

ON THE DISTRIBUTION OF THE FISHES (ORDERS CLUPEI—
FORMES, BATHYCLUPEIFORMES, GALAXIIFORMES, SCO—
PELIFORMES AND ATELEOPIFORMES) OF THE INDIAN RE—
GION IN RELATION TO THE MEAN ANNUAL ISOTHERMS

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(With 1 plate and 1 Text-fig.)

CONTENTS

	PAGE
I—Introduction	405
II—Distribution of species	406
III—Conclusions	411
IV—Systematic list of the fishes showing the latitudinal and longi- tudinal ranges, habitat or range of depths in metres and distribution	413
V—Summary	433
VI—References	433

I—INTRODUCTION

In a previous paper by us (Misra and Menon, 1958) the distributional pattern of the Elasmobranchs and Chimaeras of the Indian region with particular reference to the mean annual isotherms was indicated. The present paper is a similar study regarding the distribution of the fishes of the Orders Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes and Ateleopiformes of the Indian region in relation to the mean annual isotherms of 6°, 12° and 20°C.

In the Check-List of these orders by Misra (1947), 171 species were listed from within the limits of the Indian region, *i.e.*, on the west, the Gulf of Oman and then from Ras-el-Haad southwards along Long. 60°E.; on the south, from Lat. 1°S., where it meets Long. 60°E., eastwards to the coast of Sumatra ; on the East, the coast of Burma.

In addition to these, 4 more species, viz., *Sardinella perforata* (Cantor), *Pellona hoevenii* Blkr., *Platyroctogen mirus* Lloyd and *Chirocentrus nudus* Swns., have been added in this paper at the same time relegating two species, *Notopterus osmani* Rahimullah and Das and *Stomias valdiviae* Br. to the synonymy of *Notopterus notopterus* (Pallas) and *Stomias affinis* Gthr. respectively. Thus the total number of species dealt with here is 173 (including 4 subspecies), consisting of 85 littoral, 3 land-locked and exotic, and 85 bathypelagic species.

The mean annual isotherms of 6°, 12° and 30°C. are shown by dotted lines in the accompanying map (Plate 34). The limits of these three isotherms were defined in the previous paper (Misra and Menon, 1958, p. 73) ; and in the classified list of the 173 species given in the end are shown their mean annual isotherms, latitudinal and longitudinal ranges, vertical ranges, distribution, habitat or depths in metres and bottom temperatures wherever available.

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II—DISTRIBUTION OF SPECIES

A detailed and specific study of the distributional ranges of the fishes in relation to the three isotherms reveals the following :—

1. *Littoral or semipelagic, land-locked and bathypelagic species.*—Out of the total 173 species, 85 are littoral, 3 exotic and land-locked, and 85 bathypelagic. All the littoral or semipelagic species are in the 20°C. isotherm. Out of 85 bathypelagic species, 52 are in 20°C. and 21 in both 20° and 12°C. isotherms. Of the remaining 12 species, one species, *Nansenia graenlandicus* (Reinhardt) is restricted to 20°C. isotherm and beyond 6°C. isotherm in the Arctic zone ; five species, viz., *Myctophum coccoi* (Cocco), *Malacosteus niger* Ayres, *Argyropelecus hemigymnus* Cocco, *Argyropeletus aculeatus* V and *Sternoptyx diaphana* Herm. are distributed in 20°, 12° and 6°C. isotherms, while two species, *Cyclothone acclinidens* Garman and *Idiacanthus fasciola* Ptrs. have been recorded in 20° and 12°C. isotherms and beyond 6°C. isotherm in the Antarctic zone ; two species, *Cyclothone signata signata* Garman and *Argyropelecus olfersi* (C.) are distributed in 20°, 12° and 6°C. isotherms and beyond 6°C. isotherm in the Arctic zone ; *Argyropelecus sladeni* Regan is restricted to 20°C. isotherm and beyond 6°C. in the Antarctic zone, while *Cyclothone microdon microdon* Gthr. is remarkable in having been recorded from 20°, 12° and 6°C. isotherms and beyond 6°C. both in the Arctic and Antarctic zones. The 3 land-locked species are exotic and freshwater, viz., *Salmo gairdnerii gairdnerii* Richardson, *Salmo levenensis* Walker and *Salmo trutta fario* L. These

have, since a long time, been introduced into the cold climates of the "Indian region" and are known to breed successfully, subject to snow-fall, at altitudes ranging from 8000-9000 ft. above the sea level and never below it.

2. *Endemic species*.—Out of the total 170 littoral and bathypelagic species, 33 are endemic to the "Indian region", the rest 137 occurring beyond the "Indian region". All the endemic species are in the 20°C. isotherm. Of the 33 endemic species, 16 are littoral, viz., *Ehirava fluviatilis* Deraniyagala, *Stolephorus malabaricus* (Day), *Gudusia variegata* (Day), *Ilisha leschenaulti* (V.), *Ilisha motius* (Ham.), *Ilisha sladeni* (V.), *Gonialosa manmina* (Ham.), *Gonialosa modestus* (Day), *Setipinna phasa* (Ham.), *Coilia cantoris* Blkr., *Coilia quadragesimalis* V., *Coilia ramcarati* (Ham.), *Thrissocles annandalei* (Chaudhuri), *Thrissocles kempfi* (Chaudhuri), *Thrissocles rambhae* (Chaudhuri) and *Galaxias indicus* Day. The remaining 17 of the endemic species are bathypelagic, or abyssal having been recorded from depths ranging between 272-2395 metres with bottom temperatures varying from 11.1° to 2.3°C. They are *Alepocephalus edentulus* Alc., *Alepocephalus longiceps* Lloyd, *Alepocephalus macrops* Lloyd, *Narcetes erimelas* Alc., *Xenodermichthys squamilaterus* Alc., *Leptoderma affinis* Alc., *Tauredophidium hextii* Alc., *Platyroctogen mirus* Lloyd, *Aulostomatomorpha phospherops* Alc., *Triplophos hemingi* (Mc Ardle), *Bathyclupea hoskynii* Alc., *Harpodon squamosus* Alc., *Scopelarchus guentheri* Alc., *Bathypterois (Bathypterois) atricolor* Alc., *Bathypterois (Hemipterois) guentheri* Alc., *Myctophum indicus* Day and *Lampanyctus pyrsobolus* (Alc.).

3. *Species extending beyond the "Indian region"*.—Out of the 137 species distributed beyond the "Indian region", 68 are bathypelagic or abyssal and 69 littoral. In the 69 littoral species, 10 species, viz., *Macrura ilisha* (Ham.), *Gudusia chapra* (Ham.), *Corica soborna* (Ham.), *Ilisha filigera* (V.), *Raconda russelliana* Gray, *Setipinna breviceps* (Cantor), *Coilia reynaldi* V., *Thrissocles purava* (Ham.), *Xenengraulis spinidens* J. and S. and *Saurida longimanus* Norman, are restricted to the north of Equator, their range of distribution being 0°—35°N., 48°—142°E., while the remaining 59 species extend their range both to north and south of Equator. Out of the remaining 59 species, 16 species, viz., *Elops saurus* L., *Megalops cyprinoides* (Brouss.), *Albula vulpes* (L.), *Harengula vittata* (V.), *Sardinella jussieu* Lac., *Sardinella melanura* (C.), *Sardinella perforata* (Cantor), *Sardinella sirm* (Walbaum), *Kowala coval* (C.), *Clupa nodon punctatus* (Schgl.), *Anchoviella indica* (v. Hass.), *Thrissocles baelama* (Forsk.), *Chanos chanos* (Forsk.), *Saurida gracilis* (Q. and G.), *Saurida japonicus* (Houttuyn) and *Trachinocephalus myops* (Schn.), are remarkably cosmopolitan extending from the east coast of Africa eastwards through the Indo-Pacific to the islands of Polynesia beyond 180°E., with a distributional range 35°N.—35°S., 18°E.—149°W. Of the remaining 43 littoral species, 12 species, viz., *Sardinella dayi* Regan, *Harengula ovalis* (Bennett), *Hilsa kelee* (C.), *Pellona ditchela* V., *Nematalosa nasus* (Bl.), *Anchoviella commersoni* Lac., *Thrissocles malabaricus* (Bl.), *Thrissocles setirostris* (Brouss.), *Chirocentrus dorab* (Forsk.), *Chirocentrus nudus* Swns., *Saurida tumbil* (Bl.), and *Synodus indicus* (Day) occur 20°S.

or below 20°S., but do not extend eastwards beyond 180°E., thus showing a distributional range 35°N.—33°S., 27°-180°E. Out of the remaining 31 littoral species, four species, viz., *Dussumieria hasseltii* Blkr., *Anchoviella heterolobus* (Rupp.), *Thrissocles hamiltoni* (Gray) and *Thrissocles mystax* (Schn.), restrict their range between 13°S. and 18°S. of the Equator, with the distributional range 35°N.—18°S., 39°—180°E. The remaining 27 littoral species, viz., *Dussumieria acuta* V., *Sardinella albella* (V.), *Sardinella clupeioides* (Blkr.), *Sardinella fimbriata* (V.), *Sardinella longiceps* V., *Sardinella sindensis* (Day.), *Hilsa sinensis* (L.), *Ilisha brachysoma* (Blkr.), *Ilisha elongata* (Benn.), *Ilisha indica* (Swms.), *Ilisha kampani* (Web. de Bfrit.), *Ilisha melastoma* (C.), *Ilisha novacula* (V.), *Opisthopterus. tardoore* (C.), *Clupanodon thrissa* (L.), *Anodontostoma chacunda* (Ham.), *Setipinna taty* (V.), *Coilia borneensis* (Blkr.), *Coilia dussumieri* (V.), *Anchoviella tri* (Blkr.), *Thrissocles dussumieri* (V.), *Pellona hoevenii* Blkr., *Thrissocles kammalensis* (Blkr.), *Thrissocles valenciennesi* (Blkr.), *Notopterus chitala* (Ham.), *Notopterus notopterus* (Pallas) and *Harpodon nehereus* (Ham.), extend their distribution between 2°S. and 10°S. of the Equator, not occurring beyond 150°E., within the range 35°N.—7°S., 38°—140°E.

4. *Deep-sea species restricted to the Indo-Pacific region.*—Out of the non-endemic bathypelagic species, 22 species, viz., *Alepocephalus bicolor* Alc., *Alepocephalus blanfordi* Alc., *Alepocephalus microlepis* Lloyd, *Bathytroctes microlepis* Gthr., *Bathytroctes squamosus* Alc., *Narcetes affinis* Lloyd, *Xenodermichthys guentheri* Alc., *Xenodermichthys nudus* (Br.), *Xenodermichthys lividis* Br., *Yarrella corythaeolum* (Alc.), *Stomias nebulosus* Alc., *Chauliodus pammelas* Alc., *Saurida undosquamis* Rich., *Evermanella atratus* (Alc.), *Melanostomias valdiviae* Br., *Bathypterois (Bathypterois) insularum* Alc., *Myctophum fibulatum* G. and C., *Myctophum pterotus* Alc., *Lampanyctus macropterus* Br., *Diaphus caeruleus* (Klunz.), *Scopelengys tristis* Alc. and *Ateleopus indicus* (Wood-Mason and Alc.) have been recorded only from the Indo-Pacific region from the Cape of Good Hope to the western coasts of Central America within the distributional range 35°N.—35°S., 18°E.—80°W., at depths varying from 343—3931 m., in bottom temperatures 13.3° to 2.1°C. Out of these species 6 species, viz., *Alepocephalus microlepis* Lloyd, *Xenodermichthys guentheri* Alc., *Narcetes affinis* Lloyd, *Melanostomias valdiviae* Br., *Myctophum fibulatum* G. and C. and *Scopelengys tristis* Alc., are restricted to the north of the Equator, their range of distribution being 0°—23°N., 53°E.—80°W., at depths varying from 343—3279m., in bottom temperatures 17.20° to 2.1°C. Of the remaining 16 Indo-Pacific species, *Xenodermichthys lividis* (Br.), and *Xenodermichthys nudus* (Br.), have been recorded only from within the range 0°31'—0°39'S., 98°—101°E., in depths 750—903m., just below south of the Equator, while 5 species, viz., *Yarrella corythaeolum* (Alc.), *Saurida undosquamis* Rich., *Bathypterois insularum* Alc., *Myctophum pterotus* Alc., and *Diaphus caeruleus* (Klunz.) extend their range beyond 28° south of the Equator, in depths varying from 457—2084m. and temperatures 13.3° to 3.18°C; and 9 species, viz., *Alepocephalus blanfordi* Alc., *Alepocephalus bicolor* Alc., *Bathytroctes macrolepis* Gthr., *Bathytroctes squamosus* Alc., *Stomias nebulosus* Alc., *Chauliodus pammelas* Alc., *Lampanyctus macropterus* Br., *Evermanella atratus* Alc. and *Ateleopus indicus* (Wood-Mason and Alcock) restrict their range between 2°—10° south of the

Equator in depths varying from 430—1650 m. and bottom temperatures 12.12° to 2.2°C.

