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Distribution of Ophioglossum on Islands of the Pacific Ocean

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While revising the collections of *Ophioglossum* in the Bishop Museum, the writer has mapped the distribution of the Pacific species, especially those in Polynesia and the south Pacific. Such detailed maps are of value in themselves, and they may furnish evidence on the lines of migration of members of present floras or of their ancestral species.

Ophioglossum petiolatum Hooker, with numerous synonyms, has had its distribution mapped (2, pl. 3).[2] However, it is omitted here because a new treatment of this group in Polynesia by Christensen is now in press at the Bishop Museum.

O. pedunculosum Desvaux has been listed by Copeland for Fiji (3, p. 20) and for Tahiti (4, p. 17) and accepted as ranging to Japan and India. But little material is available, a single collection from each of these two Pacific island groups. Clausen (1, pp. 140-142) tentatively accepts the species, citing material from Africa, Madagascar, and India, and accepting Prantl's published records from Ceylon and Sumatra. Weatherby (6, p. 29) published his critical studies of the types of Desvaux's American species preserved in Paris. For *O. pedunculosum* he concluded, "Certainly not the Old World relative of *O. reticulatum* to which Prantl applied the name. The specimens

[1] This is the second in a series of papers designed to present descriptions, revisions, and records of Pacific island plants. The preceding paper was published as B. P. Bishop Mus. Occ. Papers 17 (7), 1942.

[2] Numbers in parentheses refer to Bibliography, p. 182.

