

# A BRIEF ACCOUNT OF THE TOPOGRAPHY AND FISHERY POTENTIAL ON THE SOUTH WEST COAST OF INDIA

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## ABSTRACT

An exploratory survey was carried out between the latitudes 10°N and 11°N along the west coast of India. A general contour of the bottom of this region is given in the bathymetric charts. Fishery potential of this area has been indicated. Two new areas, viz. the Periyar Canyon and the Chettuva Bank were explored in this region. The catch potential and the hydrographical conditions of the Chettuva Bank have also been given. Another bank, termed as Honowar Bank has been observed off the Mysore coast.

## INTRODUCTION

During 1971, the research vessel *Varuna* on her exploratory fishing-cum-charting cruises along the west coast of India collected some interesting data which add considerably to our understanding of the topography and fishery potential of the area. At present very little information is available on the topography of the east and west coasts of India especially beyond the 90 m line. The reports on the topography of the Indian Ocean by Shepard (1948), Setty (1964), La Fond (1965) and Rao *et al.* (1965) are worth mentioning. They have given informative accounts regarding the presence of some submarine canyons and ridges in the continental shelf of east coast of India.

The present account is mainly based on the surveys carried out by R/V *Varuna* between latitudes 10°N and

11°N. A Simrad scientific sounder having a range of 5200 metres and a Simrad sonar model 580-4 with a range of 1500 metre were used throughout this survey. The exploratory fishing was carried out with the help of a 77-foot shrimp trawl with a pair of otter boards weighing 176 kg each. This survey was carried out during February, March and April 1971. In the nearshore areas, navigation control was obtained by visual and radar bearings. In the offshore areas, positions were maintained by dead reckoning with respect to land tides and celestial fixes, assuming a constant drift rate. The positional accuracy for the nearshore areas is probably within 2 km while that for the offshore areas may be as much as 3.5 to 5 km depending upon the currents and winds. A bathymetric chart showing contour lines at 90 m intervals beginning from the 90 m depth-line is presented in Fig. 1.

