FISHERIES OF THE WEST COAST OF INDIA

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PRAWN FISHERIES

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OUT of an estimated total of 8,75,420 m. tons of sea fish landed along the coast of the Indian Union in 1957, about 15·5%, *i.e.*, 1,36,812 tons, were contributed by prawns and shrimps. In addition to this, considerable quantities are fished from backwaters, estuaries and freshwater about which reliable statistics are not yet available. A very large part of this catch is landed on the west coast, mainly in the Kerala and Bombay areas. The production from these two zones amounted to about 92·4% of the average annual total catch during the five-year period 1950–54. The following account of this important fishery is therefore based, for the most part, on the data collected from this coast.

Fishing Grounds.—Based on their habitat it is convenient to divide these prawns and their fisheries into three types, namely, marine, estuarine & backwater, and freshwater fisheries. The fishing grounds in the sea exploited by native fishermen with their indigenous craft and gear are mostly situated near the coast. They seldom go beyond regions ten fathoms deep and very often fish only in quite shallow waters. During the monsoon months of June to August on the Malabar coast fishermen are frequently able to catch prawns with cast-nets since shoals come so near the coast. Fishing with trawl nets from power vessels has been carried on for some time along the coast and such vessels have usually gone farther out into the sea. The rich prawn fisheries of estuaries, backwaters and saltwater lakes along the coastal areas of India, both in the east and the west, are as important as the marine prawn fisheries, if not more so, from the point of view of present production. The long chain of lakes, commonly called backwaters, extending along the southern half of the coast of Kerala and the mouths of numerous hill-streams in the Malabar area yield large quantities of prawns annually. Various species of freshwater prawns are fished from rivers, lakes and other bodies of freshwater throughout the country.

Composition of Catches.—Most of the sea prawns caught belong to a group called Penaeidea. The most important of them are as follows :

(1) *Penaeus carinatus*, (2) *P. indicus*, (3) *Metapenaeus monoceros*, (4) *M. dobsoni*, (5) *M. affinis*, (6) *M. brevicornis*, (7) *Parapenaeopsis stylifera*, (8) *P. maxillipedo*, (9) *P. sculptilis*. Among these the two species mentioned last are of significance only in some months along the Bombay coast.

Penaeus carinatus (Malayalam—*Kārachemmeen*).—This is the largest prawn of our waters, growing to about a foot in length; but it is not caught in such large numbers as some of the other species.

Penaeus indicus (Malayalam—*Vella chemmeen*, *Nāran chemmeen*).—It grows to about 8″ in length. Its fairly large size and abundance practically along the entire coastline make it probably the most important commercial species.

Metapenaeus monoceros (Malayalam—*Choodan chemmeen*).—Fully grown prawns measure about $6\frac{1}{2}$″. Such prawns, however, are seldom caught from the sea by the fishermen; but they have been caught in the trawl net from deeper waters. They are common in backwaters and estuaries and contribute a significant proportion of the total catch in those months during which the salinity is not high. The catch from such localities is made up exclusively of young immature prawns.

Metapenaeus dobsoni (Malayalam—*Thelli chemmeen*).—The maximum size attained is about $4\frac{1}{2}$″. It is very abundant in estuaries and backwaters and dominates the catches frequently. It is fished in enormous numbers from the backwaters of Kerala. Fairly good catches are obtained from the sea also during some months.

Metapenaeus brevicornis.—It is the commonest Penaeid of Bengal. It is caught on the Bombay coast also, but not in large numbers.

Parapenaeopsis stylifera (Malayalam—*Karikkādi chemmeen*).—It is also a comparatively small prawn, seldom growing beyond $4\frac{1}{2}$″. Its characteristic reddish brown colour makes it quite easy to recognise. It is caught in very large numbers along the Kerala coast during the months December to May.