5. *Deep-sea species common to the Indo-Pacific and Atlantic.*—Nine species, viz., *Vinciguerria nimbarius* J. W., *Bathytroctes microlepis* Gthr., *Platytrectes apus* Gthr., *Photostomias guerni* Collet, *Astronesthes marh, tensii* Klunz., *Bathilychnus cyaneus* Br., *Melanostomias melanops* Br., *Lampanyctus gemmifer* G. and B., and *Diaphus garmani* Gilbert, occur north of the Equator both in the Indo-Pacific and Atlantic Oceans, their range in the Indian Ocean being 4°-24°N., 39°—94°E., and in the Atlantic 0°—39°N., 7°—13°W.

Four species, viz., *Gonostoma elongatum* Gthr., *Polyipnus spinosus* Gthr., *Lampanyctus longipes* Br., and *Neoscopelus macrolepidotus* Johnson have been recorded north and south of the Equator in the Indo-Pacific region and north of the Equator in the Atlantic Ocean within the ranges 33°N.—35°S., 18°E.—178°W. and 0°—41°N., 7°E.—80°W respectively; one species, *Chlorophthalmus agassizi* Bonap. has been recorded north and south of the Indo-Pacific and the Mediterranean with the distributional range 20°N.—35°S., 18°E.—155°W and 38°13'N., 15°13'E. respectively.

One species, *Diaphus splendidum* (Br.) shows a distributional range 35°N.—20°S., 42°—135°E. north and south of Equator in the Indo-Pacific and 3°—9°S., 7°—9°E. south of the Equator in the Atlantic.

One species *Stomias affinis* Gthr., has been found north of the Equator in the Indo-Pacific and north and south of the Equator in the Atlantic within the range 0°—15°N., 41°—98°E. and 30°N.—5°S., 11°E.—87°W. respectively.

One species *Lampanyctus micropteuum* (Alc.) presents a distributional range 0°—6°S., 58°—99°E. in the Indo-Pacific occurring only to the south of the Equator and 3°N.—9°S., 7°E.—9°W in the Atlantic occurring both to the south and north of the Equator.

Of the remaining 29 species, 14 species, viz., *Bathytroctes rostratus* Gthr., *Cyclothone microdon pallida* Br., *Cyclothone obscura* Br., *Valencienellus stellatus* Garman, *Cyclothone signata alba* Br., *Vinciguerria lucetius* Garman, *Argyropelecus affinis* Garman, *Astronesthes indicus* Br., *Myctophum laternatum* Garman, *Myctophum reinhardti* (Lutken), *Myctophum spinosus* (Steind.), *Myctophum valdiviae* Br., *Diaphus dumerili* (Blkr.) and *Diaphus lutkeni* Br. occur both to the south and north of the Equator in the Indo-Pacific as well as in the Atlantic, their range of distribution respectively, being 34°N.—40°S., 18°E.—74°W. and 44°N.—37°S., 16°E.—87°W., three species, viz., *Chauliodus sloani* Schn. *Lestidium (Bathysudis) speciosus* Bellotti and *Diaphus rafines quei* Cocco.

occur both to the south and north of the Equator in the Indo-Pacific, and the Atlantic within the ranges 35°N.—29°S., 30°E.—140°W and 37°N.—40°S., 16°E.—87°W respectively, and also in the Mediterranean 36°—38N., 14°—15°E.

Out of the remaining 12 species, *Nasenai graenlandicus* (Reinhard) has been recorded from north and south of the Equator in the Indian Ocean and north of the Equator in the Atlantic sector of the Arctic Ocean within the ranges 4°N.—29°S., 30°—73°E. and 72°N., 40°W., respectively ; *Cyclothone accilinidens* Garman has been recorded from north and south of the Equator in the Indian Ocean and Atlantic and also from the Atlantic sector of the Antarctic within the ranges 24°N.—26°S., 41°—97°E, 37°N.—28°S., 9°E.—21°W and 56°31 S., 14°29/E. respectively ; *Cyclothone microdon-microdon* Gthr., has been recorded from north and south of the Equator both in the Indo-Pacific and the Atlantic, from the Atlantic sector of the Arctic in the ranges 11°N.—50°S., 18°E.—90°W., 40°N.—50°S., 18°E—88°W., 65°—67°N., 30°—58°W., 53°—62°S., 95°E.—57°W., respectively ; *Cyclothone signata signata* Garman has been recorded from the north and south of Equator both in the Indian and Atlantic Oceans and also from the Atlantic sector, of the Arctic Ocean within the ranges 13°N.—30°S., 48°—97°E.k 31°N.—37°S., 18°E.—21°W., 61°21'N., 80°41'W., respectively ; *Sternoptyx diaphana* Garm. has been recorded from north and south of the Equator both in the Indo-Pacific and Atlantic and also from the subarctic sector of the Atlantic in the ranges 35°N.—47°S., 18°E.—115°W., 46°N.—35°S., 16°E.—87°W., and 46°N., 56°W., respectively , *Argyrolepecus aculeatus* V has been recorded north and south of the Equator both in the Indian Ocean and Atlantic Oceans and also from the coast of Norway in the subarctic sector of the Atlantic within the ragnes of 20°N.—32°S., 39°—99°E.. 32°N.—35°S. 16°E—87°W., and 10°E., 70°N, respectively *Argyrolepecus hemigymnus* Cocco has been recorded north and south of the Equator both in the Indian and Atlantic Oceans and also from the Mediterranean and the subarctic sector of the Atlantic in ranges 12°N.—30°S., 51°—97°E., 39°N.—35°S., 27°—87°W.. 38°N., 15°E. and 60°—64°N., 1°—7°W.,—respectively ; *Argyrolepecus olforsti* (C.) has been recorded north and south of the Equator both in the Indian and Atlantic Oceans from the subarctic sector of the Atlantic and also from the Arctic Ocean within the ranges 9°N.—35°S., 18°E.—79°W., 63°N.—3°S., 7°E.—74°W. and 71°N., 25°E., respectively ; *Argynolepecus sladeni* Regan has been recorded from north and south of the Equator both in the Indian and Atlantic Oceans and also from the Atlantic sector of the Antarctic within the ranges 12°N.—5°S., 41°—65°E., 12°N.—12°S., 11°E—20°W and 61°25'30°S., 53°46W., respectively ; *Malacosteus niger* Ayres has been recorded north and south of the Equator both in the Indian and Atlantic Oceans and also from the subarctic sector of the Atlantic within the ranges 13°N.—10°S., 46°—97°E., 42°N—33°S., 15°E., 70°N., respectively ; *Idiacanthus fasciola* Ptrs. has been recorded from north and south of the Equator in the Indian and Atlantic Oceans and the subantarctic sector of the Atlantic within the ranges 7°N.—5°S., 48°—85°E., 40°N.—36°S., 17°E.—80°W., and 55°S.—56°S., 14°—16°E., respectively ; *Myctophum coccoi* Cocco has been recorded from north and south of the Equator both in the Indo-Pacific and Atlantic from the subarctic sector

of the Atlantic and also from the Mediterranean within the ranges 34°N.—39°S., 18°E.—71°W., 46°N.—38°S., 2°E.—70°W and 37°35'N., 14°10'E., respectively.

6. *Vertical distribution of the species.*—Littoral or semipelagic species occur in waters within the Continental shelf in depths less than 200 metres. Bathypelagic species inhabit waters beyond the Continental shelf in depths below 200 metres. Abyssal species occur in waters beyond the Continental slope in depths below 2000 metres. Out of the total 85 bathypelagic species 35 have been recorded both from the bathypelagic and abyssal zones, 2 from the abyssal zone and 48 from the bathypelagic 200—2000 m. The bathypelagic species are, thus, found to have a wide vertical range being capable of migrating upwards and downwards.

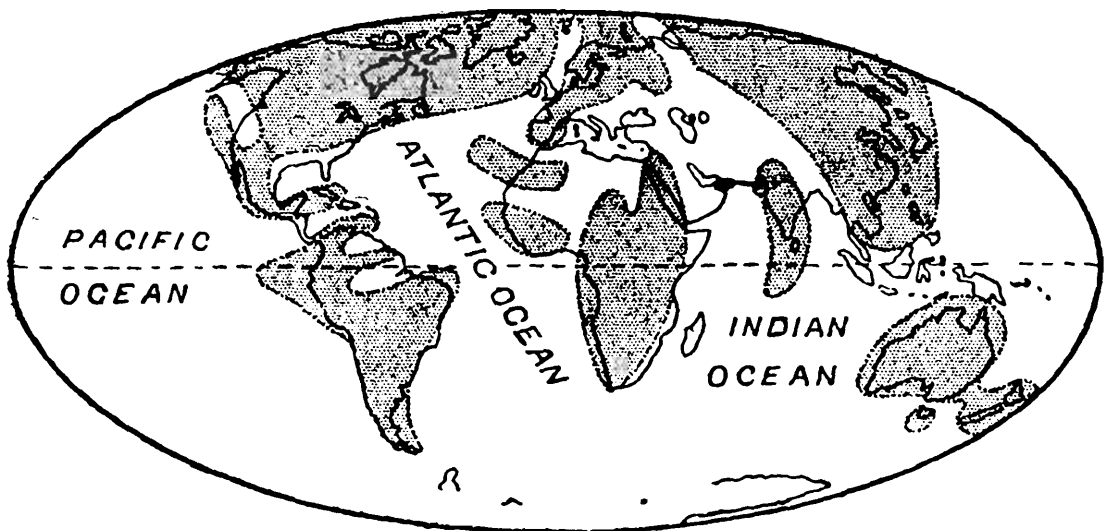
III—CONCLUSIONS

In the total 173 species of fishes of the Orders Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes and Ateleopiformes of the "Indian regions" 85 are littoral or semipelagic 3 land-locked and exotic, and 85 are bathypelagic or abyssal. The Order Clupeiformes consists of 76 littoral, 3 exotic and land-locked and 53 bathypelagic species. The Orders Bathyclupeiformes and Galaxiiformes are represented by a single species in each, of which the former is bathypelagic and the latter littoral. In the Order Scopeliformes 7 species are littoral and 29 bathypelagic or abyssal. The Order Ateleopiformes is represented by a single bathypelagic species. In other words, out of the total 173 species dealt with here, 133 belong to the Order Clupeiformes, 57 to the Order Scopeliformes and one each of the Orders Bathyclupeiformes, Galaxiiformes and Ateleopiformes. Thus the Order Clupeiformes and Scopeliformes together consist of 170 species, out of which 83 are bathypelagic and 87 littoral. Of the 83 bathypelagic species 16 are endemic to the "Indian region", while 67 species have been recorded from the Indo-Pacific, Atlantic, Arctic and Antarctic regions. Out of the 87 littoral species 3 are exotic, 16 are endemic and the remaining 68 species have a restricted range in the Indo-Pacific and tropical Atlantic. *Bathyclupea hoskynii* Alc., the single species representing the Order Bathyclupeiformes and *Galaxias indicus* Day, the single representative of the Order Galaxiiformes are confined to the Bay of Bengal, and the littoral district of Madras, W Bengal and E. Pakistan respectively, while the sole species *Ateleopus indicus* Wood-Mason and Alcock, of the Order Ateleopiformes has been recorded only from the Arabian Sea, Bay of Bengal and the Philippine seas.

