

Book Reviews



EDITED BY R. TODD ENGSTROM

The following critiques express the opinions of the individual evaluators regarding the strengths, weaknesses, and value of the books they review. As such, the appraisals are subjective assessments and do not necessarily reflect the opinions of the editors or any official policy of the American Ornithologists' Union.

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Ecological and Environmental Physiology of Birds.—J. Eduardo, P. W. Bicudo, William A. Buttemer, Mark A. Chappell, James T. Pearson, and Claus Bech. 2010. Oxford University Press, New York. x + 328 pp., 60 illustrations. ISBN 978-0-19-922844-7 (Cloth, \$125.00), ISBN 978-0-19-922845-4 (Paper, \$65.00).—The need to better understand how birds work—their physiology and anatomy in relation to their ecology—continues to grow as environmental challenges such as climate change demand reliable predictions of how birds may respond to relatively dramatic changes in the environment. Their cosmopolitan and mobile nature makes birds ever popular as well as excellent bio-indicators for the health of our planet's ecosystems. Thus, those of us who study birds must continue to learn more about them, as attention on birds seems well placed and growing. How can we make sure that our understanding of the basic biology of birds stays current in the face of the burgeoning literature? How about having some of our trusted colleagues provide us with a state-of-the-art review that summarizes recent advances, provides us with an entry into the primary literature on the topics, and points out unknowns that require further study.

Oxford University Press bets that we would appreciate (and purchase) these types of reviews and has begun publishing, under the watchful editorial eye of Warren Burggren, a series of volumes that provide an overview of the ecological and environmental physiology of different taxa. The first volume focused on amphibians, and this second one focuses on their more distant and popular relatives, the birds. The series is designed to provide state-of-the-art reviews on the physiological ecology of key taxa that should be of interest to graduate students and researchers. *Ecological and Environmental Physiology of Birds* accomplishes this state-of-the-art review and provides a worthy supplementary text for those teaching various “-ology” courses (e.g., ornithology, comparative physiology, vertebrate biology, and wildlife ecology) as well as for researchers who would appreciate a book-length review of key topics in avian physiological ecology.

The importance of a bird's physiology and anatomy was appreciated even in the first ornithology texts, although it was typically presented from a functional-morphology perspective—for

example, the four-chambered heart provided separation of oxygenated and deoxygenated blood, the air sacs of birds enabled a flow-through respiratory system, the digestive system was relatively simple and was distinctive from that of mammals in having a gizzard that replaced functional teeth. We have entered a new age in our understanding of avian physiology that acknowledges the merits of functional morphology while highlighting the impressive phenotypic flexibility of physiological systems and the tight linkages between avian ecology and physiology. This new textbook, co-authored by some very qualified ornithologists and physiologists from throughout the globe, is firmly consistent with this contemporary perspective of avian physiology.

The book begins with a “Blueprint of a bird,” a summary of the functional morphology of birds, including the evolution of birds and adaptations for flight, and a second chapter that describes basic physiological principles (i.e., gas and heat exchange, energy flow, and water and ion fluxes) and their implications for birds. Summarizing such far-reaching topics in a concise manner is a formidable challenge, and I found these first two chapters to be unsuccessful primarily because the author(s) did not find the right balance between dense descriptions of key topics, effective visuals to depict key concepts, and eclectic yet intelligibly detailed descriptions of key concepts. I suspect that many readers who are unfamiliar with the topic or have forgotten the traditional physiological principles that they learned in a basic vertebrate physiology course will consult other fine textbooks for figures and descriptions that clarify these concepts. On the other hand, these chapters provide a succinct, factual, well-referenced, and contemporary review of these topics so that the interested reader can easily delve deeper into topics of particular interest.

The next five chapters focus on important contemporary topics in avian physiological ecology: the physiological basis for fecundity–longevity tradeoffs; nutritional ecology and digestive physiology; physiological adaptation associated with living in arid, cold, and high-altitude environments; neural and sensory physiology; and developmental physiology. These five chapters constitute more than 60% of the book volume, are the heart of the book, and warrant the price of admission. As promised, these chapters

provide state-of-the-art reviews on these key topics in physiology that should be helpful to graduate students and researchers who appreciate a succinct synthesis that provides key inroads into the literature on these topics.

