ing affair. Much was made of the remarkable coincidence between the orbital period of Jupiter and the 11-year activity cycle. The 22-year drought cycle found for the western states was held up repeatedly as firm evidence for the reality of a sun-weather effect. Frankly I was most strongly impressed by an East Coast forecaster who made a living predicting local weather; his most important input was sunspot number, and his success rate was reputed to be superior to that of the U.S. Weather Bureau.

Four years later comes this second symposium. The discipline is said to have matured, a somewhat dour National Academy report having stressed the need for the discovery of physical mechanisms and this being a symposium theme. And, the active cavity radiometer on the Solar Maximum satellite had actually detected a diminution of the solar irradiance accompanying the transit of large sunspots in 1980, an attainment of significance in understanding past solar constant work.

Sun-weather (or sun-climate) studies remain controversial. A symposium is a proper forum for voicing disparate views, and this symposium provided such a forum. As a result the depth, applicability, and scholarly content of the papers vary enormously.

One contribution that notably spurs imagination comes from an unlikely source, a prospecting geologist with the Broken Hill Mining Company in Australia. George Williams has possibly discovered the signature of the solar cycle in a Precambrian "varved" deposit approximately 680 $\times$ 10^6 years old. These rocks are strikingly layered in (assumed annual) widths of 11, 22, 145, and 290 years. A 20,000-year record is available. If Williams's interpretation is correct, the solar cycle has changed little in the intervening one-tenth of the age of the universe. We may wonder why solar activity back then so clearly modulated conditions on the earth when it seems not to now.

The subject of the relationship of solar events and electric fields receives a fair amount of attention, but a panel discussion on the subject fractures any ideas gained from the individual presentations.

This book is recommended for anyone whose interest is tweaked by the idea of a sun-weather connection. A number of papers are fascinating. I recommend that the reader begin with overviews by Eddy and McCormac and then pick and choose to his or her own satisfaction.

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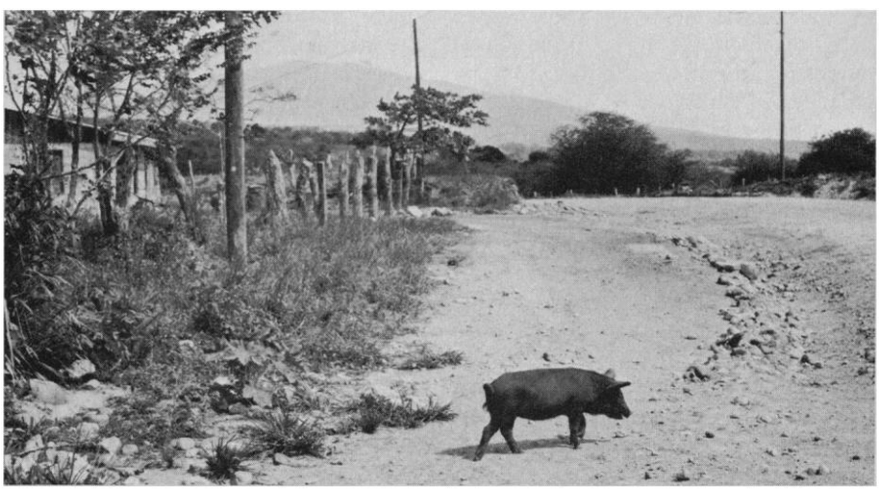
Tropical Biology

Costa Rican Natural History. DANIEL H. JANZEN, Ed. University of Chicago Press, Chicago, 1983. xii, 816 pp., illus. $50; paper, $30.

