

PROCEEDINGS OF THE SYMPOSIUM  
ON  
**LIVING RESOURCES**  
*of*  
**THE SEAS AROUND INDIA**



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**SPECIAL PUBLICATION**  
**CENTRAL MARINE FISHERIES RESEARCH INSTITUTE**  
**COCHIN-11**  
**1973**

## CHANK RESOURCES OF INDIA

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### ABSTRACT

The sacred chank *Xancus pyrum* (Linn.) is a commercially important gastropod fished in large numbers along the coasts of all but a few of the maritime states of India. Fishing is carried out mainly by skin diving, although hand-picking and net fishing are also prevalent here and there. The fishery provides a good source of living to nearly 1,000 divers in the Madras State in addition to those engaged in the same profession along the Gujarat and Kerala coasts. The main market for these chanks is West Bengal where chank bangle industry is flourishing.

Investigation conducted by means of SCUBA by the authors have brought to light good concentration of chank population suitable for commercial exploitation, over vast stretches in the Palk Bay and Gulf of Mannar. The statistics of annual chank landings, yield from area to area, account of the chank fishery in important centres, details of the diving method and the extent of the chank grounds are recorded.

Possibilities for exploiting unfished areas and suggestions for increasing the fishing tempo are discussed in detail. In this context SCUBA diving for chanks has proved very advantageous and is recommended keeping in view the economic aspect of the divers as well as judicious exploitation of the stock.

### INTRODUCTION

COMPARED to many other countries, the shell fisheries of India occupy an insignificant position both as a source of income to the fishermen and as an item of food. This is perhaps due to the fact that neither the scope of the shell fish industry has been properly assessed nor the available resource fully utilized. As it stands now only the sacred chank, *Xancus pyrum* (Linn.) is of commercial importance. Bangles sawn from this shell are worn by the women of Bengal who provide a steady market for the richly carved and highly polished chank bangles. In addition to this the use of chank for blowing as a trumpet in religious and ceremonial functions, in the dedication to temples and houses for worship, as feeding spouts, in medicines and in the preparation of chank lime is not uncommon. Of late, there is a good market for the chank flesh as an item of food. The horny operculum of the shell is in great demand in the preparation of incense sticks.

To meet these demands, hundreds of fishermen and divers in different chank fishing centres of the east and west coasts of India search the reefs and scour the sand beds within 20 metre depth of the sea during favourable weather looking for the chanks. In some places they wade through the shallows, in others nets bring the chank to the surface. But more than 90% of the chanks are brought by skin divers who descend to the sea bottom and hunt for the chank by sight.

Fishing for the chank has been the regular calling of the fishermen from time immemorial and the market for the chank has never been dull. A look at the statistics of chank landings from the important areas of fishing (Tables I to VI) will show the large quantities of chank fished annually. But for a negligible percentage of these, the entire stock goes to the Bengal market where there is an organized small-scale industry for the chank bangles. The present level of supply is found to be far below the requirement since the chanks from the Ceylon coast are not available now as in the pre-independence days. This is because of the fact that in those days the Ceylon fishery was

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conducted with the help of divers drawn from India. Now these divers are not allowed to come there as a result of which chank fishery in Ceylon has suffered a great set-back. This has considerably helped the Indian fishery to prosper.

It is felt that if a proper survey of the chank resources of our waters is undertaken and if the tempo of the exploitation is increased, there is every possibility of the chank industry being further expanded. This will give greater revenue to the fishermen, to the Governments of the concerned states where chank fisheries exist, and to the people who are engaged in the chank-bangle industry. The present paper is presented with the object of indicating the possibilities of expansion of the fisheries based on the results of preliminary survey conducted to find out the extent of chank beds notably in the Gulf of Mannar and on the effectiveness of modern methods of exploitation.

DISTRIBUTION OF CHANK; AREAS OF OCCURRENCE AND DEPTH

Chank is extremely abundant on the east coast of India being found and fished from Cape Comorin to Madras, although the density of its occurrence appears to thin out north of Point Calimere. The northern limit on the east coast is the Godavari river mouth. On the west coast its geographical distribution is peculiar. Good numbers are fished from the Gulf of Kutch coast, but southward of this no trace of the chank is found till the southern coastline of the Kerala State where it forms a small fishery. It is also found in the Andaman Island to some extent. Outside the Indian territory, off Ceylon from Puttalam in the north-west coast to Trincomalee on the north-east coast large numbers of this shell occur (Fig. 1).