In addition to these prawns, shrimps belonging to various species of the genus *Acetes* are also caught and marketed during certain months. They are small, seldom exceeding an inch in length and occur in huge shoals. Among prawns outside the group Penaeidea, species of *Leander*, especially *L. styliferus*, contribute substantially to the catches in the Gangetic delta and the Bombay coast. The fishery of backwaters and estuaries is supported by the same species as in marine catches except for *Parapenaeopsis* spp. which do not migrate into such environments. The catches, however, are almost exclusively composed of young and immature prawns, adults being present only in

the sea. Adult males of *M. dobsoni* have been noticed in backwaters also. Most of the freshwater prawns caught belong to various species of *Palaemon*. *Palaemon carcinus* (Malayalam—*Konchu*) is the largest, growing to about a foot in length. It migrates into brackishwater to breed and because of this habit, large numbers are caught from such environments during certain months. In the Kerala backwaters there is a fairly good fishery during the months September, October and November. Because of its size and availability in good numbers for over three months it is very much in demand for freezing and eventual export.

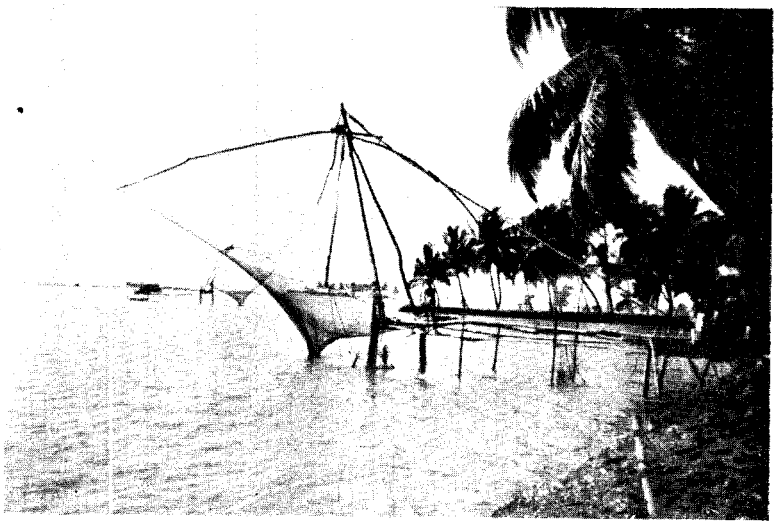
Fishing Methods.—Boat-seine is one of the commonest types of nets used for fishing prawns along the Kerala Coast. Though there may be regional variation in minor details it consists essentially of a bag-like part and a couple of wings and is usually operated by 8 to 10 men from two canoes. It is rarely used in water over 10 fathoms in depth. Besides prawns, various species of small fish are also caught by this net. Another type of net widely used in estuaries and backwaters, creeks and shallow inlets, is a conical net with or without floats above and weights to anchor it or supported on pairs of stakes driven into the bottom. Its size varies widely; some of the largest in use along the coast of Bombay may be 500–700′ in length with a mouth of 200–300′ in circumference. It is usually set against the tide, which sweeps the prawns into them, and is hauled up at the turn of the tide. It is the most important method adopted in the backwaters of Kerala throughout the year, wherever tides are not too feeble. The Chinese nets, so conspicuous along the shore of the backwaters of Kerala, also catch considerable quantities of prawns. The cast-net, the drag-net, etc., are other types of nets in common use in various parts of the country to capture prawns.

The peculiar method of trapping prawns with the aid of tidal action in paddy fields in the northern districts of the former Travancore-Cochin should also be mentioned here. About 10,000 acres of single crop paddy fields lying along the edge of backwaters and connected canals are utilised for this purpose and on a modest estimate about 4,000 tons of prawns are caught annually. The season for this fishery starts by about the middle of November and ends by the middle of April. An ingenious device made use of in the shallow stretches of the backwaters of this area is locally called '*Pachil*'. It consists of two canoes connected at both ends by short bamboo poles, and a heavy iron chain fastened by its two ends to the bows of the canoes. The chain drags along the bottom when the canoes move and the prawns which are scared jump out of the water, almost always falling into the canoes, where they are trapped.

