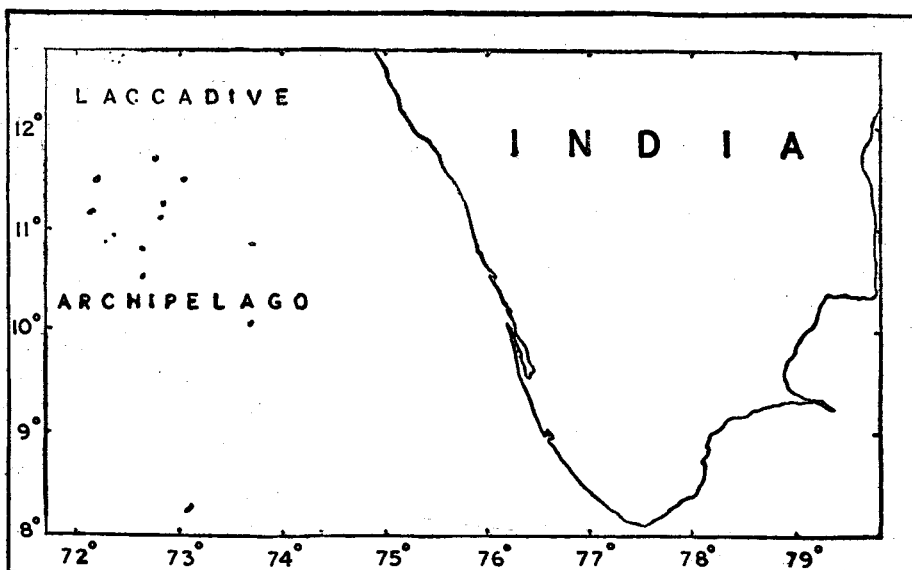


INTRODUCTION

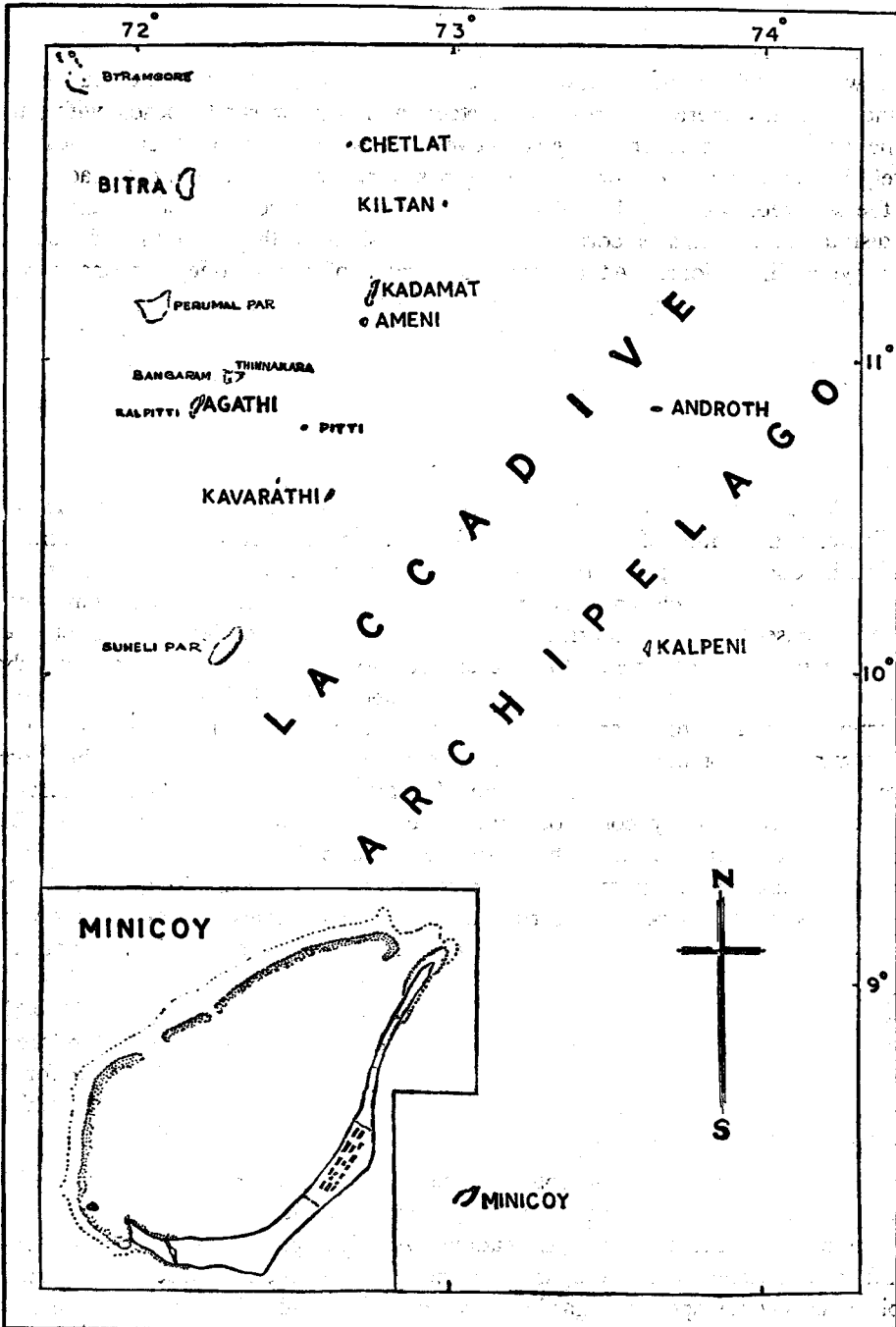
From the point of view of fish and fisheries, the Laccadive Archipelago has remained a little known area till about a decade and a half ago. In the *Fishes of India* by Francis Day, brought out between 1875 and 1878 which still remains the most important work of reference on fishes of the Indian region containing descriptions of 1340 species, there is not a single record of any fish collected from the Laccadives. In the *Catalogue of the fishes of the British Museum* by Günther, published in 8 volumes between 1859 and 1870 also there is no reference to specimens from this area. However, during the cruises of the Royal Indian Marine Survey Ship *INVESTIGATOR* towards the close of the last century, the fauna of this area began to receive some attention at the hands of Alcock who described the deep sea fishes collected from there. The Cambridge Expedition under the leadership of Stanley Gardiner in the course of the investigations during 1899 and 1900 on the fauna and geography of the Maldive and Laccadive Archipelagoes did not make any exhaustive study of fishes. In the account by Regan (1903) there is reference to 71 species of fishes from the Maldives, while there are no records from the Laccadives. The Laccadive islands were being administered then by the erstwhile Madras Presidency, and with the establishment of a Fisheries Department in the State, fisheries personnel were also included in the inspection parties that went periodically from the mainland. Hornell (1910), Ayyangar (1922), Ellis (1924), Burton (1940) and Mathew and Ramachandran (1956) have made some observations on the fish and fisheries of the islands. However, except observations of a general nature mentioned above, no sustained work relating to fish or fisheries of the area could be considered to have been carried