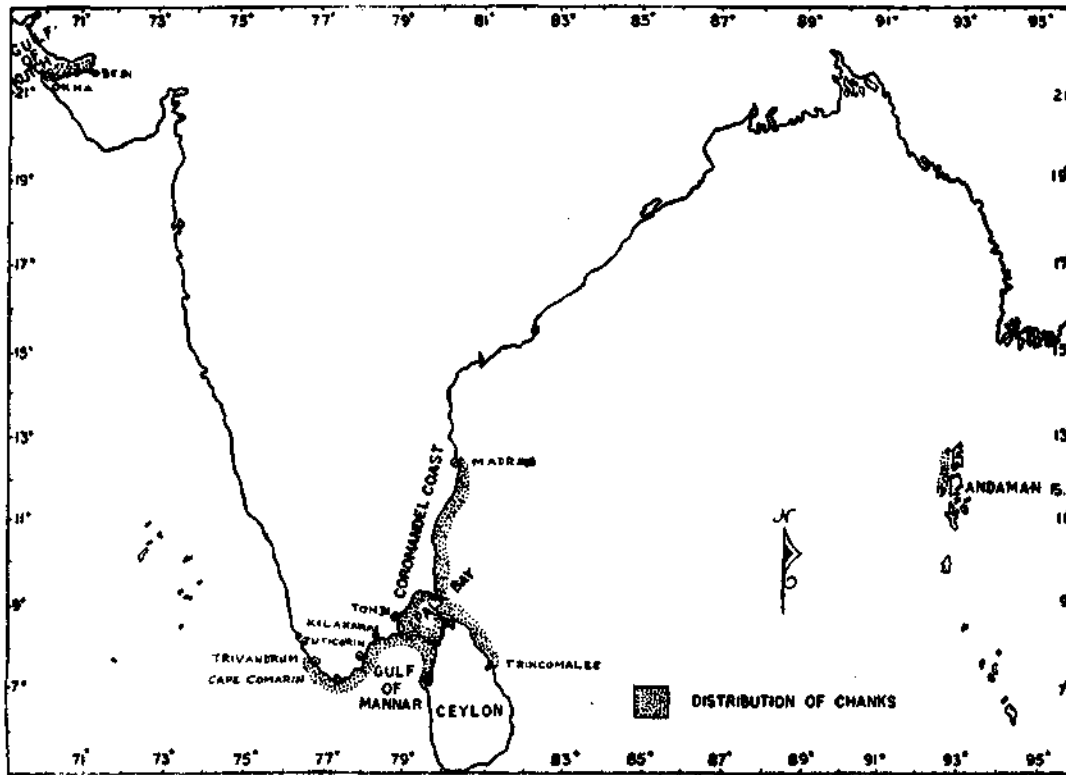


FIG. 1.

Being gregarious it forms distinct beds. The most important beds lie in the Gulf of Mannar along the Indian coast in depths of 10–20 metres with sandy bottom (Hornell, 1922). In the Palk Bay to the north of Adam's bridge chanks occur at lesser depths up to 12 metres in sand mixed with mud. Along the Coramandel coast they are either found on sand or sand mixed with mud at depths varying from 6–20 metres. The chanks fished off the coasts of Trivandrum and Kanyakumari districts are also from depths of 10–20 metres. Along the Gujarat coast they are found on or in the vicinities of the coral reefs where one can wade through the shallow water to harvest them (Gokhale, 1960). The depth of water at which the chanks occur on Ceylon coast is very much the same as that of Palk Bay and Gulf of Mannar coasts of India.

#### REGIONAL CHANK FISHERIES

The following are the regional chank fisheries currently exploited:

1. Madras coast .. (a) Tirunelveli fishery.  
(b) Ramanathapuram fishery.  
(c) Sivaganga fishery.  
(d) Tanjavoor fishery.  
(e) South Arcot and Chingleput fishery.  
(f) Kanyakumari fishery.
2. Kerala coast .. Trivandrum fishery.
3. Gujarat coast .. Gulf of Kutch fishery.

Without exception the fishery is a state monopoly although the *modus operandi* in the exploitation of the chanks varies from place to place.

##### *Tirunelveli fishery*

The fishery along the coast of Tirunelveli from Kootapuli to Kannirajapuram, a distance of 136 km with Tuticorin as the main centre, is controlled by the Madras Government and the exploitation is done departmentally. The important centres where chanks are collected are Idinthakarai, Ovari, Tiruchendur, Kayalpattinam and Tuticorin.

The fishing season starts from the middle of November with the onset of the north-east monsoon period and lasts till the end of May when south-west monsoon sets in. This is a very important fishery yielding annually about half a million good chanks valued at 0.8 million rupees approximately (Table 1).