While the bathypelagic species are not affected by such physical barriers as the isotherms and a few of them extend their distribution in all the five oceans, the littoral species evince a distributional pattern quite characteristic of them, by not penetrating into the cold waters

of the Atlantic west of the Cape of Good Hope. The littoral and semi-pelagic species of the "Indian region" extend their range from the Red Sea and the east coast of Africa, through the Indo-Pacific eastwards even as far as to the east coast of tropical North and South America, but their range towards the west is restricted beyond the west of the Cape of Good Hope. This is due to the fact that the 12°C isotherm (Plate 34) bordering the south-west coast of Africa beyond west of the Cape of Good Hope and extending upto 22°S. latitude, serves as a physical barrier for the free intermingling of the fishes of the Atlantic with those of the Indian region. However, it is probable that some of the species occurring in 20°C isotherm may often extend their range to 12°C isotherm in the Mediterranean and temperate Atlantic as and when surface temperature conditions there become favourable during the summer months of the year.

Among the 16 littoral, semipelagic species extending their range eastwards beyond 180°E., *Albula vulpes* (L.), with its type-locality in



TEXT-FIG. 1.—Map showing land distribution in the Eocene. (After Norman).

the Bahama Is., Atlantic, is singular in its occurrence in the Indo-Pacific region. The occurrence of some Mediterranean and tropical Atlantic species in the Indo-Pacific and some Indo-Pacific species in the tropical Atlantic and the Mediterranean may be explained (Günther, 188° ; Alcock, 1899 ; Norman, 1931) by the configuration of the Land masses during the Eocene period when the Mediterranean sea extended eastwards and opened into the Indian Ocean, and the isthmus of Panama was submerged under sea and the Atlantic and Pacific Oceans were continuous (Text-fig. 1), thus making it possible for an intermingling of the species. Smith (1953) has suggested that species common to the Indo-Pacific and the tropical Atlantic and the Mediterranean may be "relics of intermingling, for not very long ago in geological time conditions were different and there was almost certainly a warm water connection between the Indian and Atlantic Oceans" Besides, the recent and artificially constructed Panama and Suez canals may have to some extent served as a connecting passage for a free dispersal of species in certain cases.

IV—SYSTEMATIC LIST* OF THE FISHES SHOWING THE LATITUDINAL AND LONGITUDINAL RANGES, HABITAT OR DEPTHS IN METRES AND DISTRIBUTION

Species	Range in latitudes and longitudes	Range of depth in metres.	Distribution
Series Pisces Class Teleostomi Subclass Actinopterygii Order Clupeiformes (Isospondyli, Malacopterygii S. Str., Thrissomorphi). Suborder Clupeoidei Superfamily Elopoidae Family Elopidae			
Family ELOPIDAE			
1. <i>Elops saurus</i> L.			
In 20°C. isotherm	35°N.—35°S., 18°E.—155°W.	Littoral ; euryhaline.	Red Sea, Arabia, east and south coasts of Africa, Cape of Good Hope, Madagascar, Mauritius, Pakistan, India, Ceylon, Malay Peninsula, Indonesia, Philippines, China, Korea, Japan, New South Wales, Hawaii.
Family MEGALOPIDAE			
2. <i>Negalops cyprinoides</i> (Brouss.)—			
In 20°C. isotherm	35°N.—34°S., 26°E.—170°W.	Do.	East and south coasts of Africa, Natal, Zanzibar, Madagascar, Mauritius, India, Pakistan, Ceylon, Burma, Malay Peninsula, Indonesia, Siam, Philippines, China, Formosa, Fusan, Queensland, Melanesia, Micronesia, Polynesia, Tahiti.
Superfamily Albuloidae			
Family ALBULIDAE			
3. <i>Albula vulpes</i> L.			
In 20°C. isotherm	35°N.—29°S., 30°E.—149°W ; 18°—23°N., 74°W.	Littoral	Red Sea, Natal, South Africa, Zanzibar, Mauritius, India, Ceylon, Pakistan, Malay Peninsula, Indonesia, Cochin, China, Philippines, Korea, Japan, Queensland, New South Wales, Melanesia, Micronesia Polynesia, Hawaii, Brazil, Antilles.
Superfamily Clupeoidae			
Family CLUPEIDAE			
Subfamily Dussumieriini			
4. <i>Dussumieria acuta</i> V.			
In 20°C. isotherm	25°N.—7°S., 45°—140°E.	Do.	South Arabia, Pakistan, India, Ceylon, Malay Peninsula, Singapore, Indonesia, Siam, China, Philippines, Melanesia.