out till regular investigations were initiated by the Central Marine Fisheries Research Institute in 1958. Balan (1958) recorded 80 species of fishes from four islands of the Laccadives. Subsequently, Jones and Kumaran (1959) published a comprehensive account of the fishing industry of Minicoy and recorded 154 species from that island alone. Later, the collection of more material resulted in the publication of a series of articles by Jones and Kumaran (1965-1970) about the new records of fishes from the region. Developmental stages of some fishes were also described. Further, the fishery and certain aspects of the biology of the skipjack, *Katsuwonus pelamis* were studied by the scientific staff of the Central Marine Fisheries Research Institute which resulted in several valuable publications. The extensive coral reefs, lagoons and abysses around the Laccadive Archipelago are the abode of an extremely rich and varied fish fauna. This descriptive account of the fishes collected from the Laccadive Archipelago including Minicoy has been prepared with the main objective of enabling the layman and the scientist to identify and study any fish occurring in the Laccadives.

The Laccadive group of islands lying approximately between $8^{\circ}00'$ N to $12^{\circ}30'$ N latitude and 72° E to 74° E longitude consists of ten inhabited islands viz., Agathi, Ameni, Androth, Bitra, Chetlat, Kadamat, Kalpeni, Kavarathi, Kiltan and Minicoy and a dozen uninhabited islands (Maps I, II and III), many of them adjacent to the main islands connected by submerged reefs and is separated from the Maldive Islands in the south by the eight degree channel. Exposed and surf ridden reefs and sand mounds of varying magnitude occur in between some islands. The greatest depth of the sea in between the islands may be anything upto 1500 meters.



Map I. The southern section of India with the Laccadive Archipelago.

