LITERATURE

Comments on Recent Literature

Clutch Size in Birds. Great differences exist among the families of birds in the number of eggs laid per clutch. Since the populations of most species remain more or less constant, it is usually assumed that such variations in clutch size represent adjustments to different mortality rates. Yet it is difficult to understand how mortality factors affecting the whole life span of a bird can influence the number of eggs laid. In a recent important series of papers by David Lack on clutch size in birds and litter size in mammals, he points out that natural selection will favor those individuals producing the greatest number of offspring, regardless of potential dangers involved in overpopulation.

Natural selection, operating in the direct manner just suggested, presumably explains the egg laying feats of a codfish or a queen termite. Here physiological capacity (including seasonal cycles of the ovary) sets the only limit upon the number of eggs laid. The same may be true of most reptiles, but among birds it seems to hold only for the Megapodiidae and possibly for some parasitic species—in other words, for birds that do not incubate their eggs or care for their young.

Incubation imposes great restrictions upon clutch size. Sandpipers, for example, lay 4 large eggs; apparently this is the maximum number that can be covered by the parent. In some of the larger gulls a clutch of 3 is very constant and may also be as many as the bird can successfully incubate. These gulls have 3 distinct brood patches, 1 for each egg, suggesting that this clutch size is of long standing. Further evidence of this is the fact that sandpipers and gulls are "determinate" layers (Davis, 1942); if eggs are destroyed or removed during the laying period the birds will not lay additional ones in an "attempt" to complete the clutch as so many birds do.

Although clutch size in gulls, sandpipers, and probably a few other groups is apparently determined by the number of eggs the parent is capable of incubating, Lack believes this to be exceptional. Most species can incubate more eggs than they normally lay. Even the partridge, *Perdix perdix*, which lays as many as 15 eggs, can incubate 20 or more without decrease in hatchability (Lack, 1947). Lack believes that in such species—and this is his most important conclusion—clutch size is equivalent to the maximum number of young that can be reared by a given species at a particular season and locality.

In support of this plausible hypothesis Lack has assembled a certain amount of direct evidence. In the Starling, *Sturnus vulgaris*, banding records show that birds laying clutches of above average size actually leave fewer descendants than do those laying average clutches. Though some of the former group succeed in fledging unusually large broods, the young apparently leave the

nest in a weakened or retarded condition, since their mortality during the first few months thereafter is greater than among birds from broods of normal size (Lack, 1948b). In the Alpine Swift, *Apus melba*, analysis of banding records also suggests that normal clutch size represents the maximum number of young that can be reared (Lack and Arn, 1947). This paper has been criticized at some length by Bender (1948), who emphasizes some of the difficulties involved in such studies, and suggests a number of additional factors which may influence clutch size.

Lack has assembled circumstantial evidence in favor of his hypothesis that is impressive because of its very quantity. Latitudinal increases in clutch size he attributes to the longer days of the northern summer, permitting birds to care for larger broods. In the night feeding goatsuckers this trend is absent. Differences in the number of eggs in first and second broods also seem to agree well with seasonal variations in the quantity of food available. The larger broods usual in cavity nesting birds he considers a result of lessened predation. This permits, without excessive mortality, a longer nestling period than is possible in many species that build open, exposed nests.

If natural selection produces a normal clutch size corresponding to the maximum number of young a pair of birds of a particular species can rear, rapid increases in population might be expected. Such increases are potentially possible but as the numbers of a species mount, its mortality factors operate more stringently and eventually equal the rate of reproduction (Nicholson, 1933). Predation, to mention one population control, increases greatly, as Errington has shown, when a species becomes so numerous as to overcrowd is normal habitats. In the Gray Heron, *Ardea cinerea*, a severe winter sometimes decimates the British population. Recovery is then very rapid, but as competition for food or other essentials becomes sharper, the population again becomes stabilized (Lack, 1946). Clutch size usually remains the same throughout such fluctuations, though in a few raptores it responds to variations in food supply.