##### *Ramanathapuram fishery*

This fishery along the Ramanathapuram District coast from Kannirajapuram in the Gulf of Mannar to Pamban and from Rameswaram to Karangadu in the Palk Bay, an approximate dis-

TABLE I

*Chanks fished from Tuticorin for the years 1931-32 to 1966-67*

Year	Full size	Under sized	Wormed
1931-32	309943	62711	17016
1932-33	309226	79971	27438
1933-34	441520	79010	26067
1934-35	326999	68892	13187
1935-36	323475	145081	20781
1936-37	398782	58526	6364
1937-38	309257	37187	13256
1938-39	363960	36578	6547
1939-40	539662	58224	7987
1940-41	436626	47882	13509
1941-42	495403	46113	20377
1942-43	458894	29918	46421
1943-44	430274	29541	24500
1944-45	268318	21033	13664
1945-46	476902	19622	13596
1946-47	666	475	120
1947-48	683319	25859	27021
1948-49	599103	397183	28368
1949-50	1034667	56826	30225
1950-51	983815	63345	30631
1951-52	681006	42025	19189
1952-53	944666	64380	50843
1953-54	900345	83997	61438
1954-55	346680	28305	9987
1955-56	508365	32338	16838
1956-57	660869	35045	27387
1957-58	860472	30858	30470
1958-59	1155644	61871	43357
1959-60	1134191	47946	64857
1960-61	561726	76388	28446
1961-62	574893	82811	33059
1962-63	459762	115792	43658
1963-64	355439	71639	28711
1964-65	112046	39877	17088
1965-66	7031	4548	1856
1966-67	285344	50984	18304

tance of 190 km is leased out to a private party. The important centres from where fishermen go out for chank fishing and the season of fishing are as follows:

	Place	Season
Gulf of Mannar	1. Kannirajapuram	December to March
	2. Kilakarai	September to December
	3. Periapatnam	September to December
	4. Vedalai	September to December

	Place	Season
Palk Bay	5. Rameswaram	March to June
	6. Thangachimadam	March to June
	7. Pamban	March to June
	8. Devipatnam	June to September
	9. Irumeni	May to August
	10. Tirupalakudi	June to September

Annually about three hundred thousand chanks are fished from this area and the rental derived amounts to nearly Rs. 2,25,000 (Table II).

TABLE II  
*Chanks fished from Sivaganga and Ramanathapuram waters for the years 1954-55 to 1967-68\**

Year	Full size	Under sized	Wormed
1954-55	325505	21819	26678 Ramanathapuram
	3824	374	330 Sivaganga
1955-56	349000	16859	7185 Ramanathapuram
	6544	790	1569 Sivaganga
1956-57	392573	23747	23619 Ramanathapuram
	124572	3478	28141 Sivaganga
1957-58	690510	21287	48418 Ramanathapuram
	243153	1680	60256 Sivaganga
1958-59	533086	14741	50394 Ramanathapuram
	68831	22029	.. Sivaganga
1959-60	587960	52815	8923R
1960-61	1059099	64931	16893
1961-62	689668	56355	2038
1962-63	622622	72283	21341
1963-64	695624	96615	15765
1964-65	262168	36390	9392
1965-66	844401	73090	17148
1966-67	6223	4683	27693
1967-68	..	..	

\* Separate figures of chank fisheries for Ramanathapuram and Sivaganga waters are not available from 1960.

#### *Sivaganga Fishery*

The fishery from Karangadu to Sundarapandyampattinam, a distance of about 30 km is separately leased out to a private party although this area is also part of the Ramanathapuram District. The important fishing centres are Karangadu, Mullimunai, Tondi, Pasipattinam and Vattanam. The season of fishing in this area is from April to October.

The number of chanks fished here being very small, the amounts realised out of leasing the fishery comes to roughly Rs. 30,000 per year.

#### *Tanjavoor Fishery*

All along the coast of this district, except for a short distance between Point Calimere to Pudukuda, the right of collecting of chank is leased to private party. There are about 20 centres of collection of chank of which Mullipattinam, Chinnamunai, Senthalai, Periathambiranpattinam, Gopalapattinam, Adirampattinam and Sethubavachatram are important.

Only about 30,000 chanks are fished annually and hence this is a minor fishery only (Table III). There is no particular period in which the chank is fished. It may be said to extend all through the year since no diving work is involved.

TABLE III

*Chanks fished from the Tanjavoor District for years 1952-53 to 1966-67*

Year	Full size	Under sized	Wormed
1952-53	33289	5891	8816
1953-54	43007	163	13290
1954-55	11832	4677	657
1955-56	17992	7068	766
1956-57	31766	13099	1566
1957-58	41394	6469	815
1958-59	44981	10644	5267
1959-60	30299	7142	1217
1960-61	33239	5891	8816
1961-62	43007	163	13790
1962-63	43945	23731	10999
1963-64	33237	18297	10999
1964-65	43391	17855	12405
1965-66	29452	14768	540
1966-67	13816	7505	5897

#### *South Arcot and Chingleput Fishery*

The fishery is of very minor importance. Annually less than 15,000 chanks are fished. The fishery is leased out on an amount of about Rs. 17,000 per annum. Chanks are collected as and where they are available along the coast.

