ORNITHOLOGICAL LITERATURE

THE BIRDS OF KENTUCKY. By Robert M. Mengel. American Ornithologists' Union, Ornithological Monographs No. 3, 1965; xvi + 581 pp., 4 col. pls., 43 figs., 9 drawings (vignettes), map of Kentucky. $10.00 ($8.00 to members of the A.O.U.). May be ordered from Burt L. Monroe, Sr., Ridge Road, Anchorage, Kentucky 40001.

This is a state bird book, new style. It is an ecological study of the birdlife of Kentucky, the author having made use of modern concepts and methods. Hence, it has the good features of a faunal catalogue, plus a balanced account of the varied habitats which support the state's avifauna. The reader will know what is there, but he will also have an idea as to why it is there.

As one of the home areas for John James Audubon, Kentucky is ornithological hallowed ground. Audubon stood, for a time at least, as resident ornithologist on the Kentucky frontier. Add to this the fact that every early explorer, traveler or adventurer—and a surprising number of these had scientific interests—who reached the West via the Ohio River had, perforce, to touch Kentucky. The list of visitors reads like a western "Who's Who." Dr. Mengel has not neglected the work of any of them; he has mined in a rich vein.

Only two of our states, Kentucky and Tennessee, extend from the Appalachians to the Mississippi Embayment. These, and only these, form a land bridge from eastern mountains to interior lowlands, with all the riches of fauna and flora that such expanses afford. Mengel divides Kentucky, for his studies, into seven physiographic sections, these ranging from the summit of Black Mountain at 4,150 to an elevation of 275 feet on the Mississippi River.

A major section of the volume is devoted to ecological studies of each of these seven physiographic regions. Characteristic birds are listed and related to the vegetative types which support them. Special attention is given to species which occur at the limits of their ranges. An analysis of each population suggests the probable place of origin of limital species. There is an attempt to assess the effects of deforestation, soil disturbances, and other man-made phenomena.

In his accounts of species and forms known to occur in Kentucky, Mengel gives no space to such matters as synonymy, general range, or species description. These things are abundantly cared for in today's general ornithological literature; they are not needed in a modern state bird book. Each species account begins with a brief statement as to status in Kentucky, then, whenever needed, there are more detailed statements as to occurrences in spring, summer, fall, and winter. There is a list of specimens examined, and the author has taken endless pains in tracing down supporting specimens of rare and little known species and forms.

Breeding species are given special attention, and in his accounts of these the author's penetrating ecological observations are most in evidence. He is never content merely to report that a bird is present; rather, he seeks reasons for its presence, and gives rich detail as to its habitat preferences. Zoology alone could not have produced such accounts; they are supported by botanical, geological, and edaphic studies as well.

There are the expected lists of hypothetical and dubious species, these fascinating sources for further field studies. There is a full bibliography and a fine index. Printing and paper are good, and there seems to be a minimum of typographical errors, sure sign of good proofreading and editing.

It is unavoidable, but true, that such state catalogues as this will seem obsolescent to

present-day students in the field, particularly those keen-eyed and enthusiastic youngsters who are eager to discover what appear to be mistakes or discrepancies in a printed account. This may be the more apparent here since most of Mengel's studies are based on observations made some years ago. Fortunately, we are all becoming more aware, thanks to careful students of populations, that even common and widely distributed birds fluctuate widely in their numbers from year to year. This is why there will always be a place for good resident bird students who are in the field throughout the year. Let no beginner feel that all the work has been done, and that he has no contribution to make!

I suppose that reviewers are expected to be critical, if they have any function at all. If forced into this position, I would observe that Mengel's color plates are unfortunate in their reproduction. I cannot believe that Kentucky Eastern Phoebes have such yellow bellies, nor that Black Mountain Veeries are so washed out in their brown back coloration.

Now that this has been said, let's add that this volume is a fine and comprehensive study, one that will be followed in style by state bird catalogues of the future.—MAURICE BROOKS.

