REVIEWS

The Honey-guides.—Herbert Friedmann, United States National Museum Bulletin 208, vii + 292 pp., 25 pls., 5 figs. in text, 1955.—This study of the habits and adaptations of honey-guides is highly commendable both for its especially interesting subject matter and its execution. The author's well considered plan of presentation of the monograph accurately explains its style: "If at times it may seem that unnecessary detail has been set forth I would remind the reader that our studies are still in the fact-finding stage, and that some of these possibly tedious minutiae may turn out to be revealing and significant in the light of further data . . . and may help to qualify or support some of the statements derived from them. . . . Throughout, every effort has been made to integrate all available knowledge, even when that integration is still on the merely suggestive level. In a field where the gaps in the evidence are so numerous, it seems better to venture occasionally with an interpretation or an opinion not yet wholly provable . . . than to follow the safer, but intellectually sterile, course of attempting to understand nothing because it is not yet possible to understand all."

The focal points of biological interest in the honey-guides are: (1) their brood parasitism and its level of adaptiveness; (2) the guiding habit; (3) wax-eating and digestion; and (4) the evolution and phylogeny of the group. These are treated in the first 82 pages of the book and are followed by a series of species accounts giving distribution, both of the species and their races, and the detailed documentation of natural history under appropriate topical headings. All the species are illustrated in color by Walter Weber. Other plates show habitats, the amazing bill and foot specializations of the nestlings, eggs of parasites and hosts, and Greater and Lesser honey-guides feeding on bee-comb.

The honey-guides (family Indicatoridae) consist of eleven species arranged in four genera. They are related to the barbets and occur in Africa and southern Asia. The evidence derived from distribution and phylogeny within the group is insufficient to permit conclusions regarding center of origin. There are more species and a greater diversity of types in Africa than in Asia, but the two Asiatic species are not closely related to one another and suggest long-standing presence in that area. *Indicator maculatus* of west Africa is probably as close as any member of the group to the presumed ancestral forest-dwelling stock of the family. In one phyletic line only, that leading to *Indicator indicator*, did the guiding habit develop. A second phyletic line, entailing principally a reduction in size and of the bill led to two subgenera of *Indicator*. A third line involving narrowing of the bill led to the monotypic genus *Melignomon* and the genus *Prodotiscus* with two species. The monotypic genus *Melichneutes* is an offshoot of the main generic stock represented by *I. maculatus*. There is considerable anatomical and behavioral evidence supporting the generic separations.

In their brood parasitism, the honey-guides (except *Prodotiscus*) victimize primarily picarian and coraciiform birds, which are hole nesters, and only such passerine forms as use similar nest sites. Thus the honey-guides are rarely in competition with the other parasitic birds (cuckoos and weaver finches) of Africa. The Indicatoridae have lost more of the ordinary features of the reproductive cycle than the other parasitic groups. They show less "attentive behavior." Territorial exclusiveness is lacking and courtship is absent or infrequent. Honey-guides do not have rapid nestling growth but parasitize in the main species of similar growth rate and with similarly unmarked eggs. However, in some and perhaps all, a nestling mandibular

hook is developed which early in nest life is used vigorously by the parasite to injure and eventually eliminate the host nestlings through death.

In their guiding behavior, the birds lead man and probably originally the honey-badger or ratel to the site of bees' nests by means of chattering conspicuously in front of them and flying ahead. "The bird evinces an excitement behavior when meeting with a potential symbiont, and this excitement abates only when the bird sees or hears flying, buzzing bees. Inasmuch as this latter is most apt to happen near a bees' nest, the result is that by following the excited bird the symbiont is usually eventually brought to the vicinity of a bees' nest. The whole behavior works out as if it were purposive, but there is no reason to read any 'purpose' or 'plan' into it." Although Friedmann is rightly inclined to rule out purpose and also prior knowledge of bee-nest locations before the guiding to them is instituted, he writes of the possible origin of the behavior as follows: "Originally the bird probably knew of one or more bees' nests, and when coming upon a ratel began to chatter as if in anticipation of the latter being already at the hive (with which the creature was associated in the bird's memory), and flew back to the known hive, followed by the [ratel]. . . . The flight back to the known bees' nest might have had to be a repetitive affair until the slower moving mammal reached the spot. From this it seems there developed the tendency to chatter to a symbiont even when no particular bees' nest may have been close at hand, and that the resulting series of flights that we call guiding eventually halted when the bird saw . . . bees. Thus, originally, 'guiding' would seem to have been more accurately a matter of leading to a known goal than it has since come to be. That it was never essential to either the bird or the mammal permitted its development . . . as a more or less adventitious addition to their food-seeking activities. . . . It is . . . difficult . . . to imagine the development of such a habit if it were the chief foraging method, as it would have been of no conceivable value to either until it was perfected by both."

