

which was required intact for our investigation (Fig. 1). A shorter length of stem was cut out to provide material for the close investigation of the anatomy of the palm stem being carried out at Fairchild Tropical Garden. The complexity of the vascular system revealed by this cross-cut is evident in Fig. 3, although, as has been described earlier, some advance in unravelling it has come from studying diminutive palms like *Rhapis* which can be regarded as models for more massive plants (Zimmermann and Tomlinson, 1965).

Leaf bases had then to be cut one by one from the stem, in order to reveal parts of further interest to us. *Corypha* does not succumb willingly, being armed with saw-like teeth along the margin of the petiole (Fig. 4). These teeth inflicted many a wound before the axis was divested of most of its leaves and could be erected as a stubby totem (Fig. 5). In this position there was least danger of tender young leaves fragmenting as they were cut out. Soon we were within the crown, the woody parts of older leaves discarded, and at last the machete could be laid aside in favor of a sharp scalpel used to cut through the soft bases of immature leaves (Fig. 6). Parts of these

successively younger leaves went into fixative for a future examination in the laboratory of the development of their conducting tissues (Fig 7). Finally the youngest developing leaves were revealed (see cover) and they and the shoot apex in turn went into preservative. A whole morning had passed, but from the material we had preserved we hoped soon we could better appreciate how *Corypha* develops and is constructed.

Modern biology is making such great advances at the sub-microscopic and molecular level, using tools of every-increasing refinement, that it seems ludicrous that research needs to be carried out using a chain-saw. Nevertheless investigations on this monster scale are needed so that no imbalance of understanding develops in the science of biology as a whole.

Literature Cited

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Palm Hunting Around the World

HAROLD E. MOORE, JR.

IV Lord Howe Island

The last palm stop in Australia was, in many ways, the most exciting. Lord Howe Island, from which come the kentias of commerce — *Howea Belmoreana* and *H. Forsteriana* — has long intrigued me because of two other palms whose relationships are not perfectly clear. Thus I had begun making plans to visit the island many months before. The island is reached today by flying-boat from Sydney and during the sum-

mer season is a favored vacation spot for Australians. Reservations often need to be made much in advance; flights depend on the tides and weather and are at intervals of days not hours. As plans to visit Indonesia were changed during the trip, there was much correspondence attempting to arrange a visit to Lord Howe. Finally plans were completed to leave from Sydney on Monday



1. Mt. Gower (right) and base of Mt. Lidgbird with *Howeia Forsteriana* on sands back of beach.



2. Mt. Lidgbird and central Lord Howe Island from trail to Mt. Gower.



3, 4. *Howeia Belmoreana* (above) and *H. Forsteriana* (below and background above) at end of road near base of Mt. Lidgbird.





5. *Howeia Belmoreana* abounds on trail to Gower.
6. *Hedyscepe Canterburyana* on Gower trail.



noon, February 24th, and to return on the 27th.

Rosebay, a suburb of Sydney, is headquarters for the flying boats which take off from Sydney Harbor in clouds of spray in sight of the magnificent bridge so often pictured. Then one is airborne for something over two hours before a speck of land appears to mar the white-capped sea below. Landing is as much of a thrill as taking off, more so perhaps as one steps into a small launch to be carried to the dock where visitors and residents wait to welcome new arrivals.

Mr. and Mrs. Payten, whose pleasant guest-house "Valdon" was my home away from home, helped me get in touch with Max Shick who had agreed to guide me up Mt. Gower on the 25th, as he earlier had guided other botanists including Mr. Peter Green from the Arnold Arboretum of Harvard University to whom I am indebted for the introduction to Max.

Lord Howe Island, lying about 480 miles northeast of Sydney, is about 7 miles long and one and one-half miles wide, the low northerly end with hills to 700 feet, and at the southern end two mountains, Mount Lidgbird and Mount Gower. Mount Gower is higher (2,840 feet) but easier to climb than Mount Lidgbird which is connected to it by ridge about 1,240 feet high at its lowest point. Three sides drop sharply to the sea but the trail, after a sharp ascent from the beach follows the slope between the peaks. *Howeia Forsteriana* is the predominant palm of the lower sandy areas, though here and there one finds *H. Belmoreana* with it. Climbing upward, however, one sees only *H. Belmoreana* which is abundant up to 1,400 feet or so. At about this elevation, an occasional plant of *Hedyscepe Canterburyana* appears but the species does



7. *Hedyscepe* crowns rise above low forest on ridge between Mts. Gower and Lidgbird.



