

RECENT LITERATURE.

Rowan's 'The Riddle of Migration.'—Those who have followed Prof. Rowan's experiments with juncos and crows have some idea of the angle from which he has been attacking the problem of bird migration but the little volume¹ which he has just published will be a revelation to most readers and a surprise to those already familiar with his work, as they will be delighted with clarity of his explanation of the nature of the "riddle" and the factors involved, and the logical way in which he leads up to the research in which he has been especially interested.

In the prologue he gives us two pictures of migration: one of Pink-footed Geese feeding in Yorkshire, where every condition seems to us satisfactory for their nesting but no! "For them it is the bleak face of Spitzbergen with its ice-bound lagoons, its snow-covered cliffs and precipices, its ocean crossing, its hazards, its hidden perils. No aviator's instruments are theirs; no navigator's compass can help them. But what of that? Though they fly by night, though they encounter deterring storm or tempting moorland or leagues of ice-flecked ocean . . . they will arrive on schedule as thousands of their generations have done before them." Again it is a flock of mixed shore-birds, all birds of the year passing south through Alberta: "traveling into the unknown without guidance, without previous experience, without knowledge of life ultimately to winter on predestined grounds the very existence of which they are completely ignorant"—some in Patagonia, some in Peru, some in California, each species to its own destination.

"Few achievements in the animal kingdom" says our author, "parallel this, the most striking aspect of bird migration and to attempt to explain it in terms of modern scientific knowledge brings us face to face with the fundamental problems of Life" and involves the researches of the anatomist, the bio-chemist, the bio-physicist, the physiologist, etc., in addition to the field observations already so abundantly supplied. In his first chapter Prof. Rowan considers 'The Living Bird' which he finds admirably adapted for life in the air, in which owing to its restless nature most of its time is spent. It is thus perfectly fitted to perform great migrations. The bird's brain is of a comparatively low type so that its intelligence is limited and its responses to stimuli are instinctive; it has a poorly developed sense smell and taste and its hearing, while acute, is probably indifferent to the character of sound, but it has a remarkable perfection of vision. Of its internal glands, the reproductive organs are the most important from the standpoint of migration.

Then considering "Environment Past and Present" and the "Evolution of Migrations" our author shows the dependence of birds on food supply, the debilitating effect of lack of exposure to the ultra violet ray, which is almost absent during the northern winter, and the effect of low temperature,

¹ The Riddle of Migration. By William Rowan, University of Alberta. Baltimore, The Williams and Wilkins Company. 1931. Pp. i-xiv+1-151. Price \$2.00.

water supply, shortage of day-light etc., as possible factors in the evolution of migration. He also points out that in most birds failure to migrate means death, so that natural selection is evidently the basic principle involved in the matter.

He does not regard the ice age as having had any great part in the establishing of the habit of migration since he considers that conditions previous to this epoch were much as they are today and the habit of migration had doubtless already been acquired. He also points out that inferences from the actions of homing pigeons are to be discounted in the study of migration since they are resident birds with an attraction to their home, while young migrants starting south are deliberately leaving their home, not seeking it.

Finally Prof. Rowan considers the annual migrations as we see them today and briefly his theory is as follows:

While all of the factors already mentioned and probably others as yet undetected may have been instrumental in bringing migration about through the long ages that birds have been on the earth, when we come to consider a factor that may be regarded as the stimulus that sets the movement in operation today we find our field of choice limited. For while the date of migration in any given species is remarkably regular, year after year, nearly all of these factors are distinctly variable. In fact there is only one that in its regularity is comparable with the seasonal flights of the birds and this is day length. Birds are not today influenced by food in leaving their summer homes, for most of them leave before there is the slightest lack of food, nor is temperature change *per se* an impelling force, and it is exceedingly variable, while no way has appeared by which a bird might be aware of change in barometric pressure which too, is notably variable in different years. Day length, in addition to its constant and regular change as the season advances or recedes, is recognized as of vital importance to nearly all animals whose activities are directly or indirectly influenced by sun light.

When we attempt to connect day length with the movements of the birds we find that by artificially manipulating the amount of light to which a bird is exposed the interstitial tissue of the reproductive organs may be brought into any desired stage of development and either advanced or retarded as compared with birds subject to natural conditions. Next we find that the hormone produced by this tissue controls sexual behaviour and as migration is a phase of this behaviour the connection seems complete.

Birds taken during the migrations are found to have the interstitial tissue in a condition of increase or decrease while those in winter quarters or in the breeding quarters, where they are resident for the time being, have it at the lowest or highest stage of development respectively.

Prof. Rowan by keeping Juncos in open air aviaries in Alberta has shown that those kept under normal conditions until winter, and then liberated, do not migrate, the stimulus having disappeared with the static condition of the reproductive organs, while those which in the autumn were subjected

to a constantly *increased* amount of electric light developed sexual organs similar to those of birds in the south in spring, ready to start on their northward flight, and such birds liberated in Alberta in midwinter at once disappeared, presumably going north. Crows similarly treated actually did go north as records showed, they being conspicuous were noted where the smaller juncos would probably escape notice.

Further experiments also showed that it was not the length of day (i. e. the *amount* of light) that directly affected the development of the gonads but the length of time spent in activity, for which of course the amount of day-light was responsible.

This is but a very brief résumé of Prof. Rowan's researches and one should read his book in order to realize the convincing nature of his experiments and the long strides that he has made in solving the riddle that has been a matter of speculation ever since man began to study birds.—W. S.

Peters' 'Check-List of Birds of the World.'—America is at the moment rich in check-lists, with the almost simultaneous appearance of the fourth edition of the 'A. O. U. Check-List' and the first volume of the far more pretentious work¹ of Mr. Peters, covering the birds of the entire world.

The need of such a work as Mr. Peters' is apparent to every ornithologist who has to concern himself with systematic problems or the working up of collections. So much has transpired in technical ornithology since the time of Sharpe's 'Hand-List' that one has to spend much valuable time in collecting the necessary references from the scattered literature before he can begin his study. Everyone, therefore, will welcome the appearance of Mr. Peters' first volume and wish him all speed with the remaining nine. The unfortunate part of any such work is that before the last volume can appear the first will be, to a certain extent at least, out of date. The solution would seem to be to have several individuals working simultaneously on different volumes but this would probably not be practicable, therefore, let us hope that our author has a large part of his task in various stages of completion so that we shall not have to wait too long, and meanwhile let us give him all the help and encouragement possible in his praiseworthy effort to transfer the authoritative check-list of birds from England to America!

Coöperation will be all the easier since, so far as we can see, there is very little to criticize in the general style and appearance of the work and everything to praise. In typography it closely resembles the new 'A. O. U. Check-List' but continues to use diphthongs and does not attempt to distinguish the italic æ from œ. The author adopts the same classification as that prepared for the A. O. U. List, using the more amplified scheme published by Dr. Wetmore in 1930 to cover the birds of the world. This

¹ Check-List of Birds of the World. Volume I. By James Lee Peters, Assistant Curator of Birds, Museum of Comparative Zoölogy at Harvard College. Cambridge, Harvard University Press 1931. Pp. 1-xviii + 1-345. Price, \$3.50.