The Botanical History of the 'Sindian' and the Age of Abraham's Oak

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The Turk, desiring always to raise taxes with the least amount of trouble, puts a tax of £E1 per tree on certain trees of any size. A notable example of the effect of this tax is that of the Olive forest formerly existing between Gaza-Ascalon and Mejdol, still shown on our maps as "Olive forest."

When the advance came I went to see this "forest," but found only very large Olive tree stools, the whole having been cut down by the owners and the wood sold, thereby avoiding the annual tax of £E1 per tree!

An oak forest of considerable size is shown on the maps of 1878 behind El Jelil marshes, some 17 miles north of Jaffa, but this also has vanished, and, though some fair-sized tree stools remain, the rest is scrub and of no size. A better collection of *Q. calliprinos* existed recently near Zimmarin, about 20 miles south of Mount Carmel, but only scrub now remains, the Turk having cut the larger trees or saplings for firewood. At the dump I saw no log exceeding 12 in. in diameter. On the slopes of Mount Carmel this oak forms certainly four-fifths of the scrub, and one sees many bushes with thick branches 8 or 9 ft. long, growing out of the rocks on hill sides, in many cases bearing acorns. But these slopes are in many parts too steep even for goats, and no flocks appeared there such as we saw on the Judean hills. The oak forest below Zimmarin starts, apparently, where cultivation ceases, and extends up the lower foothills and eventually round the spurs of hills to the Carmel range, but never actually reaches the hill tops.

There is no reason why, in the fertile soil and good climate of Palestine, groves of *Q. calliprinos* and other trees should not be grown again and protected under Government supervision. It is particularly noticeable how successfully the German-Jewish Colonies have planted trees, usually Eucalyptus. The growth these have made in a comparatively short time is remarkable.

The country badly needs re-afforestation, which would, under proper care, soon be a paying proposition. The chief enemy would be the herds of goats or sheep, but these could be fenced off with barbed wire. On rare occasions flights of locusts occur which consume most of the green things they meet, but I did not see any *Q. calliprinos* scrub or Eucalyptus which showed signs of former attack by them. Palm trees, Olive trees and, of course, Almond trees had suffered severely, and in gardens which had been left to run wild the trees were often in a dying condition.

XLI.—THE BOTANICAL HISTORY OF THE 'SINDIAN' AND THE AGE OF ABRAHAM'S OAK.

O. STAFF.

The nomenclature of the species of *Quercus* to which the famous Abraham's Oak belongs is somewhat confused, partly owing to its having been described several times over, and partly on account of the broader or narrower view of the species which successive writers have applied to the group of which it is a member. The

following lines are intended as a contribution towards a clearer and, at the same time, practical concept of the type of oak in question.

As the Arabs of Palestine have long known it by the name "Sindian," we may, for the sake of greater clearness, speak here of it as the Sindian Oak, and thus keep it distinct from the Kermes Oak of South Europe and North Africa, with which it is frequently associated. Both belong to the "*coccifera*" group, *Quercus coccifera* being the name originally applied by Linnaeus to the Kermes oak. These "*Cocciferae*" represent a type of evergreen oak, widely distributed over the whole of the Mediterranean region from the Atlantic to the Levant. They form a characteristic element of the "maquis" or "macchie," that is, the scrub-formation of the coastland of the Mediterranean, ascending here and there in the adjoining mountain ranges to altitudes of up to over 4000 ft. Mostly shrubs from a few to 10 ft. high, they grow occasionally into small trees up to 20 ft. high, or, as in the eastern section of the area, into quite stately trees. The small, hard evergreen and mostly spinous leaves vary in size, shape and the degree of spinosity in the same individual, or in the individuals of a given colony, or, as it appears, from race to race. The fruits show a similar range of variation with regard to size, shape of the phyllaries or scales of the cupules, the length of the acorns relative to that of the cupule, and the time they take to mature. Here the variation is partly of the nature of response to conditions of nutrition or possibly age, individual fluctuation, or of a fixed character indicating the presence of distinct generic units. This partly real and partly apparent instability of the characters which challenge discrimination is very difficult to appreciate in detail, and apt to lead to one of the two extremes of taxonomic treatment, excessive "lumping" or excessive "splitting." Both have had their apostles. The conception of one extremely "variable" or polymorphic *Q. coccifera*, covering the whole group, is contrasted with the creation of almost a score of species proposed in the course of time for this same group. In either case it seems that too much has been merely assumed, and it will require prolonged observation and experiment to disentangle the stable and the unstable element in this apparent chaos of forms. No attempt in that direction is made here, but, viewing the material at my disposal, I have come to the conclusion that so far only one type of the *coccifera* group is known to exist in Palestine. It occurs either as a shrub or a tree of varying and occasionally considerable size; it has leaves, no doubt, of variable size, but on the whole larger and more oblong than those of the Kermes oak, and its fruits have large to very large cupules with rather long linear- or lanceolate-oblong phyllaries or scales, mostly free from the middle upwards and erect or more or less recurved and covered with a fine greyish down. This oak is a common, if not the most common, constituent of the scrub or the maquis formation which occurs all over the southern and western slopes of the Judean plateau from the latitude of Hebron to Mount Carmel, entering here and there deeply along the valleys into the