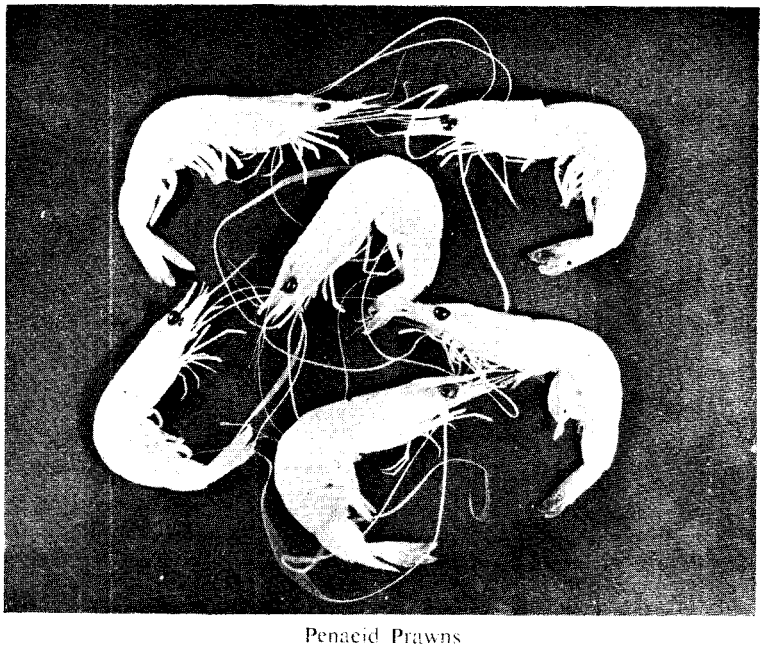
Seasonal Variations.—Though a few prawns may be caught at various points of the coast in all months, the marine fishery is markedly seasonal. On the west coast the season generally coincides with the monsoon period, June to September in the southern half. In other months, particularly from October to April, few prawns are caught, not because they have disappeared from the fishing grounds, but because the more profitable sardine and mackerel fisheries claim the attention of all fishermen. August to October are the best months in the Bombay area, while the season in Saurashtra extends from July to September or October. The backwaters of Kerala provide an exception to this since the stake nets and Chinese nets are operated throughout the year, except when there are floods in the monsoon months. The peak of this fishery is, however, in the months of October to April.

Processing and Marketing.—Only a small portion of the catch is consumed locally. Hawkers carrying baskets of prawns and fish for door-to-door sale are a familiar sight in the villages of Kerala. Prawns are packed between layers of ice either entire or after removal of the ' head ' for despatching to inland towns. Freezing of prawns for export, mostly to America, is now being done at several centres along the coast. Prawns are graded according to size and the larger ones are frozen directly after removal of the head. Smaller ones are first boiled and shelled and then frozen.

Several methods are in vogue for drying prawns. The simplest and probably the crudest is spreading them out in the sun to dry. They are then marketed. A better method that is widely adopted is to first boil the prawns and then dry them in the sun. After they are well dried, the shells are removed by putting them in gunny bags and threshing with a stick or by beating the bag itself on a block of wood. The product has only a limited market in India; it is mostly exported to south-east Asian countries. Semi-drying is a process developed and popularised by the Madras Government Fisheries Department. In this method also prawns are boiled and then shelled. After immersion for a short time in staturated salt solution they are dried in the sun or by artificial driers. Drying however is stopped before the meat becomes hard. Boiled and shelled prawns are pickled in vinegar or weak toddy with condiments and spices mostly for home consumption. It may generally be stated that marketing is seldom attempted by the fishermen themselves except for those who are fortunate enough to own their own implements. Usually the catches pass into the hands of middlemen to whom the fishermen are obliged to sell because of prior commitments. The organization of co-operative societies is, however, gradually changing this situation.



