

to Samoa and other small, essentially predator-free tropical islands without prior human inhabitants. In Samoa as in Hawaii, after initial European contact there was about a two hundred year-long lag in reliable natural history writing, much less adequate bird censuses. Clearly some extinctions could have occurred during this period; there is no evidence that they did not. The same period encompasses the Little Ice Age, when tropical islands, particularly ones at high latitudes within the tropics, such as Manu'a, would have experienced biologically significant decreases in temperature and rainfall that could have altered local plant and animal communities and reduced primary production and biomass (see N. Roberts, *The Holocene*, Basil Blackwell, New York, 1989). Such considerations are ignored in the To'aga report and generally in the literature of prehistoric human catastrophism which it represents.

As for the seabirds apparently extirpated sometime during the three millennia of human occupation at To'aga, Kirch and Hunt suggest, without elaboration, "the loss of these species [*Puffinus pacificus*, *P. lherminiere*, *P. griseus*, *Pterodroma rostrata*, *Pt. sp.* and *Sula sula*] from the island . . . most likely reflects both direct predation by humans and habitat disturbance" (p. 241, brackets added). Why these factors and not others are "most likely" reflected by species loss is not indicated, and we are left to imagine what kinds of bird harvesting strategies and habitat changes could have been effected by human activities that would have resulted in the extinction of seabirds. Did the islanders remove their nesting sites as they hunted them? Burned them, perhaps?

The chapter bibliographies are convenient in this long work. An annoying omission is the lack of bibliographic information for the sources listed in the legend on Fig. 4.4, a map of the southwestern Pacific showing locations with evidence for a mid- to late-Holocene high sea stand and associated radiocarbon ages. More careful editorial review would have caught inconsistent use of singular and plural ("a total . . . was . . ."; "a total . . . were . . ."; "none . . . were"; "studies . . . was"), some mis-spellings (e.g., "devestated" and some scientific names of plants ("*Hibicus tiliaceus*", *Erythrina variegata*" (pp. 19–20)) and the mis-stating of Unit 28 for Unit 23 in a crucial discussion of charcoal and marine shell radiocarbon dating (p. 87). Puzzling is the lack of the stratigraphic profile for Unit 28, since it yielded "the oldest date for unquestionably *in-situ* cul-

tural material obtained from the To'aga site" (p. 60) and since the layer with the early date (IIc) has a complex stratigraphic relationship with layer IIId in nearby but seaward units 15-29-30 (p. 66). Similarly, the missing Unit 28 profile belongs with those of Units 15, 16 and 17 in Fig. 5.16, which purports to show stratigraphic correlations along Transect 5 from its inland to its seaward ends (which faces of these units are shown has to be guessed as they are not labeled).

Notwithstanding the attempts to inflate the significance of the project—with a title that suggests the To'aga site is a complete representation ("encapsulation") of "Three Millenia" of occupation of the Manua Island group of American Samoa and frequent use of superlatives such as "the oldest," "the deepest," "the largest," "the most diverse," "unique and highly significant"—the archaeological data reported in this volume do not accurately represent the site's overall structure nor its occupational history, much less that of the Manu'a group. As a report of contract research *The To'aga Site* is useful, particularly in predicting where the earliest cultural deposits are likely to be found in islands like Ofu. And, because of the relative dearth of observations on prehistoric cultural materials in Samoan sites, its empirical content is welcome. But as a contribution to a scientific understanding of cultural evolution or of the prehistory of Polynesia, it falls well short of the mark.

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Ecological disasters

PLUNDERING PARADISE. THE STRUGGLE FOR THE ENVIRONMENT IN THE PHILIPPINES. Robin Broad with John Cavanagh. University of California Press, Berkeley. 197 pp., hardcover, illus. ISBN 0-520-08081-5. US\$25.

AND NO BIRDS SING: THE STORY OF AN ECOLOGICAL DISASTER IN A TROPICAL PARADISE. Mark Jaffe. Simon & Schuster, New York. 283 pp., hardcover. ISBN 0-671-75107-7. US\$ 23.

Human impacts on the environment are graphically described in these two very readable books about very different situations in this region.

Plundering Paradise is an indictment of the systematic exploitation of the environment—and the people—in the Philippines. *And No Birds Sing* is about the ecological consequences of the accidental introduction of the brown tree snake to Guam. Both also document what people are doing to try to salvage these environments.

Plundering Paradise presents a very compelling, personal account of the unofficial view—the people's view—of problems in the Philippines.

The environmental conflict in the United States might be represented—if somewhat extremely—by environmentalists whimpering about owls versus loggers whimpering about loss of jobs. “In the conventional stereotype, a concern with the environment is almost a defining feature of affluence—i.e., of the absence of more pressing concerns,” as Barbara Ehrenreich notes in the preface to this book. In the Philippines, environmental concerns are becoming a defining feature of *poverty*. Tens of thousands of ordinary farmers, fishers and other rural people in the Philippines are being driven into ever more desperate circumstances by logging and other corporate plunder of the environment on which they depend for their lives.