HANDBOOK OF WATERFOWL BEHAVIOR. By Paul A. Johnsgard. Cornell University Press, Ithaca, New York, 1965: 6¼ × 9½ in., xvi + 378 pp., 11 pls. (photos), 96 figs. (drawings). $10.00.

The name Paul Johnsgard and the subject of waterfowl behavior have become almost synonymous. His list of publications on the subject is impressive. His study of the evolutionary relationships among North American Mallards was particularly outstanding. I have been impressed by Dr. Johnsgard's ability to accomplish work and publish results at a rate few biologists have equalled. "Handbook of Waterfowl Behavior" is his most ambitious endeavor, but perhaps in this case he was too ambitious.

The Handbook of Waterfowl Behavior contains descriptions and discussions of the social aspects of the behavior of 133 species of waterfowl with special emphasis on displays associated with pair formation and copulation. Some of the material was drawn from the literature, but most is from motion pictures taken by the author at the Wildfowl Trust, Slimbridge, England. By the author's admission, the descriptive material is very incomplete.

Those who have been interested in the behavior of waterfowl might hope that such a broad knowledge of ducks and geese of the world would lead the author to new knowledge of the evolutionary relationships within this varied and interesting group of birds. Very few individuals are qualified to evaluate Dr. Johnsgard's conclusions regarding the classification of ducks and geese. The reviewer is not one of these individuals. However, the use of the comparative approach to behavior study requires detailed and quantitative data on the various species and genera in question. Perhaps Dr. Johnsgard's rather hurried walk through the forest of waterfowl behavior has given him insight into the taxonomic relationships among the forms found there; however, I do not see that he has developed a very solid foundation for such conclusions.

The author rarely delves into questions concerning the evolution and function of the social signals he describes. He seldom views behavior as the product of an adaptational process. I believe that it is difficult to speak authoritatively on the subject of behavior without some interest in this aspect of the problem. This weakness in Dr. Johnsgard's approach is understandable, for most of his observations did not take place in the natural environments of the animals.

The reviewer feels qualified to comment briefly on the discussion of the Pintail (*Anas*

acuta). The behavior of this species is presented on pages 182–185. Under "General Behavior," preflight movements of the Pintail are considered. They are described as the usual type, neck-jerking and lateral head-shaking. My observations indicate that the most frequent preflight movement among Pintails is a rapid vertical movement of the bill while holding the neck outstretched and motionless. On page 185, copulation of the Pintail is described. The author states that head-pumping by the male and female is typical of the Pintail in the precopulatory situation. I have observed this behavior and have never seen the female perform head-pumping.

Throughout the discussion of the Pintail, the author omits most of the behavior which distinguishes the Pintail from other ducks. The seriousness of his omission is compounded by the emphasis it places on statements made. For example, diving behavior of Pintails is the first topic under General Behavior. During a three-year study of Pintails, I did not see diving occur. When the shallow-water habit of this species is compared to that of other species, I would venture to guess that the Pintail will be among the duck species which are least likely to dive for food.

As a person views the behavior of a particular species for the first time, he often fails to comprehend much of what he observes. Waterfowl seem to be especially troublesome in this regard for the language of the group is complex. If the Handbook of Waterfowl Behavior is used as a reference book or a field guide, it will help both the casual observer and the serious student to really *see* what he observes. The book will make that first step in the observation of ducks and geese much easier. Dr. Johnsgard states in the acknowledgments, ". . . the objective of the present report is merely to provide the barest minimum of information on each species that will allow other persons to compare their observations and to develop more detail and quantitative studies." In this light, the book represents a most worthwhile effort on the part of the author.—Robert I. Smith.

The Birds of Arizona. By Allan Phillips, Joe Marshall, and Gale Monson. University of Arizona Press, Tucson, 1964; 9½ × 12 in., xviii + 220 pp. $15.00.