latter, then covers much of the hills around the plain of Esdraelon, and finally continues northwards, facing on one side the Phoenician plain and merging on the other in the richer woodlands of Upper Galilee and the Lebanon. Tristram also records it from Gilead on the other side of the Jordan, but I have not seen any specimens from there. Farther north, however, at Banias, it was collected by Post, and, according to Kotschy, it also occurs in the Antilebanon. Beyond this region it extends through the Jebel Nur into the Cilician Taurus, here, as in the Lebanon, ascending to over 4500 ft. It has also been found in Cyprus from the coast hills to the mountains of the interior. The Arabs distinguish this oak, as has already been stated, as Sindian. Dr. E. Robinson records this name for the Abraham's Oak of Hebron and a similar tree at Seilun (Shilo) in Samaria. Brocchi heard the same name applied to the "*coccifera*" oak of the Lebanon, and Sindyaneh or Sendianeh, N.E. of Kaisariyeh, near the Zimmarin of Major Portal, derives, no doubt, its name from the same vernacular. This oak has been repeatedly figured.

Linnaeus had evidently no first-hand knowledge of the Palestine Oaks*. The only reference to them is in *Species Plantarum*, ed. ii., 1413, where Judaea is quoted among the habitats of *Quercus coccifera*. This he had from Gronovius (*Flor. Or.*, 1755, p. 119), who, in turn, quotes Rauwolf. The latter (*Beschreib. Raiss. Morgenl.* 1583), mentions "*Ilex minor*" from the hills above Tripolis (p. 59) and "*Ilices*" from east of Rame (p. 460). Belon, who was at Rame about 27 years before Rauwolf, mentions them as "*Chênes verds.*" It was not until 1812 that this oak received critical attention, when Labillardière, who had collected it himself in the Lebanon, described and figured it, identifying it, however, with Desfontaine's *Q. pseudococcifera* from Algeria. Then in 1838 Webb, pointing out its distinctness from the Algerian plant, named it *Q. calliprinos*. Unfortunately he included in this species an oak of which he had collected some imperfect material in the mountains near Tetuan in Morocco. Th. Kotschy, during his travels in the Orient in 1853 and 1855, paid much attention to the oaks and amassed considerable material for study, which was distributed generously and was also to form part of the basis of a monograph of the European and the Oriental oaks. He was evidently much impressed by certain differences, particularly in the structure of the cupule, and without careful collation attached freely new names to the specimens he dispersed. Some of them remained "*nomina nuda*," although they were quoted by subsequent writers or used for the designation of subordinate forms. Others he connected with very full descriptions and splendid

* Strand, in his *Flora Palaestina*, usually quoted Linnaeus, *Flora Palaestina* (Amoen. iv. 1756), enumerates five species of *Quercus*, one of them *Quercus coccifera* of Rauwolf's collection, the others "a Pocockio in Palestina collectas e a D. Millero extricatas." They are evidently the oaks listed by Pococke in his "Description of the East," vol. ii. p. 187, under Tournefortian diagnoses taken from Tournefort's *Corollarium*. What these correspond to we do not know; but it is very improbable they were based on Palestine specimens, and have evidently nothing to do with the Abraham's Oak. I have not been able to trace Pococke's specimens.

