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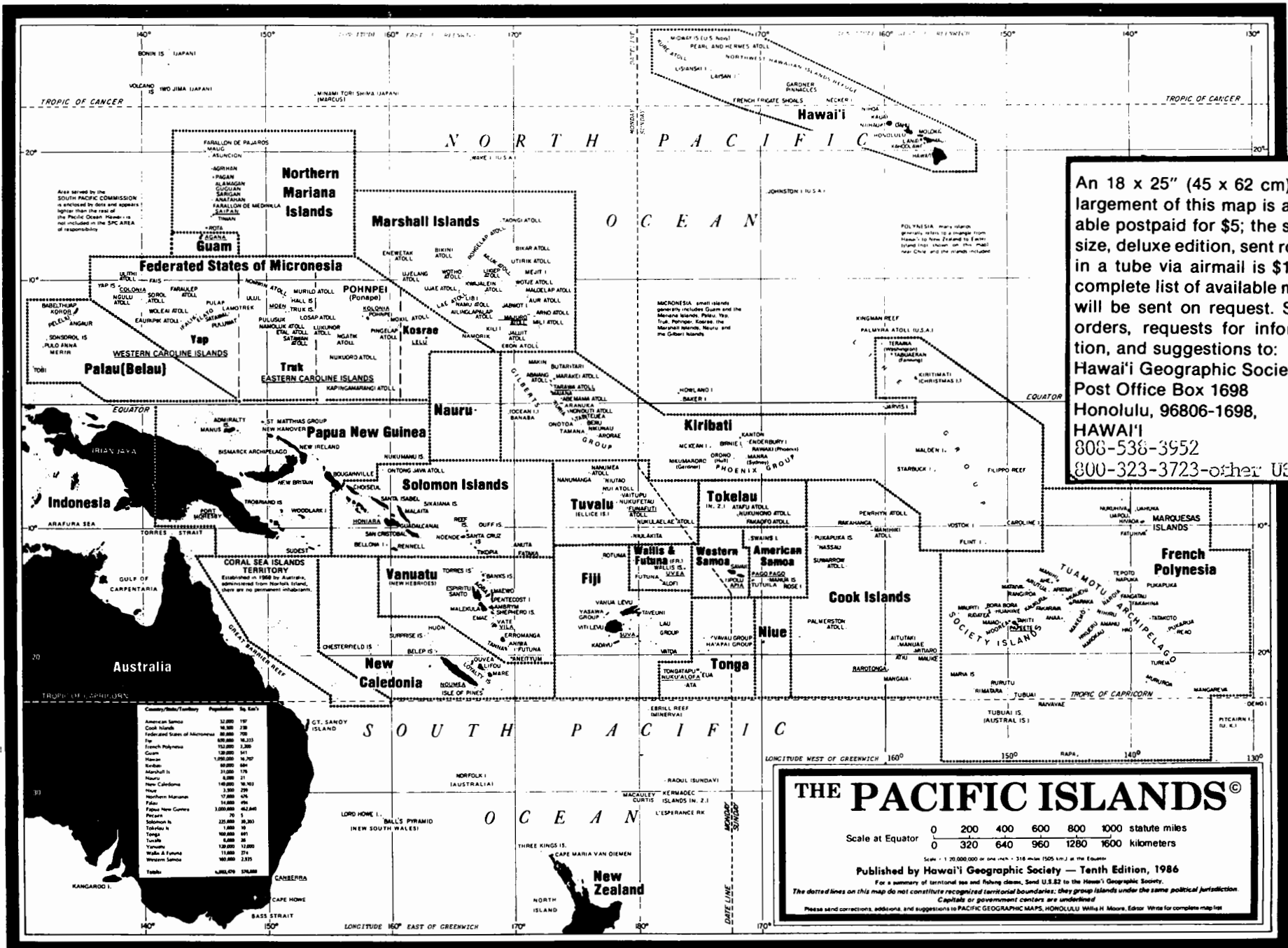
**A BIBLIOGRAPHY OF PLANT CONSERVATION IN THE
PACIFIC ISLANDS: ENDANGERED SPECIES,
HABITAT CONVERSION, INTRODUCED BIOTA**

BY

ROBERT A. DEFILIPPS

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Introduction

To plant conservationists who must fervently gather botanical intelligence against a time-frame of rapidly dwindling plant populations and habitats, the following statements expressed by M.-H. Sachet and F.R. Fosberg (1955, 1971) are both pertinent and self-explanatory:

"The great unsolved problem of modern scientific methodology is that of bibliography, that of knowing what has been accomplished already. In starting any line of investigation the scientist is faced with the choice of ignoring his predecessors, possibly wasting much time on work that has already been done and missing valuable information and ideas, or of spending a large proportion of his time in study of current and past literature on the field. The latter alternative is preferable from almost any viewpoint, though the amount of time involved makes it very expensive...Any worker who, for his own investigation, explores the literature of a field with some thoroughness may do his colleagues a useful service if he presents the results of such a search in the form of an annotated bibliography. His familiarity with the contents of the papers examined may enable him to save later workers an enormous amount of time by indicating very briefly what the paper is, whether it contains original information and what aspect of the field is covered."

Several large regions of the world are plagued by conservation problems shaped around a particular inherent set of geographical, biological and human conditions which have been operational for varying periods of time. Typical of situations facing Latin America are the progress of economic development in Amazonia with its attendant loss of rainforest biodiversity, and the Central American "hamburger connection" involving conversion of forests to grazing land to support the export of cheap beef to the United States. Characteristic of Africa is the struggle with desertification in the Sahel and the terminally desperate fuelwood crisis there. Europe has its centuries-long history of urbanization and the deforestation of Mediterranean lands to contend with, while the similarly industrialized North American continent must deal with large-scale wetland drainage, the effects of high-technology terrain vehicles (swamp buggies, dune buggies, snowmobiles, motorcycles) on the landscape, as well as protecting the endangered cacti indigenous to the deserts from overexploitative commerce.

The 7,500 islands of the Pacific Ocean share a unifying theme in connection with environmental and ecological disturbances, for their island ecosystems are very sensitive and fragile, and easily susceptible to irreversible vegetational and erosional damage as caused by weeds, feral animals, and humankind. As noted by Arthur Dahl (1986), "The total land area of Oceania is very small, but the region has the world's highest proportions of endangered species,...and probably endemic species, per unit area or per inhabitant." In addition to the specialized and endangered flora of such isolated Pacific ecosystems, which are partly within the Cretaceous cradle of evolution of the first, primitive flowering plants, the Pacific islands usher us into their uniqueness by means of consideration of the sandalwood trade, the phenomenon of mass dieback of forests, the practice of total conversion of islands into coconut plantations for the copra trade, the impact of military operations during World War II, studies of radioactivity levels and nuclear detonations on the remote shores of selected atolls, and the serious degradation of the incomparably beautiful and productive coral reefs by crown-of-thorns starfish and silt from accelerated terrestrial erosion.

The geographical scope of this bibliography, on which research was concluded in May 1987, encompasses Micronesia, Polynesia and Melanesia, with boundaries including Clipperton, Cocos, Galapagos, Easter and Juan Fernandez Islands in the eastern Pacific; Norfolk, Lord Howe, New Hebrides, Bismarck, and Admiralty Islands in the south and western reaches of the ocean, and northwards to the Ryukyu and Bonin (Ogasawara) Islands. The coverage excludes a number of islands which are in a comparatively close proximity to

mainland, such as Japan, the Philippines, Borneo, and New Guinea, as well as the more distant and very large islands comprising New Zealand.

A number of people deserve my grateful thanks for their encouragement and assistance during this project. In the Department of Botany, Smithsonian Institution, I wish to thank Dr. F. Raymond Fosberg, Dr. Marie-Helene Sachet, Dr. Mark M. Littler, Royce Oliver; staff of the Plant Conservation Unit, S. Jane Villa-Lobos, Shirley L. Maina, and Olga Herrera-MacBryde; technical aid from Kim Barker, Karen Lee, Chris Tuccinardi and Marie Uehling; and botany interns Jeff Nekola and Orlo C. Steele for contributions to the geographical index and annotations, respectively. I would also like to acknowledge the help of Marsha Sitnik, Office of the Director, National Museum of Natural History, for supplying data on the Galapagos. I am particularly indebted to S. Jane Villa-Lobos for her critical assistance with computerization of the manuscript. Persons who also extended courtesies and supplied references include Mrs. Ruth F. Schallert (Librarian), Stephen D. Davis (IUCN Conservation Monitoring Centre, Threatened Plants Unit, Royal Botanic Gardens, Kew), Dr. Gustav Paulay (University of Washington, Seattle), and Dr. David S. Liem (Derwood, Maryland).

References

- Dahl, A.L. 1986. Review of the Protected Areas System in Oceania. 239 pp. Gland, Switzerland and Cambridge, England: IUCN and UNEP.
- Sachet, M.-H. and F.R. Fosberg. 1955. Island Bibliographies: Micronesian Botany, Land Environment and Ecology of Coral Atolls, Vegetation of Tropical Pacific Islands. 577 pp. Washington, D.C.: National Academy of Sciences - National Research Council.
- Sachet, M.-H. and F.R. Fosberg. 1971. Island Bibliographies Supplement. 427 pp. Washington, D.C.: Pacific Science Board, National Academy of Sciences.

Abbott, W. L. 1975. Ua man ke ea o ka aina i ka pono (The life of the land is perpetuated in righteousness). Defenders 50(6): 460.

A plea for non-violence to Hawaiian environment.

Acosta-Solis, M. 1963. Protection and conservation problems on the Galapagos Islands. Occasional Papers California Academy of Sciences 44: 141-146.

Suggests that all hunting, agriculture and human settlement should be prohibited on the islands or parts of islands to be declared as nature reserves.

Acosta-Solis, M. 1966. Problems of conservation and economic development of the Galapagos, pp. 282-285, in Bowman, R.I., ed., The Galapagos. Berkeley and Los Angeles: University of California Press.

General discussion of primary problems.

Adsersen, H. 1976. A botanist's notes on Pinta. Noticias de Galapagos 24: 26-28.

Analysis of goat damage to fern peat area on Pinta leads to the general conclusion that "three goats brought ashore on a tropical island may give rise to a population that in a mere 15 years can destroy an entire and unique plant community, which has taken thousands of years to become established."

Albert, H. 1986. Structure of a disturbed forest community replanted with Eucalyptus robusta on Wai'alaie Ridge, Oahu, Hawaii. Newsletter Hawaiian Botanical Society 25 (2): 60-69.

Planting eucalyptus on this disturbed site effectively and rapidly regenerated forest cover, but there is evidence that the eucalyptus is spreading beyond the area originally planted.

Amerson, A. B. 1971. The natural history of French Frigate Shoals, northwestern Hawaiian Islands. Atoll Research Bulletin 150: 1-383.

Tern Island vegetation has been variously impacted by a U.S. naval air facility on the island in World War II, by the U.S. Coast Guard LORAN transmitting station, and by the subsequent arrival of weeds.

Amerson, A. B. 1973. Ecological Baseline Survey of Johnston Atoll, Central Pacific Ocean. 365 pp. Washington, D.C.: Ecology Program, Smithsonian Institution.

All original vegetation on Johnston Island was eradicated by the U.S. Navy in 1941-1942 during the building of runways.

Amerson, A. B., Clapp, R.B. and W.O. Wirtz. 1974. The natural history of Pearl and Hermes Reef, northwestern Hawaiian Islands. Atoll Research Bulletin 174: 1-306.

The atoll is part of the Hawaiian Islands National Wildlife Refuge. On Southeast Island, ironwood (Casuarina) trees were planted by the U.S. Navy in 1963 to increase the island's visibility from the ocean. As this was in violation of Refuge regulations, all trees not already dead were destroyed in 1964.

Amerson, A.B. and P.C. Shelton. 1976. The natural history of Johnston Atoll, Central Pacific Ocean. Atoll Research Bulletin 192: 1-479.

Terrestrial vegetation has been heavily disturbed by man.

Amerson, A.B., Whistler, W.A. and T.D. Schwaner. 1982a. Wildlife and Wildlife Habitat of American Samoa. I. Environment and Ecology. 119 pp. Washington, D.C.: U.S. Fish and Wildlife Service.

With the introduction of Western material culture, the only types of vegetation that were not exploited were the cloud forest, littoral scrub, littoral strand and montane scrub. Lists 15 potentially threatened or endangered plant species, 24 species requiring determination of population status, and 20 orchid species needing status studies.

Amerson, A.B., Whistler, W.A. and T.D. Schwaner. 1982b. Wildlife and Wildlife Habitat of American Samoa. II. Accounts of Flora and Fauna. 151 pp. Washington, D.C.: U.S. Fish and Wildlife Service.

Includes brief description and geographical range of potentially threatened or endangered plant species.

Anderson, A. 1979. The Blue Reef. 259 pp. New York: Alfred A. Knopf.

Contains history of detonation of nuclear devices on Enewetak Atoll. "Remarkably, he finds little apparent damage (to life forms) beyond the immediate vicinity of the blast points. Even there, he reports, the flora and fauna are not visibly different from life forms elsewhere in the atoll."

Anderson, J.A. 1972. Return to Eniwetok. Micronesian Reporter 20(3): 28-32.

Briefly describes the nature of devastation resulting from 1954 explosion of hydrogen bomb.

Animal Species Advisory Commission, State of Hawaii. 1974. Reviews of the Five-Year Forest Planting Plan for the State of Hawaii, Fiscal Years 1972-1976 and the Attendant Environmental Impact Statement, Department of Land and Natural Resources. 69 pp. Honolulu, Hawaii: Department of Land and Natural Resources.

During 1972-1976, the Department's intention was to plant in the various Hawaiian islands (Kauai, Oahu,

- Maui, Molokai, Hawaii) 25,000 native trees, and the following amounts of introduced species: 119,000 Australian toon (Toona australis); 164,000 slash pine (Pinus elliottii); 816,000 rosegum (Eucalyptus grandis); and 962,000 saligna (Eucalyptus saligna).
- Anonymous. 1942. Midway plants. Scientific American 167: 170.
Laysan Island vegetation was destroyed by rabbits in 1903.
- Anonymous. 1954. Biological control in the Hawaiian Islands. Pacific Science Association Information Bulletin 6(2): 9-10.
Large areas of the islands are covered with exotic Lantana and Schinus terebinthifolius.
- Anonymous. 1958. The Vegetation of Micronesia. 160 pp. Engineer Intelligence Study No. 257. Washington, D.C.: U.S. Geological Survey, Military Geology Branch.
Contains much data on causes of denudation and disruption of vegetation in all of the island groups.
- Anonymous. 1966. Poro, a new mining and industrial centre in New Caledonia. South Pacific Bulletin 16(4): 25-26.
Regarding this nickel mine, it is ventured that "as a first step in the industrialization of the hinterland, Poro ...offers promising prospects of what New Caledonia could be like tomorrow."
- Anonymous. 1967. Norfolk Island. IUCN Bulletin 2(2): 13.
Stands of native rain forest on Mt. Pitt and Mt. Bates are threatened by encroaching roads projects.
- Anonymous. 1968. Chile: the Juan Fernandez Islands. IUCN Bulletin 2(8): 61.
Native plant species are declining due to introduced biota.
- Anonymous. 1969a. Survey of rare and threatened plant species in the Pacific Basin. Association for Tropical Biology Newsletter 19: 12-13.
Announcement of a survey list to be prepared by Subcommittee on Nature Protection of the Standing Committee on Pacific Botany, Pacific Science Association.
- Anonymous. 1969b. Phosphate prospecting begins. H.Q. Highlights 1 March 1969:4.
Palau phosphate mining could disturb vegetation.
- Anonymous. 1973. Museum miscellany. Ka 'Elele 116-118:4.
Seeds of ohia (Sesbania tomentosa) and other endangered Hawaiian plants have been planted on the Bishop Museum grounds in Honolulu, in hopes of preserving the species.

- Anonymous. 1977. The greening of Kauai. Marathon World 14(2): 10-13.
Concerns the Pacific Tropical Botanical Garden, whose mission is to grow endangered species.
- Anonymous. 1978a. Gaining ground in Galapagos. IUCN Bulletin 9(5): 27.
Striking recovery of vegetation is seen after extermination of feral goats.
- Anonymous. 1978b. Hide-and-see orchid found. Bishop Museum News and Ka 'Elele 5(2): 3.
Rare endemic orchid, Platanthera holochila, rediscovered in Alakai Swamp bog, Kauai, in 1977.
- Anonymous. 1979a. Rare and endangered species planted at Waimea Arboretum. Notes Waimea Arboretum 6(2): 7-10.
Lists names of Hawaiian endangered endemics in cultivation.
- Anonymous. 1979b. Kokia cookei- extinction or survival? Notes Waimea Arboretum 6(1): 2-5.
Discusses Tokyo tissue culture attempts with this endangered Hawaiian malvaceous plant.
- Anonymous. 1979c. Tree-fern logging on Hawaii. Oryx 15(2): 127.
Brief account of the activity is given.
- Anonymous. 1979d. A plea for plants. IUCN Bulletin 10(2): 9,16.
Includes the endangered Hibiscus insularis, endemic to Philip Island and threatened by feral rabbits.
- Anonymous. 1979e. Service lists 32 plants. Endangered Species Technical Bulletin 4(11): 1, 5-8.
Includes, from Hawaiian Islands, Lipochaeta venosa, Haplostachys haplostachya var. angustifolia, Stenogyne angustifolia var. angustifolia and Kokia cookei.
- Anonymous. 1980. 'Ewa Plains 'akoko proposed as endangered. Endangered Species Technical Bulletin 5(10): 5-6.
Concerns Euphorbia skottsbergii var. kalaeloana.
- Anonymous. 1981a. Serianthes nelsonii: an update. Notes Waimea Arboretum 8(1): 8-9.
New record of this plant for Rota; previously known only from four trees on Guam.
- Anonymous. 1981b. Kokia cookei: progress report. Notes Waimea Arboretum 8(1): 8.
Several graftings of Kokia cookei onto K. drynarioides

have been planted at Waimea, Hawaiian Islands.

Anonymous. 1982. The Nature Conservancy in Hawaii. The Nature Conservancy News 32(3): 18-23.

Discussion of unique areas preserved in Hawaii.

Anonymous. 1983a. Les chevres et vaches de Rapa favorisent l'erosion de l'ile. Les Nouvelles (newspaper) 21 January. 3 pp.

Research of Gustav Paulay on Rapa, French Polynesia, concerning destructive action of sheep and goats on vegetation.

Anonymous. 1983b. An island at risk. Oryx 17(3): 109.

Incipient danger in proposed development of Henderson Island.

Anonymous. 1984a. IUCN Bulletin 15(7-9): 91.

Natural features of islands should preclude development.

Anonymous. 1984b. Easter enigma solved. IUCN Bulletin 15(1-3): 6.

Deforestation of Easter Island may have led to the collapse of the island's civilization. Loss of soil fertility as a result of deforestation may have undermined food production and caused out-migration of people. Sophora toromiro, the only Easter Island endemic plant, is extirpated in the wild.

Anonymous. 1985a. Koke'e logging: "maintenance"?. Elepaio 45(12): 131-132.

