

REVIEWS

EDITED BY WALTER BOCK

A field guide to the birds.—Roger Tory Peterson. 1980. Boston, Houghton Mifflin Company. 384 pp., 390 maps, 136 color plates. \$15.00 (cloth), \$9.95 (paper).—It has been nearly half a century since the first Peterson field guide was published, and the impact of that work on field ornithology and field identification has been tremendous. Peterson has transformed the approach to bird identification, has helped birding become one of the most popular avocations in the country, and has made many significant contributions to both ornithology and conservation. His work has served as a paradigm for a multitude of field guides covering most regions of the world, and most if not all of today's field experts began their studies under the tutelage of the man known without dispute as the dean of American birdwatchers. The organization, accuracy, and simplicity of Peterson's field guides are excelled by none and, while this new edition is not without its problems, any flaws in the work are certainly overshadowed by its author's considerable accomplishments.

The fourth edition of "A field guide to the birds," covering the birds of North America east of the Rockies, has been anxiously awaited for almost a decade. This edition is not a minor revision of the previous volume; the plates have all been redone, every species is now shown in color, and the number of plates has more than doubled. While the useful system of arrows pointing to key characters has been retained, the number of species per plate has been reduced and the figures enlarged. Six plates depicting accidentals and one covering selected exotics are new features. A new format has been used, with the text facing the corresponding plates, and the text has consequently been condensed. Range maps covering those species regularly occurring in eastern North America are an additional new feature.

In analyzing the new plates I naturally compared them to those in the previous edition. The larger size of the figures in the new volume has enabled the artist to show more detail, and while one would expect more detail to be accompanied by greater accuracy that is unfortunately not always the case in these new plates. Some plates (e.g. vireos with wing bars, p. 229) are superb and represent a marked improvement over those in the previous edition; others, however, are less accurate than their predecessors. The *Catharus* thrushes are too plump and are shown in a posture that suggests that they walk like an Ovenbird rather than hop as thrushes typically do. The bluebirds, especially the female Eastern, appear too large-headed. The winter loons, particularly the Common and Arctic, are better illustrated in the previous edition, as are the chickadees, especially the Black-capped. In many instances the colors were more accurately depicted in the older work. For example, the female Summer Tanager is too green in the new edition and is shown as more closely resembling the female Scarlet Tanager than it really does. The adult female "Baltimore Oriole" is not orange enough, and the upperparts of Veery are much too dull.

More misleading than the misrepresentation of color and shape are the errors found in the warbler plates. Without question, the worst plates in the new guide are the "confusing fall warbler" plates (pp. 248–249), which are quite similar in both appearance and organization to the corresponding plates in the 1947 version. It would be best for the field observer to ignore these plates and rely on the fall (variously labeled female, immature, and winter) birds portrayed in the species accounts, as they are for the most part correctly illustrated. Although some of the new figures are more accurate, the misleading labeling and the contradictions between the illustrations accompanying the species accounts and those on the fall warbler plates are bound to confuse all but the trained observer. For example, compare the face patterns of the two female Hooded Warblers, the coloration of the two fall (female) Bay-breasted Warblers (labeled winter in the main text), the face patterns (especially the lores and eye rings) of the two female Common Yellowthroats, and the bill shapes of the two Nashville Warblers. Other errors in the warbler plates are exemplified by the Louisiana Waterthrush, which is shown with clean white underparts and a supercilium of even width; in reality, this species has pinkish-buff lower flanks that *contrast* with the rest of the white underparts and a supercilium that broadens behind the eye.

The errors are by no means confined to the warbler plates. The Yellow Rail is shown with only a small white patch on the secondaries, when in truth this rail has a much bolder white stripe that extends well out onto the primaries. The immature Laughing Gull is shown with white rather than dark outer tail feathers, and the head of the immature Glaucous Gull is shown with a very atypically colored and incorrectly shaped bill. The female Lazuli Bunting is portrayed as being a richer brown than the Indigo Bunting when in actuality it is a paler, duller bird. Although the Clay-colored Sparrows on p. 283 are correctly illustrated, the Clay-colored Sparrow on p. 281 looks too much like a Chipping Sparrow.

Additional difficulties arise with the immature gulls; the particular plumages are for the most part correctly illustrated but in many cases the age has been mislabeled. For example, the third-winter Herring

Gull is in fact a second-winter bird; the second-winter Ring-billed Gull is a first-winter bird, and the bird labeled first-winter is a juvenile; the bird labeled first-winter Laughing Gull is a juvenile and the second-winter bird is actually a first-winter bird. The gull student is bound to be bewildered when attempting to sort out this confusing group and will inevitably be reduced to identifying only the adult gulls.

Errors of omission may also mislead the student of field identification. Why show the head of an adult Thayer's Gull when most of the records in the eastern U.S. are of first-winter birds? Only a light-phase adult South Polar Skua is illustrated; however, many of the sightings are of the uniformly dark immatures. These two oversights are particularly regrettable as neither species has been handled in the previous works. Another significant omission is the juvenile plumages of most of the shorebirds. In most species of waders the juvenile plumage differs considerably from the adult breeding or winter plumages. In fall the majority of adults of many species of shorebirds have passed through by mid-August, after which juveniles predominate, and for some species (e.g. Buff-breasted and Baird's sandpipers) only juveniles are likely, as the adults migrate primarily through the central United States. The failure to include the juvenile plumages can only serve to perpetuate the confusion created by this intricate family. Adding to the difficulties is the fact that Peterson has included some juvenile shorebirds (unknowingly?) and has mistakenly labeled them winter birds. The "winter" Red Knot and the swimming "winter" Northern Phalarope, for example, are actually in juvenile plumage. The smaller winter peeps appear to be in a combination of juvenile and winter plumage. Certainly, no full winter-plumaged Western Sandpiper ever shows any trace of rusty on the scapulars.

While the schematic drawings used by Peterson have many advantages they also have their limitations. The buteo illustrations reflect particularly the limitations of this style. The buteos are all shown with a similar shape and flight silhouette; however, buteos as well as most other hawks are often best identified by their distinctive shape and flight posture, particularly given the degree of variation in the plumages of these birds. Despite distinctive differences in head shape the White-crowned and White-throated Sparrows are depicted as almost identical in this regard. Observers attempting to identify *Oporornis* warblers with this guide will continue to separate the Connecticut from the Mourning only by the presence of a complete white eye ring, failing to take into account very different shape and behavioral differences (the Connecticut walks and the Mourning hops).

In being adapted to the new format, the text has been condensed while still retaining the summary of the key field marks. Though the rather chatty and informal style of the 1947 edition is more readable, the convenience for the reader of having the text immediately adjacent to the appropriate plate undoubtedly outweighs the stylistic disadvantages. The main problem with the text is that it is far too similar to the 1947 revision. It is antiquated, representing primarily the knowledge of field identification of 30 yr ago. A great deal of knowledge has been acquired in the intervening decades and has been published in a number of journals, many of which present regular features on field identification. As yet, no North American guide has incorporated this wealth of new information, and Peterson unfortunately has apparently chosen to be imitative in this regard and missed a unique opportunity. While the new guide occasionally interjects new information (e.g. mentioning and illustrating the white patch on the upper back of the immature Masked Booby), there are numerous instances where the text and plates fail to reflect the advances made. The following are some examples of groups that would have been greatly improved by the inclusion of new information: winter loons, cormorants, female and immature scoters, immature jaegers, gulls, terns (especially Common vs. Arctic), dowitchers, peeps, *Empidonax* flycatchers, pipits, *Catharus* thrushes, vireos (especially Philadelphia vs. Warbling), Brewer's vs. Rusty blackbird, Great-tailed vs. Boat-tailed grackle and female and winter longspurs. Ironically, the one reference that Peterson does cite, on the identification of accipiters (see under Sharp-shinned Hawk, p. 152), is a work of dubious value that was later partially discredited. In some cases, certain new field identification characters were mentioned yet other far more pertinent characters were neglected. For example, the text mentions the more narrowly pointed back feathers on the Olivaceous Cormorant, yet fails to point out its proportionally longer tail, a character that is particularly useful in the field. Unfortunately, it appears that Peterson not only failed to consult current experts on field identification, but also and more disturbing largely ignored the literature.

One of the especially enjoyable features in the 1947 edition was the separate section on subspecies. Though taxonomically somewhat outdated, this annotated section detailing ranges as well as plumage differences was very informative and, while space limitations may have dictated such a choice, its deletion from the new edition is unfortunate. Peterson does refer those interested in subspecies to the 1957 A.O.U. Checklist; however, there one is compelled to wade through the lengthy lists of western subspecies as well, and the A.O.U. Checklist does not discuss identification differences between subspecies. Peterson

does discuss and illustrate in the main text a few subspecies that he feels are easily distinguished in the field. Unfortunately, he did not illustrate both races of Short-billed Dowitcher that occur in the east—*L. g. griseus* (the race illustrated) and *L. g. hendersoni*. The breeding plumages of the two races differ considerably, and in fact observers familiar with only the more numerous race on the East coast (*griseus*) often mistake *hendersoni* with its solidly colored underparts for a Long-billed Dowitcher. Consequently, a great deal of confusion has arisen concerning the status of Long-billed Dowitcher on the East coast. Should Peterson revise his western guide (as is planned) it is hoped that his treatment of subspecies will be more extensive. In the west, substantial geographic barriers have led to greater isolation and morphological diversity within species, and failure to give subspecies adequate treatment will in many cases lead to confusion in determining what species a bird is, let alone what subspecies.