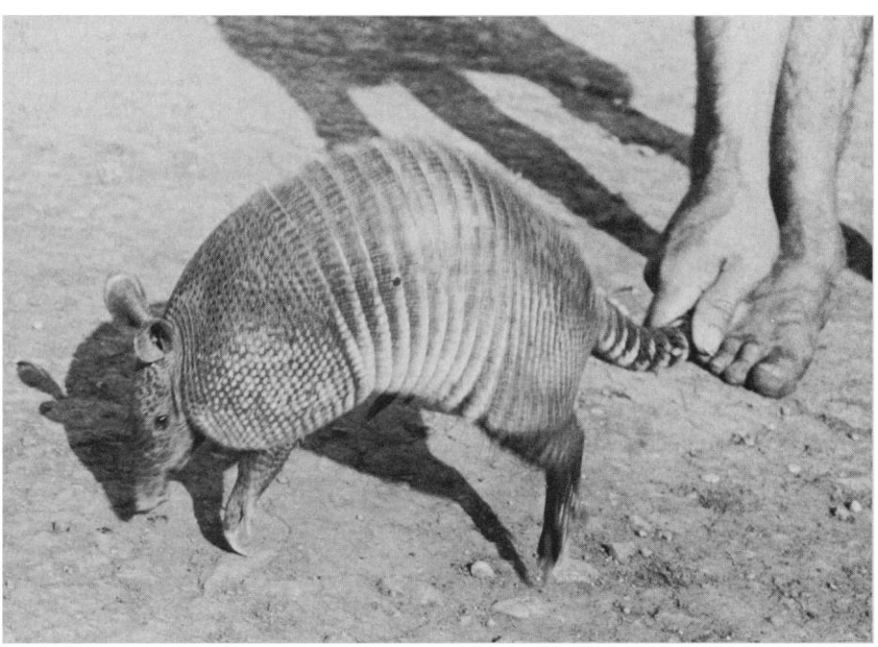
This book consists of six sections, on agricultural organisms, plants, herpetofauna, mammals, birds, and insects respectively, each with numerous short essays on species that were considered interesting, important, or representative, prefaced by a general introduction for the group concerned. It opens with five background chapters.

As Dryden said of the *Canterbury Tales*, so also in this book, "here is God's plenty." Just as Chaucer described a cross section of English humankind in all its marvelous diversity, so the short essays that make up the meat of this book describe, with singular eloquence, a cross section of the stunning variety of life to be found in Costa Rica. The bane of most compendia is here a virtue: the variety of voices and viewpoints describing these plants and animals adds greatly to the power of the book.

Unfortunately, the prologue to this remarkable collection is quite unworthy of it. The first chapter, on the development of natural history in Costa Rica, opens with a caricature of Spain that



"Small adult *Sus scrofa* exhibiting escape behavior. Potrerillos, Guanacaste, Costa Rica." [Photo, D. H. Janzen; from *Costa Rican Natural History*]



"*Dasypus novemcinctus*, adult male at peak of characteristic leap-hop used to escape the grasp of a potential predator. March 1980, Santa Rosa National Park, Costa Rica." [Photo, D. H. Janzen; from *Costa Rican Natural History*]

would make an 18th-century Orangeman, or even an Elizabethan corsair, blush. The authors do not try to enter into the spirit of the times they so freely condemn, and history lacking such elementary human sympathy is worthless. The following chapter, on the history of the Central American biota, is overambitious and a bit amateurish but full of interesting references. The fourth chapter, on the geology of Costa Rica, is a most inadequate substitute for a decent geological map and accompanying explanatory table.

The excellent section on agriculture is the first to give the reader a sense of the quality of the book. The following section, on plants, is, however, most disappointing. The introduction to the plant section should glue this whole varied book together. As it is, it is full of interesting information, but it is overly enfeoffed to Holdridge's "life zones," it is too prone to substitute lists of plant names for genuine description, and it gives too little sense of the effects of the various rhythms of the forest on either the plants or their attendant animals. The introductions to the following sections remedy this lack as best they can, but the failure to do this in the proper place disorganizes the book unnecessarily. Moreover, some of the plant essays read like timber-cruisers' diagnoses, although many others are enlivened by details of pollination or speculation about dispersers, past and present. Since many of these plants were chosen for their importance to the landscape, it is sad that the illustrations are so poorly reproduced.

The animal sections are much better. They offer a fascinating series of vignettes of different social systems, different ways of finding food or avoiding being eaten, different degrees and manners of caring for young, and the like. They form an incredible kaleidoscope, showing forth the variety and perfection of adaptation and demonstrating as has nothing else I have yet read how necessary is the perspective that tropical studies offer to an understanding of the possibilities inherent in evolution. The animal sections are distinguished by superb introductions, the introductions for herpetofauna and birds being particularly fine. It is a pity that the worst of this book is concentrated toward the front, where it is most likely to discourage the reader.

