The following recipe is given for a preparation used
with success in the author's hothouses: A wine bottle
half filled with equal parts of tobacco extract and quassia
is filled up with crude spirit; this mixture is left for 10
to 12 days in a warm place and then, after dilution with an
equal quantity of water, is evaporated to half its bulk,
when the spirit evaporates and a watery extract of tobacco
and quassia remains; to this a piece of camphor the size of
a walnut is added. This mixture is evaporated over a lamp in
the hothouse at night.

KORFF, G. and BÖNING, K.

(65)

SELLERIEWANZEN UND IHRE BEKÄMPFUNG. Prakt. Bl. Bayer.
Landesamt. Pflanzenbau u. Schutz (n.s.) 11: 221-226. 1934.

Experiments were carried out with sprays containing
soft soap alone and with added agents for the control of

celery leaf bugs. The added agents tested were insect powder, lysol, petroleum, spirit, tobacco extract, and quassia. The following sprays killed 100 percent of the bugs within 2 hours: soft soap 2 percent plus lysol 1/2 percent, soft soap 1/8 percent plus petroleum 2 percent, soft soap 2 percent plus quassia 1 percent, and soft soap 2 percent plus quassia 1/2 percent (10 bugs in the first three tests and 11 in the last). Soft soap alone at a strength of 3 percent killed 80 percent of the bugs and at a strength of 1 percent killed 90 percent of the bugs. Insect powder plus sulphur (2:1), Polvosol 1 percent, alkali and kainite solution 10 percent were also tested and gave inferior results.

KOROLKOV, D. M.

(66)

INSECTS INJURIOUS TO GARDENS. MATERIALS FOR THE STUDY OF THE INJURIOUS INSECTS OF THE GOVERNMENT OF MOSCOW DURING THE YEAR 1912. Published by the Zemstvo of the Government of Moscow, 1912-1913, pp. 1-25. [In Russian. Abstract in Rev. Appl. Ent. (A)1: 205-209. 1913.]

As an insecticide for the control of Psylla mali Först. the author recommends a decoction of quassia with soft soap prepared as follows: Boil 3 pounds of quassia chips in water for 2 hours and strain, make up to 22 gallons with water and add 1-1/2 pounds of soft soap.

LINDSAY, J.

(67)

AN ACCOUNT OF THE QUASSIA POLYGAMA, OR BITTER-WOOD OF JAMAICA AND OF THE CINCHONA BRACHYCARPA, A NEW SPECIES OF JESUIT'S BARK FOUND IN THE SAME ISLAND. Roy. Soc. Edinb. Trans. 3: 205-214. 1794.

Quassia polygama (Q. excelsa Sw., Picrania amara Wright) is a tall tree (100 feet or more) with smooth gray bark, yellow wood, subalternate, oval-shaped leaves, and small greenish-yellow flowers in clusters. The fruit is a smooth black drupe the size of a pea. There is little pulp and the nut covers a round kernel. Except for the fruit pulp, all parts of the tree are intensely bitter. In taste and virtues it is nearly equal to the Surinam quassia and is said to be safely used in all cases where Quassia amara has been thought proper. It is recommended for remittent fevers, ague, dysentery, amenorrhea, chlorosis, dyspepsia, and dirt eating. The dose of the bark is 15 grains to 1 dram. A wine glass full of infusion is given every 3, 4, or 6 hours.

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LLOYD, J. U.

(68)

ORIGIN AND HISTORY OF ALL THE PHARMACOPEIAL VEGETABLE
DRUGS, CHEMICALS AND PREPARATIONS, with Bibliography.
Vol. 1, Vegetable Drugs. 449 pp. Cincinnati. 1921.

"Quassia amara takes its name from a slave of Surinam named Quassi, who used the plant as a secret remedy with great success in the treatment of malignant fevers common to his locality and climate. Daniel Rolander, a Swede, became interested in the drug, and 'in consequence of a valuable consideration', purchased from the slave Quassi a knowledge of the drug composing his remedy. Rolander returned to Stockholm in 1756, when he introduced the drug to Europe. In 1760 or 1761 Carol Gust. Dahlberg, an officer of the Dutch army and an eminent botanist, a pupil of Linnaeus, returned to Sweden from Surinam, where he too had become acquainted with the slave Quassi, and through kindness to him had so gained his affection that he revealed not only the composition of his secret remedy, but even showed to him the tree from which the drug was derived. Dahlberg procured specimens of the root, flowers, and leaves of the tree, preserved them in alcohol, and presented them to Linnaeus, who named the wood Lignum quassiae, in honor of the slave, and established a new genus for the plant, which he named Quassia amara. The drug was brought to the notice of the medical profession by Linnaeus' lectures on materia medica, as well as through a dissertation written under his direction, in 1763, by one of his pupils, Carolus M. Blom. Rather more than a questioning, however, seems to exist, as to the exact plant employed by the slave Quassi. As pointed out by Wright, the leaves pictured in the Linnaean Dissertation belonged to another species than the Quassia amara, an error corrected by the younger Linnaeus.

"In this connection it may be stated that Phillipe Fermin, a French physician and traveler in Surinam, spelled the name of the slave Coissi, questioning somewhat the fact of his having discovered the uses of the remedy, which Fermin states had been used in Surinam as early as 1714. It may also be noted that, according to Murray, a spice dealer of Amsterdam, Albert Seba, is said to have had in his collection a specimen of a bark of a tree named quasci as early as 1730. Be this as it may, the drug known as quassia under the empirical introduction given by the native of Dutch Guiana became known to European civilization, and in 1788 became official in the London Pharmacopeia. Concerning the origin of the drug, the German Pharmacopeia, 1872, demanded that the wood employed be that of Quassia amara. In the second edition, 1882, that of Picraena excelsa was concurrently admitted. Either species furnishes the official quassia of the present Pharmacopeia of the United States" (pp. 259-61).

LUNDBLAD, O.

(69)

MOROTBLADLOPPAN TRIOZA VIRIDULA ZETT. DESS BIOLOGI OCH
UPPTÄDANDE SOM SKADEDJUR I SVERIGE. Medd. Cent. Anst.
Försöksv. Jordbr. no. 350 (Lantbruksent. avd. no. 55),
45 pp. 1929. [With summary in English. Abstract in Rev.
Appl. Ent. (A)18: 231. 1920.]

Uniformly good results were obtained in the control
of Trioza viridula Zett. on carrots from 1923 to 1928 with
nicotine sprays, but the cost is high and cheaper materials,
such as quassia, have been found almost as satisfactory.

LYONS, A. B.

(70)

PLANT NAMES SCIENTIFIC AND POPULAR. 630 pp. Detroit. 1907.

"Picrasma, Plume 1815. Quassia. Simarubaceae. Syn.
Aeschrich, Vell. 1827, Picraena, Lindl. 1836; Nima, Ham.,
Quassia', Simaruba, in part: Trees. About 8 species, warmer
regions, Old and New World. See Quassia and Simaruba.

"a. P. excelsa (Swz.) Planch. (Q. excelsa Swz., Q. polygama
Linds., Picraena excelsa Lindl. (Kew), S. excelsa D.C.)
West Indies. Jamaica Quassia, Litter Ash, Bitterwood tree,
Lofty Quassia. Wood, Quassia wood, Jamaica Bitterwood:
Quassia, W. S. F. (in part), Quassiae lignum, Br., Lignum
muscarum v. muscidum; Ger. Jamaika-quassia; Jamaikanische
Quassienholz, Fliegenholz; Fr. Quassie de la Jamaïque; bitter
tonic, insecticide. (b) P. ailantoides (Bunge) Planch.,
Nigaki of Japan and (c) P. quassioides (Ham.) Benn. (Nima
quassioides Ham.) of northern India have the same properties."