figures in his folio "Die Eichen Mitteleuropas und des Orients," which appeared in parts from 1858-1862. In this work he distinguished four species of the "*cocciferae*," which he recognised as a group "Phyllocentron" among the evergreen oaks of his section "*Mesolepidium*." Among these *Q. palaestina* covered the Oak of Hebron, whilst the corresponding oak of the Lebanon is not accounted for. *Q. palaestina* is also mentioned by Kotschy as growing around Hebron, in a paper on the spring flora of South Palestine (in Verh. Zool.-Bot. Ges. Wien, 1861, 16); but in two later papers, "Der Libanon und seine Alpenflora" and "Die Sommerflora des Antilibanon" (ibid. 1864), he mentions *Q. calliprinos* (pp. 451, 455, 748) and *Q. pseudococcifera* (pp. 748, 764), and identifies the latter with the "Sendian" of the natives. Thus Kotschy's account of the "*Cocciferae*" remains incomplete and confused; but it seems as if he had meant at some time to extend his concept of *Q. palaestina* so as to include more northern representatives, for he distributed specimens collected on Jebel Nur (Nur Dag, S.E. Cilicia), in 1859 under the name "*Quercus palaestina*." It was only a few years after Kotschy's travels in Palestine and the Lebanon that Sir J. D. Hooker (1860) visited the same regions. He, too, studied the oaks of the Holy Land in the field as well as in the Herbarium. With much of Kotschy's material before him, he came to the conclusion that there was only one prickly evergreen oak in Palestine, very closely allied to the Kermes oak, but still sufficiently different to require a distinctive name. Although considering the differences as "no more than enough to establish a variety upon," he decided for Labillardière's name *Q. pseudococcifera*, quoting, however, Desfontaine as its author. With this inclusion the area of the Syrian oak was extended automatically to Algeria and the Iberian peninsula, and its distinctiveness practically obliterated. Hooker's paper was read before the Linnean Society in June, 1861, and printed the same year. Three years later (Nov., 1864) followed A. De Candolle's exhaustive monograph of the *Cupuliferae* (Prodrom. vol. xvi. ii.), in which an elaborate attempt was made to classify the numerous forms of the "*cocciferae*" which had by that time been distinguished in one form or the other. It resulted in the recognition of three species, *Q. coccifera* with the Kermes oak, and *Q. calliprinos* with the Sindian as leading types, and *Q. Fenzlii* based on the oak figured by Kotschy under that name. Eight varieties were recognised under *Q. coccifera*, and ten under *Q. calliprinos*. Desfontaine's *Q. pseudococcifera* was transferred as a var. *pseudococcifera* to *Q. coccifera*, and Webb's specimen of *Q. calliprinos* from Tetuan, to another variety (queried) of *Q. coccifera*, namely, *tomentosa*. *Q. calliprinos* was thus confined to the eastern part of the Mediterranean region ("In orientali regione Maris Mediterranei"), and all the Palestine and Syrian "*cocciferae*," with the exception of *Q. Fenzlii*, oaks came now under this heading. Kotschy's *Q. palaestina*, as described and figured by him on tab. xix. of his monograph is quoted as a synonym of var. *arcuata*, a name originally used by Kotschy himself on one of his distribution labels. The Lebanon form of Labillardière, as

already stated, constitutes the nucleus of the species, whilst other forms are described as distinct varieties, namely (γ) *inops* (Lebanon, *Kotschy*), (δ) *consobrina* (Beirut and Lebanon, *Kotschy*), (ξ) *brachybalanos* (Beirut, Carmel, etc., *Kotschy*, *Bove*, *Gaillardot*), and (ι) *pachybalanos* (Carmel, Tabor, *Gaillardot*). To judge by the authentic specimens of those varieties which I have seen, I can see in them nothing but unstable fluctuations or races not worthy of being distinguished at present. For practical and especially economical purposes, at any rate, they may be safely considered as a specific unit, which, under the existing rules of nomenclature, would have to be given the name *Q. calliprinos*. De Candolle's account of *Q. calliprinos* implies a considerable extension of the species beyond Syria and Palestine, through the Taurus and Western Asia Minor to Constantinople, and to Cyprus, Crete, and the island of Zante; but from the material I have been able to examine I am inclined to restrict the area in its western and north-western extension to Cyprus and the Cilician Taurus.