Chinese Dip-Net used for Prawn Fishing in Cochin Backwaters



Penaeid Prawns

Biology.—No Penaeid prawn has been found to breed anywhere except in the sea. In fact, females can become mature only in the sea. The smaller species like *M. dobsoni* spawn in comparatively shallow waters up to about 12 fathoms while the larger ones like *P. indicus* liberate their eggs farther out. Several thousands of eggs are usually released by a single female. Breeding starts soon after the north-east monsoon and may continue for several months. The egg hatches out into a minute larva called nauplius, which does not resemble the parents even remotely. It sheds its skin a number of times, growing as it does so, and at the end of about 2 to 3 weeks passes into the stage known as the post-larva, which bears close resemblance to the adults. Post-larvæ of most of the Penaeids mentioned earlier migrate into estuaries and backwaters. The brackish nature of the water and the abundance of organic detritus (on which they feed) present in such environments provide extremely favourable conditions for rapid growth. Growth is not continuous as in fishes generally. Since these prawns are covered by a hard shell they could grow only when this shell is shed and the skin is soft. The length of life of most of these prawns is still unknown. *M. dobsoni*, however, seems to live for about three years and *Parapenaeopsis stylifera* for two. It may require several years' intensive study before the life-span of the other species also could be inferred.

It is this habit of the post-larvæ of migrating into brackishwater environments, that provides the basis for the rich prawn fisheries of these areas. Immense numbers of prawn fry enter these waters during several months making it possible for the fishery to continue without much interruption throughout the year. Prawns prefer a muddy bottom and they swallow the mud along with the detritus and the minute animal and vegetable organisms in it. This, however, may not furnish a satisfactory explanation for the association of prawn fisheries with mud banks, so characteristic of some parts of the Kerala coast during the monsoon period. For instance, there is a very active prawn fishery in the region of such a mud bank near Alleppey, several hundreds of tons of prawns being caught during the months May to September. It may be that since the water above these banks is placid, prawns concentrate there in order to escape from the turbulent surrounding areas.

Research.—Practically no research work on the prawn fisheries of the country had been done before the establishment of the Central Marine Fisheries Research Station in 1947. Since then much valuable data have been collected bearing on the biology of Indian prawns of commercial importance. Practically all aspects of the biology of one species, *M. dobsoni*,

have been elucidated and all aspects (except the larval development) of another species, *P. stylifera*, have been studied. The commercial catches and latterly the trawl catches have been regularly analysed with a view to collecting information on the changes in their composition from month to month. A number of papers embodying part of the data collected have already been published. The recruitment of fry to the backwaters of Cochin has been given special attention in order to follow their fluctuation from year to year and also to assess the effects, if any, of mechanised fishing in the seas outside. Experiments designed to ascertain the possibility of improving the output from the important paddy field fishery are also being conducted in a large field, approximately 20 acres in area, leased for the purpose.

Future Development.—In the course of the analysis of marine catches evidence has accumulated to show that the bulk of the catches from the sea consists of young and immature prawns. From brackishwater environments, as has already been stated, they consist almost exclusively of such prawns. Adults of larger species like *P. indicus*, *M. monoceros*, *M. affinis* are not caught in appreciable numbers at any time of the year. Biological studies have brought out the fact that older prawns pass into comparatively deeper regions of the sea. Since the sea fishery is at present confined almost exclusively to the shallow coastal waters it is not surprising that the bigger and older prawns escape being caught. Positive evidence pointing to the presence of such prawns in deeper waters has been afforded by the capture on some days of large individuals of *P. indicus* and *M. monoceros* by the trawlers of the Government of India and the Indo-Norwegian Project.

The facts mentioned in the previous paragraph point to the possibility of development of the marine fishery by extending operations far beyond the present limit. Exploratory fishing operations in waters up to about 70 to 80 fathoms have to be undertaken to discover concentrations of such prawns that could be exploited commercially. The experience of other countries, notably America, is so encouraging that efforts at exploratory fishing in Indian waters should be expected to succeed. The possibility of improving the present catches by mechanised fishing has also been demonstrated. Most types of indigenous gear seem to be inefficient when fishing close to the bottom; only trawl nets do this efficiently. Since prawns remain close to the bottom or partly buried in mud the use of trawl nets could ensure their efficient capture.