400 koa trees to be cut in Koke'e State Park, jeopardizing the most diverse mesic forests in Hawaii.

Anonymous. 1985b. Ohi'a woodchipping double talk. Elepaio 45(12): 132-134.

Deprecates the continuance of woodchipping in the United States' last lowland tropical forest, in Hawaii.

Anonymous. 1985c. Plan approved for three songbirds of the northwestern Hawaiian Islands. Endangered Species Technical Bulletin 10(2): 8-10.

Notes that the fragile ecosystem of Laysan Island was severely damaged early in this century after introduced rabbits multiplied and consumed virtually all the vegetation, resulting in a wasteland. As a direct result of this, several endemic terrestrial birds became extinct: the Laysan millerbird (Acrocephalus familiaris familiaris), Laysan honeycreeper (Himatione sanguinea freethi), and Laysan rail (Porzana palmeri).

Anonymous. 1985d. Kauai: the garden island. Hawaii 2(1) (Issue No. 3): 10-15.

Notes the problems of declining sugarcane acreage and

prospects of increased tourism in this relatively unspoiled environment.

Anonymous. 1985e. Northern Islands slated for preservation. Coastal Views(Saipan, Marianas) 7(2): 1,3,10; see also op. cit.7(3): 1,8-9 (1985).

Describes, with photos, four islands in Northern Marianas which will be given conservation protection status: Maug, Uracas, Asuncion, and Guguan. The island of Farallon de Medinilla, which is regularly bombed and strafed as a target range under the military lease agreement with the United States, is no longer considered a candidate for preservation.

Anonymous. 1985f. CNMI Northern islands win preservation. Information Bulletin (Pacific Science Association) 7(6): 57-58.

In November 1985, four uninhabited islands in the Commonwealth of the Northern Mariana Islands (Uracas (Farallon de Pajaros), Asuncion, Guguan, Maug) were set aside for purposes of conservation and preservation, including the plant species. The effects of past human habitation on Sariguan Island, including large populations of rats and wild goats, made that island a poor candidate for preservation status because many native species and habitats have been disturbed or destroyed.

Anonymous. 1986a. Endangered Species Act protection proposed for four plants. Endangered Species Technical Bulletin 9(10): 3-4.

In the Marianas, much of the habitat of Serianthes nelsonii has been destroyed by human activities, to the extent that only 64 of the plants survive on Rota, and only 2 remaining trees are on Guam.

Anonymous. 1986b. Two plants given final Endangered Species Act protection: Lanai sandalwood or 'iliahi. Endangered Species Technical Bulletin 11(2): 3.

Concerns Santalum freycinetianum var. lanaiense, of which only 39 individuals remain on Lanai (Hawaiian Islands). Introduced rats prey on its fruits, and it is also subjected to severe ecosystem disturbances.

Anonymous. 1986c. Found again. Species (Newsletter of IUCN-Species Survival Commission) 6: 20.

Formerly presumed extinct, Abutilon julianae (Malvaceae) from Norfolk Island was last recorded in 1912, but it was recently discovered on Philip Island, where vegetation once devastated by goats, pigs and rabbits is now regenerating.

Anonymous. 1986d. Recovering the Galapagos. IUCN Bulletin 17(4-6): 77.

"The IUCN, in cooperation with the Charles Darwin

Foundation, is attempting to reduce the threat posed to the Galapagos Islands native species by dozens of species introduced by man." Santiago Island still has the serious problem of 100,000 goats and 20,000 pigs.

Anonymous. 1986e. Mullein discovered in Haleakala National Park. Newsletter Hawaiian Botanical Society 25(3): 89. A single common mullein plant (Verbascum thapsus) has been found near roadside at 9000 ft., and park employees are wary that potential infestation can be controlled.

Anonymous. 1987. Thyrsopteris elegans. IUCN Bulletin 18(1-3): SR12-SR13.

This tree-fern, along with 97 other plant species, is endemic to the Juan Fernandez Islands. More than half of these species are threatened by erosion created by the continuing spread of introduced animals, mainly feral cattle, sheep and goats.

Apfelbaum, S.I., Ludwig, J.P. and C. E. Ludwig. 1983. Ecological problems associated with disruption of dune vegetation dynamics by Casuarina equisetifolia L. at Sand Island, Midway Atoll. Atoll Research Bulletin 261: 1-19.

"It is clear that certain areas on Midway are being damaged for continued Navy use and altered for other uses. The cross runway is being invaded rapidly by ironwood (Casuarina). The runway aprons are almost completely invaded and root-heaving of the pavement by ironwood will probably destroy the runway in the 1980's. Similar problems are far more advanced on the Eastern Island runways."

Apple, R. and P. Apple. 1972. Again? Axis deer? Yes! Elepaio 32(9): 83.

Relates history and controversy over introduction of axis deer in Hawaiian Islands.

Atkinson, I.A.E. 1977. A reassessment of factors, particularly Rattus rattus L., influencing the decline of endemic forest birds in the Hawaiian Islands. Pacific Science 31(2): 109-113.

Includes section on introduced browsing mammals (cattle, horses, sheep, goats, English pigs) whose devouring of vegetation affected the food supply of the birds.

Aubert de la Rue, E. 1958. Man's influence on tropical vegetation. Proc. Ninth Pacific Science Congress 20: 81-94.

Examples cited include New Caledonian rain forest on serpentine massifs destroyed in process of mining nickel, chromium and cobalt; and the dangerously threatened limestone primary forests on Walpole I. and Maka-tea I. which are fated to disappear completely to permit the extraction of calcium phosphate deposits below

ground. Concludes with discussion by eight scientists.

Ayensu, E.S. and R.A. DeFilipps. 1978. Endangered and Threatened Plants of the United States. 403 pp. Washington, D.C.: Smithsonian Institution and World Wildlife Fund-U.S.

Lists 646 candidate endangered, 197 candidate threatened, and 270 presumed extinct plant species, subspecies and varieties in the Hawaiian Islands, which altogether comprise 50.6 percent of the indigenous flora.

Ayensu, E.S., Heywood, V.H., Lucas, G.L. and R.A. DeFilipps. 1984. Our Green and Living World: The Wisdom to Save It. 255 pp. Washington, D.C.: Smithsonian Institution Press.

Includes mention of vegetation status on Philip I., Norfolk I., Rose Atoll (American Samoa), Takapoto Atoll (Tuamotus), and Hawaiian Is.

Baines, G. 1984. Environment and resources: managing the South Pacific's future. Ambio 13(5-6): 355-358.

General discussion of critical issues.

Baker, J.K. and S. Allen. 1977. Hybrid Hibiscadelphus (Malvaceae) in the Hawaiian Islands. Pacific Science 31(3): 285-291.

Concerns progeny of H. giffardianus x H. hualalaiensis. Factors of hybrid fertility and gene flow "must be taken into consideration in any program designed to protect the genetic integrity of Hibiscadelphus taxa". Discovery of hybrid Hibiscadelphus has created much interest and controversy among those concerned with maintaining native species and ecosystem integrity.

Baker, R.H. 1946. Some effects of the war on the wildlife of Micronesia. Trans. Eleventh North American Wildlife Conference, pp. 205-213.

Effects of World War II on vegetation of Peleliu and Ulithi are considered.

Bakus, G.J. 1975. Marine zonation and ecology of Cocos Island, off Central America. Atoll Research Bulletin 179: 1-9.

Observes that feral pigs and goats roam the island.

Baldwin, P.H. and G.O. Fagerlund. 1943. The effect of cattle grazing on koa reproduction in Hawaii National Park. Ecology 24: 118-122.

Deleterious effects of cattle on Acacia koa.

Barrau, J. 1958a. Plant introduction and exploration in the South Pacific. South Pacific Bulletin 8(1): 16-19.

Duboisia myoporoides (Solanaceae) is a wild plant of New

Caledonia that potentially could be grown commercially for medicinal purposes.

Barrau, J. 1958b. Beware of this attractive noxious weed. South Pacific Bulletin 8(3):7.

Cryptostegia grandiflora (Asclepiadaceae), the "Indian rubber vine", is invading pastures of western New Caledonia.

Barrau, J. 1959a. Marquesas journey. South Pacific Bulletin 9(1): 18-21, 35.

"In many islands one finds at altitudes varying between 1,500 and 2,400 feet, vast grassy patches containing graminaceae (sic) and ferns of the Gleichenia type. These represent the final stage of the severe degradation of the vegetation caused by man and animals introduced since the arrival of the white man. This degradation often goes hand in hand with bad soil erosion."

Barrau, J. 1959b. The tamanu tree. South Pacific Bulletin 9(2): 44.

Kernels of Calophyllum inophyllum (Guttiferae) are exported to the French cosmetic industry from Tahiti. "There is certainly sufficient demand to demonstrate that local wild plants of the South Pacific Islands can sometimes be a source of cash income."

Barrau, J. 1960a. Plant exploration and introduction in Micronesia. South Pacific Bulletin 10(1): 44-47.

"Guam was on the route of the Spanish galleons which sailed across the Pacific linking Central America and the Philippines. This explains why so many plants of American origin were introduced into this island."

Barrau, J. 1960b. The sandalwood tree. South Pacific Bulletin 10(4): 39, 63.

Recounts the history of sandalwood decimation in Fiji, Juan Fernandez Is. and Hawaii, and lists the species of Santalum in Oceania.

Barrau, J. 1967. Les hommes, les plantes et la mer en Oceanie tropicale. Cahiers du Pacifique 10: 59-78.

Review of the history of introduced Pacific sustenance plants.

Barrau, J. 1981. Indigenous and colonial land-use systems in Indo-Oceanian savannas: the case of New Caledonia, pp. 253-265, in Harris, D.R., ed., Human Ecology in Savanna Environments. London: Academic Press.

Account of the European bastardization of a formerly stable ecosystem.

Barrau, J. 1983. La diffusion humaine des vegetaux et des animaux envisagee d'un point de vue biogeographique. C.

R. Societe Biogeographie 59(1): 19-27.

Island ecosystems such as New Caledonia provide examples of biogeographical changes caused by the diffusion of plants and animals by man.

Barrau, J. and L. Devambe. 1957. Quelques resultats inattendus de l'acclimatation en Nouvelle-Caledonie. Terre et Vie 104(4): 324-334.

Effects of introduced deer and plant species on New Caledonian vegetation.

Bartley, W.S. 1954. Iwo Jima: Amphibious Epic. 253 pp. U.S. Marine Corps Historical Monograph. Washington, D.C.: U.S. Marine Corps.

Includes photos showing effect of war operations on the vegetation during the capture of Iwo Jima in 1945.

Bayliss-Smith, T.P. 1978. Batiki in the 1970's: Satellite of Suva, pp.67-128, in Unesco/UNFPA Fiji Island Reports, No.4. Canberra, Australia: ANU for Unesco.

Most of Batiki once supported a tree cover; now there is dense weedy covering in a fire-climax vegetation.

Beighton, P. 1966. Easter Island people. Geographical Journal 132: 347-359.

Gives location of introduced Eucalyptus groves.

Berger, A.J. 1966. Save Hawaii's unique flora and fauna. Elepaio 27(1): 1-2.

Imputes lack of conservation effectiveness to the State reforestation activities; article followed by rebuttal by Governor Burns.

Berger, A.J. 1974. History of exotic birds in Hawaii. Elepaio 35(6): 60-65.

Includes discussion of habitat destruction caused by sugarcane cultivation, sandalwood harvests, and invasive tropical weeds (Lantana, Myrica, Rubus, Opuntia).

Berger, A.J. 1975a. The Hawaiian honeycreepers, 1778-1974. Elepaio 35 (10): 110-118.

Includes detailed history of Hawaiian forest destruction.

Berger, A.J. 1975b. Hawaii's dubious distinction. Defenders 50(6): 491-496.

Excellent summary of serious degradation of forests, noting there are 4,500 species of exotic (introduced) plants in the Hawaiian Islands.

Berger, A.J. 1977. Aloha means goodbye. National Wildlife 15(1): 28-35.

Disturbance of Hawaiian forests reduces habitats.

- Biddulph, O. and R. Cory. 1952. The relationship between Ca45, total calcium and fission product radioactivity in plants of Portulaca oleracea growing in the vicinity of the atom bomb test sites on Eniwetok Atoll. U.S. Atomic Energy Commission Report UWFL-31: 1-15.
Physiological effects of radiation demonstrated.
- Bishop, L.E. and D. Herbst. 1973. A new Hibiscadelphus (Malvaceae) from Kauai. Brittonia 25(3): 290-293.
The endangered species H. distans is described, with notes on status of close relatives.
- Black, J.M. 1976. Galapagos National Park, problems and solutions. Parks 1(1): 2-4.
Discusses invading plagues of weeds and grazing animals and their destructive effects.
- Blumberg, B.S. and R.A. Conard. 1961. A note on the vegetation of the northern islets of Rongelap Atoll, Marshall Islands, March 1959. Atoll Research Bulletin 84: 4-5.
Changes in the vegetation are similar to those suspected, by some researchers, as due to radioactive fallout.
- Boutilier, J.A. 1981. The nature, scope, and impact of the tourist industry in the Solomon Islands, pp. 37-50, in Force, R.W. and B. Bishop, eds., Persistence and Change. 155 pp. Honolulu, Hawaii: Pacific Science Association.
Contains appropriate cautionary statements in hopes that the nascent Solomon Islands tourist industry will not result in disfigurement and overdevelopment such as befell Waikiki, Hawaiian Islands.
- Bowman, R.I. 1963. The scientific need for island reserve areas, pp. 60-76, in Scientific Use of Natural Areas Symposium, XVI International Congress of Zoology. 103 pp. Miami, Florida: Coconut Grove. Field Research Projects, Natural Areas Studies No. 2.
Using Galapagos and other Pacific islands as examples, presents the scientific importance of islands for evolutionary studies (7 reasons), distributional studies, ecosystem studies, and "living museum" studies.
- Brewer, W.A. 1975. The assault of our reefs and lagoons. Micronesian Reporter 23(3): 16-20.
"Sedimentation of estuaries, bays, and lagoons from accelerated, man-induced erosion is...probably the greatest environmental threat to Micronesia today."
- Brookfield, H. and G. Glaser. 1975. Population and environment in the eastern islands of Fiji. Nature and Resources 11(2): 2-8.
Critical issues include environmental effects of the introduction of new weeds, and also the cessation of

human interference in certain areas.

Browne, M.W. 1987 (Jan. 13). New findings reveal ancient abuse of lands. New York Times, Science Times C1-C3.

Deforestation of Easter Island and other areas is used to support the observation that "there has never been such a thing as a noble savage, and that present-day man is neither more nor less destructive than his forebears."

Bruhin, D. 1985. The two endemic palms of Chile. International Dendrological Society Yearbook 1984: 119-122.

Includes Juania palm of Juan Fernandez Islands.

Bryan, E.H. 1929. The background of Hawaiian botany. The Mid-Pacific 37: 33-40.

Wasteful water runoff from deforested mountains must be counteracted "by covering the mountains with suitable and sufficient vegetation, to replace the native forests which are fast disappearing."

Bryan, E.H. 1931. Kahoolawe, the island of dust. Bishop Museum Special Publication 19: 13-14.

On this Hawaiian island, destructive animals have obliterated native vegetation.

Bryan, E.H. 1949. Economic Insects of Micronesia. 29 pp. Washington, D.C.: National Research Council.

To control the undesirable foreign Lantana camara plant on Ponape, the following insect enemies were introduced: lantana tortricid moth, lantana plume moth, lantana leaf bug, and lantana seed fly.

Bryan, E.H. 1954. The Hawaiian Chain. 71 pp. Honolulu, Hawaii: Bishop Museum Press.

Includes discussion of the upset of nature's balance, foreign introductions, and the sandalwood trade.

Bryan, E.H. 1982. Introduction, pp. ii-v, in Lamberson, J.O., A Guide to Terrestrial Plants of Enewetak Atoll. 73 pp. Honolulu, Hawaii: Pacific Scientific Information Center, B.P. Bishop Museum.

Due to World War II bombardments and later nuclear tests, "Enewetak might be called the most abused atoll in the Pacific."

Bryan, L.W. 1947. Twenty-five years of forestry work on the island of Hawaii. Hawaiian Planters' Record 51(1): 1-80.

Includes photos of introduced trees and revegetation projects, also of roundups of feral sheep and goats.

Bryan, L.W. 1971. Native Hawaiian plants. Newsletter

Hawaiian Botanical Society 10(4): 38-42.

Observations on numerous threatened endemic species.

Bryan, L.W. 1973. Ahinahina. Newsletter Hawaiian Botanical Society 12(1): 1-2.

On the decline and protection of Argyroxiphium sandwicense, the silversword or ahinahina (Compositae).

Buck, M. 1984. The precious forests of Ponape and Kosrae. Glimpses of Micronesia 24(3): 24(3): 33-37.

A forest inventory is being undertaken to provide baseline data or a starting point to monitor the effect of the current period of Micronesian cultural transition, growth, and change, on the forest resource.

Budowski, G. 1972. Book review, of Wiggins, I.L. and D.M. Porter, 1971, Flora of the Galapagos. IUCN Bulletin 3(10): 50.

Review is critical of the book's casual remark that the El Junco lake area on San Cristobal Island might support carefully planned, limited agricultural activity.

Bunge, F.M. and M.W. Cooke. 1984. Oceania, A Regional Study. 550 pp. Washington, D.C.: Headquarters, Department of the Army.

Includes useful background overview of the region.

Burcham, L.T. 1948. Observations on the grass flora of certain Pacific islands. Contributions United States National Herbarium 30(2): 405-447.

On Peleliu I. (Palau Is.), "virtually all vegetation was denuded from the western and southern portions by our (military) operations. However, configuration of the terrain and nature of the coral bedrock are such that this denudation should produce no erosion problems; as a matter of fact, the net result of these activities should be to accelerate soil formation."

Byrne, J.E., ed. 1979. Literature Review and Synthesis of Information on Pacific Island Ecosystems. Washington, D.C.: U.S. Fish and Wildlife Service, Office of Biological Services.

Contains articles by various authors concerning status of ecosystems in the Pacific.

Calvopina, L.H. and F. Calvopina. 1980. Reproductive biology of wild goats and growth and development of vegetation in permanent goat exclosures on Isla San Salvador (Santiago), pp. 87-97, in Annual Report 1980, Charles Darwin Research Station. Santa Cruz Island, Galapagos, Ecuador.

An objective of this project is to establish exclosures to protect endangered plants until goats can be brought under control or eradicated.