The range maps are by far the best new feature of this field guide. They are easy to read and outline the breeding, winter, and extralimital ranges of the species regularly occurring in the East. Particularly helpful is the fact that the state and provincial boundaries have been included for each map, making exact range delineation much easier. Also very instructive are the written comments detailing migration patterns, regular winter range (if south of North America), local population increases and declines, extralimital records, etc. Knowledge of local bird distribution is essential in becoming a better field observer as it enables one to know what species to expect and, therefore, to realize if a species is unusual. Such knowledge will lead to more critical observation and better documentation of records. The new Peterson maps are the best yet compiled in a North American field guide and will contribute significantly to the process of learning bird distribution. Despite their usefulness and relative superiority, however, the maps are not without flaws. For example, Wood Thrushes are shown summering only to extreme southern Maine when in fact they are now breeding across the entire state as well as into parts of Nova Scotia and New Brunswick. Bachman's Sparrow is shown nesting in Maryland where they have not bred for over a decade. These are unnecessary errors as the correct information is readily available. Peterson states that a thorough review of the literature was done in order to prepare the maps; however, it is unclear how extensively *American Birds* and its predecessor *Audubon Field Notes* (journals devoted largely to the discussion of bird distribution) were used. Advice from and review by experts on distribution such as the regional editors of *American Birds* certainly would have improved this section of the book. Their help would have been invaluable for those states that have no distribution books as well as for states where such books are available, as bird distribution is constantly changing and published material is often quickly outdated. Breeding bird surveys organized by the Migratory Bird Populations Station would also have been a useful source of current information on bird distribution. Although a more varied approach to the research of bird distribution than was apparently practiced by the author would certainly have improved the maps, they are nevertheless excellent and the guide is worth buying for the maps alone.

The new guide includes six plates of accidentals that have occurred in the East. Two of the plates are devoted to seabirds, two to accidentals of Eurasian origin, and two illustrate accidentals from the tropics. Brief annotations detail places of occurrence and in some cases give key field marks. The accidentals from the West have been included in list form on a separate page. These plates are helpful in that they illustrate many species not pictured in other North American guides, but they are best used in conjunction with more detailed sources, as neither the plates nor the annotations are without problems. For example, the pint-sized Greater Golden Plover is too drab and has a misshapen bill. In addition, a breeding-plumaged bird should also have been shown as most of the Canadian Maritimes records are in spring and are primarily of birds in partial or full alternate plumage. The author portrays nicely the adult Red-footed Boobies (dark and light phase) but has excluded the immature, the more important age to depict as most U.S. records have been of immature birds. Similarly, a winter-plumaged White-winged Black Tern should have been shown in addition to the breeding-plumaged figure. The long and slender bill of the Mongolian Plover is actually much more typical of the Greater Sand Plover (*Charadrius leschenaultii*). The wisdom of illustrating the Great Snipe is questionable as there is still not a valid record for North America. I'm unfamiliar with the details of the New Jersey sighting, but the circumstances of the Virginia sighting are comical and the record should certainly be disregarded. In any case, I doubt that this species will ever be recorded in North America based on its range, and its inclusion in this guide will only encourage additional erroneous reports. The annotations are in many cases misleading. For example, one might easily conclude that the Black-browed and Yellow-nosed albatross are equally likely to occur, when in fact the Yellow-nosed is the more likely in the western North Atlantic. Black-browed has still not been accepted for inclusion on the North American list although it has been recorded in Greenland and is an almost regular stray in the eastern North Atlantic. Also questionable is the inclusion on the accidental plates of some species of waterfowl (Red-crested Pochard, Shelduck, Ruddy Shelduck, Greylag

Goose, Lesser White-fronted Goose, and Red-breasted Goose) that belong in the exotic section. The exotic plate is a positive addition to this guide. It includes a number of species that one is likely to encounter in the wild sooner or later, and their portrayal here is very helpful.

In retrospect, this review of Peterson's latest field guide may seem unduly critical, but it is frustrating to see many of the advances in field ornithology made in the last 30 yr omitted from the book. Perhaps my expectations were too high, but they grew from the standard of excellence established by Peterson himself in his previous works. Glaring as some of the deficiencies in the book are, this new edition is a considerable accomplishment and is still one of the best field guides available for eastern North America; it is, unfortunately, just not fully the effort expected.—JON DUNN.

The evolutionary synthesis. Perspectives on the unification of biology.—Ernst Mayr and William B. Provine, Eds. 1980. Cambridge, Massachusetts, Harvard University Press. xiv + 488 pp., \$25.00.—Most biologists are aware of the general history of Darwinian evolutionary theory, starting with the original theory of Darwin in 1859, changing gradually into Neodarwinism by the turn of the century, plunging into the depths of despair during the early decades of the 20th century with the rise of Mendelian genetics, and finally emerging triumphantly during the period between 1936 and 1947 as the "Modern Synthesis." After this tortuous development, the concepts of the modern synthesis are closer to the original ideas proposed by Darwin in the first edition of his "On the origin of species" than most of the intervening theories of evolutionary change. The major new contribution appeared to be a knowledge of the mechanisms of heredity developed since 1900 by the Mendelian geneticists. And hence, the common belief exists that the modern synthesis of evolutionary theory developed as a natural continuation of the advances in Mendelian genetics with the major stimulus being provided by experimental geneticists working with laboratory populations of animals and plants. The books and papers of R. A. Fisher ("The genetical theory of natural selection" 1930), S. Wright ("Evolution in Mendelian populations" 1931, *Genetics*, Vol. 16) and J. B. S. Haldane ("The causes of evolution" 1932) are usually cited as marking the beginnings of the synthesis. Yet considerable evidence suggests that these views on the development of the synthetic theory are not in agreement with recorded events and the recollections of evolutionists involved with the formulation of the modern synthesis. Moreover, although the currently accepted theory of evolution is usually called the modern synthesis after the book by Julian Huxley ("Evolution, the modern synthesis" 1942), the question always remained of whether development of evolution in this period was really a synthesis, and if so, what areas of biological study contributed in any major way to it. A thorough historical analysis of the events during the decade of the synthesis was needed to shed light on these and other questions. [The dates of the synthetic decade are roughly between 1936 and 1947 or the period bounded by the presentation of the 1936 Jesup lectures at Columbia University by Dobzhansky that resulted in his "Genetics and the origin of species" (1937), and the 1947 Princeton Conference that resulted in the book "Genetics, paleontology and evolution" (1949)]. The urgency of such an analysis was obvious early in the 1970's in view of the advanced age of most of the prominent figures involved in the synthesis. At the urging of Ernst Mayr, the Committee on the Recent History of Science and Technology of the American Academy of Arts and Sciences organized a conference of two workshops meeting in May and October, 1974 plus a detailed questionnaire sent to many additional workers. The conference was arranged none too soon, as several workshop participants died shortly thereafter, and a number of important persons (J. Huxley, B. Rensch, G. G. Simpson) were unable to attend. This volume provides the published results of this conference, but it contains only a small part of the wealth of information gathered. All materials from this conference have been deposited in the archives of the American Philosophical Society.

After an introductory chapter by Ernst Mayr outlining the factors leading to the development of the evolutionary synthesis as well as those hindering it, the first section of the book covers the contributions to the synthesis from genetics, cytology, embryology, systematics, botany, paleontology, and morphology. The second contains chapters on the development of evolutionary ideas in the Soviet Union, Germany, France, England, and the United States. The final section includes a discussion of the concept of synthesis in scientific fields by Dudley Shapere, an epilogue by William Provine, and several biographical essays. The format and subjects chosen provide a thorough, integrated coverage of the events and developments of this decade and of their important antecedents. I found "The evolutionary synthesis" a delight to read, fascinating, informative, and full of ideas and information about the epoch-making books of the modern synthesis and their authors. I had read these books as a student and used them many times, but now they have come alive and have been placed in a solid historical perspective of the overall attitudes toward evolutionary theory in Europe and North America and in several biological disciplines. It is of interest

to learn that very few undergraduate and graduate courses in evolutionary theory were offered up to 1947, even in universities that were at the center of evolutionary research. Assessment of the importance or lack of importance of well-known texts during that period often differs from what would be estimated from today's vantage point.