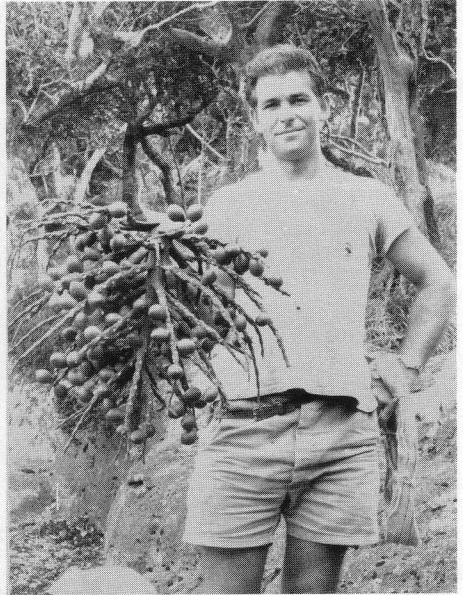
8. A close-up of *Hedyscepe Canterburyana* in fruit.

not become common until one reaches the more exposed ridges at 2,000 to 2,400 feet where scattered individuals with their prominent silver-blue leaf-sheaths, short petioles and stiffly arched green leaves stand out in and above the low montane forest. The trees, when we saw them, bore fruit in various stages. These, when ripe, are ovoid, deep dull red and about an inch long on stiff green inflorescences below the crown-shaft.

It is only on the uppermost slopes and in the low wind-swept wet mossy forest on the flat top of the mountain that *Lepidorrhachis Mooreana* (*Clino-stigma Mooreanum*) appears. There is no difficulty in distinguishing it because of the green leaf-sheaths swollen at the base not forming as distinct a crown-shaft and the much lower stature. *Hedyscepe* reaches a height of 20-30 feet but *Lepidorrhachis* only 6-8 feet. The young inflorescences are exerted above the enclosing sheath of the outer leaf in this species, expanding when the leaf falls. The small red fruits on a more branched



9. Max Shick climbs a *Hedyscepe* using the technique and type of sugar bag climbing rope formerly much more used when collecting seeds of *Howeia* was an industry.



10. Max holds a fruit cluster of *Hedyscepe*.

green inflorescences are also distinctive. Rats seem to have a predilection for these fruits so that today inflorescences are enclosed in wire mesh when seed is desired else none is obtained.

The palms are thus rather clearly zoned on the mountain: *Howeia Foresticna* along the sandy shores in lowland forest, succeeded by *H. Belmoreana* on the slopes in upland high forest, *Hedyscepe* on the ridges in montane low forest, and *Lepidorrhachis* at the summit in the moss forest. The various forest associations on the island have been described in greater detail by W. R. B. Oliver in "The Vegetation and Flora of Lord Howe Island" (Transactions and Proceedings of the New Zealand Institute for 1916, 49: 94-161. 1917). The palms are illustrated there in several photographs (plates X-XVI — the *Hedyscepe* in plate XIII, fig 2 being mislabelled *Howeia Belmoreana*).

The *Howeia* species were once important in the economy of the island, the seeds having been collected and shipped



11. *Lepidorrhachis Mooreana* on Mt. Gower is less imposing than *Hedyscepe*. Note that the leaf sheaths form a much less prominent crownshaft.