The eighth chapter provides an overview of contemporary methods for measuring energy expenditure and movement patterns of birds, and a reminder of many of the new stable-isotope and molecular methods that avian physiologists and ecologists have at their disposal. The brave new world of ornithology is incredibly bright if we all embrace these new technologies and understand both their promise and limitations. The book ends with a concluding chapter on selected future directions that highlights several of the current “hot” topics in avian physiological ecology, although within this final six pages the authors have tried to inspire us rather than provide details about fruitful future directions.

In general, this book achieves the goal of this series in providing a succinct state-of-the-art review on the physiological ecology of birds. Graduate students and researchers interested in updating their knowledge of this field will be well served by this book. The lack of figures and other illustrations to depict key concepts, and the relatively brief reviews of key topics, make the book less appealing for use as a textbook for an upper-division course. However, it has much value when placed next to your favorite ornithology and physiology text(s) so that you can use it as a fine supplement as you prepare your lectures, when you need reminders of the breadth and depth of a key topic, or as you plan your next research project.—SCOTT R. MCWILLIAMS, *Program in Wildlife & Conservation Biology, Department of Natural Resources Science, University of Rhode Island, Kingston, Rhode Island 02881, USA. E-mail: srmcwilliams@uri.edu.*

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Living on the Edge: Wetlands and Birds in a Changing Sahel.—Leo Zwartts, Bob G. Bijlsma, Jan van der Kamp, and Eddy Wymenga. 2009. KVN Publishing, Zeist, The Netherlands, 564 pp. ISBN 9789050112802. Hardcover, \$130.—Most North American ornithologists know that the Sahel is that semitropical zone between the Sahara and tropical Africa, and that R. E. Moreau's classic early-70s book on bird migration in Africa identified this then little-known area as of importance to wintering Palearctic migrants. They may also recall it as the site of massive human suffering in the drought of a couple of decades ago. Beyond that, unless one is studying the birds that use the zone or has wanted to visit Timbuktu, most North Americans don't know much more and haven't much compulsion to learn. Palearctic ornithologists know and care more, but their source materials have been limited. For those not working on Palearctic migrants, why should precious time be spent on a book that is essentially regional in focus and outlook? The reasons are several: it is a wonderful book, well written, well illustrated, well presented, and that is a rare joy;

it is an even rarer example of excellence in primary scholarship at the book scale of publishing; it is a model of wise use (and in some cases deliberate nonuse) of existing data; it tells an important tale of the complexity of unraveling environmental change; and it is a case-history harbinger of what likely is to come to other parts of the globe, because it is in the Sahel that the effects of climate change are not modeled predictions but real and compelling facts on the ground.

This book aims to reveal the ecology of the Sahel and the Palearctic birds that use it, particularly waterbirds. Why waterbirds in the seasonally desiccated landscape of the sub-Sahara? Because it is also a landscape containing dry-country rivers, wetlands, and lakes, including the Niger River and Inner Niger Delta, the Senegal River and Senegal Delta, Habesja-Nguru floodplain, Lake Chad and its basin, and the Sudd, habitats used by a half billion European birds (more or less). The Sahel first came to my attention years ago when it was unexpectedly discovered that survivorship of southern European Purple Herons was correlated not with what was happening in Europe but with rainfall in the Sahel, inversely so. It turns out that about a quarter of European birds migrate seasonally to the Sahel during the northern subtropical drying season, and these species are, for the most part (75 of 127), in a state of population decline. Conditions in the Sahel are a prime candidate by way of explanation. The climate in the Sahel has been changing complexly for thousands of years, and over the last decades mostly getting drier, although somewhat wetter more recently. The authors show that of all the proposed explanations, this drying is most closely correlated with ocean warming—global climate change in action. They explore why most climate-change models do not detect the Great African Drought of 1972–1992 and find that the most acceptable of current models show a continuation of current conditions with further drying in subsequent decades, thus setting the stage for critical bird-conservation issues of the future. For today, the current problems are people-caused.