- Calvopina, L.H. and T. DeVries. 1975. Estructura de la poblacion de cabras salvajes (Capra hircus L.) y los danos causados en la vegetacion de la Isla San Salvador, Galapagos. Rev. Universidad Catolica 3(8): 219-241.
Concerns the structure of the wild goat population and the damage caused to vegetation on San Salvador Island, Galapagos.
- Campbell, D.J. and M.R. Rudge. 1978. Reply to: Goats on Auckland Islands. New Zealand Journal of Botany 16(2): 293-296.
Instructive for its approach to the feral goat problem in general.
- Campbell, E.M.J. 1952. Land and population problems in Fiji. Geographical Journal 118(4): 477-482.
Population pressure impacts land adversely.
- Campon, R. 1982. Additional Reading. Natural History 91(12): 88-89.
The December 1982 special issue of Natural History on Hawaii: Showcase of Evolution presents many interesting articles, and supplementary reading suggested by Campon covers the major topics.
- Canby, T.Y. 1984. El Nino's ill wind. National Geographic 165(2): 144-183.
Explains causation of storms damaging vegetation, including picture of 1983 cyclone on Aruta Atoll, Polynesia, which arose due to El Nino.
- Canfield, J.E. 1981. Palau: diversity and status of the native vegetation of a unique Pacific island ecosystem. Newsletter Hawaiian Botanical Society 20: 14-20.
Human disturbance factors include the historical burning of uplands, extensive cultivation of lowlands, mining and war damage, and the recent influx of weedy introductions.
- Carew-Reid, J. 1984. The South Pacific Regional Environment Program. Ambio 13(5-6): 377.
General description of the program.
- Carlquist, S. 1965. Island Life. 451 pp. Garden City, New York: Natural History Press.
Includes plant endemism, adaptation to island ecosystems, archipelago effects.
- Carlquist, S. 1970. Hawaii: A Natural History. 463 pp. Garden City, New York: Natural History Press.
Includes biological phenomena relevant to plant conservation such as dispersal, loss of competitiveness, adaptation, breeding systems; special discussions on lobelioids, silverswords, extinction, and conservation.

- Carlquist, S. 1974. Island Biology. 600 pp. New York: Columbia University Press.
Evolutionary processes and patterns in island biota, e.g. Hawaii, New Caledonia, Galapagos, and Juan Fernandez Islands.
- Carlquist, S. 1982a. The first arrivals. Natural History 91(12): 20-22, 24, 26, 28,30.
Chance and deliberate dispersals of plants and animals to the Hawaiian Islands are described.
- Carlquist, S. 1982b. Hawaii: a museum of evolution. The Nature Conservancy News 32(3): 4-11; Bulletin Pacific Tropical Botanical Garden 13(2): 33-39 (1983).
Includes discussion of threats to the vulnerable flora, such as feral mammals.
- Carlson, N.K. 1954. The vanishing fishponds of Molokai. Natural History 63: 248-254.
Ponds are silting-up, due to increased soil erosion on slopes caused by overgrazing and destruction of vegetation.
- Carlson, N.K. 1973. The Kamehameha Schools-Bernice Pauahi Bishop Estate and the forests of the Big Island. Newsletter Hawaiian Botanical Society 12(3): 16-19.
A conservationist offers alternative viewpoint to total preservation of Hawaiian forests.
- Carpenter, R.W. 1959. Maui notes. Elepaio 20(1): 1.
Concerning the feral goats, Park Naturalist Carpenter cheerfully observes that "with all the damage they do, they are interesting to watch and may be seen most anywhere in the crater, and especially on the cliffs, in herds of from 3 or 4 to 30 or 40".
- Carr, G.D. Undated, unpublished manuscripts. Status reports on Argyroxiphium sandwicense DC. var. sandwicense (Asteraceae); Santalum freycinetianum Gaud. var. lanaiense Rock (Santalaceae); Scaevola coriacea Nutt. (Goodeniaceae). Washington, D.C.: U.S. Department of the Interior.
Endangered plants of Hawaiian Islands.
- Carr, G.D. 1982. Unpublished manuscripts. Status reports on Dubautia herbstobatae Carr (Compositae); Dubautia latifolia (Gray) Keck (Compositae); Wilkesia hobbdi St. John (Compositae). Washington, D.C.: U.S. Department of the Interior.
Endangered plants of Hawaiian Islands.
- Carr, G.D. and J.K. Baker. 1977. Cytogenetics of Hibiscadelphus (Malvaceae): a meiotic analysis of hybrids in Hawaii Volcano National Park. Pacific Science 31(2):

191-194.

Hybridization can cause concern for the integrity of taxa. Refer to article by J.K. Baker and S. Allen (1977).

Carr, G.D., Robichaux, R.H. and D.W. Kyhos. 1982. Radiating silverswords. Natural History 91(12): 36-39. Variation, evolution, adaptive radiation in Hawaiian Compositae of the genera Argyroxiphium, Dubautia, and Wilkesia.

Carson, H.L. 1982a. Hawaii: showcase of evolution, an introduction. Natural History 91(12): 16-18. Hawaiian biota are mentioned.

Carson, H.L. 1982b. A cloudy future. Natural History 91(12): 72. "Energy needs in the 1980's have generated new threats to natural areas (of Hawaii), especially to the rain and cloud forests that are still not deeply penetrated by agriculture."

Carter, W. 1940. A neglected aspect of land utilization in Hawaii. Proc. Sixth Pacific Science Congress 4: 903. It is suggested to convert suitable forest lands to smallholder fruit and nut crops, e.g. cashew nuts in upper forests, and coconuts in coastal areas, to augment the Hawaiian food supply, and to quinine plantations for strategic medicine.

Catala, R.L.A. 1953. Protection de la nature en Nouvelle-Caledonie. Proc. Seventh Pacific Science Congress 4: 674-679. In New Caledonia, native and naturalized weeds are rupturing the equilibrium of the land.

Caufield, C. 1985. In The Rainforest. 304 pp. New York: Alfred A. Knopf. Makes reference to Unilever timbering in the Solomon Islands.

Caum, E.L. 1936. Notes on the flora and fauna of Lehua and Kaula islands. Occasional Papers, B.P. Bishop Museum 11(21): 3-17. Lehua is overrun by rabbits and Lantana camara. Aubrey Robinson, owner of island of Niihau, is systematically exterminating the lantana on Lehua to prevent its spread to Niihau (Hawaiian Islands).

Chamberlain, P. 1972. Micro planning. Micronesian Reporter 20(2): 33-43. Account of 1972 master planning for Wotje Atoll in the Marshall Islands; includes 1944 aerial photo of the heavily bomb-cratered island.

Chand, V. and S. Chand. 1980. Medicinal plants of Fiji with special attention to the antifertility plants, p. 235, in Fourth Asian Symposium on Medicinal Plants and Spices. Abstracts. Bangkok: Government of Thailand and Unesco.

An assessment of the traditionally used antifertility plants will attempt to discover their potential as a medicinal source in the Fijian fertility regulation program, since, although family planning is an important program in the nation, abortion is not yet legalized.

Chapline, W.R. 1961. FAO's interest in forest, range and watershed conservation in the Pacific area. Proc. Eighth Pacific Science Congress 6: 226-232.

Recommends studies to develop sound policies of forest grazing, e.g. reseeded forests that have deteriorated due to grazing animals, with native or exotic grasses.

Chapman, M.D. 1985. Environmental influences on the development of traditional conservation in the South Pacific region. Environmental Conservation 12(3): 217-230.

It is suggested that environmental factors such as predictability and extremeness could account for some of the fundamental differences in conservational attitudes observed in different traditional societies. Quite elaborate intentional conservation measures and regulations were in effect on Pukapuka and Tahiti in the old days.

Chapman, V.J. 1967. Conservation of maritime vegetation and the introduction of submerged freshwater aquatics. Micronesica 3: 31-35.

Appropriate cautionary measures must be observed with any introductions.

Chapman, V.J. 1969. Conservation of island ecosystems in the South-West Pacific. Biological Conservation 1: 159-165.

Includes descriptions of some species and vegetation types meriting preservation.

Char, W. 1976. Field studies of the Sesbania complex on the island of Hawaii. Bulletin Pacific Tropical Botanical Garden 6(2):41.

Sesbania tomentosa is subjected to cattle browsing damage at South Point (Ka Lae).

Char, W.P. and N. Balakrishnan. 1979. 'Ewa Plains Botanical Survey. Honolulu, Hawaii: University of Hawaii at Manoa. U.S. Department of the Interior Contract Report.

Includes status of Abutilon menziesii and many other endemics.

- Chave, E.H. and J.E. Maragos. 1973. A historical sketch of the Kaneohe Bay region, pp. 9-13, in Smith, S.V., et al., eds., Atlas of Kaneohe Bay: A Reef Ecosystem Under Stress. 128 pp. Honolulu, Hawaii: University of Hawaii Sea Grant Program.
Population increase, urbanization, replacement of native vegetation by weeds and other introductions, and grazing which facilitated increased erosion and sediment loading in streams, are among causes of deterioration of the ecosystem. The effects of nutrient stresses on the biota include diminishment of algae in the south Bay, and an enormous growth of the "bubble alga", Dictyosphaeria, in mid-Bay.
- Cheatham, N.H. 1968. Forestry and conservation in the Trust Territory of the Pacific Islands. South Pacific Bulletin 18(4): 38-41, 47.
Notes certain problems such as indiscriminate burning of the grassland areas on Babelthuap Island.
- Cheatham, N.H. 1975. Land development: its environmental impact in Micronesia. Micronesian Reporter 23(3): 7-11.
"When planners consider various approaches to land development, they should weigh the estimated ecological impacts and choose alternatives that have the least detrimental impact on the environment."
- Chevalier, J.-P., Denizot, M., Mougin, J.-L., Plessis, Y. and B. Salvat. 1968. Etude geomorphologique et bionomique de l'Atoll de Mururoa (Tuamotu). Cahiers du Pacifique 12: 1-144.
A section on flora and vegetation mentions the adventive plants on this French nuclear testing ground.
- Chilcott, M. 1986. Australian plants campaign. Threatened Plants Newsletter (IUCN) 16: 6-8.
Includes discussion of project on conservation biology of the endangered Hibiscus insularis, a plant reduced to 8-10 living individuals in two small thickets on Philip Island, where its survival is threatened by rabbits.
- Chock, A.K. 1963. Kokee. Newsletter Hawaiian Botanical Society 2(3): 37-39.
Kokee, where much of the endemic vegetation of Kauai is found, is partially being overrun by invasive exotic weeds such as blackberry, firebush, Malabar melastome, and lantana.
- Christensen, B. 1983. Mangroves- what are they worth? Unasylva 35(139): 2-15.
Ecological significance of mangroves is discussed.
- Christensen, C. 1979. Propagating Kauai's Brighamia. Bulletin Pacific Tropical Botanical Garden 9(1): 2-4.

Brighamia citrina var. napaliensis (Lobeliaceae), from the Na Pali cliffs of Kauai, in the first Brighamia ever to flower in cultivation.

- Christensen, C.C. 1982. Hawaiian land snails: past, present, and (?) future. Ka 'Elele 9(2): 3.
"Land clearance for agriculture and deforestation by cattle or other means have resulted in the extinction of many species that were dependent on native vegetation."
- Christensen, C.C. and P.V. Kirch. 1981. Nonmarine mollusks from archaeological sites on Tikopia, southeastern Solomon Islands. Pacific Science 35(1): 75-88.
Since the year 900 BC, mankind has cleared land for agricultural purposes on Tikopia, resulting in displacement of native vegetation. Then, interisland transport of economic plants by humans provided opportunities for the introduction of adventive terrestrial mollusks, of which three species are known to have become established there as of 900 BC.
- Christian, K.A. and C.R. Tracy. 1980. An update on the status of Isla Santa Fe since the eradication of the feral goats. Noticias de Galapagos 31: 16-17.
On this island in the Galapagos, native vegetation appears denser and more diverse since feral goats were exterminated.
- Christophersen, E. and E.L. Caum. 1931. Vascular plants of the Leeward Islands, Hawaii. B.P. Bishop Museum Bulletin 81: 1-41.
Relates history of rabbit swarms on Laysan Island, which denuded the terrain.
- Cieply, M. 1983. East of Eden. Forbes (31 January): 34-36.
Tough economic considerations of Hawaiian land use are discussed.
- Clapp, R.B., Kridler, E. and R.B. Fleet. 1977. The natural history of Nihoa Island, northwestern Hawaiian Islands. Atoll Research Bulletin 207: 1-147.
Discusses population of the threatened Pritchardia remota palm.
- Clapp, R.B. and F.C. Sibley. 1971. Notes on the vascular flora and terrestrial vertebrates of Caroline Atoll, Southern Line Islands. Atoll Research Bulletin 145: 1-18.
Discusses the atoll as a coconut plantation in past years.
- Clapp, R.B. and W.O. Wirtz. 1975. The natural history of Lisianski Island, northwestern Hawaiian Islands. Atoll Research Bulletin 186: 1-196.
Introduced European rabbits starved to extinction in

1915-1916 only after eating "every particle of vegetation" on Lisianski Island. A few plant species have begun to recolonize and revegetate the island.

Clark, H. 1986 (Sept. 21). Forest blaze on Big Island saddens botanists. The Sunday Star-Bulletin & Advertiser (Honolulu): A-12.

Report of an extensive fire which burned nearly 4,000 acres on the North Kona side of the Big Island, Hawaii. "This was the very best example of Hawaii dryland forest. There are nine species in that area on the endangered species list" said Quentin Tomich.

Clarke, J.F.G. 1986. Pyralidae and Microlepidoptera of the Marquesas Archipelago. Smithsonian Contributions to Zoology No. 416. 485 pp. Washington, D.C.: Smithsonian Institution.

Includes photographs depicting areas in the Marquesas where much devastation has been caused by deforestation, slashing, burning, and the introduction of horses, cattle and pigs, as well as showing pockets of original flora at higher elevations.

Clay, H.F. 1961. Narrative report of botanical field work on Kure Island, 3 October 1959 to 9 October 1959. Atoll Research Bulletin 78: 1-4.

Includes photo showing "habitat improvement", land clearance for albatross runways.

Cloud, P.E., Schmidt, R.G. and H.W. Burke. 1956. Geology of Saipan, Mariana Islands. Part 1. General Geology. U.S. Geological Survey Professional Paper 280-A. 126 pp.

"The vegetation of Saipan has been so altered by cultivation, burning, and importation of foreign species that it is difficult for any but the skilled botanist to know what plants are indigenous and which introduced."

Coblentz, B.E. 1978. The effects of feral goats (Capra hircus) on island ecosystems. Biological Conservation 13(4): 279-286.

Numerous deleterious effects of this pest are discussed.

Colinvaux, P.A., Schofield, E.K. and I.L. Wiggins. 1968. Galapagos flora: Fernandina (Narborough) caldera before recent volcanic event. Science 162: 1144-1145.

Exemplifies volcanic eruption as a natural threat to plant populations. The major, multimegaton explosion which collapsed the caldera probably killed or buried the plants on the crater walls, although summit Scalesia forest appeared almost unaffected.

Collins, M. and S. Wells. 1983. The IUCN Invertebrate RDB (Red Data Book)- Plant connections. Threatened Plants Newsletter 11: 19-21.

On Oahu (Hawaiian Islands), the indigenous Achatinella land snails are not adapting to the fast-growing introduced trees.

Colwell, R.N. 1946. The estimation of ground cover conditions from aerial photographic interpretation of vegetation types. Photogrammatic Engineering (June 1946): 151-161.

Includes photos and discussion of interconnecting facts regarding the values of plants, which are not often contemplated by altruistic botanists, e.g.: the dense concentrations of cycads in limestone areas of Okinawa indicate coral deposits at or near the surface of the earth, and such sites are ideally suited, in turn, for borrow-pit excavation of coral needed for surfacing roads and airfields.

Colwell, R.N. 1948. Aerial photographic interpretation of vegetation for military purposes. Photogrammetric Engineering (December 1948): 472-481.

The Pacific War Theatre sustained much vegetation damage in World War II. It is often on the basis of type of barrier posed to the conduct of military operations, that vegetation is classified on aerial photos for military purposes. Article includes stereogram (aerial photo) showing value of tone in differentiating coconut from betelnut palm, and discusses military value of casuarina, nipa palm, hevea rubber and cinchona. "There are four important ways in which vegetation may affect military operations: (1) it may facilitate or impede the movement of foot soldiers and motorized equipment; (2) it may accentuate or conceal evidence of military activity; (3) it may determine the ease with which clearings can be made for the construction of airfields and roads; and (4) it may serve as a source of construction material, fuel, or food."

Connell, J. 1984. Islands under pressure- population growth and urbanization in the South Pacific. Ambio 13 (5-6): 306-308, 310-312.

Discusses effects of population pressure on land.

Connell, J. 1986. Population, migration, and problems of atoll development in the South Pacific. Pacific Studies 9(2): 41-58.

Good precautionary background for considerations of development of atoll resources.

Cook, C.M. 1937. Extinction of land shell faunas of the Mangareva Islands. B.P. Bishop Museum Special Publication 30: 12-13.

Due to the destruction of practically all the native forests, the endemic land snails have been almost entirely wiped out.

Coolidge, H.J., compiler. 1948. Conservation in Micronesia. 70 pp. Washington, D.C.: National Research Council.

Contains 22 papers on conservation subjects by various authors, being a report on two conferences held under the auspices of the Pacific Science Board in Honolulu and Washington, D.C. in 1948.

Cooray, R.G. 1974. Stand Structure of a Montane Rain Forest on Mauna Loa, Hawaii. Island Ecosystems IRP/IBP Hawaii, Technical Report No. 44. 98 pp. Honolulu, Hawaii: University of Hawaii.

Rooting activity of feral pigs destroys Acacia koa seedlings rooted in mineral soil. Pig populations, if allowed to increase, may cause a change in the stability trends of species populations, and an overall deterioration of this native rainforest ecosystem.

Corner, E.J.H. 1972. Urgent exploration needs: Pacific floras. Pacific Science Association Information Bulletin 24 (3 & 4): 17-27.

Lists operational threats in various island groups. The floras of the Admiralty Is., Santa Cruz Is., New Hebrides, Rotuma I. and Wallis I. are particularly inadequately explored.

Corporacion Nacional Forestal. 1976a. Plants, pp. 6-10, in Plan de Manejo Parque Nacional Juan Fernandez. Santiago, Chile: Org. Nacional Unidas para la Agric. y la Aliment., Oficina Regional para America Latina.

Management plan for Juan Fernandez Is. National Park.

Corporacion Nacional Forestal. 1976b. Plants, pp. 9-10, in Plan de Manejo Parque Nacional Rapa Nui. Santiago, Chile: Org. Nacional Unidas para la Agric. y la Aliment., Oficina Regional para America Latina.

Management plan for Rapa Nui (Easter Island) National Park.

Corwin, G., et al. 1957. Military Geology of Pagan, Mariana Islands. 259 pp. H.Q. US Army Japan.

"At present the airfield is pocked with bomb craters up to 18 feet deep and is overgrown by swordgrass, shortgrass, and scattered Casuarina trees."

Costa, M. 1978. The Garden of Eden alive and blooming on Kauai. Latitude 20 (The Hawaiian Air Magazine) 6(3): 18-19, 38-39.

Article concerns the Pacific Tropical Botanic Garden, which cultivates endangered plant species.

Costin, A.B. and R.H. Groves, eds. 1973. Nature Conservation in the Pacific. IUCN Publications New Series, No. 25. 337 pp. Morges, Switzerland: IUCN

(International Union for Conservation of Nature and Natural Resources).