#### *Kanyakumari fishery*

The fishery extending from Cape Comorin to Thuttur, a distance of about 65 km, is also leased out to private party. The important centres of collection are Muttam, Colachel, Thengapattinam, Enayaputhanthurai, Kodimunai and Ramanathanthurai.



The season of fishing extends from middle of January to end of April. About 10,000 chanks are fished annually and the lease amount comes to approximately Rs. 5,000 per year (Table IV)

TABLE IV

*Chanks fished in the Kanyakumari District for the years 1957-58 to 1963-64*

Year	Full size	Under sized	Wormed
1957-58	2032	282	361
1958-59	2702	922	280
1959-60	2485	239	735
1960-61	8607	2909	244
1961-62	13231	1409	4
1962-63	10103	1994	1385
1963-64	5945	4656	..

#### *Trivandrum Fishery*

This fishery is leased out by Government to Cooperative Societies on a minimum royalty basis. The amount realised is about Rs. 20,000 per year (Table V). The important places where the chank is collected are Poovar, Vizhingam, Kovalam, Cheriathurai, Valiathurai, Sankumugom, Veli and Cherumankarai a stretch of nearly 60 km. The fishing season is from December to April.

TABLE V

*Chanks fished from the Kerala State: Trivandrum fishery 1956-57 to 1962-63*

Year	Number of chanks fished
1956-57	16125
1957-58	18355
1958-59	26629
1959-60	23979
1960-61	23975
1961-62	21294
1962-63	10443

#### *Gulf of Kutch Fishery*

The State Government does not engage any fishermen for the collection of the chank. The local 'wagher' fisherfolk collect and surrender them to government (Table VI). The intertidal zones of Okha, Aramada, Poshitra, Ajad, Wadinar, Bharana, Salaya, Sikka, Pirotan Island and Bedi on the southern bank of the Gulf are the important places, approximately a distance of 130 km.

For the sake of completion of the record it is felt necessary to make here a passing remark on the *Ceylon fishery* also. Chanks are fished by divers around the northern parts of Ceylon from the Dutch Bay on the west, northwards past Mannar Island and Jaffna area round to Mullaitivu on the north-east coast. The best and the largest reputed shells are fished on the rocky bottom off the Island of Nayanativu, off Punkuditivu and Mannar Islands. Poor quality chanks are fished from the grassy bank of Kalmunai and Nachikarai. Sub-fossil shells are taken from Jaffna lagoon, Tannakelappu and Kilali along the north shore and around Punaryn on the South Punkuditivu.

TABLE VI

*Chanks fished from the Gujarat State for the years 1952-53 to 1966-67*

Year	Quantity
1952-53	14058
1953-54	16752
1954-55	14419
1955-56	11628
1956-57	10002
1957-58	10601
1958-59	15580
1959-60	23037
1960-61	16079
1961-62	19373
1962-63	18123
1963-64	25655
1964-65	24752
1965-66	13688
1966-67	12161

#### FISHING METHODS

In the Gulf of Kutch the local fishermen make the collections by picking the chanks from the intertidal flats. Along the Trivandrum and Kanyakumari coasts they dive for the chanks. Similarly in Tirunelveli, Ramanathapuram, and Sivaganga coast also the fishermen do skin-diving and bring the catches and sell them either to Government or to the lessees as the case may be. A good number of chanks are caught in 'Nandu valai' in Palk Bay (Devipattinam and nearby places). In the Coramandel coast, the Tanjavor fishery is mainly dependent on the shells obtained incidentally in the nets operated by catamaran fishermen. The bulk of the shells are taken by 'Vellai valai', a light trawl operated by catamarans. Along the South Arcot coast chanks are taken in 'Thuri-valai', again a catamaran light trawl.

On the Ceylon coast also chanks are dived for and taken by skin divers as in the case of Tirunelveli coast, modified in many places by the fact that the beds are in the shallow waters so that the divers dispense with the stone and the rope. In the shallow Jaffna lagoon, approximately an area of 670 sq.km. the fishermen wade through the water in the shallows up to 1.5 metre depth and

with the help of a long iron rod search in the mud till they strike against a chank. They hook it with the other end of the iron rod and bring the chank to the surface, a method requiring some dexterity.

