COASTAL AND DEEP-WATER BENTHIC FISHES OF THE ANTARCTIC. By HUGH H. DEWITT. *Antarctic Map Folio Series, Folio 15. New York: American Geographical Society, 1971. 11¼ x 17¼ inches, 10 pages, 31 maps. $6.00.*

The earliest collections of antarctic fishes disclosed the unique character of the fauna, reflecting doubtless the extreme isolation of the southern lands and their continental shelves, probably also the long geological duration of such isolation, and also the probable long-continued duration of the Antarctic Convergence as a planetary feature. However, there is one significant peculiarity of the antarctic continental shelf, namely its exceptional depth (500 to 750 metres, as opposed to the average of 132 metres for the rest of the earth). This curious fact is now attributed to the downward pressure exerted on the whole continent by the vast ice load it carries. Its effect upon living creatures is considerable, for it means that shelf animals encounter greater depths and pressures than elsewhere in the world; so far as concerns the fishes, this means that some of them exhibit anatomical characters more appropriate to deeper faunas, such as the continental slopes normally support. DeWitt therefore finds that topographic discontinuities, rather than absolute depth, are better features for diagnosing the component parts of the fish fauna. Nonetheless he still finds it convenient to distinguish between coastal and deep-water fishes, according to their relationships with corresponding faunas in other parts of the ocean.

The coastal fishes comprise representatives of 14 families. Four of these families, namely the antarctic cod (so-called), the plunder fishes, the dragon fishes and the ice fishes, constitute the pièce-de-résistance of the antarctic endemics, namely the Notothenioidei, an assemblage of perch-like, or perhaps blenny-like, fishes typical of the Antarctic. Indeed, some 60 per cent of all known antarctic fishes belong here, and they seem to represent the ancient native fish fauna of Antarctica, perhaps 40 million years old or even older.

So odd are these notothenioid families that some brief comments on them are justified here. Most peculiar of all are the ice fishes, or family Channichthyidae, which have no respiratory pigment in their blood (which therefore appears whitish!): these fishes are apparently predators upon crustaceans and on other fishes, but for information on their respiratory physiology the reader will need to consult some other work. The antarctic cod, or family Nototheniidae, are mostly rather sedentary bottom forms, feeding on invertebrates and algae, but occasionally living near the undersurface of the floating ice shelves. The plunder fishes, or Harpagiferidae, are similar but lack scales, and have a chin barbel doubtless of use in the bottom environment they tend to occupy, most in rather deep water. The dragon fishes, or Bathydraconidae, have an elongate body, and lack the anterior spinous dorsal fin. Examples of these peculiar fishes are illustrated on the maps which show their known distribution patterns.

DeWitt distinguishes a second category of coastal fishes which he believes represents a more recent invasion from elsewhere and not, therefore, part of the original antarctic fauna. Here he includes some widely distributed families of fishes, such as the eel pouts (Zoarcidae), the snail fishes (Liparidae), the rays (Rajidae), the moras (Moridae), true cod (Gadidae), flatfishes (Bothidae), and also two other families of southern origin; the last-mentioned are the cod-like Muraenolepidae and the so-called horse- or pig-fishes (Congiopodidae). There are also in this category two families of jawless fishes or Agnatha, namely lampreys and hagfishes. The former are represented by *Geotria australis*, long known from Australia, New Zealand and South America, but only recently (1964) shown to be part of the antarctic marine fauna, and to serve as food for albatross. The hags are known from two species of Myxinidae.

Four families of deep-water benthic fishes are reported, and comprise groups which range bathyal and abyssal zones elsewhere in the ocean. Included here are the eel-like Synaphobranchidae and Halosauridae, the elongate and soft-bodied Brotulidae, and the rat-tail cod or Macrouridae, well known from some deep-water fisheries. The presence of such fishes in antarctic deep-water habitats offers no biogeographic problems.

Zoogeographic analysis (in some detail) leads to the isolation of the following main elements: bathyal and abyssal species, living usually below 2,000 metres, though occasionally entering the shelf; endemic species on particular island shelves; endemic species of west Antarctica and east Antarctica; and a group of circumantarctic species. The last-named of these categories presents West-Wind-Drift distribution patterns similar to those of echinoderms, as DeWitt notes, though he was unable to detect clear decay series. The Scotia Arc is identified as the main portal of entry and exit of shallow-water forms, again matching conclusions

drawn for echinoderms.