Coulter, J.W. 1931. Population and utilization of land and sea in Hawaii, 1853. B.P. Bishop Museum Bulletin 88:1-33. Useful data for determining vegetational changes occurring since 1853.

Coulter, J.W. 1940. The relation of soil erosion to land utilization in the Territory of Hawaii. Proc. Sixth Pacific Science Congress 4: 897-901.
Soil erosion is due to perturbations of the original vegetative cover, such as pineapple cultivation and overgrazing by wild sheep and goats. Some introduced plants are good soil-binders.

Coulter, J.W. 1946. Impact of the war on South Sea islands. Geographical Review 36(3): 409-419.
Construction of many airplane fields and hangars caused forests to be "cleared and the ground leveled with broken coral. Many people profited by the "white man's war"."

Cowan, I.M. 1976. Biota Pacifica 2000, pp. 86-98, in Scagel, R.F., ed., Mankind's Future in the Pacific. 198 pp. Vancouver: University of British Columbia Press.

The discovery of the Pacific Islands by the forerunners of the Melanesians, Micronesians, and Polynesians is much more recent (in many cases as recent as within the last 1,000 years) than the history of the peopling of Africa, southern Europe and Asia. In the Pacific Islands (and the Americas and Australia), man and fauna did not evolve together as in Europe and Asia, but instead man arrived in the Pacific with a well-developed hunting technology as a totally new force upon the existing biotic equation. The author further notes that man's power of extermination was best in hitherto untouched ecosystems. The subsequent arrival of Europeans in the Pacific in the 1500's was different only in degree to the forerunners of the indigenous Pacific islanders, and included introduction of foreign grazing animals and noxious weedy plants. Mentions forest destruction; Hawaii; Laysan I.; Galapagos.

Coyne, P. 1983. Revegetation attempt on Philip Island, South Pacific. Threatened Plants Newsletter(IUCN) 12: 14.

Enclosures protecting soil from rabbit grazing give evidence of soil's ability to support growth and regeneration of native and introduced plant species.

Craine, C. 1975. Dangerous and endangered species: a

- political update on native ecosystems. Newsletter Hawaiian Botanical Society 14(1): 13-18.
Mainly about the effects of axis deer and cattle on ecosystems.
- Cranwell, L.M. 1984. Lehua Maka Noe, an endangered bog. Newsletter Hawaiian Botanical Society 23: 3-6.
Kauai bog appears threatened by a proposal to build an earthen dam nearby.
- Creutz, E. 1966. The tiare apetahi of Raiatea. Garden Journal (New York Botanical Garden) 16(4): 142-144.
Apetahi raiateensis (Lobeliaceae) is a shrub which grows only on several acres at one locality on Temehani Plateau on the island of Raiatea, which is 100 miles northwest of Tahiti.
- Cribb, P.J. 1986. The slipper orchids of New Guinea and the Solomon Islands. Kew Magazine 3(4): 159-166.
Plate 71. Paphiopedilum bougainvilleanum from Bougainville is a species endangered by over-collecting, and Plate 72. P. wentworthianum from Bougainville and Guadalcanal represents a species which numbers no more than 100-200 individuals in the wild.
- Cribb, P.J., Campbell, J. and G. Dennis. 1985. Paphiopedilum in the Solomon Islands: the rediscovery of "P. dennisii". Orchid Review 93(1098): 130-131.
On Guadalcanal, much of the mountainous locale of a new Paphiopedilum orchid once provisionally named P. dennisii, and now known to be P. wentworthianum, was under shifting agriculture and then covered by secondary growth, since the plant was first discovered in 1962. In 1984 it was rediscovered in an extremely inaccessible part of the island.
- Croft, K.D., Cannon, J.R., Matsuki, Y., Toia, R.F. and A.H. White. 1980. Medicinal plants of the Fiji Islands, p. 227, in Fourth Asian Symposium on Medicinal Plants and Spices. Abstracts. Bangkok: Government of Thailand and Unesco.
Work includes examination of a variety of Alyxia bracteolosa rich in alkaloids; bark alkaloids from Hermandia peltata; and coumarins from Micromelum minutum. Bleekeria vitiensis (Apocynaceae), a Fijian endemic, is believed useful in control of some cancers, and has been shown to contain a mixture of alkaloids which exhibit a wide spectrum of antitumor activity.
- Croft, L., Hemmes, D.E. and J.D. Macneil. 1976. Puukohola Heiau National Historic Site plant survey. Newsletter Hawaiian Botanical Society 15(4-5): 81-94.
Site contains rare endemic pololei fern, Ophioglossum concinnum.

Crosby, W. and E.Y. Hosaka. 1955. Vegetation, pp. 28-34, in M.G. Cline, Soil Survey of the Territory of Hawaii. USDA, Soil Survey Series 1939, No. 25.

Including many interesting facts on introduced trees, including the spreading forests of algaroba (Prosopis chilensis), an exotic first introduced to Hawaii as a few seeds in 1820 by a French priest in Honolulu.

Cruz, F., Cruz, J. and J.E. Lawesson. 1986. Lantana camara L., a threat to native plants and animals. Noticias de Galapagos 43: 10-11.

The aggressive introduced weed Lantana camara (Verbenaceae) is spreading into the breeding ground of the Hawaiian, or dark-rumped, petrel (Pterodroma phaeopygia) on Floreana I. in the Galapagos, forming impenetrable stands to 6 feet tall in which the birds cannot make their nesting burrows. Lantana in the area also threatens several Floreana endemic plant species, Leucocarpus pinnatifidus and Scalesia villosa (both Compositae).

Cumberland, K.B. 1949. Pacific island neighbourhood: the postwar agricultural prospect. New Zealand Geographer 5(1): 1-18.

Notes postwar vegetation changes in Fiji, Samoa, and Cook Islands.

Cumberland, K.B. 1953. Soil erosion and the world food situation. Fiji Soc. Sci. Ind. 4: 1-8.

Notes deforestation in Fiji and Rarotonga.

Cumberland, K.B. 1963. Man's role in modifying island environments in the Southwest Pacific, with special reference to New Zealand, pp. 186-206, in Fosberg, F.R., ed. (1963).

"In pre-European times, the rotation of land for food gardens and exploitation of forest resources for food, fiber, fish poisons, and ornamental coloring matter, had interfered with virtually all primary forest on islands the size of Upolu, Mangaia, Tahiti, Rarotonga and Niue, which had little, if any, truly primary forest when Europeans arrived. In New Caledonia, Viti Levu, and Vanua Levu there were large leeward and seasonally drier areas from which even secondary forest had been removed and replaced with a graminaceous cover." Also discusses effects of domestic animals and exotic weeds in the area.

Curry-Lindahl, K. 1980. Zoogeographic subregions of the Pacific realm as a background for terrestrial ecological reserves: Part 1: General introduction and northern and western Pacific regions. Environmental Conservation 7(1): 125-136; Part 2: Central and eastern regions, etc., with conclusions, op.cit. 7(2): 125-136.

Data from faunal regions and ecological zonation schemes in the islands are used to develop a scientific basis for a system of Pacific natural areas. Presents much useful animal information that can be integrated with considerations of plant species and habitats. Part 2 includes mention of plants and exotic grazing animals in Hawaiian and Juan Fernandez islands.

Curry-Lindahl, K. 1981. Twenty years of conservation in the Galapagos: Assessment, lessons and future priorities. Noticias de Galapagos 34: 8-9.

"It is vital for the future of Galapagos to acknowledge the facts that the islands are ill-adapted to human settlement, unsuitable for agriculture and that livestock has disastrous environmental effects."

Dahl, A.L. 1980. Regional Ecosystems Survey of the South Pacific Area. 99 pp. Technical Paper No. 179, South Pacific Commission and IUCN. Noumea, New Caledonia: South Pacific Commission.

Major assessment review article summarizing all available information on conservation status of South Pacific islands, including listings of rare or endemic plants, and recommended nature reserve sites.

Dahl, A.L. 1984a. Future directions for the Oceanian Realm, pp. 359-362, in McNeely, J.A. and K.R. Miller, eds., National Parks, Conservation, and Development: The Role of Protected Areas in Sustaining Society. 825 pp. Washington, D.C.: Smithsonian Institution Press.

"The peoples of the Pacific Islands have developed cultures and traditions with an important conservation element. However, present trends, based on external sources of food, capital, and labour, are placing much of the natural and cultural heritage of the Pacific region at risk."

Dahl, A.L. 1984b. Oceania's most pressing environmental concerns. Ambio 13(5-6): 296-301.

Includes mention of endangered species.

Dahl, A.L. 1984c. Biogeographical aspects of isolation in the Pacific. Ambio 13(5-6): 302-305.

Biota evolving in isolation result in numerous endemics and highly localized species.

Dahl, A.L. 1985. Status and conservation of South Pacific coral reefs. Proc. Fifth International Coral Reef Congress, Tahiti, 1985, 2: 95 (Abstract).

"The impacts of development in adjacent land areas and of damaging activities on the reefs themselves are probably producing a steady increase in the proportion of damaged and degraded reefs."

- Dahl, A.L. and I.L. Baumgart. 1982. The state of the environment in the South Pacific, pp. 47-71, in SPREP Conference Human Environment. Report. Noumea, New Caledonia: South Pacific Commission.
Includes sections on forestry, conservation of fauna and flora, mangroves, development trends and their environmental consequences.
- Danielsson, B. 1984. Under a cloud of secrecy: the French nuclear tests in the southeastern Pacific. Ambio 13(5-6): 336-341.
Perturbations of environment in Mururoa Atoll, Tuamotus.
- D'Arcy, W.G. 1976. Near extinct plant in Climatron. Missouri Botanical Garden Bulletin 64(3): 5.
Lebronnecia kokoioides Fosberg & Sachet (Malvaceae) reduced to one mature tree and some seedlings in the wild, from Iva-Iva in the Marquesas Islands.
- Davidson, J. 1956. Peter Dillon and the discovery of sandalwood in the New Hebrides. Journal Societe Oceanistes 12(12): 99-105.
Interesting history of sandalwood forest exploitation on Eromanga from 1825 onwards. "From their heavily armed vessels, they (shipmasters) would open fire on villages whose people attempted to interfere with their despoiling of the forest." Similar incidents are recounted in Kent, G. 1972. Company of Heaven: Early Missionaries in the South Seas. 230 pp. Nashville, Tennessee: Thomas Nelson Inc.
- Davis, C.J. and N.L.H. Krauss. 1961. Recent development in biological control of weed pests in Hawaii. Tenth Pacific Science Congress. Abstracts: 204-205.
New insect defoliators are effective on pernicious Lantana camara.
- Davis, S.D., Droop, S.J.M., Gregerson, P., Henson, L., Leon, C.J., Villa-Lobos, J.L., Syngé, H. and J. Zantovska. 1986. Plants in Danger: What do we know? 461 pp. Gland, Switzerland and Cambridge, England: International Union for Conservation of Nature and Natural Resources (IUCN).
A comprehensive, concise guide to information on endangered plants and their habitats around the world, and the efforts to conserve them, with detailed information for all island-groups in the Pacific Ocean.
- Dawson, E.Y. 1959. Changes in Palmyra Atoll and its vegetation through the activities of man, 1913-1958. Pacific Naturalist 1(2): 1-51.
Numerous alterations to vegetation occurred concomitant with the establishment of military base.

Dawson, E.Y. 1962. Cacti of the Galapagos Islands and of coastal Ecuador. Cactus and Succulent Journal(U.S.) 34(4): 99-105.

Notes that Opuntia occurs infrequently on Charles and Chatham islands, probably due to the presence of tame and wild donkeys, and wild goats.

Dawson, J.W. 1981. The species-rich, highly endemic serpentine flora of New Caledonia. Tuatara 25(1): 1-6.

Contains endemism percentages for various localities on the island.

Decker, B.G. 1971. Plants, man and landscape in Marquesan valleys, French Polynesia. Dissertation Abstracts International 31(10): 1 page.

Contains "interpretive insights into the trend and nature of profound ecological change during almost two centuries since effective contact with European and Yankee mariners in the late eighteenth century."

Decker, B.G. 1975. Unique dry-island biota under official protection in northwestern Marquesas Islands (Isles Marquises). Biological Conservation 5(1): 66-67.

The islands are Eiao, Ile de Sable, and Hatutu. Some feral sheep and swine problems evidenced on Eiao.

Degener, O. 1945. Plants of Hawaii National Park Illustrative of Plants and Customs of the South Seas. 314 pp. Ann Arbor, Michigan.

Includes discussion of rare silversword and greensword plants (Argyroxiphium, Compositae).

Degener, O. 1963. Botanists expedition to Lanai. Newsletter Hawaiian Botanical Society 2: 107-108.

Forests of Lanai have become degraded.

Degener, O. 1966. Book review. Phytologia 13(5): 369-370.

A review of G.C. Ruhle, 1966. Waimea Canyon and Kokee, A Nature Guide. "With man's silly introduction of the passionflower (Tacsonia mollissima HBK) that smothers native trees, the raspberry (Rubus penetrans L.H. Bailey) and tibouchina (Tibouchina semidecandra Cogn.) that crowd out native shrubs and herbs, the barn owl which is a veritable flying mongoose, the goat and mouflon that browse along dry cliffs and ledges already subject to erosion without four-footed help, and the blacktailed deer that will devastate the endemic bog flora of Waialeale, man is wrecking within less than 200 years a flora that has taken 20 or so million years to perfect."

Degener, O. 1968. Comments on axis deer. Elepaio 29(3): 27.

Due to their damaging effects on vegetation, the author

refers to introduced goats, sheep, deer, mouflon, buffalo, and pigs as "four-legged vermin".

Degener, O. 1972. Axis deer damages. Elepaio 32 (11): 105-106.

Describes the annihilation of original dry forest of West Molokai by axis deer during the last 20 to 30 years.

Degener, O. 1977. Help save the dwindling endemic flora of the Hawaiian Islands at least as herbarium specimens for museums of the world. Phytologia 37(4): 281-284.

Recounts history of introduction of the pernicious weed Clidemia hirta (Koster's curse), and mentions that the nascent industrial forest resource base appears to favor Queensland maple, toona, and eucalypts.

Degener, O. and I. Degener. 1958. The Hawaiian beach scaevola (Goodeniaceae). Phytologia 6(6): 321.

Scaevola sericea var. faurei introduced to Canton Atoll in 1950-1951 has flourished.

Degener, O. and I. Degener. 1959. Canton Island, South Pacific (Resurvey of 1958). Atoll Research Bulletin 64: 1-24.

Some of the plants introduced to Canton Island have thrived and become naturalized; an update of O. Degener and E.G. Gillaspay (1955).

Degener, O. and I. Degener. 1961a. Green Hawaii: past, present and future of an island flora. Pacific Discovery 14(5): 14-17.

Evolved over a span of 13 million years, the isolated, indigenous Hawaiian flora has now become threatened by man, weeds, and grazing animals. Includes chronology of introduction of goats (in 1778), cattle and sheep (1793), horses (1803), axis deer (1867), as well as the more recently imported pronghorn antelope, mouflon sheep, brush-tailed rock wallaby, Rocky Mountain mule deer, and Columbian blacktailed deer, into Hawaii. Notes that the approximate percentage of native-growth (vegetation) remaining on each island is: Kauai-60%, Oahu-40%, Molokai-28%, Lanai-73%, Maui-34%, Hawaii-18%, and Kahoolawe-native vegetation liquidated. Includes photos of bulldozing destruction, faulty reforestation, and living type specimen of Pritchardia macrocarpa palm at Foster Botanical Garden.

Degener, O. and I. Degener. 1961b. A new Hawaiian variety of Capparis. Phytologia 7(7): 369.

"The precipitous northwest shore about Polihale, Kauai, is arid and, due to the ravages of feral goats and the competition with exotic weeds such as Leucaena glauca (L.) Benth. and Pluchea odorata (L.) Cass., almost de-

void of native plants."

Degener, O. and I. Degener. 1961c. A new Dodonaea from Molokai, Hawaii. Phytologia 7(9): 465.

Local officials are introducing continental game animals such as antelope, deer, and mouflon, and planting areas not suitable to agriculture or animal husbandry, with exotic timber trees such as pines and Samanea saman.

Degener, O. and I. Degener. 1963. Kaena Point, Oahu. Newsletter Hawaiian Botanical Society 2(6): 77-79.

The Kaena dunes area is the last stronghold of Sesbania tomentosa (Leguminosae), a vanishing species.

Degener, O. and I. Degener. 1966. Yes, thank you; we love ferns. Phytologia 13(7): 449-452.

Mentions specific areas on the islands of Hawaii, Oahu, Maui, Lanai, and Molokai, in which the native flora is in danger of extirpation.

Degener, O. and I. Degener. 1968. Review of F.E. Wimmer, Campanulaceae-Lobelioideae Supplementum. Phytologia 17(5): 369-371.

Newly describes the endangered Trematolobelia wimmeri, noting that in the area devastated by the 1959 Kilauea-Iki eruption, "in place of Trematolobelia, the unwelcome exotics Anemone japonica, Buddleja asiatica and Rubus penetrans were taking over the area."

Degener, O. and I. Degener. 1969. Review. Phytologia 19(1): 47-49.

Review of Finnish article on Hawaii, but includes information from the reviewers that "the 40 blacktail deer introduced from Canada in 1961 have multiplied steadily until there are at least 400 in the Kokee area of Kauai."

Degener, O. and I. Degener. 1970. Book review. The genus Pelea, with pertinent and impertinent remarks. Phytologia 19(5): 313-319.

Mentions collecting of the aromatic Pelea anisata for leis. Notes that the "holocaust of the native Hawaiian biota in less than two centuries is a horrible condemnation of our "civilization"."

Degener, O. and I. Degener. 1971a. Natural history of the Bonin Islands. Phytologia 21(2): 97-99.

Review of work by Japanese authors T. Tuyama and S. Asami, The Nature of the Bonin Islands, noting that overgrazed, eroded grasslands due to cattle are depicted therein.

Degener, O. and I. Degener. 1971b. Some Aleurites taxa in Hawaii and a note regarding Argemone. Phytologia 21(5):

315-319.

Aleurites moluccana var. aulanii, the small-seeded kukui (Euphorbiaceae) is newly described; used in seed leis. "Apparently only one tree remains in this once heavily populated valley (Waipio Valley, District of Kohala), badly mauled by careless collectors of its prized seeds."

Degener, O. and I. Degener. 1971c. Pritchardia and Cocos in the Hawaiian Islands. Phytologia 21(5): 320-326.

Many living colonies of loulou palm (Pritchardia) have succumbed to bulldozers. Notes that "Until recent bulldozing on Oahu destroyed them, erect (fossil) molds of the trunks were observable on the north side of the road leading mauka to the U.S. Army Tripler General Hospital."

Degener, O. and I. Degener. 1971d. Review and comments about a thing. Phytologia 21(6): 369-374.

Review of R.E. Warner, ed., Scientific Report of the Kipahula Valley Expedition, sponsored by The Nature Conservancy. Notes that "When Astelia species are terrestrial, feral pigs feed on the rhizomes and young leaves, often destroying the colonies. They also penetrate the higher stretches of cinder-covered terrain where the endemic bracken can survive with its underground rhizomes to the exclusion of other vascular plants. Pigs, with great ease, root out the rhizomes from the friable ash, pumice and cinders for food."