"Quassia, L. 1762. Quassia. Simarubaceae. Names for
Quassi (or Choisi), a negro of Surinam. Trees with bitter
bark and wood. Four species, Africa and tropical America.

"a. Q. amara L. Surinam. Surinam Quassia. Wood,
Lignum Quassiae P. G., in part (See Picrasma excelsa), Lig.
quassiae surinamensis; Ger. Quassienholz, Bitterholz,
Fliegenholz; Fr. Quassie amère, Bois amer de Surinam (Codex);
Sp. Quasia; bitter tonic."

"Simarouba, Aubl. 1775.

Simarubaceae.

From vernacular name of (a) Guiana. Syn. Simaruba, D.C.
Trees with bitter bark and wood. About 6 species, tropical
America; 1 in U. S. See Picrasma.

"a. S. amara Aubl. (S. officinalis D.C., Q. Simaruba L. f.).
Guiana to Brazil. Mountain Damson, Bitter Damson, Paradise
tree, Stavewood (Slavewood); in Guiana called Simaruba, in
Martinique, Bois blanc. Bark of the root, Simaruba bark;

Ger. Simarubarinde, Rührrinde; bitter, tonic.

"b. S. glauca D.C. (Q. glauca Spreng., S. officinalis Macf. not D.C., S. medicinalis Endl.). West Indies and Central America. Paradise tree; Fr. Simarouba (Coccoloba). Properties of (a). S. yambouba St. Hil, Brazil. Paraiba. Bark, cortex paraibae, reputed antivenom to snake poison."

McINDOC, N. E., and SIEVERS, A. F.

(71)

QUASSIA EXTRACT AS A CONTACT INSECTICIDE. Jour. Agr. Research 10: 497-531. 1917.

A study of various methods of preparing quassia extracts and of the effect of the extracts on aphids is reported. It is stated that, owing to the poor insecticidal properties of quassin, quassin can never become a general insecticide for all aphids. The most effective extract used was prepared by soaking 22 pounds of quassia chips in 100 gallons of fish oil-soap solution (1.6 pounds of soap to 100 gallons of water) for 24 hours. The results recorded are comparable to those obtained by using nicotine sulfate, but because of the slow action of quassin, this spray is much less reliable than nicotine sulfate.

MALENOTTI, E.

(72)

GLI AFIDI DEL PESCO. 4 pp. Verona (Oss. fitopat. Veneto) 1933. [Abstract in Rev. Appl. Ent. (A)22: 116-117. 1934.]

Sprays used for the control of aphids attacking peach included a preparation called quassina, which appears to prevent the young aphids from attaching themselves to foliage covered with it.

MASSUTE, F.

(73)

BEITRÄGE ZUR KENNNTNIS DER CHEMISCHEN BESTANDTEILE VON QUASSIA AMARA L. UND PICRAENA EXCELSA LINDS. Arch. Pharm. 28: 147-171. 1890. [Abstract in Jour. Chem. Soc. 58: 791-792. 1890.]

The coarsely powdered drug Quassia amara was digested three times with 50-60 percent alcohol, the liquids mixed and treated with a little freshly burned magnesia, a little acetic acid added, if necessary, to produce a slight acid reaction, and the solution filtered, after which the alcohol was expelled at the lowest possible temperature. The aqueous solution thus obtained was warmed gently in an open dish, and the water was replenished from time to time, so as to get rid of all alcohol. On cooling, the separated resin was removed and the liquid repeatedly shaken up with chloroform. From the separated chloroform solution the chloroform was distilled off and the residue treated with a mixture of absolute alcohol and ether;

this was evaporated and the residue was dissolved in absolute ether, which, on slow evaporation, gave crystals of quassiin, which further treatment with ether and alcohol rendered nearly pure. This process insures the isolation of the bitter principle actually existing in the plants and avoids the formation of decomposition products. Repeated recrystallization of the product led to the separation of four compounds differing in their solubilities and melting points. The melting points were 210-211°, 215-217°, 221-226°, and 239-242°. The first and last compounds could not be further examined because of the lack of material; but the first agrees with the quassiin obtained by boiling the wood with water, as in Christensen's extraction method, and in crystalline form and melting point is the same as that observed by Wiggers and by Oliveri and Denaro. Quassiin, melting point 215-217°, on analysis gave $C_{75}H_{46}O_{10}$ and that with melting point 221-226° gave $C_{37}H_{50}O_{10}$. The bitter principle picrasmin, obtained as above from Picrasma excelsa, melted at 206-208° and was a mixture of two varieties, one melting at 204° and the other at 209-213°. Some commercial crystalline material was purified and the two varieties were readily isolated; that melting at 204° was found to have the formula $C_{35}H_{46}O_{10}$ while the other gave $C_{36}H_{48}O_{10}$. It is probable that quassiin and picrasmin are not identical but form two series of homologous compounds. To elucidate this point, some of the decomposition products of picrasmin were studied. Hydrochloric acid in a closed tube with picrasmin produced picrasmic acid; the barium salt of this acid was analyzed and showed the acid to be dibasic; its formation may be thus represented: $C_{31}H_{40}O_6 (COOMe)_2 + 2HCl = C_{31}H_{40}O_6 (COOH)_2 + 2MeCl$. Zeisel's reaction, in which picrasmin is treated with fuming hydriodic acid in a current of carbon dioxide, shows that three methoxyl groups are present, but only two of these are attached to carboxyl, as shown by treatment with hydrochloric acid. Quassiinic acid, $C_{30}H_{38}O_{10}$, obtained by Oliveri and Denaro, and picrasmic acid, $C_{33}H_{42}O_{10} + 5H_2O$, obtained by the author, strengthen the view of the nonidentity of quassiin and picrasmin.

(74)

BEITRÄGE ZUR KENNNTNIS DER CHEMISCHEN BESTANDTEILE VON QUASSIA
AMARA L. UND PICRAMNA EXCELSA LINDS. 29 pp. Diss. Erlangen.
Berlin. 1890.

Similar to the preceding article. (73).

MOON, A.

(75)

A CATALOGUE OF THE INDIGENOUS AND EXOTIC PLANTS GROWING IN
CEYLON. In seven sections, totaling 158 pp. Colombo, 1824.

Ailanthus excelsa is listed.

MØRK-HANSEN, K.

(76)

BEKÆMPNING AV GEOMETRA-LARVER PAA BØGEKEMPLANTER VED SPRØJTNING MED FLUEGIFT. Fra Skoven og Traemaredet 1(13). 2 pp. 1919.
[Abstract in Rev. Appl. Ent. (A)7: 469. 1919.]

The caterpillars of moths such as Hybernia defoliaria and allied species, which were defoliating beech seedlings, have been successfully combated by spraying with quassia extract. This method was employed because it was impossible at the time to procure arsenical sprays. The extract was made from 10 pounds of quassia shavings in 2 gallons of boiling water, the fluid after 1 hour being passed through a sieve and mixed with lime water.

MORSTATT, H.

(77)

BEOBACHTUNGEN ÜBER DAS AUFTRETEN VON PFLANZENKRANKHEITEN IM JAHRE 1913. Der pflanzer 9: 211-224. 1913.

A 2 percent spray of Floria-quassia-soap was very effective for the control of leaf wasps (Athalia sp.) on mustard and black radish.

