

## ORNITHOLOGICAL LITERATURE

**RADAR ORNITHOLOGY.** By Eric Eastwood. Methuen & Co., London (distributed in the U.S.A. by Barnes and Noble, New York), 1967: 6¼ × 9½ in., xii + 278 pp., 24 pls., many figs. 75 s (\$9.00).

Radar ornithology is still in its infancy, even though it has matured enough now to have a book devoted to it. Dr. Eastwood is in a delicate position. If not the father, he is at least a close family relative of the infant. He could be tempted to an excess of praise, or to a compensatory over-criticism. Remarkably, he has avoided either without bragging of this agile feat and has given us a very readable book.

The tendency of one intimately involved in any field is to describe the technical aspects of that field in glorious detail. In a book on radar this could result in a jungle of electronic mathematics impenetrable enough to stop all but the most persistent. The value of this book is that it presents no pyrotechnical display, but provides instead just about enough technical discussion so that the reader has some "feel" for the value of radar and some concept of the problems involved in using it. I suspect some readers will find too much, others will regard the description of "radar working" as too superficial. Dr. Eastwood does oscillate somewhat from detail to generality but I believe most readers will find the mean level quite satisfactory. The practicing researcher has technical information available, anyway, and eventually ends up with a sort of do-it-yourself approach which goes beyond the printed information available. The discussion of principles of radar, the extraction and display, and the interpretation of radar data are essential to the appreciation of the rest of the book (and the bulk of it) on findings of radar ornithology. Much of what is claimed in this central core of the book cannot be evaluated without some technical background (any hi-fi stereo bug will recognize the situation), so pages 1-78 should be read carefully and in sequence. I mention the latter because it is possible to sample the remaining sections of the volume as interest dictates. I rather recommend that the reader do this. Unless one has a particular interest in, say, patterns of migration over a certain area in the fall, I think it is hard to keep all the observations mentioned in mind and continue reading with sustained enthusiasm. As yet there are too few generalizations available to serve as memory pegs for the mass of data reviewed by Dr. Eastwood. Nevertheless, each case presented serves as a fascinating demonstration both of what migrating birds can do *and do* and of the detecting abilities of radar. Fortunately, Dr. Eastwood has set up bite-sized divisions under clear bold-faced headings which facilitate the sampling process. The following list of topics will give some idea of the scope of the book's main section: time variation, patterns in Europe and North America, flight behavior, wind drift, orientation, ring angels, altitudes of flight, soaring and gliding, counting, effects of weather. In one chapter Dr. Eastwood turns the tables and discusses the effect of radio waves on birds. He presents a remarkable amount of information in all the foregoing, yet does encourage further study by pointing out gaps in information and the ambiguity of some observations and by suggesting what information is still needed.

The final chapter is a brief but optimistic look at the future of radar ornithology. The author stresses the need for both coordinated studies covering large landscape units and intensive studies of individual birds in flight. He also points out the importance of defining and refining questions as hypotheses are generated and of considering the limitations of the instrument. New developments of radar now available only to the military, or anticipated, will reduce certainly the confines of the latter

problem. As the author says, so much of radar ornithology has been "opportunistic," with ornithologists making use of what equipment they could and wherever it happened to be located. Now it is time to plan studies with respect to the biological problems requiring investigation with radar.

Dr. Eastwood's book is essentially a review, creative as well as critical, and suggests great promise for the infant subject.—JEFF SWINEBROAD.

BIRD GUIDE OF THAILAND. By Boonsong Lekagul. Privately printed with the advice of the Association for the Conservation of Nature, Bangkok, 1968:  $5\frac{1}{4} \times 7\frac{1}{2}$  in., xxviii + 271 pp., 81 col. pls. of line drawings, 6 photos, 1 map. \$7.50. Order from the author, c/o Association for the Conservation of Nature, 4 Old Custom Lane, Bangkok, Thailand; add \$1.00 for mailing. (Also available for \$8.50 from Pierce Book Company, Winthrop, Iowa).

