BOOK REVIEWS
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Foreigners treat New Zealand more as a source of familiar anecdotes than as the remarkable evolutionary experiment that it is. Every biologist knows about the remarkable kiwi, the mighty moa, the three-eyed living fossil tuatara, the lost world of Gondwanan relics, the island ark, the predator-free Eden, and so forth, from the pages of their undergraduate texts. These familiar tales barely scratch the surface, though. New Zealand is, and especially was, a land of surpassing weirdness. Colonies of petrels nested in the mountains above the snowline, where they were attacked and eaten by marauding flocks of alpine parrots. Bats rolled up their wings and scurried about on the forest floor, burrowing into the leaf litter but understandably avoiding the giant flightless crickets that were bigger than they. Flightless ducks jostled with flightless parrots, flightless coots with flightless geese. Most of them only ventured out at night for fear of a 30-pound eagle dropping on them—an eagle, incidentally, that could and probably did kill and eat humans in addition to 300-pound moa.

Why aren’t the details of this looking-glass world better known to Northern Hemisphere biologists? Since the nineteenth-century glory days of research into New Zealand’s avifauna, when Owen published paper after beautifully illustrated paper on spectacular moa bones, there have been very few avian paleontologists in New Zealand at any given moment—sometimes just one. Papers have been published in relatively obscure New Zealand journals. Popular works have been thin on the ground.

Over the last decade, this picture began to change. A flurry of long, detailed papers have been published, methodically cataloguing and summarizing fossil excavations throughout the country. The end point of this research is the present volume, the first comprehensive, book-length survey of research into the prehuman fauna of New Zealand, most of it conducted by Worthy and Holdaway themselves.

Trevor Worthy and Richard Holdaway, the uncontented authorities in this field, are the beneficiaries of a radical shake-up in New Zealand science that allowed private individuals as well as institutions to compete for funding. Both are independent researchers, unburdened by teaching and committees. Both have extensive experience in stratigraphic excavation of bone deposits from caves and swamps, the usual resting places for the subfossil bones that make up almost all of New Zealand’s avifaunal record. This book reads as their conscious effort to set a new baseline for vertebrate paleontology in New Zealand, and identify future research directions.

Worthy and Holdaway’s research has reshaped our views of New Zealand’s avifauna and ecology. The Lost World of the Moa has an arresting observation or discovery every few pages. The whole New Zealand coastline, and hillsides miles inland, were honeycombed with burrows of hundreds of millions of petrels, prions, penguins, and shearwaters, which transferred staggering amounts of nutrients from the ocean to the land. New Zealand was the last major landmass to be inhabited by humans: the ancestors of Maori arrived only 800 years ago, but previous visitors 2000 years ago left no traces but Rattus exulans, which had a head start in wiping out the smallest native species. Avian community structure varied dramatically from east to west, and with the rising and falling treeline during and after glaciations. Worthy and Holdaway point out that the largest moa was perhaps not quite as huge as is generally thought, and almost parenthetically, that the Elephant Bird (Aepyornis maximus) of Madagascar, for fifty years reflexively cited as the world’s largest bird at exactly 438 kg, was almost certainly not that large either.

They also firmly set straight some of the old and hairy anecdotes mentioned above. There is no excuse now for anyone to claim there were more than 11 moa species (at least until mitochondrial DNA is more thoroughly analyzed), or that they survived into European times. The poigniant story of Traversia lyalli being wiped out by the lighthouse keeper’s cat is deflated: forest clearance and museum collectors were equally responsible. And New Zealand is now an even more horrifying case study of human-caused extinction. Two hundred Polynesian settlers led to the extinction of moa in less than a century. “On the Coromandel Peninsula, the moa population may have survived for less than a decade after human settlement, and perhaps for as few as 5 years,” they note (p. 546). The slow replacement rate of moa made them a nonrenewable resource for humans. “Moa were mined, not cropped” (p. 546).

This research also has conservation implications for extant species. Endangered species like the Blue Duck (Hymenolaimus malacorhynchos) are routinely assumed to be narrowly adapted to their marginal, predator-free habitats. Fossil evidence routinely reveals that New Zealand birds were much less fussy before mammals arrived; Blue Ducks were found not only in the fast-flowing streams they now inhabit, but in the forest far from running water. Anyone involved in species