NAGAIBAKOV, V.

(78)

THE FIGHT AGAINST SCHIZONEURA LANIGERA, HAUSM; DURING THE 1914 SEASON. Agr. of Turkestan no. 8: 742-745. 1914. [In Russian. Abstract in Rev. Appl. Ent. (A)2: 701. 1914.]

Spraying with quassia emulsion was undertaken against Schizoneura lanigera in the orchards of the Tashkent district of Turkestan. The mode of preparation was as follows: 30 pounds of quassia chips were boiled in about 27 gallons of water for 2 to 3 hours, the decoction afterwards being strained and mixed with 20 pounds of green soap, dissolved in warm, soft water; the whole was then made up with water to a total volume of 210 to 240 gallons.

NAUMANI, A.

(79)

SCHÄDLINGE AN CHRYSANTHEMUM INDICUM. Kranke Pflanze 3: 185-188. 1926.

It is difficult to control Lygus campestris, L. pabulinus, L. bipunctatus, Calocoris binotatus, and similar bugs on Chrysanthemum indicum. Some success follows repeated spraying with quassia-soap emulsion, preferably in the early morning when the insects are still "night-stiff."

OL, I. A.

(80)

THE CONTROL OF APHIS POMI, DE GEER. Prog. Fruit Growing and Market Gard. 13(30): 718-719. 1916. [In Russian. Abstract in Rev. Appl. Ent. (A)4: 415. 1916.]

Aphis pomi may be controlled by spraying in spring, before the leaves have been curled, with quassia emulsion with soap. the emulsion is prepared by boiling 3 pounds of quassia shavings in about 6 gallons of water for 2 or 3 hours and adding 2 or 3 pounds of soft soap dissolved in a small quantity of water to the strained liquor.

OLIVERI, V.

(81)

CONSTITUTION OF QUASSIN. *Gaz. Chim. Ital.* 17: 570-577.

1887. [In Italian. Abstract in *Jour. Chem. Soc.* [London] 54: 1311. 1888.]

Of the derivatives of quassin, quassic acid seems to be the compound best adapted for investigation to obtain an insight into the constitution of quassin. To prepare the acid it is advisable to operate on small quantities of quassin at a time (5 g.); this is heated at 100° for 1 hour in a sealed tube with hydrochloric acid (40 cc.) diluted with its own volume of water. The solution is separated from resinous matter by filtration and precipitated with water. The precipitate, after being washed, is crystallized several times from alcohol, by which means the unaltered quassin is easily separated, as the quassic acid is comparatively insoluble in cold alcohol.

Quassic acid, $C_{30}H_{36}O_{10}$, crystallizes in small, colorless, monoclinic prisms, containing 1 mol of water, which they lose at 100° . It melts with decomposition at about $244-245^{\circ}$, is soluble in boiling alcohol, but only sparingly in cold alcohol and ether. It dissolves in ammonia, and in solutions of alkaline carbonates with a yellow-color, more or less inclined to red. Its ammoniacal solution gives precipitates with mercuric chloride, lead acetate, copper sulphate, and ferric chloride, and reduces silver nitrate; its aqueous solution is colored greenish yellow by ferric chloride.

In a previous communication (1885;907) quassin was regarded as the dimethyl ester of quassic acid. This the author has now confirmed by proving that methyl chloride is formed by the action of hydrochloric acid on quassin, and that quassic acid is dibasic. For this purpose several of its salts were prepared and analyzed. Barium quassate, $C_{30}H_{36}O_{10} Ba, 7H_2O$, forms a yellowish-red, crystalline mass. The lead salt, $C_{30}H_{36}O_{10} Pb, 6H_2O$, is thrown down as a yellow precipitate, on adding lead acetate to a neutral solution of ammonium quassate; ferric quassate, $(C_{30}H_{36}O_{10})_3 Fe$, is a brownish-green, amorphous precipitate.

When a solution of hydroxylamine hydrochloride is added (6 g.) to quassic acid (10 g.), dissolved in sodium

carbonate, an abundant precipitate of the dioxime of quassic acid, $C_{28}H_{36}O_8(C:NOH)_2$, is thrown down after a little time. It may be purified by crystallization from dilute alcohol, when it is obtained in yellowish rectangular prisms; it melts at 228-230° with decomposition.

When quassin is heated with concentrated hydriodic acid (sp. gr. 1.70) and some amorphous phosphorus for 20 hours, at a temperature of 150°, gradually increased to 280°, a reducing action takes place, which varies with the temperature; at 150° methyl iodide is produced, while at the higher temperature resinous products and a mixture of hydrocarbons are obtained. The latter, separated from the filtered and neutralized solution by distillation with steam, appeared as a yellowish, oily liquid, which on being subjected to fractional distillation yielded three definite hydrocarbons. The first, boiling at 188-195°, was found to have the composition of β -durene, $C_{10}H_{16}$, and by treatment with bromine yielded a brominated derivative crystallizing in colorless needles melting at about 200°. The second fraction, boiling at 220-240°, had the composition $C_{14}H_{18}$ and gave a brominated derivative which crystallized from alcohol in colorless needles, melting at about 150° and subliming at a lower temperature. The residue which did not come over at 240° contained anthracene. The author considers it proved that quassin contains four hydroxyl groups, two carboxymethyl groups, and two ketone groups. From other results obtained, which he hopes soon to publish, it would appear that quassin is an anthraquinone derivative.

(82)

CONSTITUTION OF QUASSIN. Gaz. Chim. Ital. 18: 169-170. 1888.
[In Italian. Abstract in Jour. Chem. Soc. [London] 56:
278. 1889.]

In a previous communication (81) the author pointed out that quassic acid contained 2 ketonic groups since it gave rise to a dioxime. It seemed desirable to establish that these CO-groups existed also in quassin, and for this purpose the author prepared the compound of quassin with phenylhydrazine. Quassin (3 g.) and phenylhydrazine hydrochloride (4 g.) were dissolved in the smallest possible quantity of alcohol, a solution of sodium acetate added (6 g. in 15 cc. water) and the whole heated at 100° for an hour. The yellow, amorphous deposit formed on allowing it to remain for a day was thoroughly washed with water and attempts made to obtain it in a crystalline state but without success. An analysis showed that it had the composition $C_{30}H_{40}O_8(CN.NHPh)_2$. It is formed from phenylhydrazine and quassin, with elimination of the elements of water, thus: $C_{30}H_{40}O_8(CO)_2 + 2NH_2.NHPh = C_{30}H_{40}O_8(CN.NHPh)_2 + 2H_2O$.

----- and DENARO, A.

(23)

QUASSIN AND ITS CONSTITUTION. Gas. Chim. Ital. 14: 1-9. 1884.
Amer. Jour. Pharm. 57: 29-30. 1885. [In Italian. Abstract in
Jour. Chem. Soc. [London] 46: 1192-1193. 1884.]

To prepare quassin from quassia, 10 kilograms of finely divided wood are twice extracted with 45 l. of boiling water and the solution evaporated to 10 l. at gentle heat. When cold, the quassin is precipitated by tannin, collected, washed, mixed with lead carbonate, and dried. The product is then extracted with boiling alcohol, the alcohol distilled off, and the quassin allowed to crystallize, after which it is purified by repeated crystallization from dilute alcohol; 30 kilograms of wood gave 10 g. of pure quassin. It crystallizes in very slender, colorless, iridescent, monoclinic needles. It melts at $210-211^{\circ}$ and is very soluble in alcohol, chloroform, and acetic acid, but only sparingly in ether. 100 parts of water at 22° dissolve 0.2529 [Parts?]. The aqueous solution becomes yellow on exposure to the air, is dextrorotatory, excessively bitter, and reduces Fehling's solution. Results of analyses agree nearly with the formula $C_{52}H_{44}O_{10}$.