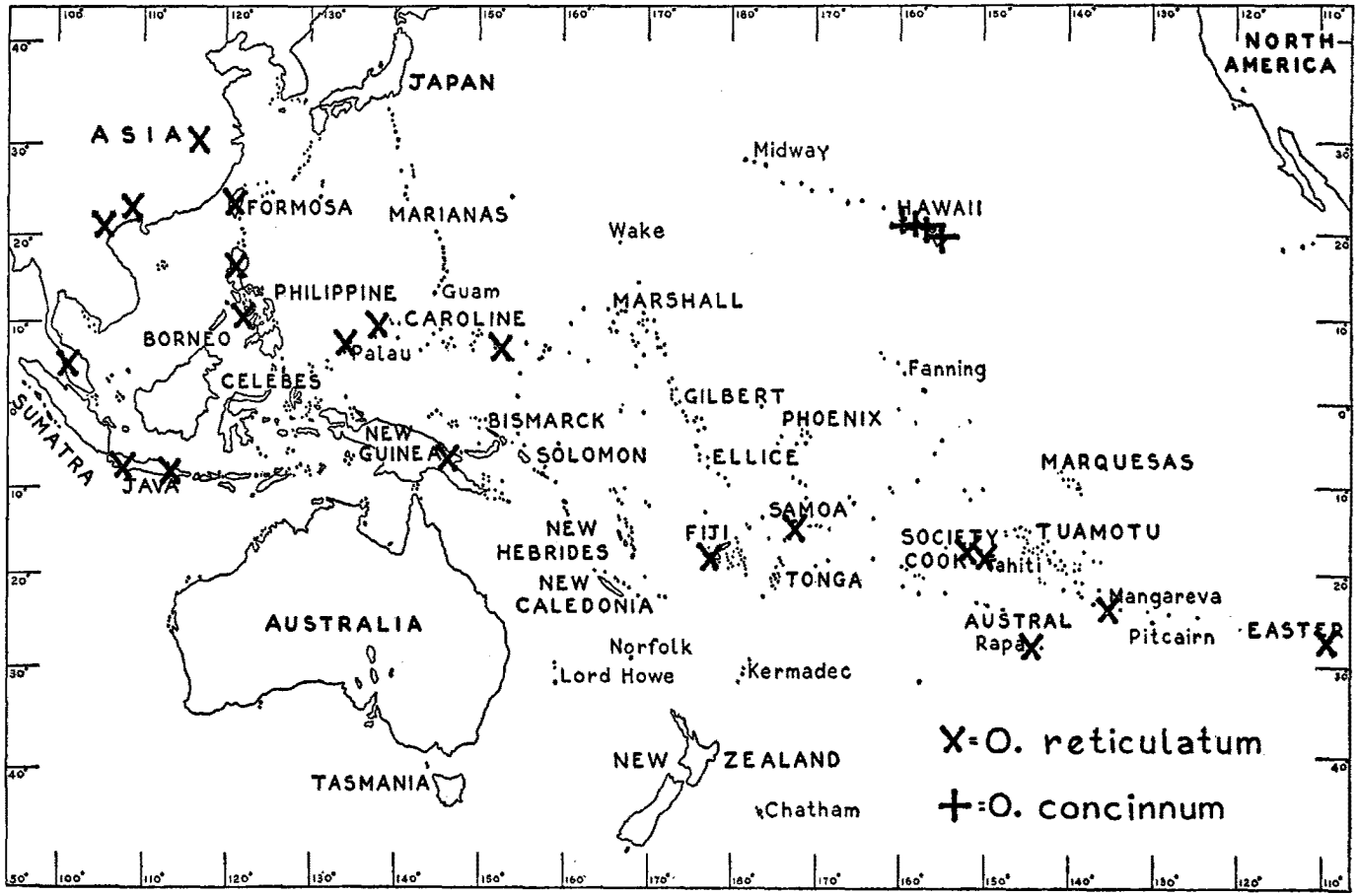

FIGURE 1.—Distribution of *Ophioglossum reticulatum* and *O. concinnum*.

appear to represent a broad-leaved form of the group of *O. ellipticum;* for its certain placing, critical study with more material than is at present available in America, or perhaps anywhere, is needed." The present writer has not solved this intricate problem or established the certain placement of the single collections from Tahiti and Viti Levu. It is omitted from the maps here presented.

O. lusitanicum Linnaeus and its subspecies are mapped by Clausen (1, fig. 28). The ssp. *coriaceum* (Cunningham) Clausen also occurs on Easter Island, on the slopes of Mount Katiki, *Skottsberg no. 651.* The remaining Polynesian species are here mapped.

O. concinnum Brackenridge is restricted to the Hawaiian islands (fig. 1). It is found from the seashore to the high mountains, and has been collected on Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii.

O. reticulatum Linnaeus is pantropic. Its continental distribution in the Americas, Africa, and Asia is shown on the map by Clausen (1, fig. 24). The accompanying distribution maps of it (fig. 1) and the other species are based on specimens in the Bishop Museum and on authentic published records. *O. reticulatum* appears to be absent from many of the large islands in the Pacific tropics. The specimens are often minute and only a skilled, keen-eyed collector detects them in the grass. It is believed that eventually it will be discovered on many more of the islands. Even so, it has now been found from Formosa, the Philippines, and Java, eastward through Micronesia, Melanesia, and Polynesia to Easter Island. Since the distribution is pantropic and spans the Pacific, no deductions can be drawn as to the direction of migration.

O. pendulum Linnaeus was described, and *O. falcatum* (Presl) Fowler distinguished from it, by the writer (5, pp. 351-357). That paper resulted from study of the specimens in the Gray Herbarium and from field experience with both species. Now the large collections of the two species in the Bishop Museum have been revised. They have confirmed the distinctions between the two species and not even extended the extremes of measurement of the diagnostic structures. *O. pendulum* is unknown in the Hawaiian islands. It occurs from Madagascar, Reunion, Ceylon and southern Asia, Malaya, Indo-China, and China. In the Pacific, it extends (fig. 2) from Sumatra to Yaku-shima Island in the Ryukyu chain, eastward to New South Wales, the Austral Islands, Makatea, and the Marquesas. It is unknown on

