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Book review

Empire in the New World

Biogeography of the West Indies: Patterns and Perspectives. C.A. Woods, and F.E. Sergile. CRC Press, Boca Raton, 2001. 582 pp.

The West Indies are located within the Caribbean Gate, one of the world's foremost centers of evolution (Croizat, 1952). This biogeographic label recognizes the significant regional diversity of life within and around the Caribbean basin and the multitude of biogeographic relationships connecting the Caribbean to every other part of the globe. With the geographic juxtaposition of island and continental life, biogeographers of the New World have long attempted to unravel the biogeographic puzzle of Caribbean life. A recent contribution to this ongoing effort is this revised edition of Woods' (1989) *Caribbean Biogeography*. Following an 11-year interval, Charles Woods responded to continued interest in his first book by producing the current volume with its extensive compilation of phylogenetic, geologic, and geographic information distributed among 27 individual contributions. According to Woods (p. 1) the purpose of the book is to pull together some of the "more interesting patterns and trends in West Indian biogeography and serve as a stimulus to future research as well as provide a source book on West Indian biogeography." There are three principal subject areas covered in the volume: evolutionary and spatial differentiation of taxa ("historical biogeography"), changes in the spatial composition and distribution of taxa in response to local conditions such as climate and human activities, and the political context of past and present biogeography (science and conservation).

The subject of evolutionary differentiation begins with an historical overview by Woods (Chapter 1) followed by an "overview" of Caribbean biogeography by Blair Hedges (Chapter 2) who repeats the classic landbridge and migration debate of pre-plate-tectonic times. Hedges presents arguments in favor of preferred geohistorical narratives and phylogenetic divergence estimates derived from molecular clock theory to oppose the paleogeographic narratives of Ross MacPhee and Manuel Itutturalde-Vincent. Hedges' approach to the integration of biology and geology is for "biogeographers to base their conclusions on unbiased reconstructions of Earth history" (p. 3). Plate tectonic theory permeates many of the historical biogeographic contributions in both Caribbean volumes and yet Hedges and Woods both manage to overlook the spatial correlation of biogeographic and tectonic patterns by Croizat (1958, 1964). Of particular historical significance for the Caribbean is what may be the very first correlation between plate tectonic structure and biological patterns by Croizat (1975). Croizat's spatial correlation method, generally known as track analysis is highly significant for current studies of the Caribbean since the overriding question for many biogeographers is the extent to which biology and tectonics may be contemporaneous. Hedges' (p. 21) out of hand dismissal of track congruence as simply a reflection of similar patterns of dispersal (migration) fails to address the tectonic correlation method that is fundamental to the analysis of track congruence. Croizat's spatial correlation method offers empirical evidence for predicting evolutionary history (Craw et al., 1999) as an alternative to the method of deriving biogeographic speculations from geohistorical narratives that is favored by Hedges and other Darwinian biogeographers.

The Darwinian hegemony imposed by Hedges sets the scene for subsequent chapters dealing with the geographic origin and differentiation of taxa in the Caribbean where authors adopt Darwin's theory of geographic distribution. Geographic origin is tied to Darwinian "centers of origin" postulated to exist outside the current geographic range so it is only a matter of arguing whether one believes dispersal into the Caribbean occurred before (vicariance) or after (dispersal) the formation of geographic barriers. These decisions are largely based on accepted positions concerning geohistorical narratives and theories about phylogenetic age. Thus, the biogeographic narratives are developed by the layering of geological and phylogenetic narratives that exemplifies Darwinian biogeography—with or without cladistics.