Friedmann's best evidence for lack of purpose and knowledge of locations of bees' nests in the current manifestations of the behavior are his own tracings of guiding routes which even in open terrain were circuitous and random in direction. It is always difficult to prove a negative, and some may question lack of memory location in the honey-guides. But certainly if they have memory of the location of bees' nests, they seem not to put it to the most effective and direct use.

The role of the ratel as a follower in the guiding process seems now conclusively established by the assemblage of reports and testimony Friedmann has gathered. One only wishes that Friedmann might have seen this event himself but such an opportunity would rarely occur. Guiding of men still continues but with locally varying frequency. The author himself had 23 experiences in being guided.

Honey-guides are not dependent on mammalian symbionts for getting at honey comb. In one way or another they obtain it continually, and, most significantly, it is the beeswax they seek. When given a choice between dry, empty comb and comb filled with honey and larvae, they prefer the dry wax. Experiments were conducted which show that certain components of the beeswax, especially those of low softening and melting points, are assimilated by the bird. Moreover it was possible to keep honey-guides alive for as long as 32 days at a time on a diet of nothing but dried, cleaned beeswax. Signs of deficiency in diet showed up, but obviously the wax afforded a major element of nutrition for some time. Further studies on the digestive processes involved and on the role of bacteria are being pursued. Although wax-eating is not peculiar to honey-guides, no other types of birds show such avidity for it or consume it for its own sake.

This reviewer believes that no well-informed zoologist should miss studying Friedmann's important findings on honey-guides. They constitute a fascinating story with broad biologic implications. Furthermore, although the several topics are well developed to date, many more facets of behavior and function in this group are exposed for additional fruitful investigation.—ALDEN H. MILLER

New Zealand Birds.—W. R. B. Oliver. A. H. & A. W. Reed, Wellington. Second Edition. 661 pp. (Distributed by W. S. Heinman, 400 E. 72nd. St., New York 21. Price, $25.00.)—Oliver's standard work on the birds of New Zealand (see Auk, 48: 300–301, 1931) has been revised, enlarged, and brought up to date. The species accounts are excellent and include lists of important references, a feature which could be copied to good advantage by more authors of regional works. The section on extinct birds includes particularly valuable material on the moas, fossil penguins, and fossil rails and their allies.

The many illustrations are extremely variable as to quality and type. For example, to illustrate the sixteen forms of cormorants there are 21 photographs of birds in the wild, 1 of a mounted bird, 1 of the head of a skin, 4 sketches of heads, and 1 photograph of a plate from Buller's earlier work, together filling the equivalent of nine pages. These birds could, I am sure, have been better illustrated in two pages of wash or line drawings by a competent artist, with a saving of seven pages (and at least twenty-five cents in the not inconsiderable cost of the volume).

The value of the text, however, far outweighs shortcomings of the illustrations, and the work will probably remain the standard one for some years to come.—ROBERT W. STORER.

The Birds of the British Isles. Volume Five.—David Armitage Bannerman. (Oliver and Boyd, Edinburgh), xiii + 350 pp., 34 colored plates by George E. Lodge. Price, 63 shillings.—This volume is devoted to the diurnal birds of prey and is in format and quality similar to the preceding ones (see Auk, 71: 216–217, 1954). The species accounts, however, are expanded, averaging fourteen pages and including an even greater wealth of detail than those in the earlier volumes. A memorial to Lodge is included in the introductory material.—ROBERT W. STORER.

Bird Recognition III. Rails, Game-birds and Larger Perching and Singing Birds.—James Fisher. (Penguin Books Ltd.), 159 pp. 1955. Price, $0.85.—The third volume of this compact and useful work on British birds is similar to its predecessors in form (see Auk, 70: 222, 1953) and covers the doves, rails, gallinaceous birds, swifts, nightjars, kingfishers, cuckoos, corvids, starlings, larks, shrikes, thrushes, swallows, and several related smaller groups.—ROBERT W. STORER.