This review barely suggests the great amount of data on clutch size and related subjects that Lack has assembled and tabulated. His analysis leads to important conclusions but at the same time reveals the need for much additional investigation. Many of the problems remaining unanswered can be studied to advantage by anyone able to spend some time in the field during the nesting season.

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DEAN AMADON

BOOK REVIEWS

Birds of Cincinnati and Southwestern Ohio. By EMERSON KEMSIES. Ohio Audubon Society, Cincinnati, Ohio, 1948: $8\frac{1}{4}$ x 11 in., mimeographed, pp. ii + 60.

The region covered by this bulletin includes Hamilton, Clermont, and Butler counties in Ohio. Within the area are Ohio River bottomlands and upland pastures. The author properly calls attention to an interesting local transition between northern and southern birds. Data are given on 292 species and races, most of them represented by specimens, but a few of questionable status. There are brief notes on the ecology of some species.

The American Woodcock is interestingly considered "a regular and frequent summer resident throughout the area". Red-shouldered Hawks are listed as "fairly common summer residents", while Red-tailed Hawks are not recorded as breeding, and are "seen much less frequently than the following species" (i.e., Red-shouldered Hawk). In the nearby Appalachian region, with which this reviewer is much more familiar, the Red-tailed Hawk is generally a breeding species of the broad river valleys, while the Red-shouldered Hawk is much more common in the mountains.

Accidental confusion between the ranges of the Trumpeter Swan and the Whooping Crane seems apparent. On page 15 the Whooping Crane is described as ". . .now almost extinct except for a few pairs in Yellowstone and British Columbia. . .".

Bird students in the Cincinnati region will find Mr. Kemsies' bulletin a very useful publication. Other observers in the Ohio Valley will be interested in comparing local conditions in southwestern Ohio with those prevailing in their own regions.

MAURICE BROOKS

How to Know the Birds: A Simple Aid to Bird Recognition. By ROGER TORY PETERSON. A Mentor Book, Published by the New American Library of World Literature, Inc., New York, N. Y. Pp. 144, profuse illus. in black and white. Paper covers. Index. 1949. Price 35¢. Also published by Houghton Miflin Co., Boston with cloth covers and 5 colored plates. Price $2.00.

The ornithologist has had access to expensive reference books that told him the lengths of bills, tarsi, and folded wings in millimeters, numbers of eggs per clutch, egg measurements, etc. But this inexpensive book tells how to identify birds through perception of their silhouettes, markings, actions, or habitats.

The Peterson Field Guides, superseding all former such publications in their design, may still exclude a number of impecunious bird lovers from owning them, but there is now no excuse for the veriest beggar not to argue with his companion in poverty as to whether that lately-seen bird was a Chipping or a Field Sparrow.

Cheap literature, in the reviewer's opinion, is a blight on the reading public, but in this instance all he can find breath to say is, "Bravo!" We would have a better land and culture

if more of our experts would take time to bring their experience within the compass of casual readers.

So much having been read in general praise of the booklet, the reader might want a few concrete facts. The bird examples are said to be restricted to a small number of types, but actually a wealth of species is included, and only the more-than-average amateur will find lacunae in the coverage. The black-and-white illustrations sustain Mr. Peterson's reputation as a delineator of birds in conventional, functional states. The text sounds no note of condescension, although it is masterfully levelled a pitch or two lower than the language in his Field Guides. There are no technical names. A notable aspect of the book is the series of brief characterizations of each family of birds and further the excellent short sketches of the habitats of birds.

C. BROOKE WORTH

The Parasitic Cuckoos of Africa. By HERBERT FRIEDMANN. Washington Academy of Sciences Monograph number one. xii + 204 pages. 20 figs. 1 map, $4.50.

The present information concerning the habits of the parasitic cuckoos is merged in this book with original observations made by the author in 1924–25. Five genera (15 species) are discussed to the extent that the meager data permits. The distribution, courtship behavior, egg, young, and foster species are mentioned, when known, for each species. The introduction to each genus indicates its place in the evolution of social parasitism.