In Chapter 4 Brian McNab finds no unequivocal answer as to whether the endemic Caribbean vertebrates differ in any consistent and substantial manner from their continental relatives. Walter Judd (Chapter 5) speculates on long-distance dispersal for *Lyonia* sect. *Lyonia* according to geohistorical theories and invokes future studies that will "undoubtedly improve our un-

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derstanding of the biogeography of this complex region.'' Similar speculations are entertained by Julio Genaro and Ana Tejuca (Chapter 6) and Jorge de la Cruz (Chapter 7) for the insect and tick fauna, respectively. The Caribbean is treated as one of five main sources for the Florida spider fauna by Jonathan Reiskind (Chapter 8) using a method he describes (p. 112) as being, at best, ''an educated guess.'' According to Ross Bell in Chapter 9, all rhysodid beetle distributions in the Caribbean can be explained by dispersal, so there is no need to invoke vicariance. Following a series of historical narratives Jacqueline and Lee Miller (Chapter 10) conclude that their knowledge of butterfly biogeography remains ''unclear'' (p. 149). They also introduce the notion (p. 127) that geological drift models spurred Croizat's interest in biogeography, whereas Croizat (1952, p. 1) attributes his interest to geographic anomalies in plant distribution. Like Hedges, p. 21, Jacqueline and Lee Miller restrict Croizat's biogeographic method to track congruence and therefore overlook the tectonic correlation component. They also appear to be unaware of panbiogeographic methods applied to butterfly biogeography (e.g., Craw, 1990a; Grehan, 1991) that might be pertinent to their Caribbean enterprise.

Carla Hass, Linda Maxson, and Blair Hedges (Chapter 11) use immunological divergence estimates to propose Cenozoic dispersal as the primary mechanism for colonization by Caribbean vertebrates. This is proposition tested by correspondence to preferred geohistorical narratives so that there is no necessary geographic relationship between taxa or spatial correlation with Mesozoic tectonics. This layering of biogeographical and geohistorical narratives is similarly applied to terrestrial vertebrates (Roger Portell, Stephen Donovan, and Daryl Domning, Chapter 13), to sloths (Jennifer White and Ross MacPhee, Chapter 14), to endemic Antillean insectivores (Howard Whidden and Robert Asher, Chapter 15; Jose Ottenwhilder, Chapter 16), and to rodents (Charles Woods, Rafael Borroto, and William Kilpatrick, Chapter 18).

The subject of environmental influences begins with interpretations of paleoclimatic evidence by Jason Curtis, Mark Brenner, and David Hodell (Chapter 3) in support of former geographic changes in the distribution of dominant tropical forest plants and they attribute disjunctions and restrictions for xerophytic species to loss of habitat in the Holocene. Mathew Williams and David Steadman (Chapter 12) conclude that at least 75% of the original parrot fauna has already become extinct because of historic and prehistoric human impacts. Marc Allard (Chapter 17) and his colleagues use the mitochondrial control region of *Solenodon paradoxus* from Hispaniola to examine the implications for biogeography, systematics, and conservation management without reaching any major conclusions other than that there appears to be some genetic variability which ''may'' be useful for conservation management of the species.

Armando Rodríguez-Durán and Thomas Kunz (Chapter 19) suggest that geographic proximity to mainland sources, presence of caves, food diversity, and island area are important elements of Caribbean bat ecology and biogeography. Gary Morgan (Chapter 20) suggests that some bats have distributions that are very different from their Pleistocene and early Holocene ranges with extinctions being a major factor. Roy Horst, Donald Hoadgland, and William Kilpatrick (Chapter 21) predict future colonization of new areas on larger islands by the small Asian mongoose. Lynn Lefebvre and her colleagues (Chapter 22) attribute hunting, habitat degradation, illegal killing, and collisions with boats as major factors in the decline in populations of the West Indian manatee. Overall prospects for the future survival of this species is considered poor for many regions since there is no conservation strategy for the entire distribution.

Four chapters provide historical reconstructions of human activity and impact. Elizabeth Wing (Chapter 24) suggests a pattern of over exploitation by native Americans of initial food resources resulting in a transition from reef fishes and land crabs to inshore and pelagic fishes and mollusks. An historical model of colonization by Samuel Wilson (Chapter 25) suggests a distinction between social organization at 2000 BC characterized by the absence of evidence for pottery or village construction and that at 500 BC with strong evidence of large, permanent habitation and pottery. An archeological study of remains of the endemic hutia by Laurie Wilkins (Chapter 26) leads to a discussion of whether this species was subject to captive management. Wilkins suggests that the age structure of remains probably represents a natural population, but a definitive answer is not possible.

