species of the family are pelagic during part of their lives, or (dragon fishes) and Channichthyidae (ice fishes), all belonging to the genera known in the family.

The Antarctic Fish Fauna

divided into two groups, with respect to both habitat and relationships, is 614. which we may call deep-sea fishes and coastal fishes, a distinction which can probably be made along any coast fronting the open ocean. The pattern is not a simple one in the Antarctic, however. Andriashev and Tokarev (1958) and Andriashev (1965), among others, have noted the presence within the continental shelf of deep trenches or regions, with depths as great as 1600 m. Adie (1964b) and Rutford, et al. (1968) as well as the previous authors, have also noted that the depth of the continental shelf about the continent is unusually deep, averaging between 500 and 750 m, compared to a world average of about 132 m. Adie (1964b) explains these greater depths as a result of the depression of the entire Antarctic continent and associated shelf region due to the weight of accumulated ice during the Pleistocene, and he presents a correlation of shelf depth with latitude. Thus South Georgia, with an average shelf depth of about 120 m, has not been affected, but the South Orkney Islands (shelf depth about 230 m), South Shetland Islands (about 250 m) and the southern part of the Antarctic Peninsula The Notothenioidei are a diverse group of some 90 to 100 species, of (about 450 m) show increasing depth with increasing latitude. Another which 75 are known from the Antarctic. At various times they have result of this depression is that where the shelf is very broad, as in the been placed with the percoid fishes (Regan, 1913; Berg, 1940), in a Ross Sea, the greatest depths are close to the southern shores. The separate suborder of the perch-like fishes (Greenwood, et al., 1966), or southwest basin in the Ross Sea has depths of slightly more than with the blenny-like fishes (Gosline, 1968). Their diversity in habit and 1000 m, whereas the shelf edge is everywhere less than 600 m. For this structure, together with the uncertainty of their relationships and their reason, many typical shelf species have the aspect of deep-sea fishes, southern distribution, argue strongly for an independent evolution in and have been called pseudoabyssal forms (Andriashev, 1953, 1965; the cool waters of the southern hemisphere throughout at least most of Andriashev and Tokarev, 1958), as distinct from true abyssal forms the Tertiary. Their fossil record is too meager for any indication of derived from worldwide deep-sea groups.

The boundaries of the two faunas, then, cannot be described by The Nototheniidae form the largest assemblage of Antarctic fishes, depth, but rather by topography. About the continent proper, the edge and are the most diverse family in structure, habit and distribution of the continental shelf and the upper part of the continental slope (Maps 7-20). Most are rather sedentary bottom forms, which feed on a seem to be the areas of overlap of the two faunas. Farther north, along variety of invertebrates, and in some cases algae (Arnaud and Hureau, the Scotia Ridge, the few data available to me indicate that a 1966). Some have become specifically adapted to living in and about characteristically Antarctic fauna extends to a relatively greater depth, the undersurface of sea ice (Trematomus borchgrevinki, T. brachysoma at least with respect to the shelf edge. In the Ross Sea, this change in and probably Pagothenia antarctica, Maps 18 and 20). One is entirely fauna is probably associated with a relatively rapid change in pelagic in habit (Pleuragramma antarcticum, Map 20). Pleuragramma temperature as one moves from the shelf edge down the continental has become the dominant midwater fish over the continental shelf, at slope (Countryman and Gsell, 1966; DeWitt, 1970a).