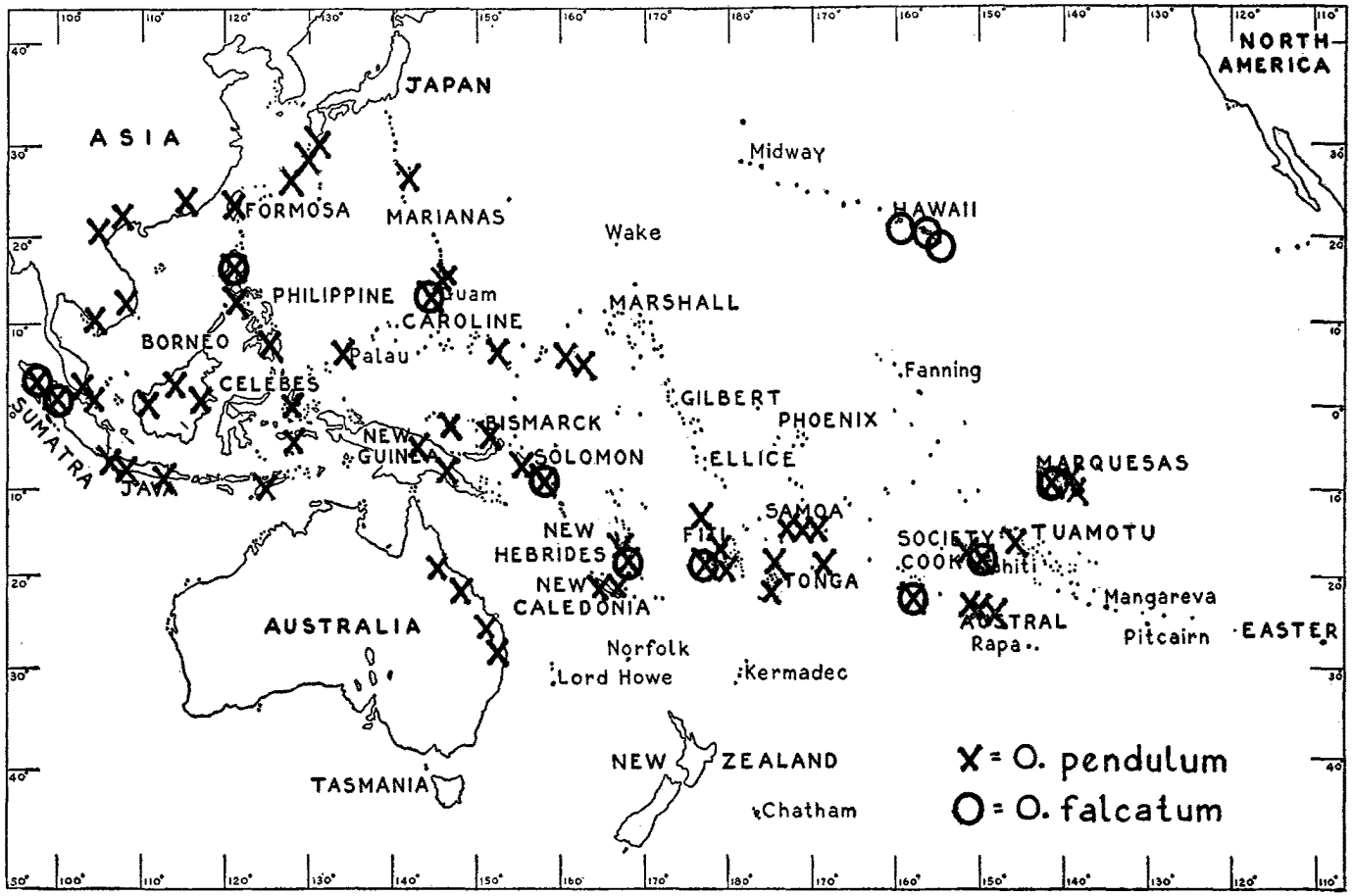

FIGURE 2.—Distribution of *Ophioglossum pendulum* and *O. falcatum*.

the atolls and low coral islands. To be sure, there is one specimen in the Bishop Museum that is purported to come from an atoll. The single sterile frond is small and flat, and the vein reticulation is fine like that of *O. falcatum.* The fertile spike is coarse and 25 cm. long on a stalk 4 cm. long, so it must be considered good *O. pendulum.* The label is on the printed form, "Ex Herb. Edward Bailey, Wailuku, Haw. Is." It bears the written data, "Mille, Marshall Is., Collected by E. B." Mille, now spelled Mili, is an atoll in the Marshall Islands. The data would seem plausible, though incomplete, but there are no other collections or reports of *O. pendulum* or *O. falcatum* from any other atoll or low coral island in the Pacific. Some of these islands are well enough watered to support a moist forest and this often shelters the epiphytic fern *Asplenium nidus* Linnaeus. These habitats appear to be suitable for *Ophioglossum,* but the fact remains that there are no other records of it. The total flora of these low islands is usually less than 30 species of vascular plants. Hundreds of these islands have been explored, and for scores of them the meager flora is believed to be completely known. Weighing these facts, the record for Mili by the amateur fern lover E. Bailey, is rejected as a probable error in data. It awaits independent confirmation.

O. falcatum (Presl) Fowler is most closely related to, and certainly evolved from *O. pendulum.* The former has a much smaller area of distribution, being absent from the islands off Africa and in the Indian Ocean and from southern and eastern Asia. It is infrequent and local, but extends from Sumatra and Luzon eastward to Tahiti, the Marquesas, and Hawaii (fig. 2). At all of the localities where *O. falcatum* occurs *O. pendulum* also occurs and is much more abundant, except in the Hawaiian islands, where *O. pendulum* is absent but where *O. falcatum* is abundant and widely distributed. It is deduced that *O. falcatum* originated in the western Pacific, as in Sumatra or the Philippines, that it migrated eastward to the Marquesas and to the Hawaiian islands, where alone it is dominant. Compared with the parent species, it is less aggressive and less tolerant of climatic extremes.

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The author is responsible for all statements in this paper.