Not only does this book provide a good history of the evolutionary synthesis, but many new scientific insights and ideas. I found myself rethinking a number of subtle and some not-so-subtle points of evolutionary theory while reading this historical work. Somehow concentration on the problems facing earlier workers and how they were overcome is automatically redirected to consideration of current questions. The species concept was central to so much of the evolutionary synthesis; successful solutions of the meaning of the species and of the process of speciation were essential to the development of the modern synthetic theory of evolution. Yet, as clearly shown in a number of articles in this book, some of the core ideas about species and speciation were not understood in 1936–47 and not even today. Two of the most important are the ecological aspects of speciation, long championed by David Lack, and the nondimensional nature of the biological species concept, advocated almost single-handedly by Ernst Mayr. Today, some workers are recognizing slowly that evolutionary theory can be developed only on the nondimensional species concept. The long-standing confusion between the origin of adaptations and the origin of species was scarcely resolved in the evolutionary synthesis because of a lack of clarity between evolutionary mechanisms and initial/boundary conditions. Is the external reproductive (e.g. ecogeographical) barrier an evolutionary mechanism or an initial/boundary condition? Its role in the speciation process is not questioned, rather its true nature within evolutionary theory. Most evolutionists still treat the external reproductive barrier as a mechanism although it appears to possess all characteristics of an initial/boundary condition.

Most interesting for this review are the two major questions posed to the members of the conference, namely: (a) Was the evolutionary synthesis a true scientific synthesis of those biological disciplines that contribute directly to evolutionary theory; and (b) Was the evolutionary synthesis a direct and natural development of experimental Mendelian genetics? I shall examine each in turn.

Development of evolutionary theory in the decade following 1936 was a synthesis, but it involved very few biological fields. Basically it was a synthesis of ideas in population genetics of natural populations and in taxonomic-geographical analyses of species and of infraspecific variation. It is quite clear that other fields did not contribute at all or not directly to the synthesis. Of the biological disciplines (i.e. process-oriented) discussed in this volume, morphology, embryology, cytology, and paleontology did not contribute to theory development during this period. Fields such as ecology and animal behavior are not even mentioned. Consequently, important evolutionary concepts such as adaptation and the processes of adaptive evolutionary change, and the whole subject of mechanisms of macroevolutionary modification, never formed a real part of the evolutionary synthesis. To be sure, these topics were discussed and at great length by some workers, but these concepts were external to evolutionary theory being developed during the synthetic decade. Even if one sets aside all evolutionary theory dependent on biological advances since 1947, such as all the important ideas arising from our knowledge of molecular genetics and from animal behavior (especially of social animals), the evolutionary synthesis of 1936–47 was not a true scientific synthesis; too much was excluded. But this conclusion matters little. Evolutionary theory of this period was a synthesis, and an excellent one, of population genetics of natural populations and systematics of species and their variation. It established for the first time since Darwin a firm basis for evolutionary theory, including mechanisms of change, and provided a firm foundation for future studies that are still expanding after 40 yr. The synthesis hoped for by the architects of the modern synthesis was not achieved by 1947 and has not yet been reached. It may be argued that a complete synthesis will never be attained because new factual knowledge and new approaches will always be added to evolutionary biology. Yet, with the steady progress of work in evolutionary theory, the goals set by workers in the synthetic decade may be reached within the reasonable future and will be close to the ideas postulated by many workers prior to 1947.

Most interesting is whether the modern synthetic theory of evolution developed naturally and directly from experimental Mendelian genetics, as is commonly stated. The answer based on the evidence presented in this volume is a clear and definite no. Rather, the synthesis was between systematists (naturalists) working with variation within and between species and population geneticists studying the genetics and variation of natural populations. Classical Mendelian genetics, such as the Morgan school, working with the mechanisms of heredity of artificial populations in the laboratory, had little if anything to do with the evolutionary synthesis of 1936–47. It was certainly not the direct forerunner of the modern synthesis. The major publications of Wright, Fisher, and Haldane do not mark the beginnings of this development; indeed most of the leading figures in the evolutionary synthesis did not know these pub-

lications until well into the synthesis decade. The essential advance in genetics was the study of variation and population genetics of natural populations by geneticists whose early training was in systematics and natural history or who were trained by professors whose early work was in these areas. It is quite true that genetics had a critical role in the evolutionary synthesis, but the essential fact is that this genetics was population genetics of natural populations done by geneticists whose immediate background was in systematics and natural history, not in classical, laboratory-based, experimental Mendelian genetics of artificial populations. The core development of this population genetics started in Russia in the early 1920's under the leadership of Chetverikov. This approach and results were brought to the West by Timofeeff-Ressovsky (to Germany) and Dobzhansky (to the United States). The major advance that initiated the evolutionary synthesis was Dobzhansky's "Genetics and the origin of species" published in 1937; it provided the bridge between genetics and systematics and led directly to volumes such as Mayr's "Systematics and the origin of species" in 1942. Dobzhansky was trained as an entomologist specializing in the taxonomy of lady beetles (Coccinellidae; p. 231). A second, independent line of development may have existed in the United Kingdom largely via the work in ecological genetics by E. B. Ford, who was also trained as an entomologist and field biologist. This development culminated in J. Huxley's "Evolution, the modern synthesis" in 1942, which must have been strongly influenced by Dobzhansky's volume and work stemming directly from it, judging from the text citations and bibliography, in spite of statements in the Preface. Unfortunately, Ford's book "Ecological genetics" was published in 1964, long after the period of the synthesis, so that his important work did not have the influence it deserved.

The overwhelming bulk of contributions to "The evolutionary synthesis" supports the thesis that the modern synthesis of evolution developed directly and naturally from the study of variation and genetics of natural populations and of species by population geneticists and systematists. The former provided the essential ideas on genetics and its bearing on evolutionary theory. The latter analyzed variation between and within species and the mechanism of speciation. The common bond was training in taxonomy and natural history with the common meeting ground being in the study of variation within and between populations and in the analysis of selection forces on this populational variation. Reluctance exists on the part of some contributors (e.g. William Provine in his Epilogue) to accept this thesis over the old one that the evolutionary synthesis developed directly from Mendelian genetics, a view also held by a number of geneticists. Yet little documentation has been provided by supporters of the genetics origin of the evolutionary synthesis in their earlier writings and really none exists in this volume. Although this issue may not be settled definitely, the ball seems to be in the court of the proponents of the genetics origin of the evolutionary synthesis to support their position.

"The evolutionary synthesis" is a major contribution to the history of biology, and for the specialist in evolutionary biology it is an important scientific work. It is of special interest to ornithologists because of the primary advances made by students of avian biology. F. M. Chapman, E. Stresemann, B. Rensch, J. Huxley, and E. Mayr had important parts in the synthesis or presynthesis. Many others contributed by supplying the data base of knowledge on variation and speciation in birds that had an essential role in the synthesis.

The major acknowledgment for success of this book must go to Ernst Mayr, who was the driving force in this project from its conception to the publication of this volume. The American Academy of Arts and Sciences and all contributors and participants of the workshop, notably William Provine, who shared the responsibilities of putting this volume together, must be thanked, as well as Harvard University Press for publishing yet another outstanding biology text at a reasonable cost in these days of rapidly rising book prices. I urge all ornithologists with any interest in evolutionary theory to obtain a copy of "The evolutionary synthesis" for their own library and to read it carefully for hours of most enjoyable reading and a better understanding of one of the most important developments in evolutionary biology since the publication of Darwin's "On the origin of species" in 1859.—WALTER J. BOCK.

Breeding biology of the Egyptian Plover, *Pluvianus aegyptius*.—Thomas R. Howell. 1979. Berkeley and Los Angeles, University of California Publications in Zoology, Vol. 113, University of California Press. vi + 76 pp., frontispiece + 15 plates, 6 figures, 5 tables. \$10.50.—The subject of Dr. Howell's monograph, the Egyptian Plover, is extraordinary on two counts; in the first place, it is reputed to pick food from the jaws of basking crocodiles, and, secondly, it buries its eggs *and* chicks in the sand. Dr. Howell quickly dispenses with the first reputation, but the second is discussed in considerable detail.

The monograph begins with a brief introduction followed by a scholarly historical review of the species. Records of the Egyptian Plover's association with crocodiles date back to 459 B.C. In terms of its contemporary biology, however, pickings from crocodiles' jaws are of little consequence, if they occur

at all. Subsequently, Dr. Howell describes his study area, in Ethiopia, and a brief account is given of the natural history of the bird. Approximately 30 pages are devoted to the more traditional aspects of breeding biology, including sonograms of the vocalizations. A novel feature of the monograph is the attention given to the incubation temperature and other aspects of the incubation physiology of the Egyptian Plover. The section on egg temperature is warranted because the two most remarkable aspects of the bird's incubation behavior, viz. burying the eggs in the sand and periodic soaking of the nest scrape with water, are both intimately connected with the regulation of egg temperature. A brief introduction to the concepts of incubation physiology prepares the reader who is unfamiliar with them. The monograph concludes with a discussion of the significance of burying the eggs and chicks, periodic soaking of the nest-scrape with water, and other features of the plover's breeding biology. Finally, the information obtained by Dr. Howell is adduced to support the phylogenetic position of the Egyptian Plover as a member of the Subfamily *Cursoriinae*.

