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G. V. T. Matthews

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# BIRD NAVIGATION

BY

G. V. T. MATTHEWS, M.A., PH.D.

*The Wildfowl Trust, Slimbridge*

SECOND EDITION



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## PREFACE TO THE SECOND EDITION

The first edition of 'Bird Navigation' preceded a period of intensive activity which threw everything back in the melting pot. When the book sold out three years later the Cambridge University Press suggested that it should be reprinted. But it had already become so out of date that I asked to be allowed to revise it extensively. The Press, for whose forbearance I am very grateful, agreed to put scientific considerations before commercial ones.

A measure of the intensification of research in this field is given by the list of references. This includes some 350 post-1954 titles as against 220 earlier ones. The latter remain after heavy pruning carried out in the interests of keeping this a slim volume.

The text has been completely re-written and I have endeavoured to present a reasonably unbiased review of the field. It does, of course, remain a personal interpretation and statement.

A particularly hard blow to development in our field was occasioned by the premature death of Gustav Kramer in 1959. His contributions need no stressing, and this book is respectfully dedicated to his memory. He would have preferred, I know, that points of controversy should not be glossed over, and I have not done so.

Finally, I must thank all those friends and colleagues who kept on pressing me to get this book finished, not least among them my wife, Janet Kear. I also owe a particular debt to Don Griffin, who has ever been a stimulation and has most kindly subjected this text to ruthless criticisms. Eleanor Temple Carrington patiently and meticulously prepared the typescript.

The work was carried out while I held a post at the Wildfowl Trust financed by the Natural Environment Research Council. I am grateful for the support and encouragement of both these bodies, and especially for that of Peter Scott.

G. V. T. M.

*November 1967*

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## PREFACE TO THE FIRST EDITION

The presumed navigational powers of animals, and in particular those of birds, have attracted scientific attention for more than a century. It is during the last ten years that a fresh impetus has been given by the advancement of new theories and the development of new experimental techniques. This monograph attempts to survey the present position which, perhaps momentarily, appears to have some coherence. The path of progress in this field is littered with discarded theories and it is possible that the one at present favoured may be found inadequate. But both the existence and the physical bases of bird navigation are now firmly established, and it is more likely that future developments will lie in a better appreciation of the way in which a bird interprets and acts upon the information available to it.

I should like to acknowledge my debt to those who both encouraged and enabled me to undertake research in this field, particularly Professor Sir James Gray, F.R.S., and Dr W. H. Thorpe, F.R.S., and to those bodies which provided financial backing, the Department of Scientific and Industrial Research and the Royal Society. I am most grateful to Dr George Salt for his help and advice in the preparation of the monograph.

G. V. T. M.

*3 November 1954*



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## AUTHOR'S NOTE

In view of certain semantic controversies I would state that 'navigation' is used to mean the ability to initiate and maintain directed movement independently of learned landmarks. Directed movement with reference to the latter may be considered as 'pilotage'. 'Orientation' is not, to my mind, a substitute term for any form of navigation. It should imply the taking up of a direction in relation to a stimulus or stimuli—and no more. Qualifying adjectives should refer to the stimulus concerned, but I am aware that I have sinned by perpetrating 'nonsense' orientation. Still, no-one is likely to be misled into thinking that birds are orientating by, with or from nonsense. I have, however, eschewed 'celestial navigation', which has too much flavour of Kai Lung and would be better used in accounting for the movement of angels in pre-radar days.

Bird species are referred to by their vernacular English (or American) names, but a list of their Latin names appears at the back of the book. With so much interesting work being done with other animals, reference has perforce been made to them at various places. Here the generic name is inserted in the text to bring home the point. However, no attempt has been made to review thoroughly the massive literature on the invertebrates.