

BOOK REVIEWS

Island Biospheres

VIRGIN ISLANDS BIOSPHERE RESERVE BASELINE STUDIES: MARINE AND TERRESTRIAL ECOSYSTEMS OF THE VIRGIN ISLANDS NATIONAL PARK AND BIOSPHERE RESERVE. 1988. Published jointly by the U.S. Department of the Interior National Park Service and by the Virgin Islands Resource Management Cooperative. The individual reports and a 30-minute videotape of the "biosphere reserve" concept can be purchased from Island Resources Foundation, Publications Center, 1718 P Street NW, Suite T-4, Washington, D.C. 20036.

This series of 29 technical reports, totalling over 2,300 pages, is the product of 5 years of work by over 50 researchers from a dozen institutions. The information presented in these reports largely pertains to the ecosystem, including terrestrial and marine components, of a specific island, St. John in the U.S. Virgin Islands. Emphasis in these studies was given to long-term monitoring sites. Despite the details of the habitats and the particular species in the individual reports being relevant to the Lesser Antilles, the combined product can be considered on a global basis as a landmark example of a biosphere program. One hundred fourteen nations are now participating in the UNESCO Man and the Biosphere (MAB) Program. But a case study of a biosphere program in operation has been needed so that resource managers can evaluate the role of biosphere reserves in developing sustainable economies. This series of technical reports may begin to fulfill this need, especially for systems of small islands like Micronesia.

The concept of the biosphere program is that in order to develop a sustainable economic system, it will be necessary to have an understanding of both the regional ecological processes and the socioeconomic system. To be realistic, conservation measures must take into account the local socioeconomic pressures, and the direction of economic development must take into account the local ecological constraints. The basic design for a biosphere reserve includes one or more natural areas in which the region's characteristics may be studied free (as possible) of human influence. This will provide a baseline against which the effects of human activities can be assessed in

other nearby areas. The program includes experimental and demonstration areas where scientists, managers, and local people work together to plan, test, and implement economic uses and activities that are culturally and ecologically appropriate.

The broad-scale perspective of the UNESCO Man and the Biosphere (MAB) Program has led to reports on disparate aspects of the ecosystem at St. Croix, although all relate to resource management and economic development of the small island. Among the 29 technical reports, topics include assessment and long-term monitoring of fish and mollusc populations, long-term monitoring of fisheries yields, the impacts of human activities such as anchoring and coastal development, descriptions and maps of habitats, monitoring of diseases of corals, socioeconomic and cultural role of fishing, historic patterns of land use, sedimentation and reef development, and the basis for a zoning plan for the reserve.

The first volume contains an executive summary and an abstract of each of the reports. The final volume (No. 29) is a synthesis which summarizes what has been learned about ecosystems and the socioeconomic environment of St. John. A synthesis of selected resource management information, an overview of the history, geography, geology, climate, marine and terrestrial habitats, stresses to the habitats, human uses, fisheries, and recommendations for future research and resource management are included.

CHARLES BIRKELAND, *University of Guam*

New Guinea Flora

AN ANNOTATED CHECKLIST OF THE FLORA OF KAIRIRU ISLAND, NEW GUINEA. O. William Borrell. Bulleen, Vic., Australia. Publ. by the author. i-xii, 1-241. 1989. ISBN 0 7316 4463 8. Price \$A20.00. Order from Marcellin College, 160 Bulleen Rd., Bulleen, Vic. 3015, Australia.

O. W. Borrell, or Brother Borrell as he is widely known, is a Research Associate in the University of Melbourne's School of Botany. Between 1974 and 1979, while teaching at St. Xavier's high

school in Kairiru, he began collecting plant specimens and sending duplicates to the Lae Herbarium. With the encouragement of E. E. Henty, he started to write up a floristic checklist of the island. Kairiru is situated off Wewak, Papua New Guinea, in the East Sepik District. It is a little to the east of the 143 meridian (E long.) and a little more than 3° south of the equator. Fascinated by the vegetation, and assisted by many students and other inhabitants of the island, he compiled over the years notes and drawings on as many of the native species as possible. With the assistance also of the staff of the Lae Herbarium and various botanists, the collections were studied, the notes transformed into manuscript, galleys, and finally the present book.

Borrell joins the company of Rev. Fr. Peekel, whose studies of the flora of New Ireland in the pre-World War II era proceeded in a similar manner, and of others who have found value and interest in attempting to document the rich floras of tropical areas in which they worked.

The book is a sturdy paperbound volume of about 9.75×7 inches. Its format is straightforward; after a brief introduction (4 pages, with a map), the checklist commences immediately. This is arranged in systematic order by major groups (Pteridopyta, Gymnospermae, Monocotyledonae, Dicotyledoneae), thereafter by family, in alphabetical order, by genus also in alphabetical order, and by species, in alphabetical order also.

There are no keys, but each species has a short (usually 2–6 lines) description with a brief indication of habitat preference. In each case one or two, sometimes more, plant specimens are cited (most are in numerical sequence in the OWB series). These specimens are all presumably represented at Lae. The scientific name (with authors) is given when known, but sometimes the name is uncertainly applied (indicated by a query) or no name is definitely applied (in which case, species are called A, B, C, etc.). There are 16 full pages of photographs, each page with 4 photos, 8 in color and 8 in black and white. The photos are generally excellent, showing leaves and flowers or fruits, well printed and reasonably sharp. They are not numbered, but each bears a simple legend (simply the species name). Following page 100, the 16 pages of photos are inserted but not numbered; after which page 101 resumes. From page 149 there follow 77 pages of line drawings, also arranged 4 to the page. These drawings are rather varied, but usually contain a leafy branch

with enlarged flower or fruit portraits; sometimes a habitat or habit picture as well is included. There are annotations on each. These seem to be direct reproductions of the field sketches.