As to *Q. Fenzlii*, some difficulty arises from a certain discrepancy between the original description and figure (*Kotschy*, *Eich. Mittel Europ. Orient*, t. 24), and the specimens distributed under that name. *Kotschy* states that the oak in question was collected "in regione montana Xyftlic" above Tarsus in Cilicia, between 3500 and 4000 ft., and distributed under the Nos. 397 and 398, and that it was distinguished by its small delicate (zart) leaves* and closely compressed phyllaries or cupular scales. The specimen numbered "*Kotschy*, It. Cil. 398" and localized "in regione montana Zyftlik" at Kew is, in my opinion distinctly *Q. calliprinos*, with an immature acorn whose cupule has phyllaries typical of the species and just beginning to spread out. They are neither as short nor as appressed as shown in the plate. No. 397 of the same set, at Kew, was distributed as *Q. calliprinos*, *Webb*. It is stated to have been collected "in regione montana prope 'Gullek Boghas'" in the Cilician Taurus at 4000 ft. Both are dated Sept., 1853, and the altitude given for both is 4000 ft. No. 397 is laid out very amply and is undoubtedly *Q. calliprinos* with acorns in a more advanced state. Neither specimen corresponds exactly to *Kotschy*'s figure of *Q. Fenzlii*.

Kotschy, in his book "*Reise in den Cilicischen Taurus*," enumerates *Q. Fenzlii* on p. 381 as occurring "in collibus cretaceis, bis zu 2000," and on p. 369 he says that it descends in the hill zone—the upper limits of which he places at 2000 ft.—to 1000 ft., whilst *Q. calliprinos* (p. 370) occurs from 2000 ft. upwards. In the "Höhen-tableau" at the end of the book *Q. Fenzlii* and *Q. Calliprinos* are entered under the same number in the 1000-2000 ft. zone in the margin and in the 1000-2000 and 2000-3000 ft. zones in the panorama. Moreover, "Zyftlik" on the shoulders of Hadschin Dag, east of Gülek gala was not visited in September, as the label says, but on August 24 and 25, and no mention of *Q. Fenzlii* is made in the account of that excursion. Yet *Q. calliprinos* was collected on that occasion and distributed

* In the description the leaves are described as "subcoriacea rigida."

as No. 40 "*Quercus calliprinos*, Webb, var." To unravel the confusion it will be necessary to see the original field labels. At any rate, so much is certain that the Sindian occurs in the Cilician Taurus and that *Q. Fenzlii* is either in part or *in toto* identical with it. I may here add that Kotschy collected in the same region another oak of the "*coccifera*" group which he identified with *Q. rigida* of Willd. (Spec. Pl. iv. 404), and figured on t. 8 of his folio work. It has all the appearance of *Q. calliprinos* except for the usually intensely glaucous underside of the leaves. Willdenow's plant was collected by C. Schwarz in "Caramania," which means no doubt in this case the western continuation of the Cilician Taurus and its foothills. A. de Candolle (l.c. 56) reduced it to a variety (K) of *Q. calliprinos*, and it may indeed represent only an excessive xerophytic condition of the latter. According to Kotschy it is not uncommon near Gülek Boghaz.

Boissier (Flor. Or. iv. 1879; p. 1169), treats our oak under the varieties *calliprinos* (including *Q. Fenzlii*), *pseudococcifera* and *palaestina* of *Q. coccifera*, distinguishing them mainly by the phyllaries whether they are erect and more or less appressed or more or less spreading or squarrosely recurved or finally "*eximie retrofractae*." Post (Flor. Syria and Palestine, 1896; p. 739), follows Boissier, including, however, the var. *palaestina* under var. *pseudococcifera*.

