

he must not expect to be served French or French-creole food, nor should he expect to meet any expressions of an indigenous culture, be it dancing, music or poetry. What culture originally may have existed appears to have been wiped out or, some say, went underground during the hard times of early colonial settlement. In this

respect the Seychelles stand in a striking contrast to the South Pacific islands and even to the West Indies. Still, the visitor will find much worth coming for — glorious scenery, a unique flora, a near-ideal climate but one in which mosquitoes will not thrive, good roads, good hotels and, first and last, nice, hospitable people.

## History of the Coconut Palm in America

O. F. COOK

Cook's views of the origin and history of the coconut palm, as published in *Contributions from the United States National Herbarium* 14: 271-342, 1910, are too lengthy to reprint in their entirety. The summary (pp. 338-342) is reprinted here in conjunction with the reprinting of Beccari's opposing views. Both the above paper and an earlier one "The Origin and Distribution of the Cocoa Palm" in *Contributions from the United States National Herbarium* 7: 257-293, 1901, should be read by those interested in the matter.

### SUMMARY OF RESULTS

The history of the coconut palm has relation to several different kinds of scientific questions, so that the facts require to be summarized from several different standpoints.

#### Botanical Conclusions

All the palms that are related to the coconut, comprising about 20 genera and 200 species, are natives of America, with the possible exception of a single species, the West African oil palm. All the species of the genus *Cocos* and of the closely allied genera are natives of South America. The species of *Cocos* that are most related to the coconut are natives of the interior valleys and plateaus of the Andes, where the coconut also thrives, remote from the sea.

Comparison of the structure of the fruit and the method of germination of the coconut with those of the related palms indicates a high degree of specialization, but not for purposes of maritime distribution. The unusually large, heavy seed and the thick, fibrous husk are to be considered as adaptations for protecting the embryo, assisting in germination, and establishing the young plants in the dry climates of interior localities, the

only conditions where this palm could be expected to maintain its existence in a wild state.

The habits of the coconut palm afford no indication that its original habitat was on the seacoast, and none of its closer relatives have maritime habits or maritime distribution. The coconut palm does not appear to be able to maintain itself under littoral conditions without the assistance of man. Though carried by man to all of the warmer parts of the earth, it has not been able to establish itself as a wild plant on any tropical coast, but is always crowded out by other vegetation after human care is withdrawn.

Wafer's circumstantial account of the existence of large numbers of coconut palms on the Cocos Islands, 300 miles west of Panama, in 1685, taken together with their almost complete disappearance at the present day, affords a striking illustration of the dependence of the coconut upon human assistance not only for its distribution, but for its continued existence on oceanic islands.

The dissemination of the coco palm along the tropical coasts is to be ascribed

to the agency of primitive man, as with the sweet potato, banana, and other domesticated plants which were widely distributed in prehistoric times. The theory that it has been disseminated by ocean currents is gratuitous, unproved, and improbable.

The development of distinct varieties of the coconut has not been confined to the Polynesian and Malayan islands. Distinct varieties are also to be found in isolated localities in America, such as the Soconusco region of Mexico and the island of Porto Rico.

The existence of many and diverse varieties in the Malay region does not indicate that the species is native there, but the opposite, since the proximity of the wild stock of a species is likely to hinder the appearance and preservation of mutations among its cultivated representatives. The relative uniformity of the coconuts of America is in accord with the probability of an origin in this hemisphere. The discovery of distinct varieties in isolated localities in America accords with the probability that the Malayan varieties have arisen, like other cultivated varieties, through segregation and mutation rather than by gradual evolution and natural selection.

### Historical Conclusions

At the time of the discovery of America the coconut was not confined to the Pacific side of the Isthmus of Panama, as De Candolle believed, but was already widely distributed along the Atlantic side of the American tropics. Early records show its presence in Cuba, Porto Rico, Brazil, and Colombia at dates so early as to preclude the idea of introduction by the Spaniards.

The statement of Pickering, frequently quoted in works of reference, to the effect that coconuts were reported by Columbus on the coast of Central America during his fourth voyage, proves to

be erroneous. On the other hand, there appears to be a definite reference to the coconut in Cuba in the journal of the first voyage of Columbus.

De Candolle's inference from Acosta's report of coconuts in Porto Rico at the end of the sixteenth century, that they had recently been introduced by the Spaniards, proves to have no warrant in history and is directly opposed by the more extended reference to the coconut in Porto Rico by the Duke of Cumberland's chaplain, who visited the island only a few years after Acosta.

De Candolle's use of the testimony of Piso and Marcgrave to support the idea of the introduction of the coconut into Brazil by Europeans is also unwarranted, since those writers only indicated that the plant was cultivated. An earlier and more explicit record, unknown to De Candolle, gives an account of the coconut as one of the native products of Brazil.

The journal of Cieza de Leon, who accompanied the first Spanish expedition to the interior of Colombia, indicates the presence of the coconut palm in localities where it still continues to exist, as shown by the accounts of Velasco, Humboldt, and more recent travelers, down to the present decade.

### Ethnological Conclusions

The American origin of the coconut palm and the strict limitation of its status in maritime tropics to that of a cultivated plant are facts of ethnological significance. The wide distribution of the coconut in prehistoric times is evidence of the antiquity of agriculture in America and of very early communication across the Pacific.

The American origin of the coconut palm, along with its inability to maintain itself on tropical seacoasts without human assistance, compels us to believe that its trans-Pacific distribution was the

work of primitive man. The dependence of the Pacific islanders upon the coconut may be taken to show that these islands could not have been occupied without the previous domestication and dissemination of the coconut.

