PUNICA GRANATUM.

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PUNICA GRANATUM.*

BOTANICAL HISTORY.

The genus punica consists at the present time of two species[1], the one under consideration and P. protopunica, described in 1882 by Balfour[2], from the island of Socotra.

Punica granatum has been in cultivation from the earliest historical times, and is now found in all warm countries of the world, and frequently as an ornamental plant in this country and abroad[3], where it requires protection during the winter season, as it will not endure the cold. It is recorded, e. g., that in 1838 the trees in the neighborhood of London were killed by the frost.[4] The form generally grown as ornament is the double variety, and consequently barren. The fruit of the pomegranate has been esteemed a delicacy from the most ancient time, and we often see it offered for sale at our fruit stands. In the West Indies, where the plant would thrive naturally, it is not extensively cultivated, and the writer of this botanical history (C. G. Lloyd), who has visited all these islands, does not remember to have seen it or its fruit there. Like all cultivated plants, it is liable to variation, and several of its forms have been considered distinct species and named by several authors; however, they are all now considered forms of one species.

The pomegranate plant is a shrub in cultivation in this country, but in the tropics reaches the height of a small tree 10 to 15 feet high. The leaves are opposite, are sometimes alternate above, oblong or lanceolate, thick and with entire margin. The flowers are bright-red and are clustered in the axis of the upper leaves, Varieties of white and even black (?) flowers are stated to exist in Java.[43,44] The calyx is thick, leathery, adnate, with five to seven thick valvate sepals. The stamens are numer-

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ous, inserted in the calyx tube. The petals are normally the same number as the segments of the calyx and inserted in the mouth of the calyx-tube alternate with its segments. In the double flowers commonly cultivated the petals are of course indefinitely increased by transformation of the stamens. The fruit, which has been prized for the pulp in which the seeds are imbedded, is about the size of an apple*, smooth, with a thick skin, and is in reality the enlarged calyx surmounted by its persistent lobes. It is divided by thin divisions into a number of cells, each packed full of angular seeds contained in a juicy pulp.

HISTORICAL NOTES.

The pomegranate shrub, according to De Candolle[6], is originally a native of Persia and adjacent countries, but has been cultivated and naturalized in the Mediterranean countries at such an early date that it has even been considered indigenous to these countries.

Pomegranate was included among the vegetables that were held sacred by the Assyrians[7] and the Egyptians;[8] and the latter nation made it a custom to place in the graves of the dead fruits of the field and garden, among them pomegranates, specimens of which are preserved to the present day[25]. The pomegranate had undoubtedly an occult significance with the ancient nations. It was frequently used as a mystical emblem in adorning the capitals of Assyrian[7,9] and Egyptians columns, and the Bible tells us that in the building of Solomon's temple the capitals of the columns were decorated with a " network of pomegranates."[10] Also the hem of the high-priest's robe was adorned with imitations of pomegranates in blue, purple and scarlet, alternating with bells of gold[11]. The pomegranate was one of the three fruits brought to Moses by the men that he sent to spy out the land of promise[12], Many other passages scattered throughout the Bible refer to our plant[13], and testify to the esteem in which the tree and the fruit (then called rimmon) were held in ancient times. The fruit and seed of the pomegranate are mentioned in the "Arabian Nights."

* Called by Pliny malum punicum (Punic or Carthaginian apple),

Pomegranates were represented on Carthaginian and Phenician medals[14] and on the reverse of the coins of the island of Rhodes[8]. In Greek mythology the pomegranate is very conspicuous[15 16 17], and symbolizes fecundity and abundance. The fruit was dedicated to Juno, a deity always represented in sculptures as holding a pomegranate, [16]

The Greek authors, e. g., Theophrastus,[18] describe the pomegranate under the names of "roa" and "roa side"; also Dioscorides[22], who quite explicitly sets forth the medicinal properties of the different parts of the plant. Among Roman authors who describe the pomegranate and its uses are Cato Censorius[19], Pliny[20], Celsus[21], and others. Subsequent writers, for example the Arabians, in the ninth century, also refer to the pomegranate, but seem to have mainly reiterated the substance of the writings of their Greek and Roman predecessors.[14] Of the writers of the middle ages may be mentioned Tragus[23] and J. Bauhinus[24], the latter giving a most detailed compilation of that which was known before his time on the subject of the pomegranate, including the myths with which it is connected. It was not until the present century, however, that the literature of the pomegranate was enriched by the study of its chemical aspects.

CONSTITUENTS AND PROPERTIES.

The bark of the root, according to Wackenroder (1824), contains 22 per cent (according to a later authority, in 1880, 20 per cent) of a tannic acid, subsequently termed punicotannic acid. The astringency of the root is due to this principle and the aqueous infusion yields a dark-blue color or precipitate with ferric salts. In 1878 and 1880 Tanret discovered several alkaloids in the root-bark, the most prominent of which he called pelletierine. This has been shown to possess the anthelmintic properties of the root.[25] The amount of alkaloids in the root-bark seems to vary according to the variety of flowers, the white-flowering variety, occurring in Java, yielding as high as 3.75 per cent of hydrochlorids of total alkaloids.[43] The bark also contains mannite and a yellow coloring matter. A yellow stain is produced if the inner surface of the root-bark is moistened with water and rubbed on paper[26].

The rind of the fruit also contains a considerable amount of tannic acid, about 19 per cent. It is stated that the rind of the fruit of the wild pomegranate is more astringent than that of the cultivated.[27]

Pomegranate flowers called balaustion by Dioscorides,[22] also are rich in tannic acid, have a bitterish and astringent taste, but no odor. They color the saliva violet-red.

USES.