When quassin is heated with 4 percent sulphuric acid at 90° for some hours, it yields quasside, $C_{32}H_{42}O_9$, m. p. $192-194^{\circ}$, by removal of 1 molecule of water. Quasside is also formed when quassin is boiled with acetic anhydride, but if sodium acetate is present there is a powerful reaction, and several substances seem to be produced. Bromine in acetic acid acts on quassin in the same solvent, and when water is added an amorphous resinous substance is obtained. This melts with decomposition at 153° , and results of analyses suggest the formula $C_{32}H_{44}Br_3O_9$. The action of nitric acid on an acetic acid solution of quassin seems to give rise to a nitro derivative, which is precipitated on addition of water. It dissolves in boiling alcohol and, as the solution cools, is deposited again as a yellowish powder, m. p. 130° . If quassin is heated with concentrated hydrochloric acid in sealed tubes for 4 hours at 100° , methyl chloride is evolved, and the acid solution, when diluted with water, deposits first a resinous substance and later a colorless substance in small nodules. The latter, which the authors call quassic acid, $C_{14}H_{19}O_5COOH$ or $C_{28}H_{38}O_6(COOH)_2$, is far less soluble in alcohol than quassin, crystallizes in silky needles, m. p. 245° , and reduces Fehling's solution and ammoniacal silver nitrate. The action of nascent hydrogen and of boiling dilute nitric acid on quassin gives resinous products. Fusion with potash and oxidation with chromic anhydride were unsatisfactory.

The resinous matter obtained in the preparation of crystallized quassin was distilled with zinc dust. The brown oily product was treated with sodium and fractionally distilled. The portion passing over at 170-190° when redistilled gave an oil boiling at 173-178° of the formula $C_{11}H_{16}$, while crystals melting at 76-78° were obtained from the residuo.

----- and DENARO, A.

(84)

QUASSIN. *Gaz. Chim. Ital.* 15: 6-8. 1885. [In Italian. Abstract in *Jour. Chem. Soc.* [London] 48 (ii): 907. 1885.]

The authors, in continuation of their investigations on quassin, point out that by heating it in a current of dry air at 150° it can be converted, with a loss of 1 mol of water, into an anhydride, quasside, $C_{32}H_{42}O_9$. If heated with acetic anhydride and sodium acetate, however, 2 mols of water are removed with formation of a second anhydride, $C_{32}H_{40}O_8$, which forms a white, pearly, amorphous mass, soluble in alcohol, chloroform, and ether, and melts at 150-158°. Phosphorus pentachloride reacts violently with quassin to yield a pentachloro-derivative, $C_{32}H_{39}O_8Cl_5$, a yellow powder melting with decomposition at 119°. This is probably derived from quassin by the substitution of two hydroxyl groupings and three hydrogen atoms by chlorine.

OZOLS, E.

(85)

ZALĀ BURKANU LAPU UTS (*TRIOZA VIRIDULA* ZETT.) Lauksaimniecības pārvaldes izdevums, Krājuma pie "Letas", 32 pp. Riga. 1925. [With summary in English. Abstract in *Rev. Appl. Ent.* (A) 14: 137. 1926.]

A decoction of quassia is one of the best remedies for carrots attacked by *Trioza viridula* Zett.

PAILLOT, A.

(86)

LA FAUSSE CHEMILLE DU PÊCHER. *Rev. Hort. Algérie* 26: 110-112. 1922.

Treatment with nicotine or *Quassia amara* gives excellent control of *Neurotona* (*Lyda*) *nemoralis*. The quassia spray is prepared as follows: Make a decoction of 1 kg. of quassia chips in about 10 liters of water; heat for 2 hours and then cool. Dissolve 2 kg. of black soap in several liters of water. Add the quassia decoction; pass a little water again over the chips. Make up to 100 l. Spraying should be done with a spray rod about 2 m. long and the leaves should be well wet. The first spray should be applied 4 or 5 days before oviposition and a second 4 days after the maximum oviposition.

(87)

SUR UN PARASITE NOUVEAU DES PLANTATIONS DE PECHERS DANS
LA VALLÉE DU RHONE. Prog. Agr. et Vitic. 77: 69-71. 1922.

The following formula is given for an insecticide for
combating Neurotoma (Lyda, Pemphylus) nemoralis on peach trees:

Quassia (chips)----- 1 kg.

Black soap----- 1.500 kg.

Water----- 100 l.

The chips are boiled for 2 hours in a few liters of water.

Badly infested peach trees sprayed with this mixture on
May 14 were found to be in very good condition on May 28.

PAPE, H.

(88)

TOMATENSCHÄDLINGE. Gartenwelt 1925, nos. 36-37. [Abstract in
Rev. Appl. Ent. (A) 14: 99. 1926.]

Spraying with quassia-soap is recommended for the control
of the bugs Lygus pabulinus L. and L. pratensis L., which occur
on the leaves of tomatoes.

PARKER, W. B.

(89)

QUASSIIN AS A CONTACT INSECTICIDE. U.S. Dept. Agr. Bull. 165.
8 pp. 1914.

Experiments which were carried out on the solubility
of quassiin (from Picrasma excelsa Swz.) in a number of
solvents and solutions gave the following results:

<u>Solvent</u>	<u>Solubility of quassiin</u>	<u>Solvent</u>	<u>Solubility of Quassiin</u>	
Chloroform	Readily soluble	Sodium hydroxide solution	Readily soluble	Yellow solution
Ether	Not soluble	Calcium hydroxide solution	"	"
Methyl alcohol	Readily soluble	Potassium cyanide solution	"	"
Ethyl alcohol	" "	Sodium carbonate solution	"	"
Hot water	" "	Hydrocyanic acid solution	"	"
Cold water	Sparingly soluble (1:1200)	Ammonium hydrate solution	"	"
Kerosene	Not soluble	Whale oil soap (alk) solution	"	"
Gasoline	" "	Sodium chloride solution	Apparently insoluble	
Carbon tetrachloride	" "	Hydrochloric acid solution	"	"
Benzine	" "	Sulphuric acid solution	"	"
Turpentine	Possibly soluble	Nitric acid solution	"	"
Potassium hydroxide solution	Readily soluble yellow	Acetic acid solution	"	"

Tests to compare the insecticidal action of quassiin with that of nicotine sulphate upon the hop aphid (Phorodon humuli Schrank) and the prune aphid (Hyalopterus pruni Fab.), in which soap bark (2 pounds to 100 gallons was used as a spreader, showed that quassiin used at the rate of 0.4 g. to 2,000 cc. was almost as effective as nicotine sulphate at the same concentration, and that quassiin at the rate of 0.4 g. to 1,000 cc. was fully as effective, killing practically 100 percent of the insects.

A formula is suggested for a spray which contains 3 pounds of quassia chips (0.75 percent quassiin) and 3 pounds of whale-oil soap to 100 gallons.

PATRIS, J. B.

(90)

SUR L'HISTOIRE NATURELLE ET MÉDICALE DU CASSIE. Jour. Phys., Chim., Hist. Nat. et Arts 9: 140-144. 1777.