The monograph is written in the first person and the Egyptian Plover is abbreviated to EP throughout the text. While both of these are in keeping with contemporary trends in scientific writing, the abbreviation of Egyptian Plover is, in fact, a deliberate attempt by the author to distract attention from the familiar name of the species which, as is pointed out, is now a double misnomer—the Egyptian Plover no longer occurs in Egypt and it is not a plover. The monograph is largely based on a 10-week study conducted at Gambela, Ethiopia, in 1977. In many ways the monograph is a testament to the author's considerable experience in conducting physiological measurements under field conditions. Few other biologists would have harvested such a wealth of data on diverse aspects of the bird's biology in a comparable period of time. Inevitably, there are aspects of the work that would have benefitted from a more prolonged study period, or a second season in Ethiopia. For example, I would have liked more information on the thermoregulatory behavior and physiology of the heat-stressed adult birds, and one feels sure that the author would have liked to have stayed longer in order to document, *inter alia*, the fledging period. Nevertheless, the amount of information collected by the author is impressive, and while there are always some points on which one would like additional light to be thrown, it is important that what is known about the species be published. One of the functions of a published report is, after all, to raise further questions and to draw attention to gaps in our knowledge.

As far as the printing and publishing of the monograph are concerned, the arrangement is generally satisfactory, although the interposition of the Acknowledgments between the Introduction and Historical Review strikes a slightly discordant note. The Plates vary in quality—one suspects with the difficulty of the feature being portrayed (it is not easy to photograph a chick buried in the sand!)—but all illustrate the particular behavior in question. An alternative organization of the text would have been to integrate the section on incubation physiology into the general biology of incubation. One suspects that this may well be the pattern in many subsequent reports on breeding biology. Initially, therefore, it may be appropriate to separate, as Dr. Howell has done, the physiological aspects of incubation from other features, in order to draw attention to the value of conducting physiological measurements.

The author concludes that the Egyptian Plover is derived from an ancestral stock that gave rise to the coursers. Unlike other coursers, however, the Egyptian Plover colonized transient river sandbars that must have resulted in the exposure of eggs and chicks to both aerial predators and solar radiation. Protection from predators was achieved by burying the eggs, and later the chicks, in the sand. This obviated the need for cryptic coloring, a feature of other coursers. In fact, the plumage of the adult birds is conspicuously marked and their aggressive displays are effective in repelling adversaries. Because of the very hot environment, however, covering the eggs with sand did not provide adequate protection from overheating. In order to keep the egg temperature within reasonable limits, the plover developed another charadriiform characteristic—periodic soaking of the ventral feathers in water and wetting of the eggs—with implications for water loss from the eggs, and possibly for the duration of incubation.

One of the consequences of publication of Dr. Howell's monograph will be to draw attention to a species of unusual interest to incubation physiologists. Thus, the Egyptian Plover has a very long incubation time in relation to its egg weight, but unlike some other birds with prolonged incubation, the water-vapor conductance of the egg shell is not reduced. This appears to be an adaptation to the frequent wetting of the nest-scrape in order to keep the eggs cool. The mean water-vapor pressure in the immediate vicinity of the eggs is correspondingly high and it is this factor that limits the mean daily water loss from the egg. The long incubation and the precocial mode of development both predicate the assumption that the freshly laid egg has a high energy (= yolk) content. Yet the plover's egg is very small in relation to the weight of the adult. It would be of great interest from an energetic point of view to know the proportion of yolk in the freshly laid egg.

I am grateful to Dr. Howell for providing two important pieces of information regarding the eggs: their

initial weight and a detailed description of the pipping process. Knowledge of the weight of the freshly laid eggs, or an estimate thereof, is axiomatic for most allometric relationships in incubation physiology. In many birds with prolonged incubation, the interval between external pipping (star-fracture of the shell) and hatching is also long. Water loss from the egg during this period proceeds at an increased rate and a significant proportion of the total water loss from the egg may occur between pipping and hatching. The pipping-hatching interval does not appear to be unduly long in the Egyptian Plover.

It would not be surprising if Dr. Howell's monograph became a paradigm for studies of breeding biology in birds. He has shown that, with the addition of a few simple measurements related to the incubation physiology of the eggs, the traditional horizons of reproductive biology may be expanded enormously, providing fresh insights into the breeding biology of the birds. The reader may wish to refer to a recent symposium on the Physiology of the Avian Egg, edited by Cynthia Carey and published in the *American Zoologist* (Vol. 20, No. 2, pp. 325-484, 1980), for further information on current concepts of the physiology and ecology of incubation. Dr. Howell's monograph should be required reading for anyone embarking on a study of the breeding biology of a species.—G. CAUSEY WHITTOW.

The birds of Oman.—Michael Gallagher and Martin W. Woodcock. 1980. London, Quartet Books. 310 pp., frontispiece, 120 color plates, 12 color photographs. £37.50.—This is a comprehensive and elegant treatment of the birds of the Sultanate of Oman, which is located on the southeastern corner of the Arabian Peninsula. Contrary to popular beliefs, this is not solely a region of deserts punctuated by oil facilities, but is remarkably diverse in both habitats and birds. Oman lies at the junction of three major biogeographic regions, the Palearctic, Ethiopian, and Oriental, and its avifauna contains characteristic representatives of each. In addition, it is a major migration corridor between Eurasia and Africa. As a consequence, some 372 species have been reliably recorded in Oman and its adjacent waters, most of them of Palearctic affinities.

The book begins with a Forward by His Majesty Sultan Qaboos bin Said, Sultan of Oman, whose encouragement and support made the volume possible. There are brief treatments of the climate and physiographic regions of Oman, including 12 color photographs of the latter. Following a review of the history of ornithological investigations in Oman, the habitat affinities, breeding status, migration patterns, seabird faunas, and avifaunal connections to India and Africa are briefly discussed. There is special emphasis on the ways in which birds respond to the rigors of desert environments. In general, these summaries are nicely done, although I could not help noting an uncritical acceptance of ecological dogma in the discussion of habitat relationships (e.g. "many species may live within the same habitat, but competition between them has generally been reduced, if not entirely eliminated, by the special adaptations of each species to life in a particular niche within the habitat"; p. 24). Another chapter describes how one goes about observing birds. Intended for the beginner, this is a nice introduction, and it includes a convenient table summarizing important avian events in Oman through the year on a month-by-month basis, an unusually detailed diagram of the topography of birds, and a glossary of some important terms.

The major part of the book is devoted to accounts of the species recorded in Oman. General descriptions are provided for each family of birds, and for each species the worldwide distribution, status in Oman, size, description (with notes on similar species), behavior, habitat, foods, breeding biology, and vocal patterns are summarized. Most of these species, as well as several additional forms, are depicted on the 120 large color plates. The plates are reproduced extremely well and in general have a pleasing format and good composition. Some of the birds appear a bit stiff and many seem flat, lacking any apparent "depth" to the body, but others (especially the shorebirds) are quite nicely done. Appendices include a check-list of Oman birds, additional species recorded since the main text was completed, species whose status requires confirmation, records of escaped captive species, and a summary of banding recoveries in Oman. The book is not intended as a field guide, but it is a useful treatment of the birds of this region, and it is a beautifully produced book.

Despite the efforts that have contributed to the documentations of species' distributions, status, and habits that are recorded here, the Sultanate is still little-known ornithologically, partly because it was ignored for so long, partly because until rather recently political activities hindered field studies in much of the region. This book should serve as an impetus to further study of this diverse and fascinating area.—JOHN A. WIENS.

Birds of the Carolinas.—Eloise F. Potter, James F. Parnell, and Robert P. Teulings. 1980. Chapel Hill, University of North Carolina Press. viii + 408 pp., 338 color photos, map. Cloth. \$14.95.—The

authors have attempted to provide a reference on the avifauna of North and South Carolina that would appeal to both the beginning bird-watcher and the experienced birder. For the most part, they have succeeded, although the book is not the definitive, authoritative "state book" that the title might imply. Generally speaking, data on distribution, abundance, nesting, and food habits are qualitative rather than quantitative; yet "Birds of the Carolinas" is a fine replacement for the woefully antiquated "Birds of North Carolina" (Pearson, Brimley, and Brimley 1942; updated by Wray and Davis 1959) and "South Carolina Bird Life" (Sprunt and Chamberlain 1949; updated by Burton 1970).

The majority of the book consists of species accounts for each of the 419 birds recorded in the Carolinas (with published details), plus color photographs of approximately two-thirds of them. Preceding the species accounts are brief sections on bird identification, migration in the Carolinas, the annual cycle, conservation, and habitats in the region arranged by physiographic province. These sections should be useful to the beginner, but advanced students are likely to skim over them on their way to the species accounts. A glossary and a list of suggested reading material follow the accounts. A sketch illustrating the topography of a bird is presented in the glossary; however, the labeling of the underparts leaves much to be desired. The "chin" arrow is pointing to the throat, and the "belly" arrow points to the region posterior to the legs.

Maps inside the front and back covers indicate the major towns and cities in the Carolinas, as well as state parks and refuges. The failure to include a map of physiographic provinces and counties, however, is most unfortunate, especially since provinces and counties are mentioned frequently in the species accounts.