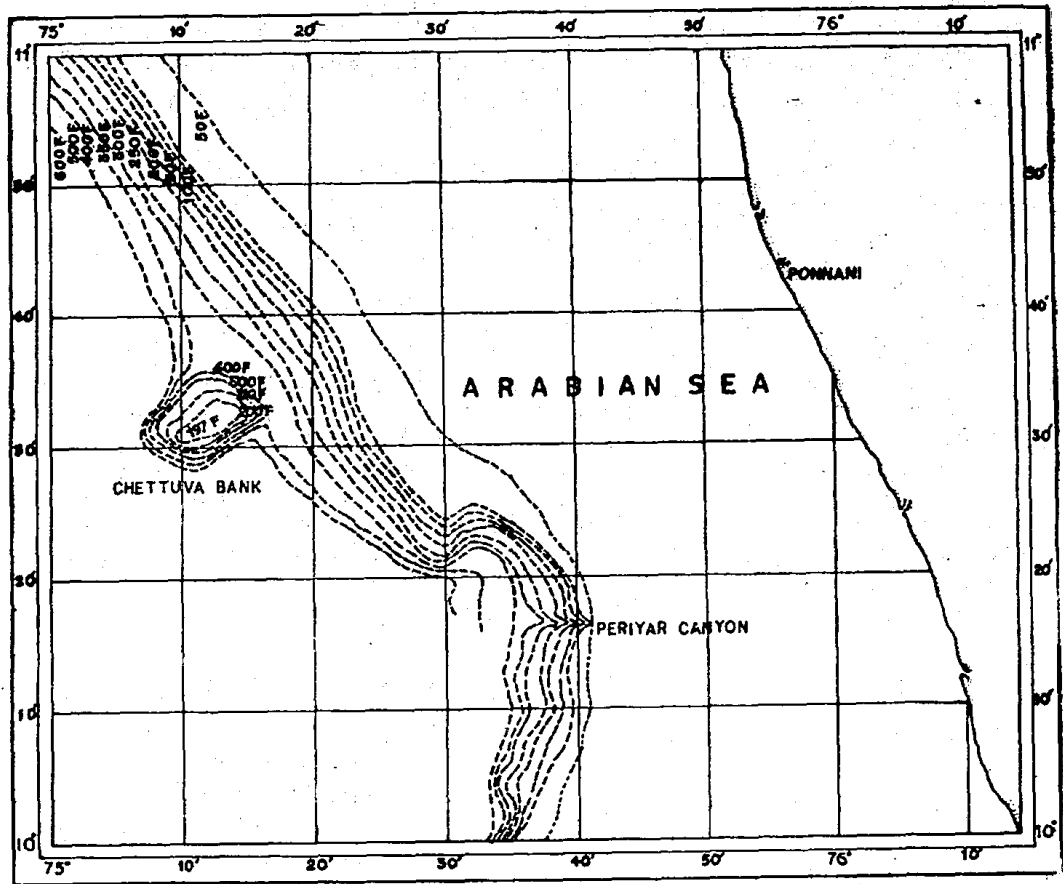


Fig. 1 Map showing Chettuva Bank and Periyar Canyon in the Arabian Sea in relation to southwest coast of India. ( 1 fathom = 1.8288 m ).

#### GENERAL CONTOUR OF THE BOTTOM

The survey revealed some interesting information on the nature and contour of the area lying between 100 m and 800 m depths. The area lying within this depth is comparatively a narrow strip with an average width of 9 to 23 km (Fig. 1). The steepness of the shelf and the slope varies from place to place. The shelf area lying between 90 and 180 m is with an inclination of 11 to 27 m every 2 km while the area between 180 and 800 m is with an inclination of 90 to 135

m every 2 km. The shelf area lying north of latitude 10°25'N is wider when compared to the area lying south of it. The ground lying within this depth range is not suitable for an ordinary type of trawling due to steepness and uneven nature of the surface. The uneven nature of the surface is mainly due to the presence of shallow ridge-like projections which rise to 0.25 to 3.50 m from the ground level. Fishing in this area with hooks and lines and with bobbins trawl revealed that it is

potentially a rich fishing ground. The main fishes available in this locality are the species of 'Kalava', i.e., *Epinephelus diacanthus*, *E. areolatus*, *E. malabaricus*, *E. chlorostigma*, *E. tauvina*, and the 'Velameen' *Pristipomoides argyrogrammicus*. Based on the available data the Integrated Fisheries Project has started to exploit this area with bobbins trawl.

#### THE PERIYAR CANYON

An important finding made during this survey was the presence of a small canyon like depression in the continental shelf between the latitudes 10°15'N and 10°19'N (Fig. 1). It is V-shaped in profile and becomes broader towards offshore. It commences its course at about the 90 m line where the 180 m isobath pass along the 90 m depth line and extends across the shelf beyond 635 m depth. Attempts to sample the sediments of the canyon failed due to strong currents but the high acoustic reflectivity suggested a firm bottom presumably well swept by turbidity currents. The width of the canyon head varies from 3.5 to 5 km. The Integrated Fisheries Project named it as the Periyar Canyon as it is lying off the mouth of Periyar river. Several theories have been put forward regarding the origin of submarine canyons like turbidity current hypothesis, sub-aerial erosion, sand flows etc. (Shepard, 1948). But the present one probably owes its origin to the Periyar river and is maintained by the submarine processes of the turbidity currents, since it is located off the mouth of Periyar river. But a thorough investigation of this canyon is necessary before its origin and exact relationship to the continental shelf can be explained.

#### THE CHETTUVA BANK

Another interesting observation made during the survey was the presence of a raised flat-bottom beyond the 545 m line (Fig. 1). Echo surveys were made to find out the area and the depth range of this raised flat-bottom. This ground is located between the latitudes 10°31'N and 10°33'N and longitudes 75°09'E and 75°15'E and is approximately 100 km away from the coast. It covers an area of about 28 sq km with an average depth range of 360 to 385 m. This ground was named the Chettuva Bank after the place Chettuva, off which it is located.

To understand the fishery potential of this area, nearly 8 trawl hauls were made from different regions (Table I). The bottom is comparatively hard and composed of fine sand and mud. A total of 667 kg of fishes, prawns and lobsters were hauled on board in 7 hours and the calculated catch per hour is 95.3 kg.

Of the total catch, 12.3% were of deep sea lobster - *Puerulus sewelli*. A peculiarity observed in this catch was that it contained specimens of varying sizes, ranging from 40 mm to 195 mm in varying stages of maturity. Of these, 65% were females from which 30% were carrying eggs of different stages of maturity.