The characteristic Antarctic deep-sea fishes are members of the The Harpagiferidae (Maps 21-23) are similar to the Nototheniidae in found from shallow near-shore regions of warm seas to the greatest range (Map 22). depths for which fishes have been recorded. Most are found at abyssal The Bathydraconidae (Maps 24-26) are distinguished by their depths, and are soft-bodied, rather elongate forms, although not elongate form and the absence of a spinous anterior dorsal fin. This is a eel-like. In the area discussed, one deep-water form has been described, more diverse group than the last, some having only a few scales and Bassogigas brucei (Map 2). The fourth family, the Macrouridae, or rat others developing pointed snouts and large canine teeth (Gymnodraco tails, constitutes the most common and widespread family of fishes acuticeps, Map 25). The genus Bathydraco includes two species found at abyssal depths. Long considered as deep-sea relatives of the inhabiting abyssal depths: B. antarcticus and B. scotiae. This family is codfishes, they are elongate fishes with large heads and eyes, covered the most Antarctic of the Notothenioidei, being restricted to the coasts with spiny scales, and have a very long and attenuated posterior body of the continent and the Scotia Ridge northward to South Georgia, with often no recognizable caudal fin. Seven species have been recorded with one deep-water species found on the Kerguelen Plateau (Map 26). benthic (Map 5).

found on continental slopes and submarine ridges. Compare, for least partly pelagic. example, the distributions of the deep-water groups mentioned above Andriashev (1965) included the Muraenolepidae as an element of the

occasionally leave the bottom to feed, only the one species listed above suborder Notothenioidei, may be termed the "... ancient autochthonic appears to be wholly pelagic. The family Zoarcidae, known from both elements..." of the fish fauna (Andriashev, 1965). They include over hemispheres, contains both shallow and bathyal species. The genus 60% of the species found in the Antarctic and over 90% of the Melanostigma contains the only pelagic representatives of the family, individuals. Table 1 shows the relative numbers, expressed as percents, with species in both hemispheres. The Macrouridae constitute the most of the fishes collected with bottom trawls in the area of the Ross Sea characteristic element of the bottom fish fauna in the deep waters of 'during Eltanin Cruise 27, in January and February of 1967. These the world ocean. Cynomacrurus is one of the two or three pelagic figures include data from hauls made on the continental slope as well as on the shelf of the Ross Sea. The figures would be weighted still more heavily toward the Notothenioids if the slope data were omitted. Note the dominance of the family Nototheniidae, to which nearly 60% of the specimens belong.

TABLE 1. Relative numbers of specimens collected in Blake trawls in the Ross Sea Most of the bottom fishes found within our defined area can be area during Eltanin Cruise 27 in 1967. The total number of specimens for all groups

Family		Percent
- <u>L</u> Nototheniidae		58.0
Nototheniidae Harpagiferidae Bathydraconidae Channichthyidae	4%	10.1
Bathydraconidae	92.4%	17.6
Channichthyidae	0,	L6.7
Muraenolepidae		1.1
Zoarcidae		2.4
Rajidae		0.2
Liparidae		1.8
Macrouridae		2.1

relationships or prior distribution.

least in the Ross Sea (DeWitt, 1970a).

families Synaphobranchidae, Halosauridae, Brotulidae, and Macrouri- general appearance, but lack scales and have a larger head. All but one dae. The first two families comprise elongate, rather eel-like forms have a mental barbel and a rounded hook on the operculum. These are found only at bathyal and abyssal depths. Two species, one from each all bottom fishes, most from fairly deep water. The most widespread family, are known from our area: Histiobranchus bathybius and form, however, Harpagifer bispinis in its various subspecies, is often Aldrovandia macrochir (Map 2). The Brotulidae are a diverse group found in the littoral zone under rocks in the more temperate parts of its

from our area, one of which, Cynomacrurus piriei, is pelagic rather than The Channichthyidae (Maps 28-31) are recognized by their nearly complete lack of scales, the presence of an anterior spinous dorsal fin, The remaining species can be called coastal fishes, even though some and a very large, often spiny, head with a produced and flattened snout. are known from depths as great as some of the deep-sea forms. The They also lack an oxygen-carrying pigment in their blood, which families Moridae, Zoarcidae (eel pouts) and Liparidae (snailfishes), appears pale whitish. Most are probably sedentary predators, feeding on especially, contain numerous species from deep water. As opposed to fishes and larger crustaceans (Robilliard and Dayton, 1969), but some, the truly abyssal forms, the deep-water species of these families are such as Neopagetopsis ionah and Champsocephalus gunnari may be at