"Cassie" was introduced from Surinam into Cayenne, where it is cultivated. The plant is described and the author states that, whereas he at first considered it a species of Simarouba, he now knows it to belong to a new genus and he gives the following description of this "first known species": "Quassia pontaphylla, pediculis alatis, floribus racemosis, terminalibus, coccineis fructu penta spermo. J. B. Pat."

All parts of the plant are very bitter, particularly the bark of the root, the flowers, and the seeds. It possesses all the good qualities of cinchona, and fevers which resisted the action of Peruvian bark have often yielded to infusion of the leaves of "Cassia". The tealike infusion of the flowers is more efficacious than the leaves. According to a letter from de Cromelin and de Piedmond in 1772, the doctors of Surinam use only the fresh root and employ it less as a febrifuge than as a stomachic in the slow fevers, which commonly follow acute fevers.

PEREIRA, J.

(91)

THE ELEMENTS OF MATERIA MEDICA AND THERAPEUTICS. 2 v.
Philadelphia. 1852-1854.

Simaruba amara Aublet. (bitter simaruba or mountain damson) and Picraena excelsa Lindley (the lofty bitterwood tree) are described and their medicinal use discussed. Wright tells us that no insect will live near cabinet work made of P. (Quassia) excelsa. It has long been known that an aqueous infusion of this substance is an excellent fly poison (v. 2, pp. 871-875).

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

(92)

THE BRITISH PHARMACEUTICAL CODEX. 1768 pp. London 1934

Quassia wood (quassiae lignum) is obtained from the trunk and branches of Picraena excelsa Lindl. [Picrasma e. Swartz. (Planchon)], a tree indigenous to Jamaica. The wood is imported in billets and logs, which are cut into chips and kiln dried. The chief constituent is picrasmin or quassin, a mixture of two homologous crystalline, bitter principles, α - and β -picrasmin. Quassia is a pure bitter, employed to increase the appetite. An infusion of quassia (1:20) or "liquor quassiae concentratus", mixed with an equal quantity of water, is used as an injection for the threadworms of children. A similar solution painted on the skin keeps away small insects.

Quassin may be obtained by exhausting Jamaica quassia wood with 50 percent alcohol, neutralizing with magnesia, making acid with tartaric acid, and removing the ethyl alcohol by distillation. The residue is shaken with chloroform, the latter evaporated to a syrup and dissolved in a mixture of equal volumes of absolute alcohol and ether; evaporated and dissolved in little absolute alcohol. Cover this concentrated solution with a layer of ether and set aside to crystallize. Recrystallize from alcohol. A mixture of two homologous, crystalline, bitter principles. α -picrasmin, $C_{35}H_{46}O_{10}$, m. p. 204° and β -picrasmin, $C_{36}H_{48}O_{10}$, m. p.

209-212° is obtained as white, odorless, crystalline needles or prisms, neutral, dextro-rotatory, and permanent in air.

The principle of Surinam quassia is closely allied, consisting of a mixture of principles, $C_{35}H_{46}O_{10}$ and $C_{37}H_{50}O_{10}$. A purified extract, an amorphous, granulated, sticky powder, a yellow brown, is commercially known as quassin.

PICKEL, B.

(93)

DUAS FRAGAS DO TOMATEIRO. Chacaras e Quintaes 33(2): 145-147. 1928. [Abstract in Rev. Appl. Ent. (A) 16: 683. 1928.]

A quassia-soap spray is very efficient against Corythaica monacha Stal, which occurs on a number of species of Solanum in Brazil. Attention is drawn to the fact that Quassia amara grows extensively in Brazil.

POIRET, J. L. M.

(94)

ENCYCLOPÉDIE MÉTHODIQUE. Botanique 6: 23-25. Paris. 1804.

Generic characteristics of Quassia are listed and the species Q. amara, Q. simarouba (Simarouba amara) and Q. excelsa (polygama) are described.

RIEDER, C.

(95)

UNTERSUCHUNGEN ÜBER DEN EINFLUSS EINES BITTERSTOFFES AUF DEN VORGANG DER RESORPTION. Arch. Expt. Path. u. Pharmacol. 63: 304-330. 1910.

The experiments reported were carried out to show that bitter substances, in this instance Merck's quassin, may cause delayed resorption. Resorption with and without quassin was determined by the following methods: (1) The effect upon the rapidity of onset and the duration and character of symptoms of strychnine poisoning; (2) determination of the quantity of a sodium thiosulphate solution remaining in the stomach after ingestion through a stomach tube; (3) determination of the amount of solol excreted in the urine; (4) determination of iodine excreted after ingestion of potassium iodide; (5) determination, by x-ray examination and by the use of a duodenal fistula, of the speed of movement of the stomach contents into the intestine. The results obtained by methods (1), (3), and (4) support the conclusion that certain quantities of a bitter substance may delay the movement of dissolved substances from the lumen of the digestive tract into the blood. The other methods did not show any difference between animals with and without quassin.

RITCHIE, A. H.

(96)

ECONOMIC ENTOMOLOGY IN JAMAICA. Jamaica Dept. Agr. Bull.
(n.s.) 2: 335-338. 1915.

Bitterwood (Picraena excelsa Swz.) grows in goodly quantity in the island of Jamaica and over four thousand tons is exported annually. Brief information is given on its use as an aphicide, which is taken from U. S. Dept. Agr. Bull. 165, Quassiin as a Contact Insecticide, by W. B. Parker (89).

ROYLE, J. F.

(97)

ILLUSTRATIONS OF THE BOTANY AND OTHER BRANCHES OF THE NATURAL HISTORY OF THE HIMALYAN MOUNTAINS AND OF THE FLORA OF CASHMERE. v. I. London. 1839.

Under the Simarubeae it is stated that Samadera of Gaertner, to which Adrien has referred Vittmannia Vahl and Niota Lam., is found in Madagascar and Java and in Ceylon and the southern parts of India. In the Himalayas there is a representative of this family in Nima quassioides of Hamilton, referred by Dow to Simaba. The Simarubeae are as closely allied botanically as in the possession of a similar intense, pure bitterness, diffused over every part, owing to the presence of the bitter principle quassine (p. 158).

SACHAROV, N.

(98)

PESTS OF MUSTARD AND METHODS OF FIGHTING THEM (PRELIMINARY OBSERVATIONS). Rept. Ent. Sta. Astrachan Soc. Fruit Growing, Market Gard., and Agriculture. 42 pp. 1914. [In Russian. Abstract in Rev. Appl. Ent. (A)2: 355-358. 1914.]

As a remedy against the sucking pests of mustard, Eurydema ornatum, E. festum, and Carpocoris purpureipennis, the author recommends spraying with quassia and green soap emulsions. In his experiments these insecticides killed 20 to 50 percent of the larvae. The spraying must be done during flowering and after it is over. He describes the mode of preparing the emulsions and gives the cost of a vedro (2.7 gals.) as about 6 cents for quassia.

SAVTCHENKO, I.

(99)

FROM THE DISTRICT OF MELITOPOL (GOVERNMENT OF TAURIDA). Hort. 15(6): 334-335. 1916. [In Russian. Abstract in Rev. Appl. Ent. (A) 4: 381. 1916.]

Owing to the increased price of tobacco, quassia emulsion was used against aphids. Four pounds of quassia are boiled for about 2 hours in 8-1/2 or 9 gallons of water; the decoction is left overnight to settle and is then filtered; 3 pounds of soft soap dissolved in hot water are then added and water to make a total of 27 to 30 gallons.