The first chapters are analyses of the abiotic and biological characteristics of the Sahel, including climate, vegetation, rivers, and land use. These are clearly written, full of original analyses, superior interpretation of the literature, excellent illustrations, and mind-bending use of original modeling and satellite data—a tour de force of geography. They show, for example, that, contrary to the previously accepted paradigm, which once underpinned the Desertification Convention, desertification is more the result of climate change than of human activity, which can, however, prolong drought recovery. Massive human population increases and urbanization, increases in farmed land and the elimination of land rotation, dams and water use, destruction of native forests for charcoal, planting of insect-free trees, hunting, and elimination of the once huge herds of grazing wildlife—much of this in the past 50 years—all contribute to a continuation of the pattern of habitat loss for birds, which began in drought.

The second part of the book devotes chapters to the great wetlands and to rice farming. The Inner Niger and Senegal deltas are treated in most detail because they are the better known. Dams, irrigation, land-use changes, climate change, and population pressures have changed the way these Sahel wetlands function. The seasonal flood pulse and seasonal dry-down have been altered to the extent that 15–20% of the floodplains of the Inner Niger Delta have been lost and the Senegal Delta was converted

from a wetland of seasonally fluctuating salinity to freshwater. The Goliath Heron, five species of storks, and the Hammerkop, all abundant in the 1930s, no longer are found or breed in the Inner Niger Delta, because of both habitat change and human consumption. On the other hand, over 100,000 pairs of colonial waterbirds (in large part Cattle Egrets) are estimated to still nest in the Inner Niger Delta, and wintering waterbirds still number in the millions. In the Senegal Delta and Hadeija-Nguru floodplains, dams have totally changed the hydrology and led to invasions by exotic plants. Active management using artificial flooding to simulate a more natural hydrology has maintained the conservation values of Djoudj and Diawling national parks, which, although mere patches of remnant habitat, support hundreds of thousands of waterbirds. The world-famous story of the “drying of Lake Chad” is well covered and shown to be much overblown in the public mind, the danger coming not so much from the long-term trend of drying as from governmental determination not to learn the clear lessons from elsewhere but to continue to plot and scheme to stabilize lake levels. The Sudd, the largest wetland of the world, is also one of the least known; little more is known now than in Moreau’s time. Unfortunately, according to the authors’ analyses, the most complete survey of waterbird numbers for the area seems to be wrong. In fact, throughout the book, the authors work very hard to get the best possible population estimates by evaluating a hodgepodge of census and survey data of varying methodology, quality, and extent that they have procured from various sources for the individual species, the major wetlands, and the Sahel as a whole. They call bad data bad data, estimates estimates, and complain clearly about the pitfalls in existing monitoring data, much of which is very poor and lacking in any sense of error estimation. They present their numerical guesses as best they can; I have little doubt anyone has done it better. They similarly do what they can with migration and winter mortality data.

In the third part of the book, 31 chapters are devoted to the birds. The first, 40 pages long, details how the Sahel serves as the wintering area for the northern continent; the second explains the role of locusts; and the last three discuss the Sahel in relation to Europe. In between, chapters of a few pages each cover individual species of European migrants, mostly waterbirds, including status, trend, migration, and distribution, nearly all with maps of banding recoveries. The book ends with an analysis of the connectivity of the Sahel with European bird trends, an exceptional attempt to discern trends and causality from messy data. Almost 1,450 references, an excellent index, and technical chapter endnotes support the materials covered.

This is a book that has interesting things to say on most pages and real treasures on some. Although the book is multi-authored, its voice is amazingly consistent throughout. The figures and color photographs are superior; the latter not only illustrating the point being discussed but also revealing the harsh beauty, mystery, and human face of the region. The authors set out on this project in the early 2000s, when they realized how little information was available. They decided to get control not only of the literature but also of unanalyzed databases and to do original analyses, modeling, and field research as required to more fully understand and tell the story. This original research makes the book special. The overall impression one takes from each of the chapters is that the authors speak authoritatively. They have no hesitancy in taking on

long-held views and prior misanalyses or in drawing conclusions from the literature and their own analyses that ring both true and fair. It is a book to be recommended to ornithologists and bird conservationists alike, worldwide, and a necessity for any university library.—JAMES A. KUSHLAN, P.O. Box 2008, Key Biscayne, Florida 33149, USA. E-mail: jkushlan@earthlink.net.