At last, those who are concerned with birds in the Southwest have an accurate and authoritative volume covering a major part of the region. Although possessing one of the largest avifaunas of any state, Arizona has had no book treating its entire bird life. For many years—until early in 1964—there was not even an up-to-date checklist available. The annotated list which appeared that year as Part 4 of Lowe's "The Vertebrates of Arizona" was written by Monson and Phillips and was based on the same data that appear in the present volume. Some of the wording is exactly the same in both works. Users of both will note, however, that whereas the checklist employed nomenclature of the fifth edition of the A.O.U. Check-list, there are numerous departures from this in "The Birds of Arizona."

The book opens attractively with a colored frontispiece (by W. J. Schaldach) depicting a pair of Masked Bobwhites with golden-leaved cottonwoods and Baboquivari Peak in the background. Following a two-page preface by Guy Emerson is a table of contents, a list of museums referred to in the text, and an introduction by Marshall stating clearly the aims of the book and role of each author. Five well-illustrated pages of habitat information (with a sad commentary on man's destructive activities) by Monson and Phillips, and a map, precede the 212-page text. The latter treats each of the 423 species admitted to the Arizona list by the authors' strict criteria. (However, if A.O.U. Check-list nomenclature were here followed the species list would be longer.)

Forms of hypothetical occurrence are not numbered as are the others, but are included

in brackets in their customary taxonomic position. Subspecies receive considerable attention but are treated within each species account. Space devoted to one species varies from five or six lines (e.g., Blue-footed Booby) to more than two pages (Screech Owl). The pages carry double columns of print and, very often, an outline map showing the Arizona distribution of one or more Arizona species or subspecies.

Each family is introduced by an interesting general summary of the group as represented in Arizona, with occasional comments on remarkable habits or structure of extralimital forms; these introductory discussions are largely by Monson. Two groups, the hummingbirds and *Empidonax* flycatchers have keys for specimen identification that will assist the bird-bander or anyone with a dead bird to name. Phillips' *Empidonax* key is more satisfying to use than any other heretofore available. Nevertheless, as the author states, it will not work 100 per cent of the time. (I might add that if a specimen won't "key out" here it is sufficiently interesting to warrant preservation; too many inexperienced banders continue to ring *Empidonax* flycatchers recorded positively as one species or another. It is not that easy.) The hummingbird key is useful only in a very general way, not permitting final distinction between, say, females of the two *Archilochus* species, or those of *Selasphorus*. But it does permit narrowing down the number of species to which an unknown individual may belong.

Marshall's introduction reveals that the book's aim is to "tell exactly where and when each kind of Arizona bird can be found and to remark what is interesting about it in Arizona." It tries "to present ornithology as an engaging pursuit full of absorbing problems, not as a static discipline with everything settled by pompous dicta of the experts. Original information that cannot be found in other books is emphasized. On almost every page we seek to entice the attention of the amateur ornithologist toward the biological problems that birds so superbly illuminate, in hopes that he will be encouraged to contribute to their solution." Certainly no one could quarrel with these aims nor with the sincerity evidenced by the authors in doing exactly as Marshall has written. Virtually every page does indeed reflect our present lack of detailed information on distribution, breeding, or movements of Arizona's birds. More than most other state bird books, this one emphasizes what we *don't* know.

On its positive side it has no equal as a source of information on southwestern birds. Nothing has been taken for granted. Wherever possible, specimens have been re-examined, regardless of their location. Unlike some modern books treating of bird distribution, the species accounts in this volume are based largely on critically examined specimens, not sight records. Many published reports, and even specimens in some cases, are viewed by the authors with a healthy skepticism which some may consider extreme. Throughout the book, dates of occurrence are italicized when supported by specimen evidence; furthermore, a parenthetical insertion reveals location of the specimen(s). References to specimens in the older literature are not taken at face value; everything appears to have been re-examined. Thus the accounts are exceptionally well documented and can be safely relied upon by the most critical reader.