The species accounts are presented in taxonomic sequence, broken down by order and family. An account consists of a sentence to a paragraph each on range (distribution, relative abundance, arrival and departure dates, and habitat), feeding habits, and description or field identification. Species that breed in the Carolinas also have a "nesting habits" paragraph included. All in all, the species accounts are very readable and quite accurate, though they are rather brief and qualitative, with no mention of observers or citation of the literature. I would have preferred that the "range" paragraph be expanded by a sentence or two for many species, especially for the shearwaters and storm-petrels. The "nesting habits" section is surprisingly detailed for such a book; for a few species [e.g. Yellow-billed Cuckoo (*Coccyzus americanus*) and Horned Lark (*Eremophila alpestris*)] the nesting paragraph(s) is much too lengthy in relation to the remainder of the account. The section on "description" is the weakest part of the accounts, not so much in that it is poorly written or contains an abundance of errors, but simply in that it is unnecessary to all except those few souls who do not own a field guide.

Several specific comments and criticisms on the species accounts, generally in regard to "range," seem warranted. The Dovekie (*Alle alle*) is said to be "fairly common some years" (p. 186). This phrase greatly exaggerates the present-day abundance, and Dovekies haven't been fairly common for 15 or more years. The Bank Swallow (*Riparia riparia*) breeds only in Wilkes County, North Carolina, and perhaps formerly in Henderson County in that state; thus, the statement that it "appears to nest locally in the mountains and piedmont of the Carolinas" (p. 238) is unfounded. The Golden-winged Warbler (*Vermivora chrysoptera*) breeds essentially throughout the North Carolina mountains, not just in the southwestern part of the state (p. 302). The Orange-crowned Warbler (*V. celata*) is said to be rare to very rare inland in winter (p. 307), a correct statement in my opinion, so how can it also be "known only as a transient" inland? Both the Yellow Warbler (*Dendroica petechia*) and American Redstart (*Setophaga ruticilla*) nest in moderate numbers at least 300 m higher in elevation than stated on pp. 309 and 335. I was also baffled to find that immature White-throated Sparrows (*Zonotrichia albicollis*) are easily confused with Lincoln's Sparrows (*Melospiza lincolni*) (p. 390).

Although experienced birders and professionals should find the species accounts the predominant feature of the book, I suspect that others interested in birds will enjoy the photographs as much as, if not more than, the text. Several dozen people contributed the color photos, and most of these contributors are well-known birders in the Carolinas and adjacent states. In general, the photos are of excellent quality, and I was particularly fascinated by John Trott's pictures of a number of woodland species caught on film at the edge of a rocky pool, perhaps in his garden. The authors have done a thorough job in assuring the correct identification of the photos, but I did note a couple of errors. The coloration of the Western Sandpiper (*Calidris mauri*) on p. 158, especially the rich brown upperparts without any trace of rufous, had me puzzled. A few weeks later, Bob Lewis confided to me that his photo was not that of a Western at all, but of a Least Sandpiper (*C. minutilla*)! The only other obvious error I detected was the immature Peregrine Falcon (*Falco peregrinus*) posing as an adult (p. 116).

"Birds of the Carolinas" is a fine contribution to the ornithological literature of the Southeast, and it is certainly one of the better books that combine color photographs with a substantive text. In this day

of escalating prices, one would expect to pay over \$20 for a 400-page book with 338 color photos. At \$14.95 the book is quite a bargain.—HARRY E. LEGRAND JR.

Behavioral mechanisms in ecology.—Douglass H. Morse. 1980. Cambridge, Harvard University Press. Pp. viii + 383, many figures, few tables. \$25.00.—Since 1975, when the first books emphasizing a modern ecological view of behavior appeared, behavioral ecology has emerged as a recognized field of its own, encompassing sociobiology, optimal foraging, and other less glamorous specialties. This book surveys the field from the viewpoint of a field naturalist and empirical ecologist. Skeptical of exotic but unsatisfying theories, the author time and again drills home the point that present theories do not match the real world as revealed by field naturalists. Morse brings to the task not only an enviable record of published research; he frequently employs his own personal field observations.

"Mechanisms" covers much the same material as Krebs and Davies' "Behavioural Ecology" but does so with considerably less gullibility. One will not find in "Mechanisms" sycophantic praise of ESSs, optimization approaches, inclusive fitness theory, or of anything. Instead, one encounters a prosaic cataloguing of facts and views hung on a framework of logical categories. This can be rather dry at times. Nevertheless, "Mechanisms" surveys behavioral ecology for the first time from the vantage point of a single author, a useful achievement.

Chapters on foraging and food selection, habitat selection, reproduction, territoriality, spacing, and social groups overlap broadly with Krebs and Davies. Unique chapters cover behavioral thermoregulation and maintenance and future directions. A distinctive feature of "Mechanisms" is the integration of behavioral data and concepts into a community perspective. I found this the most valuable and progressive feature of the book.

"Mechanisms" is rich in empirical detail and features birds to an embarrassing degree. Graphs and histograms abound, while mathematics is totally lacking. The figure legends are small and nearly illegible in many cases.

I used "Mechanisms" as a text for a course in avian social systems in 1981. A typical comment from a senior: "I found the level at which the book was written to be commensurate with my own aptitude in the area and hence found it comprehensible throughout." A graduate student wrote, "This book is a fine reference for modern avian behavioral ecology . . ."

"Mechanisms" is written from the viewpoint of an American ecologist. Niche theory receives far more attention than in Krebs and Davies. This difference is especially evident in the chapters on food, habitats, and interspecific competition. There is a definite lack of sophistication on the behavioral side—perhaps understandable in an ecologist but not forgivable. Morse seems oblivious of the different meanings of the term innate, of the long history of debate on this subject, and of the demonstrated complexities in the development of behavior. Strictly speaking, it is incorrect to employ innate in the sense of "genetically determined," as Morse does when speaking of a behavior. For explanation, see any good, upper-level behavior text for the last 20 yr. Any reader doubting this is advised to peruse the recent papers of Gilbert Gottlieb on the ontogeny of avian social behavior.

"Mechanisms" is not strong on evolutionary theory. Inclusive fitness theory is hidden under "Communal birds," and social insects are hardly mentioned. Optimality methods are mentioned but not developed. The concepts of evolutionarily stable strategy (ESS) and trait-group genetic structure are so well hidden that I failed to find them. Ecologists commonly use such terms as altruism, inclusive fitness, and kin selection imprecisely, and Morse provides no relief. The unfortunate term "group-living" is used synonymously with "communal," despite the fact that many noncommunal birds live in groups (e.g. colonial and winter-flocking species). Helpers are inexplicably called "associates," but fortunately they are described as helping; perhaps "associating" would not be adequately descriptive.

In brief, I found "Mechanisms" to be a suitable text for undergraduates, but I feel that it should be seasoned with portions of evolutionary theory and mathematics to taste.—JERRAM L. BROWN.

Bird student. An autobiography.—George Miksch Sutton. 1980. Austin, University of Texas Press. viii + 216 pp., 10 color plates; halftones and line drawings. \$15.95.—How do people become ornithologists? Not birdwatchers, or avian ecologists, but *ornithologists*, in the sense that they live and breathe the study of birds? Here George Sutton provides one answer, and it is an absorbing, personal, and fascinating account. He allows us to see the ontogeny of a naturalist unfolding before us, from the earliest childhood remembrances to the full-fledged maturity of a graduate student well along in his profession—the formative years. In the process, the sensitivity to nature, always there, deepens, the how questions become why questions, and the dedication to be a *student* of birds becomes firmer.

Born at the end of the last century into an artistic, talented family, Sutton's childhood was spent in Nebraska, Minnesota, Oregon, Illinois, Texas, and West Virginia. The beginning of his interest in birds is unclear—it is almost as if it was just *there*, waiting to be released. His was a boyhood filled with experiences with birds, however. He observed, drew, and gathered bits of nature, and occupied a room in which these collections were proudly displayed. His parents were very understanding.

As he grew, his interests did also, and they blended with his artistic talent in the drawings and paintings of birds that seemed an inevitable part of studying and *knowing* birds to him. These led to his close relationship with Louis Agassiz Fuertes, whose interest and encouragement catalyzed Sutton's dedication to ornithology and painting. His association with the Carnegie Museum provided the first real opportunity to put into professional practice his experiences with birds and his sensitivity to their habits, and this, in turn, led to the expeditions that were to complete the ontogeny of an ornithologist. But these opportunities did not just happen, nor was Sutton simply lucky enough to be in the right places at the right times. He *made* his opportunities, by immense dedication and drive and a sure knowledge of what he wished to do. What emerges, then, is an image of the development of a young man with talent and a burning interest, who also had the courage and motivation to act on his convictions, to wedge his way actively into the world of professional ornithology, and who, because of his talent and desire, met continuing encouragement along the way.

Sutton's story is told with considerable grace and elegance, and a touch of humor. The narratives are absorbing, the anecdotes familiar to any who have had close ties with nature as children. He succeeds in drawing the reader in to share his experiences in a very personal way, and in conveying deep feelings about nature, and about people. There is a disturbing element to his story, also. One must wonder whether modern society, modern science, and our system of training and of relating knowledge provide the same sort of encouragement to permit childhood fantasies and passions to develop into a profession in the same way, whether there is still a place for such naturalists. I hope so.