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The Wilderness Warrior: Theodore Roosevelt and the Crusade for America.—Douglas Brinkley. 2009. HarperCollins, New York. xv + 940pp., ISBN 9780060565282. Hardbound, \$34.99; Paperback, \$19.99.—This book’s subtitle could as easily have been “Theodore Roosevelt as Ornithologist and Bird Conservationist.” The dust jacket introduces the book as an examination of the naturalist president, and so it is. Most Americans know from their history books and communal cultural literacy about the Theodore Roosevelt of the Rough Riders in the Spanish-American War, of trust busting, big-stick foreign policy, the Panama Canal, and big game hunting. The more historically minded might know of his Nobel Peace Prize, his devotion to the strenuous life, and his Bull Moose progressive movement. Some even may know that his death was hastened by his South American explorations. Conservationists know him for setting aside public lands that eventually became the first and still greatest national system of wildlife refuges, parks, and forests in the world. What may not be so well known is why he did this, and exploring this question is the core goal of Brinkley’s book. Theodore Roosevelt never meant to be president; he meant to be a great American naturalist. In fact, in his early life he devoted himself to studying birds, and later he was indeed one of the leading mammalogists of his era. Few ornithologists or present-day birders know, I dare say, that he was at his very core one of them.

To set the stage, it is valuable to appreciate his political milieu, and that he was an accidental president. He never could have been nominated on his own because of his progressive social policies, liberal economic policies, belief in government, and obsession with conservation. While his ascension to the presidency via assassination was accidental, so was his being vice president in the first place, owing to the New York powers being anxious to get him out of the state, where as governor he annoyed them by setting aside parks; reorganizing management of public lands, fish, and wildlife; and overseeing the destruction of the New York-based millenary trade, which was killing millions of birds for their feathers, as well as wanting to tend to the social ills of the city. But not owing his ascension to power to anyone, he did what he wanted, letting the chips fall where they might. And what he chose to do was tend to the preservation of wilderness and, very deliberately, the total protection of nongame birds. The American conservation movement was well underway when Roosevelt became president, but he legitimized it. By the end of his first term, America was electing governors and members of congress who followed

his progressive social and conservation agenda, thereby helping secure the legacy. By the end of his life, conservation was a core American value.

Also to set the stage, it is valuable to recall where biology was in Roosevelt's time. It was just coming to be professionalized and was still debating the validity and extensions of Darwin's theories (published the year after Roosevelt's birth). And this is what the young Roosevelt wanted to be and, in fact, became—a Darwinian-trained biologist. It was an acceptable ambition for a gentleman from a wealthy, well-respected, indulgent, civic-minded family. Frank M. Chapman (curator of birds at the American Museum of Natural History [AMNH]) was a banker with family wealth and a high school education. C. Hart Merriam (chief of the precursor to the Biological Survey and later the Fish and Wildlife Service) was a medical doctor, as was Elliott Coues. William Brewster (curator of birds at Museum of Comparative Zoology) never attended college. Gifford Pinchot (first director of the Forest Service) had one year postgraduate work and was from a family made wealthy by timber exploitation. In the cause of professionalizing ornithology, the untrained naturalists Coues and Brewster, along with J. A. Allen, founded the AOU in 1883. This occurred when Roosevelt was 25 years old, just about the time when he gave up his ambition to be one of them.

The book covers 917 pages of text backed up by 75 pages of clear and revealing notes and takes a combined chronological and thematic approach. Brinkley examines Theodore's childhood education, which he couches in terms of the education of a Darwinian naturalist. He then looks successively at the diverse influences on Roosevelt's life, such as the animal rights movement that was part of his family's legacy; his black-sheep uncle Robert R. Roosevelt, the greatest fish conservationist of any era; his early outdoor and wilderness experiences; Harvard; his life as a western cowboy; big game hunting and game protection; relationships with the great naturalists of the day; government service; the Spanish American War; and his later outdoor, wilderness, and hunting experiences. Then Brinkley segues into Roosevelt's presidency and how he went about nationalizing resource conservation in America. Brinkley ends his story as Roosevelt leaves office in 1909, skipping the final 10 years of his great European tour, his Bull Moose insurgency, his 90-minute speech given with a bullet lodged in his chest, his South American expedition of discovery, and his death in 1919. Although the author's series of books on the American conservation movement picks up from this point, it remains a surprising ending for the storyline of this particular book, as it skips the opportunity to share some of Roosevelt's most transcendent statements on conservation. However, by 1909 Theodore Roosevelt had accomplished the work to which his life was dedicated, and to which this book is dedicated to explaining—the preservation of wilderness, the human need it nourishes, and the birds and mammals it supports.