with the species Lycenchelys of the family Zoarcidae (Map 3) or with original, or ancient, fish fauna. It seems better, however, to consider the morids Antimora rostrata and Halargyreus johnsonii (Map 2; this small and peculiar family of Gadoid fishes (Map 2) as a more recent invader into the Antarctic. The two species found near the continent The coastal fishes comprise a diverse group, including representatives are taken primarily on the continental slope, and not on the inner, or of fourteen families. Four of these families, the Nototheniidae southern, parts of the continental shelf. This was clearly evident from (Antarctic cods), Harpagiferidae (plunder fishes), Bathydraconidae the trawl catches obtained during Eltanin Cruise 27 into the Ross Sea,

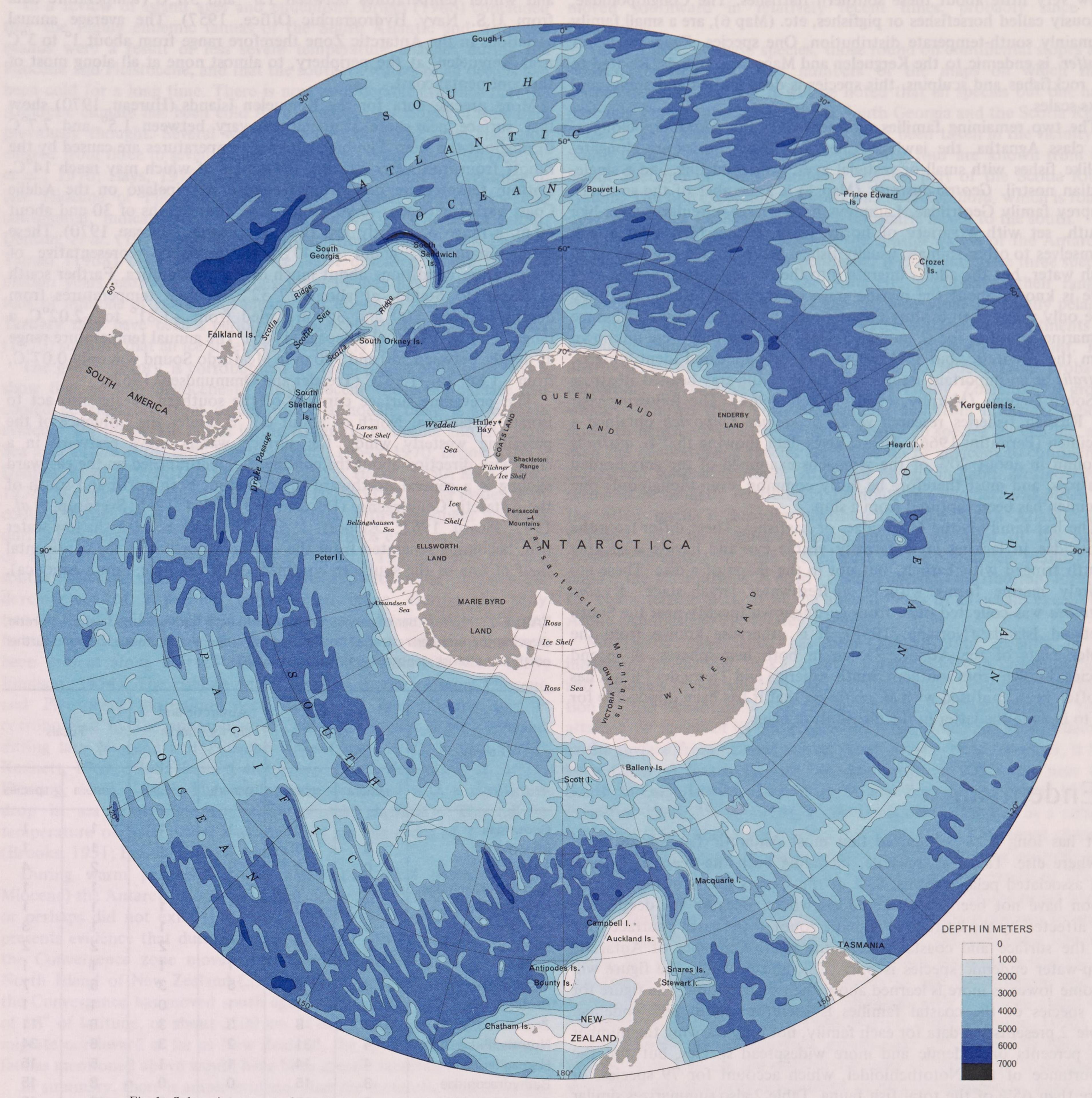


Fig. 1. Submarine topography in the region south of 35°S. (Generalized from a map prepared by Bruce Heezen for Folio 16 of the Antarctic Map Folio Series.)

when 35 tows were made with Blake trawls on the shelf and on the regions of the continental shelf, though they are nowhere common. slope to the north. Muraenolepids were taken at five stations, all at the The remaining groups form only a very minor part of the fish fauna, which have more recently entered the Antarctic Zone.

specimens and species, yet it is formed by a surprisingly diverse array of the codfishes, and penetrate only into the periphery of the Antarctic, unrelated forms. With the exception of the Muraenolepidae and reaching South Georgia and the South Sandwich Islands. Two species Congiopodidae, all belong to families with wide distributions through- are recorded: Antimora rostrata and Halargyreus johnsonii, both well out the world. The most important of these groups is the family known from the North Atlantic. The Gadidae, or true cods (Map 2) are Zoarcidae or eel pouts (Maps 3 and 4), which may be encountered represented by one species, Micromesistius australis, which migrates nearly everywhere in the Antarctic, occasionally in large numbers. during the summer into the Scotia Sea as far south as Clarence and These elongate, eel-like fishes may be underrepresented in trawl Elephant Islands off the tip of the Antarctic Peninsula. In the Antarctic catches, and perhaps are more common than our