At one place in the book, Sutton remarks that "what I wanted to be, first of all, was . . . an ornithologist knowledgeable enough to draw birds well, write good books, and teach younger people." This book, and his many other accomplishments, stands as a testimonial to how very well he succeeded!—JOHN A. WIENS.

Behavior of marine animals. Current perspectives in research. Volume 4: marine birds.—J. Burger, B. L. Olla, and H. E. Winn, Eds. 1980. New York, Plenum Press. xvii + 515 pp. \$45.00.—This volume clearly meets its stated aim of providing "a representative selection of the current research" with concentration on "various aspects of . . . behavior and ecology" of marine birds. As such, it strongly indicates the interests and acquaintances of the senior editor and is a useful compilation. A northeastern bias in the authorship is evident. This perhaps is an artifact of who is studying seabird ecology and behavior, or who was willing to write a book chapter; each author is clearly well qualified. Anyone planning research on seabirds, or any bird for that matter, must digest and assimilate the contents of this volume prior to beginning their study. Several chapters are reviews of the field while other authors choose to stress presentation and analysis of their own data. This mix is quite stimulating. If I were limited in number of books to take to a seabird colony for a long stay, this volume would be a sure bet to accompany me, and it is a valuable edition to my home library.

Richard Brown's thorough and very useful summary, "Seabirds as marine animals" (pp. 1–39), sets the stage for following chapters. The perspective pointed out is that "it is difficult at present to interpret seabird distributions over a broad geographic scale in precise terms." This must be kept in mind by all marine ornithologists, especially those working on islands. The reference list in this chapter is especially useful. Bernice Wenzel brings all ornithologists up to date with a complete summary, "chemoreception in seabirds" (pp. 41–67), with references through 1979 and an effective historical review of olfaction in birds. She clearly points out the almost total lack of information on the subject, a void she and her laboratory are ably attempting to fill. The many questions that need answering and the need for experimental studies are well stated. I believe this experimental approach is true not only of olfaction studies, but is the only way to make further progress in understanding seabird biology. Mere observations have provided us with a useful background, but manipulation is what is now needed to answer specific, well thought-out questions of an evolutionary nature.

Francine and Paul Buckley use their own work to illustrate general points relating to "habitat selection" (pp. 69–112) in a simplified yet clear chapter that will easily serve as a primer for all studies and especially for persons beginning research. Ticks are a problem in more species than mentioned on p. 101 (see Wilson Bull. 1977, 89: 157–158).

I was first struck here by the stress authors of most chapters in this volume put on their own studies,

while not attempting to provide a thorough review of the literature. In such a volume this direction may be acceptable, but the usefulness of picking it up as a reference is somewhat diminished.

George Hunt provides a useful discussion of "Mate selection and mating systems" (pp. 113–151) that properly raises more questions than it answers. He points out the usefulness of studying an aberrant system such as has occupied his recent energy on gulls, and clearly points out the variability that occurs in reproductive systems of seabirds and the opportunity we have to study such variability. It would be useful to have the citation to the Newman et al. unpublished manuscript (p. 124). I still do not understand why one wants to mate with the largest guy around (p. 122) and am not convinced that the female-female pairing is not a DDT-related artifact (p. 140).

John Ryder gives a brief, adequate, useful, and, at this point, necessary summary of the "Influence of age on breeding biology" (pp. 153–168). He clearly points out the need for further specific research on this topic before generalizations on evolutionary trends can be even close to heuristic. C. G. Beer provides an excellent, elegant summary of "Communication behavior of gulls and other seabirds" (pp. 169–205) that should be required reading for all biologists, ethologists, and especially sociobiologists.

Michael Gochfeld's chapter, "Mechanisms and adaptive value of reproductive synchrony" (pp. 207–270), is perhaps the crux of this volume. This chapter is a stimulating, useful discussion of methods. A clear plea is made for data presentation in publications and for students to design proper studies based on valid assumptions and using correct definitions. The text is somewhat pedantic and repetitive in places, with an undue reliance on personal communications and an unsatisfying high-latitude bias. Gochfeld clearly points out that only studies of individual birds over long periods of time will produce useful data. "Quick and dirty" studies cannot be tolerated any longer, especially in long-lived seabirds. Useful subheads to topics are provided, as they are in other chapters. I see no reason to pursue the supposed "Darling effect" any further, and am somewhat surprised by the stress on predation as a driving force (p. 254) in island-nesting birds. I must point out that two Christmas Islands exist, in the Pacific and Indian Oceans, and they have very different seabird systems (p. 258), not similar as is implied here.

"An ecological perspective on the development of behavior" by Roger Evans (pp. 271–322) is a thorough, valuable review, although the reliance on K-selection terminology is bothersome. Tables II (p. 277) and VI (p. 302–303) and relevant discussions are a useful new approach. Integration of references to other chapters in this volume would have been useful (p. 284). Studies such as are outlined here will provide especially illuminating data in the future.

Montevicchi and Porter, in "Parental investments . . . at the breeding areas" (pp. 323–365), already have added importantly to the extensive literature on Gannets (*Morus bassanus*). Variation between populations comes across very clearly to me in this chapter.

It is tempting to speculate that writing "The transition to independence and postfledging parental care" (pp. 367–447) stimulated Joanna Burger to gather together the other manuscripts for this volume. If so, it served a useful purpose. This chapter presents a novel and intriguing idea that needs to be pursued. The literature review seems overly superficial and out of date, with papers especially in the mid- to late 1970s, primary sources, and other chapters in this volume omitted. Much of the text seems oversimplified (p. 369, last paragraph, for example), and the lack of reference to available data makes some of the assumptions wrong (p. 394–395). The all-inclusive model to explain postfledging care (p. 435) could just as well serve to explain everything in biology if the axes were relabeled.

Bill Southern summarizes "Comparative distribution and orientation in North American gulls" (pp. 449–498). This is an excellent, clear, concise culmination of his many studies and thus is most welcome. The suggestion at the bottom of p. 463 that immatures need adults to recognize their range is a fascinating idea. This chapter illuminates the usefulness and limitations of banding data and the need for integration of field and laboratory research efforts.

This book is well produced but the number of typos is unfortunate: unintelligible garble on line 15, p. vii; Pelecaniform with an i on p. 121 and many places following; Noddie, Frigate Bird p. 279; *Fregata* with an i on p. 122, and Stercorariidae also; this reviewer's name on p. 458, but many lesser words on other pages. The inconsistency in reference citations is bothersome: those by Wenzel, Hunt, and Ryder only give the first pages of citations, all others are inclusive. A useful subject and species index are provided. Because the volume is set up as separate chapters, considerable redundancy in references occurs; one integrated citation list would have been more useful and saved paper. Likewise, lists of species occur in several locations and these could more usefully have been combined. Taxonomic-nomenclatural inconsistencies are frequent and uniform reference to the Morony, Bock, and Farrand list (1975, American Museum of Natural History) should be made standard and would be a valuable addition to all behavior-ecology texts.

The reader will come away from this volume with a clear understanding of what has been and especially

what needs to be done in marine colonial bird research. Although much has been published on seabirds in the past two decades, we really have made little progress since the classic summaries and conclusions of David Lack. This volume serves as an invaluable perspective, and should act as a critical stimulus for proper, forthcoming research on marine birds.—RALPH W. SCHREIBER.

Evolutionary biology of parasites.—Peter W. Price. 1980. Monographs in Population Biology No. 15. Princeton, New Jersey, Princeton University Press. xi + 237 pp. \$17.50 (cloth), \$5.95 (paper).—For years my friends who work with parasites of various sorts have been telling me what marvelous systems parasites really are, how the specificity and clear definition of their relationships to host organisms make them ideally suited to investigations of niche structuring and community patterns, how they may serve as models of the evolutionary process, and how much more they could contribute to our knowledge of ecological and evolutionary dynamics than, say, studies of birds. I used to dismiss this as the jealousy of those who work with soft-bodied and dull organisms, but after reading Price's book I am no longer sure.

Price approaches parasites from a broad evolutionary and ecological perspective, asking what features are common to the parasitic mode of life, and how an understanding of these can contribute to a better understanding of the overall diversity of life. The importance of Price's synthesis is to some degree a consequence of the rather unconventional definition of "parasite" that he adopts, as an organism that lives in or *on* another organism. Thus considered, many specialized herbivores are included as parasites, and it is little wonder that perhaps 60% of the insects whose feeding habits are known qualify as parasites. But this approach to parasites is useful, too, in that it permits a much broader and perhaps more interesting search for common themes than might be possible were only classical internal parasites considered. Price demonstrates convincingly that parasite systems *are* good systems for addressing ecological and evolutionary theory in fresh ways.

Price develops his treatment of parasite systems within the context of six ecological and evolutionary concepts: (1) Parasites are adapted to exploit small, discontinuous environments, their hosts. As a consequence, they are likely to occur in small, homogeneous, isolated populations. (2) Parasites represent the extreme in specialized resource exploitation. This, in turn, enhances the prospects that many species may coexist. (3) Parasite populations and communities are nonequilibrium. The ephemerality of host patches and the probabilistic nature of host colonization make it unlikely that parasite systems will approach equilibrium. (4) Evolutionary rates and speciation rates among parasites can be high, as a consequence of the ecological factors that promote fractionation of gene pools and asexual reproduction. (5) Adaptive radiation is extensive, its development in each parasite taxon depending upon the diversity of available hosts, the size of the host individuals or populations, the evolutionary time available, and the selective forces favoring coevolutionary modifications of parasite and host. (6) Among parasites, forms of speciation other than classical allopatric speciation may be of considerable importance.

