

entific journal was also a wise one as it helps bring this volume out of the realm of the "gray literature." It should be much more widely accessible through bibliographic sources than are previous *Perdix* proceedings. I was impressed with the editorial job done with *Perdix V* (Church et al. 1990); *Perdix VI* is another step above that proceedings.

The intended audience is obviously the professional biologist with interests in the biology and conservation of partridges, quails, or francolins. For those of us in the United States, it does highlight our rather provincial nature. For example, there are 7 papers published by American biologists and 7 papers published by Chinese biologists. I suspect that it was much more difficult for the Chinese to travel to England for the conference than it was for Americans. The pool of biologists interested in these species is probably also much larger in the United States. Readers could debate the merits or unevenness of the volume in places, or the production delays after the conference, but I believe it is a must for American quail and partridge biologists. I also recommend this volume be included in university and agency libraries. I am pleased with the results this time around, and I await the opportunity to see the results of the next conference, hopefully with an even greater representation of partridge, quail, and francolin biologists from around the world.

LITERATURE CITED

CHURCH, K. E., R. E. WARNER, AND S. J. BRADY, EDITORS. 1990. *Perdix V: gray partridge and ring-necked pheasant workshop*. Kansas Dep. Wildl. and Parks, Emporia. 420pp.

—John P. Carroll, Department of Biological and Environmental Sciences, California University of Pennsylvania, California, PA 15419.

White Ibis: Wetland Wanderer. By Keith L. Bildstein. Smithsonian Institution Press, Washington, DC. 1993. xiii + 242pp., 23 black-and-white photos, 44 line drawings, figures, 3 appendices, references, index. \$22.50 ISBN 1-56-98-223-3 (cloth).

This book is a personalized yet technical account of the author's studies of the white ibis, once and probably still the most abundant colonial wading bird of North America. In it the author shares with his readers the difficulties, joys, and passions of more than a decade of research experiences that take him from the field to the lab and from South Carolina to South America.

He begins with a description of how he first became interested in the species and goes on from there to describe how he and his colleagues followed diligently an investigative trail that took them into unexpected and initially unfamiliar fields of biology.

The first chapter is an account of the many cultural connections of ibises with humans and of early natural

history writings about the white ibis. On the basis of accumulating evidence (e.g., Hancock et al. 1992), the author accepts that the white ibises of North America are conspecific with the predominantly red scarlet ibises of South America. Acknowledging the close relationship of these 2 forms is of consequence in that he later will make important extrapolations from one population to the other.

The book then describes the various aspects of the author's studies, including the situation at his primary study area in South Carolina where he undertook studies of feeding and nesting biology. Chapters cover their breeding, development, feeding, habitat use, physiology, and their ecosystem role—a part of a long-term ecological research program at North Inlet, South Carolina. He also shares his experiences with scarlet ibises in Trinidad and with hurricane Hugo. Throughout, the author gives a keen sense of the challenges, the confusions, the successes, and the sheer joy of doing field biology.

The part of the story I would like to emphasize is how basic science solved a long-standing problem in ibis conservation. The white ibis is primarily a coastal species, although even my own early studies had produced puzzling data suggesting that coastally nesting birds were at a reproductive disadvantage. The white ibis is a crustacean specialist, eating primarily fiddler crabs and crayfish, food that the normal vertebrate biologist might consider to be interchangeable. Why then did adult ibis, which are perfectly happy at other times to eat crabs, fly distances during nesting to feed their young crayfish?

Bildstein followed his hunches that the question would be resolved by better understanding ibis physiology. In collaboration with physiologist Jim Johnston, Bildstein took his subjects into the lab (not an easy job in itself) to study how ibises could physiologically handle the high salt content of marine prey. The bottom line was that nestling white ibis were unable to tolerate a high-salt diet, thus explaining many long-standing problems of white ibis nesting biology, food choice, and use of habitat. It also provided an immediate conservation application: despite nesting on coastal islands and frequenting salt marshes for much of the year, ibises also require freshwater wetlands for successful nesting.

The real conservation payoff, however, came a little later, when Bildstein turned his attention to one of the greatest puzzles of ibis conservation, the long-standing lack of nesting by scarlet ibises in their most famous sanctuary in Trinidad. One of the two national symbols of Trinidad and protected (at least on paper) for decades in their mangrove swamp roost sites within the Caroni Swamp, the scarlet ibis no longer bred in Trinidad much to the consternation of local tourist officials. Why? The answer, Bildstein found, was back in the lab in South Carolina. Development of the few freshwater marshes found on the island had eliminated the inland feeding sites necessary for ibises to nest successfully. So adults, while perfectly capable of using the protected mangrove swamps for themselves, abandoned nesting there due to habitat alteration elsewhere. Looking at the Trinidad situation in isolation, no one would have thought that this coastally nesting species had been so affected by inland habitat change. Only the basic

research conducted elsewhere extrapolated to Trinidad allowed the answer to emerge.