All the inhabited islands except Androth are protected by a shallow lagoon and the outer reef around the lagoon (with one or two tidal channels) is generally somewhat crescentic in form. The convexity of the crescent faces the weather and the seaward slope is usually steeper. The islands are small, the largest being Minicoy which is 455 hectares in extent and the depth of the lagoon may not generally exceed 13 meters at high tide. Most of the coastline of the islands consists of very gradually sloping narrow sandy beaches on the lagoon side and sandy slopes alternating with boulders and sand-stones on the seaward side. Androth island lies in east to west position and is exposed on all sides but there is sparse growth of coral all along the northern side. Kalpeni and Kiltan lie somewhat in north to south position with shallow lagoons on the western side. The north-eastern and south-eastern shores of all other islands are exposed and the north-western and south-western shores are protected by lagoon. On the lagoon beach and on the shores of the sand



Map II. The islands and reefs of the Laccadive Archipelago. Minicoy is shown enlarged in the inset. Beleapani Reef, immediately north of Byramgore Reef, is not shown.

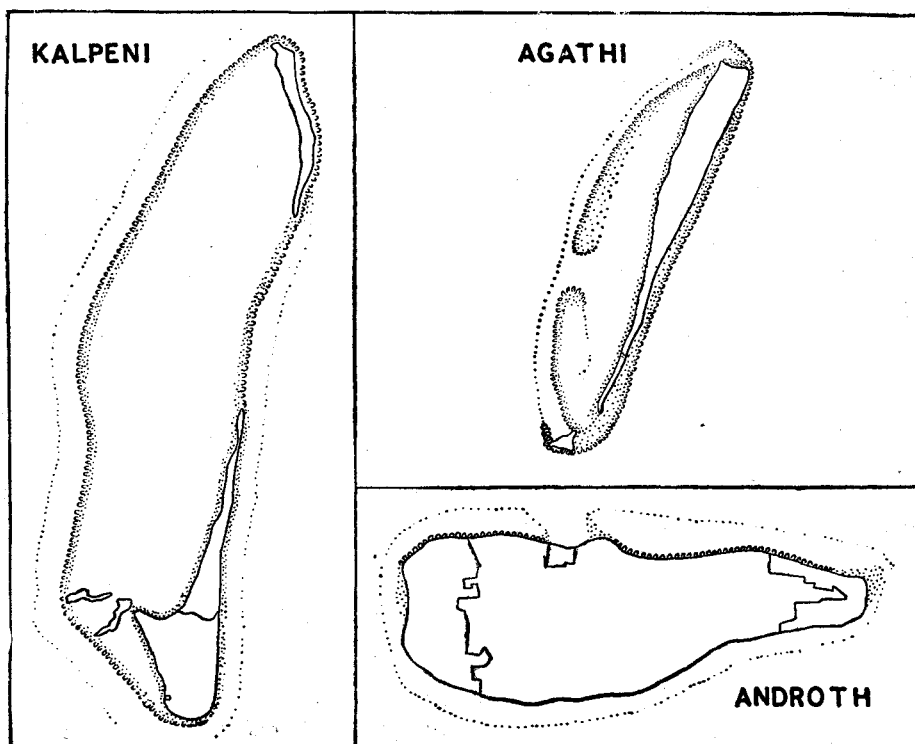
mounds and outer reef the slope is extremely gradual downwards from extreme high water mark to below low tide level, whereas on the seaward side of the island generally there is a somewhat steep and narrow sandy beach with sandstone and boulders extending just above high water mark to around mean sea level, below which the lower shore slopes very greatly upto the terraced part of the sea bed. Most of the substratum of the lagoon consists of varying grades of disintegrated grains of coral and molluscan shells with pinnacles and boulders of varying dimensions. At extreme low water of spring tide, lagoons become shallow and large areas, especially the outer reef remain exposed. A good number of pools are formed in several areas in the intertidal zone, those on the outer reef flat being especially noteworthy. The extensive coral reefs, lagoons and abysses around are the abode of an extremely rich and varied fish fauna due to the wide diversity of ecological niches created by the various constructive and destructive agencies in the environment.