One minor criticism: the author's curious practice of citing his authorities in reverse chronological order seems to attribute to northern geophysicists findings actually made much earlier by Australian and New Zealand biologists, as for example the late Miocene coolings evident in New Zealand, but strangely attributed to an English student of geomagnetism and hard-rock geology.

H. Barraclough Fell

FIELD WORK OF A MUSEUM NATURALIST: ALASKA – SOUTHEAST; ALASKA – FAR NORTH; 1919-1922. By ALFRED M. BAILEY. *Colorado: Denver Museum of Natural History, 1971. 6 x 9 inches, 192 pages, illustrated. $2.50 U.S. postpaid.*

This genuine and engaging little book, dedicated by the author to his wife, is a narrative of about three years' collecting in Alaska, without the detailed observations on natural history of Bailey's formerly published accounts. It will be of interest to Alaska hands, with its accounts of settlements, vessels, natives, old-timers and officials; and to modern naturalists and travellers who enjoy reading the recollections of their tougher precursors. It is illustrated by no less than ninety-five fine full and half-page period photographs, plus two maps, and embellished by a stream of anecdote involving Alfred and Muriel Bailey, Bailey's associate Russell Hendee, their numerous acquaintances and the Airedale "Jerry". Though written with the immediacy of dates, times and distances, the accounts of the great bird flocks, the pods of sea mammals, the free collecting forays by Americans to the Siberian shore, the determined and strong personalities of the settlers and their native friends, evoke nostalgia and heighten one's awareness of the precarious existence of man's cultural and natural resources.

A. H. Macpherson

INTERNATIONAL BIOLOGICAL PROGRAMME, TUNDRA BIOME: PROCEEDINGS IV. INTERNATIONAL MEETING ON THE BIOLOGICAL PRODUCTIVITY OF TUNDRA, LENINGRAD, USSR, OCTOBER, 1971. Edited by F. E. WIELGOLASKI and TH. ROSSWALL. *Stockholm: Swedish IBP Committee, 1972. 6½ x 9½ inches, 320 pages, illustrated. $4.00.*

Synthesis of research carried out in the International Biological Program is now occurring. The collaborative aspects of research have been a strong element in the tundra biome and a distinct contribution of IBP. Exchanges among circumpolar scientists have, in the past, been usually limited to formal papers, a few international conferences or the fortunate travels of a very few professional scientists.

Thus the publication of the third and fourth proceedings of IBP tundra workshops is a significant manifestation of changes within the scientific community. The fourth meeting occurred in Leningrad, October 25 to 29 1971. The most exciting portion of the resulting publication is the availability of summary descriptions and data from tundra research in USSR.

The Proceedings consist of three distinct parts: Part 1, comprising one third of the volume, is a set of ten articles on general problems of accounting for biological productivity in tundra regions. Dr. F. E. Wielgolaski of Norway presents a discussion of vegetation types by species composition and morphologic structure across the circumpolar tundra together with tabulated mean values of standing crop and apparent annual production by country and vegetation type. Initial attempts at simulation modelling of biomass production are described by H. E. Jones and A. J. P. Gore of the United Kingdom. Both a biomass balance method and an energy flux approach were compared for three sites at Moor House, United Kingdom; Barrow, Alaska; and Hardangervidda, Norway. Agreement between the two independent estimates for three sites was within the limits of the range of efficiency of solar energy conversion (1 per cent $\pm$ 0.2 per cent) used in the energy flux model. L. L. Tieszen describes the primary producer research in the U.S. tundra program which is focused on canopy structure, photosynthetic fixation and allocation of CO_2. This emphasis on plant physiological processes appears to address specifically the gap encountered by the U.K. model in accounting for seasonal variations in biomass increment. V. N. Andreev *et al.* summarize methods and values of estimating seasonal changes in above-ground phytomass employed in the Institute of Biology in Yakutia field station on the Kolyma River. The objective was to predict seasonal productivity by individual species, and most of the species analysed were circumpolar monocots. Initial multiple regression analyses of tundra decomposition processes by O. W. Heal, soil microbiological studies by T. V. Aristovskaya and O. M. Parinkina indicate that real progress is beginning to emerge on this