Dr. Boonsong, by profession a physician, by devotion an ornithologist and conservationist, has produced a remarkably complete and useful field guide. All the 829 bird species known from Thailand (formerly Siam) are depicted in color—even the peculiar new River-martin (*Pseudochelidon sirintarae*) described in 1968, which provides the frontispiece. The illustrations are by the author, and, though not of professional caliber and on some plates dully printed, they should serve for identification of almost all species. The drawings are in field-guide style and show both sexes when markedly different. In the case of raptors and waders, the line drawings depict birds in flight. The distinguishing tail characters of the various snipe are illustrated on one plate. The text, in English, gives scientific name, English name, Thai name (both in Thai and Latin characters), length, field marks, and sometimes vocalizations; it briefly indicates the part of the country where the species occurs as well as its habitat and status as migrant visitor or resident. A map of Thailand shows major geographical and political divisions, tinted to reflect the type of vegetation of the area. This is supplemented by a chapter on zoogeography. The sequence and scientific nomenclature essentially follow Deignan's (1963) Thailand check-list, but after the plates and text had been prepared, additional species were found in the country, so text and illustrations covering these had to be included at the end.

There are said to be about fifty thousand North Americans currently, if temporarily, in Thailand. Adding the number in neighboring countries of southeast Asia, including Vietnam, the potential market for this little book is substantial. Its quality and present uniqueness should make the small edition go rapidly out of print. Dr. Boonsong merits great credit in preparing and publishing this work on his own. As a conservationist he felt that bird preservation required a book by which his countrymen could identify, and thus more fully appreciate, their immense and interesting avifauna. For Thai unfamiliar with English ornithological terminology, he has provided a glossary and special index. These, with the pictures and the Thai names, should suffice until an edition entirely in the Thai language can be financed. The present version serves as an inexpensive introduction to the bird life of an ornithologically rich area of the globe.—E. EISENMANN.

ORNITHOLOGY: AN INTRODUCTION. By Austin L. Rand. W. W. Norton & Company, New York, 1967:  $6\frac{3}{4} \times 9\frac{1}{2}$  in., 311 pp., 51 figs. \$8.50.

Publishers, like clothes designers, quickly learn to create modes and to capitalize upon them. The success of the Peterson Field Guides and *Life's* Nature Library Series

has engendered a rash of popular science books for the "general reader"—a "ready-to-wear" form of learning that is fashionable, fairly inexpensive, and comfortable for even the most non-scientific reader.

Norton and Company have augmented this genre with "The World Naturalist Series," including Austin Rand's book on ornithology. The reader of this book will find the going uniformly easy and palatable. Technical jargon is eliminated here, but the text is larded with important aspects of bird biology. The author's preface was written in mid-1964. No references go beyond 1964. I wonder why, then, the book was not published until late 1967. A lot of exciting ornithology has been written in the intervening period on a variety of topics, especially ecology, behavior, migration, and orientation. It is a pity that none of this could have been included in the text.

The book covers almost all aspects of bird biology in 240 pages and 24 chapters. Five appendices describe briefly the different orders of birds, explain scientific nomenclature, list several references on techniques of studying birds, and provide notes and suggested readings for each chapter. Appropriately for this book, all scientific names are included in an appendix. Twenty-three pages very adequately index the book's contents.

The chapters cover such aspects of bird biology as characteristics of birds as a group, the bird body, sense organs, size and shape of birds, patterns of diversity, social feeding, food and water, breeding cycle, nest and eggs, parents and young, social nesting, homing and orientation, migration and hibernation, predation and parasites, coloration, feathers and molt, flight, bird song, behavior, geography, the nature of species, and birds and man. Scattered throughout the chapters are some of Rand's personal observations — all too few — from both the museum and the field. They considerably enhance the book's readability.

The writer who is imbued with the technicalities of his science must shift gears when writing for the public, translating scientific jargon into language that the public can not only assimilate but also enjoy. The author succeeded in this difficult task. The danger in such translation is obviously found in a tendency to generalize, to oversimplify ideas and conditions. Numerous exceptions to general statements cannot, of course, be included in a book of this nature.

The author maintains a consistent writing style throughout. But not all chapters are of consistent quality. Sections on the senses of birds, patterns of diversity, and the nature of species are especially well presented for the general reader. Others on activity and rest, behavior, and bird song are weaker, lacking in solid information. Too much space is devoted to the musical qualities of bird song, and not enough to some other topics, such as some of the recent theories of bird orientation. The author attempts to avoid the use of technical terminology as completely as possible. He succeeds very well, with the exception of a few lapses. Because of the delay between the writing and publication, several stated facts were no longer valid by the time this book was published.