Broad & Cavanagh's book is in many ways iconoclastic. It questions many of the official views about what are the key environmental problems in the Philippines and other Third World countries, about the effect of aid and development models from the “West,” and about the people most likely to provide answers to the problems. The authors express surprise at the prevailing view in Washington that the collapse of state socialism in Eastern Europe and the former Soviet Union is a sign of the ultimate victory of “free-market” development. They are “shocked that the model being hailed as the victor is precisely the strategy whose colossal failure we just witnessed in the Philippines” (p. 154).

An example of the official view can be found in Fox's article in *South-East Asia's Environmental Future: The Search for Sustainability* (see “Books received”). As Fox tells it, “until ‘public’ land is certified by the DENR [Dept. Environment and Natural Resources] to be alienable and disposable, the government maintains that private ownership rights cannot be recognized. As a result, most forest occupants have no incentive to manage the land they occupy. . . . To provide local people with the security of tenure necessary to encourage investments in land management,

the DENR has established a number of programs. . . .” He thus implies that forest management problems are the fault of the rural people, and he makes no reference to the wealthy individuals who control the resources through the government, and who, as Broad and Cavanagh point out, also control the land tenure reforms.

Plundering Paradise is, as the blurb says, a “traveler's tale,” and it stands in sharp contrast to most academic treatises on Third World environmental degradation both in style and content. But it is not merely a traveler's tale, for the authors are not simply horrified tourists. Both are professionals in international policy, and the book was researched under a grant from the John D. and Catherine T. MacArthur Foundation. Moreover, they have had “numerous earlier sojourns in the Philippines, dating back to 1977” (Peace Corps perhaps?) and they obviously care about the Philippine people. The blurb claims that this is “an insider's look at life in the Philippines.” In fact, they may be only just “inside” enough to have lost the detachment that one would expect from researchers (or journalists). If this is a fault, it is also one of the strengths of the book, for it provides a different and therefore refreshing perspective.

In some ways, this book is too much of a travelogue: following the trail of the Bataan Death March (which one of Cavanagh's grandfathers survived) not only is a backdrop for an account of this heavily industrialized province near Manila, but becomes an excuse for a major digression on U.S.-Philippines relations that is rather weakly connected to the environmental theme.

While many analysts see population growth as a cause of unsustainable development, Broad & Cavanagh cite economist James Boyce in arguing that “to identify population as the root of the problem is to mistake a symptom for a cause.” Rapid population growth, they argue, is motivated primarily by widespread poverty, and the root problem is inequity in the distribution of wealth and power. But the division of opinion between optimistic “Pollyannas” (mostly economists) and pessimistic “Cassandras” (mostly biologists), is a deep one (Mann 1993). Broad & Cavanagh very convincingly demonstrate the inequity in the Philippines and its environmental consequences; indeed, this is the underlying theme of the book. But beyond those pressing concerns seems to be a faith, shared by the policymakers in Washington whom they criticize, that growth and development are sustainable. As Jon-

athon Porritt (1991) has noted, "sustainable development" is an oxymoron—or worse, it is dangerous "doublethink" that blinds governments to the fact that infinite growth is not possible on a finite planet. The two thousand years since Christ was born are not long in human existence; can we contemplate sustainable resource use even that far into the future?

The ecological disaster described in *And No Birds Sing* is completely different, and the style of the two books is equally different. Jaffe easily approaches his story from the outside not only because he is a professional journalist but also because the people in his story are neither victims nor villains, but the scientists involved in working out what happened to the birds of Guam. It is told as a detective story, and it derives its human interest from this. But, as Jaffe notes, the ecological story is of interest in many places, too, because of the lessons it has about environmental management and the dangers of introduced species.

The significance of the story is explained in a quote from Stuart Pimm (p. 206–7): "What the world is going to look like fifty years from now is little islands of native vegetation surrounded by highly modified areas. . . . We are going to have national parks . . . surrounded by areas that are full of people, full of invasive plants and animals, areas that are ecological disasters. . . . Fifty years from now people are going to be managing the animals and plants in those habitat fragments. . . . Look at Hawaii to anticipate the problems we are going to have in world parks a generation from now."

In Hawaii, of course, the brown tree snake is not merely a useful lesson, it is a real threat. The snake that got to Guam as a stowaway could easily spread from Guam as a stowaway; indeed, it has been found at airports in Hawaii, and may have already established on Saipan. A bill to protect Hawaii from *Boiga irregularis*, introduced by Hawaii congressman Daniel Akaka, became a section of a law to control invasive zebra mussels in the midwest.

This is a detective story, and the central question is, what killed the birds of Guam? Although it is now well accepted that the snake did it, the main detective, biologist Julie Savidge, had a struggle to convince the scientific community of the snake's guilt. After all, no reptile had ever been known to decimate an avifauna. One especially vocal critic of Savidge's snake hypothesis

was noted ornithologist H. Douglas Pratt. He first challenged her at a conference; later he wrote what came to be Savidge's call to arms: "The 'snake hypothesis' is fraught with innumerable and insurmountable logical inconsistencies." (p. 71) The favored explanation was disease—for instance, avian malaria has had a big impact on birds in Hawaii—and much work went into testing birds for susceptibility and examining tissue samples from dead birds. One of the difficulties of the snake theory was that few people had seen many snakes. Stateside newspapers recently have carried numerous stories suggesting that you can hardly move here without stepping on a snake. Yet, as Pratt said in his first encounter with Savidge, "I've been on Guam several times [studying the birds] and I've never even seen a brown tree snake." (p. 69) The snakes are nocturnal and very hard to spot, even when you're looking for them. They have also proved difficult to enumerate (Rodda & Fritts 1992). But eventually Pratt and everyone else was convinced, and efforts turned to how to control the snake on Guam and how to prevent it spreading to other islands.

