

THE NEW STUDY OF BIRD BEHAVIOR<sup>1</sup>

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IN the foreword of a recent scientific journal the editor made a simple and direct statement to the effect that his new periodical was to be dedicated to the publication of the results of original research, *including thinking*. It requires no great depth of insight to see that he was reacting to the inevitable boredom of the vast volume of papers containing much accurate and valuable matter, but which were individually and collectively without any point, and consequently, devoid of immediate significance. His reaction is a timely one and may well be applied to that branch of science that deals with birds. In ornithology the need for accurate descriptions not only of the birds but also of their habits and their habitats, and for careful delineations of their distribution in space and time, appears to be still the central theme to the majority of students, and the result has been that we are in possession of vast quantities of data of several sorts, but have almost nothing in the way of what, for want of a better term, may be called the logic of ornithology. The idea that science consists of an orderly arrangement of tried and tested facts put together like the bricks of a building is a false one. The important thing in any science is its theory or system of logical concepts by which the facts involved are grouped so as to be mutually clarifying and suggestively helpful in current research. In other words, if we may return to our simile of facts and bricks, science without its theory would be like a building without a plan. The architect is more important than the bricklayer, although each needs the other to make a solid and enduring structure.

In no phase of ornithology has there been placed on record a larger quantity of disconnected facts and observations than in that which deals with the life histories and habits of birds. Numberless observations have been recorded merely because they were easy to record; others, less obvious at first sight, have also been published, but practically all of them involve merely the use of the five senses and betray little sign of the cogitative faculties of which those senses are the feeders of raw

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<sup>1</sup>Being a review of H. Eliot Howard's *An Introduction to the Study of Bird Behaviour*, Cambridge University Press, 1929, pp. xii—136, 10 plates, 2 maps, price 42 shillings. Published by permission of the Secretary of the Smithsonian Institution.

materials. The plain truth of the matter is that until very recently the great majority of bird-students did not know how to think in the cold, dispassionate manner so essential to scientific progress. They were bird-lovers, not bird-students. Fortunately, the distinction between these attitudes has manifested itself in the last few years, and many students of the living bird have divorced sentiment from reason and have really begun to direct their observations along definite lines instead of simply observing casually for the pleasurable sensations they derived. The great growth of bird-banding is one of the most significant results of this new attitude. Another important outcome has been the increasing number of detailed life history studies in which all the habits of a single species are correlated and shown to be possessed of a certain continuity or in which obscure habits of groups of species are made more understandable and their origin and development rendered less mysterious.

Years before most students of birds even began to realize the need for correlating their heterogeneous data, a lone worker in England became convinced that to understand the true meaning of any part of the sum total of habits of any bird, it was necessary to piece together carefully the entire life history of that bird, as the individual parts were of significance only in so far as they contributed to the whole picture. That man is the author of the book here under review. Between the years 1907 and 1914 H. Eliot Howard published his sumptuous two-volume work on the British Warblers, an intimate study or history of these birds from the point of view of their problems in life. In this important work the now familiar idea of the breeding territory first took definite form. Following his studies of the Warblers, Howard then concentrated on the problem of "territory" as such; its relationship to such other topics as song, display, and migration being nicely set forth in his book "Territory in Bird Life," which appeared in 1920. Now, after an interval of nine years, he breaks his all too prolonged literary silence and brings to our attention the results of his continued researches. This book, modestly titled, "An Introduction to the Study of Bird Behaviour" is, in the opinion of the present reviewer, the most important and significant interpretive study of avian life ever made in any country, and the fact that it is based very largely on two common birds of the English countryside serves to reveal the unbounded wealth of material and opportunity for research available close at hand. Far too many ornithological investigators (whose science is extensive at the expense of

depth) appear to feel that it is necessary to go to the remotest parts of the world in order to obtain results of value. In certain lines of work this is true, but if science is to be an effective scheme of thought, it must have the depth that comes from intense application and that never can accrue from fragmentary studies of great numbers of species.

In writing this paper the reviewer has attempted a summary of Howard's book three different times, and each time the result was different and each time it was woefully insufficient. Some have criticized Howard's previous works as being "wordy," but in the present instance each word, each phrase, each sentence is so necessary to the argumentative coherence of the whole that it becomes well-nigh impossible to do the book justice without making the review almost as long as the book itself. This is wholly understandable to any one who has read the book, as it is in itself a summary and a review of a very prolonged period of reflectful and intelligently directed observation. Every person interested in understanding the lives and actions of any birds in particular or of birds in general, simply must read and reread and ponder over this remarkable book. No review can be sufficient in this case. For the benefit of those whose interests lie more in other lines the following inadequate words will have to suffice.

The general problem discussed in Howard's book is the behavior of birds during the breeding-season, commencing with the earliest inception of the territorial reaction of the males, before the females have arrived or are in condition to respond, and continuing until the young are fully fledged and are able to care for themselves. To quote from his introduction, we note that "the behaviour of a bird during the breeding season is determined by reactions peculiar to that season; and since these reactions only function in response to stimulation provided by the external world, it is manifest that we must regard a bird with its environment as an organic whole. We can study life and we can study environment but we must not divorce them if we are to study behaviour. True, we can take any one reaction and study it by itself and learn something about its mechanism, but we can learn nothing about its utility or value for that depends upon other reactions which minister to it and to which it ministers. One reaction in itself is neither more nor less important than another; each forms a portion of the environment for others; each is sensitive to the modification of others—they form a constellation, and somewhere in the organization of the living bird they have a common structural link. Hence I speak of a neurally linked pattern of events within that organization."

