

Difficulty in accounting for regional differences in the numbers and endemism of species is enhanced by the dearth of precise information about the ecology of so many of the birds concerned, and here Moreau points the way to further research that naturalists might undertake. Birds of the evergreen forest are highly specific to that habitat and need to be considered separately from all the others; both groups can be sub-divided into typically lowland and typically montane species, with a few intermediates. Comparison of separate areas of roughly similar habitat reveals wide differences in the richness of the fauna; the southern tropics are richer than the northern, Kenya than West Africa, and so on.

Seasonal change is as strongly marked in the greater part of tropical Africa as in northern Europe, and much more so than in the Mediterranean basin. Most native species, nevertheless, persist as residents, even in areas with severe and prolonged dry seasons. A few are migratory within the continent, usually from higher to lower latitudes, but sometimes across the equator; there is also a migration of Madagascar birds into East Africa. It is remarkable that during the (summer) rains the belt just south of the Sahara is sought both by birds coming there to breed and by others arriving from elsewhere in Africa to spend their off-season.

Every year, also, the native faunas are seasonally augmented by vast hordes of Palaearctic migrants. This movement, contrasting with that of land birds in South America, extends continuously (except probably in evergreen forest) to the southern extremity of the continent. Many migrants, however, do not go beyond the northern tropics, and are there at the most arid season—yet they must fatten themselves for the homeward flight across the Sahara.

This is a zoogeographical study in depth and is likely to remain a valuable source book for a long time.

LANDSBOROUGH THOMSON

## AND MORE FROM NEW GUINEA

### Handbook of New Guinea Birds

By Austin L. Rand and E. Thomas Gilliard. Pp. x+612+81 plates. (London: Weidenfeld and Nicolson, 1967.) 126s. net.

THE Papuan sub-region, the area covered by this work, is for its size one of the richest avifaunal regions in the world, both in number and variety of unique forms. It has attracted the attention of many notable ornithologists, from Salvadori to Stresemann and Mayr, but few have been more competent and devoted than Austin Rand and the late Tom Gilliard; between them they have spent more than six years in the field and many more studying specimens in museums in Chicago and New York.

Identification of the 650 species is the main purpose of the book. This is achieved by a process of descriptive guidance through orders, families and genera, including keys based mainly on field characters, down to detailed descriptions. This is supplemented by brief notes on range, sub-species, nesting and a summary of other points of interest under the heading of remarks. There is also a representative sample of illustrations, twenty-seven species in colour and 130 in half-tone sketches.

The quality of the text and its presentation, with a few exceptions such as the form of the keys, should satisfy anyone interested in identifying a New Guinea bird; but to the bibliophile this pleasing appearance may be marred by the quality of the illustrations. The user with some idea of the bird he wishes to "look up" may be irritated by the lack of an index.

The fact that few of the million and a quarter Papuan inhabitants may be greatly interested in avian systematics is no reason for not producing a work of this kind, but there is little doubt that it will be of great use to any who

are, and also to museum ornithologists elsewhere. Both are fortunate to be so well served. J. D. MACDONALD

## DOWN TO EARTH

### Soil Organic Matter

Its Nature, Its Role in Soil Formation and in Soil Fertility. By M. M. Kononova. Second English edition. Translated from the Russian by T. Z. Nowakowski and A. C. D. Newman. Pp. 544. (Oxford, London and New York: Pergamon Press, Ltd., 1966.) 105s. net.

STUDIES on soil organic matter have been greatly extended during the past fifteen to twenty years, not only in Western Europe and North America but particularly in the Soviet Union. Although the many studies carried out in the Soviet Union had been admirably summarized and reviewed by Professor M. M. Kononova in her book on *Soil Organic Matter*, first published in Russian in 1951, it was not until the publication of a German translation in 1958 that her work became available to most soil scientists outside the Soviet Union. The publication of an English translation in 1961 greatly extended the availability of her work and that of her Russian colleagues. The appearance of a second English edition so soon is indicative of the high regard in which her book is held and of its value to soil scientists generally. Undoubtedly the book was initially of prime interest to Western workers because of the access it gave to Russian ideas, but it is not in any way one-sided and fairly represents the state of research work and knowledge of soil organic matter on a world-wide basis.

The general pattern of the second edition follows very closely on that of the first, but there have been some extensive revisions particularly in the chapters on the nature of soil organic matter and its role in soil formation and soil fertility. The portion dealing with the effect of humus on higher plants has also been very much revised, particularly in view of the extensive work being carried out in Eastern Europe and especially in the Soviet Union.

After an introductory section dealing with historical aspects there is a detailed account of the chemical composition of soil organic matter. This illustrates very well how the present state of our knowledge is an unhappy mixture of what might best be termed "chemical folk-lore" and modern scientific evidence. Professor Kononova has been very careful to present as objectively as possible the views of many different authors and to avoid bias, but I believe that many readers would have appreciated a somewhat clearer statement of her own estimate of what much of the evidence is worth. It is becoming increasingly clear that the humic materials owe most of their properties to the fact that they are high molecular weight polymers formed by the condensation of a variety of building blocks and are not simple molecular species of the older organic chemists.

The chapter dealing with the biochemistry of humus formation emphasizes how little we really know about this problem despite its importance. Throughout the author makes a clear distinction between materials which are classed as strictly "humus substances" and organic substances of "individual nature" such as the fats, carbohydrates, tannins, resins and terpenes. Very often the importance of these materials is overlooked. Chapter 4, dealing with soil formation and soil fertility, raises a similar problem in relation to the presence of vitamins, auxins and antibiotics in the soil as distinct from the humic materials. The second half of the chapter, which discusses the physiological effects of organic materials in the soil, deserves to be widely read by plant physiologists. The unfortunate squabbles over "muck and magic" and "chemical" fertilizers in the country have prejudiced many physiologists against any studies in this field. The issues are still clouded, but there is increasing evidence indicating