* Certain nomenclatorial errors and omissions occurring in the "Check List of the Fishes of India, Burma and Ceylon II. Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes and Ateleopiformes", *Rec. India Mus.*, 45, pp. 377-431 (1947), have been rectified.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
5. <i>Dussumieria hasseltii</i> Blkr. In 20°C. isotherm	22°N.—13°S., 75°—140°E.	Littoral	India, Ceylon, Burma, Malaya Peninsula, Singapore, Indonesia, Siam, Cochin China, Philippines, Formosa, China, Queensland.
6. <i>Ehirava fluviatilis</i> Deraniyagala In 20°C. isotherm	6°—7°N., 79°50' E.	Littoral; euryhaline.	Ceylon.
7. <i>Stolephorus malabaricus</i> (Day) Subfamily Clupeini	11°N., 76°E.	Do.	India.
8. <i>Harengula ovalis</i> (Bennett) =[<i>Harengula punctata</i> (Rupp.)] In 20°C. isotherm	35°N.—29°S., 30°—180°E.	Littoral	Suez Canal, Red Sea, Arabia, South Africa, Natal, Seychelles, India, Ceylon, Pakistan, Indonesia, Philippines, China, Japan, Melanesia, Micronesia, Polynesia.
9. <i>Harengula vittata</i> (V.) In 20°C. isotherm	25°N.—29°S., 30°E.—170°W.	Littoral	South Africa, Zanzibar, Indonesia, Siam, Melanesia, Polynesia.
10. <i>Sardinella albella</i> (V.) In 20°C. isotherm	24°N.—7°S., 38°—123°E.	Do.	East coast of Africa, Pakistan, India-Indonesia, Siam, Hongkong, Philippines.
11. <i>Sardinella clupeioides</i> (Blkr.) In 20°C. isotherm	26°N.—7°S., 80°—127°E.	Do.	Ceylon, Malaya, Indonesia, Philippines, Japan.
12. <i>Sardinella dayi</i> Regan In 20°C. isotherm	14°N.—20°S., 57°—74°E.	Do.	India, Mauritius.
13. <i>Sardinella fimbriata</i> (V.) In 20°C. isotherm	25°N.—7°S., 62°—123°E.	Do.	Pakistan, India, Ceylon, Burma, Singapore, Indonesia, Siam, Tonkin, China, Philippines.
14. <i>Sardinella jusieu</i> Lac. [<i>Sardinella gibbosa</i> (Blkr.)] In 20°C. isotherm	34°N.—29°S., 30°E.—170°W.	Do.	Natal, Durban, Mauritius, Bourbon, Madagascar, India, Ceylon, Malaya, Indonesia, Shanghai, Hongkong, Philippines, Queensland, Micronesia, Polynesia, Fiji, Samoa.
15. <i>Sardinella longiceps</i> V. In 20°C. isotherm	25°N.—7°S., 39°—123°E.	Do.	Mombasa, Arabia, Seychelles, Pakistan, India, Ceylon, Indonesia, Cochin China, Philippines.
16. <i>Sardinella melanura</i> (C.) In 20°C. isotherm	34°N.—25°S., 32°E.—149°W.	Do.	East coast of Africa, Mauritius, Madagascar, Pakistan, India, Ceylon, Malaya, Singapore, Indonesia, Siam, Philippines, Japan, Micronesia, Polynesia.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
17. <i>Sardinella perforata</i> (Cantor) In 20°C. isotherm	27°N.—12°S., 51°—170°E.	Littoral	Persian Gulf, Malaya, Singapore, Indonesia, Siam, Philippines, China, Polynesia, Samoa.
18. <i>Sardinella sindensis</i> (Day) In 20°C. isotherm	25°—4°S., 62°—128°E.	Do.	Pakistan, India, Indonesia, Formosa.
19. <i>Sardinella sirm</i> (Walbaum) In 20°C. isotherm	22°N.—12°S., 38°E.—170°W.	Do.	Red Sea, Arabia, Zanzibar, Malaya, Indonesia, Annam coast, Hongkong, Philippines, Micronesia, Polynesia, Samoa.
20. <i>Macrura ilisha</i> (Ham.) In 20°C. isotherm	6°—35°N., 48°—98°E.	Littoral ; eury- haline	Iraq, Persian Gulf, Pakistan, India, Ceylon, Burma.
21. <i>Macrura kelee</i> (C.) =[<i>Hilsa kanagurta</i> (Blkr.)]. In 20°C. isotherm	25°N.—29°S., 30°—135°E.	Do.	Aden, Zanzibar, Durban, Pakistan, India, Ceylon, Malaya, Amoy, Indonesia, Siam, Micronesia.
22. <i>Macrura sinensis</i> (L.) =[<i>Hilsa toli</i> (C.V.)] In 20°C. isotherm	25°N.—7°S., 62°—120°E.	Do.	Pakistan, India, Ceylon, Malaya, Indonesia, Siam, Cochin China, Cambodia, Formosa, China.
23. <i>Gudusia chapra</i> (Ham.) In 20°C. isotherm	5°—24°N., 67°—100°E.	Do.	Pakistan, India, Burma, Malaya.
24. <i>Gudusia variegata</i> (Day) In 20°C. isotherm	16°—20°N., 96°—98°E.	Do.	Burma.
25. <i>Kowala coval</i> (C.) In 20°C. isotherm	25°N.—18°S., 62°E.—149°W.	Do.	Pakistan, India, Ceylon, Burma, Malaya, Indonesia, Siam, Cochin China, Philippines, Melanesia, Tahiti.
26. <i>Corica soborna</i> (Ham.) In 20°C. isotherm	1°—26°N., 85°—111°E.	Do.	India, Pakistan, South West Borneo, Siam.
27. <i>Ilisha brachysoma</i> (Blkr.) In 20°C. isotherm	22°N.—7°S., 76°—114°E.	Littoral	India, Ceylon, Malaya, Indonesia, Siam, Cochin China, Hongkong.
28. <i>Ilisha elongata</i> (Benn.) In 20°C. isotherm	35°N.—7°S., 62°—135°E.	Do.	Pakistan, India, Ceylon, Malaya, Indonesia, Siam, Indo-China, Formosa, China, Japan, Korea.
29. <i>Ilisha filigera</i> (V.) In 20°C. isotherm	6°—18°N., 72°—108°E.	Do.	India, Ceylon, Indo-China.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
30. <i>Ilisha indica</i> (Swms.) In 20°C. isotherm	25°N.—7°S., 38°—123°E.	Littoral	East coast of Africa, Zanzibar, Pakistan, India, Ceylon, Burma, Malaya, Indonesia, Siam, Cochin, China, Philippines, China.
31. <i>Ilisha kampeni</i> (Web. de Bfrt.)— In 20°C. isotherm	13°N.—7°S., 80°—118°E.	Do	India, Indonesia, Siam.
32. <i>Ilisha leschenaulti</i> (V.) In 20°C. isotherm	11°N., 79°E.	Do.	India.
33. <i>Ilisha melastoma</i> (C.) In 20°C. isotherm	25°N.—7°S., 62°—118°E.	Do.	India, Pakistan, Burma, Malaya, Indonesia, Siam, Cochin, China.
34. <i>Ilisha motius</i> (Ham.) In 20°C. isotherm	19°—27°N., 85°—95°E.	Do.	India, Pakistan.
35. <i>Ilisha novacula</i> (V.) In 20°C. isotherm	22°N.—7°S., 96°—114°E.	Do.	Burma, Indonesia, China.
36. <i>Ilisha sladeni</i> (Day) In 20°C. isotherm	16°—21°N., 96°—98°E.	Do.	Burma.
37. <i>Pellona ditchela</i> (V.) In 20°C. isotherm	17°N.—29°S., 30°—140°E.	Do.	Natal, Madagascar, India, Ceylon, Burma, Malaya, Indonesia, Pelew, Gulf of Carpentaria.
38. <i>Pellona hoevenii</i> Blkr. In 20°C. isotherm	17°—7°N., 83°—123°E.	Do.	India, Malaya, Indonesia, Siam, Annam coast, Philippines.
39. <i>Opisthopterus tardoore</i> (C.) In 20°C. isotherm	25°N.—7°S., 62°—114°E.	Littoral ; euryhaline	Pakistan, India, Ceylon, Burma, Malaya, Indo- nesia, Siam, Indo-China, Hongkong.
40. <i>Raonda russelliana</i> Gray In 20°C. isotherm	0°—25°N., 62°—105°E.	Do.	Pakistan, India, Ceylon, Burma, Malaya, Penin- sula, Indonesia, Cochin, China.
Subfamily (<i>Dorosomatini</i>)			
41. <i>Clupanodon punctatus</i> (Schl.) In 20°C. isotherm	35°N.—18°S., 80°E.—149°W.	Do.	India, China, Japan, Korea, Tahiti.
42. <i>Clupanodon thrissa</i> (L.) In 20°C. isotherm	35°N.—3°S., 72°—135°N.	Do.	India, Ceylon, Philippines, Indo-China, China, Japan, New Guinea.
43. <i>Gonialosa manmina</i> (Ham.) In 20°C. isotherm	6°—27°N., 62°—95°E.	Do.	Pakistan, India, Ceylon.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
44. <i>Gonialosa modestus</i> (Day)			
In 20°C. isotherm	16°—18°N., 94°—97°E.	Littoral; euryhaline.	Burma.
45. <i>Nematalosa nasus</i> (Bl.)			
In 20°C. isotherm	34°N.—29°S., 30°—123°E.	Do.	Durban, Iraq, Muscat, Pakistan, India, Ceylon, Burma, Malaya, Indonesia, Canton.
46. <i>Anodontostoma chacunda</i> (Ham.)			
In 20°C. isotherm	25°N.—7°S., 62°—142°E.	Do.	Pakistan, India, Ceylon, Burma, Malay Peninsula, Indonesia, Siam, Indo-China, Hainan, Philippines, Melanesia.
Family ENGRAULIDAE			
47. <i>Setipinna breviceps</i> (Cantor)			
In 20°C. isotherm	0°—22°N., 88°—115°E.	Do.	India, Pakistan, Burma, Malay Peninsula, Indonesia, Indo-China.
48. <i>Setipinna phasa</i> (Ham.)			
In 20°C. isotherm	16°—24°N., 85°—98°E.	Do.	India, Pakistan, Burma.
49. <i>Setipinna taty</i> (V.)			
In 20°C. isotherm	35°N.—7°S., 76°—130°E.	Do.	India, Pakistan, Ceylon, Burma, Malaya, Indonesia, Siam, Cochin China, China, Korea.
50. <i>Coilia borneensis</i> Blkr.			
In 20°C. isotherm	16°N.—2°S., 80°—115°E.	Do.	India, Burma, Malaya, Siam, Indo-China.
51. <i>Coilia cantoris</i> Blkr.			
In 20°C. isotherm	20°N., 88°E.	Do.	India.
52. <i>Coilia dussumieri</i> V.			
In 20°C. isotherm	25°N.—7°S., 62°—108°E.	Do.	Pakistan, India, Malaya, Indonesia, Siam, Indo-China.
53. <i>Coilia quadragesimalis</i> V.			
In 20°C. isotherm	6°—21°N., 79°—89°E.	Do.	India, Pakistan, Ceylon.
54. <i>Coilia ramcarati</i> (Ham.)			
In 20°C. isotherm	20°—22°N., 88°—92°E.	Do.	India, Pakistan, Burma,
55. <i>Coilia reynaldi</i> V.			
In 20°C. isotherm	1°—22°N., 88°—103°E.	Do.	India, Burma, Malaya, Singapore.
56. <i>Anchoviella commersonii</i> Lac.			
In 20°C. isotherm	24°N.—29°S., 30°—123°E.	Do.	South Africa, Muscat, India, Ceylon, Indonesia, Siam, Cochin, China, Hongkong, Amoy, Philippines.
57. <i>Anchoviella heterolobus</i> (Rupp.)			
In 20°C. isotherm	20°N.—17°S., 39°—180°E.	Do.	Red Sea, India, Burma, Indonesia, Siam, Cochin China, Philippines, Queensland, Solomon, Fiji.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
58. <i>Anchoviella indica</i> (V. Hass.) In 20°C. isotherm	27°N.—29°S., 30°E.—149°W.	Littoral ; euryhaline	South Africa, Zanzibar, Pakistan, India, Ceylon, Malaya, Indonesia, Siam, Cochin, China, Annam, Hongkong, Formosa, Japan, Pelew Islands, Samoa, Tahiti.
59. <i>Anchoviella tri</i> (Blkr.) In 20°C. isotherm	25°N.—7°S., 62°—135°E.	Do.	Pakistan, India, Malaya, Indonesia, Cochin, China, Amoy, Philippines, Pelew Islands.
60. <i>Thrissocles annandalei</i> (Chaudhuri)— In 20°C. isotherm	19°N., 85°E.	Do.	India.
61. <i>Thrissocles baelama</i> (Forsk.) In 20°C. isotherm	25°N.—20°S., 39°E.—170°W.	Do.	Red Sea, Zanzibar, Mauritius, Seychelles, Pakistan, Ceylon, India, Malaya, Indonesia, Siam, Indo-China, Guam, Polynesia, Samoa.
62. <i>Thrissocles dussumieri</i> (V.) In 20°C. isotherm	25°N.—7°S., 72°—123°E.	Do.	India, Pakistan, Ceylon, Burma, Malaya, Indonesia, Siam, Indo-China, Hongkong, Philippines.
63. <i>Thrissocles hamiltoni</i> (Gray) In 20°C. isotherm	35°N.—18°S., 62°—140°E.	Do.	Pakistan, India, Ceylon, Burma, Malaya, Singapore, Indonesia, Siam, Cochin, China, China, Korea, Philippines, Queensland.
64. <i>Thrissocles kammalensis</i> (Blkr.) In 20°C. isotherm	24°N.—7°S., 85°—120°E.	Do.	India, Pakistan, Ceylon, Indonesia, China.
65. <i>Thrissocles kempi</i> (Chaudhuri) In 20°C. isotherm	19°N., 85°E.	Do.	India.
66. <i>Thrissocles malabaricus</i> (Bl.) In 20°C. isotherm	25°N.—33°S., 27°—120°E.	Littoral	South Africa, Pakistan, India, Ceylon, North Celebes.
67. <i>Thrissocles mystax</i> (Schn.) In 20°C. isotherm	35°N.—18°S., 62°—140°E.	Littoral ; euryhaline.	India, Pakistan, Ceylon, Burma, Malaya, Singapore, Indonesia, Siam, Annam, China, Philippines, Queensland, Fusan.
68. <i>Thrissocles purava</i> (Ham.) In 20°C. isotherm	1°—25°N., 62°—142°E.	Do.	Pakistan, India, Burma, Bonin Islands, Micronesia.
69. <i>Thrissocles rambhae</i> (Chaudhuri) In 20°C. isotherm	19°N., 85°E.	Do.	India.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
70. <i>Thrissocles setirostris</i> (Brouss.)			
In 20°C. isotherm	25°N.—29°S., 30°—167°E.	Littoral; euryhaline	Red Sea, South Africa, Pakistan, Malaya, Indonesia, Siam, Indo-China, China, Queensland, Melanesia.
71. <i>Thrissocles valenciennesi</i> (Blkr.)			
In 20°C. isotherm	18°N.—7°S., 72°—123°E.	Do.	India, Malaya, Singapore, Indonesia, Philippines.
72. <i>Xenograulis spinidens</i> J. & S.			
In 20°C. isotherm	11°—22°N., 85°—101°E.	Do.	India, Burma, Siam.
Superfamily Alepocephaloidea Family ALEPOCEPHALIDAE (including Platyproctidae Roule 1919).			
73. <i>Alepocephalus bicolor</i> Alc.			
In 20°C. isotherm	13°N.—8°S., 46°—121°E.	438—1080	Gulf of Aden, 1061—1060m., 10.86°C. at 1000m., surface temperature 23.69°C.; Arabian Sea, 658m., 9.2°C., surface temperature 27.8°C.; Bay of Bengal 438—504m., 11.1°C., surface temperature 26.2°C., West coast of Sumatra, 750m.; Flores Sea, 521—538m.
74. <i>Alepocephalus blanfordi</i> —(Alc.)			
In 20°C. isotherm	6°N.—8°S., 77°—121°E.	694—1650	South of Cape Comorin, AT1650m., 5°C.; Flores Sea, 694m.
75. <i>Alepocephalus edentulus</i> Alc.			
In 20°C. isotherm	12° 50' N., 81° 36' E.	868	Off Madras coast, 868m. 7.5°C.
76. <i>Alepocephalus longiceps</i> Lloyd			
In 20°C. isotherm	12°49' 30"N., 96°24' 30"E.	1267	Andaman Sea, 1267m.
77. <i>Alepocephalus macrops</i> Lloyd			
In 20°C. isotherm	17°7'30" N., 94°5'30" E.	766	Off Arakan coast, 766m. 12.4°C.
78. <i>Alepocephalus microlepis</i> Lloyd			
In 20°C. isotherm	7°—23°N., 57°—76°E.	1102—1591	Gulf of Oman, 1260—1280m., 6.3°C.; Laccadive Sea, 1505—1591m., South of Cape Comorin, 1102m.
79. <i>Bathytroctes macrolepis</i> Gthr.			
In 20°C. isotherm	12°N.—2S., 96°—120E.	3931	Andaman Sea, North of Celebes, 3931m.
80. <i>Bathytroctes microlepis</i> Gthr.			
In 20°C. and 12°C. isotherms	12° 49' 30"N., 92° 24' 30"E. and 36°N., 7°W.	914—1993	Andaman Sea, 8 miles southeast of Cinque I., 914m.; south east of St. Vincent, Portugal, 1993m., 3.1°C.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
81. <i>Bathytroctes rostratus</i> Gthr.			
In 20°C. and 12°C. isotherms	9°N.—6°S., 48°—85°E., and 44°N.—8°S., 2°—34°W.	1,113—2,000	Northeast coast of Africa, 1,500—2,000m., 3.5°— 5.7°C. ; between Zanzi- bar and Seychelles, 1,500 —2,000m., 3°5;—5.7°C. ; Bay of Bengal, 1,500— 2,000 m., 3.5°—5.7°C. ; Pernambuco, Brazil, Morocco coast, 1,113m., 8°C. ; 1,234m., 8°C. ; Gulf of Gascony.
82. <i>Bathytroctes squamosus</i> Alc.			
In 20°C. isotherm	15°N.—8°S., 72°—115°E.	1,018—1,353	Off the Laccadives, 1,353m., 6.7°C. ; Bali Sea, 1018m.
83. <i>Narcetes affinis</i> Lloyd			
In 20°C. isotherm	24°35'10". N., 57°46' 6"E.	1,838	Gulf of Oman, 1,838m., 4.4°C.
84. <i>Narcetes erimelas</i> Alc.			
In 20°C. isotherm	15°2'N., 72°34'E.	1,353	Northwest of Laccadives, 1,353m., 6.7°C.
85. <i>Xenodermichthys guentheri</i> (Alc.)			
In 20°C. isotherm	7°—15°N., 46°— 91°E.	786—1,240	Gulf of Aden, 1,022—1,080 m. ; Off Travencore coast, 786m., 8.3°C. ; Off Madras coast, 1,240m., 5.6°C.
86. <i>Xenodermichthys lividus</i> (Br.)			
In 20°C. isotherm	0°—31°S., 99°— 101°E.	768—903	West coast of Sumatra, 768—903m.
87. <i>Xenodermichthys nudus</i> (Br.)			
In 20°C. isotherm	0°39'2" S., 98°52' 3"E.	750	West coast of Sumatra, 750m.
88. <i>Xenodermichthys squamilaterus</i> (Alc.)			
In 20°C. isotherm	14°13'N., 93°40'E.	676—766	Off Andamans, 676—676m.— 766m., 8.3°C.
89. <i>Leptoderma affinis</i> Alc.			
In 20°C. isotherm	16°N., 82°E.	1,377	Off Kistna Delta, 1,377m. 5.1°C.
90. <i>Tauredophidium hextii</i> Alc.			
In 20°C. isotherm	18°26'N., 85° 24'E.	2,395	Off Ganjam Coast, 2,395m.; 2.3°C.
91. <i>Platytroctes apus</i> Gthr.			
In 20°C. isotherm	15°2'N., 72°34' E. ; and 1°22'N., 26°36'W.	1,353—2,743	In the neighbourhood of the Laccadive banks, 1,353 m., 3.7°C. ; Mid-Atlantic, 2,743m., 2.8°C.
92. <i>Platytroctegen mirus</i> Lloyd			
In 20°C. isotherm	12°18'46"N., 74°5'29"E.	914	Laccadive Sea, 914m., 7.6°C.