SCHLESINGER, L. and SCHLOSSMANN, H. (100)

ÜBER DIE HERZWIRKUNG VON QUASSIN UND LIGNUM QUASSIAE.

Arch. Expt. Path. u. Pharmakol. 158: 198-200. 1930.

A study is reported of the action of quassia and macerated Lignum quassiae on the isolated hearts of frogs, rabbits, and cats. The authors conclude that insofar as there is any action at all the heart function is unfavorably influenced. The hastening action reported by Weger was not observed.

SCOTT, E. W., ABBOTT, W. S., and DUDLEY, J. E., Jr. (101)

RESULTS OF EXPERIMENTS WITH MISCELLANEOUS SUBSTANCES
AGAINST BEDBUGS, COCKROACHES, CLOTHES MOTHS, AND CARPET
BEETLES. U. S. Dept. Agr. Bull. 707. 36 pp. 1918.

Quassia chips were found to be ineffective against bedbugs, cockroaches, and clothes moths.

SHIPELEV, K. (102)

THE CONTROL OF PESTS OF RASPBERRIES. Prog. Hort. and
Market Gard. 13(2): 51-56. 1916. [In Russian. Abstract
in Rev. Appl. Ent. (A)4: 140. 1916.]

Aphis urticae and Siphonophora rubi, which are the most common aphids attacking raspberries, are controlled by spraying with quassia decoction or emulsion.

SIROMOLOT, P. (103)

THE CULTIVATION OF CANTALOUPE MELONS IN THE ENOTAEVSK
DISTRICT OF THE GOVERNMENT OF ASTRACHAN. Fruit Growing.
no. 9-10: 536-551. 1915. [In Russian. Abstract in Rev.
Appl. Ent. (A)4: 55-56. 1916.]

Against aphids, spraying twice with quassia solution is advised. Control measures should be begun as soon as these pests are noticed and before the plants become large.

SPRENGEL, K. [Trans. by A. J. L. Jourdan] (104)

HISTOIRE DE LA MÉDECINE. 9 v. Paris. 1815-1832.

According to Haller (Bibliotheca botanica, 2 v., Tiguri. 1771), Quassia excelsa was employed in Europe in 1742, but no other author gives any trace of its use until Daniel Rolander, Swedish naturalist, returned from Surinam in 1756 and gave a quantity of the wood to Linnaeus. According to Rolander and Rottboell

(Descriptiones variarum plantarum à Surinam, Havn. 1776), a native named Quassi sold the wood as a secret remedy. This was the reason for the systematic name which Linnaeus gave to the tree. Kratzenstein first made known the difference between the wood of the root and that of the trunk. Linnaeus had made his first trials with the root; later only the wood of the trunk was received in Europe. Schlaeger, Paarmann, Eböling, and Patris carried out excellent chemical and practical researches on this medicament.

Another species of this genus, Quassia simaruba, had been made known to the French by Barrère in 1723. Jussieu found this to possess very energetic curative virtues in dysentery. Dégner, Zimmermann, Monro, Crall, and Wright recognized also that the bark was outstanding among the fortifying medicaments (v. 5, pp. 489-491).

STRICKLAND, E. H.

(105)

POISONED MOLASSES FOR THE DESTRUCTION OF NOCTUID MOTHS.

Jour. Econ. Ent. 15: 214-220. 1922.

A poison bait used experimentally for the control of the noctuid moth Perosagrotis orthogonia Morr. (pale Western cutworm) consists of a 10 percent solution of cane molasses, the diluent being water in which quassia chips have been soaked overnight at the rate of 2 ounces to the quart. In each bottle of this solution is inserted one commercial fly pad (containing arsenic), sufficient saccharines to cover a Canadian 5 cent piece (1 g.), and 8 drops of amyl acetate. Females as well as males are attracted to the bait, and with the combination of quassia and arsenic very few are able to lay eggs subsequently to feeding. Quassia is nonpoisonous to stock and is distasteful to them.

TEMPEL, W.

(106)

BLATTLAUSE AM PFIRSICH. Kranke Pflanze 4: 82-84. 1927.

Against the homey-louse on pear, various nicotine- or quassia-containing sprays work very well. Homemade quassia-soap emulsion has been used for many years with the best results. Experiments by the author in previous years with nicotine-quassia-soap (Hinsberg) also have given equally good results. The materials are applied with a fine, atomizing sprayer.

(107)

ZUR KOHLSCHABENBEKÄMPFUNG. Kranke Pflanze 5: 121-122. 1928.

The following measures are worthwhile for combating cabbage

moths on cabbage plants of which the hearts have already closed:

Spraying with nicotine- or quassia-containing sprays, such as nicotine-soap solution or quassia-soap solution. The latter is prepared by boiling 1.5 kg. of quassia chips in 10 l. of water, allowing to stand for 24 hours after cooling, decanting, mixing with a solution of 2.5 kg. of soft soap in 5 liters of water, and diluting to 100 l. A preparation called Fefo-Quassia is also listed along with some other ready-to-use insecticides.

THEOBALD, F. V.

(108)

THE APHIDES ON MANGOLDS AND ALLIED PLANTS. Jour. Bd. Agr.
[London] 19: 914-922. 1913.

A spray of soft soap and quassia (8 pounds of soap and 5 pounds of quassia per 100 gallons of water) is advised for combating the "collier" or black fly (Aphis rumicis) which attacks mangolds, beans, and beets.

(109)

APHIDES ATTACKING VEGETABLES AND MARKET-GARDEN CROPS.
Jour. Roy. Hort. Soc. 50: 28-45. 1925.

Spraying with soft soap and quassia is mentioned as a control measure for the green pea aphid (Macrosiphum pisi Kalt.) and the black fly or "collier" (Aphis rumicis L.) which attack peas and beans, and for aphids attacking potatoes, namely, the green and pink potato and rose aphid (Macrosiphum solanifolii Ashm.) the allied green potato aphid (Myzus pseudosolani Theobald), the green peach aphid (Myzus persicae Sulzer), and the small potato aphid (Aphis solanina Passerini).

TRÄGARDH, I.

(110)

BIDRAG TILL KÄNNEDOMMEN OM SPINNKVÄLSTREK. (TETRANYCHUS, DUF.)
Meddel. no. 109 Centralanst. Försöksv. Jordbruksområdet,
Stockholm, Ent. Adv. no. 20, 1915. [Abstract in Rev. Appl. Ent.
(A): 252-254. 1915]

In experiments conducted against the gooseberry mite (Bryobia praetiosa Koch) in which lime-sulphur spray 1 to 5 (21° B.) was used, 8.5 percent of the mites survived; when the strength was 1 to 10, 8 percent survived. The bushes were, however, too thick, which made it difficult to wet all the leaves. In order to increase the wetting power of the fluid, Vermorel and Dantony's method of adding gelatine was adopted (10-15 g. per 100 l. of water), the concentration being 1 to 20 of the spray, and quassia and nicotine were used for comparison.

The number of mites, which on the unsprayed bushes was 18.6 per leaf, after the spraying diminished to 1 when lime-sulphur spray was used, to 2.6 with quassia, and to 2.8 with nicotine. Against the greenhouse mite (Tetranychus althaeae von Hanstein) a still weaker solution of lime-sulphur emulsion spray was used, 1 to 40, with the addition of gelatine and quassia nicotine emulsion, 40 g. per l. The result surpassed all expectations; the spray covered the leaves completely with a thin film and an examination on the following day revealed that all the mites were dead. An examination a fortnight later showed that all the eggs were destroyed.