If I am mentioning what appear to be shortcomings of this book, I emphasize that they are minor ones. The text of the book is lucid and informative. The most serious impediment to the book's likely success will be its illustrations. The publisher bears the onus for this deficiency. Seldom have I seen a book published with such poorly executed and inadequate illustrations. Drawings are few and inaccurate and the illustrative material poorly selected. The reader of such a popular science book, because he is a tyro, needs desperately good graphic teaching to augment the text. One wonders why the publishers went to the effort to get such a well-known ornithologist as Austin

Rand to write this excellent text, but failed to back up his effort with high quality art work. What a difference it would make in the sales of the book!—D. A. LANCASTER.

A NATURALIST IN TRINIDAD. By C. Brooke Worth. J. B. Lippincott Company, Philadelphia, New York, 1967: 6 × 9 in., 291 pp., 18 drawings, 2 maps. \$7.95.

The island of Trinidad, about nine miles north of Venezuela, is more closely allied faunally to South America than to the West Indies. Like much of South America, its natural history is still in the pioneering stage.

In 1960, C. Brooke Worth, after serving as a medical parasitologist in India and South Africa, went to Port-of-Spain, the capital of Trinidad and Tobago, to join the staff of the TRVL (Trinidad Regional Virus Laboratory). Supported by the Rockefeller Foundation, this organization was created for research on viruses among various animals. Dr. Worth's position was that of field naturalist, and so he was expected to study the habits of local wildlife and obtain specimens of blood from the subjects under observation.

For field headquarters, he chose Bush Bush Island in the Nariva Swamp on the east side of Trinidad. Relatively untouched and remote, being accessible only by boat from the coast, Bush Bush was ideal. Here he had a small prefabricated building erected and named it We House from a local expression. Most of the book is centered on Bush Bush although it takes in trips to the Arima Valley in the northern range, Port-of-Spain, and Soldado Rock off the southeastern coast.

Dr. Worth's project encompassed practically the whole field of natural history, but his particular interest was ornithology. He sat up nets to capture birds for banding and bleeding. To obtain specimens in the upper canopy, he invented a method of raising the nets to tree-top level. The first species caught in this manner was the Black-tailed Tityra. Later species included the Palm Tanager, Sulphury Flatbill, Seven-colored Parrot, and several kinds of honeycreepers.

Dr. Worth gave attention to other creatures besides birds, as the headings of some of the book's chapters reveal: Monkeys, Small Mammals, Spiders and Bugs, Bees, Snails, Ants, Bats, Snakes, Lizards and Caymans, Butterflies and Boys.

One feature of special attraction was a cocorite palm in the yard of We House. The life, both plant and animal, associated with this tree is a summary in microcosm of the wildlife in the area.

While Bush Bush Island was retained essentially in its wild state, human occupation did initiate changes. Leon, Dr. Worth's helper, cultivated some plantains, the leaves of which bats found to be ideal places for roosting. A small beach lizard from the coast found its way to sections of exposed sand that resulted from the opening of the forest. A succession of animal and plant life, due to changes of this sort, is always of interest.

Since "A Naturalist in Trinidad" is primarily autobiographical, Dr. Worth makes no attempt to delve deeply into any one topic. However, he has a facility for effecting vivid descriptions. Thus the book is certain to please the armchair reader who desires a vicarious introduction to Central and South America, or the individual who wishes to travel retrospectively to Trinidad.

Don R. Eckelberry has greatly enhanced the book with 18 excellent black-and-white drawings, all done from personal observations during his many months in Trinidad. Two maps, one of Trinidad and one of Bush Bush Island, help to orient the reader.—MARGARET H. HUNDLEY.

OF PREDATION AND LIFE. By Paul L. Errington. Iowa State University Press, Ames, 1967: 6 × 9 in., xii + 277 pp., 1 photo of author, many sketches by Dycie Madson. \$6.95.

For more than 30 years Paul Errington labored to promote the appreciation of predators as part of the natural order of living communities and to develop a theory of predation. In simplified form, the theory states that most vertebrate predators consume surplus individuals from their prey populations—individuals that would die from some other cause if not eaten—and that predation is largely non-regulatory in determining the population levels of prey, although he did allow certain exceptions. This book is a posthumous attempt at popularization and elaboration of Errington's basic philosophy about predation. The first draft of the manuscript was complete at the time of his death in 1962, and we are indebted to his wife, Carolyn Errington, for undertaking the revision necessary for publication.