Degener, O. and I. Degener. 1971e. Sophora in Hawaii. Phytologia 21(6): 411-415.

"Today, with Lanai practically a hunting preserve stocked with feral goat, axis deer, mouflon and pronghorn, we surmise the four trees (of Sophora lanaiensis) are no more...We believe this species (Sophora molokaiensis) extinct because, when we collected specimens of the plant in 1961 the area, thanks to the jeep road, was being bulldozed in strips for the planting of Pinus taeda to foster a lumber industry."

Degener, O. and I. Degener. 1972. Wikstroemia pulcherrima var. petersonii Deg. & Deg., from Hawaii. Phytologia 24(2): 151-154.

This variety is being exterminated by trampling cattle except between roadside fences.

Degener, O. and I. Degener. 1973. Santalum paniculatum var. chartaceum Deg. & Deg. Phytologia 27(3): 145-147.

"As many owners of this subdivision (Fern Forest Estates, Puna, Hawaii) are having their lots bulldozed clean of the endemic forest to replant them with Psidium guajava L. for an anticipated jam, jelly and juice

industry, this interesting taxon may not survive many more years."

Degener, O. and I. Degener. 1974a. Appraisal of Hawaiian taxonomy. Phytologia 29(3): 240-246.

Contains a capsule-commentary on history of human intervention in Hawaiian endemic flora and vegetation.

Degener, O. and I. Degener. 1974b. Flotsam and jetsam of Canton Atoll, South Pacific. Phytologia 28(4): 405-418.

Includes map indicating areas disturbed by bulldozing operations on Canton Island.

Degener, O. and I. Degener. 1974c. To save a rare naupaka. Newsletter Hawaiian Botanical Society 13(4): 16.

On sand dunes next to golf course at Waihee, 300 individuals of Scaevola coriacea are still surviving.

Degener, O. and I. Degener. 1975a. Silverswords and the Blue Data Book. Notes Waimea Arboretum 2(1): 3-6.

Historical causes of endangerment of the Hawaiian flora, particularly the decline of Argyroxiphium (Compositae).

Degener, O. and I. Degener. 1975b. Concerning a magazine article. Degener's Leaflet No. 3. 6 pp.

Notice of miscaptioned Hawaiian Argyroxiphium in D.W. Jenkins and E.S. Ayensu (1975).

Degener, O. and I. Degener. 1976. Wikstroemia perdita Deg. & Deg., an extinct(?) endemic of a paradise lost by exotic primates. Phytologia 34(1): 28-32.

A thymelaeaceous species known only from one male tree occurring in a bulldozed Hawaiian Metrosideros forest propels the authors into a swirling continuum of invective directed at "idiotic Primapes", namely the exotic primates (humankind) of the article's title.

Degener, O. and I. Degener. 1977a. Book review. Phytologia 35(3): 220.

Review of M.D. Merlin, 1976. Hawaiian Forest Plants. "Its lasting value is conservational, helping to stem the tide of extermination of Hawaii's botanical treasures."

Degener, O. and I. Degener. 1977b. Hibiscadelphus number KK-HX-1: an international treasure in Hawaii. Phytologia 35(5): 385-396.

Concerns a plant of H. giffardianus which is a direct descendant of the type specimen tree. Lists many introduced exotics becoming weedy in Hawaii Volcanoes National Park.

Degener, O. and I. Degener. 1977c. Some taxa of red-flowered hibiscus endemic to the Hawaiian Islands. Phytologia 35(6): 459-470.

The Hawaiian Hibiscus Society's living collection in Waikiki, Honolulu contained about 20 endemic Hawaiian species. The plantings were suddenly bulldozed without much prior warning, and the area was summarily converted into a scientifically worthless rose garden.

Degener, O. and I. Degener. 1984. To whom it may concern: regarding Kahauale'a Geothermal Project. Notes Waimea Arboretum 11(2): 6-12.

A plea to confine the proposed project, located on the island of Hawaii, to lower elevations where vegetation has already been massacred, rather than to the high elevations where indigenous flora still survives.

Degener, O., Degener, I. and H. Hormann. 1969. Cyanea carlsonii Rock and the unnatural distribution of Sphagnum palustre L. Phytologia 19(1): 1-3.

Cyanea carlsonii on island of Hawaii is threatened by possibility of grazing animals and is evidently nearly extinct. Sphagnum moss formerly was harvested above Waipio to be "used for embalming earth-free seedlings of exotic timber trees before carrying them into the jungle for planting."

Degener, O. and E. Gillaspay. 1955. Canton Island, South Pacific. Atoll Research Bulletin 41: 1-51.

During World War II, there was extensive construction and land-grading on Canton. Article lists ornamental and useful plant seeds later supplied from Hawaii in an attempt to revegetate the bare island with a binding plant cover for induction of land stabilization.

Degeners and Sunadas. 1976. Argyroxiphium kauense, the Kau silversword. Phytologia 33(3): 173-177.

Notes that the plant is "very localized in distribution and exposed to extinction in case a flow of lava should overwhelm the area from the summit of actively volcanic Mauna Loa, or from introduced insects and browsing animals or exotic weeds."

DeGroot, R.S. 1983. Tourism and conservation in the Galapagos Islands. Biological Conservation 26(4): 291-300.

Consideration of tourist impact and how to contain it.

Dening, G. 1982. The Marquesas. 111 pp. Papeete, Tahiti: Les Editions du Pacifique.

Includes photo of Motane I. in which feral sheep appear.

DeRoy, T. 1987. When aliens take over. International Wildlife 17(1): 34-37.

Discusses the effects of feral animal invaders in the Galapagos, including the cows on Isabela I. which trample ferns and brush and thereby promote the spread of

grasslands, and the goats which transform dry areas into deserts.

D'Espeissis, J.L. 1953. Forestry in Fiji. Trans. & Proc. Fiji Society of Science and Industry 3(2): 130-139.

Fijian soil erosion and soil fertility losses are caused by unwise land use, uncontrolled burning, and timber cutting.

Devaney, D.M., Kelly, M., Lee, P.J. and L.S. Motteler. 1976. Kaneohe: A History of Change (1778-1950). 271 pp. Honolulu, Hawaii: Bernice P. Bishop Museum.

Notes that eleven species of threatened and vulnerable Cyrtandra are located in the Kaneohe Bay region of Oahu (Hawaiian Islands): 6 species from Waikane, 3 from Waiahole, and 1 each from Heeia and Kaneohe.

DeVries, T. 1977. Como la caza de chivos afecta la vegetacion en las Islas Santa Fe y Pinta, Galapagos. Rev. Universidad Catolica 5(16): 171-181.

Discusses hunting of goats on two of the Galapagos Islands, Santa Fe and Pinta, and its effect on vegetation recovery.

DeVries, T. and J. Black. 1983. Of men, goats and guava: problems caused by introduced species in the Galapagos. Noticias de Galapagos 38: 18-21.

"The most serious threats to the native vegetation by introduced plants are those caused by guava, cinchona, various grasses and, on some islands, Lantana camara.

Diamond, J.M.(convener). 1982. Implications of island biogeography for ecosystem conservation, pp. 46-60, in Siegfried, W.R. and B.R. Davies, eds., Conservation of Ecosystems: Theory and Practice. 97 pp. South African National Science Programmes Report No. 61. Pretoria: CSIR.

An introduction to current theoretical and practical considerations of biotic extinctions on islands, including such concepts as differential extinction risk; r-strategy and K-strategy types of life-history effects; and the "trophic cascade" effect mode of sequential extinction in relation to reintroduction into the wild.

DiCatri, F. and G. Glaser. 1980. Highlands and islands: ecosystems in danger. The Unesco Courier(April 1980): 6-11.

Land in eastern Fiji must be used for subsistence agriculture, rather than for other purposes.

DiSalvatore, B. 1981. The goat men of Aguijan. Islands 1(1): 86-92.

Aguijan I. (Marianas) is uninhabited by humans, but

supports c. 1,500 feral goats and is occasionally visited by goat hunters. In the early 1940's the Japanese introduced Australian pine as windbreaks, and massive pineapple and sugarcane plantations. Goats had exterminated much original vegetation in their wanderings.

Doan, D.B., et al. 1960. Military Geology of Tinian, Mariana Islands. 149 pp. H.Q. US Army Pacific.

"Land so severely altered by construction or preparation of military installations as to be beyond reasonable possibility of rehabilitation for agriculture or restoration to any semblance of its natural state has been mapped and measured."

Doan, D.B., Paseur, J.E. and F.R. Fosberg. 1960. Military Geology of the Miyako Archipelago, Ryukyu-Retto. 214 pp. H.Q. US Army Pacific.

"In almost every area, any part of the vegetation that is of any use to man has been, and is still being, exploited mercilessly, leaving scarcely a stick of firewood worth carrying home."

Dodd, E. 1976. Polynesia's Sacred Isle. 224 pp. New York: Dodd, Mead & Company.

Volume III of The Ring of Fire trilogy, this book contains much valuable data on the "tiare apetahi", Apetahia raiateensis, a lobelioid endemic to Mt. Temehani on Raiatea, Society Islands.

Dodge, E.S. 1976. Islands and Empires: Western Impact on the Pacific and East Asia. 350 pp. Minneapolis: University of Minnesota Press.

"The first impact of sandalwooding was felt from about 1790 to 1820 in the Polynesian islands and Fiji...Marquesan wood was cleaned out in only three years, beginning in 1814, but sandalwooding in Hawaii and Fiji spanned a decade or two and had a profound effect on the people of those islands."

Doe, G.T. 1971. The battle of Kwajalein. Micronesian Reporter 19(1): 17-25.

Includes photos of vegetation devastation resulting from 1944 battle in the Marshall Islands.

Donaghho, W.R. 1970. Destruction of virgin ohia and koa forest on Hawaii by the Division of Forestry. Elepaio 30(7): 67.

"The present program of forest destruction on Hawaii must stop. No one has the right to ruin our natural resources in this manner."

Doran, E. 1959. Handbook of Selected Pacific Islands. 223 pp. Pacific Missile Range, Point Mugu, California.

Publication No. PMR-MP-59-30.

"In general, the northern half of Eniwetok Atoll, subjected to AEC tests, does not have a "normal" vegetation. Site Irene, for example, is devoid of all vegetation. Heavy fighting in World War II destroyed most of the trees on the larger islets and, indeed, not one tree survived into 1946 on Fred (Eniwetok)."

Doria, J.J. 1979. Haleakala's silversword has a chance. National Parks and Conservation Magazine 53(12): 14-16.

Argyroxiphium macrocephalum, once on the verge of extinction, is protected in Haleakala National Park, Hawaii, but feral goats are serious obstacles to recovery.

Dorst, J., et al. 1972. Conservation, pp. 69-74, in Simkin, T., et al., eds., Galapagos Science: 1972 Status and Needs. Washington, D.C.: Smithsonian Institution.

A call for baseline and control studies of introduced destructive plants and animals, and for population dynamics and monitoring studies of endangered plant species.

Doty, M.S. 1969. The Ecology of Honaunau Bay, Hawaii. 221 pp. Hawaii Botanical Science Paper No. 14. University of Hawaii.

The vegetation at Honaunau has become so weedy that the author concludes there is no compelling botanical reason to bother about preserving it in its present condition.

Doty, M.S. 1973. Chapter 16. Marine organisms, tropical algal ecology and conservation, pp. 183-196, in A.B. Costin and R.H. Groves, eds. (1973).

For the study of invasive species, population dynamics and equilibrium, and algal phytogeography, the algal ecosystems of the Pacific Islands are worthy of conservation as a prelude to planned rational use of their resources.

Douglas, B. 1971. The export trade in tropical products in New Caledonia, 1841-1872. Journal Societe Oceanistes 31: 157-169.

Includes consideration of the sandalwood export trade.

Douglas, G. 1970. Draft check list of Pacific oceanic islands. Micronesica 5(2): 327-463.

Remarks on land use history and conservation status of various islands are included.

Doumenge, F. 1963. L'ile de Makatea et ses problemes. Cahiers du Pacifique 5: 41-68.

Impacts of intensive phosphate exploitation are discussed.

Dousset, R. and E. Taillemite. Undated(post-1978). The Great Book of the Pacific. 279 pp. Dee Why West, Australia: Books for Pleasure.

Sumptuous account of Pacific island cultures, including much on human immigration and development in New Caledonia. There, "the silvery niaouli bush, which produces soothing oil and provides so many cures with its bark, disappears into paper factories, while the nickel works spew their red dust into the air to darken the once crystal clear waters of the rivers...Meanwhile modern medicine is there to cure diseases which were formerly contained by a better adaptation to natural life". (Cf. Prior, I. and J. Stanhope, 1980).

Drahos, N. 1974. New specimen of Guam's rarest tree found. Guam Rail 8(9): 5.

An account of the discovery of the second known living specimen of Serianthes nelsonii (Leguminosae), which was found in 1974 on Pati Point, Andersen Air Force Base, Guam.

Duefrene, P. 1984. The top of Mauna Kea. Aloha 7(4): 62-67.

Discusses the effects of overgrazing cattle, sheep, and goats on the mamane-naio forests, as well as consequences for endangered birds. Mauna Kea is on the Big Island of Hawaii.

Duffy, D.C. 1981. Ferals that failed. Noticias de Galapagos 33: 21-22.

It is refreshing to consider the failure and partial failure of animals which are destructive to vegetation and are, or were, introduced in the Galapagos. Goats failed in only a few places, but feral sheep, deer and rabbits are fortunately exterminated in the islands.

Dugain, F. 1953. Degradation et protection des sols de la Nouvelle-Caledonie. Et. Melan. n.s. 5(7): 69-86.

A cause of soil degradation in New Caledonia is erosion induced by destruction of vegetation.

Dutton, C.E. 1884. Hawaiian volcanoes. U.S. Geological Survey Annual Report 4: 75-219.

Useful for comparison of vegetation status between 1882 and the present time.

Dworsky, S. 1986. Two in the tropics. Horticulture 64(3): 56-62.

The Pacific Tropical Botanical Garden and Allerton Gardens on Kauai (Hawaiian Islands) preserve plant species threatened with extinction in their natural habitat.

Dybas, H.S. 1948. Comments on conservation in Micronesia,

pp. 58-59, in H.J. Coolidge, compiler (1948).

Indicates the least-damaged vegetated areas, as well as general threats, in the Marianas (Tinian, Saipan, Guam) and Carolines (Palau, Ponape).

E., M. 1938. One hundred and fiftieth anniversary of the "Bounty" expedition. Gardeners' Chronicle ser.3, 104: 305-306.

Cutting of trees on Pitcairn Island affected rainfall and soil fertility.

Eckhardt, R.C. 1972. Introduced plants and animals in the Galapagos Islands. BioScience 22(10): 585-590.

Discusses the disastrous effects of many species.

Egler, F.E. 1939. Vegetation zones of Oahu, Hawaii. Empire Forestry Journal 18(1): 44-57.

Includes details of vegetation zones dominated by foreign, fast-spreading plants including guava, and other significant aliens such as Coffea arabica (Kona coffee). The introduced guava zone of vegetation is being invaded by Psidium guajava and Psidium cattleianum var. lucidum, which are themselves guavas.

Egler, F.E. 1941. Unrecognized arid Hawaiian soil erosion. Science 94: 513-514.

Concerns the relationship between vegetation and soil erosion.

Egler, F.E. 1942. Indigene versus alien in the development of arid Hawaiian vegetation. Ecology 23(1): 14-23.

On Oahu, in the absence of anthropic influences, most of the alien plants will be destroyed by the indigenous plants.

Egler, F.E. 1947. Arid southeast Oahu vegetation, Hawaii. Ecological Monographs 17(4): 383-435.

Includes section on grazing factors which inhibit and destroy original vegetation.

Egler, F.E. 1956. Oceania, pp. 611-630, in A World Geography of Forest Resources. The Ronald Press Company.

Includes discussion of the deleterious effects of man in the Pacific forests, subdivided into "Black Men and Brown Men" (Melanesians, Micronesians and Polynesians) and "White Men and Yellow Men" (the equally destructive Europeans and Mongoloid people arriving later).

Eibl-Eibesfeldt, I. 1960. Naturschutzprobleme auf den Galapagos-Inseln. Acta Tropica 17(2): 97-137.

Includes a brief mention, with photo, of the decimating effects of wild goats on Barrington Island (Galapagos), where they consumed all the vegetation except columnar cactus.

- Eliasson, U. 1968. On the influence of introduced animals on the natural vegetation of the Galapagos Islands. Noticias de Galapagos 11: 19-21.
Endemic Scalesia, Calandrinia and Portulaca species are detrimentally affected by feral grazing animals.
- Eliasson, U. 1982. Changes and constancy in the vegetation of the Galapagos Islands. Noticias de Galapagos 36: 7-12.
Threatening introduced plants affecting natural vegetation include Cinchona succirubra on Santa Cruz I. and Kalanchoe pinnata on Floreana.
- Elliott, H.F.I. 1973. Chapter 20. Past, present and future conservation status of Pacific islands, pp. 217-227, in A.B. Costin and R.H. Groves, eds.(1973).
Presents data on frequency of the following types of disturbances known to adversely affect Pacific island ecosystems: 1. airstrips, airports; 2. coconut planting; 3. tourism, private ownership; 4. fowling; 5. mining, salt, phosphates; 6. military, naval, air bases; 7. nuclear and other weapons testing; 8. penal, leper, quarantine stations; 9. cattle and sheep; 10. horses and donkeys; 11. pigs; 12. cats, dogs, foxes; 13. poultry; 14. goats; 15. rabbits; 16. mice; 17. rats.
- Elliott, M.E. and E.M. Hall. 1977. Wetlands and Wetland Vegetation of Hawaii. 344 pp. Report prepared for the U.S. Army Corps of Engineers, Pacific Ocean Division, Fort Shafter.
Detrimental disturbance factors, when present, are noted for 62 wetland sites. Destructive management practices are often applied to Hawaiian wetlands.
- Ellis, W.S. 1986. Bikini: a way of life lost. National Geographic 169(6): 813-834.
Intriguing story of the post-war nuclear test blasts on Enewetak and Bikini atolls (Marshall Is.), and subsequent radioactive contamination clean-up attempts.
- Ellshoff, Z.E.1986. Symposium on control of introduced plants in native ecosystems of Hawaii: summary of presentations. Newsletter Hawaiian Botanical Society 25(3): 79-88.
Contains a summary of the important facts gleaned from the presented papers, along with the Program of the symposium, which occurred on June 10-12, 1986.
- Elton, C.S. 1958. The Ecology of Invasions by Animals and Plants. 181 pp. London: Methuen.
Includes comments on vegetation impacted on Easter Island and Hawaiian Islands.
- Ely, C.A. and R.B. Clapp. 1973. The natural history of Laysan Island, northwestern Hawaiian Islands. Atoll Re-

search Bulletin 171: 1-361.

"Rabbits introduced in 1903...and only the timely arrival of the Tanager expedition in 1923 saved the island from complete devegetation."