These are intriguing and important concepts, and Price's review of work on parasite systems (broadly defined) indicates how they can lead to a reevaluation of conventional thinking in ecology and evolutionary biology. Further, their relevance is not restricted to parasites. The treatment of nonequilibrium states and the factors leading to them, for example, has parallels in many sorts of populations and communities. Moreover, parasites may have a variety of effects on their hosts, ranging from proximate behavioral changes to long-term evolutionary responses. Price suggests that parasites may thus influence every aspect of the population biology of their hosts, and interpretations of population sizes, age structuring, range dynamics, and the like that ignore the possible impacts of parasitism may well be incomplete or in error. Although these points may not appear to apply directly to avian systems, they are nonetheless relevant. How much of avian demography may reflect the influences of parasites, and to what degree are Price's arguments about the nonequilibrium status of parasite systems germane to studies of birds? Those who believe that birds are not overtly influenced by parasitism, or that bird communities are governed by equilibrium dynamics, would do well to consider Price's points carefully.

The book is not without flaws. In places Price's arguments tend to be founded more upon assertions than upon evidence or rigorous examination of alternative hypotheses, and he is himself guilty of adaptive story-telling at times. He tends to overuse direct quotations from those he cites, and the general lack of attention to proper punctuation makes reading difficult. To the avian biologist who is deeply interested in ecological and evolutionary processes and who desires a fresh perspective, however, these problems should not detract from the basic appeal of Price's book.—JOHN A. WIENS.

Bird community dynamics in a ponderosa pine forest.—Robert C. Szaro and Russell P. Balda. 1979. Studies in Avian Biology No. 3, Cooper Ornithological Society. vi + 66 pp. \$6.00 + 0.50 for

postage and handling.—Analyses of avian communities have several potential values. First, they may provide an innovative synthesis of basic knowledge through integration of results with earlier work, both avian and nonavian. Second, they may provide insights for foresters and wildlife biologists charged with management of wildlife (avian) resources. Third, they may be straightforward presentations of data in a descriptive framework. The present volume contains a little of each of these values.

Szaro and Balda evaluate the effects of differing tree densities and, thus, foliage volume and profiles on diversity, density, and behavior of breeding birds in ponderosa pine forest. Five homogeneous stands were selected as study plots: control (untreated), silviculturally cut, severely thinned, strip-cut, and clear-cut. Ponderosa densities varied from 0 to 580 trees/ha with treatments accomplished up to 6 yr (clear-cut) before birds were censused. Breeding bird densities and behavioral data were collected for three consecutive years (1972–74).

Species richness was low on the clear-cut (3–5 species) and varied (12–22) among the other areas without any general pattern. Absolute and relative densities varied among foraging and nesting guilds in concert with foliage and tree density. Climatic variation, especially winter and spring precipitation among the years, contributed to that variation.

Detailed analysis of behavior (single species and community level) demonstrates the role of vegetation structure in determining avian use of habitat. For example, Gray-headed Juncos spend more time foraging on strip-cut than on control plots; foraging juncos “pick and glean” and perch on the ground more on strip-cut than control plots. Use of available foliage volume by height is explored for a number of species, year, and study-area combinations. Overall, two types of behavior (foraging method and stance) were little affected, while others (perch selection, tree-species selection, and foraging height) changed markedly with manipulation of habitat.

Territory size varied considerably among years and study plots for several species and was especially related to changes in the fit between bird-use profiles and foliage profiles. Dendrograms based on cluster analysis of composite behavior for breeding birds were used to examine resource partitioning and the niche. Generally the resulting clusters were similar to the more subjectively determined foraging guilds discussed earlier in the monograph. A more appropriate approach might have been to define the guilds quantitatively and objectively *before* discussion of them, especially when extensive data on foraging ecology were available. Finally, biomass and energetics of the avifaunas were treated in a descriptive fashion.

This monograph contains data relevant to three subjects of interest to basic and/or theoretical ecologists: between-year variation at each site, behavior shifts among individuals of a species at different sites, and shifts in territory size with changes in habitat quality (e.g. foliage volume). Temporal dynamics of avian communities are a consequence of both biotic and abiotic factors and are poorly understood at best. The data in this monograph could have been used more effectively to explore these patterns. Resource managers can certainly learn about the impact of forest practices on the avifaunas of ponderosa pine by reading this study. However, they will have to develop their own management recommendations, as none are explicitly provided. In other cases the significance of descriptive presentations (biomass and energetics, species diversity using information theory) do not seem to contribute to either basic or applied objectives.

Overall, the authors have compiled a wealth of information on the avifauna of ponderosa pine forests. In addition, they describe intriguing patterns that must be tested with more carefully designed tests of specific hypotheses and even field experiments involving manipulation of birds and their habitats. It would be useful, for example, if we understood the ecological and evolutionary reasons for changes in junco biology among areas. Are they related to food resources as well as vegetation structure? How and why?

The answers to such questions are especially elusive in field studies of complex communities. The challenge for the future is to find ways of teasing clear conclusions from the masses of data that are being accumulated. That objective can be best accomplished by early formulation of hypotheses to be tested and careful design of field protocols.—JAMES R. KARR.

The Great Gray Owl: Phantom of the northern forest.—Robert W. Nero. 1980. Washington, D.C., Smithsonian Institution Press. 167 pp., photographs by Robert R. Taylor, including 30 color and numerous black-and-white, 2 maps, bibliography, and index. \$17.50.—When Phil Reader and I gave Robert Nero the details of a 1964 Great Gray Owl nest near The Pas, we did not realize then that this nesting record was only Manitoba's second for the species. Nor could we appreciate then that it also was this very nesting that would spark Robert Nero into launching his ambitious and colorful pursuit of these

fabulous birds. Through his countless trekkings in southern Manitoba and northern Minnesota, Nero discovered for us the poorly known tamarack solitudes of the Great Gray and a good many of the species' elusive and seemingly unfathomable secrets.

Nero's book about phantoms of the northern forest is a very readable account of the author's woody and roadside adventures with the Great Gray Owls, and though written primarily for nature enthusiasts and birders, the text is so filled with good observations and little-known facts about these birds that the professional ornithologist will find it not only enjoyable but useful.

I had always believed breeding Great Grays to be residents of the nearly impenetrable black spruce bogs called muskeg; reinforcing this notion was the hike with Phil Reader on a moose trail through a great muskeg that led to our 1964 nesting. No wonder I was astounded by Nero's later discovery of a large and healthy population of these owls far to the south of The Pas in partly logged tamarack bogs near traveled roads and human activity. Always I thought that the wintering Great Grays reported from these southern bog areas resulted from spectacular migrations of sorts—times when large numbers of them are driven south from their muskeg haunts by crashes in rodent numbers.

That so many Great Grays breed within these so called wintering areas forces us to reassess our thinking on the species. This discovery alone may prove to be the book's most important contribution—especially since recent observations by Steven L. Loch and Alfred H. Grewe clearly substantiate Nero's findings. In their preliminary report on the current status of the Great Gray Owl in Minnesota (presented at the Minnesota Ornithologists' Union annual meeting in Minneapolis on 6 December 1980), Loch and Grewe demonstrated convincingly that the species breeds far more commonly in Minnesota than formerly believed, even in areas considerably south of those studied by Nero. After all these many years of Great Gray Owl neglect, I find it remarkable that back-to-back studies were carried on independently in adjacent areas. How timely for Nero to have his new book benefit by Loch's and Grewe's substantive report.

Not enough can be said of Robert Taylor's numerous photographs. They are special, every one of them. That of the hunting male on an aspen branch is so artistically composed that I find myself returning to page 14 time and again; your first gaze at this photo will prove as intent as that of the owl's eyeing a mouse. True to life action shots are abundantly and clearly portrayed, many outstandingly so, including that of a hungry individual in a Manitoba snow storm (page 19); a baited individual about to be netted (page 31); a deceptively large individual teetering on a spruce tip (page 72). Another (page 27) stalked by two netters was photographed in winter woods at such great distance that the owl appears in the background as a mere spot—yet clearly identifiable as a Great Gray, so sharp were Taylor's camera lens and skills.

Those who have worked in northern spruce bogs understand only too well the problems of photographing wildlife in the dim light of evergreens. Deciduous tamaracks afford relief in winter and spring, but once the feathery needles of this bog species unfurl, the world of Nero's Great Grays transforms dramatically into strange green jungles. Taylor somehow puts all this verdure to good advantage in capturing the fairyland habitat of a summer tamarack bog. Of all of his excellent photos, however, none equals that of a male Great Gray gliding from its nest on page 133. In this single flashing spread of feathers, Taylor's lens capsulizes the immensity of the bird's surface area that not only accounts for the species' mothlike flight but defies logic as to how the big bird manages flight in dense woods. Great Gray feathers, according to Nero, are so soft and pliable that no harm befalls them however they are pushed through narrow places.