Two articles represent what I consider to be the most significant contributions to this volume. The first is a critical review by Pruna Goodgall on the historical interrelationships between politics, ideology, and biogeographic interpretations of the Cuban biota during the 19th century (Chapter 23). Pruna Goodgall describes how underlying ideological issues shape the natural history essay and how certain places, landscapes, and organisms are translated into the metaphorical images of the nation itself. The significance of these factors extends beyond the local theater of Cuban science, since they have also shaped the science and conservation of New Zealand's natural history and sense of identity (Craw, 1990b, 1993; Grehan, 1990). In both instances the history of biogeography is dominated by the Victorian view of mobility, dominance, and colonization. Sandwiched between conservation and historical narratives, this paper may have been better positioned as the

first chapter in a book ideologically laden with Darwinian biogeography.

In the final, and perhaps the most important contribution, Florence Sergile and Charles Woods review 10 years of conservation activity in Haiti (Chapter 27). I may not be alone in finding the subject of conservation one of the most depressing issues in natural history as the West failed to avoid complicity in the vast destruction of natural environments throughout the globe. Many parts of the world with considerable biodiversity are among the most affected, and Haiti is no exception. Only 1% of the landmass is protected, yet Sergile and Woods believe that the potential for Haiti to protect the remains of its biological diversity has slowly become a reality over the past 10 years. This success is attributed to a combination of government commitment and a countrywide campaign in environmental education despite the lack of financial resources weakening the best management and enforcement policies. A key element identified by Sergile and Woods is the inclusion of a wide circle of the Haitian population in the decision-making process and the increased number of programs promoting environmental education. They attribute the increased acceptance of these conservation efforts to recognition in Haiti that conservation is not an obstacle to development but is important for reforestation, water management, soil conservation, and therefore economic growth—a message still to be fully appreciated by many developed countries.

Against these successes Sergile and Woods recognize the threats to conservation posed by the impact of recent political events on international aid agencies and the separation of social and environmental problems. Another critical issue concerns what they describe as shortsighted policies by the United States Agency for International Development that were exacerbated by changing priorities, personnel, and project officers. Long-term sustainable development schemes were left floundering as priorities shifted and funding evaporated before the projects were completed. Sergile and Woods find this situation symptomatic for other Caribbean countries suffering the devastating effects of superficial policies preoccupied with short-term returns without addressing real sustainability and environmental impact issues.

It is my opinion that the book would have been greatly enhanced by beginning with the chapters dealing with the ideological landscape of natural history and the central question of conservation. The former is essential for understanding the science and practice of biogeography, and without the latter the exercise of biogeography might as well be relegated to the status of a hobby.

In conclusion the expectation for a "new wave" of Caribbean biogeography does not yet appear to be realized. The principles of Darwin's "geographic distribution" that permeate historical speculations on the age of taxa, their means of dispersal, and the role of centers of origin within the constraints of accepted geohistorical narratives are very much the same as the first volume. This similarity of method may be considered both its strength and its weakness. Its strength lies in the apparent continued popularity of Darwinian biogeography by the great majority of practitioners in historical biogeography. In this respect the book conforms to the generally accepted standards of the discipline. Its weakness may lie in the uncertainties that continue to be expressed or hinted by some contributors, particularly those utilizing the appeal to future research as a rhetorical device, and the absence of non-Darwinian contributions in the dialogue (cf. Morrone, 2001). The layering of biological and geological narratives that exemplifies historical approaches to the Caribbean in this volume also remains methodologically problematic in that biogeography is rendered devoid of empirical content (Craw et al., 1999).

Tectonic patterns received greater attention in the first volume although they were poorly correlated, if at all, with biogeographic patterns and the current volume fails to address the issue at all. One may need to look to a future volume to effectively provide a spatial synthesis of biogeographic and tectonic patterns in the Caribbean (cf. Heads, 1990). As a compendium of phylogenetic and geographic discovery the book still stands as an essential source of geographic and systematic information for future research into the origins and evolution of the Caribbean biota. For the critical review of conservation ideology and politics, in particular, the editors of this volume must be congratulated.

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