(111)

VÅRA VANLIGA SPINNKVALSTER OCH DERAS BEDÖMPANDE. Centralanst. Försöksv. Jordbruksområdet., Stockholm, Flygblad no. 58. Ent. Adv. no. 13. 4 pp. 1916. [Abstract in Rev. Appl. Ent. (A)4: 353. 1916.]

Spraying of plants in greenhouses with quassia is very useful as a control for spinning mites.

TROITZKY, N. N.

(112)

ABOUT CABBAGE, CHORTOPHILA BRASSICAE AND PLASMODIOPHORA BRASSICAE. Proc. 2d All-Russian Ent.-Phytopath. Meeting in Petrograd, 25th-30th Oct., 1920, pp. 165-177. 1921. [In Russian. Abstract in Rev. Appl. Ent. (A)10: 433. 1922.]

As it is almost impossible to free the roots of cabbage seedlings from the larvae and eggs of Phorbia (Chortophila) brassicae Bch., disinfection with the following substances has been tried: Quassia, quassia and green soap, green soap alone, and kerosene emulsion. The plants were dipped with the surrounding earth into the insecticide until the earth was saturated, after which they were transferred to the field. The harvest from the disinfected plants, particularly those treated with quassia, was greatly increased in comparison with untreated plants.

TULLGREN, A.

(113)

SKADEDJUR PÅ HALLONEUSKAR. Trädgården no. 20: 158-159. 1916. [Abstract in Rev. Appl. Ent. (A)4: 355. 1916.]

Certain aphids occur on raspberries, but seldom in sufficient numbers to cause serious injury. They are easily controlled by spraying with quassia.

(114)

SKADEDJUR I SVERIGE ÅREN 1912-1916. Meddel. Centralanst. Jorsbruksförsök no. 152. Ent.Avd. no. 27. 104 pp. [Abstract in Rev. Appl. Ent. (A)6: 145-151. 1918.]

Typhlocyba rosae L., chiefly on roses, was successfully combated by spraying with quassia.

UPENIECK, N.

(115)

AN EXPERIMENT IN ORGANIZING GANGS OF WORKMEN FOR THE CONTROL OF PESTS OF CITRUS TREES IN 1915. Russian Subtropics no. 11-12: 29-72. 1916. [In Russian. Abstract in Rev. Appl. Ent. (A)5: 356-357. 1917.]

Aphids on citrus can be effectively controlled with a decoction of quassia containing 1.3 percent of soft soap.

V., S.

(116)

ON THE REPLACEMENT OF QUASSIA BY TOBACCO. Fruit-Growing 27(8-9): 378-379. 1916. [In Russian. Abstract in Rev. Appl. Ent. (A)4: 495. 1916.]

As a substitute for quassia decoction and soap, tobacco and soap may be used.

VELICHKEVICH, A. I.

(117)

INSECTS INJURIOUS TO ONIONS IN THE NOVGOROD GOVERNMENT. Défense des Plantes 4(4-5): 717-728. 1927. [In Russian. Abstract in Rev. Appl. Ent. (A) 16: 367. 1928.]

As Hylemyia antiqua Meig., Eumerus strigatus Fall., and Muscina stabulans Fall. may begin to lay eggs on onions in the store or before they are transplanted, it is advisable that they be treated before being planted. The various substances recommended by others for this purpose are enumerated, the best results being obtained with quassia.

WAHL, B.

(118)

DIE BEKÄMPFUNG DER BLATTLÄUSE (APHIDAE). Reprint from Monatsh. Landw. 1913; Wien, 4 pp. [Abstract in Rev. Appl. Ent. (A) 1: 471. 1913.]

Among the summer remedies for the common green fly (aphis) is the following:

Quassia and soft soap mixture: 3 pounds of quassia chips are boiled in 2 gallons of water and left standing 24 hours; the liquid is then poured off; this is mixed with an equal volume of neutral soap solution, made by dissolving 5 pounds of soap in 2 gallons of water.

WAHL, C. von

(119)

DIE GESPINSTMOTTEN. Hauptstelle für Pflanzenschutz in Baden an der Grossh. Landw. Versuchsanstalt Augustenberg. Flugblatt no. 5. 1916. [Abstract in Rev. Appl. Ent. (A)8: 288. 1920]

Remedial measures against Hyponomeuta malinellus and H. variabilis are spraying with soft-soap solutions containing nicotine or quassia.

WAHL, R.

(120)

BEKÄMPFUNG DER SPINNMILBEN. Mitt. Landw. Bakt. u.
Pflanzenschutzsta. Wien, 12 pp. n. d. [Abstract in
Rev. Appl. Ent. (A)8: 262, 1920.]

The measures advocated for the control of the red spider include the application of quassia sprays.

WIGGERS, A.

(121)

UEBER DEN QUASSIT. Liebigs Ann. Chem. 21: 40-48. 1837.

The author prefers the name "Quassit" to quassin, as being indicative of the indifference of the material to acids. His method of preparation is as follows:

The cut-up wood is repeatedly boiled with water. The filtered decoction is evaporated to three-fourths the weight of the wood used, stirred with a measured quantity of slaked lime, allowed to stand for a day with frequent shaking, and then filtered. The filtered liquid is evaporated to dryness and the residue extracted with 80-to 90-percent alcohol. When the alcohol is distilling off and the solution evaporated to dryness, there is left a bright-yellow, crystalline, deliquescent, bitter-tasting mass, which dissolves readily in water and alcohol. To separate the quassit pure from this mass, it is repeatedly dissolved in the smallest possible quantity of alcohol, a large quantity of ether is added, and the liquid is filtered from the material precipitated by the ether and evaporated. This is repeated until the quassit remains colorless. Finally the alcohol-ether solution is poured into a little water and allowed to evaporate spontaneously in order to obtain crystals.

Quassit forms very small, white, opaque prisms. The presence of water is necessary for crystallization. There is always a part which does not crystallize. Quassit is stable in air, odorless, and very bitter-tasting. It is difficultly soluble in water (100 parts at 12° dissolve 0.45 part), but its solutions are almost unbearably bitter. Its solubility in water is increased by salts and easily soluble organic substances. Aqueous solutions of quassit are precipitated by tannic acid, but not by iodine, chlorine, sublimate, iron solutions, or lead acetate. Quassit is only slightly soluble in ether, alcohol being the best solvent. The solutions are colorless and neutral. Dilute acids and alkalis increase the solubility in water, but do not react. Concentrated sulphuric acid dissolved quassit without coloration or decomposition in the cold, but charring occurs upon heating. Cold nitric acid (sp. gr. 1.250) dissolves quassit readily and apparently without change, but on heating red fumes are evolved and the quassit is converted to oxalic acid.

Upon heating quassit melts like a resin and at a temperature only slightly above that of rosin. Results of analyses indicate the following composition for quassit: $C_{20}H_{25}O_6$.

WILLDENOW, C. L.

(122)

SPECIES PLANTARUM. Ed. 4, v. 2, pp. 567-569. Berlin. 1799.

Quassia amara, Q. sinaruba, and Q. excelsa are described.

WOOD, H. C., REMINGTON, J. P., and SADTLER, S. P.

(123)

THE DISPENSATORY OF THE UNITED STATES OF AMERICA. Ed. 19, 1,947 pp. Philadelphia. 1907.