The second great story, not yet resolved, is that of the effects of Hurricane Hugo. White ibises are tricky birds that will move their colony sites at the first provocation, or as far as we can tell at no provocation at all. The hurricane swept across the colony site, altering the landscape a bit and reducing their subsequent nesting numbers. The recovery of habitat and populations is now underway and can be monitored by interdisciplinary teams. But what could now be understood if the early base line studies had not been conducted, having no idea that a catastrophic event was coming? As we come to appreciate better the critical role that nonrecurring, density independent, "catastrophic" events may play in population stability and community development, the value of long-term, multidisciplinary studies should become even more evident. It is long-term monitoring and studies such as those at North Inlet that will provide the basic research base needed to answer future questions of significance to the management of wildlife resources and their habitats, questions that now we are not even capable of asking.

LITERATURE CITED

HANCOCK, J. A., J. A. KUSHLAN, AND M. P. KAHL. 1992. Storks, ibises, and spoonbills of the World. Academic Press, London, U.K. 385pp.

—James A. Kushlan, Department of Biology, University of Mississippi, University, MS 38677.

A Practical Guide to Producing and Harvesting White-tailed Deer (second ed.). By James C. Kroll. Institute for White-tailed Deer Management and Research, Center for Applied Studies in Forestry, College of Forestry, Stephen F. Austin State University, Nacogdoches, TX. 1992. xii + 591pp., 53 illustrations, 5 tables, 7 color photographs, 279 black-and-white photographs, index. \$40.00 ISBN 0-938361-09-0 (cloth).

This interesting and thought-provoking book comes at a time of great user and manager interest in white-tailed deer. Kroll's purpose in producing this book is to combine information on production of deer with information on harvesting methods. The book is aimed at a sophisticated general public audience that "demands an in-depth manual aimed specifically at production and harvesting . . . written in easily understood language" (p. 2).

Kroll's stated philosophy of deer management is that deer exist as a product of management, and intensive management is the paradigm he prefers. This is in contrast to the extensive management familiar to many of us in the public sector. The entirety of the book is developed around these key concepts.

A Practical Guide is divided into 3 sections: "Bi-

ology and Management", "Harvesting Whitetails", and "Socio-economics of Whitetail Management and Hunting". The primary material of interest to wildlife professionals in the section "Biology and Management" where Kroll covers the gamut of basic life history and management. Several chapters in this section contain some new information collected by the author and his students.

Kroll's chapter "Population Management: the Basics" contains a thorough and well-explained treatment of population ecology that is understandable to most biologists, but probably still out of reach of a general audience. His treatment of antlerogenesis, nutrition, and genetics is likewise useful reading for the biologist. The material on hunting is enlightening to anyone "hooked" on deer hunting. The photographs, largely by noted photographer Mike Biggs, are superb and add a touch of class throughout the book. There are, unfortunately, a number of illustrations referred to in the text that are missing.

A Practical Guide is an effort to provide a general purpose handbook for deer management. The practical reality is that white-tailed deer occupy such a broad range in North America and use a broad spectrum of habitats making development of a comprehensive management guide difficult (Hunter 1990: 247). Much in Kroll's book is still largely applicable only to areas where managers can exert complete control over large areas of deer habitat so that habitat and harvest strategies can be effective. The agricultural Midwest and the Northeast are examples where this level of land control is unattainable except perhaps where large public land holdings can be devoted to intensive deer management. The intensive level of management called for in this book is yet to be tested in northern regions where winter severity is high and the carrying capacity of winter thermal cover is low.

My primary concern with this book is that it has been promoted extensively in a prominent outdoor magazine. Because I am not certain this book is clearly understandable by all potential audiences, I am concerned that it may lead to misunderstandings between deer managers and sportsmen in areas where Kroll's methods are untested. Deer hunters are becoming increasingly sophisticated and are constantly seeking technical information to aid them in their sport. However, such information can be easily misunderstood by those not trained to understand biological and ecological limitations and critical evaluation of scientific research.

I think all deer managers/researchers should read this book. There is much in this book of value to professionals, but I question the value to a general public audience.

LITERATURE CITED

HUNTER, M. L., JR. 1990. Wildlife, forests, and forestry. Prentice Hall, Englewood Cliffs, N.J. 370pp.

—Roger D. Applegate, Wildlife Division, Maine Department of Inland Fisheries and Wildlife, 650 State Street, Bangor, ME 04401.