

Thomson's 'Problems of Bird Migration.'¹—Some three years ago we had the pleasure of noticing a work on 'The Biology of Birds' by Prof. J. Arthur Thomson, in which the general facts and problems of ornithology were discussed, not by an ornithologist, but by a general zoologist. Now we have before us a work on 'The Problems of Bird Migration' by his son, Dr. A. Landsborough Thomson, in which this important phase of bird study is presented by one who is primarily a student of animal behavior.

Such authors are free from the traditions and prejudices of the ornithologist *sensu strictu* and can bring to bear upon their subject data and theories derived from the broader field of zoology with results and viewpoints that the ornithologist can well study with profit. The present author has undoubtedly prepared himself well for his task, and the bibliographies appearing at the end of each chapter contain the vast majority of publications dealing with migration. These form the basis of the first two parts of the work which consist of an admirably prepared summary of the principal known facts regarding bird migration (Part I) and special studies of bird migration with particular reference to bird marking (Part II). These are prefaced by an introduction on migratory movements in the animal kingdom in which bird migration is seen in its true perspective.

Part II will be of great interest and value to bird banders in this country, with its account of methods, its numerous maps, and its detailed discussion of data relative to the banding and movements of the Swallow, White Stork, Lapwing, Starling, Ducks and Gulls. Part I will form a working foundation for any investigation of bird migration no matter what the standpoint of the investigator may be, and presents the known facts in a clear and comprehensive way.

It is to Part III, however, "the main problems of bird migration," that we turn with the greatest avidity, but here it should be explained that the author is careful to state that his work "aims at a statement of the problems presented by the phenomenon of bird migration rather than at an attempt, *hopeless in the present state of knowledge*, at their solution" [italics ours].

Dr. Thomson considers that the problems presented by the migration of birds are four in number.

1. Its *raison d'être* which he answers with a definiteness that seems entirely warranted: "It enables the migrants to inhabit two different areas at the respective seasons most favorable in each." "Migration," he adds, "is an expensive custom involving great expenditure of energy and heavy loss of life and if the results were not highly beneficial the habit would surely have ceased to exist.

2. What originally developed the custom of migration? Here we are told only speculation is possible. The most general theory has been that a suitable breeding area and satisfactory winter feeding ground were

¹ Problems of Bird Migration. By A. Landsborough Thomson, O.B.E., M.A., D.Sc. (Aberdeen). H. F. & G. Witherby, 326 High Holborn, W.C. 1. [London]. 1926. pp. i-xvi, 1-350. Price 18s. net.

originally coincident, and through changed conditions have diverged, forcing migration from one to the other. The climatic changes of the glacial epochs and the extension of range of species have been suggested as primary influences to this end, while the suggestion has also been made that migration may have arisen suddenly from abrupt movements such as still occur in certain species today. All of these theories are, however, in Dr. Thomson's opinion, beset with difficulties and they do not explain the nature of the inborn custom nor the manner of its inheritance.

3. What is the stimulus that puts migration in action at the proper time twice a year? This necessary stimulus has been sought in physiological changes connected with the recurrence of the reproductive season and also in external climatic conditions. Our author suggests that both may be operative, the former predominating in spring and the latter in autumn although climatic changes may again and again stimulate migration after a physiological stimulus has produced the necessary condition of unrest, thus causing the successive advances in spring.

4. The last problem is the *modus operandi* of the actual migratory performance; what determines the routes and how do the birds follow them? Dr. Thomson thinks that there must be some inherited memory of path and goal and contends that the knowledge cannot be traditional since young birds migrate for the first time unguided. Vision he regards as an important point although he admits it may seem inadequate in over-sea paths, and we surely think it is. He considers that the term a "special sense of direction" is devoid of exact meaning, which is very true except it denote a faculty that wild animals have that we cannot yet describe in terms of the known senses. He moreover feels that the homing of pigeons and other birds removed to distant points artificially "is not strictly analagous to migration but raises some points of difficulty."

We may not agree with his estimates of some of the theories that have been advanced but here again we must point out that he is merely weighing them in accordance with their value in the study of behavior and giving us what he regards as a working hypothesis for future studies.

When we read his admirable work we realize the complexity of the subject and the amount of knowledge that we should possess of the work of our predecessors before we are justified in entering upon the field of speculation and theory. If bird banders hope to advance beyond the stage of putting bands on birds' legs, or recorders of bird arrivals wish to understand the significance of what they are doing, they should read this book and gain some clear idea of the magnitude of the problem they are attacking.—W.S.

Heilmann on 'The Origin of Birds.'—This important work¹ consists of a compilation of all the data so far presented bearing upon the ancestry

¹ *The Origin of Birds.* By Gerhard Heilmann. With two plates in colour and one hundred and forty photographs and text-figures from drawings by the author. London, H. F. & G. Witherby, 326 High Holborn, W. C. 1926. pp. 1-208. Price 20s. net.