It may be thus seen that the most important method of chank fishing is by skin diving although it is an age-old method. The best skin diver will be able to keep himself under water for a little over a minute and he can make about 40 dives a day, depending on his ability and the weather. Although the crafts used in carrying the divers differ from place to place in shape, in size and capacity, the Tuticorin-type of boat is the most common and it can carry about 10-15 divers. The Kilakarai-type of boats and Tondi-type of boats which are heavier and balanced with planks and outriggers respectively can carry more number of divers. Mechanized boats are not used at present in commercial chank fishing anywhere in India.

#### *Diving Force*

It has been estimated that there are about 1,000 divers drawn from Tirunelveli, Ramanathapuram and Kanyakumari districts alone taking part in the chank fisheries of the Gulf of Mannar and Palk Bay. Out of these, 760 persons are active and the rest either old or invalid, who take to diving off and on. Most of the active divers come from Tuticorin (250), Kilakarai (170), Periapattinam (180), Kadiapattinam (50), Colachel (30), Vedalai (20) and Rameswaram (10). Some divers come also from Muttam, Kurumpanai, Kodimunai, Pattinamarudur, Kankollanpattinam, Sudukattanpatti, Ahmadapuram, Mandapam, Akkalamadam, Pudumadam, Manakkad, Pamban, Devipattinam, Karangadu, Tirupalakudi and Irumeni.

#### COMMERCIAL VARIETIES OF CHANKS

Hornell (1915) distinguished 5 well-marked sub-species of the central form *Xancus pyrum* (Linn.) in different localities. The diversities are attributed to the difference in the nature of environment, such as exposure to unfavourable conditions like surf action, prolonged spells of turbid mud-laden water or due to the physico-chemical properties of the water in which they live. The differences in the varieties depend mainly on the ratio of length and width, the ratio of the axial length to the diameter of the body whorl, weight of the shell and the thickness of periostracum. The varieties distinguished are: *Xancus pyrum* var. *obtusa*, *Xancus pyrum* var. *acuta*; *Xancus pyrum* var. *globosa*, *Xancus pyrum* var. *comorinensis* and *Xancus pyrum* var. *fuscus*. The barrier formed by Rameswaram and the Adam's bridge very nearly forms a dividing line, var. *obtusa* being found entirely north of this line and var. *acuta* in the whole of the coastal waters of the Gulf of Mannar. But, in and around Rameswaram up to Mandapam a small number of chanks locally called 'Irupiravi' meaning 'two origins' are found (Photograph 1) showing characters of *obtusa* in the matter of formation of spires and the appearance of opercular region like that of *acuta*. The varieties *globosa* and *comorinensis* are viewed as closely related forms of *acuta* and are restricted to the extreme south of Indian Peninsula running northward from Cape Comorin on both the east and west coasts for nearly 20 km and 64 km respectively. The variety *comorinensis* inhabits shallow waters exposed to heavy swells and at greater depths in the same geographical range. The variety *fuscus* is confined to Andamans and has developed fixed characters because of its isolation. The Gulf of Kutch form appears almost identical with Rameswaram variety perhaps due to identical habitats in which they live.

The variety *acuta* is called 'Jadhi' (Photograph 2) and *obtusa* (Photograph 3) is known as 'Patti' in commerce. Even amongst these two there appears to be many local races, although difficult to distinguish clearly as such.

#### *Variety obtusa*

Judging the importance from the numerical point of view of both Indian and Ceylon catches, this variety occupies the first place, making up all except a fraction of the produce of the great

fisheries in the north of Ceylon and along the Indian coast of Palk Bay and then from Point Calimere to Madras. The characters of this variety fluctuate within considerable limits, from a form with well marked though short spire (Irumeni, Devipatnam race, Photographs 4 and 5) to one where it is extremely abbreviated with whorls much telescoped (Photographs 6 and 7).

#### *Variety acuta*

Next in importance to variety *obtusata* comes this elegant form, comparatively narrow, moderately elongate with well-balanced spire (Photograph 8). The breadth in length averages 1.83 reduced to 1.75 in the case of short specimens. The forms fished off Tuticorin, Kilakarai and Rameswaram belong to this variety; in addition the Gulf of Kutch chank also belongs to this variety.

### FISHERY VALUE

There is a good demand for the chank flesh as an item of food by many sections of people. The chank flesh is found to be rich in protein and mineral (Chari, 1966) and the values compare favourably with the flesh of any fish. The foot of the animal is pulled out of the shell by means of a sharp, curved knife. The flesh so scooped out is boiled, sliced and sun-dried for frying. It has been observed that from 100 chanks two litres of flesh are taken, the cost of which ranges from Rs. 4 to Rs. 5. Thus if the annual landings of chank is one million shells, the fishermen derive Rs. 50,000 by the sale of the flesh alone. The chank opercula are in great demand by merchants from Mysore State for making incense sticks. One kg. of opercula costs Rs. 50. It has been estimated that 10,000 chanks yield this quantity. Therefore out of one million shells the fishermen derive an additional income of Rs. 5,000.