Howard begins by presenting to his readers detailed accounts of the behavior of two familiar birds, the Reed-Bunting and the Yellow Bunting. These accounts are not only beautifully presented illuminating descriptions of the natural history of these forms, but present the factual basis for much that is to follow. However, these two particular species are merely random examples, and are not chosen because of any peculiarities they may possess. The behavior of the birds during the total period of reproductive activity is shown to be divisible into four phases. The first of these is noticeable only in the males and results in the establishment of individual breeding territories. The change in behavior is chiefly a change from gregariousness (winter flocking) to a preference for solitude. It also manifests itself in the beginning of song, which, of course, is associated with, and only given in, the territory of each male. The second phase begins with the arrival of a female in proper physiological condition to stimulate the actions of the male and to be stimulated by it. The behavior of the male changes—he remains more and more within the limits of his territory; the song reaches its climax of perfection. The most characteristic symptom of this phase is, however, the sexual flight in which the male pursues the female in a mad, frenzied flight which is almost unbelievable in contrast to the total indifference exhibited only a few days earlier in the first phase. The first indication of nest-building on the part of the female ushers in the third phase, which lasts through the period of nest-building and egg-laying. During this phase the male stops singing, either entirely, or to a very large extent. The fourth phase covers the period of incubation and care of the young. The male may start singing again, and the female acts (aside from caring for the eggs and young) much as in the second phase. This may be looked upon as a preliminary to a second cycle telescoped on to the end of the first in two-brooded birds, but it lacks the pristine freshness and potency of the first one. All in all, we have here spread out before us a panorama of consecutive events based on an inherited nervous pattern, and which are released into expression through internal changes as well as by external causes. Each act occurs in a definite relationship to other acts which precede or succeed it, and all occur with the certainty and rapidity of reflexes; the responses are in the form of reactions and, when interrupted by accidental or other agencies, they exhibit an almost bewildering diversity of conditioned responses, which are otherwise completely hidden by the normal course of events. The intensity of the reactions is shown to be

dependent to some extent on external conditions, especially temperature and atmospheric pressure, and also on internal stimuli—hunger, fear, etc. The intensity is generally greater in the male, but this appears to be largely due to the fact that the physiological control of reactions is stronger in the female.

After displaying the habits of the Reed-Bunting and the Yellow Bunting for the edification of his readers, Howard then proceeds with an analysis of their behavior, as is inadequately traced above, and then dilates on his main theme, that the whole story has a biological value and significance that far exceeds a mere summation of its component parts. In fact, he goes to the extent of calling his fourth chapter "The Whole has Value, the Parts by Themselves have None." It is hopeless to attempt to summarize this part of the book. By a masterly grouping and regrouping of his apparently heterogeneous data, by focussing on them the light of recent advances in comparative psychology, first from one angle, then from another, the author leads his readers along an intricate path of the most searching sort of psychic analysis and is able to show that nothing is casual, that all reactions are dependent on what has gone before or is happening simultaneously, and that what appeared to be diverse modes of behavior are merely isolated elements, the fusion of which in different quantities and degrees at different stages of the reproductive season may account for the observable discrepancies in behavior. It is in this chapter that he takes us far beyond the limits reached in his earlier works. It is a great tribute to the zeal, intelligence, and ability with which he has so patiently worked out the interrelationships between a host of specific behavioristic elements, that the result is one of the few works in which a psychologist (for Howard is preëminently an avian psychologist) is able to convince a biologist that the methods and results of the "mind science" are coequal in value with those of the "life science."

With an achievement such as this most writers would be satisfied to pause, but not so our present author. Having established the coherence, the cause-and-effect relations of behavior, he goes still farther, and asks himself if, with the rich harvest of new materials and of deeper understanding that he has acquired, it is not admissible to attempt to view the same story (the behavior during the reproductive cycle) through the now possible synthesis of his facts; in other words, to view the subject not from the point of view of a human observer, but from that of the bird itself, reconstructed by aid of an intimate knowledge of its psychic functionings. The

last chapter, "An Approach to a Mind Story," is the result. While it is, on the whole, less satisfying and convincing than the preceding chapter, it is, nevertheless, a very thrilling piece of writing. Most of us have imagined, at least as children, how interesting it would be if we could talk to animals in their own language and think as they do. That childish dream comes nearer to fulfillment in the last thirty pages of Howard's text than anywhere else in the experience of the present reviewer. To read it (and it must be read slowly and attentively like the rest of the book) is an intellectual adventure of the highest order. We get out of our own skins more completely there than anywhere else in the whole range of ornithological literature, and on turning the last page return to ourselves richer in having been away for a brief period.

The book is very handsomely gotten up and is illustrated by ten beautiful plates in black and white after drawings by G. E. Lodge.

Any review is expected to point out the flaws as well as the merits of the work it deals with. The main fault with the present book is its expensiveness, which may limit its circulation among bird-students. Bird-banders may well wish that Howard had banded his birds to be sure of their individual identity, but this is a rather minor matter, as his results show clearly that he is an uncommonly keen and accurate observer. His use of the mammalian terms of œstrous, proœstrous, and posœstrous in connection with birds may be objected to on rather good biological grounds, and the argument biologists habitually hold forth against psychologists that there are insufficient physical data in the work of the latter may also be applied, but all of these are ungracious, to say the least, in consideration of the great work Howard has done.

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