tropics that text-books written for temperate zones are of little real use and in some cases are often misleading.

This book, the first of its kind on animal nutrition in India, compiled from experimental results which have been obtained there and by one who has spent a life-time working on the subject, should be most useful to those who are doing advisory work on animal production not only in India but also throughout the tropics. The tables of chemical composition and digestibility, mineral and vitamin content of Indian feeding-stuffs will be invaluable for the rationing of animals in tropical countries, for until this book appeared they were to be found only in inaccessible publications and reports. These tables will do for the tropics what the tables of Kellner, Armsby and others have done for temperate climates. In general, the book follows the traditional lines of those on animal nutrition, but with special reference to Indian conditions, and includes sections on the feeding of buffaloes and camels. A chapter on some harmful foods and famine fodders supplies useful information rarely found in nutrition books written for temperate climates.

Perhaps the most important respect in which the book differs from those written for temperate areas is that it starts with the soil and deals with its deterioration and erosion from overgrazing, an aspect of animal nutrition which is of special importance in the tropics. As the author states, the ultimate solution of the problem of feeding animals in India lies in the restoration of the proper equilibrium between the soil and the human and cattle population.

JOHN HAMMOND

BIRDS OF A LOW RAINFALL REGION

A Handbook of the Birds of Western Australia (with the exception of the Kimberley Division)

By D. L. Serventy and H. M. Whittell. Second edition. Pp. viii+384. (Perth: Paterson Brokensha Pty., Ltd., 1951.) n.p.

AUSTRALIA, scarcely less than Great Britain, has of recent years been flooded with 'Nature books' of dubious accuracy and of poor quality. These have been hastily put together in order to exploit the growing desire of the public for information about animals, particularly birds.

The present volume is a refreshing departure from the general run of ornithological literature. It is the result of much painstaking scholarship, and it contains information that will interest any biologist who is concerned with the effects of landscape aridity on form, of environmental change on distribution, or the influence of irregular and scanty rainfall on the breeding seasons of animals. It is, then, far more than a mere handbook of the fauna of a single restricted area within political boundaries.

Certain parts of the book are of especial interest in that they throw further doubt on the validity of the day-length hypothesis in the regulation of avian breeding seasons. This notion has gained almost universal acceptance since Rowan's epochal demonstration, about twenty-five years ago, that the reproductive mechanism of vertebrates can be stimulated by increased lighting. There can, of course, be no question that the hypophysis can be indirectly influenced and gonad modification induced in many species by artificial photostimulation; but the importance of day-length as an ultimate, or even as an initiating factor, in the timing of avian breeding seasons under natural conditions has been seriously questioned by recent work in Britain on British and Australian species. Serventy and Whittell point out in the volume under review that in Western Australia light increases in duration from June until December; but, in the southern parts of the country, many species ovulate from mid-April onwards. In the north-west, breeding occurs mostly in the winter, while in the south-west most birds ovulate during the spring months when light is increasing. In each region there is a very pretty correlation between sexual activity and rainfall, and as a consequence, the young are launched from region to region at times most propitious for their survival. In one area where spring ovulation is normal, a heavy and unseasonal deluge was followed by widespread autumn reproduction. A hundred miles away where the rains did not penetrate, breeding did not occur until the following spring. This kind of information supports the concept that after the post-nuptial period of gonad metamorphosis (which varies in duration from species to species) many birds are ready to undergo reproductive activity immediately there occurs in the environment the combination of external stimuli to which they are hereditarily attuned to respond. Breeding can occur quite irrespective of changes in day-length. Serventy and Whittell have further information that suggests the operation of an internal rhythm among sea-birds. The silver gull (*Larus novæ-hollandiæ*), for example, has a winter and a spring breeding population on the same small coastal island.

The present "Handbook" contains a great amount of detail that is chiefly important to local naturalists, including a most excellent history of Western Australian ornithology dating from the seventeenth century explorers such as van Hillegom, de Vlamingh (who discovered that a black swan was not a *rara avis* after all) and the remarkable English buccaneer, William Dampier. It is to be hoped that subsequent editions may include the birds of the remote Kimberley region with its 'incubator bird' (*Megapodius*), fruit-pigeons, pittas and other forms of tropical origin and affinity. In fact, one cannot think of two men better qualified to write a much-needed modern handbook covering the birds of the entire continent of Australia.

A. J. MARSHALL

SIX-FIGURE MATHEMATICAL TABLES

Chambers's Shorter Six-Figure Mathematical Tables

By Dr. L. J. Comrie. Pp. xxvi+388. (Edinburgh and London: W. and R. Chambers, Ltd., 1950.) 12*s*. 6*d*. net.

WHEN accuracy in simple numerical calculations greater than that attainable by the use of the common four- or five-figure tables has been desired, it has been usual to resort to Chambers's seven-figure tables, although they are restricted to common logarithms and the trigonometrical functions. The question of a revised edition of the latter tables was referred to Dr. L. J. Comrie, and the substance of his recommendations was that a wider range of ele-