Evans, E.C., Murchison, A.E., Peeling, T.J., and Q.D. Stephen-Hassard. 1972. A Proximate Biological Survey of Pearl Harbor, Oahu. 65 pp. NUC-TP 290. San Diego, California: Naval Undersea Research and Development Center.

Includes list of 10 endangered plant species of the area, which are co-existing with introduced European weeds.

Eyde, R.H. and S.L. Olson. 1983. The dead trees of Ilha da Trindade. Bartonia 49: 32-51.
Studies by Professor D. Mueller-Dombois on dieback of Metrosideros collina forests on island of Hawaii are referred to in this study of disappearing trees on an Atlantic Ocean island.

Fagerlund, G.O. 1947. The Exotic Plants of Hawaii National Park. 62 pp., mimeod. Hawaii National Park, Natural History Bulletin, No. 10.

Where the vegetation of an area remains in its original condition, foreign plants have little chance to establish themselves. But much of the Kilauea-Mauna Loa section of Hawaii National Park (244 square miles) has been disturbed and exotic plants have invaded. Birds, especially alien species, are distributing agents for seeds of many alien plants. Includes checklist of 384 exotic species in the park. Report notes the peculiar fact that many of these plants were introduced in order to add variety to the perceived visual "monotony" possessed by the indigenous Hawaiian vegetation. A long bibliography is provided.

Falanruw, M.V.C. 1971. Conservation in Micronesia. Atoll Research Bulletin 148: 18-20.

Originally, man's culture included the practice of limitation of human population; this practice formed a buffer which prevented the destruction of his islands. Other original preservation factors include self-imposed "conservation laws", complex land ownership systems, and various taboos.

Falanruw, M.C. 1976a. Life on Guam: Human Impact. 84 pp. Guam Department of Education.

Workbook on Guam ecological and environmental problems for high schools. Notes that almost two-thirds of Guamanian plant species are introductions from elsewhere.

Falanruw, M.C. 1976b. Life on Guam: Savanna, Old Fields,

Roadsides. 74 pp. Guam Department of Education.

Workbook for high schools, including topics such as savanna burning effects, soil erosion caused by motorcycle tracks, reforestation programs, and the parade of invasive American pests including tangantangan (Leucaena leucocephala).

Falanruw, M.V.C. 1985. People pressure and management of limited resources on Yap, pp. 348-354, in McNeely, J.A. and K.R. Miller, eds., National Parks, Conservation, and Development: The Role of Protected Areas in Sustaining Society. Washington, D.C.: Smithsonian Institution Press.

"Prospects for sustainable development seem dismal."

Faulkner, D. 1981. Palau: a pattern of islands. Oceans 14(4): 36-43.

Management plan threatens island.

Fay, J.J. 1978. Hawaii: extinction unmerciful. Garden 2(4): 22-27.

Elaborates the reasons for, and extent of, plant decimation in the Hawaiian Islands.

Fay, J.J. 1980 (2 September). Endangered and threatened wildlife and plants: proposed endangered status for the 'Ewa Plains 'akoko (Euphorbia skottsbergii var. kalaeloana). Federal Register 45(171): 58166-58168.

This, and the Fay citation following it, are included to demonstrate the process whereby a plant species is officially listed as endangered or threatened pursuant to the U.S. Endangered Species Act of 1973, by means of a notice proposing its status; then a waiting period during which further status information is collected from interested individuals in the scientific, commercial, and public communities; and then the publication of a final rulemaking or determination. All are published under auspices of the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C., in the Federal Register.

Fay, J.J. 1982 (24 August). Endangered and threatened wildlife and plants: determination that Euphorbia skottsbergii var. kalaeloana ('Ewa Plains 'Akoko) is an endangered species. Federal Register 47(164): 36846-36849.

See annotation under preceding citation.

Fernald, E.F. 1981. A decision-making process for application to island resources, pp. 59-68, in Force, R.W. and B. Bishop, eds., Persistence and Change. 155 pp. Honolulu, Hawaii: Pacific Science Association.

Suggests that information on a particular island's potentially and actually destructive alien plants and grazing animals should be included as resource manage-

ment data, since those organisms represent the possibility of causing local ecosystem instability.

Fischer, J.L. and A.M. Fischer. 1957. The Eastern Carolines. 274 pp. Washington, D.C.: Pacific Science Board.

Includes general remarks on condition of natural vegetation on the islands, noting, e.g., that nearly all mature native Exorrhiza palm trees on Truk were chopped down by the Japanese during World War II in order to consume the terminal bud as a green vegetable called "heart of palm".

Fisher, H.I. 1949. Populations of birds on Midway and the man-made factors affecting them. Pacific Science 3(2): 103-110.

Includes effects of war activities on the vegetation.

Fisher, H.I. 1966. Airplane-albatross collisions on Midway Atoll. Condor 68: 229-242.

Depicts bulldozed vegetation on Midway.

Flanders, G. 1985. Preserving Hawaii's heritage. Hawaii 2(3): 22-25.

Short but excellent article discussing panoply of threats to Hawaii's botanical heritage. Cattle destroy more of Hawaii's native plants than any other animal, yet the State of Hawaii leases out 200,500 acres for cattle grazing. Also reports that in one leasing situation, government-owned koa trees, which provided a habitat for the severely endangered alala bird, were felled for sale despite the repeated objections of state foresters. 10 photos.

Forbes, C.N. 1911. Notes on the naturalized flora of the Hawaiian Islands. Occasional Papers, B.P. Bishop Museum 4(5): 23-34.

"Introduced weeds appear along new trails through the native forest in from two to three weeks in places where it would be impossible to find them before."

Forbes, C.N. 1913a. Notes on the flora of Kahoolawe and Molokini. Occasional Papers, B.P. Bishop Museum 5(3): 3-15.

On Kahoolawe (Hawaiian Is.), "goats cause considerable harm by girdling the keawe (Prosopis juliflora), a tree introduced here about fifteen years ago and spread by horses and mules."

Forbes, C.N. 1913b. An enumeration of Niihau plants. Occasional Papers, B.P. Bishop Museum 5(3): 17-29.

Although this Hawaiian island was formerly overrun with goats, most of its available land is now used as sheep and horse pasture.

- Force, R.W. 1981. Introduction: Change, nonchange, and exchange, pp. 1-13, in Force, R.W. and B. Bishop, eds., Persistence and Change. 155 pp. Honolulu, Hawaii: Pacific Science Association.
Includes mention of the consequences of plant disturbance to Palau and Hawaii in this review of man's arrival and subsequent utilization of natural resources in the Pacific.
- Fosberg, F.R. 1936. Plant collecting on Lanai, 1935. Mid-Pacific Magazine 49: 119-123.
Discusses rehabilitation of Lanai vegetation.
- Fosberg, F.R. 1937a. An aggressive Lantana mutation. B.P. Bishop Museum Special Publication 31: 18.
An aggressive form of Lantana camara has spread to large areas in Manoa and Palolo valleys, Oahu. The Oahu mutation has corolla white, with yellow tube, and more prickly stems than the typical form. It is replacing the normal form rapidly, due to greater shade tolerance, greater seed production, and greater resistance to parasites.
- Fosberg, F.R. 1937b. Immigrant plants in the Hawaiian Islands. I. University of Hawaii Occasional Papers No. 32: 3-11.
Includes objectionable Compositae: Pluchea, Eupatorium, and Elephantopus.
- Fosberg, F.R. 1942. Uses of Hawaiian ferns. American Fern Journal 32(1): 15-23.
It is likely that wild hogs and other introduced animals are responsible for the destruction of the "pala" (Marttia douglasii), which was formerly rather common in Hawaii, and is today rare.
- Fosberg, F.R. 1948a. Immigrant plants in the Hawaiian Islands. II. University of Hawaii Occasional Papers No. 46: 1-17.
An early warning of many exotics which have since become pernicious smotherers of the indigenous vegetation.
- Fosberg, F.R. 1948b. Island floras, pp. 18-21, in H.J. Coolidge, compiler (1948).
Discusses the peculiarities and vulnerability of island floras in the Carolines and Marianas, and the need to conserve irreplaceable plants.
- Fosberg, F.R. 1948c. Derivation of the flora of the Hawaiian Islands, pp. 107-119, in Zimmerman, E.C., Insects of Hawaii, vol. 1. Introduction. Honolulu, Hawaii: University of Hawaii Press. (Reprinted as pp. 396-408 in Kay, E.A., ed., 1972. A Natural History of the Hawaiian Islands- Selected Readings. Honolulu, Hawaii:

University of Hawaii Press.)

"An average of one successful arrival and establishment every 20,000 to 30,000 years would account for the flora..., granting an estimate of 5 to 10 million years of above-water history for the entire Hawaiian chain."

Fosberg, F.R. 1949. Flora of Johnston Island, Central Pacific. Pacific Science 3(4): 338-339.

By 1946, "there was apparently no original vegetation remaining, the whole island being occupied by runways and buildings with disturbed ground in the open places and along paths and roadsides."

Fosberg, F.R. 1950. The problem of rare and vanishing plant species. Proc. Papers International Technical Conference, Protection of Nature, Lake Success 1949: 502-504.

Many Pacific plants have nearly vanished, e.g. Capparis carolinensis from island of Peleliu represented by one living specimen in 1946, and causes of such diminishment are generally goats, temporary agriculture, and weedy exotic plants crowding out the indigenous flora.

Fosberg, F.R. 1951. Micronesia, pp. 515-517, in IUCN, The Position of Nature Protection Throughout the World in 1950. Brussels: IUCN.

"Old habits, such as that of burning the vegetation, are destructive...the natives do not understand why they should not burn grass, brush, and forest."

Fosberg, F.R. 1953a. A conservation program for Micronesia. Proc. Seventh Pacific Science Congress 4: 670-673. Discussion of atoll and high island conservation problems.

Fosberg, F.R. 1953b. The naturalized flora of Micronesia and World War II. Eighth Pacific Science Congress Abstracts, pp. 174-176.

Introduction and spread of plant species as a result of the war.

Fosberg, F.R. 1953c. Vegetation of Central Pacific atolls: a brief summary. Atoll Research Bulletin 23: 1-26.

Includes comments on changes caused by activities of man.

Fosberg, F.R. 1954a. Vanishing island floras and vegetation. IUCN Technical Meeting, Caracas, 1952 (Reports), pp. 538-543.

Protection of lowland flora, which often contains interesting species (not just widespread plants as so often assumed), is encouraged, especially for Hawaiian Is., Palau, Fiji, and the Solomons.

Fosberg, F.R. 1954b. The protection of nature in the islands of the Pacific. VIII Congres International de Botanique, pp. 104-116.

With the advent of the Europeans, several events occurred which ultimately resulted in widespread disaster for nature in the Pacific: (1) the release of goats and other hoofed animals, (2) the introduction of steel tools, and (3) the introduction of a commercial economy as against the originally developed subsistence agriculture. To these events were later added the effects of World War II and considerations of human population increases.

Fosberg, F.R. 1955. Northern Marshall Islands Expedition, 1951-1952. Narrative. Atoll Research Bulletin 38: 1-36.

Includes notes on adventive, weedy vegetation which rapidly colonized such islands as Wake after World War II.

Fosberg, F.R. 1956a. The protection of nature in the islands of the Pacific. 8me Congres International de Botanique C.R. Seances 21-27: 104-117.

Progress in conservation on Micronesia, particularly Guam, is reported.

Fosberg, F.R. 1956b. Vegetation, pp. 185-220, in Military Geography of the Northern Marshalls. 320 pp. H.Q. US Army Forces Far East.

Discussion of 21 atolls includes revegetation of areas denuded either naturally or by military operations, and rates of change in plant communities, often smothered by weeds.

Fosberg, F.R. 1957a. Vegetation of the Oceanic Province of the Pacific. Proc. Eighth Pacific Science Congress 4: 48-55.

Includes numerous general and specific observations on vegetation alteration and disruption in the Pacific islands.

Fosberg, F.R. 1957b. The naturalized flora of Micronesia and World War II. Proc. Eighth Pacific Science Congress 4: 229-234.

During the war, Angaur and Peleliu were almost completely burned over; scarcely an acre of Saipan remained undisturbed; and the northern plateau of Guam was heavily impacted. These and other areas afforded habitats for new invasions of weeds after the cessation of hostilities.

Fosberg, F.R. 1959a. Long-term effects of radioactive fallout on plants? Atoll Research Bulletin 61: 1-11. Condensed in Nature 183: 1448 (1959).

Islets in Utirik, Ailinginae, Rongelap, and Rongerik

atolls display a vegetation in very poor condition with visible abnormalities, after the Castle Bravo bomb test on Bikini Atoll on March 1, 1954.

Fosberg, F.R. 1959b. Vegetation and flora of Wake Island. Atoll Research Bulletin 67: 1-20.

Includes discussion of regeneration of the Wake vegetation after three years of almost daily bombardment in World War II.

Fosberg, F.R. 1959c. Conservation situation in Oceania. Proc. Ninth Pacific Science Congress 7: 30-31.

In the past 4 years, 5 conservation areas were set aside in Guam to preserve examples of forest; mouflon, or wild sheep, were introduced on Lanai and Kauai (Hawaiian Is.); the French administration in New Caledonia decided to go ahead with construction of a dam which would flood the famous Plaine des Lacs, with its remarkable aggregation of rare and endemic plants; Christmas Island was used for nuclear weapons testing; colonization and sheep ranching were encouraged on Juan Fernandez Islands National Park (Chile); and, goats were introduced into Henderson Island.

Fosberg, F.R. 1959d. Vegetation, pp. 168-172, in Tracey, J.I., et al. (1959).

On Guam, "A long history of disturbance by the Guamanians, by frequent typhoons, and by the destructive effects of World War II and subsequent military activities, has left little undisturbed primary forest on the island."

Fosberg, F.R. 1960a. The vegetation of Micronesia: 1. General descriptions, the vegetation of the Marianas Islands, and a detailed consideration of the vegetation of Guam. Bulletin American Museum of Natural History 119, Article 1: 75 pp. + 40 plates.

Abundant information on disturbance, secondary forests, succession, deterioration of vegetation through effects of introduced plants, wartime activities, land clearance, and intensive pre-World War II phosphate mining.

Fosberg, F.R. 1960b. Vegetation, pp. 165-187, in Doan, D.B., et al., Military Geology of the Miyako Archipelago, Ryukyu-Retto. H.Q. US Army Pacific.

"The vegetation of even the completely uncultivable areas of limestone with practically no soil has been profoundly influenced by man."

Fosberg, F.R. 1960c. Vegetation, pp. 51-84, in Foster, H.L., et al., Military Geology of Ishigaki-Shima, Ryukyu-Retto. H.Q. US Army Pacific.

The vegetational aspect of this island is changing due to introduction of exotic plants, and active land

clearing for pineapple plantations has greatly reduced the amount of forest at base of mountains.

Fosberg, F.R. 1961. Typhoon effects on individual species of plants, pp. 57-68, in Blumenstock, D.I., ed., A report on typhoon effects upon Jaluit Atoll. Atoll Research Bulletin 75: 1-105.

Devastating impact of Typhoon Ophelia on January 7, 1958.

Fosberg, F.R. 1963a. Grazing animals and the vegetation of oceanic islands, pp. 168-169, in Unesco, Symposium on the Impact of Man on Humid Tropics Vegetation (Goroka, Papua New Guinea). 402 pp. Djakarta.

Consideration of vegetation disturbance by grazing quadrupeds.

Fosberg, F.R. 1963b. Disturbance in island ecosystems, pp. 557-561, in Gressitt, J.L., ed. (1963).

Mentions Hawaiian examples of ecosystems extremely susceptible to disturbance.

Fosberg, F.R., ed. 1963 (Reprinted 1965). Man's Place in the Island Ecosystem: A Symposium. 264 pp. Honolulu: Bishop Museum Press.

Fosberg, F.R. 1966. The volcanic island ecosystem, pp. 55-61, in Bowman, R.I., ed., The Galapagos. Berkeley and Los Angeles: University of California Press.

Includes brief discussion on status of Galapagos Islands ecosystems.

Fosberg, F.R. 1967. Some ecological effects of wild and semi-wild exotic species of vascular plants, pp. 98-109, in Towards A New Relationship of Man and Nature in Temperate Lands, Part III. Changes due to Introduced Species. IUCN Publications New Series, No. 9. Morges, Switzerland: IUCN.

Review article includes mention of invasion of Eupatorium adenophorum on Molokai, Hawaiian Is.

Fosberg, F.R. 1968a. Some relations between ecosystem size and cultural evolution, pp. 702-704, in Misra, R. and B. Gopal, eds., Proceedings of the Symposium on Recent Advances in Tropical Ecology, Part II. Varanasi, India: International Society for Tropical Ecology.

Resistance of traditional cultures to introduced cultures in the Pacific has tended to break down, and the ecological effects of such deterioration include accelerated soil erosion, siltation of marine environments, and abandonment of taro culture and the highly evolved irrigation systems that accompany it.

Fosberg, F.R. 1968b. Systematic notes on Micronesian

plants. Phytologia 15(7): 496-502.

Mimosa invisa from Saipan and Palau, an "unpleasant, viciously spiny Brazilian creeper,...should be ruthlessly eradicated wherever found."

Fosberg, F.R. 1971. Endangered island plants. Bulletin Pacific Tropical Botanical Garden 1(3): 1-7.

Includes biological reasons for fragility of island ecosystems, and adaptations developed by indigenous Hawaiian flora in isolation from predators.

Fosberg, F.R. 1972a. Man's effects on island ecosystems, pp. 869-880, in Farvar, M.T. and J.P. Milton, eds., The Careless Technology: Ecology and International Development. Garden City, New York: Natural History Press.

Explains destructive acts of man on vegetation.

Fosberg, F.R. 1972b. The axis deer problem. Elepaio 32(9): 86-88.

"Scientifically (speaking),... introducing deer on the island of Hawaii will, in the long run, be a catastrophe with no compensating benefit."

Fosberg, F.R. 1973a. Temperate zone influence on tropical forest land use: a plea for sanity, pp. 345-350, in Meggers, B.J., Ayensu, E.S., and W.D. Duckworth, eds., Tropical Forest Ecosystems in Africa and South America: A Comparative Review. Washington, D.C.: Smithsonian Institution Press.

"Tropical peoples suspect, understandably, that attempts to introduce ideas of conservation and environmental preservation are merely designed to deny them material benefits from rapid exploitation of their resources. Yet, it is distressing to see them repeating the same mistakes that have brought about serious degradation of temperate environments, perpetuating them, in fact, with the increased tempo characteristic of the tropics and augmented by modern technology." Notes stream siltation on Hamakua Coast of Hawaii due to sugarcane plantations on sloping ground inviting runoff.

Fosberg, F.R. 1973b. On present condition and conservation of forests in Micronesia, pp. 165-171, in Planned Utilization of the Lowland Tropical Forests. 263 pp. Pacific Science Association Symposium, 1971, Cipayung, Bogor, Java.

"Forest types which may be regarded as "natural", even though they result from modification of original forest by man, still exist on Guam, Rota, Alamagan, and possibly to a very limited extent on Saipan, in the Marianas, on Babeldaob in the Palaus, on Yap, Truk, Ponape and Kusaie, and on a few of the atolls in the Carolines."