This book is an excellent reference volume, doing for animals of Costa Rica what Corner's *Wayside Trees of Malaya* did for Malaysian trees 40 years ago. I do not know how good a guide to Costa Rica this book will make. The illustrations rarely serve to identify the organisms discussed, nor could they have without increasing the cost of the book to pay for plates and drawings (and colored maps for the prologues). Perhaps the neophyte can only use this book in conjunction with a course from the Organization for Tropical Studies.

This book, however, is a worthy celebration of both the stunning variety of adaptation to be found in the Costa Rican tropics and, by implication, the ingenuity of those who deciphered them. There is, of course, much more to be done: we need to know how all the variety of cooperation, opportunism, and creative strife limned in these essays contributes to the ever-changing harmonies of tropical communities. Nevertheless, the biologist who has been exhausted by excessive teaching, harassed by creationists, bored by the seeming pointlessness of research, or worn out by the growing tendency to choose research projects solely for their virtues as pawns in philosophical controversy should read the essays in this book. They remind us all how fascinating our subject can be and show us what splendors inhabit those remnants of Eden that are still accessible to us. Perhaps they will spur us to learn how humans may live more nearly in harmony with their fellow creatures. At worst, we can give thanks for being vouchsafed such fascinating acquaintance with our fellow creatures before they, and we, are consumed in one last night of hate and war.

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A Maya Site

Coba. A Classic Maya Metropolis. WILLIAM J. FOLAN, ELLEN R. KINTZ, and LARAINE A. FLETCHER. Academic Press, New York, 1983. xxvi, 256 pp., illus., + boxed maps. $70. Studies in Archaeology.

The basic theme of this book is the reconstruction of the social, political, and economic organization of the major Maya center of Coba, in northern Quintana Roo, Mexico. More specifically, the intent of the authors is to demonstrate the "urban" status of Coba during the Late Classic period from about A.D. 600 to 800. The book thus takes its place in the venerable debate concerning the process of urbanization in Lowland Maya cultural evolution. Successive chapters written by various of the three authors address such topics as linear features, kitchen gardens, household composition, cottage industry and guild formation, class structure, and prehistoric demography.

Most of the data presented are embodied in a set of maps generated by several mapping projects in the mid- and late 1970's. These projects surveyed some 21.3 square kilometers of the estimated 63-square-kilometer area of the whole site. Only about half of the surveyed zone is represented on the maps, and Zone 1, a 2.8-square-kilometer sector of well-mapped architectural features extending north from the core of Coba, actually provides a large quantity of the data utilized in the discussions. Neither extensive, systematic test-pitting nor surface collection was carried out, so virtually all inferences derive from the mapped surface architecture. Information from the associated Mexican work at Coba, which focused mainly on excavation and reconstruction in the site core and which did include some excavation, is presented only in a cursory manner.

In my opinion this book suffers from two major flaws. The first is that the authors have allowed their preconceived ideas about Maya urbanism to cloud their interpretations. From the beginning, they had the sense of Coba as "a mighty sociopolitical unit that had apparently been imbued with great economic powers" (p. xvii), and with regard to economic complexity they assume what they have to demonstrate, maintaining that "Lowland Maya centers, now known to be large and complex in form and function, must have included economic production as one of their major activities" (p. 149). And later on the same page, "Maya centers like Coba, Tikal, Bonampak, Seibal, Dzibilchaltun, Palenque, and Copan were not only political and religious centers but economic and production centers as well." In other words since Coba is a major Maya center it follows that such complex economic institutions must have existed. Thus we are assured with no supporting evidence that the "central market" of Coba must have been near the Ixmoja or Chumuk Mul complexes (p. 51) and that the site of Tancah (which is 1 kilometer inland) served as a port for Coba (p. 14). Similarly, though we are told of no striking concentrations of special features, artifacts, or raw materials that would point to craft specialization, platforms lacking super-structures near "elite" residences are assumed to be "workshops" (p. 154). In fact, no major Lowland Maya center, to my knowledge, has produced hard data indicating patterns of economic specialization on a scale remotely comparable to that of the great