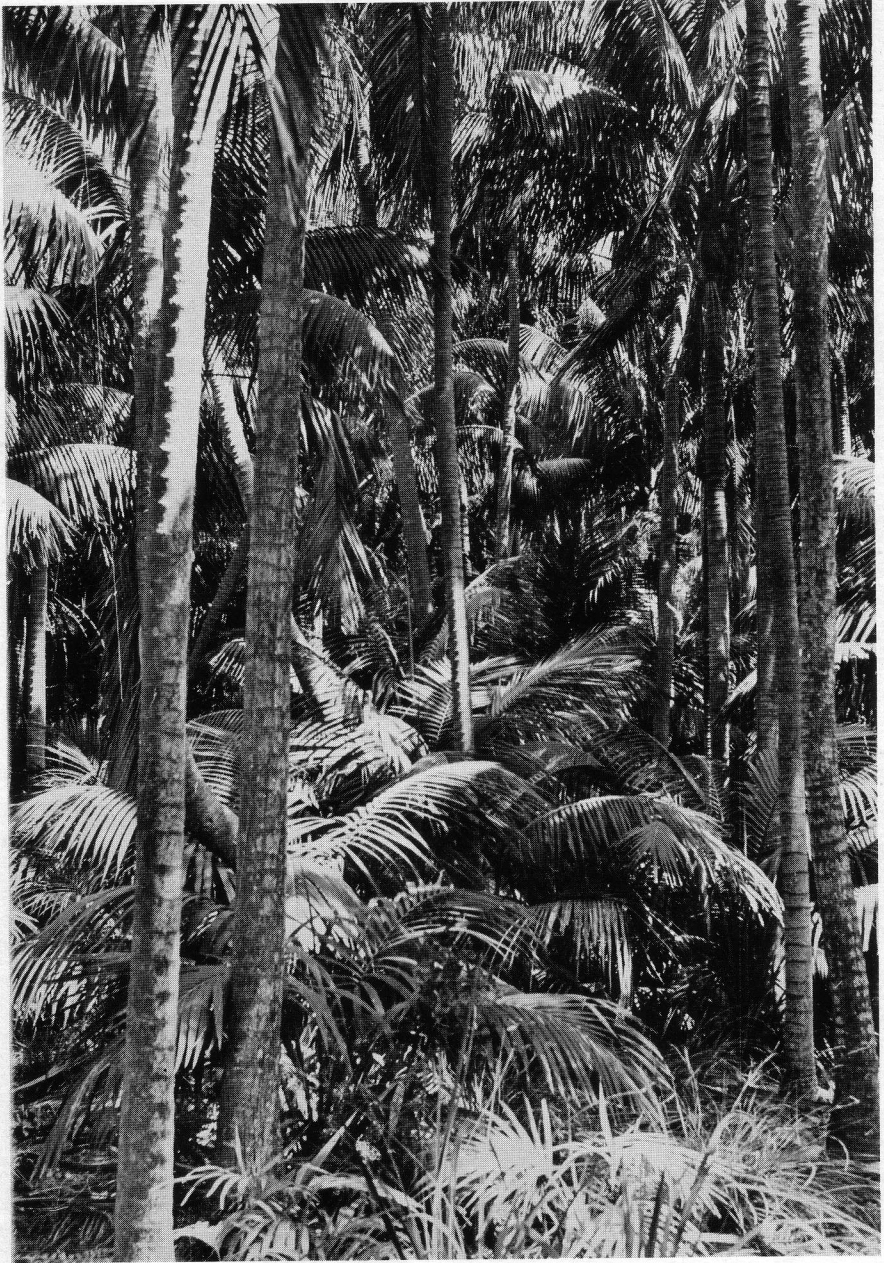


12. *Lepidorrhachis* in young fruit on Mt. Gower.

in quantity under a cooperative "share" arrangement to supply florists with the familiar "Kentia" of commerce. An article in the National Geographic Magazine (H. L. Clark, The Paradise of the



13. Wire netting is needed to keep rats from harvesting fruits of *Lepidorrhachis*.



14. Within the groves of *Howea Forsteriana*, light and shadow make a beautiful pattern.

Tasman, vol. 68: 115-136. 1935) tells the story of the island and palm collecting at greater length. Though collecting seed is less important today than

tourism, many of the older trees are marked with notches on the trunk used by climbers in the past. And my prized "sugar-bag" climbing rope, a gift from



15. A grove of *Howeia Forsteriana*, North Beach at north end of island.

Max Shick which I learned to use on Lord Howe and which proved useful elsewhere in the Pacific, is obviously modelled after the climbing device to be seen in use on p. 119 of the National Geographic article mentioned.

Lord Howe Island deserves the adjectives used to describe it and is understandably a popular place for the

vacationer who likes a quiet relaxed uncrowded place. For palm devotees it has its four palms found nowhere else to recommend it as well. One leaves Lord Howe with more than reluctance but the next step for me was the realization of a long-standing dream, a visit to New Guinea and the islands eastward to Fiji completing the palm circuit.

Dichotomous Branching in Palms?

P. B. TOMLINSON and H. E. MOORE, JR.

Palms are usually thought of as having solitary or clustered unbranched aerial stems each with a terminal cluster of leaves, though in fact some kind of branching does occur basally to produce clustered or colonial palms (Tomlinson, 1964).

A peculiar type of branching, however, occurs with regularity in some palms. This is an apparently equal forking of the axis which, for descriptive purposes, we refer to in this article as "dichotomy," though we are as yet unable to demonstrate whether it is a true dichotomy in the botanical sense or only an apparent dichotomy. The most striking and familiar example is found in some species of *Hyphaene* from Africa, Arabia and India. It is less widely known that several other palms show the

same or a similar type of "dichotomous" branching. We would like to draw attention to some of these examples and to suggest the need for further observation among the palms as well as the need for detailed studies of development to determine the exact nature of the branching pattern or patterns. Because the term dichotomy has a very particular definition botanically, the word and its adjectival derivatives, are placed in quotes in the following paragraphs when used in a more general sense.

That this branching in *Hyphaene* may be a true dichotomy, resulting from an equal division of the crown, and not the result of a precocious development of a lateral branch, is suggested by the observations of a Dutch botanist, Schoute (1909). He had available for study only