It is clear that Errington remained true to his early convictions right to the end of his life, despite increasing difficulties with some of the more recent findings of his own and other researches. The organization and chapter titles of this book reveal some of the problems that beset him in later years, as well as the clarity of his original insight. Part I consists of four chapters dealing with preliminaries and perspectives. In Part II there is a chapter entitled, "Predation and the Bobwhite Quail: some comfortable generalizations," followed by another headed, "More about predation and the Bobwhite Quail." Farther on there is a chapter headed, "Predation and the Muskrat: when the patterns still looked fairly simple," followed by, "More about predation and the Muskrat." In Part III, the final chapter about "Predation and life's wholeness" reveals Errington at his best as a writer, naturalist, and conservationist—not quite in the class of Aldo Leopold—but credible and appealing nonetheless.

Errington's influence on vertebrate population biology—particularly its management aspects—has been very great; and I suppose it is safe to say that most field biologists today accept the thesis that predation among vertebrate populations is epiphenomenal to other controlling factors. Only in the case of certain highly capable predators—such as canids and felids that prey on ungulates lacking important self-limiting mechanisms of population control—is predation thought to act as a true limiting factor, according to the Erringtonian theory.

Errington's ideas constituted a healthy reaction against the glib and shallow thinking about predation current before and during the time he was formulating his views in the 1930's and early 1940's. First, there was the attitude of the hunter and gamekeeper, who thought that all predators were "bad" because they kill game and that by eliminating predators the game would automatically increase. Then, there was the equally uncritical approach of the protectionists and economic biologists who attempted to prove how "beneficial" birds and some other animals are because of the great numbers of insects, rodents, and weed seeds they eat but who paid no attention to the dynamics of the populations involved in their calculations. The mere fact of eating was all that these groups emphasized. Errington gave a more balanced perspective to predation by considering it one among many factors that can influence the numbers of animals. For this reason his work remains important, but one should avoid the temptation to generalize his theory to cover all cases of predator-prey relations.

Some of the difficulty in understanding the details of Errington's thinking stems from his choice of subjects for study, as well as from his methods of research. It is no slight to recall that Errington was a local field-naturalist who worked on certain specific wildlife problems in the north-central United States (Wisconsin and Iowa), but it is important to examine his studies in the context of their limited geographic

and ecological setting. His views about predation were formed early in his career from studies of Bobwhite (*Colinus virginianus*) and one of its less important predators, the Great Horned Owl (*Bubo virginianus*), but even more so, from his lifelong preoccupation with muskrats (*Ondatra zebethicus*) and their main predator, the mink (*Mustela vison*).

In Wisconsin the Bobwhite populations reside at the northern limits of the species range, in an environment that is climatically marginal for the existence of quail. There one would expect the overriding mortality on quail populations to be associated with hard winters or other climatic extremes that largely obscure biological regulation by factors such as predation. This is precisely the conclusion I reach from Errington's quail studies, and all the tedious recitation about the thousands of Great Horned Owl pellets that did not contain quail remains is beside the point. Moreover, the quail studies suffer from a lack of information about mortality during the late spring and summer period of breeding and development of the young quail. Much of Errington's puzzlement about the three different "thresholds of security" shown by the Prairie du Sac quail might have been erased by a detailed, month by month analysis of mortality, including the kill by owls and other predators of quail.

Errington's views were most strongly molded by his experience with the single predator-single prey interaction between minks and muskrats. Again, these mammals live in a special, marshland habitat that is often beset by environmental crises—drought years, hard winters with deep freezing, early spring thawing followed by re-freezing—that are likely to overshadow biological controls and reduce populations far below the spring capacity of the habitat to support muskrats during the more favorable years. The basic aggressive behavior of the muskrat—the intraspecific intolerance which Errington emphasized as the main regulator of population density—possibly has been selected as a response to the extremely variable and unpredictable nature of the animal's habitat. The effects of predation could easily be masked by such a meteorologically influenced population. It seems doubtful that one can generalize Errington's findings on muskrats to include other vertebrate prey populations, especially those that occupy more terrestrial habitats, which are less subject to extreme crises.

Errington emphasized that it is the "biological surplus" of transient, unsettled muskrats after dispersal to the spring breeding home ranges that are particularly subject to predation or other mortality, but that the settled rats are relatively safe. Other examples have come to light, however, in which the predators operate on settled, breeding populations of prey animals, such as European Sparrow Hawks (*Accipiter nisus*), on passerine birds (L. Tinbergen, 1946), an aggregation of avian and mammalian predators, on birds and mammals (Craighead and Craighead, 1956), Gyrfalcons (*Falco rusticolus*), on ptarmigan (Cade, 1960), and Northern Shrikes (*Lanius excubitor*), on passerine birds and microtine rodents (Cade, 1967). Errington never considered examples of this sort, and predation on muskrats may be atypical in respect to influences on resident, breeding populations, because few predators seem to be adapted to get at the rats in their optimum nesting habitat. The mink is about the only one, according to Errington.