Fosberg, F.R. 1973c. Chapter 13. Vascular plants - widespread island species, pp. 167-169, in A.B. Costin and R.H. Groves, eds. (1973).

Many widespread plant species of the Pacific Islands are polymorphic, comprising several recognizable varieties and forms. These variants should not be destroyed, and many of them have unfortunately already been lost.

Fosberg, F.R. 1973d. Chapter 19. Past, present and future conservation problems of oceanic islands, pp. 209-215, in A.B. Costin and R.H. Groves, eds. (1973).

Discusses catastrophic effects of introduced plants and animals on these islands, where competition from an indigenous equilibrated biota is of minimal effect against the aliens.

Fosberg, F.R. 1975. The deflowering of Hawaii. National Parks and Conservation Magazine 49(10): 4-10.

Recommends that large samples of all kinds of habitat must be preserved if a significant number of Hawaii's endangered plant species is to be saved from extinction.

Fosberg, F.R. 1977. An irresponsible scientific expedition. Atoll Research Bulletin 219: 4-5.

Reports fire-vandalism to Pisonia forest on Vostok Island caused by expedition mounted by government of the Gilbert and Ellice Islands.

Fosberg, F.R. 1979. Tropical floristic botany - concepts and status - with special attention to tropical islands, pp. 89-105, in Larsen, K. and B. Holm-Nielsen, eds., Tropical Botany. 453 pp. London: Academic Press.

Makes the useful distinction within destructive weeds, between those able to invade closed, rarely even undisturbed, vegetation, such as Clidemia hirta, Psidium cattleianum, P. guajava, Paederia foetida and Mikania scandens sensu lato, and the category of weeds that are able to occupy open or disturbed areas (habitats) created by man through agricultural, grazing, logging and other activities. Many island endemics have been killed out by plants of the first category in closed vegetation.

Fosberg, F.R. 1983. The human factor in the biogeography of oceanic islands. C.R. Soc. Biogéographie 59(2): 147-190.

Discusses introduction of exotic plants and animals; deforestation; agriculture; fire; and also individually describes the degree of alteration by man which has occurred on each of the principal oceanic islands. "Since the original biogeographic patterns on most islands are not or little understood, ...the nature and effects of man's activities should be carefully and continually documented."

Fosberg, F.R. 1984a. Henderson Island saved. Environmental Conservation 11(2): 183-184.

Stimulated by environmental concerns, the British government declined an offer to partially convert the island to a private development.

Fosberg, F.R. 1984b. Phytogeographic comparison of Polynesia and Micronesia, pp. 33-44, in Radovsky, F.J., Raven, P.H. and S.H. Sohmer, eds., Biogeography of the Tropical Pacific. Bishop Museum Special Publication No. 72. 221 pp.

Includes discussion of anthropic (human) plant geography, and reconstruction of original, pre-human vegetation on high and low islands. Notes that "On oceanic islands,...man's arrival was comparatively recent, and he had already reached the stage where he could build boats, make tools and weapons, use fire, domesticate animals and plants, and thus produce much of his own food." Observes that "if we do not do something soon to protect the remaining vestiges of natural vegetation in the islands, Pacific botany will continue only as herbarium paleobotany."

Fosberg, F.R. 1985. Present state of knowledge of the floras and vegetation of emergent reef surfaces. Proc. Fifth International Coral Reef Congress, Tahiti 2: 138.(Abstract)

"The sad fact, also, is that on almost all coral islands and limestone portions of "high" islands phosphate mining, plantation agriculture, military activities, nuclear weapons testing, introduced feral herbivores and weedy exotic plants, as well as overly dense human settlement have changed the vegetation, eliminated species, and blurred the biogeographic patterns so that island biogeography has become a difficult and uncertain science."

Fosberg, F.R. and G. Corwin. 1985. A fossil flora from Pagan, Mariana Islands. Pacific Science 12: 3-16.

Among other exotic flora, the Jatropha gossypifolia introduced by the Japanese in the 1930's has spread and now dominates large areas in central Pagan.

Fosberg, F.R. and D. Herbst. 1975. Rare and endangered species of Hawaiian vascular plants. Allertonia 1(1): 1-72.

An extensive listing of endangered and threatened plant species, subspecies and varieties, representing one of the more fragile and vulnerable floras on earth.

Fosberg, F.R. and M.-H. Sachet. 1962. Vascular plants recorded from Jaluit Atoll. Atoll Research Bulletin 92: 1-39.

Useful for tracing the spread of introduced plants throughout the Marshall Islands, from pre-German and Japanese times.

Fosberg, F.R. and M.-H. Sachet. 1966. Lebronnecia, gen. nov. (Malvaceae) des Iles Marquises. Adansonia 6(3): 507-510.

Extremely rare and endangered Lebronnecia kokioides is described from Tahuata Island.

Fosberg, F.R. and M.-H. Sachet. 1969. Wake Island vegetation and flora, 1961-1963. Atoll Research Bulletin 123: 1-15.

Observations on disturbance and recovery of vegetation.

Fosberg, F.R. and M.-H. Sachet. 1983a. Henderson Island threatened. Environmental Conservation 10(2): 171-173.

Threatened desecration of a unique biota due to human development activities (later averted by British government).

Fosberg, F.R. and M.-H. Sachet. 1983b. Plants of the Society Islands, pp. 76-107, in Carr, D.J., ed., Sydney Parkinson, Artist of Cook's Endeavour Voyage. 300 pp. Honolulu, Hawaii: University Press of Hawaii.

Parkinson's paintings of plants done in 1769 are useful for documenting species, such as both Hibiscus rosasinensis and Miscanthus floridulus on Tahiti, which were members of the Polynesian flora in pre-European times.

Fosberg, F.R. and M.-H. Sachet. 1985. Rare, endangered, and extinct Society Island plants. National Geographic Society Research Reports 21: 161-165.

Approximately 200 out of the total 850 indigenous plant species of the Society Islands are either rare or extinct.

Fosberg, F.R., Sachet, M.-H. and D.R. Stoddart. 1983. Henderson Island (Southern Polynesia): Summary of current knowledge. Atoll Research Bulletin 272: 1-47.

A reasonably unaltered, raised atoll threatened at the time by the spectre of development for human activities. The indigenous flora of Henderson includes 9 species and 6 varieties of endemic angiosperms.

Fowler, L. 1979. Population ecology and impact of the feral burros of Galapagos. Annual Report of the Charles Darwin Research Station 1979: 111-113.

Burros (Equus asinus) were introduced to the Galapagos in the mid-1800's and have become firmly established on all 5 major islands. On Volcan Alcedo (Isla Isabela) the large feral burro population may be overgrazing the vegetation, particularly in the dry season.

Frome, M. 1986. Hawaii's heritage remains at risk. Defenders 61(5): 18-19, 44.

Includes brief discussion of effects of seemingly disadvantageous Hawaiian forestry practices, and status of Hawaiian Volcanoes National Park and proposed geothermal energy complex on the Campbell Estate at Kilauea.

Fullard-Leo, B. 1985. Turtle Bay Hilton: one island, two worlds. Aloha 8(4): 68-70.

Amusements provided for guests at Turtle Bay Hilton and Country Club on Oahu (Hawaiian Islands) include dune-cycling on four-wheeled recreation vehicles along secluded beach and forest trails.

Fullaway, D.T. 1975. Forestry's role in Micronesia. Micronesian Reporter 23(3): 12-15.

Due to domination by a steady succession of foreign powers, some Micronesian societies have been influenced to change from depending on the land for their needs, to a dependency on imported goods, which has affected their attitude towards conservation of land-based resources.

Funk, E. 1982. Unpublished manuscripts. Status reports on Abutilon menziesii Seem. (Malvaceae); Geranium arboreum Gray (Geraniaceae). Washington, D.C.: U.S. Department of the Interior.

Endangered plants of Hawaiian Islands.

Furnas, J.C. 1948. Anatomy of Paradise: Hawaii and the Islands of the South Seas. 542 pp. New York: William Sloane Associates, Inc.

In the Hawaiian Islands, "Sandalwooding left its mark. The hunt for it destroyed a good deal of timberland, as the natives lazily burned the forest to detect stands of it by smell. But far more destructive was the fact that the trade attracted whites, whose very presence was subversive."

Gagne, B.H. 1982. Unpublished manuscript. Status report on Gardenia brighamii Mann (Rubiaceae). Washington, D.C.: U.S. Department of the Interior.

Endangered plants of Hawaiian Islands.

Gagne, W.C. 1975. Hawaii's tragic dismemberment. Defenders 50(6): 461-469.

Causes of threats to fragile ecosystems of Hawaii are portrayed.

Gagne, W.C. 1983. Nihoa: biological gem of the northwest Hawaiian Islands. Ka 'Elele 10(7): 3-5.

The remote environment of the endemic, presumed vulnerable Nihoa loulou palm, Pritchardia remota.

- Gagne, W.C. 1986. Hawaii's botanical gardens: panacea or Pandora's box in the conservation of Hawaii's native flora. Newsletter Hawaiian Botanical Society 25: 7-10.
 "Some plant groups such as the melastomes and gingers have become sufficiently notorious naturalizers that unanimity would be reached on banning further introductions and coming to grips with the eventual control of the escapees."
- Gardiner, J.M. 1979. Silverswords and greenswords from Hawaii. The Garden 104(2): 50-54.
 Includes data on Argyroxiphium kauense in cultivation at Royal Botanic Garden, Edinburgh, and cultural requirements of A. sandwicense and A. kauense.
- Gardner, T. and P. Gardner. 1985. Rescue in paradise. International Wildlife 15(4):12-13.
 Lord Howe I. woodhen saved from threat of extinction presented by feral pigs and goats which were "destroying the thick, wet, forest litter".
- Garnock-Jones, P.J. 1978. Plant Communities on Lakeba and southern Vanua Balavu, Lau Group, Fiji. Royal Society of New Zealand Bulletin 17: 95-117.
 Man-induced fire, severe soil erosion, and introduced weeds play a part in altering naturally vegetated land here.
- Gerrish, G. and D. Mueller-Dombois. 1980. Behavior of native and non-native plants in two tropical rain forests on Oahu, Hawaiian Islands. Phytocoenologia 8(2): 237-295.
 Distribution patterns of several exotic species indicate that they may be altering the vegetation structure over large areas in a manner that may reduce the quality of the habitat for endemic plants.
- Giffin, J. 1977. Ecology of the feral pig on Hawai'i Island. Elepaio 37(12): 140-142.
 "Fern or rain forest habitat is the most extensive feral pig habitat found in the State". Pigs break open tree-fern trunks for starch.
- Gilbert, B. 1977. A hellish spot in heavenly surroundings. Audubon 79(2): 30-46.
 Article concerns Kalaupapa Peninsula on Molokai I., Hawaiian Is. Discusses "mongrelization" of Hawaiian flora with a "conglomerate of Asiatic, Polynesian, South, Central, North American, Mediterranean, and African species."
- Gilbert, C. 1974. The Galapagos and man. Oceans 7(2): 40-47.
 Includes remarks on extent of agriculture in the archipelago.

- Gillett, G.W. 1972. The critical need for conservation in the Marquesas Islands. Newsletter Hawaiian Botanical Society 11(4): 33-36.
Domesticated and feral grazing animals have largely exterminated the original flora of Nukuhiva, Uahuka, and Uapou.
- Gilmartin, A.J. 1970. First colloquium on rare and endangered species of Hawaii. Association for Tropical Biology Newsletter 22: 1-4.
Mentions bulldozing of koa (Acacia koa) forests and replanting them with Eucalyptus in certain areas.
- Gilpin, M.E. and J.M. Diamond. 1980. Subdivision of nature reserves and the maintenance of species diversity. Nature 285(5766): 567-568.
Includes reference to Vanuatu (New Hebrides).
- Given, D.R. 1975. Conservation of rare and threatened plant taxa in New Zealand: some principles. Proc. New Zealand Ecological Society 22: 1-6.
Includes concise remarks on the status of the Philip Island glory pea (Streblorrhiza speciosa), a presumed extinct legume.
- Glassman, S.F. 1957. The vascular flora of Ponape and its phytogeographical affinities. Proc. Eighth Pacific Science Congress 4: 201-213.
A number of endemics in the original vegetation of the comparably sized island of Guam must have been destroyed by man, causing confusion when scientists try to estimate the true, or former, percentage of endemism on Ponape.
- Gold, H. 1984. The Galapagos: Seeing what Charles Darwin saw. Islands 4(5): 40-59.
Notes a study of revegetated areas fenced off from goats by personnel of the Galapagos National Park. The Park and the Charles Darwin Research Station are helping to protect the caldera floor of Volcan Alcedo, as well as the cacti of Isla Fernandina, and the pahoehoe lava fields of Isla San Salvador.
- Gold, H. 1985. Maui, the isle of the trickster god. Islands 5(2): 20-31.
Includes photographs of Haleakala National Park, and also of recent enormous housing developments on the north coast of Maui at Kahului, and at Kaanapali Beach.
- Gon, S.M. 1987. The dunes of Mo'omomi. The Nature Conservancy News 37(1): 14-17.
On the coast of west Molokai, Hawaiian Islands. "Within vast, integrated communities of nearly undisturbed na-

tive grasses and shrubs grow more rare coastal species than in any other single place in the islands."

Gorman, M.L. and S. Siwatibau. 1975. The status of Neoveitchia storckii, a species of palm tree endemic to the Fijian island of Viti Levu. Biological Conservation 8(1): 73-76.

"The species has been reduced to a single population of 150-200 sexually mature trees."

Gormley, R. 1984. Molokai-on the edge. Aloha 7(1): 20-27. Pineapple plantations are slackening and tourism is increasing, calling for wise land-use in diversified agricultural and development programs so as not to harm the Molokai ecosystem.

Gosnell, M. 1976. The island dilemma. International Wildlife 6(5): 24-35.

On Kauai (Hawaiian Islands) indigenous forests have been cleared for housing developments and for cultivation of Anthurium species and other florist flowers. Also, the introduced European blackberry is a pest there.

Gourou, P. 1963. Pressure on island environment, pp. 207-225, in Fosberg, F.R., ed. (1963).

In the discussion following this article, F.R. Fosberg notes that deforestation and accelerated erosion have had adverse effects on the landscape of Kahoolawe, Lanai, southeast Oahu, and Niihau (Hawaiian Is.).

Gradstein, S.R. and W.A. Weber. 1982. Bryogeography of the Galapagos Islands. Journal Hattori Botanical Laboratory 52: 127-152.

"Because of the destruction of much of the original Scalesia forest (itself a rich habitat), and its replacement by extensively introduced exotic trees and cultivars, this zone (moist evergreen woodland) probably will continue to yield new discoveries of bryophytes and possibly some of them will have been accidentally imported in modern times with animals, fowl, provisions, shoes and pants-cuffs, just as have so many phanerogams."

Grady, M. 1986. Stand structure of an isolated forest in Lyon Arboretum, Oahu, Hawaii. Newsletter Hawaiian Botanical Society 25(2): 47-59.

"Understanding the structural dynamics of small stands can help in planning for nature reserves to prevent extinction of unique forest ecosystems."

Graf, D.F. 1972. American Samoa - Annual Environmental Report. 17 pp. Pago Pago, American Samoa: Office of the Governor.

"With slopes often exceeding 30 percent, the clearing of

vegetation for gardening or home construction generally results in considerable erosion."

Graham, B. 1987 (March 19). Tourism, immigration put strain on Galapagos. Washington Post: A-25.

Pressures from the commercial tourist trade along with a sharp increase in numbers of permanent settlers worry some conservationists that development will be allowed to progress uncontrolled, although government officials indicate that preservation of the islands is important. One senior planner spoke of the desirability of guarding against the "Hawaiianization" of the Galapagos.

Grant, P.R. 1981. Population fluctuations, tree rings and climate. Noticias de Galapagos 33: 12-16.

On Isabela and Santa Cruz (Galapagos), the Bursera populations will eventually collapse unless the feral goats are controlled. A study of individual growth patterns from tree rings will be helpful in assessing the long term survival of Bursera populations.

Green, P.S. 1969. Discussion. Philosophical Transactions Royal Society B255: 616-617.

"Unintelligent burning is a great danger to the plant cover in New Caledonia, almost as great perhaps as the danger from the encroachment of mining, even in the remoter areas in the northern parts of the island."

Green, P.S. 1979. Observations on the phytogeography of the New Hebrides, Lord Howe Island and Norfolk Island, pp. 41-53, in Bramwell, D., ed., Plants and Islands. 459 pp. New York and London: Academic Press.

Only 3 or 4 bushes of Hibiscus insularis now exist in the wild on Philip Island, an island that "presents us with a first-rate example of what man, by means of goats and pigs and finally by rabbits, can do to exterminate a flora."

Green, P.S. 1985. Refound: on South Sea isle. Threatened Plants Newsletter 15: 21.

Abutilon julianae (Malvaceae), extirpated on Norfolk Island, has recently been discovered on Philip Island. Includes observations on condition of Philip vegetation.

Grepin, F. 1976. La medecine Tahitienne traditionnelle. Cahiers du Pacifique 19: 337-382.

Includes list of c.75 traditional medicinal plants of Tahiti, with 14 useful illustrations, and recipes for medications.

Gressitt, J.L., ed. 1963. Pacific Basin Biogeography: A Symposium. 563 pp. Honolulu, Hawaii: Bishop Museum Press.

Groube, L.M. 1971. Tonga, Lapita pottery, and Polynesian

- origins. Journal of the Polynesian Society 80(3): 278-316.
Mankind has been occupying Tonga and altering its vegetation to some extent for over 3,000 years.
- Guillaumin, A. 1933. Matériaux pour la flore de la Nouvelle-Calédonie, XIII. Revision des Verbenacees. Bull. Soc. Bot. France 80: 476-480.
Briefly traces the introduction and spread of Lantana camara and other verbenaceous weeds in New Caledonia.
- Guillaumin, A. 1953a. Mesures de conservation a prendre pour la sauvegarde de la flore de la Nouvelle-Calédonie. (Resume). Proc. Seventh Pacific Science Congress 4: 674.
Urgently recommends establishment of series of integral nature reserves to protect localized plant species.
- Guillaumin, A. 1953b. L'évolution de la flore Neo-Calédonienne. Journ. Soc. Oceanistes 9(9): 79-85.
Includes discussion of introduced plants, weeds, forest exploitation.
- Guillaumin, A. 1970. Le santal en Nouvelle-Calédonie. Journ. Agric. Trop. Bot. Appl. 17(7-9): 340-341. (Notice (review) by Plessis, J. 1972. Cahiers du Pacifique 16: 214).
Detrimental exploitation of New Caledonian sandalwood had become 230, 563 kg.'s worth in 1908; trade has since ceased.
- Gustafson, R.J. 1979. Hawaii's unique and vanishing flora - the genesis of an exhibit. Terra 18(2): 3-9.
Discusses demolishment of Hawaiian flora.
- Hall, E.O. 1839. Notes of a tour around Oahu. Hawaiian Spectator 2: 94-112.
Describes lowland vegetation as it was before sugarcane, pineapple, and Prosopis took it over.
- Hall, W.L. 1904. The forests of the Hawaiian Islands. USDA Forestry Bulletin 48: 1-29.
Includes notes on forest decline and reforestation.
- Halle, F. 1978. Arbres et forets des Iles Marquises. Cahiers du Pacifique 21: 315-357.
Includes discussion of Marquesan forest types which are perpetuated, and encouraged, or modified by human inhabitants.
- Halle, N. 1980. Les Orchidees de Tubai (Archipel des Australes, Sud Polynesie). Cahiers de l'Indo-Pacifique 11(3): 69-130.
Cyathea cumingii Baker, the tree-fern of Tubai, is highly endangered. Forests with lesser degradation in

high altitudes contain rare species seemingly in danger of extinction. Contains catalogue of ferns and angiosperms of Austral Is., to which additions are made in the article on vegetation of Rurutu, Halle, N. 1983. Bull. Mus. Nat. Hist. Nat. Paris, ser.4, sect.B., Adansonia 5(2): 141-150.