It seemed worth while to make an attempt to get at an approximate estimate of the age of the famous Sindian of Hebron. For that purpose the following data were available. J. D. Hooker on the authority of Porter who measured it about 1850, gives the girth of the trunk of the tree as 23 ft. A somewhat excentric section of a trunk or more likely a branch of a Sindian oak from Hebron in the Museum at Kew (Vester coll. no. 34), has 37 annual rings. The first 10 rings show over the longest radius an annual average increment of 3 mm., the following 5 of 1.9 mm., and the remaining 22 which are fairly evenly distant of 1.5 mm. Assuming that the trunk of the tree grew after the first 30 years at an average rate of 1.5 mm., the age of the tree may be estimated roughly at 700 years. This would make the date of the starting of the tree the year 1150 or thereabouts, that is the time of the Second Crusade. It is therefore not surprising that we hear nothing of it for a very long time after. Even Belon, a very keen observer and naturalist, who visited Hebron in 1548 does not mention it, although the diameter of the trunk of the tree must have then measured about 4 ft. with a girth of about 13 ft. At that time it would have been, as oaks go, a fair-sized, but by no means very striking tree, particularly if, as we may assume, large trees were then less rare in Palestine than they are now. This, however, is certainly not the full explanation of Belon's omission to mention the tree. It is rather to be sought in the fact that in those days the legend of the Abraham tree attached to a Terebinth (*Pistacia Terebinthus*). This is what Belon (Observ. Plus. Singul. p. 145 verso), says—"Le lieu ou Abraham estoit lorsqu'il en veist trois et en adore un. Tres vidit et unum adoravit, nous fut montré hors le village d'Ebron, dessus le fossé d'un

champ où fût créé Adam et est marqué d'un Terebinthe, qui a trois arbres sortant d'un tronc." This field was evidently not the same where the present Abraham's oak stands, but farther north where the Jewish tradition has for a long time located the house of Abraham in Mamre. (*See* Ritter, *Erdkunde*, XVI. iii. 225.) When this terebinth disappeared is not known; it does not seem to have been seen by the numerous travellers who visited Hebron after Belon. But it seems that following on its destruction the tradition of Abraham's house was transferred to the great Sindian oak to the west of the present Hebron.

Some kind of tree cult seems to have been attached to the great trees of Hebron since the earliest times, perhaps as a relic of real tree worship. It has been suggested (Rosenmüller, *Bibl. Naturg.* 232), that the old Hebrew word for them, Allon or Aelon, signified originally any big tree, just as "oak" is frequently used in the same sense. If that is so, the oak and the terebinth must always have had the monopoly of the claim to that name although we may not be able to decide which of the two was Abraham's tree.

XLII.—ARCEUTHOBium OXYCEDRI AND ITS DISTRIBUTION.

W. B. TURRILL.

The generic name *Arceuthobium*, M. Bieb., *Fl. Taur.*, 3, p. 629, 1819, is one of the *Nomina Conservanda* of the Vienna Rules, being antedated by *Razoumowskia*, Hoffm. *Hort. Mosq.*, 1808. This latter name is used by many authors, especially American, instead of *Arceuthobium*. About 18 species are known, all except four being confined to North America. The genus is allied to *Viscum* but is well distinguished by the anthers being distinct from the petals and not adnate to them for the whole or greater part of their length.

An interesting account of the genus entitled "Überblick über die Arten der Gattung *Arceuthobium* (*Razoumowskia*) mit besonderer Berücksichtigung ihrer Biologie und praktischen Bedeutung" by C. von Tubeuf, has recently appeared in *Naturw. Zeitsch. Forst- und Landw.*, 1919, pp. 167-273. This paper deals more especially with the anatomical, physiological and practical questions connected with the genus and is chiefly concerned with American species. The distribution of the extra-American species is not given in detail and two of the recently described ones are not mentioned. A long bibliography is appended.

Of the four species not found in America three can be briefly referred to here. *Arceuthobium minutissimum*, Hook. f., is limited to Kashmir and Nepal, where it occurs on *Pinus excelsa*. It is one of the smallest Phanerogams known, being only 2-5 mm. in length. *A. chinense*, Lecomte in *Not. Syst.*, vol. iii. p. 170 (1915), is parasitic on *Abies* in the province of Yunnan. *A. Dacrydii*, Ridley in *Journ. Fed. Malay States Mus.*, vol. vi. p. 170 (1915), is parasitic on *Dacrydium Beccarii* "near the camp on the Padang," Gunong Tahan, Pahang.