Introduction to Functional Analysis

By Prof. Angus E. Taylor. Pp. xvi+423. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1958.) 100*s*. net.

LINEAR functional analysis arose partly from Hilbert's theory of space of an infinity of dimensions and its axiomatic formulation by John von Neumann, and partly from Banach's development of Fréchet's work on abstract spaces. Good recent books include those by Zaanen and by Riesz and Nagy. Prof. Taylor's introduction will not displace these books, but can serve as a useful survey of basic methods. In lecture form, the material has been tried out on several graduate courses in the United States, and hence is particularly helpful in the early chapters. In the first, the algebraic formulation is kept clear of topology; linear spaces, operators and functionals are defined and illustrated by a wealth of examples of each type, so that the novice is gently helped to surmount his initial difficulty of forming some concrete idea of these abstract concepts. The second chapter is a reference section on topology; then in the third, the linear space and the topological space are related to provide the concept of the linear topological space, again with many carefully detailed instances of such spaces. The reader who studies these three chapters closely will be rewarded with a firm grasp of fundamentals and should then cope readily with the somewhat increased pace of the later chapters giving the general theory of linear operators, spectral analysis and the standard results for self-adjoint, normal and unitary operators. The old-fashioned analyst will be pleased to see contour integration employed in the spectral theory, a method much emphasized in some of Taylor's own papers. The final chapter, on integration and linear functionals, is intentionally only a sign-post to further reading in this field. The book should be particularly valuable to those who need to get some knowledge of the unifying and co-ordinating power of this potent theory without having to make a specialist's study of it. T. A. A. Broadbent

The Birds of the Palearctic Fauna

A Systematic Reference. Order Passeriformes. By Dr. Charles Vaurie. Pp. xii+762. (London: H. F. and G. Witherby, Ltd., 1959.) 105*s*.

IT has been claimed that birds are systematically better known than any other class of animals, but even for the relatively familiar Palæarctic region a new 'base-line' has become desirable. This is here provided in respect of the passerine birds—a second volume is now being prepared to cover the rest—in succession to the corresponding part of Hartert's "Die Vögel der paläarktischen Fauna" of 1903–32. Unlike Hartert, the present author does not give descriptions of species, but only the main points distinguishing one sub-specific form from another; synonymies are brought up to date rather than repeated in full. English names are given for all species, with the French and German equivalents where these exist.

The present less-rigid outlook on intraspecific systematics is reflected in the emphasis placed on the 'clinal' nature of much of the geographical variation, and previously described races which the author regards as mere stages on a cline or as otherwise unsatisfactory are relegated to the synonymy; races which the author accepts are graded as "well" and "moderately well" differentiated but are otherwise given identical treatment. Of special value are the detailed accounts of the ranges of all forms, and these are usefully reinforced by information about the habitat of each species. There are also brief indications of extra-limital distribution and of the existence of extra-limital races, the latter being mentioned by name when not too numerous. There are doubtless some points on which other experts may differ, but the volume can be welcomed as an up-to-date authoritative work of reference on the systematics and zoogeography of the palæarctic passerine avifauna. Landsborough Thomson

The Open Sea—Its Natural History

Part 2: Fish and Fisheries, with Chapters on Whales, Turtles and Animals of the Sea Floor. By Sir Alister Hardy. (The New Naturalist: a Survey of British Natural History.) Pp. xiv+322+48 plates. (London: William Collins, Sons and Co., Ltd., 1959.) 30*s*. net.

THOSE who enjoyed Sir Alister Hardy's first book on "The Open Sea" will also enjoy his second, for it has the same virtues: it is written with infectious enthusiasm and with a wide knowledge of fish and fishermen. He has sailed in both the old and the new *Discovery*, in trawlers on fishing trips and in fisheries research vessels of many lands, so that he brings a vivid sense of actuality into his writing.

Beginning with a brief résumé of the fundamentals of life in the sea, the author goes on to describe what a fish is and how it lives and moves. Then follow chapters on particular fish and fisheries. The herring is given pride of place with a short account of its history and of the research work on it right up to the present day. After two chapters on the bottom fauna, we return to fishing with descriptions of different types of gear and chapters on plaice, elasmobranchs and gadoids. The over-fishing problem is not neglected, and indeed in many places throughout the book the author shows how the knowledge we already have could be applied to improve or increase the fisheries. He ends with the plea that the division of the North Sea into northern and southern spheres of research should be abandoned in favour of a united effort covering the whole area.

There are chapters also on the animals of the ocean floor, on parasites, particularly of fish, on reptiles (not omitting the sea-serpent) and on marine mammals.

No attempt has been made to cover the systematics or physiology of fish. This is a natural history of the creatures living in the open seas around Britain and there can be few who will read it without learning something new and interesting.

Mention must be made of the excellent illustrations. Many of the plates are reproductions of the author's own delightful water colours. The photographs, many by Dr. D. P. Wilson, are outstanding and include some wonderful shots of whales and courting fish. S. M. Marshall

Flora of Peru

By Rogers McVaugh. (Field Museum of Natural History: Botanical Series, Vol. 13, Part 4, No. 2.) Pp. ii+569–818. (Chicago: Field Museum of Natural History, 1958.) 3.75 dollars.

THIS part continues the Flora of Peru with the account of the difficult family, Myrtaceae, contributed by Prof. Rogers McVaugh, of the University of Michigan. The bulk of the species belongs to two large genera, *Myrcia* and *Eugenia*. The author is to be congratulated on his carefully prepared keys and long specific descriptions. There are no illustrations.