The rates paid by the private and public sectors for the chanks vary from place to place. For instance in the Gulf of Kutch chanks above 90 mm diameter fetch a price Rs. 0.90 each and those between 60-90 mm diameter, Rs. 0.60. The disposal rate is rather high being Rs. 7 and Rs. 6 each respectively. The Ramanathapuram coast chank is sold at price ranging from Re. 0.40 each (Devipatnam area) to Re. 0.65 each (Kilakarai area). The Government of Madras pay Re. 0.60 per chank from the Tirunelveli coast. Taking on an average the rate of a full sized good chank to be Re. 0.60, the income to the fishermen would amount to Rs. 6,00,000 for every million chanks fished. Mention may be made here of the additional revenue to the divers when a freak chank or *Valampuri* (Photograph 8) is fished by them. This sinistral form which is a freak is in great demand for worship in Hindu temples. The price offered for acquiring the same is fantastic, ranging from Rs. 500 (for a small chank of less than 45 mm diameter) to Rs. 10,000 for a perfect chank of 65 mm diameter or even more depending on the size.

The *valampuri* is said to occur mostly in and around Rameswaram waters. On the Tirunelveli coast official records show only two *valampuri* chanks having been fished so far one in 1930 and the other in 1957.

The Government pay the cost of 1,000 ordinary chanks to the diver who brings one *valampuri* chank. The lessees of Ramanathapuram Chank beds are expected to surrender one *valampuri* chank per year to the Government (as per lease agreement) or the cost of 1,000 ordinary chanks in lieu thereof; invariably the Government get the latter. The Government auction the *valampuri* chank when fished by calling for tenders on an all-India basis.

### EXPLOITATION OF CHANKS AT THE PRESENT LEVEL

Before independence nearly 4/5 of the total Bengal requirements of chank were met by Ceylon and the rest from Tirunelveli and Ramanathapuram fisheries. The annual requirement of

the chanks was estimated at 2.5 million (Hornell, 1914). Since the Ceylon supply dwindled, the level of output from Indian coast has risen upto 1.5 million per year. This is hardly sufficient to meet the demands from the market. It is necessary to intensify the fishing for chanks which necessitates an evaluation of the available resources, establishing new areas of fishing and improving the technique of fishing.

India has a coastline of 4,667 km. The chank is known to occur along a distance of 130 km in the Gulf of Kutch, 65 km in Kerala and 430 km in Madras coast (excluding 290 km on Tanjavor, South Arcot and Chingleput coasts). In the Gulf of Mannar and the west coast the chank living areas are known to extend nearly 16 km into the sea, whereas in Palk Bay they extend upto 12 km and on the Coramandel coast to 10 km. Thus it may be roughly estimated that 10,000 sq. km of our inshore sea-bottom are potential chank grounds, leaving out Kutch area and the Andamans.

The present exploitation on an all-India basis suffers from many drawbacks. Many productive areas far off from the base of operations are rarely tapped due to difficulties by way of towage of the sail crafts employed. The divers rarely go out in search of new fishing grounds. They are aware of only a few rich chank grounds which they exploit season after season. In areas like the Gulf of Kutch, Tanjavor, Chingleput and South Arcot coasts diving for chanks is not done. In other areas where diving is done the system is age-old and dependent on fair weather, clarity of water and favourable currents. There is also the limitation of depth to which a skin diver can descend. If the fishermen are shown new areas of fishing, taught modern methods of exploitation of the chank and provided with motorised crafts, the total output of the fishery is bound to increase many fold. Towards this goal it was felt necessary and very useful to conduct underwater survey of the sea-bottom from 10-27 metre depth along our coast by direct observations using SCUBA\* to find out:

1. the extent and exact location of the chank beds in various zones, and the density of population;
2. new chank grounds in deeper waters so that these may also be exploited to increase the catches; and
3. to demonstrate the usefulness of modern diving equipments in chank fishing.

Such a programme can be only a long-range one and will take quite some time to be completed. To start with, survey of the sea-floor off Tuticorin was begun, since this is one of the important chank fishery zones.