The authors' extensive knowledge of living birds is reflected in the numerous worthwhile aids and cautions in field identification. Every reporter of sight records in the Southwest should read (and heed) these comments; there is much information here that is not in the field guides. To cite but a few examples: male Allen's and Rufous hummingbirds "cannot safely be distinguished in the field" owing to variable back color (p. 64); Clay-colored and Brewer's sparrows may be very difficult to distinguish, but "When in doubt, your bird is a Brewer's!" (p. 197); "the White-necked Raven is impossible to identify in life unless seen right beside the Common Raven, when its smaller size can be

discerned" (p. 106). These may seem rather dogmatic statements in this era of enlightened field recognition. Nevertheless, I have been uncertain of several male *Selasphorus* that I have seen clearly; and without exception every questionable "Clay-colored" Sparrow I've taken has proved to be a Brewer's; you *know* if you see a genuine Clay-colored. Eight years' close association with southwestern *Corvus* has convinced me that only the uninitiated or careless observer identifies most ravens to species. The White-necked Raven (*C. cryptoleucus*) is, we all know, a desert or desert-grassland bird, whereas *C. corax* is more of a mountain species. Phillips states (p. 106), "A raven nest in a yucca or low mesquite would almost certainly be [that of] a White-necked." But the "almost" is important, as disclosed by our recent discovery of breeding Common Ravens in the mesquite-yucca-grassland near Silver City where it has been assumed that the only breeding ravens had to be *cryptoleucus*. I can likewise endorse the statement (p. 78) that "Many observers do not realize how much a Say's Phoebe resembles a kingbird . . . nor do they appreciate how similar to each other the various species of kingbirds appear." I cite these instances to emphasize my complete agreement with the authors, lest some readers be inclined to dismiss their words of caution. One must witness repeated misidentifications of some of these birds before becoming fully impressed by the magnitude of the potential error inherent in the masses of sight records published annually.

Marshall writes in his introduction that the book "is Phillips' Birds of Arizona 'as told to' Marshall and Monson." Phillips "is responsible for the scientific names and classification used." There are numerous deviations from the conventional A.O.U. Check-list nomenclature. *Phainopepla* is placed in the Bombycillidae; *Peucedramus* in the Sylviidae. Surprisingly, the latter and the Turdidae are retained as families, not as subfamilies of the Muscicapidae. Notable is the dismissal of numerous familiar genera such as *Chen*, *Lophodytes*, *Lophortyx*, *Squatarola*, *Columbigallina*, *Platypsaris*, *Iridoprocne*, *Petrochelidon*, *Ixoreus*, *Hylocichla*, *Vermivora* (here = *Helminthophila*), *Richmondena*, *Pyrrhuloxia*, *Guiraca*, *Hesperiphona*, *Chlorura*, *Passerculus*, *Amphispiza*, and *Rhynchophanes*. However, *Passerella* is maintained as distinct from *Melospiza*, and *Setophaga* is not merged with *Myioborus* as some have proposed. *Anas crecca* is considered only "possibly conspecific" with *A. carolinensis*.

The Snow and Blue geese are united under *Anser caerulescens*. The Mexican Duck (*Anas diazi*) is treated as a race of the Mallard. Harlan's Hawk is reunited with the Red-tails. The Arizona Woodpecker is merged with *Dendrocopos stricklandi* of Mexico. The Black-eared Bushtit (*Psaltriparus melanotis*) is considered to be a form of the polymorphic *P. minimus*, with the proportion of black-eared birds increasing southward. *Troglodytes brunneicollis* and *T. aedon* are likewise considered clinal variations of a single species. *Sitta pygmaea* is lumped with *S. pusilla*.

Phillips recognizes only one species of *Colaptes*, combining under *C. auratus* the Yellow-shafted, Red-shafted, and Gilded flickers (which he advocated at least as early as 1947, cf. *Condor*, 49:121) since "the differently colored forms of Flickers interbreed massively wherever they possibly can."