Species	Range of latitudes and longitudes	Range of depth in metres	Distribution
Family DOLICHOPTERYGIDAE			
93. <i>Aulostomatomorpha phosporops</i> Alc.			
In 20°C. isotherm	11°12'47"N., 74°25'3"E.	1,828	Laccadive Sea, 828 m. 3.7°C.
Suborder Chirocentroidei			
Family CHIROCENTRIDE			
94. <i>Chirocentrus dabryi</i> (Forsk.)			
In 20°C. isotherm	35°N.—29°S., 30°—180°E.	Littoral	Red Sea, Natal, South Africa, Muscat, Pakistan, India, Ceylon, Burma, Malaya, Singapore, Indonesia, Siam, Annam, Hongkong, China, Formosa, Japan, Philippines, Queensland, Melanesia, Fiji.
95. <i>Chirocentrus runnius</i> Swms.	17°N.—29°S., 30°—120°E.	Do.	South Africa, India, Ceylon, Malaya, Singapore, Indonesia.
Suborder Chanoidei			
Family CHANIDAE			
96. <i>Chanos chanos</i> (Forsk.)			
In 20°C. isotherm	27°N.—29°S., 32°E.—149°W.	Littoral ; euryhaline	Red Sea, Arabia, Zanzibar, Mozambique, Mauritius, South Africa, Natal, Seychelles, Chagos Archipelago, Maldives, Laccadives, India, Ceylon, Malaya, Indonesia, Tahiti
Suborder Salmonoidei			
Family SALMONIDAE			
97. <i>Salmo gairdnerii gairdnerii</i> Richardson In 20°C., 12°C. and 6°C. isotherms	34°—36°N., 72°—76°E., 8°N., 80°E. ; 29°S., 25°E. ; 23°—55°N., 110°—130°W. ; and 0°50'W., 54°N.	Fresh water (landlocked).	Pakistan (introduced); India (introduced); Ceylon (introduced); South Africa (introduced); North America, from British Columbia to California; England (introduced).
98. <i>Salmo leucomaenis</i> Walker In 20°C., 12°C. and 6°C. isotherms	11°N.—76°E. ; 29°S., 25°E. ; 35°S., 148°E., and 52°—58°N., 0°—5°W.	Do.	India (introduced); South Africa (introduced); Australia (introduced); England, Scotland.
99. <i>Salmo trutta fario</i> L. In 20°C., 12°C. and 6°C. isotherms	34°—36°N., 72°—76°E., 29°S., 25°E. ; 35°N., 148°E. ; 23°—55°N., 110°—130°W. ; and 45°—60°N., 0°—130°E.	Do.	Pakistan (introduced); South Africa (introduced); South Australia (introduced); North America (introduced); Eurasia.
Family MICROSTOMIDAE.			
100. <i>Nansenis graenlandicus</i> (Reinhardt) In 20°C. and beyond 6°C. isotherms in the arctic zone	4°N.—29°S., 30°—73°E.; and 72°N., 40°W	439—658	Off Natal and Delagoa Bay, 439—475m.; South Africa near Zanzibar, ART640—658m; Maldiva area, 494m., 0.86°C. North Atlantic.