#### *Survey of the Fishing Ground*

An area of 1,000 sq.km was selected for the survey, dividing the entire area into 3 convenient sections. Detailed account of the method followed in the survey work is described by Mahadevan and Nagappan Nayar (1968). A total of 775 sq.km has been surveyed till now, covered by 1,853 dives made at 600 metres interval and when needed at shorter intervals also. The survey has brought to light extensive chank beds within Lat. 8° 35' N to 8° 55' N to Long. 78° 15' E to 78° 35' E (Table VII). The outstanding feature of the survey was the discovery of new chank beds in depth range above 20 m. These beds lie within 20-25 m and run north to south. The chanks were all large sized measuring over 60 mm in diameter which is an ideal size for the bangle industry. In other areas shoreward of this, the density was much less and the size also smaller. This might be due to the fact that while many of the nearby beds are constantly fished the divers do not exploit the beds in the deeper waters and they are unable to dive with their primitive technique thus leaving a good population of chanks unfished. With a dive lasting for 45 minutes duration with aqua-lungs 416 chanks were collected by a single person indicating the richness of the area newly found as compared to 279 which could be gathered in the shoreward area in the same period. The

\* Self-contained underwater breathing apparatus.

survey work done till now has covered only 2/3 of the area originally proposed to be investigated. The remaining 1/3 southern portion off Tuticorin also promises to turn out to be extensive and rich ground as trial dives made off Tiruchendur at 22 metres have brought to light the presence of chank population similar to that noticed beyond the 20 metre range already covered. For all practical purposes this may only be a continuation of the northern bed. If so, the 20-25 metre sandy seabottom from Lat. 8° 25' N to 8° 55' N a distance of 48 km would prove to be the most extensive and continuous bed yet located. The fishermen rarely go to the southern beds off Tuticorin due to lack of proper facilities. Once a year they move over to Tiruchendur and exploit the beds close to shore for a week or so and then return to Tuticorin with their catches. This appears to be an insufficient effort and steps are necessary to arrange regular fishing of this area since the average catch per dive compares favourably with Tuticorin beds.

TABLE VII

*Extent of chank beds in the area between Lat. 8° 45' N to 8° 55' N*

Line	Total stations surveyed	Population of chanks			Remarks
		U.S.	F.S.	W	
I	36	R	..	..	..
II	32	..	..	..	..
III	34	R	R	..	..
IV	38	..	..	..	..
V	28	..	..	..	..
VI	43	R	R	..	..
VII	37	..	..	..	..
VIII	43	R	C	F	Chanks at 18 m depth for 1.6 km distance
IX	40	..	..	..	..
X	40	..	F	..	Chanks at 20 m to 1 km distance
XI	40	..	..	..	..
XII	31	R	C	R	Chanks at 16 m to 2 km distance
XIII	42	R	F	R	Strip only
XIV	40	F	F	R	Chanks at 19-22 km to 6 m distance
XV	37	A	P	F	..
XVI	43	P	C	F	Chanks at 20 m to 1 km distance
XVII	42	C	P	R	Chanks at 16, 17, 21 and 23 m to 3 km distance
XVIII	43	C	C	R	Chanks at 21 m to 1.8 km long
XIX	44	P	C	R	Chanks at 18-21 m to 2.5 km distance
XX	42	A	C	R	Chanks at 19, 21 m to 2.5 km distance
XXI	43	P	C	F	Chanks at 17, 19 m to 9 km extent
XXII	41	R	R	R	..
XXIII	47	C	R	F	Chanks at 14 m, 16, 17 m to 1.6 km distance
XXIV	53	C	C	F	Chanks at 15 m, 17 to 20 m to 4 km long
XXV	54	C	C	F	Chanks at 15-16 m to 1.6 km extent

TABLE VII (Contd.)

Line	Total stations surveyed	Population of chanks			Remarks
		U.S.	F.S.	W	
XXVI	53	P	C	P	Chanks at 16-18 m to 8 km extent
XXVII	55	P	C	P	Chanks at 15.5 - 17 m to 4.8 km extent
XXVIII	58	P	C	P	Chanks at 16-17 m to 5.4 km extent
XXIX	57	P	C	P	Chanks at 16 m to 3.0 km extent
XXX	62	P	C	P	..
I	32	..	..	..	..
II	36	..	..	..	..
III	31	..	..	..	..
IV	31	..	..	..	..
V	37	..	..	..	..
VI	38	..	..	..	..
VII	34	..	..	..	..
VIII	37	..	..	..	..
IX	35	..	..	..	..
X	36	..	..	..	..
XI	37	..	C	..	Chanks at 19 m for 5.6 km extent
XII	38	C	C	C	Chanks at 20 m for 6.8 km extent
XIII	40	C	F	F	Chanks at 19 m for 4.8 km extent
XIV	37	C	F	F	Chanks at 19 m for 4.2 km extent
XV	40	C	F	..	..
XVI	40	..	..	..	..
XVII	39	..	..	..	..
XVIII	39	..	..	..	..
XIX	38	..	..	..	..
XX	37	..	..	..	Muddy gully region off Pinnakayal Village
XXI	37	..	..	..	..
XXII	35	..	..	..	..
XXIII	35	..	..	..	..
XXIV	32	..	..	..	..
XXV	34	..	..	..	..
XXVI	31	F	F	C	1.8 km extent chank bed
XXVII	31	F	C	F	1.8 km extent chank bed
XXVIII	31	P	C	F	3.0 km extent chank bed
XXIX	31	P	C	F	1.8 km extent chank bed
XXX	34	P	C	C	1.2 km extent chank bed
XXXI	31	P	C	C	1.2 km extent chank bed

U.S. Under sized; below 55 mm diameter—unsuitable for commercial exploitation. F.S. above 55 mm diameter—full size; W—Wormed; R—Rare A—Abundant; F—Few; P—Plenty; C—Common.