Hamann, O. 1978. Recovery of vegetation on Pinta and Santa Fe Islands. Noticias de Galapagos 27: 19-20.
Liquidation of goat populations produced recovery of vegetation.

Hamann, O. 1979a. Taxonomic and floristic notes from the Galapagos Islands. Bot. Notiser 132: 435-440.
Callitriche deflexa is a recent introduction which prefers habitats disturbed by goats and pigs. The recent spread of Triumfetta semitriloba may be associated with the continuing disturbance of the natural vegetation caused by feral animals.

Hamann, O. 1979b. Regeneration of vegetation on Santa Fe and Pinta Islands, Galapagos, after the eradication of goats. Biological Conservation 15(3): 215-236.
On Pinta Island about 40,000 feral goats were shot during the period 1971-1977, and as a result of the killings, a rapid regeneration of vegetation in the arid lowlands is underway.

Hamann, O. 1979c. The survival strategies of some threatened Galapagos plants. Noticias de Galapagos 30: 22-25.
Habitat diminishment of Scalesia, Piscidia and Miconia is discussed.

Hamann, O. 1981. Plant communities of the Galapagos Islands. Dansk Botanisk Arkiv 34(2): 1-163.
Grazing goats have degraded the steppe forest in the central arid region of Pinta. Santa Cruz I. has experienced many recent vegetational changes due to introduced plants on new roads, woodcutting, and effects of goats, pigs and donkeys. On Baltra I., it is predicted that desert scrub will dominate due to man's negative influence. On Santa Fe I., goats have devastated the dry-season deciduous steppe forest. The highland plateau of Santa Maria I. is mostly covered with Psidium guajava, an introduced, aggressive competitor. Feral goats are the most serious plague of San Salvador I. The only large island of the Galapagos remaining completely undisturbed by man is Fernandina, which has frequent volcanic eruptions.

Hamilton, L.S., ed. 1983. Forest and Watershed Development and Conservation in Asia and the Pacific. 560 pp. Boulder, Colorado and Essex, England: Westview Press.

Discusses forests and watersheds as natural resources to be conserved as valuable assets.

Hamilton, T.H., Rubinoff, I., Barth, R.H. and G.L. Bush. 1963. Species abundance: natural regulation of insular variation. Science 142: 1575-1577.

Of interest relating to studies of endemism and evolution in the Galapagos.

Harney, T. 1983. Fostering rare breeds on the museum's rooftop. The Torch (Smithsonian Institution) 83(1 January): 2.

The endangered Abutilon sachetianum (Malvaceae) from Marquesas Is. is being grown in National Museum of Natural History's rooftop greenhouse, Washington, D.C.

Harris, D.R. 1962. Invasion of oceanic islands by alien plants. Transactions, Institute of British Geographers 31: 67-82.

Includes pertinent observations on the Pacific Islands.

Harrison, B.C. 1972. The vegetation of Waihoi Valley, East Maui, pp. 94-136, in Kjargaard, J.I., ed., Scientific Report of the Waihoi Valley Project. Sponsored by National Science Foundation. 252 pp. University of Hawaii.

Pastures with remnants of thicket-producing indigenous Dicranopteris linearis (uluhe fern) are often trampled by cattle "until there is nothing but bare earth, almost as if a bulldozer had been at work". "Further introduction of hooved animals to Maui should be prevented to protect habitats such as Waihoi from being modified." A stand of a possibly new species or variety of Pritchardia palm was mapped.

Hart, A.D. 1975. Living jewels imperiled. Defenders 50(6): 482-486.

Introduced trees, pests and collectors are decimating indigenous land snails (Achatinella) of Hawaii.

Hartley, R.L. 1963. Agriculture on Rotuma Island. South Pacific Bulletin 13(2): 57-61, 63.

On Rotuma I. (politically a part of Fiji Is.) the two most heavily infesting weeds are Lantana camara and Hibiscus tiliaceus. Native "timber is now being used regularly and in large quantities for firing the copra driers."

Hartt, C.E. and M.C. Neal. 1940. The plant ecology of Mauna Kea, Hawaii. Ecology 21(2): 237-266.

Depredations made by feral grazing cattle, goats, sheep, horses and hogs are discussed as biotic factors in the removal of the flora.

- Hashimoto, T. 1977. Ogasawara plants with potential for cultivation as ornamentals. Notes Waimea Arboretum 4(1): 12-19.
 Interesting data on endemic plants having ornamental qualities suitable for consideration as useful to man.
- Hatheway, W.H. 1952. Composition of certain native dry forests: Mokuleia, Oahu, Territory of Hawaii. Ecological Monographs 22: 153-168.
 Characteristics and composition of some of the vegetation zones have been altered or destroyed by feral grazing animals and introduced plant pests such as Prosopis and Leucaena.
- Havas, V. 1985a. Galapagos tortoises race progress and flames. Islands 5(5): 10.
 Describes adverse effects on environment caused by enormously widespread fire which began in February 1985 when Santo Tomas residents (on Isabela I.) burned diseased coffee plants and the fire inadvertently spread to native vegetation.
- Havas, V. 1985b. Next stop, Easter Island. Islands 5(6): 12.
 It has been claimed that Easter Island's ecology will not be interfered with by NASA's planned extension of Mataverí airstrip for the purpose of accommodating future aborted launchings of space shuttles from California's Vandenberg Air Force Base.
- Hawaii Volcanoes National Park. 1974. National Park Service Silversword Restoration Project Proposal. 15pp. Hawaii Volcanoes National Park, National Park Service, U.S. Department of the Interior.
 Concerns conservation of the rare silversword plants of Hawaii (Argyroxiphium, Compositae).
- Heacox, K. 1984. El cuidado de las Islas Encantadas. Americas 36(6): 2-5, 46-49.
 Efforts to prevent adverse impacts from tourism in the Galapagos Islands.
- Haine, A. 1984. Urbanization and social change in the Marshall Islands. Ambio 13(5-6): 313-315.
 Urbanization has inevitable effects on the surrounding environment.
- Heinl, R.D. 1947. The Defense of Wake. 75 pp. Washington, D.C.: U.S. Marine Corps.
 Photos depicting effects of 1941 military operations on the vegetation of Wake atoll are included.
- Heinl, R.D. and J.A. Crown. 1954. The Marshalls: Increasing the Tempo. 188 pp. Washington, D.C.: U.S.

Marine Corps.

Photos depicting effects of 1944 military operations on the vegetation of the Marshall Islands are included.

Herbst, D.R. 1972a. Botanical survey of the Waiehu sand dunes. Bulletin Pacific Tropical Botanical Garden 2(1): 6-7.

Includes information on Hawaiian Scaevola coriacea.

Herbst, D. 1972b. Ohai, a rare and endangered Hawaiian plant. Bulletin Pacific Tropical Botanical Garden 2(3): 58.

Sesbania tomentosa on leeward shores is presently threatened by motorcyclists and the proposed construction of a highway which would open the area to greater disturbance.

Herbst, D. 1976. Appendix B-2. Vegetation survey of the Barbers Point Harbor Area, Oahu. 3 pp. Final Environmental Impact Statement, Barbers Point Harbor, Oahu, Hawaii. Honolulu, Hawaii: U.S. Army Engineers.

Mentions endangered plant species in the area.

Herbst, D. 1977a. Endangered Hawaiian plants. Newsletter Hawaiian Botanical Society 16(1-2): 22-29.

"A kapu placed on cattle allowed the build-up of enormous herds until their destruction (of vegetation) was so great that man was forced to contain or destroy them."

Herbst, D. 1977b. Vanishing plants. Water Spectrum 9(4): 20-26.

Includes discussion of vanishing elements of Hawaii's indigenous flora.

Herbst, D. 1980. Miscellaneous notes on the Hawaiian flora. I. Phytologia 45(1): 67-81.

Includes notes on spread of introduced weeds near LORAN station on Tern Island, French Frigate Shoals.

Herbst, D. 1984. Cooke's kokio (Kokia cookei). Endangered Wild Flower Calendar. Brooklyn, New York: Department of Biology, Brooklyn College.

Includes descriptive caption material.

Herbst, D. and J.J. Fay. 1981 (30 January). Proposal to list Panicum carteri (Carter's Panicgrass) as an endangered species and determine its critical habitat. Federal Register 46(20): 9976-9979.

Includes range map of Panicum carteri on Mokoli'i Island, Hawaiian Islands.

Hertlein, L.G. 1963. Contribution to the biogeography of Cocos Island, including a bibliography. Proc. California

Academy of Science 32(8): 219-289.

Cocos I., in the Pacific Ocean off Central America: discussion of biotic environment.

Hess, W.N. 1962. New horizons in resource development.

Geographical Review 52: 1-24.

Illustrates nuclear blast devastation on Enewetak.

Heyerdahl, T. 1940. Marquesas Islands. Proc. Sixth Pacific Science Congress 4: 543-546.

At the time, nature protection was lacking in the Marquesas. In some places, semiwild animals were devouring plants and bringing in weeds which then developed and spread along trails.

Heyerdahl, T. 1963. Prehistoric voyages as agencies for Melanesian and South American plant and animal dispersal to Polynesia, pp. 23-35, in Barrau, J., ed., Plants and the Migrations of Pacific Peoples." 136 pp. Honolulu, Hawaii: Bishop Museum Press.

Remarks on a single dwarfed, mutilated living specimen of Sophora toromiro in the Rano Kao crater, the only individual remaining of this Easter Island endemic, are included.

Heyerdahl, T. 1968. The prehistoric culture of Easter Island, pp. 133-140, in Yawata, I. and Y.H. Sinoto, eds., Prehistoric Culture in Oceania: A Symposium. Honolulu, Hawaii.

Refers to evidence of forest plants existing when period of human occupation began.

Heyligers, P.C. 1967. Vegetation and ecology of Bougainville and Buka islands, pp. 121-145, in: CSIRO (Australia), Lands of Bougainville and Buka Islands, Territory of Papua and New Guinea. CSIRO Land Research Series No. 20. 184 pp. Melbourne: CSIRO.

Essential to any future studies of vegetation change on Bougainville (formerly in Solomon Islands politically), and includes descriptions of anthropogenous vegetation types. Land-use map accompanies entire publication.

Heywood, V.H. 1979. The future of island floras, pp. 431-441, in Bramwell, D., ed., Plants and Islands. London: Academic Press.

General considerations of the fate of insular plants are presented.

Hickman, J. 1985. The Enchanted Islands: The Galapagos Discovered. 169 pp. Dover, New Hampshire: Tanager Books.

Chapter 16: Conservation of Species, includes discussion of alien plants, and introduced animals such as the 100,000 goats and 20,000 pigs of Santiago Island in the Galapagos.

Higashino, P.K., Guyer, W. and C.P. Stone. 1983. The Kilauea Wilderness Marathon and Crater Rim runs: sole searching experiences. Newsletter Hawaiian Botanical Society 22: 25-28.

Contestants from the weed-ridden island of Oahu were prevented from inadvertently spreading weed seeds on the soles of their running shoes, prior to participating in a foot-race on the island of Hawaii.

Hirano, R.T. 1973. Preservation of the Hawaiian flora. Arboretum and Botanical Gardens Bulletin 7(1): 10-11.

Contains general remarks on the title subject.

Hirano, R.T. and K.M. Nagata. 1972. A Checklist of Indigenous and Endemic Plants of Hawaii in Cultivation at the Harold L. Lyon Arboretum. 22 pp. University of Hawaii, Harold L. Lyon Arboretum.

165 taxa are being cultivated for the preservation and study of a rapidly diminishing Hawaiian flora.

Hobdy, R. 1976. Hawaiian ecosystems, pp. 17-18, in Department of Planning and Economic Development, Industrial Forestry for Hawaii. 40 pp. Honolulu, Hawaii.

The need for a timber industry (commercial forestry) in Hawaii is discussed relative to a managerial commitment to protect proposed endangered plant species.

Hodel, D. 1980. Notes on Pritchardia in Hawaii. Principes 24(2): 65-81.

Several species of Pritchardia palm are highly localized endemics and threatened in Hawaii.

Hoffman, C.W. 1950. Saipan: The Beginning of the End. 286 pp. Washington, D.C.: U.S. Marine Corps.

Illustrates effects of 1944 military operations on vegetation.

Hoffman, C.W. 1951. The Seizure of Tinian. 169 pp. Washington, D.C.: U.S. Marine Corps.

Illustrates effects of 1944 military operations on vegetation.

Holden, C. 1985. Hawaiian rainforest being felled. Science 228: 1073-1074.

Ohi'a trees (Metrosideros) on 3,300-acre tract of Campbell Estate on island of Hawaii are threatened by conversion of habitat to grazing lands.

Holdgate, M.W. and E.M. Nicholson. 1967. An international conservation programme for the Pacific Islands. Micronesica 3(1): 51-54.

Lists 9 principal conservation problems.

Holdgate, M.W. and N.M. Wace. 1961. The influence of man on the floras and faunas of southern islands. The Polar Record 10(68): 475-493.

Includes Juan Fernandez Is., where problems of goats were enough to cause severe soil erosion on Masafuera.

Holdsworth, D.K. 1974. A phytochemical survey of medicinal plants in Papua New Guinea, Part I. Science in New Guinea 2(2): 142-154.

The author has investigated medicinal plants of numerous Melanesian islands politically in Papua New Guinea.

Holing, D. 1987. Hawaii: the Eden of endemism. The Nature Conservancy News 37(1): 6-13.

Discussion of Hawaii's unique biota, and of factors which contribute to its high percentage of endemism. Vulnerability to threats from introduced species and human disturbance are mentioned.

Holt, R.A. 1981. Unpublished manuscript. Status report on Gouania hillebrandii Oliver (Rhamnaceae). Washington, D.C.: U.S. Department of the Interior.

Endangered plant of the Hawaiian Islands.

Holt, R.A. 1983a. Exotic species control: an island perspective. The Nature Conservancy News 33(4): 23-24.

Includes Clidemia hirta, an objectionable melastomataceous weed of Hawaii.

Holt, R.A. 1983b. The Maui Forest Trouble: A Literature Review and Proposal for Research. Hawaii Botanical Science Paper No. 42. 67 pp. Honolulu, Hawaii: University of Hawaii.

Widespread canopy dieback in Hawaiian and other Pacific rainforests is discussed.

Holthus, P.F. 1985. A reef resource conservation and management plan for Ponape Island (Caroline Archipelago, Micronesia). Proc. Fifth International Coral Reef Congress 2: 184.(Abstract)

Includes consideration of habitat degradation from sand extraction.

Holzner, W.M., Werger, J.A. and I. Ikusima, eds. 1983. Man's Impact on Vegetation. 370 pp. The Hague, The Netherlands: Dr. W. Junk BV Publishers.

Many basic principles and problems are presented for evaluation and discussion.

Hosaka, E.Y. 1936. A troublesome introduced grass. Mid-Pacific Magazine (April-June): 126.

Chloris divaricata or "star grass", native to Australia, is a troublesome, destructive invader of Honolulu lawns where it replaces the "Bermuda grass", Cynodon dactylon.

- Hosmer, R.S. 1910. Kahoolawe Forest Reserve. Hawaiian For. Agr. 7: 264-267.
Imputes a local climatic change due to destruction of Kahoolawe vegetation.
- Hosokawa, T. 1967. Life-form of vascular plants and the climatic conditions of the Micronesian islands. Micronesica 3: 19-30.
Human disturbance of vegetation may cause confused speculation as to the original sequence of seral stages in plant succession towards climax vegetation.
- Hosokawa, T. 1973. On the tropical rainforest conservation to be proposed in Micronesia, pp. 150-164, in Planned Utilization of the Lowland Tropical Forests. 263 pp. Pacific Science Association Symposium, 1971, Cipayung, Bogor, Java.
Recommends the conservation of mossy forests near summits of Mt. Nanarant and Mt. Niinioanii and near the top of Mt. Fenkol in Kusiae; of the Planchonella forests on uninhabited Palauan islands; of any remaining Campnosperma forests on Palau and Ponape; and of any remaining Terminalia carolinensis forests on Kusaie.
- Hough, F.O. 1947. The Island War: The United States Marine Corps in the Pacific. 415 pp. Philadelphia and New York: J.B. Lippincott Company.
World War II destruction of vegetation on Pacific Islands, often as a direct or side-result of attempts to extricate opposing troops from fortified limestone caves, was accomplished with apparatus including portable one-man flamethrowers; napalm-throwers mounted on amphtracks (tracked landing vehicles) or on the turrets of tanks; and by attaching bulldozer blades to tanks and armored amphtracks (amphibious tanks) in order to clear operating positions.
- Hough, F.O. 1950. The Assault on Peleliu. 209 pp. Washington, D.C.: U.S. Marine Corps.
Illustrates effects of 1944 military operations on the vegetation of Peleliu.
- Hough, F.O. and J.A. Crown. 1952. The Campaign of New Britain. 220 pp. Washington, D.C.: U.S. Marine Corps.
Illustrates effects of 1944 military operations on the vegetation of New Britain.
- Howard, R.A. 1962. Hawaii - a botanical and horticultural opportunity. Garden Journal 12(6): 223-226.
Discusses land use and the need for preservation of natural areas in Hawaii.
- Howard, W.E. 1965. Control of Introduced Mammals in New

Zealand. 96 pp. New Zealand DSIR, Information Series, No. 45.

Unstable habitat conditions caused by introduced noxious animals such as sheep and deer in New Zealand are discussed, and should exemplify the repercussions awaiting similar ill-conceived introductions contemplated in the Pacific.

Howarth, F.G. 1972. Ecological Studies on Hawaiian Lava Tubes. 20 pp. Island Ecosystems IRP/IBP Hawaii, Technical Report No.16. Honolulu, Hawaii: University of Hawaii.

The forest overlying many of the caves has been cut or removed, thus drastically altering the ecology of the caves beneath. Also, regrettably, the fields with the largest caves known on Kauai were covered to a depth of 5 meters by sugar cane bagasse (pressed cane-stem trash) and the caves are now gone and their fauna extinct.

Howarth, F.G. 1973. The cavernicolous fauna of Hawaiian lava tubes, 1. Introduction. Pacific Insects 15(1): 139-151.

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