What is a surplus animal? Errington said, the immature, ill-situated, sick, and handicapped. But many such individuals would doubtlessly survive if not caught by predators, and some would breed. In the case of territorial birds, it is probable that surplus animals are important in maintaining the "saturated" state of the breeding habitat. Therefore, a bird that is "surplus" one moment may become a functioning

unit of the breeding population at the next. In a ptarmigan population, adult birds that are a non-breeding "surplus" one year may be breeding stock in another year, if they can survive. The extent of reduction in their numbers can have important results on the degree to which ptarmigan exploit optimum breeding conditions in a good year following several bad ones. Predation by Gyrfalcons, arctic owls, foxes, and other mammals looms as a factor of major importance in this equation.

At times, Errington stressed the randomness of the effect of predators on their prey. He thought compensatory mortality factors like predation are analogous to the reproductive behavior of bottled fruit-flies, or the molecules of a gas, in that they seem to be based on random contacts with dangers increasing with density. But this randomness does not prove out in nature as well as in theory, and some selective predators continue to catch prey at densities well below that which would be predicted by a theory of random contacts—for instance, Little Eagles (*Hieraetus morphnoides*) preying on rabbits in Australia (Calaby, 1951) and Gyrfalcons taking ptarmigan in northern Alaska (Cade, 1960). Errington did not pay enough attention to "vulnerability factors," which can drastically alter the randomness of predation based on simple density considerations, as L. Tinbergen showed for the vulnerability of different passerine species to predation by Sparrow Hawks.

Errington did not consider instances in which a host of predators that have virtually no alternate prey feeds on a single, abundant species, such as the brown lemming (*Lemmus trimucronatus*) in arctic Alaska (Pitelka, et al., 1955), or instances in which an aggregation of predator species, although having alternate prey, nevertheless is highly attracted to one or two conspicuous, easily caught species, such as ptarmigan in the low arctic tundras. Both these examples appear to represent non-random predation that may well exert important modifying influences on the population dynamics of the prey, from season to season and year to year.

Errington's methods of gathering and presenting data leave something to be desired. For instance, there are no tables, graphs, or any other convincing presentation of data in this book. Perhaps he thought these formalities unnecessary for a popular treatment of his subject, but in fact one must go back to papers mainly published before 1945 in order to find an acceptable accounting of the data upon which he based his generalizations.

Despite the thousands of Great Horned Owl pellets and mink scats he examined and despite his use of rather precise figures for estimates of Bobwhite, muskrat, and mink populations, Errington was not really quantitative, statistical, or systematic in his methods of study. He began his outdoor experiences as a hunter and trapper, and he remained naturalistic in his approach to biological study, relying heavily upon intuitive and impressionistic experiences. As far as one can tell, his only method of census was to wander around on his favorite marshes and to record observations on whatever animals happened to appear.

Errington was accomplished at "reading sign," and he was able to see much more than most of us. On page 23, for example, where he speaks about his examination of gunshot wounds on trapped mink, he says, "Another, a male, had healed wounds on head and neck suggesting that while peering out of a hole it had taken a shot charge at a distance of about thirty-five feet from a choke-bored, twelve-gauge shotgun." That is a terrific amount of detail to be able to infer from old scars on a pelt! Nor is this an isolated example of the inference Errington could generate from his observations of "sign." On page 184, he assigned 2,415 mink scats containing muskrat remains to the following categories of predation: 1600 to 1700 resulted from scavenging

on muskrats that died from disease, 360 consisted of remains of muskrats that became vulnerable to predation because of intraspecific strife, 100 consisted of victims exposed by droughts and freezeout crises, and 210 were of "young muskrats caught by the minks under varying conditions of disadvantage." Most field biologists consider themselves fortunate to be able to identify the species represented by materials in carnivore scats, and they are absolutely overjoyed if they can also work out the sex and approximate age class of the food items. Errington was able to go far beyond these routine matters and actually determine the social status, health, and general welfare of the victims.

Like all of Errington's work, "Of Predation and Life" is highly provocative and stimulating, but equally difficult and unsatisfying because of conceptual vagueness and a lack of solid factual support. The book leaves me wanting to think that it is all true, but not quite satisfied that everything is just right.—TOM J. CADE.