The 3 species of the genus Clamator are interesting because they show a courtship-feeding pattern and display no instinct to evict the young of the host. Information about the genus Cuculus (4 species) shows that at least some members are less perfectly parasitic than the European Cuckoo. There are traces of courtship feeding and a lack of the evicting behavior in *C. solitarius*. The monotypic genus Pachycoccyx is poorly known as are the 3 species of the purely African genus Cercococcyx. Some of the 4 species of the genus Chrysococcyx, unique among parasitic birds, feed their fledglings after these young birds have left the nest of their foster parents. There is courtship-feeding behavior.

The last 2 pages of the book, titled "A few concluding remarks", comment on some aspects of parasitism all too briefly but then, the data are not available and more extensive comments would be largely speculation. It is hoped that this summary of present knowledge will stimulate additional research.

DAVID E. DAVIS

Tropical Birds (from plates by John Gould). By SACHEVERALL SITWELL. B. T. Batsford Ltd., New York. 12 pp., 16 colored and 2 uncolored plates, $2.00.

Ornithologists interested in good reproductions of John Gould's famous pictures will enjoy this little book. The plates (7 by 5 inches) compare favorably with the original large pictures done nearly 100 years ago. They show 4 birds of paradise, 7 parrots, 2 kingfishers and a toucan, a finch and a fruit pigeon. The notes on the pictures however, are an amazing jumble of miscellany. Some are apparently original observations and are ornithologically worthless, while the style of writing consists of long, involved sentences guaranteed to confuse the reader.

DAVID E. DAVIS

The Flight of Birds Analyzed through Slow-motion Photography. By JOHN H. STORER. Cranbrook Inst. Sci. Bull. 28, 94 pp. Illus., 1948. $2.50.

Ever since man can remember, he has envied birds their ability to fly. Attempts have been made to imitate the birds, but from the earliest recorded case of Daedalus and Icarus, the efforts have been unsuccessful until recently. Modern science and modern machines

have finally overcome man's handicap and lifted him from the ground in a manner that he did not learn directly from the birds.

Part of the reason why it took man so long to learn how to fly was that he had great difficulties in studying and analyzing the flight of birds, because the motions are so fast that usually the eye cannot follow them. It would be interesting to speculate on what the history of human flying would have been if it had been possible to make an exhaustive study of the flight of birds beforehand.

John H. Storer gives in the present volume the results of careful studies on the flight of birds carried out over many years. By making photographs with a high speed motion picture camera and then slowing down the films, many features in the flight of birds become apparent which otherwise are hidden. Thus it becomes possible to find out just how birds are able to propel themselves through the air.

Mr. Storer applies the well established principles of aerodynamics to the flight of birds. He shows that birds and aeroplanes work largely on the same principles. The wing acts as an airfoil; by changing the angle of attack (tilt) of the wing the bird can control the lift. It appears that the birds could not have had a better wing design if they had first taken elaborate courses in aerodynamics.

Different birds have their wing structure specialized for different purposes. Thus, the albatross has a long and narrow wing, giving it a large "aspect ratio" as it would be expressed in aeronautical terminology. This equips it admirably for gliding and soaring. Birds needing great maneuverability have short stubby wings like a fighter plane, enabling them to make quick turns. A hummingbird that can hover almost motionless over a flower uses its wings more like the horizontal propeller of an autogiro. Mr. Storer finds that the flaps of an aeroplane wing, the slots, and other features have their analogs in special feathers which serve the same purposes as their counterparts on aeroplanes. The outer part of the wing constitutes the propeller. It can change its pitch readily, which is even more important than for an aeroplane propeller as it can only make a semicircular motion and then return to its initial position. When the bird soars, the propeller changes its function and merely becomes a part of the lifting wing.

These analogs are explained in simple, non-technical language and illustrated by many photographs and diagrams so that it is easy for the average bird lover to follow. The book is intended for the nature lover, the biologist and the aviator. In the words of the author: "The biologist will see the reason for the structure of bone and feather as each part of the wing takes, for a split second, some unexpected shape and position. The aviator will find interest in the similarities of design and function in bird and plane. The nature lover will discover new beauty and logic in his favorite subject."

G. H. DIEKE

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