About 45% of the total catch was of deep sea prawns. The catch was composed mainly of 4 species, *Aristeus semidentatus*, *Heterocarpus gibbosus*, *H. wood-masoni* and *Parapandalus spinipus*. *A. semidentatus* and *H. gibbosus* were of bigger size and constituted about 43% of the prawn catch. The other two species were comparatively smaller in size.

TABLE I. Catch composition, nature of bottom, depth range and position of the Chetiuwa Bank

Haul No.	Date	Duration of haul	Depth (m)	N	E	Nature of Bottom	Catch in Kg Lobster Prawns Fishes	Total
1.	11-3-71	30 min	355	10°32'	75°14'	Sand & mud	-	-
2.	11-3-71	30 min	365	10°32'	75°14'	"	8	17
3.	14-4-71	60 min	365	10°31'	75°15'	"	15	55
4.	14-4-71	60 min	365	10°31'	75°17'	"	15	55
5.	14-4-71	60 min	360	10°31'	75°15'	"	20	60
6.	15-4-71	60 min	360	10°31'	75°17'	"	10	80
7.	15-4-71	60 min	360	10°31'	75°17'	"	8	30
8.	15-4-71	60 min	360	10°31'	75°17'	"	4	30
							40	74

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Fishes constituted 39% of the total catch. Among this, the only fish of economical value obtained in large quantities was the Green Eye - *Chlorophthalmus agassizi*, which alone constituted nearly 30% of the fish catch. Other fishes of not much economic value were the following: *Ateleopus natalensis*, *Antegonia rubescens*, *Bembrops caudimacula*, *Chaux nax pictus*, *Chirolophius mutilis*, *Chlorophthalmus corniger*, *Gubiceps natalensis*, *Epinula orientalis*, *Haliutea indica*, *Lepidotrigla longipinnis*, *Myripristis kaianus*, *Neoscopeleus microlepidotus*, *Peristedion* sp., *Polymixia nobilis* and *Trigla picta*.

TABLE II Some environmental parameters from the Chettuva Bank

Station No.	Date	Position N E	Depth (m)	Temperature (°C)	Oxygen (ml/l)	Salinity (‰)
1.	11-3-71	10°31' 75°13'	365	12.05	2.903	34.71
			275	12.85	3.299	34.74
2.	11-3-71	10°32' 75°12'	365	12.15	2.177	34.74
			275	13.15	3.695	34.87
3.	12-3-71	10°33' 75°10'	365	11.85	3.101	34.07
			275	13.18	2.376	35.01
4.	12-3-71	10°34' 75°15'	365	12.29	2.442	35.01
			275	13.72	3.958	35.01
5.	12-3-71	10°35' 75°13'	365	12.04	2.705	35.01
			275	12.33	1.188	34.87

TABLE III. A comparison between Chettuva Bank and Honowar Bank

	Chettuva Bank	Honowar Bank
Area	24 sq km	185 sq km
Depth	360 - 385 m	195 - 365 m
Distance from shore	100 km	167 km
Position	10°31' to 10°36' N. 75°09' to 75°15' E.	14°03' to 14°28' N. 72°45' to 72°56' E.
Catch	Encouraging	Not encouraging
Bottom nature	Sand and mud	Mud
Temperature	11.85 to 12.05°C	12.40 to 12.80°C
Salinity	34.07 to 35.01‰	35.39 to 35.53 ‰
Oxygen	2.18 to 2.90 ml/l	0.26 to 0.85 ml/l