THORBURN'S BIRDS. Edited with an introduction and new text by James Fisher. Ebury Press/Michael Joseph, London, 1967;  $7\frac{3}{4} \times 10\frac{1}{2}$  in., 184 pp., 82 col. pls. by Archibald Thorburn; endpaper maps. 50s (\$6.00).

Anyone interested in bird painting will certainly want to have this re-issue of Thorburn's long out-of-print "British Birds," now presented in one volume including a completely new text.

The much smaller format was probably necessary to fit the modest price. But there has been a substantial loss of quality too. At least a dozen of the plates in the copy before me have a flat, "washed out" look, though the registration is consistently good. I am informed that the new plates had to be made from the earlier reproductions rather than from the original paintings long since dispersed and in private collections. That could account for any consistent loss of quality, but surely not for an inconsistent one. The publisher rather than the author is probably responsible for the decisions as to the makeup of this book. It is this reviewer's opinion that an opportunity was missed in not providing us with a volume, even at higher cost, that would have better displayed the work of one of Britain's finest bird painters.

And in larger format Mr. Fisher would have been able to give us more than his concise but excellent distributional paragraphs on each species, bibliography, index, and a two and one-half page introduction. We might have learned more about the artist upon whose work, after all, this book depends.

I first became acquainted with Thorburn's work at about the age of sixteen when an uncle gave me a small three-volume set of T. A. Coward's "Birds of the British Isles and their Eggs." I had by that time already determined to become a bird painter and I remember how I studied and studied the many fine illustrations in those books. It was then the only work I had seen which seemed to me to come up to that of Fuyertes, or nearly so. Thorburn put much more effort into feather texture and had a much softer treatment of both bird and background than did Fuyertes. Looking back, it was probably this misty atmospheric mood which I later learned was very much in the tradition of English watercolor, which kept Thorburn's work from being an influence on mine. There was something very foreign in his lighting to a boy viewing birds in an Ohio setting.

It is clear that Thorburn influenced Allan Brooks and others. He apparently worked on a toned ground, a practice which Brooks adopted early, but which Fuyertes took up only rather late in his career, and then with much less delicacy in handling.

My respect for Thorburn's work has not lessened over the years. I particularly like his shorebirds, hawks, and upland game birds. And while his flying birds are not very authentic, some of his water birds seem to ride a bit high in the water and the proportions in some figures could be better, it is only with the facial expression of owls (due to his treatment of the shapes of the facial disks) that I feel he "missed" almost consistently.

All that aside, it can still be appreciated in these plates, which figure from one to eight species each (the text usually appearing on the facing page), that Thorburn really knew his birds in life and had a rare talent for making us experience his view of them.—DON R. ECKELBERRY.

### PUBLICATION NOTES AND NOTICES

A *Biology of Birds with Particular Reference to New Zealand Birds*. By B. D. Heather. Issued by the Ornithological Society of New Zealand, 1966: 102 pp., many drawings and photos. Paper-covered. \$2.00 (including postage). Available from OSNZ, Box 40-272, Upper Hutt, New Zealand.

Written for both the student of biology and the amateur ornithologist, with all illustrations and examples of principles based on New Zealand birds. Informative to anyone contemplating work with New Zealand birds; useful to any American or Canadian instructor in ornithology wanting different ideas and examples in presenting his subject.—O.S.P.

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COMMUNICATION IN THE ANIMAL WORLD. By William F. Evans. Thomas Y. Crowell Company, New York, 1968:  $5\frac{1}{2} \times 8\frac{1}{2}$  in., x + 182 pp. illus. with drawings by Nancy Lou Graham and photos. \$5.95.

A "popular" review of the various kinds of signals used in communication. Following a brief introduction, seven chapters deal with communication in different animal groups, one being birds. A final chapter discusses methods and tools for study. The author is assistant professor of biology at Little Rock University in Arkansas.

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EXTINCT AND VANISHING BIRDS OF THE WORLD. By James C. Greenway, Jr. Second revised edition. Dover Publications, New York, 1967:  $5\frac{1}{2} \times 8\frac{1}{2}$  in., paper cover with col. illus., xvi + 520 pp., 86 figs. \$3.50.

Although this is mainly a reprint of the original edition published in 1958 (see review in *Wilson Bull.*, 70:293-294, 1958), it is also a revised edition to the extent that "the status of the species and subspecies has been brought up-to-date wherever new information has become available" and a separate bibliography of new works cited has been added.