### Modern Diving Equipments

The use of the aqualung with face mask for vision and flippers for swimming used by authors proved far superior to the method of skin diving. Side by side with skin divers, aqua-lung divers

were made to collect chanks in the same bed on the same day in several centres. The aqualung diving results showed that the catch was more than 3 times that of a skin diver.

Regarding the exploitation of chank from deeper areas it is not possible with the present skin diving system. Fishermen should learn the technique of aqualung diving which can take them safely up to 30 metres. This appears to be a sure way of increasing their catches which will boost annual landings of chanks and the earning capacity of the diver.

The introduction of face masks for better vision by the underwater survey unit has caught up with the local divers already since 1962 and many have taken to diving with masks now with satisfactory results. All through the survey work motor boats only were used. They were not only convenient for keeping the diving equipments but also very useful for quick movement from place to place irrespective of the distance to be covered and the direction of winds. Therefore added to the aqualung method of diving it is necessary that mechanized boats be acquired by them. At present the divers find it difficult and tiresome with canoes, spending their energy in rowing for long distances in search of better spots.

#### REMARKS

There seems to be considerable scope for improvement in the collection of chanks from the Gulf of Mannar zone by widening the range of exploitation beyond 20 metre depth with the help of aqualung diving. In the Palk Bay area where the chank beds lie in shallower areas, the clarity of water over the chank beds is not as good as it is in the Gulf of Mannar. This affects the catches of the skin divers. Aqua-lung diving if resorted to here also will remove this handicap to a great extent. It is an added advantage that the divers who take part in Gulf of Mannar fishery are those who participate in the Palk Bay fishery also since the season of diving does not overlap in these two areas. As such aqua-lung training will pay rich dividends in both zones.

The fishery in the west coast also holds out possibilities of improvement. An oblong patch of 50 sq.km area of sand-shingle bottom is all that is at present exploited by the divers. If the range is extended to 25 metre depth zone it will open up double the area now exploited. Survey of the bottom along the Trivandrum coast and off the coast of Kanyakumari District appears necessary.

Regarding the Coramandel fisheries it is seen from records that during the 26 years following the British acquisition of Tanjore district, the fishery of this coast flourished; the revenue exceeding Rs. 6,000-per annum. The fishery slowly dwindled to Rs. 115-per annum in 1883. Departmental fishing in the place of leasing the fishing improved the matter a little. But the reason felt for the decline of the fishing was perhaps due to the divers employed in this profession taking to more lucrative jobs. With the declension of the Tanjore fishery proper, the more northern sector was also neglected. Chanks being netted, no regular diving is practised at present. Hence the potentiality of this area remains not much exploited. The entire area has to be surveyed for finding out the richness of the chank beds and their location before anything could be suggested.

Regarding the Gulf of Kutch so far no attempt seems to have been made in diving for chanks here. As it is skin diving is not possible here since monsoon period intervenes during the warm weather when alone diving can be done; it is impossible to dive in the winter months. The modern methods of aqua-lung diving with diving suit even in the coldest waters should enable such attempts being made here also during the cold season when sea is calm. Especially when Gujarat shells are in great demand success in this attempt may open up a new source of living to the divers.



## ACKNOWLEDGEMENT

The authors are very grateful to Dr. S. Jones, Director, Central Marine Fisheries Research Institute, for it was at his suggestion and encouragement that the present paper was written. The authors are greatly indebted to Shri K. V. Rao for his critical suggestions and for going through this paper. It would have been difficult to gather all the information and much of the data given in this paper but for the kind co-operation and help rendered by Mr. Isaac Rajendran, Assistant Director of Fisheries (Pearl and Chank), Madras Fisheries Department, Dr. N. Radhakrishnan, Central Marine Fisheries Research Substation, Vizhingam, Mr. K. R. Narayanan, Gujarat Fisheries Department and Mr. Sadakatulla of M/s. T.S.O. & Co., Kilakarai. The authors are thankful to Shri P. K. Mahadevan Pillai for his assistance in the preparation of this paper.

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