Jaffe does a good job of telling how the snake got to Guam, what it did to the bird population, as well as the rodents and lizards, and why it was so invasive. The reporting is accurate, according to people at Guam Division of Aquatic and Wildlife Resources, who are among the central players in this story. Some of the keys to the snake's success include its ability to store sperm—one impregnated female can keep laying eggs for years; its adaptable diet—it eats hamburger, dog food and garbage as well as endangered species of birds; its amazing ability to climb; and its speed—it can strike faster than a bird can take wing. "Its success came not because it was an efficient specialist but because it was an unprecedented generalist." (p. 247) Jaffe also tells us what scientists learned about why the snake has such a knack of finding newborns—be they puppies, chicks, or human babies: they respond vigorously to blood. Animal behaviorist David Chizar speculates that the snake may pick up a cue from menstruating women—"mothers . . . may be inadvertently attracting the serpent to their homes, where it then attacks their babies," says Jaffe, who calls this "perhaps the most bizarre turn of the bizarre story" (p. 250). He documents, too, the ecological ripples resulting from the loss of the birds: the loss of pollinators and seed dispersers for native plants, the abundance of insects and spiders.

While a large part of the story concerns the efforts to learn about the snake, another important part is the efforts to save some of the birds from extinction. He explains why species that arrive on islands so rarely become established. His explanation of Stuart Pimm's population theory will perhaps prove rather dense for many readers, but is an important part of the story of efforts to save the Guam Rail now extinct in the wild and establish populations on snake-free Rota.

The race to save endangered species on Guam has focused especially on the Guam Rail and the Micronesian Kingfisher. When Julie Savidge was hired to find out what was killing the birds, Bob Beck was hired to save what was left. Jaffe tells how Beck was able to enlist support of many zoos for the breeding programs, and gives some insight into the logistics of maintaining a diverse genetic stock under such circumstances. The story of Beck's adventures feeding kingfishers en route to zoos (pp.73-75) is reminiscent of the humorous tales in Gerald Durrell's books. Because kingfishers have to be fed often, Beck had to take a big jar of geckoes with him on the plane and then stun the prey "without arousing the interest or ire of the other passengers."

The story of the Rail releases is here, too, including Greg Wittenman's adventures on Rota and the explanation for why the big Rail release with world expert Dillon Ripley never made the CNN news.

One can learn a lot of island biology from this book. Indeed, one can learn much more island biology from this book than from environmental biology textbooks, which are notably lacking in coverage of islands, tropical or otherwise.

The account is apparently accurate despite some careless spelling errors, like Tino Aguon's name, that may fool local readers into thinking that the whole story is riddled with errors. However, there are no references. This may be good journalistic style, but will be frustrating to readers who want to look further or verify some of the scientific statements. Much has been published from all this scientific work, and a couple of papers in *Micronesica* will give interested readers a start into the literature (McCoid 1991, Rodda & Fritts 1992).

References

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Books received Climate change and sustainable agriculture

CLIMATE & AGRICULTURE IN THE PACIFIC ISLANDS: FUTURE PERSPECTIVES. Aalbersberg, W., P. D. Nunn, A. D. Ravuvu (editors). 1993. Institute of Pacific Studies, Suva, Fiji. 80 pp., softcover. ISBN 982-02-0083-0.

SOUTH-EAST ASIA'S ENVIRONMENTAL FUTURE: THE SEARCH FOR SUSTAINABILITY. Brookfield, H. & Y. Byron (editors). 1993. United Nations University Press, Tokyo/Oxford University Press, Kuala Lumpur, Malaysia. 422 pp., hardcover. ISBN 92-808-0823-0. US\$40.

AGROFORESTRY IN THE PACIFIC ISLANDS: SYSTEMS FOR SUSTAINABILITY. Clarke, W. C. & R. R. Thaman (editors). 1993. United Nations University Press, Tokyo. 297 pp., softcover. ISBN 92-808-0824-9. US\$35. ("Developing country price US\$17.50.")¹

The small book edited by Aalbersberg et al., is a report of a 1991 conference in Fiji. Asesela Ravuvu begins by setting the historical perspective of climate change and sea level changes in the Pacific islands, noting that after the last Ice Age there was a Climate Optimum—about 5000 years ago—when average temperatures were higher than today and sea levels some 1-2 meters higher than today. When the temperatures cooled somewhat and the sea levels became what they are today, many Pacific Islands had coastal plat-

¹ The two UN University Press books can be ordered in the US from: UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706-4391.