For Tanning.-Pliny[20] mentions that the rind of the sour variety of pomegranate was used as a tanning material.*

Shortly after the days of Pliny the Moors introduced tanning into Spain, and their finest moroccos were tanned with the rind of this fruit.[13] Tanning in this manner is still in vogue in some countries, e. g., Tunis, where the pomegranate abounds;[25] also in Japan.[28].

For Dyeing.-The rind of the pomegranate, especially that of the wild plant, has been used in India as a dye-stuff from ancient times. Alexander Burnes, in his travels, describes "a little yellow flower," called Esbaruk, which grows in the low hills near Karshi and Balkh (in Afghanistan), and says that it is used as a dye-stuff. He incidentally remarks that it produces a better color than the root of the pomegranates[29] Balaustion flowers are stated by Pliny[20] to be used for dyeing cloth.

As an Article of Food.-The refreshing and cooling taste of the pulp of this fruit gave the plant great favor with the ancient natives of oriental countries, and also in our age the pomegranate is sometimes used as a table fruit.[25] The opinion of its excellence, however, is not by any means shared universally.[14] Pickering[30] states that in his experience the best pomegranates are found in Mascat in Arabia. From this province the fruit is frequently imported into India.[31] Wine frequently was made from the pomegranate in Palestine, as evidenced from the biblical name "gath rimmon," meaning press of the pomegranate;[32] and in Persia, where whole woods of pomegranates are to be found.[29] The art of making wine from this source was raised to the importance of a national industry.[4]

* Hence the name "malicorium," from corium, Latin for leather. Another official name of the rind has been cortex psidii (25),

As a Tenifuge.-Charaka-Samhita[33], probably the oldest medical work in the world, in its translation does not mention the bark of either the tree or the root of pomegranate and does not mention it in connection with tenicides.* The anthelmintic properties of the root and rind, however, were well known to the ancient people of more proximate historical age. Newberry[34] quotes from a description on the " Papyrus Ebers," discovered in recent times, on which is found the following passage: " To drive away the worm: Make an mfusion of the rind of pomegranate. " The Chinese also were acquainted with the anthelmintic property of the root.[25] Among the Roman authors, some, as e. g. Cato Censorius[19] and Pliny,[20] recommend the fruit rind: others, e. g. Celsus[21], the bark of the root as an efficient vermifuge. The Arabian writers maintain that the root-bark is a perfect specific for tapeworm.[35]

Constantinus Africanus, a prominent physician of the Salernian school of medicine, is quoted by Tragus as follows: " Boil the peelings of pomegranate in wine, and drink this potion; it will kill all the worms, especially the kind called 'ascarides,' and it is the peculiar property and nature of the pomegranate to kill worms."[23] This virtue of the plant, curiously enough, afterwards seems to have been entirely overlooked by the medical profession, and slumbered until the beginning of this century.

In 1807, Dr. Buchanan, an English physician in India, announced to Europe the fact that in India, from time immemorial, the root of the pomegranate tree was used against tapeworm with miraculous success.[36] He cited successful cases from his own practice and that of others: " I have seen two species of tenia expelled by this medicine; one is solium, the other not yet described.†" The correctness of these statements was subsequently borne out by the testimony of various eminent physicians. Dr. Gomez of Lisbon successfully treated fourteen persons for tapeworm in 1822, and the results were afterwards published in France by Merat.14 The latter publication seems to have contributed largely to spread the use of

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1 However, the work of translation is not complete as yet.

† For a list of references in this direction see Merat & De Lens (14).

this drug as a remedy for tapeworm throughout Europe. In England, however, pomegranate, it seems, has not as yet replaced the male-fern.26 In India the drug is now considered the sovereign remedy for tenia, as various writers testify.[39 40 41]

In this connection it may be of interest to state that in India the pomegranate root-bark is seldom met with in the shops. As few gardens are without the plant, it is freshly dug when required.[35] Royle[27] and others[42] maintained that the dry bark seems not to contain any definite tenicide principles, but De Vrij brought evidence to the contrary.[44] However, the alkaloid pelletierine was tried as a tenifuge with much success[35] and is now extensively employed in the form of a tannate.

The balaustion flowers possess no tenifuge property. Merat and De Lens state[14] that according to Cullen the rind of the fruit has less vermifuge power than the bark of the root, which statement is supported by the evidence of physicians for whom the writer has prepared the remedy.

Other Uses in Medicine.-The pomegranate, besides being used as a vermifuge, is employed, although more rarely, for other medicinal purposes, e. g,, for arresting hemorrhage and healing ulcers.[20] Charaka-Samhita[33] gives the fruit (rind?) a position as an astringent (p. 15 and 33) in diarrhea. Two varieties are described (p. 357) both being known under the name "dadima." In modern India, a decoction of pomegranate rind is used in combination with aromatics and opium, for diarrhea, and a decoction of the root is said to be useful in the advanced stage of dysentery[40], The ancient writers, as Dioscorides[22] and Pliny[20], indicate numerous uses in medicine for the various parts and the several species of the pomegranate, some passages furnishing rather curious reading matter, which, however, we cannot find space to repeat.

PHARMACOPEIAL RECORD.

The antiquity of the plant explains the fact that the drug found a place in early pharmacopeias. The Pharmacopoeia Borussica of 1829 (5th edition) recognized granatum, cortex pomi and flores balaustiae. In the 6th edition of 1846, however, we find only cortex radicis

granati. This was extended in the 1882 edition to cortex granati, which meant the bark of the plant and that of the root. The balaustion flowers, usually collected from the double variety, were still official in 1844 in the Dublin Pharmacopeia.

As regards the United States Pharmacopeia, granatum was first recognized in 1830, the Philadelphia edition introducing the rind of the fruit, the New York edition the bark of the root. The subsequent editions carried both, until in 1880 the rind of the fruit was dropped. In the 1890 edition the stem-bark was added.

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