Species	Range of latitude and longitudes	Range of depths in metres	Distribution
Suborder Stomiatoidei			
Superfamily Gonostomoidae (HETEROPHOTODERMI)			
Family GONOSTOMISAE (GONOSTOMIDAE + MAUROLICIDAE Jordan)			
101. <i>Gonostoma elongatum</i> Gthr. in 20°C. and 12°C isotherms	7°N.—5°S., 60°— 135°E., and 1°— 41°N., 0°31'E.— 92°W.	795—4333	Laccadive Sea, 1349— 2194m., 5.6°C.; Off Mi- nikoi Id., 2194m.; Banda Sea, 658m.; South of New Guinea, 1463m.; East Coast of North America, 795—4333m.; Gulf of Guinea, 2000m.
102. <i>Cyclothone acclimdens</i> Garm. In 20°C., 12°C. and beyond 6°C. isotherm in the antarctic zone	24°N.—26°S., 41°—97°E.; 37°N.—28°S., 9°E.—21°W.; and 56°31'S., 14°29'E.	223—4411	Northeast coast of Africa, 520—4030m.; Gulf of Aden, N200, 952(—0)m.; between Chagos I. and Zanzibar, 520—2500m.; between Chages and Ceylon, 520—2500m. Arabian Sea, N200 430—984m., 12.12°C. at 400m., 10.64°C. at 600m., 9.85°C. at 800m., 8.47°C. at 1000m.; N200, 200C (O) m., 9°C. at 1000m., 5.57°C., at 1500-m., 3.18°C. at 2000m.; Bay of Bengal, 520—4000m.; between New Amster- dam and Sumatra, 520— 4000m.; West coast of America from 0°—37°N., 223—4411m.; South Atlantic Ocean, 1500m. West Coast of Africa between Canary I. and Cape of Good Hope.
103. <i>Cyclothone microdon micro-</i> <i>don</i> Gthr. In 20°C. 12°C. and 6°C. isotherms and beyond 6°C. in the arctic and Antarctic zones	11°N.—50°S., 18°E.—90°W., 40°N.—50°S., 18°E.—88°W.; 65°—67°N.; 30°—58°W.; 53°—62°S. 15°E.—57°W.; and 40°51'N., 14°26'E.	600—5202	South coast of S. Africa, 1828—2742m.; between Maldives and Chagos Is., 600—1000m.; Bay of Ben- gal, 887m.; between New Amsterdam and Sumatra, 1000—3000m. North of New Guinea, 940—5202- m.; South of Sandwich Is. 940—5202 m.; South of Japan, 940—5202m.; North of New Zealand, 940—5202m; Galapagos; Middle and west Atlantic Ocean, 914-5202 m.; Mediterranean; East coast of south American 2500-2700 m.; West coast of Africa between Canary I. and Cape of Good Hope, 700-4000 m. Antarctic Ocean, 3292- 3611m.; Off Singny I., S. Orkneys, 2500 m., —0.68°C. at 2400m., surf. temp. —0.42°C., Daris Sirait.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
104. <i>Cyclothone microdon pallida</i> Br. In 20°C. and 12°C. isotherms	25°N.—6°S., 43°—101°E., and 32°N.—31°S., 9°E.—64°W.	250—5071	Northeast coast of Africa, 1000—5064 m.; Gulf of Aden, N200, 900 (—0) m.; N200,—952 (—0) m.; AT 1061—1080 m.; Gulf of Oman, N100, 1500m., 5.75°C.; between Zanzibar and Seychelles, 2000—5071 m.; between Seychelles and Chagos Archipelago, 1500—4129 m.; between Chagos Archipelago and Ceylon, 2500—4133 m. Arabian Sea, N200, 430—984 m., MT 2937—3183 m., N200, 2000 (—0) m.; Bay of Bengal, 2500 m.; North of New Amsterdam, Cape Verde Is., 250—550 m.; Gulf of Guinea, South-west coast of Africa.
105. <i>Cyclothone obscura</i> Br. In 20°C. and 12°C. isotherms	9°N. 10°S., 48°—98°E., and 14°N.— 31°S., 9°E.— 21°W.	800—4900	South of Socotra, 800—4000 m.; between Seychelles and Chagos Archipelago, 800—4000 m.; Bay of Bengal, 2000—2500m.; between Cocos I. and Sumatra, 800—4000 m.; West coast of Africa between Cape Verde I. and Cape of Good Hope, 800—4000 m.; Atlantic Ocean, TYF, 2500—2700 (—0) m., 2.85°C. at 2598 m.
106. <i>Cyclothone signata signata</i> Garman, In 20°C. 12°C. and 6°C. isotherms, and beyond 6°C. in the arctic zone	13°N.—30°S., 48°E.—97°E., 31°N.—37°S., 18°E.—21°W., and 61°21'N., 80°41'W.	520—3278	Gulf of Aden, 520—2500 m.; Northeast coast of Africa, 520—2500 m.; between Zanzibar and Chagos Is., 520—2500 m.; Bay of Bengal, 800—2500 m.; between New Amsterdam and Sumatra, 520—2500 m.; Gulf of Panama, 3278m.; West Coast of Africa; between Canary Is. and Cape of Good Hope, 600—3000 m.
107. <i>Cyclothone signata alba</i> Br. In 20°C. and 12°C. isotherms	13°N.—26°S., 43°—99°E., and 24°N.— 33°S., 16°E.— 21°W.	520—4454	Gulf of Aden, 520—2500 m.; Northeast Coast of Africa, 520—2500 m.; between Chagos Archipelago and Zanzibar, 520—2500m.; between Chagos Archipelago and Ceylon, 1900—2500 m.; Bay of Bengal, 800—2500 m.; West Coast of Africa between Canary Is. and Cape of Good Hope, 520—2500 m.
108. <i>Vinciguerria lucetius</i> (Garman) In 20°C. and 12°C. isotherms	21°N.—34°S., 32°E.—79°W.; and 5°N.—3°S., 7°E.—13°W.	182—3500	Delagoa Bay; between Zanzibar and Chagos Is., 800—2500m.; between Chagos Is. and Ceylon, 800—2500m.; Bay of Bengal, 800—2500 m. between New Amsterdam and Sumatra, 800—2500m; Molucco passage, 1500m.; Gulf of Panama 182—3339m.; West Coast of Central America, 182—3339m. Gulf of Guinea, 2000—3500m.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
109. <i>Vinciguerria nimbarius</i> J. W. In 20°C. isotherm	9°—24°N., 54°—69°E., and 32°N., 64°W.	549—2000	Gulf of Oman, N100, 600m., 12·38°C.; Arabian Sea, 549—640m., 11·80°C. at 579m.; N100, 1500 (—0)m., 5·57°C.; N200, 2000(—0)m., 3·18°C.; N100, 1000(—0)m., 9°C.; N100, 1500(—0)m., 5·57°C., off Bermuda.
110. <i>Valencienellus stellatus</i> Garman In 20°C. isotherm	27°N.—4°S., 43°E.—111°W.; and 30°N.—3°S., 7°E.—14°W.	548—3000	Seychelles; between Chagos Is. and Ceylon; Bay of Bengal, 2500m.; West Coast of California, 548m.; Gulf of Guinea 3000m.
111. <i>Yarella corythaeolum</i> (Alc) In 20°C. and 12°C. isotherms	N.—32°S., 30°—130°E.	338—740	Gulf of Aden, OT 457— 549m.; Natal Coast, 365m.; Zanzibar area, 640m., 8·8°C. at 627m.; Maldiva area, 494m., 10·86°C. at 400m.; Bay of Bengal, 338—740m., 13·3°C.—8·3°C.; Great Australian Bight.
112. <i>Triplophos hemingi</i> (Mc Ardle, -(<i>Triplophos elongatus</i> Br.) In 20°C. isotherm	4°56'N., 78°15'3"E.	2000	South of Ceylon, 2000m.
113. Family STERNOPTYCHDAE <i>Sternoptyx diaphana</i> Herin. In 20°C., 12°C. and 6°C. isotherms	5°N.—47°S., 8°E.—115°W.; and 46°N.—35°S., 16°E.—87°W.	273—4571	Off Cape Point, 1828m.; Zanzibar area, 1789m., 3·04°C. at 1780m.; 2926m., 2·17°C. at 2886m.; between Zanzi- bar and Seychelles, 1100—3000m.; Arabian Sea, 1667—1702m., 4·6° —4·2°C.; N200, 430— 984m., 8·48°C. at 1000m.; AT3676m., 1·93°C. at 3000m.; Bay of Bengal, 2500m.; between New Amsterdam and Sumatra, 1100—3000m.; Timor Sea, 828m.; about 60 miles north west of Lu- bung L., 1000m.; Phil- ippines, 914-3930m.; New Guinea, 914 -3930m.; North of New Zealand, 914—3930m.; South Aus- tralia, 914—3930m.; Sand- wich Is., Japan, 914— 3930m. California; South Atlantic, N450, 2000 m., 2·74°C.; TYF 1000(—0) m., 3·11°C.; St. Helena; Cape Verde Is.; Antelles; Jamaica; Portugal, 1123 —2792m.; Morocco, 1123—2792m.; Azores Is., 1123—2792m.; between Tenerife and St. Thomas, 4571m.; Sierra Leone, 4571m.; Mid-Atlantic Ocean, 4571m.; between Canary Is. and Cape of Good Hope, 273—3082m.; New foundland, 46°N., 56°W.; East Coast of North America, 273—3072m.; West Indies, 273— 3082m.; Off Florida.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
114. <i>Argyropelecus aculeatus</i> V. In 20°C., 12°C. and 6°C. isotherms	20°N.—32°S. 39°—99°E.; and 32°N.—35°S., 16°E.—87°W.	250—3000	Between Chagos Archipelago and Zanzibar, 2000—2500m.; between Chagos Archipelago and Ceylon 1900m.; Red Sea; South of Madagascar; Off Ceylon, 2000—2500m.; Bay of Bengal, 2500m.; between New Amsterdam and Sumatra, 1100—2500m.; Coast of Norway; Azores; West coast of Africa 250—1000m.; Gulf of Guinea, 600—3000m.; West of Cape of Good Hope, 2000m.; Off Bermuda; Off Florida.
115. <i>Argyropelecus affinis</i> Garm. In 20°C. and 12°C. isotherms	13°N.—6°S., 43°—85°E.; and 30°N.—31°S., 8°E.—87°W.	1000—3872m.	Coast of South Africa, 1828m.; Chagos Is., 1000—2500m.; Seychelles, 1000—2500m.; Gulf of Aden, 1000—2500m.; Arabian Sea, 3840—3872m., 1.93C. at 3500m.; Maldivé area, MT2249m.; AT 1829—2051m.; Bay of Bengal, 2500m.; West Indies, 1248m.; Gulf of Guinea, 2000m.; Off Florida.
116. <i>Argyropelecus hemigymnus</i> Cocco. In 20°C., 12°C. and 6°C. isotherms	12°N.—30°S., 51°—97°E.; 39°N.—35°S., 27°E.—87°W.; and 38°N., 15°E.	1500—3297	Between Zanzibar and Chagos Is., 1500—2400m.; South of Ceylon, 2000m.; Bay of Bengal, 3297m., 1.7°C.; between New Amsterdam and Sumatra, 1500—2400m.; Azores; West coast of South Europe, North Africa; between Shetland and Faroes Is.; Coast of Norway; Off Florida; Messina; Mediterranean.
117. <i>Argyropelecus olfersti</i> (C). In 20°C., 12°C. and 6°C. isotherms and beyond 6°C. in the Arctic zone	9°N.—35°S., 18°E.—79°W.; 63°N.—3°S., 7°E.—74°W.; and 71°N., 25°E.	263—4080	West of Chagos Is., 2200—2500m.; South of Ceylon, 2000m.; between New Amsterdam and Sumatra, 2200—2500m.; Galapagos Is., 520—4080m.; Gulf of Panama, 520—4080m.; West Coast of Central America, 520—4080m.; Coast of Norway upto Cape North; Portugal, 950—1650m.; Azores; Madiera; Cape Finisterre, 2056m.; between Canary Is. and Brazil; Gulf of Guinea, 2000—4000m.; Cape of Good Hope, 914m.; East coast of North America, 263—3782.
118. <i>Argyropelecus stadeni</i> Regan. In 20°C. isotherm and beyond 6°C. in the Antarctic zone	12°N.—5°S., 41°—65°E., 12°N. 15°S., 11°E.—20°W.; and 61°25' 30"S., 53° 46'W.	430—2886	Zanzibar area, 2926m., 2.17°C. at 2886m.; Chagos Archipelago, 731—914m.; Arabian Sea, N200 430—984m., 8.48°C. at 2886m.; Off Cape Bowles, Clarence Id., 61°25'30"S., 53° 46'W.; air temp. 1.1°C., surface temp. of sea 0.65°C., at 335m.—0.42°C.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
119. <i>Polyipnus spinosus</i> Gthr. In 20°C. and 12°C. isotherms	35°N.—35°S.,—18°—137°E.; and 2°36'5" N., 3°27'5"E.	371—1200	Zanzibar area, OT640—658m.; Indian Ocean 457m.; Northeast Coast of Africa, 1362m.; Cape to Natal, 1188m.; between north and south Sentinel Is., 400-438m.; Off Andaman Is., 438m.; 11.1°C.; West coast of Sumatra, 371-470m.; Celebes Sea, 457m.; between Philippines; and Borneo; Sagami Bay; Australia; Gulf of Guinea, 1200m.
Super family Stomiatoideae (Lepidophotodermi) Family STOMIATIDAE	0°—15°N., 41°—98°E.; and 30°N.—5°S.; 71°E.—87°W.	594—2000	Gulf of Aden, 1200m. 6.1°C.; Red Sea, 700—805m.; Laccadives, 1349m., 3.1°C.; West coast of Sumatra, 594-1800m.; West Indies, 820m.; West coast of Africa, 2000m.; Gulf of Guinea, 2000m.
120. <i>Stomias affinis</i> Gthr. <i>Stomias valdivige</i> (Br.)— In 20°C. isotherm			
121. <i>Stomias nebulosus</i> Alc. In 20°C. isotherm	6°N.—10°S., 41°—125°E.	640—1091	East coast of Africa, 639-1019m., 9°-6.4°C. Zanzibar area, OT 640-658m.; Gulf of Manaar, 1091m., 6, 4°C.; Flores Sea; Timor Sea.
122. <i>Photostomias guernei</i> Collet [<i>Photostomias atrox</i> (Alc.)] In 20°C. and 12°C. isotherms	18°26'N., 85°24'E.; and 0°—39°N., 14°—87°W.	430—2500	Off Ganjam coast., 239m., 2.3°C.; Off the Andamans, 1108m., Azores, 1138m.; Caribbean sea; Atlantic Ocean, 15°—39°N., 20°—82° W., 0—3000 M. W.; Off Florida; Off Bermuda.
123. <i>Chauliodus pammelas</i> Alc. In 20°C. isotherm	24°N.—8°S., 46°—121°E.	400—2505	Gulf of Aden, 1022-1295m., 7.16°C. at 1280 m., 6.1°C. at 1200m. 10.2°C. at 1000m. Gulf of Oman, N200; 2500m., 2.27°C.; Arabian Sea, N200, 430—984m., 8.48°C. at 1000m.; 10.64°C. at 600m.; Maldive area, 494m., 10.86°C. at 400m.; Laccadive Sea, 2505m.; 2.2°C.; Flores Sea, 530m.
124. <i>Chauliodus sloani</i> Schn. In 20°C. isotherm	35°N.—26° S., 30°—135°E., 35°N.—34°S., 16°E.—87°W.; and 36°—38°N., 15°E.—5°W.	494—4671	Southeast coast of Africa, 548-1828m.; between Zanzibar and Seychelles, 594-2200m.; Gulf of Aden, 594-2200m.; Maldive area, 494m.; 10.86°C. at 400m.; South of Ceylon, 2000m.; Gulf of Mannar, 1091m.; Bay of Bengal, 2907m., 5°C., 1686m., 5.1°C. West coast of Sumatra, 594-2200m.; North of New Amsterdam, 594-2200m.; New Guinea, 1463-3657m.; South of Japan, 1933m.; Mediera; Mid-Atlantic, 4571m.; Bermuda Is., 4671m.; Morocco, 1123m.; East coast of north and central America, 795-3783m.; Gulf of Guinea, 600-3000m.; Southwest coast of Africa 600-3000m.; Off Florida; Mediterranean.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
Superfamily Astronesthoidae (Gymnophotodermi) Family ASTRONESTHIDAE			
125. <i>Astronesthes indicus</i> Br. In 20°C. isotherm	8°N.—5°S., 46°—75°E.; and 0°56'S.—28°N., 14°—66°W.	409—3000	East of Zanzibar, 3000m.; Off the Travancore Coast, 409-529m., 12.2°C.; Atlantic Ocean; Caribbean Sea.
126. <i>Astronesthes martensii</i> Klunz In 20°C. isotherm	4°—20°N., 39°—78°E.; and 17°N., 22°W.	2000	Red Sea; South of Ceylon, 2000m.; Cape Verde I.
127. <i>Bathylchnus cyaneus</i> Br. =[<i>Astronesthes Cyaneus</i> (Br.)].— In 20°C. isotherm.	4°56'N., 78° 15'3"E., and 6°—26°N., 15° —83°W.	800-2000	South of Ceylon, 2000m. Atlantic N200, 800 (—0)m.; Caribbean Sea.
Family MELANOSTOMIATIDAE (incl. MALACOSTEIDAE)			
128. <i>Melanostomias melanops</i> Br. In 20°C. isotherm	5°23'2"N., 94°48'1"E.; and 14°38'N., 61°16'W.	1000—1024	Northwest Coast of Sumatra, 1024m.; Caribbean Sea, 1000M.W.
129. <i>Melanostomias valdiviae</i> Br. In 20°C. isotherm	0°15'2"N., 98°8'8"E.	614	West coast of Sumatra, 614m.
130. <i>Malacosteus niger</i> Ayres =(<i>Malacosteus indicus</i> Gthr.). In 20°C., 12°C. and 6°C. isotherms	13°N.—10°S., 46°—97°E., and 42°N.—38°S., 15°E.—10°W.	989—2500	Gulf of Aden, 1061-1080m.; Chagos Is., 1900-2500m. Arabian Sea, N200, 250 (-0)m.; Bay of Bengal, 2500m.; Off Cinque I., 1188m.; North of Cocos Is., 1000-2500m.; Bar- bados, 630m.; East coast of North America, 989-1950m.; West coast of South Africa, 2000m.; Gulf Stream, 42°N., 60°W.
Family IDIACANTHIDAE			
131. <i>Idiacanthus fasciola</i> Ptrs. Br. In 20°C. and 12°C. iso- therms and beyond 6°C. in the antarctic zone	7°N.—5°S., 48°—85°E., 40°N.—36°S., 17°E.—80°W.; and 55°—56°S., 14°—16°E.	1500—4000	Between Zanzibar and Seychelles, 1500-2500m.; South of Ceylon, 2000- 2500m.; East of Bouvet Is., 56° 31' 5"S., 14°29' 2"E., 1500-4000m.; West coast of Africa, 1500- 4000m.; Off Bermuda.
Suborder Notopteroidei Family NOTOPTERIDAE			
132. <i>Notopterus chitala</i> (Ham.) In 20°C. isotherm	25°N.—7°S., 70°—115°E.	Fresh water	India, Pakistan, Burma, Malaya, Indonesia, Siam, Cochin China, China.
133. <i>Notopterus notopterus</i> (Pallas) = (<i>Notopterus</i> <i>osmani</i> Rahimullah & Das). In 20°C. isotherm	30°N.—7°S., 73°—115°E.	Euryhaline	Pakistan, India, Burma, Malaya, Indonesia, Siam, Cochin China, China.
Order Bathyclupeiformes Family BATHYCLUPEIDAE			
134. <i>Bathyclupea hoskynii</i> Alc. 20°C. isotherm	11°—14°N., 80°—93°E.	272—766	Andaman Sea, 676-766m., 348-402m., 13.3°C.; Off Madras coast, 272-457 m