When large number of specimens of a species from several islands were available, a minimum of about twenty-five specimens were examined to find out the variations in morphometric and meristic characters. Some fishes, mainly deep sea forms which are known to occur in the Laccadive Sea have been included based on the contributions of Alcock and the descriptions of these have been compiled from other reference works including original published descriptions. Excluding some unidentified specimens which it is proposed to incorporate in a Supplement, 565 species were collected of which 124 species are new records for the Central Indian Ocean and detailed notes about these have been published elsewhere (Jones and Kumaran 1965-1970). Some figures in this book have already come out published in the *Journal of the Marine Biological Association of India*. These are duly acknowledged under the respective species as also the diagrams copied from other publications. In all 603 species are dealt with in this book. Descriptions of only 38 species are taken from other publications. The only book pertaining to any part of the Indian region that appeared within the last hundred years since the publication of Day's *Fishes of India* is the *Marine and fresh water fishes of Ceylon* by Munro (1955) which deals with 846 species. It was prepared specifically as a hand book of reference of fishes known to occur in Ceylon waters and it serves admirably well for the purpose. It is however a compilation work and the descriptions are based on the existing publications and not on the study of actual specimens.

The major part of the coasts of the islands of the Laccadives are studded with coral reefs and the fish fauna in general is typical of the fishes inhabiting the Indo-West Pacific. The Laccadive Archipelago even though poorer in number of species when compared to the Western Indian Ocean, is rather typical as several species regarded as common and widespread in the latter have been found to be rather rare or absent. The oceanic and bathypelagic fishes occurring in the Western Indian Ocean and the Laccadive Archipelago are similar and predominated by equatorial species. The majority of species

including the rare ones found in the Laccadives are dominant in the Western Indian Ocean. There are significant differences in the composition of the littoral fish fauna on account of the abundance of endemic species in the Western Indian Ocean brought about by the diverse environmental conditions existing there. Comparison with the published records from east coast of Africa, Mauritius, Seychelles, Aldabra etc. show that there is a pronounced relationship with the Western Indian Ocean species. Several species which are common in the Central Indo-Pacific which is considered to be a region of primary development of a variety of fish fauna are rare or absent in the Laccadives and the Western Indian Ocean while many species commonly found in the Western and Central Indian Ocean have not so far been found in the Indo-Australian Archipelago. From the pattern of distribution, it is suggested that the Western Indian Ocean, Red Sea, west coast of India, and Ceylon including Laccadive and Maldive Archipelagoes fall within the Western Indian Ocean ichthyofaunistic zoogeographic division.

With a view to help in the identification of the fishes described, simple keys are provided in this book for the families and species recorded from the



Map III. Agathi, Androth and Kalpeni islands.

Archipelago and the sea around. A series of alternative characters are used in the keys. Alternatives are generally numerical, indicate presence or absence of particular character or difference in colour and the specific identity should be confirmed by referring to the description and figure of the species. The description of the species including the range in fin counts, scale counts, body proportions etc. are entirely based on the specimens collected from the Laccadives and examined by the authors which have been listed under "Specimens studied" in the text. For the sake of brevity characters of orders and families which have been briefly described are not generally repeated in the descriptions of the species. Though most of the coral fishes are gorgeously coloured, invariably in all fishes, the colours fade rapidly after death and hence the colouration described unless otherwise stated is invariably based on preserved specimens. Original drawings of all the species available in our collection have been provided and the length of the specimen drawn as given in the legends and indicated under "Specimens studied" is standard length except otherwise specified. For a few species for which no specimens are available in our collections, figures have been copied and the source of each such figure has been indicated in the legend.

Since a detailed list of synonyms for each genus and for each species is not considered necessary for a work of this nature, only original bibliographic citation followed mostly by important references pertaining to each species recorded from adjoining regions published in standard works have been quoted even though practically in all instances several other publications have been consulted to make sure that the identification and distributional records are as far as possible correct. The geographical distribution of species is given at the end of the species description. The local names as used in the Laccadives have been provided wherever known and the localities where the local name is used is given in brackets after the names. The same fish is often known by different names in different islands, while in a number of cases several species are known by the same name. In Minicoy the Mahl language is spoken as in the Maldives, while Malayalam is the local language in all other islands. Reference may be made to Maps II and III for localities mentioned in the text. Abbreviations (p. 9) and glossary of technical terms (pp. 9-14) are provided for the guidance of non-technical readers. Scientific names are listed in the index. A bibliography of works dealing with either descriptions, records or mention of collection of fish from the Laccadive Archipelago has been provided at the end. The nomenclature followed in this book is, with some modifications, that of L. S. Berg, "Classification of fishes, both recent and fossil", *Trav. Inst. Zool. Acad. Sci. URSS*, 1940.

In a work of this nature, it can never be said that the last species occurring in the area has been collected. Many more reef and lagoon dwelling species and oceanic and deep sea species not hitherto collected are bound to occur in the Laccadive Archipelago.