data admit, for at it behaves as a pelagic fish, feeding upon krill (Merrett, 1963; Permitin, times large numbers of them have been taken by means of traps 1970), but off South America, it is considered demersal. The flatfish (DeWitt, 1962). They have also evolved into several genera and a family Bothidae, or lefteye flounders (Map 27), also penetrate only into number of species endemic to the Antarctic, evidence that they have the peripheral parts of the Antarctic. The records for Mancopsetta inhabited the region for a considerable time. Lycenchelys antarcticus maculata refer to bottom catches of metamorphosed individuals; those (Map 3) is found in very deep water, and the genus Melanostigma (Map for M. slavae are based upon small pelagic specimens which had 4) is pelagic.

snailfishes (Map 6). These are sedentary, heavy-bodied, gelatinous fishes, shelf, it is possible that the pelagic records represent specimens which sometimes with a ventral sucker. Some are beautifully colored: had strayed far south of their normal range. It may be that the purple-brown, red-orange, pink, or transparent white. They are found specimens described as M. slavae are the young of a species previously

edge of the shelf or on the upper continental slope, at depths ranging and most do not occur in the southernmost portions of the Antarctic between 351 and 1230 m. Such a pattern indicates a species not Zone. The Rajidae, or rays (Map 1), extend southward into the region adapted to the colder Ross Sea bottom water found farther south. I of the Antarctic Peninsula, and some unreported specimens have been consider the Muraenolepidae to form part of a second group of fishes taken from the edge of the continental shelf of the Ross Sea (Eltanin Cruise 27), but they are best known from South Georgia and the This second group is much less important in terms of numbers of Kerguelen Islands. The Moridae, or moras (Map 2), are close relatives of metamorphosed but not migrated to the ocean floor. Since no adult or The next group, in terms of numbers of species, is the Liparidae, or bottom-living flatfishes have been taken on the Antarctic continental virtually everywhere, in shallow as well as deep water, and from all described from farther north, perhaps M. maculata. Unfortunately, we