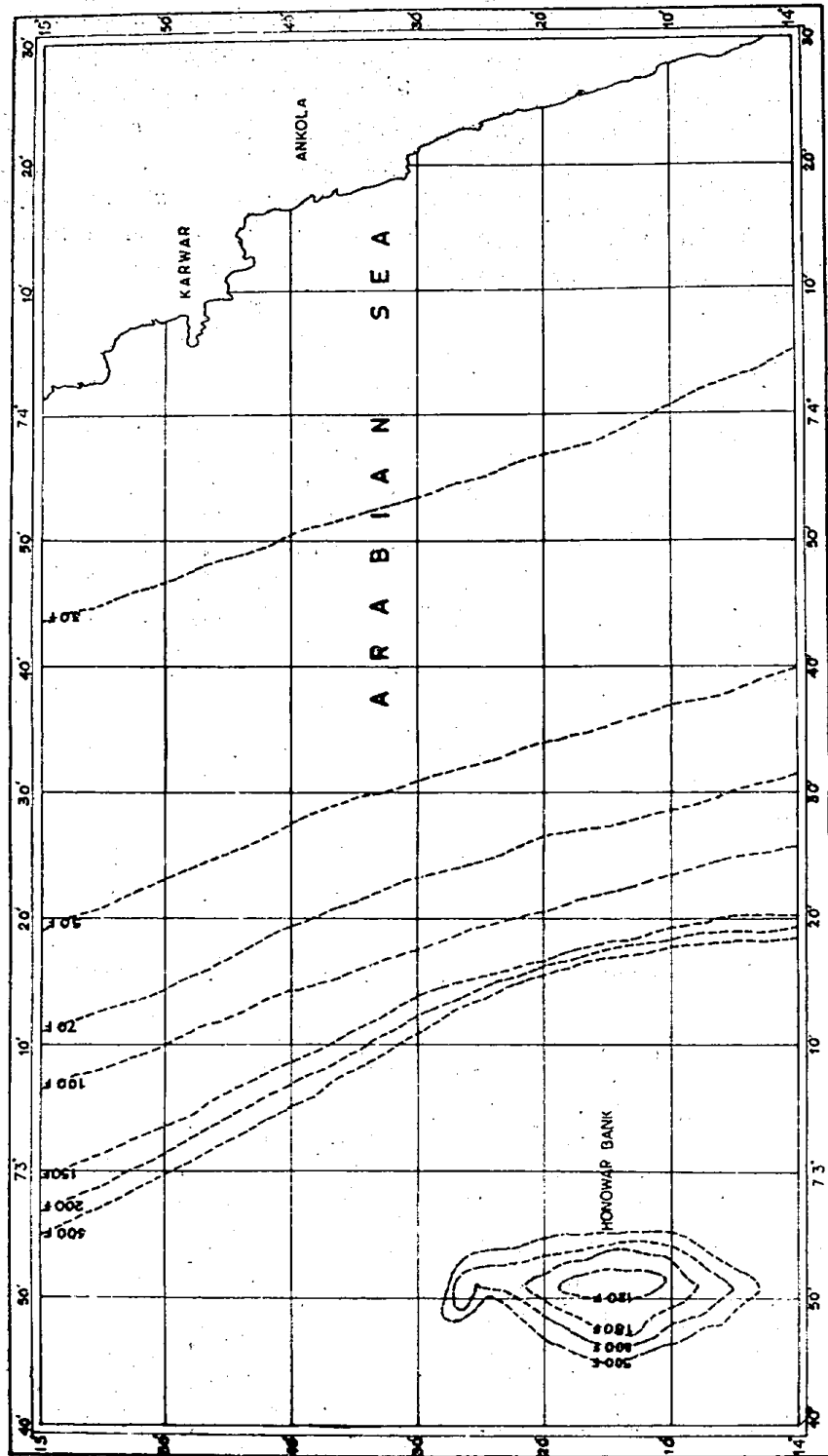


Fig. 2. Map showing the Honowar Bank in the Arabian Sea in relation to southwest coast of India.

*Varghese P. Oommen : Topography and fishery potential south west coast of India*

Hydrographical observations were made at 5 different stations in the Chettuva Bank (Table II). The bottom temperature ranged from 11.85 to 12.05°C, the dissolved oxygen from 2.18 to 2.90 ml/l and the salinity from 34.07 to 35.01‰.

A similar bank, Honowar Bank, was located during the charting cum exploratory fishing cruises along the Mysore Coast between the latitudes 14°N and 15°N (Remoey and Oommen, 1971). It is relatively a large one (Fig. 2). A comparison of the two banks is given in Table III. The catches obtained from the Honowar Bank were not encoura-

ging. These were mainly composed of trash fishes and included dead gastropod shells and tubicolous polychaetes. The deep sea lobster *Puerulus sewelli* was totally absent from this area.

ACKNOWLEDGEMENT

I am grateful to Mr. M. Devidas Menon, Director, Integrated Fishery Project, Cochin, for his valuable guidance and constant encouragements extended to me throughout the course of this investigation. My thanks are also due to the Captain and crew of the R/V *Varuna* for all their help on board the vessel.

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