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
Order Galaxiiformes			
Family GALAXIIDAE			
135. <i>Galaxias indicus</i> Day In 20°C. isotherm.	13°—23°N., 80°—91°E.	Littoral	Littoral districts of Madras, West Bengal, East Pakistan.
Order Scopeliformes (INIOMI)			
Family SYNODIDAE (SAURIDAE, SYNODONTIDAE)			
136. <i>Harpodon nehereus</i> (Ham.) In 20°C. isotherm	34°N.—7°S., 38°—130°E.	Littoral	Zanzibar, Pakistan, India, Burma, Malaya, Indonesia, China, Korea.
137. <i>Harpodon squamosus</i> Alc. In 20°C. isotherm.	15°56'50"N. 81°31'30"E.	439—504	Bay of Bengal, 439—504m., 11.1°C.
138. <i>Saurida gracilis</i> (Q. & G.) In 20°C. isotherm.	25°N.—29°S., 30°E.—149°W.	Littoral	Red Sea, East and south coasts of Africa, Madagascar, Mauritius, Zanzibar, Pakistan, India, Burma, Ceylon, Indonesia, Siam, China, Philippines, Australia, Micronesia, Polynesia, Hawaii, Tahiti.
139. <i>Saurida longimanus</i> Norman In 20°C. isotherm.	25°N., 56°E.	106—201	Gulf of Oman, OT-106—201m.
140. <i>Saurida tumbil</i> (B1.) In 20°C. isotherm	34°N.—29°S., 30°—167°E.	Littoral	Red Sea, Natal, Madagascar, Zanzibar, Indonesia, Siam, China, Japan, Korea, Philippines, Australia, Sandwich Is., Vanicolo.
141. <i>Saurida undosquamis</i> (Rich.) In 20°C. isotherm	34°N.—33°S., 28°—135°E.	65—220	Red Sea, OT-65-67m., Gulf of Aden, 220m., Gulf of Oman, 73m., Zanzibar area, 183—194m., East and south coasts of Africa, Singapore, Indonesia, China, Japan, Philippines, North West Australia.
142. <i>Synodus indicus</i> (Day) In 20°C. isotherm	11°N.—34°S., 22°—80°E.	37—91	Gulf of Aden, OT-37091m.; Mossel Bay, South Africa, India.
143. <i>Synodus japonicus</i> (Hauttuyt)-[<i>Synodus variegatus</i> (Lac.)] In 20°C. isotherm	32°N.—29°S., 30°E.—155°W.	Littoral	Red Sea, Gulf of Aden, Arabia, East and South coasts of Africa, Zanzibar, Madagascar, Mauritius, New Guinea, Hawaii, Tahiti.
144. <i>Trachinocephalus myops</i> (Schn.) In 20°C. isotherm	35°N.—33°S., 28°E.—155°W., and 14°—30°N., 5°—87°W.	Littoral	Natal, Martinique, Pakistan, India, Ceylon, Malaya, Indonesia, Philippines, Formosa, Hongkong, China, Japan, Fusan, Australia, Oceania, Hawaii, St. Helena, Martinique, Off Florida.
Family SCOPELARCHIDAE			
145. <i>Scopelarchus guentheri</i> Alc. In 20°C. isotherm	22°14'25"N., 67°8'55"E.,	1731	Off the Indus Delta, Pakistan, 1731m., 4.7°C.
Family EVERMANNELLIDAE (ODONTOSTOMIDAE)			
146. <i>Evermanella atratus</i> (Alc.) In 20°C. isotherm.	14°N.—4°S., 73°—93°E.	676—2,000	Chagos Archipelago, 2000 m.; Bay of Bengal, 1048, 7.4°C.; Andaman Sea, 676—766m.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
Family SUDIDAE			
147. <i>Chlorophthalmus agassisi</i> Bonap. In 20°C. isotherm	20°N.—35°S., 18°E.—155°W. and 38°—13°N., 15° 13'E.	48-977	Zanzibar area, 288—293m.; Cape of Good Hope to Delagoa Bay, 274—548 m.; Off Colombo Lt., 48—457m.; Off Madras coast, 265—457m., 10°C.; West coast of Sumatra, 371—977m., 11°-8°C.; Madura Sea, 289m.; Fiji Is., 575m., Hawaii; East coast of North America between 28°—39°N., 70°—79°W., 291—497m; North coast of Africa, 371—977m; Mediterranean.
148. <i>Lestidium (Bathysudis) speciosus</i> Bellotti = (<i>Omosudis elongatus</i> Br.) In 20°C. and 12°C. isotherm	7°N.—29°S., 30°—97°E.; 2°N.—3°S., 3°—7°E.; and 38°N., 14°E.	1200—3000	Off Seychelles, 1200—3000m.; Off Chagos Is., 1200—3000m.; South of Ceylon, 2000m.; Bay of Bengal, 2500.; North of Cocos Is., 1200—3000m.; Gulf of Guinea, 1200—3000m.; Mediterranean.
149. <i>Bathypterois (Bathypterois) atricolor</i> Alc. In 20°C. isotherm	6°—13°N., 70°—76°E.	839—1629	Laccadive Sea, 1629m., 5°C.; Off Maldives, 839m.; Off Cape Comorin, 506m., 4.4°C.1
150. <i>Bathypterois (Bathypterois) insularum</i> Alc. In 20°C. isotherm.	14°N.—29°S., 30°—70°E.	2084	Off the Laccadives, 2084m., 3.1°C.; Coast of South Africa.
151. <i>Bathypterois (Hemlpterois) guentheri</i> Alc. In 20°C. isotherm.	4°—13°N., 72°—92°E.	896-1316	Off the Laccadives, 1163m. 7°C.; Off the Maldives, 1316m., 6°C.; Bay of Bengal, 1026m., 7.2°C.; East of north Cinque I., 896m., 12.8°C.
Family SCOPELI DAE (MYCTOPHIDAE)			
152. <i>Myctophum cocoi</i> (Cocco)— In 20°C., 12°C and 6°C. isotherms.	34°N.—39°S., 18°E.—71°W.; and 46°N.—38° S., 2°E.—70°W.; and 37°35'N., 14°10'E.	520-3000	Between Zanzibar and Seychelles; South of Madagascar; Bay of Bengal, 2000m.; West of Sumatra, 520m. & East coast of Australia; Japan; New Zealand; Admiralty Is.; West coast of Chile; Gulf of Panama, 6°21' N., 80°41'W., 3279m., surf. temp. 23.9°C.; West coast of South America; between Azores Is. and New Foundland; North of Bermudas; West Indies; Off Azores; between Azores and Bermudas; Off Cape Verde Is.; Off Canary Is.; Off Brazil, Gulf of Madiera; Gulf of Guinea; Gulf of Mexico; West of South Africa, 3000m.; South, of Cape of Good Hope 2000m.
153. <i>Myctophum fibulatum</i> Gilbert & Gramer. In 20°C. and 12°C. isotherm.	23°N.—5°N., 64°E.—155°W.	1500-2000	Off the Indus Coast. N200, 2000(—0)m., 3.18°C.; N100, 1500(—0)m., 5.57°C., Hawaii.
154. <i>Myctophum indicus</i> Day In 20°C. isotherm.	17°42'N., 83°20'E		Off Vizagapatnam Coast.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
155. <i>Myctophum laternatum</i> Garm. in 20°C. and 12°C. isotherms	34°N.—26°S., 46°E.—80°W.; and 14°N.—34°S., 16°E.—21°W.	480-3500	Between south of Socotra and Gulf of Aden, 1200-2000m. between Zanzibar and Seychelles, 2500m.; between Chagos Archipelago and Seychelles, 2000-2500; between Chagos Archipelago and Ceylon 1900-2500m.; Arabian Sea, N200, 480-980m., 12.12°-8.4°C.; Southeast of Maldives, 2500m; Bay of Bengal, 2500m.; between New Amsterdam and Sumatra, 2200-2400m; West coast of California between 7°N. and 27° 39'N; Gulf of Panama; Off Cape Verde Is., Sierra Leone; Gulf of Guinea 2000-3500m.
156. <i>Myctophum pterotus</i> Alc. In 20°C. isotherm	34°N.—35°S., 18°E.—135°E.	179-2000	Off Cape Point; Gulf of Oman; Arabian Sea 549-640m., 11.8°C., N200, 2000(-0)m., 3.18°C.; N100, 1500(-0)m.; 5.57°C.; Bay of Bengal, 179-186m.; Andaman Sea, 676-766m.; Macassar Strait; Philippines; Japan.
157. <i>Myctophum reinhardti</i> (Lutken), In 20°C. and 12°C. isotherms	34°N.—35°S., 18°E.—74°W.; and 34°N.—31°S., 10°E.—18°W.	430-4000	South of Socotra, 1500—2000m.; Gulf of Aden, 1200m.; Cape to East London; between Zanzibar and Seychelles, 2000m.; between Seychelles and Chagos Archipelago, 2000-2500 m.; between Chagos Archipelago and Ceylon, 2000m.; Arabian Sea, N200, 430-984m., 12.12°—8.48°C.; Banda Sea (surface plankton)—; Halmaheira Sea, 1000 (-0)m. (vertical net); West coast of Chile; Japan; Madeira, 1800 m.; between Africa and South America, 5°31' N. 23° 15' W., South of Canary Is., 2000 m., Coast of Sierra Leone, 1300-3000m.; Gulf of Guinea, 700-4000 m.; Southwest coast of Africa, 2000m.; Mediterranean.
153. <i>Myctophum spinosus</i> (Steind.) In 20°C. and 12°C. isotherms	34°N.—40°S., 38°—170°E., and 14°N.—7°S., 11°—29°W.		Zanzibar; Bay of Bengal, Northwest of Australia; North of Australia; Sandwich Is.; China; Japan; Mid-Atlantic Ocean.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
159. <i>Myctophum valdiviae</i> Br. In 20° C. and 12 C. isotherms	13° N.—31° S., 46°—97° E.; and 24° N.—26° S. 7° E.—17° W.	500-4000	North east coast of Africa, 1500—2000 m. Gulf of Aden, 1200 m.; between Zanzibar and Seychelles, 2000.; between Seychelles and Chagos Archipelago, 1500—2000 m.; between Chagos Archipelago and Ceylon, 2000 m.; Bay of Bengal, 2000—2500 m.; North-East of; New Amsterdam, 1800 m.; North of Cocos Is.; 2400 m.; between Sierra Leone and Gulf of Guinea, 600—3070 m.; South-West Africa 500—4000 m.
160. <i>Lampanyctus gemmifer</i> G. B. In 20°C. and 12°C. isotherms	22°14'25"N., 67°8'55"E.; 39°39'45"N., 71°35'15"W.	983-1731	Pakistan, off Indus Delta, 1731 m., 4.7°C.; East coast of North America, 983m.
161. <i>Lampanyctus longipes</i> Br. In 20°C. isotherm	7°N.—26°S., 53°- 97°E., and 0°- 31°N., 7°E.- 15°W.	1500-2500	Off Seychelles, 1500-2000m.; Off Chagos Archipelago, 2000m.; South of Ceylon, 2000m., Bay of Bengal, 2500m.; North of Cocos Is., 2400m.; South of Cocos Is., 2200 m.; Madeira, 1800m.; Gulf of Guinea, 2000m.
162. <i>Lampanyctus macropterum</i> Br. In 20°C. isotherm	34°N.—10°S. 46°—135°E.	430-2500	Gulf of Aden, 1200m.; Northeast coast of Africa, 1000-2000m.; between Zanzibar and Seychelles, 2000 m.; North of Chagos Archipelago, 2000 m.; Arabian Sea; N 100, 2000 (-0)m.; 430-984m., N-200, 12.12°-8.48°C., N-200, 2091 (-0); South of Ceylon, 2000 m.; Bay of Bengal, 2000-2500 m.; North of Cocos Is., 2400 m.; Japan; Atlantic Ocean.
163. <i>Lampanyctus micropterum</i> (Alc.) In 20°C. isotherm	0°—6°S., 58°—99°E.; and 3°N.—1°S., 7°E.—6°W.	800-4000	East of Seychelles, 1500—2000m.; West of Chagos Archipelago; North of Chagos Archipelago, 1900-2000 m.; West coast of Sumatra, 1100 m.; Gulf of Guinea, 800-4000m.
164. <i>Lampanyctus pyrsoobolus</i> (Alc.) In 20°C. isotherm	15°38'N., 82°30'E.	1261-1682	Bay of Bengal, 1261-1682 m., 4.3°C.
165. <i>Diaphus coeruleus</i> (Klunz.) In 20°C. isotherm	34°N.—32°S., 39°—135°E.	343-1500	Red Sea; Andaman Sea, 343-402m., 13.3°C.; West Coast of Sumatra, 371 m.; Molucco passage, 1500 m.; Celebes Sea, off Mindano, 457 m. Japan; Australia.
166. <i>Diaphus dumerili</i> (Blkr.) In 20°C. isotherm	13°N.—4°S., 51°—120°E.; and 39°N.—37°S., 9°E.—7°W.	214-3500	West and east coast of Seychelles, 2000 m.; North of Chagos Archipelago, 2000 m.; Off Malabar coast, 214m.; South of Ceylon, 2000m.; Bay of Bengal, 2000 m.; Celebes; Coast of Cuba; Southeast coast of South America; Gulf of Mexico; East coast of North America between. 35°-39°N. and 70°-74°W. Gulf of Guinea, 600-3500.