The volume concludes with an index of scientific names. Vernacular names are given *passim* in the text, at the end of the description in square brackets. Many species do not have such names (or the names are unknown).

Page vi (just before the Foreword) lists the photographs and gives credit to the photographer (all are by the author except one on p. x by C. Schleicher).

The foreword is by Carrick Chambers, Emeritus Professor (University of Melbourne).

This work will be very handy for botanical and other visitors not only in Kairiru Island but probably in nearby localities on the mainland, for although additional species may be present it is unlikely that the island has any (or at any rate only very few) unique or endemic species. Within the island (24 km long, 35.6 km wide) there are hills rising to 940 m (Mt. Melangis), still within a zone of essentially lowland vegetation, but because of the insular conditions, harboring also some midmontane species. The island makes up about 100 sq. km. of terrain. There are a lake at 800 m alt., permanent small streams descending the slopes, a coastal area with swamp, rocky and sandy terrain, and a lowland area with thermal springs. Kunai (grassland) areas are present but significant areas of primary forest also persist. Cultivation is notable (with about 1500 people in 20 villages). Some mangrove swamps also occur. The soils derive from igneous rocks and are red to yellow-brown friable clays and brown soils. There are some coralline coastal headlands.

There are some few typographical errors but the text for the most part reads well. On p. 1, *Adiantum* should be *Adiantum*; the family name "Denstedtaceae" could be dropped (its correct spelling is *Dennstaedtiaceae*).

As to the scientific accuracy of the work, there is an impression of a commendably high level. It is gratifying to note that exaggerated degrees of attempted precision have been avoided. The liberal use of headings such as "*Aglaiia* sp. A" does justice to the richness of the flora, exhibits the imperfect state of our knowledge, but still points the way to the future solutions.

This work should be viewed therefore as both a summary of what is known—by no means a small amount—and also an inspiring call to continue the exploration and the botanical work

which is needed to document this interesting flora to a fuller extent.

I wish however that the author had given more notes on ethnobotanical uses, however brief; these appear to be largely lacking; some exceptions appear in the cases of food plants, e.g., under *Metroxylon sagu*. It would have been easier to consult the vernacular names if they had been separated by a typographic or other means.

According to a rough count, there are 22 families of Pteridophytes (with 81 species), 5 families of Gymnosperms (with 16 species), and 131 families of Phanerogams present in the island. The total species count is roughly 1380; of which over 1280 are flowering plants.

B.C. STONE, *Bishop Museum*.

Ravages of Man

ALTERATION OF NATIVE HAWAIIAN VEGETATION. EFFECTS OF HUMANS, THEIR ACTIVITIES AND INTRODUCTIONS. Linda W. Cuddihy and Charles P. Stone. University of Hawaii Cooperative National Park Resources Study Unit. 3190 Maile Way, Honolulu, Hawaii. 1990. 138 pp. \$US18.00 (Paperback).

Under the above title appears an account of the ravages of *Homo sapiens*, the most destructive exotic animal species ever to reach the pristine shores of Hawaii, one of the truly remarkable ecosystems on the Planet Earth.

A chain of 18 islands, with many satellite islets and rocks, stretching northwestward across the Tropic of Cancer for over 2400 km, varying from sea level coral islands to gigantic volcanoes up to 4208 m high, and isolated by 3200 km from any major land mass, never connected with any continental land, this archipelago formed a unique biological, biogeographic, and evolutionary situation. Most of its higher land plants and almost all of its land animals were found nowhere else on earth.

Perhaps as *Homo sapiens* reached Hawaii under his own power, he should not be considered an exotic. However, since exotics are defined as organisms introduced by man, and since he brought himself, he still qualifies as an exotic. His destructive behavior, after arriving, has enormously outdone that of any subsequent introduction, as amply shown by the information collected together in this book.

This book is arranged in five parts, plus a truly remarkable list of books and papers cited. After a very short, but adequate geographic, geologic, and biogeographic introduction with maps locating place names used in the book, comes a major chapter on Hawaiian natural vegetation, descriptive and interpretive. This draws on most of the good previous works, with, however, a few curious omissions, several of which are even included in the Literature Cited. Though short, this is without question the most satisfactory available general account of Hawaiian terrestrial natural vegetation. It very adequately shows the results of attempts to picture what the islands were like, vegetation-wise, before the arrival of the Polynesians, 1500 or even 2000 years ago. Of course much of the reconstruction is speculative, but based on innumerable bits of real information, such as fossil pollen, a few fossils, the characteristics of existing plant species, and the present successions on new or recent lava flows.

The second major part deals with what the Hawaiians did to this plant cover before the coming of the Europeans. Estimates varying from several hundred thousand to over a million Hawaiians at one time all seem reasonable, based on different lines of indirect evidence and on accounts by the earliest European visitors. The truly amazing results of recent archeological work show a prehistoric agricultural system, irrigated and dryland, undreamed of only a few years ago. The impact of this on the vegetation was obviously enormous. There is shown to be little or no unaltered vegetation below 500 m elevation, except on new or recent lava. In addition to direct clearing, human-induced fire is shown to have been a major factor in modifying the dry and mesic vegetation types at low or moderate elevations on all except the very rainy steep windward coasts. The valley bottoms were the most densely populated and highly modified situations, even on windward coasts. At the time of European arrival, many landscapes, though probably originally forested, were dry barren grasslands and eroded slopes.

The next section of the book deals with changes during the early post-European period, between 1778 and 1850. Direct exploitation of timber, mostly sandalwood and koa, for export and local construction, and firewood for whaling ships, devastated lowland forest. Agriculture was intensified to supply ships. But by far the most destructive event was the introduction and natu-