Syrupus quassiae is prepared as follows: Macerate during 24 hours 1,000 parts of quassia wood with 5,000 parts of water, then boil for 1/2 hour, set aside for 24 hours, and press; mix the liquid with 150 parts of molasses and evaporate to 200 parts. From this, Fly water or fly plate is prepared by mixing 200 parts of the syrup, 50 parts of alcohol and 750 parts of water. It is used by moistening with the mixture a cloth or filter paper on a plate.

"Quassia [Picrosma excelsa is official] has in the highest degree all the properties of the simple bitters. It is purely tonic, invigorating the digestive organs, with little excitement of the circulation or increase of animal heat." It is useful in failure of appetite, constipation due to debility of the muscular and intestinal coats, and dyspepsia. Compardon asserts that quassin, the active principle, acts in moderate doses as a stimulant to the salivary, hepatic, and renal secretions and in overdoses causes burning pain in the esophagus, with headache, nausea, vertigo, vomiting, diarrhoea, and muscular cramps. Quassia is given in infusion (0.5 - 1 fl.oz.), tincture (0.5 - 1 fl. drachm), extract (0.5 - 1 grain), or fluidextract (5-10 minims) (pp. 1032-1033).

WOOD, H. C., Jr., and LAWALL, C. H.

(124)

THE DISPENSATORY OF THE UNITED STATES OF AMERICA Ed. 22. 1894 pp. Philadelphia. 1937.

About the middle of the eighteenth century a negro of Surinam, named Quassi, acquired a reputation for treating the malignant fevers of that country by a secret remedy, which he was induced to disclose to Rolander, A Swede, for a valuable consideration. Specimens were taken to Stockholm by the latter in 1756 and the

medicine soon became popular in Europe. The name of the negro has been perpetuated in the generic title of the plant. But the quassia of Surinam is now comparatively little used, having been superseded by the product of Picrasma excelsa from the West Indies.

A lofty tree, sometimes attaining a height of 100 feet or more, with straight, smooth tapering trunk, often 3 feet in diameter near the base, with smooth gray bark. Leaves pinnate with naked petiole and oblong pointed leaflets standing upon short footstalks, in opposite pairs, with a single leaflet at the end. Flowers are small, yellowish green, disposed in panicles, polygamous, and pentandrous. Fruit a small black drupe. Longitudinal section of this wood exhibits elongated cells containing **single crystals** of calcium oxalate. Transverse section exhibits medullary rays, mostly 2 or 3 cells in width. This species inhabits Jamaica and the Caribbean Islands, where it is called bitter ash.

Quassia amara, or bitter quassia, is a small branching tree or shrub, with alternate leaves consisting of 2 pairs of opposite pinnae with an odd one at the end. Leaflets elliptical, pointed, sessile, smooth, of a deep-green color on upper surface, and paler on under surface. Common footstalk is articulated and winged. Flowers are hermaphrodite and decandrous, bright red, and terminate the branches in long racemes. Fruit is a 2-celled capsule containing globular seeds. Is a native of Surinam and is found in Brazil, Guiana, Colombia, Panama, and the West Indies, as also in some tropical countries of the Old World. The root, bark, and wood are intensely bitter.

Quassia is at first whitish, but becomes yellow by exposure and sometimes has blackish spots or markings, due to the presence of the mycelium of a fungus. Jamaica quassia occurs usually in chips, raspings, or billets; Surinam quassia usually in billets.

A medicine was formerly obtained from Quassia amara, but more than 20 years ago Lamarck stated that because of the scarcity of this tree Q. excelsa had been resorted to as a substitute (pp. 907-909).

WOODVILLE, W.

(125)

MEDICAL BOTANY. 5 v. London. 1832.

Under order XXXII, Gruinales (v. 5, pp. 60-62), Quassia excelsa, lofty or ash-leaved quassia, is discussed.

"Synonyma. Quassia excelsa. Swartz in Stockh. Trans. for 1738, p. 302, t. 8; Prodr. Ind. Occid. v. 2, 742;

Willd. Sp. Pl. v. 2, p. 569. *Simaruba excelsa*. DeCand. in Ann. du Mus. v. 17, p. 424; Prodr. v. 1, p. 733; Unchte Quassie, Nom. Triv. Willd. *Quassia Polygama*. Trans. Roy. Soc. Edin. v. 3. p. 205 t. 6.

"Class, Decandria. Ord. Monogynia.

"Nat. Ord. Gruinales, Linn. Magnoliae, Juss. *Simarubeae*, Rich. de Cand.

"Gen. Char. Calyx, five-leaved. Petals, five. Nectary, composed of five scales. Drupes, five, distant, bivalved, placed on a fleshy receptacle.

"Spec. Char. Flowers, polygamous. Stamens, five. Leaves, pinnate. Leaflets, opposite, petioled; common stalk naked."

This tree has also been known as *Picrania amara*, *Xylopicrum*, *Xylopia glabra*, bitter-wood or bitter ash.

The chemical properties of the bitter substance quassine, which is obtained from a watery infusion of the quassia wood, are briefly discussed.

WRIGHT, W.

(126)

A BOTANICAL AND MEDICAL ACCOUNT OF THE *QUASSIA SIMARUBA*, OR A TREE WHICH PRODUCES THE CORTEX SIMARUBA. Roy. Soc. Edinb. Trans. 2: 73-81. 1790.

The first knowledge of cortex simaruba was in 1713 when dePorchartrain sent to France the bark of a tree, called by the natives simarouba, which they used successfully in dysentery. In 1741 Geoffroy says of this bark "Est cortex radicis arboris ignotae, in Guiana nascentis, et ab incolis simarouba nuncupatae." In 1772 the author discovered in Jamaica the tree which produced the bark and sent specimens of fruit and root-bark to Hope in 1773, with a botanical account of the tree. The following year specimens and description were also sent to Fothergill, who forwarded them to Linnaeus.

The tree is common in all woodlands in Jamaica. It is very tall. The trunk of old trees is black and a little furrowed, of young ones smooth and gray. The inside bark of trunk and branches is white, fibrous, tough, and slightly bitter. The wood is hard and useful for buildings. It has no sensible bitter taste. The branches are alternate and spreading. The leaves are numerous and alternate, smooth, shining, deep green on the upper side, and white on the under side. The flowers are yellow and placed on spikes. The fruit is an oval, black, smooth, shining drupe.

The pulp is a nauseous sweet, the nut is flattened and winged on one side, the kernel small, flat, and sweet. The thick roots have a rough, scaly, warted bark, which is yellow and bitter but not disagreeable. The tree is known in Jamaica as mountain damson, bitter damson, and stavewood. It is dioecious. Simaruba is employed in the treatment of dysentery, linteria, habitual colics, immoderate fluxes of the menses from piles, and as a vermifuge. It is administered as follows: 2 drams simaruba bark, boiled from 24 ounces of water to 12 ounces and then strained. This is divided in 3 equal parts and the whole taken in 24 hours.

ZACHER., F.

(127)

SOMMERGEFAHREN FÜR DIE FABRIKATION UND DEN HANDEL VON
SÜSSWAREN. Mitt. Ges. Vorratsschutz 3(4): 45-56. 1927.
[Abstract in Rev. Appl. Ent. (A)15: 558. 1927.]

In the case of a severe infestation of cacao by Ephestia elutella (Hbn.) the larvae climb the walls of the store-room to pupate high up. The walls and ceiling may be washed with a solution prepared as follows: 3 pounds of quassia chips are boiled in 2 gallons of water, and after standing for 24 hours the decoction is poured off and mixed with a solution of 5 pounds of soft soap in 1 gallon of water, and finally diluted to 20 gallons.

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