Species	Range in latitudes and longitudes	Range of depth in metres	Distribution
167. <i>Diaphus garmani</i> In 20°C. isotherm	Gilbert 9°—23°N., 54°—64° E. ; and 22°N., 80°W.	1000-2091	Pakistan, Off Indus Delta, N100, 1000 (-0) m. ; Arabian Sea, N200, 2000 (-0) m. ; N200, 2091 (-0) m. ; Cuba.
168. <i>Diaphus lutkeni</i> In 20°C. and isotherms	(Br.)—10°N.—5°S., 43°— 12°C. 70°E., and 9°N.—35°S., 10°E. —16°W.	125-3000	Northeast Coast of Africa, 1000-2000m. ; Zanzibar, 3000m. ; West of Chagos Is. 2000m. ; Arabian Sea, N200, 400-465m., N200, 600 (-0) m. ; Atlantic Ocean, 0°-35°S., 10°E.- 14°W. ; TYF 125- 1000 (-0) m., 7-57°C. at 1000m., 13-48°C. at 200m.
169. <i>Diaphus rafinesquei</i> (Cocco) In 20°C. and 12°C. isotherms	35°S.—10°N., 46° E.—140°W. ; 37°N.—40°S., 16°E.—69°W. and 38° 13'N., 15° 13'E.	400-1024	Gulf of Aden, 1061-1080m. Off Indus Delta ; N100, 1500 (-0)m. 5-57°C. ; N200 2000 (-0)m., 3-18°C. ; Arabian Sea, 759-1024 m. ; N 200, 400-645m. ; N200, 600 (-0) m. ; East coast of North America ; 37°12' 20' N., 69°39'W. ; Messina ; Japan ; Marquesas Is.
170. <i>Diaphus splendidum</i> (Br.) In 20°C. isotherm	35°N.—29°S., 32°— 135°E. ; and 3°—9°S., 7°S.— 9°E.	289-3872	Northeast coast of Africa, 500-2000m. ; Off Seychelles, 1500m. ; Off Mauritius, 1500 —2000m. ; Arabian Sea, 3840-3872m., 3-68°C. at 2000m ; Maldiv area, 457m. ; Bay of Bengal, 2500m. ; bet- ween Cocos Is. and West coast of Sumatra, 520-2400m. ; Madura Sea, 289m. ; Japan ; Gulf of Guinea, 700- 3000m.
171. <i>Neoscopelus macrolepidotus</i> Johnson—In 20°C. and 12°C. isotherm	35°N.—29°S., 30°— E.—17°W. ; and 22°—36°E., 5°— 80°W.	400-1590	Alagoa Bay to Natal, 548m. ; East coast of Africa, 693m, 9°C. Arabian Sea, 658m. ; 9-2°C. ; Maldiv area, 494m., 10-86°C. at 400m. ; Andaman Sea, 343-740m., 13-3-8-3°C. ; West coast of Suma- tra, 614m., 10-2°C. apan ; Northeast of New Zealand, 950- 1097m., 6-4°C.
172. <i>Scopelengys tristis</i> Alcock In 20°C. isotherm	6°—12°N., 63° — 80°W.	430-3279	Laccadive Sea, 1828m. 3-7°C. ; Arabian Sea N200, 430-984m. 12-12° -8-48°C. ; Pacific coast, of Central America, 271-3279m. 3-8°-2-1°C.
Order Ateleopiformes			
Family ATELEOPIEDAE			
173. <i>Ateleopus indicus</i> (Wood Mason & Alcock). In 20°C. isotherm	14°N.—4°S., 73°— 123°E.	343-529	Arabian Sea 409-529m., 12.2°—11.1°C. ; Maldiv area, 494m., 10-86°C. at 400m., Andaman Sea, 343-402m., 13-3°C. ; Philippines.

V—SUMMARY

This paper deals with the distributional pattern of 173 species of fishes of the "Indian region" belonging to the Orders Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes, and Ateleopiformes with special reference to the *mean annual* isotherms of 6°, 12° and 20°C. The regional and zonal distribution of these species is indicated according to their latitudinal and vertical ranges, and an attempt has been made to separate them out as littoral or semipelagic, bathypelagic, abyssal, endemic, Indo-Pacific, cosmopolitan and so on. These 173 species (including 4 subspecies) consist of 85 littoral or semipelagic, 3 exotic and land-locked, and 85 bathypelagic species.

A detailed, classified list of these 173 species is given in the paper, showing their mean annual isotherms, latitudinal and longitudinal ranges, distribution, and vertical ranges, depths in metres and bottom temperatures wherever available. Out of the total 173 species, 133 belong to the Order Clupeiformes, 37 to the Order Scopeliformes and one each to the Orders Bathyclupeiformes, Galaxiiformes and Ateleopiformes. Orders Clupeiformes and Scopeliformes together constitute 170 species, out of which 83 are bathypelagic and 87 littoral or semipelagic species. Of the 83 bathypelagic species, 16 are endemic to the "Indian region", while 67 species have been recorded from the Indo-Pacific, Atlantic, Arctic and Antarctic regions, unaffected by isothermal limitations. Out of 87 littoral or semipelagic species, 3 are exotic, 16 are endemic and the remaining 68 species have a restricted range extending eastwards into the Indo-Pacific and even as far as the tropical Atlantic, but never extending westwards and penetrating the cold waters of the Atlantic west of the Cape of Good Hope. The Cape thus represents a well demarcated line of division between the Indo-Pacific and Atlantic species of littoral and semipelagic fishes.

VI—REFERENCES

- ALCOCK, A. 1899. *A descriptive Catalogue of the Indian Deep sea Fishes in the Indian Museum*. 211+viii, pp., 1 Chart.—Calcutta.
- GÜNTHER, A. 1880. *Introduction to the Study of Fishes*. xvi+720 pp.—Edinburgh.
- MISRA, K. S. 1947. A check-list of the fishes of India, Burma and Ceylon. II. Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes and Ateleopiformes.—*Rec. Indian Mus.*, Delhi, 45 (Pt. 4), pp. 377—431.
- MISRA, K. S. and MENON, M. A. S. 1958. On the distribution of the Elasmobranchs and Chimaeras of the Indian region in relation to the mean, annual isotherms.—*Rec. Indian Mus.*, Delhi, 53 (Pt. 1) [1955], pp. 73-86.
- NORMAN, J. R. 1931. *A History of Fishes*. xv+463 pp., 7 pls., 145 figs.—London.
- SMITH, J. L. B. 1953. *The Sea Fishes of Southern Africa*. (Revised ed.). xii+564 pp., 107 pls., 1232 figs.—Grahamstown.