In view of the fact that several other palms of unquestioned American origin have been domesticated by aborigines of the American tropics, no ethnological objection can be raised to the idea that the coconut palm was originally domesticated in ancient America.

The name "coco" does not appear to have been applied to the "Indian nut" till after the discovery of America and is to be considered as a word derived from the natives of the West Indies. Other natives names for the coconut are found among primitive tribes of Costa Rica, as well as in Brazil.

The presence of large numbers of coconuts on Cocos Island in the time of Wafer (1685) and their subsequent disappearance should be considered as evidence that the island was formerly inhabited, or at least regularly visited, by the maritime natives of the adjacent mainland.

The fact that the coconut is largely restricted to islands and tropical countries of low elevation explains its importance among the pre-eminently maritime people of the Old World tropics and its relatively slight importance among the non-maritime natives of the lowland tropics of America.

The evidence of the prehistoric dissemination of the coconut and other American cultivated plants across the Pacific Ocean is such as to warrant a careful consideration of other indications that agricultural civilization developed originally in America and was distributed to the shores of the Pacific and Indian Oceans by a primitive people with agricultural and maritime habits,

like those of the Polynesians and Malays.

The existence of a distinct tribe of frizzle-haired people near the Isthmus of Panama at the time of the discovery does not rest alone on Peter Martyr's casual mention of the finding of negroes, but is supported by Oviedo's contemporary history written directly from the testimony of Balboa and other members of his expedition, just after their return to Darien. The facts are not to be explained reasonably by assuming a chance arrival of African negroes, but indicate that prehistoric communication across the Pacific continued after the frizzle-haired Melanesian race had spread eastward in the Pacific.

Such communication would account for the existence of the banana plant in America previous to the arrival of the Spaniards, as well as for the Old World distribution of the coconut palm and other cultivated plants of American origin. The banana plant is as evidently a native of the eastern continent as the coconut palm of the western. Evidence of these facts appears very definite and concrete from the biological standpoint, and is worthy of careful consideration by ethnologists.

### **Agricultural Conclusions**

The coconut is confined to seacoasts only in the humid lowlands of the Tropics; in dry regions it is not restricted to coasts, but thrives in many districts remote from the sea. The fact that it received scientific study only as a maritime plant should not longer obscure the fact that it is also adapted to interior localities with saline soils. The cultural problems of the coconut palm should be investigated quite apart from the idea of maritime habits and distribution.

The possibility of raising coconuts in frost-free localities outside the Tropics is not to be tested along the seacoast, but



in interior districts where larger amounts of sunlight and heat are available, as in the valleys of southern California and Arizona. The coconut, like many other palms, is not tolerant of shade nor of long continued cool and cloudy weather. Other species of *Cocos* that are less exacting in their requirements of sunlight and heat have been found to do well along the California coast.

The possibility of introducing coconut palms into southern California is not disproved by the absence of these palms from Egypt and Palestine. Though the climatic conditions are probably favorable, it does not appear that any adequate effort has been made to introduce

the palms in those countries.

The ability of the coconut to thrive on seacoasts shows that its requirements of heat are not as great as those of the date palm. Though probably less hardy than the date palm, it is not impossible that the coconut may be able to exist in frost-free localities that have not enough heat for the ripening of dates.

The possibility of introducing the coconut palm into southern California and Arizona can not be fairly tested by the planting of the maritime varieties. The chances of success will be very much greater with the varieties that are adapted to the dry interior localities of the temperate plateaus of the Andes.

## The Origin and Dispersal of *Cocos nucifera*

O. BECCARI

*Reprinted from the Philippine Journal of Science, C. Botany 12:27-43.1917*

Having had the opportunity of meeting Mr. J. F. Rock shortly after his trip to the Palmyra Islands I became much interested in his account of the exceptional conditions which he found in the flora of this small and isolated group. This flora proves, at least as far as the phanerogams are concerned, to be composed of an extraordinarily small number of species, belonging to the common strand flora of the Malay Archipelago and Polynesia, and of the coconut palm, which composes nearly the whole of the forests that cover these islands.

The Palmyra Islands belong to the category of those uninhabited coral islands, covered with dense groves of coconut palms, and of which Simmonds writes, as reported by O. F. Cook,<sup>(1)</sup> "the ungathered nuts which have fallen year after year, lie upon the ground in incredible quantities."

The special circumstances in which

<sup>(1)</sup> History of the coconut palm in America, *Contr. U. S. Nat. Herb.* 14 (1910) 298.

the Palmyra Islands are placed; their coral origin; their isolation, consequent to the great distance from any other land; the complete absence of indigenous inhabitants; the want of drinking water; the absence of any traces of economic plants that might suggest that they had ever been inhabited; and the certainty that they are but seldom visited either by fishermen or by any person who had tried to turn their wealth (which consists of the coconut solely) into a source of profit — all these give me the occasion, in addition to describing the peculiar characteristics of the coconut produced in these islands,<sup>(2)</sup> to offer certain considerations of an evolutionary and geographic nature, opposed to those which Mr. O. F. Cook has advanced with much competence and erudition in his two memoirs on the

<sup>(2)</sup> *Cocos nucifera* Linn. forma *palmyrensis* Becc. in Rock, J. F., Palmyra Island with a description of its flora, *College of Hawaii Bull.* 4 (1916) 1-53, t. 1-20.