One of the more surprising (and to me the least defensible) lumpings is of the Nashville, Virginia's, and Colima warblers (under the name *Helminthophila ruficapilla*, the "Gray-headed Warbler"). Even if justification could be found for merging the first two, it is stretching a concept too far to place the very different *crissalis* with them in the absence of reasonable proof. Because three forms are allopatric, have similar songs and call-notes, and nest on the ground is no reason for considering them conspecific. Granted that these three birds are more similar to one another than any is to *luciae*,

peregrina, or *celata*, they are distinctive forms and no valid reasons for lumping them are presented in this work. I disagree that *crissalis*, *virginiae*, and *rufícapilla* "all have the same song"; this is not so. Their call-notes are similar, but this seems a minor point. That all three nest on the ground, whereas Lucy's Warbler nests in cavities, is insufficient evidence of conspecificity. Closely related forms may or may not have similar nesting sites (consider the variation within *Dendroica*, for example). Tail-wagging is cited as still another specific character common to all three forms. Although both Colima and Virginia's warblers indulge in this (as do various other parulids), I do not recall the Nashville Warbler as a "tail-wagger" either as a migrant or on its breeding grounds.

Expectedly, the Baltimore and Bullock's orioles are considered conspecific, as are the Rose-breasted and Black-headed grosbeaks and the Indigo and Lazuli buntings. Vernaculars assigned to these combinations are "Northern Oriole," "Common Grosbeak," and "Common Bunting." However, the familiar common names are also supplied in the account headings, and are used frequently throughout the bunting account. No new evidence to support the conspecificity of any of these forms is presented here. The rosy finches are also merged under the name *Leucosticte tephrocotis*, "Rosy Finch."

The genus Junco is considered to include, in the United States, but two species, the Brown-eyed Junco (*J. hyemalis*) and the Yellow-eyed Junco (*J. phaeonotus*). Although there is considerable merit in this arrangement, I think it is an oversimplification of the complex relationships within this genus. Granting that *hyemalis*, *mearnsi*, and the various races of *oreganus* may be conspecific, it is difficult to include *aikeni*, the White-winged Junco, in this collective "species" without considerably more evidence than is known to me. Very few *mearnsi-aikeni* hybrids are known, and I am aware of no intermediates between *aikeni* and any *Junco* other than *mearnsi*. Although the breeding ranges of those two forms overlap, with a few hybrids resulting, Miller ("Speciation in the Avian Genus Junco," 1941: 353) considered it "remarkable that more hybridization does not occur. . . . Through some factors of habitat preference and specific intolerance, or both, they remain essentially separate, as do species rather than races." This very limited interbreeding makes one question the statement (p. 203) that the brown-eyed juncos, like flickers, indulge in "interbreeding on a large scale wherever and whenever possible." Certainly this is an exaggeration. It is misleading, too, to refer to *aikeni* as "a sort of dull relative of *mearnsi*" (p. 204), for phenotypically *aikeni* is conspicuously nearer to the *hyemalis* group than to any of the *mearnsi-oreganus* complex. Interpretation of species limits in *Junco* is made no easier by the hybridization between *oreganus* and the forms of *caniceps*, but in this reviewer's opinion wholesale lumping is not necessarily the answer. Reflecting all subgeneric relationships on a racial level may obscure, rather than clarify, the picture.

Some readers will lose patience with the emphasis on taxonomic and nomenclatural matters in this book. (Thirty lines are devoted to the merits of the name *Toxostoma crissale* as opposed to *T. dorsale*.) The average reader of a state bird book probably couldn't care less about such matters, but certainly in this way much interesting history is injected into some of the species accounts.

As has already been implied, subspecies receive much emphasis—partly because so many forms usually considered full species are reduced to racial status here. Thankfully, there is likely to be little confusion to the lay reader, for the authors list each "subspecies" separately under the species, with its assigned trinomial and the commonly used vernacular—e.g., "*J. h. caniceps* (Woodhouse). 'Gray-headed Junco.'" followed by a brief description.

There seem to be very few actual errors in the book; it obviously has been proofread with great care.