Brinkley begins the book by examining Theodore's early life and its influences. The story that all know is that of his sickness. Although that was something he had to deal with, its impact on how he was perceived as a child has been a bit overblown. The more compelling story is that of his infatuation with natural history, which was accomplished despite, not because of, his respiratory issues, a devotion that continued well into college. He collected birds, starting on a family trip to Egypt. He taxidermied

specimens, having been taught by the famous John Bell, John James Audubon's New York City-based taxidermist. He created a personal natural-history museum, eventually donated to the National Museum of Natural History and the AMNH, which his father had cofounded. He took notes on his observations and made Darwinian interpretations of birds and mammals. He struggled with bird identifications before the advent of picture guides, keeping detailed daily notes of the birds seen in an era when determining bird distribution was a great scientific contribution. Feeding his photographic memory, he read natural history prodigiously, keeping by his side for much of his life copies of Darwin and Audubon. In 1879, he published *Notes on Some Birds of Oyster Bay; Long Island*, which was praised by C. Hart Merriam in the Nuttall Bulletin. He delivered a major paper before the Harvard Natural History Society on the *Coloration of Birds*.

The book chronicles in detail when and why Roosevelt made the shift from biology as his all-consuming passion to something else. It was midway through college at Harvard, which he soundly criticized for not having biology professors who cared about birds and mammals in the wild rather than under a microscope—a complaint familiar to each succeeding generation of young organismal biologists. As Brinkley argues, being autodidactic, Roosevelt was unimpressed with classroom pedantics, believing that natural history was done on horseback in buckskins in the wilderness, in the Audubon tradition. At the same time his father, the greatest influence in his life, died. He came to feel the need to provide for himself and eventually a family, and so did not see biology as a way to that end—a realization also familiar to many a senior biology student. He was turning his attention to the satisfactions of public service and the monetary rewards of writing. Biology was just not a feasible career.

As he finished college, while his life as an amateur ornithologist continued, that as a writer, public servant, and conservationist began in earnest. He continued throughout his life to record birds he saw and their habits, moving easily from the era of documenting distribution to that of documenting behavior. He sent letters to Chapman contrasting his observations of the Bewick's Wren's song and the Blue Grosbeak's plumage with those of Chapman's *Birds of the Eastern United States*. He puzzled over sparrows, writing to Chapman that "The Swamp Sparrow to me [is] in color scheme and even in voice...more like a spizella than a zonotrichia." In his last days at the presidential desk in 1908, he made a list of the 93 species of birds he had seen while he was at the White House—according to his notes, in 1907 five Black-crowned Night Herons spent the winter about a half mile west of the Washington Monument.

His observations of birds—in his childhood, during long stays in the western territories, in travels to Florida and Cuba in the war, in his imperial acquisitions in Panama and Puerto Rico, and everywhere else he went—served as the basis for his conservation ethic for birds. The stage was well set for this devotion, as the conservation movement and the bird conservation movement, led by Roosevelt's mentors John Burrows and Frank Chapman, respectively, were well underway. Brinkley makes frequent (perhaps too frequent) reference to the ascendancy of "Citizen Bird," a name taken from the 1897 book by Mildred Osgood Wright and Coues that anthropomorphized the value of birds to a generation of children as "American Citizens that should be protected." Roosevelt

believed this. He was a bird preservationist who early understood the need to save sites, particularly of the congregatory species of which he was so fond. He opposed killing nongame birds and supported states adopting the AOU Model Law to protect them. The Lacey Act of 1900 federalized the crime of interstate transport of birds killed in violation of state law. When Florida, in 1901, passed the AOU Model Law, the war against the plume trade began in earnest with Roosevelt's full support. There being no money for hiring wardens, he took advantage of the AOU Thayer Fund that aimed to protect waterbirds along the U.S. East Coast, so as to provide the manpower for enforcement that the federal government lacked, creating the federal–state–NGO partnership that characterizes bird conservation in the United States to the present.