Readers of this book will enjoy Nero's poetic descriptions of Great Gray Owl habitat; how he solicits assistance from many Manitobans and Minnesotans in seeking out his quarry; how he and companions fashion artificial nests in broken-off tamarack tops in demonstrating how the species might be managed. Above all, the reader will feel Nero's love for the owl and all the wildness that it represents. Following the release of a captive bird, Nero expounds: "Suddenly it was all owl again, wild, beautiful, free." For Nero, a stuffed, caged, or owl in the hand is no owl at all.

Much is left to be learned of Great Gray Owls. Nero devotes the last chapter of his book to this very subject. Likely you will conclude that the book is not the last word on Great Grays, but that it certainly is one of the important firsts.—DAVID F. PARMELEE.

The Peregrine Falcon.—Derek Ratcliffe. 1980. Great Britain, Poyser; Vermillion, South Dakota, Buteo Books. 416 pp., 32 plates (photographs, usually two to a plate), 3 color plates, and numerous black-and-white illustrations by Donald Watson, 1 color plate of eggs, 16 figures, 23 tables. \$42.50.—Perhaps half a dozen books have been written on the Peregrine Falcon, but only two previous ones are

really of much consequence, other than literary: Hickey's (ed.) "Peregrine Falcon populations—their biology and decline," which as the title indicates is limited in scope, and Wolfgang Fischer's "Der Wanderfalke," which is very condensed and also hard to come by (East Germany). This void has been admirably filled by Derek Ratcliffe's volume, although it too might be regarded as limited because of the great attention given to the Peregrines of Great Britain, and even there the author notes that his experience is mostly with those of the inland eyries of northern England and Scotland. Pages 24 through 125 are pretty much taken up by such subjects as distribution and numbers in Britain, including the "pesticide crash" and the later recovery. The next 175 pages and eight chapters, however, cover every phase of the natural history of the Peregrine intensively, with emphasis upon the author's and his team of associates' experience in Britain, but drawing freely upon published and unpublished work elsewhere (e.g. R. W. Nelson's in-depth thesis on the Peregrines of coastal British Columbia). As the volume runs to perhaps 70,000 words, there is ample latitude for detail. The terminology for displays and calls is standardized with that of the recently published (1980) "Birds of the Western Palearctic" (S. Cramp and K. E. L. Simmons, eds.). Enlivened by fine photos and by Mr. Watson's artistry, it will remain the standard work on this superb falcon. I suppose there are some minor slips, but I noticed only one: speaking of the relationships of the Prairie Falcon and Golden Eagle in the Snake River Canyon, Idaho, a statement of Morlan Nelson is somehow garbled, as he would hardly say that these two "overlap considerably in choice of prey . . . with Richardson's ground squirrel and yellow-bellied marmot (!) as major items for both species."

Derek Ratcliffe first came to notice through his extensive and intensive work on the decline of raptors and particularly the Peregrine, as caused by DDT and other pesticides. He was the first to have eggs chemically analyzed and the first to suggest and then prove that pesticides produce the eggshell thinning and breakage that caused the decline of the Peregrine in Britain and its complete disappearance in eastern United States. All this is chronicled in detail, and the book will also serve as the best general analysis of this subject. As is well known, the Peregrine has made a substantial comeback over much of its range in Great Britain. How long it might have taken for the same to occur in eastern North America, where no breeding stock at all remained, we shall never know because of the success of the captive propagation and release program.

The "Peregrine Falcon" will find a place on any list of the half-dozen current leading references on diurnal raptors.—DEAN AMADON.

ALSO RECEIVED

Birds of The Gambia.—M. E. J. Gore. 1981. British Ornithologists' Union (% Zoological Society, Regent's Park, London, NW1 4RY England). 130 pp., 16 black-and-white photographs. Paper, £9.—This, the third in the B.O.U.'s check-list series, presents an annotated listing of the bird species recorded reliably within The Gambia. The Gambia is a small country, roughly 10,000 km². Despite this, a total of 489 species in 73 families has been recorded, and 17 additional species are of doubtful status. Most of the species are associated with the various habitats bordering the River Gambia. The check-list briefly reviews the history of ornithology in The Gambia, its geography, vegetation, and climate, the main habitat types available to birds, and the general patterns of breeding and migration. The bulk of the book is devoted to a systematic list of the species, and provides general information on the breeding or migratory status, the abundance, the habitat affinities, and important details of records for each species. This check-list provides a useful companion to Jensen and Kirkeby's "The birds of The Gambia" (noted in *The Auk* 1981, 98: 212), especially inasmuch as some records accepted by Jensen and Kirkeby are subjected to more rigorous scrutiny by Gore.—J.A.W.

Bird songs and calls from southeast Peru.—Ben B. Coffey, Jr. and Lula C. Coffey. 1981. Memphis, Tennessee. Cassette tape in hard plastic box with list of species. \$5.00 (plus 0.75 for mailing and handling).—This is an excellent new addition to the published sound recordings of Neotropical birds by the venerable Ben Coffey and wife Lula. Privately produced by the Coffeys for Explorer's Inn and the Tambopata Nature Reserve in Peru, it is available by mail from Ben Coffey at 672 N. Belvedere, Memphis, Tennessee 38107. In about an hour-long presentation, 71 species are heard; each is announced by its English name and sometimes a sentence of commentary. Although scientific names are not given, the cassette cover states that except for the Gray Potoo (*Nyctibeus griseus*) the names follow Meyer de Schauensee (1970). This tape will be indispensable to anyone doing field work or birding on the eastern side of the Andes in Peru and useful to any bird student over a much wider adjacent region. Fourteen

species of antbirds are treated, including antshrikes, antbirds, anthrushes, and antpittas. The remainder of the contents are: 3 species of tinamous, Roadside Hawk, Barred Forest Falcon, Yellow-headed Caracara, Speckled Chachalaca, 3 doves, Mealy Parrot, Striped Cuckoo, 5 owls, 3 potoos, Ocellated Poorwill, Reddish Hummingbird, 3 trogons, 2 motmots, Striolated Puffbird, 2 nunbirds, 3 toucans, 2 woodpeckers, Cinnamon-throated Woodcreeper, 3 ovenbirds, Screaming Piha, 4 flycatchers, Ringed Antpipit, Violaceous Jay, 5 wrens, Lawrence's Thrush, Dusky-capped Greenlet, Crested Oropendola, Solitary Black Cacicque, and 3 finches.

Ben Coffey's recordings are always crisp and clear. A little filtering could have removed some of the low frequency "outdoor rumble" that is probably more evident on the cassettes than on the original recordings. This is a minor criticism, however; the tape is very much worthwhile and enthusiastically recommended.—JOHN WILLIAM HARDY.

Birds of the Qu'Appelle, 1857–1979.—E. Manley Callin. Special Publication No. 13, Saskatchewan Natural History Society (Box 1121, Regina, Saskatchewan S4P 3B4, Canada). 168 pp. \$7.00.—The sudden appearance of the Qu'Appelle Valley, some 150 m deep and more than a kilometer wide, cut into the level prairie of southeastern Saskatchewan, comes as a surprise to the unsuspecting traveller. To the ornithologist, it presents a rich avifauna occupying habitats unrepresented in the prairie above. This birdlife is described in the latest of the valuable series of faunal studies published by the Saskatchewan Natural History Society.

The author, E. Manley Callin, has spent his life in or near the valley and has kept records of its birds for over 55 years. His notes are supplemented with those of pioneers to the area, residents, and visitors who, like me, came to the area to study its birds. The list contains 288 species plus 4 "hypothetical" species and 5 readily identifiable subspecies or color morphs, a total of 297 forms.

Besides a description of the valley, its habitats, and a summary of its birdlife, the introductory section contains an interesting and useful historical account of ornithological work done in the region. The species accounts present information on status, spring arrival, fall departure, nesting, wintering, banding, and past occurrence. The work has been put together with great care and has been well edited. It is a fine addition to the ever-increasing list of regional works on which a major part of our knowledge of bird distribution is based.—ROBERT W. STORER.

Birds of Colorado's Gunnison Country.—A. S. Hyde. 1979. Western State College Foundation (120 N. Boulevard, Gunnison, Colorado 81230). 140 pp., fold-out map, 8 color plates; halftones and line drawings. \$6.95 (paper), \$15.95 (cloth).—The "Gunnison Country" of Colorado corresponds roughly to Gunnison County, in the central part of the state. It contains an elevational range of over 7,000 feet, and there is a corresponding diversity of vegetation zones and habitat types. This tidy book annotates the records that Hyde has accumulated for some 274 species in this area. Each species is described (often in flowing terms), its distribution and seasonal occurrence noted, and identification tips are provided. Hyde even includes keys to the species of *Empidonax*, to the warblers, and to the sparrows and finches. The illustrations, by Don Radovich, are excellent, and the style and reproduction of the color plates are especially commendable for a publication of such limited geographical scope. It's a nice treatment, and those intending to spend much time in this portion of the country would find it entertaining and useful. Proceeds from sales are donated to the Western State College Foundation.—J.A.W.