For all its accuracy and insistence on reliable data, the style of the writing is informal, often chatty, with occasional lapses into slang. I have already commented on the inclusion of occasional exaggerations. In a scientific work it seems out of place, as well as inaccurate, to be told that young female cowbirds have been stimulated to incubate "by shooting them full of progesterone" and, further, that adult cowbirds "stoutly refuse" to respond (p. 173). (And we tell our students to avoid anthropomorphic interpretations!) It is surprising to encounter in a paragraph on *Setophaga-Myioborus* relationships the statement "It is *ruticilla*, with its *Dendroica*-like song, eggs, and tree nesting, which is the odd-ball." Surely there are better ways to word things. Statements such as these detract greatly from the dignity, sincerity, and accuracy one has the right to expect in such a work. Perhaps such writing merely is evidence that languages, like birds, undergo evolution. Certainly the book as a whole is refreshingly readable for a state bird book. No one can complain that The Birds of Arizona is dull reading; this in part compensates for one's annoyance with the occasional "far-out" statement.

The 12 color plates, full-page reproductions of Arizona field sketches by George Miksch Sutton, are superbly reproduced and reflect Sutton at his best. I suspect that not a few copies of the book may be purchased for the plates alone. The 51 color photographs by Eliot Porter are good, though not absolutely first-rate owing largely to inferior reproduction. Most of those in my copy are very dark and dull; a few are too light (as so often is the case with reproductions of flash pictures), with the birds appearing overexposed. A few (e.g., male Phainopepla, Violet-green Swallow) are not good photographically. The birds in the two Bell's Vireo pictures would almost appear to be of two different species. Some (e.g., Lazuli Bunting, Western Tanager) are lovely, and undoubtedly most of the originals are of high quality.

Throughout the book one finds evidence of the authors' concern for conservation of birds and bird habitats in Arizona. For example, they express wonder (p. 25) that the Osprey still survives in the State, "considering that even fish-and-game rangers are instructed to shoot them on sight." (As they do in New Mexico—though officials hesitate to admit it.) Ecological changes are mentioned wherever possible. The plea (p. 42) for preservation of the much-maligned mesquite (*Prosopis juliflora*) as a valuable and necessary component of the riverbottom community should be read by everyone who tills these lands or who hunts White-winged Doves. Long overdue is the declaration that "Grasslands and riparian woods have always been neglected by the conservation movement, which concentrates on preserving mountain forests" (p. 194). This reviewer has maintained for some time that unless ornithologists become truly active in conservation activities future generations will have few natural communities to study in parts of our country. It is reassuring, therefore, to have an authoritative bird book, yet one with a conscience, available to southwesterners. Let us hope that influential Arizonans will not overlook the words of Phillips and Monson at the end of their habitat discussion (p. xvii): "If the state is to remain an attraction to naturalists it is well-nigh past time that action be taken to *preserve* some of its natural beauties. Let us hope that the data presented in this book do not represent the obituary of some of our most interesting birds. Rather may these birds continue to find shelter and safety in a green Arizona!"

In addition to its other assets, this is a handsome, well-made volume. No naturalist who lives in, or has anything to do with, the Southwest can afford to be without it; and it

deserves a place on the book shelves of every ranchhouse and schoolroom in Arizona. The authors and the University of Arizona Press deserve a great deal of credit for producing this work.—DALE A. ZIMMERMAN.

AVIAN PHYSIOLOGY. By Paul D. Sturkie. Second edition. Cornell University Press, Ithaca, New York, 1965: 6⅛ × 9¼ in., xxx + 766 pp., 116 figs. $15.00.

The appearance of this revised and enlarged edition of Dr. Sturkie's "Avian Physiology" should be welcomed by all workers in this broad field. The organization of the second edition is similar to the first, but there has been a considerable increase in the contents. The revision is over 340 pages longer; each chapter has been rewritten in part and several whole chapters have been written by authors active in specific fields. This has greatly increased the coverage of the material in many areas, but some of the shortcomings of the first edition still exist (see Dawson, 1954, *Auk*, 71:477–497). Among those areas conspicuous by their absence are treatments of the skeletal muscle and the physiology of migration. The book remains oriented heavily towards the physiology of domestic birds, although the coverage of wild birds has been increased significantly. How accurately the lack of information on wild birds reflects our actual lack of knowledge is difficult to estimate.