Above all, Roosevelt loved waterbirds, perhaps under the influence of his Uncle Rob, who besides being the founder of the American fish conservation movement authored *Florida and Its Game Water Birds*. Among the waterbirds, Theodore loved pelicans the most. It is not happenstance that on their behalf he undertook one of the most audacious moves of an American president, declaring in 1903 on his own authority and with minimal consultation within the Government that the Pelican Islands along the Florida east coast were to be a federal bird reserve. It should be appreciated that this was well before the Antiquities Act gave him such explicit authority. Chapman had persuaded him and he acted, and not for the last time. Roosevelt personally knew the waterbird colonies of the Florida west coast from his stay there before the War. He learned of California, Gulf Coast, Alaska, and Pacific bird colonies from his naturalist correspondents. These too he declared to be federal bird sanctuaries, sending the navy to protect Midway Island albatrosses from Japanese hunters. In all, he declared 51 bird sanctuaries, the kernel of the U.S. Fish and Wildlife Service Refuge System. Add to this the national forests, monuments, game reserves, and parks; by the end of his presidency, he had set aside 230 million acres.

Brinkley makes the point that this preservationist conviction has been confused and underappreciated by mainline historians more fascinated by Roosevelt's obsession with big game hunting. The author works through this thoroughly and with sound insight. Hunting large and dangerous game animals on foot and on their own terms, alone or with a guide, was something traditionally American and something needed for a strenuous and fulfilled life. This activity was not to kill for killing's sake or even to kill for eating's sake, although both were expected; it was for fair sport and self-edification and with a respect for the animal that mirrored that of Native Americans. When Roosevelt understood that big-game mammal populations were crashing in the West, he immediately founded the Boone and Crockett Club to lead the fight for large-mammal conservation, and also the New York Zoological Society, where he intended that bison be bred for release on newly protected land. And it is for these large mammals that he declared four national game preserves and some of the national

monuments. His views on predators evolved: they were to be exterminated where the game was not yet restored but protected when the game began thriving. He would have approved of Yellowstone's wolves. Roosevelt indeed was a reigning biological expert on wolves, cougar, bison, and elk, which provided the raw materials for much of his well-received outdoor writings. From the time he was president, a museum biologist could readily identify most of his hunting as "scientific collecting." His well-curated specimens (minus the ones going on the wall at Sagamore Hill) were shipped to Merriam to be used to address the pressing question of the moment, subspecies. After his presidency, he took off to Africa with specific plans to collect for his museum colleagues.

In *Wilderness Warrior*, Douglas Brinkley clearly set out to trace the influences on Theodore Roosevelt's life; but also, it would seem, to redefine our understanding of the very character of that life, no easy feat for such a well-studied historical figure. If these were his goals, he has accomplished them completely. Of course there is much more to this book than the focus of this review. There are broader insights, including the influences on Roosevelt of the American West and of the great poet-naturalists of the day, his social consciousness, his demand for the end to corruption, his need for a strenuous life, his family, and his obsessiveness. But in the process of telling the story, Brinkley has brought to the forefront the critical role of birds in Roosevelt's life and the role Roosevelt played in the preservation of American birds. Late in life, in 1916, Roosevelt offered this defense of bird conservation, which only a technically knowledgeable bird lover could have written and few have bettered:

Birds should be saved for utilitarian reasons; and, moreover, they should be saved because of reasons unconnected with dollars and cents.... The extermination of the passenger-pigeon meant that mankind was just so much poorer...and to lose the chance to see frigatebirds soaring in circles above the storm, or a file of pelicans winging their way homeward across the crimson afterglow of the sunset, or a myriad of terns flashing in the bright light of midday as they hover in a shifting maze above the beach—why, the loss is like the loss of a gallery of the masterpieces of the artists of old time.

Brinkley begins his book by recounting an event in the winter of 1903 when Roosevelt arrived at a Cabinet meeting in a state of agitation, asking, "Gentlemen do you know what happened this morning?" As they awaited the bad news of great social or political import about to be delivered by the president, he went on, "Just now I saw a Chestnut-sided Warbler, and this is only February." To the great relief of the cabinet, they knew that it was President Roosevelt, the ornithologist, speaking. This is a book for all public and institutional libraries, and for the private bookshelves of bird conservationists and ornithological historians. It is time to claim for Theodore Roosevelt a better appreciation of his rightful place in the history of American ornithology—JAMES A. KUSHLAN, P.O. Box 2008, Key Biscayne, Florida 33149, USA. E-mail: jkushlan@earthlink.net.