The book is divided into 22 chapters, each with its own bibliography. The text is not encumbered by numerous typographical errors, the most conspicuous being the inaccurate chemical formula in Figure 90. The book is well printed and the illustrations are adequate and of excellent quality.

Approximately one quarter of the book deals with the blood and circulation. Domestic birds are treated extensively but not exclusively. This is an area of considerable research interest at present and the general treatment is good. As was the case in the previous edition, the chapter on electrocardiography is lucid and instructive.

The chapter on respiration contains both morphological and physiological information, a definite necessity at the current level of our understanding of this system. Unfortunately the most recent citation is 1962 which eliminates several recent pertinent papers and reviews.

Body temperature and energy metabolism are treated in two individual chapters (both by G. C. Whittow). Much of the recent work on water economy and the role of evaporative water loss in adjustments to temperature stress is omitted, but the role of evaporation in temperature regulation is discussed. The discussion of energy metabolism is good and should serve as a stimulating introduction to this area of investigation.

Digestion, carbohydrate metabolism (by R. L. Hazelwood), and the kidneys and urine are treated next. The latter includes a summation of role of the nasal (salt) gland in extra-renal excretion and many functional aspects of the kidney. However, little is said regarding the role of the kidney in the ecological relationships of wild birds. Typically, considerable information of a pharmacological nature is included.

The chapter on the special senses by M. R. Kare is good and includes information of interest to behaviorists. The recent work on olfaction in vultures is omitted.

As might be expected, the chapters on reproduction are quite complete, but rely heavily on information from domestic birds. The coverage ranges from gross histology to the synthesis of egg proteins, and there is a special section on eggshell formation and skeletal metabolism by T. G. Taylor and D. A. Stringer. The remaining six chapters cover the endocrine glands and the nervous system. The latter includes a general introduction to the physiology of nerves, without becoming entangled in a long digression on the chemis-

try involved, and then proceeds to a consideration of the spinal cord, autonomic nervous system, and the brain.

The chapters on the endocrines are very well done and represent a well balanced approach, which includes histology, biochemistry, and function.

Dr. Sturkie has presented the broad scope of the physiology of birds in a clear, meaningful manner. This is an important contribution and an admirable accomplishment.—ALAN H. BRUSH.

THE SILENT SKY: THE INCREDIBLE EXTINCTION OF THE PASSENGER PIGEON. A Novel. By Allan W. Eckert. Little, Brown and Company, Boston, 1965: 5⅝ × 8¼ in., 243 pp., front. $4.95.

This book belongs in the currently popular category of non-fiction novels. About the now-extinct Passenger Pigeon, its leading characters are a male which became the last collected wild specimen when it was killed by a boy near Sargents, Ohio, in 1900, and Martha, the last of her race and a captive most all her life who died in a Cincinnati zoo in 1914.

There is a continuing fascination about Passenger Pigeons which may have been at their peak of abundance the most numerous species of bird that ever lived. Many scientists regarded it as the finest pigeon in the entire world. Its extinction took place with stunning abruptness. The author has studied and digested observations and records about this pigeon which were made during the Nineteenth Century and until the death of the last survivor early this century.

This tale about a species which became extinct more than half a century ago arouses a sense of outrage against the ruthless destruction of an entire race in so short a time. No one can deny that man in his greed and thoughtlessness hastened the end of the Passenger Pigeon even though its vast numbers probably would eventually have spelled its doom. At this point no man can say whether the species, which habitually wintered, fed, and bred in incredible concentrations, would have been able to change its habits as its numbers diminished naturally, and thus been able to survive.

While the reader is confident that this novel is based on fact and gives a true picture of the Passenger Pigeon and its extinction, it must be pointed out that human traits are sometimes attributed to the pigeons as when, their numbers reduced to a handful on former nesting grounds, a male occasionally approached a female in an embarrassed manner and then quickly lost interest, scanned the sky, and listened for the sound of thundering wings that would come no more.—HELEN G. CRUICKSHANK.