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The Pearl Banks Inspection—April, 1970

By

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(With three text figures)

The last major Pearl Fishery in the Gulf of Mannar was held in February-March, 1958, when about 4.5 million oysters were collected from the south-west CHEVAL paar by dredging. (Sivalingam 1961). Subsequently, two smaller fisheries, one in 1960 and another in 1961, took place. In these two fisheries one million oysters and four hundred thousand oysters respectively were collected from the CHEVAL paar by dredging. (De Fonseka 1963).

Inspections of the Banks were carried out in 1962, 1963, 1964 and 1965. (Balasuriya 1964 and Silva 1965 and 66). Since then inspections were not possible due to one of two reasons or both the non-availability of operational dredges and a suitable vessel for this type of work.

The "Pesalai" a 235-ton stern trawler was made available by the Ceylon Fisheries Corporation management for the 1970 inspection. Two new 6-foot dredges turned out by the Government Factory were also available for this work. However, the survey was limited to 3 days—the period for which the vessel had been released. It was further limited to those areas of the banks over 6 fathoms in depth because of the risk in operating a large vessel in shallower depths.

Distribution of Oysters

Charts showing the distribution of oysters over the paars compiled from the inspections made in 1921, 1922, 1923, 1924 and 1925 (Pearson 1929) were examined. Likewise the distribution of oysters in the 1958 fishery (Sivalingam 1961) were also examined. (Fig. 1). The paars most frequently populated with oysters were TRUE VENKALAI, PERIYA PAAR KARAI, NORTH CHEVAL, WEST CHEVAL, EAST CHEVAL and MODERAGAM PAAR. The modus operadi for the 1970 inspection was worked out after a study of the distributional pattern of oysters more so in view of the limited time available and the operational limitations of the vessel.

Survey

The dredge survey commenced on 4th April and was completed on 7th April. Dredging was only during the daylight hours from about 8 a.m. to 5 p.m. The trawler was rigged for operating a 6-foot dredge alternately on the port and starboard sides. A dredge was always in operation on the ground being surveyed to ensure continuity to a dredge line and to save on time. The duration of tow depended on the towing speed to secure uniformity in the distance covered by each tow. The average duration of tow was 30 minutes and the distance covered 2 nautical miles. Dredging was at the minimum speed possible in the sea condition prevailing at the time.

The material brought up by each dredge was examined for pearl oysters and other marine forms (Appendix) that co-exist on the bank. Dredge hauls were made at 36 Stations and the inspection covered an area of approximately 34 square miles.

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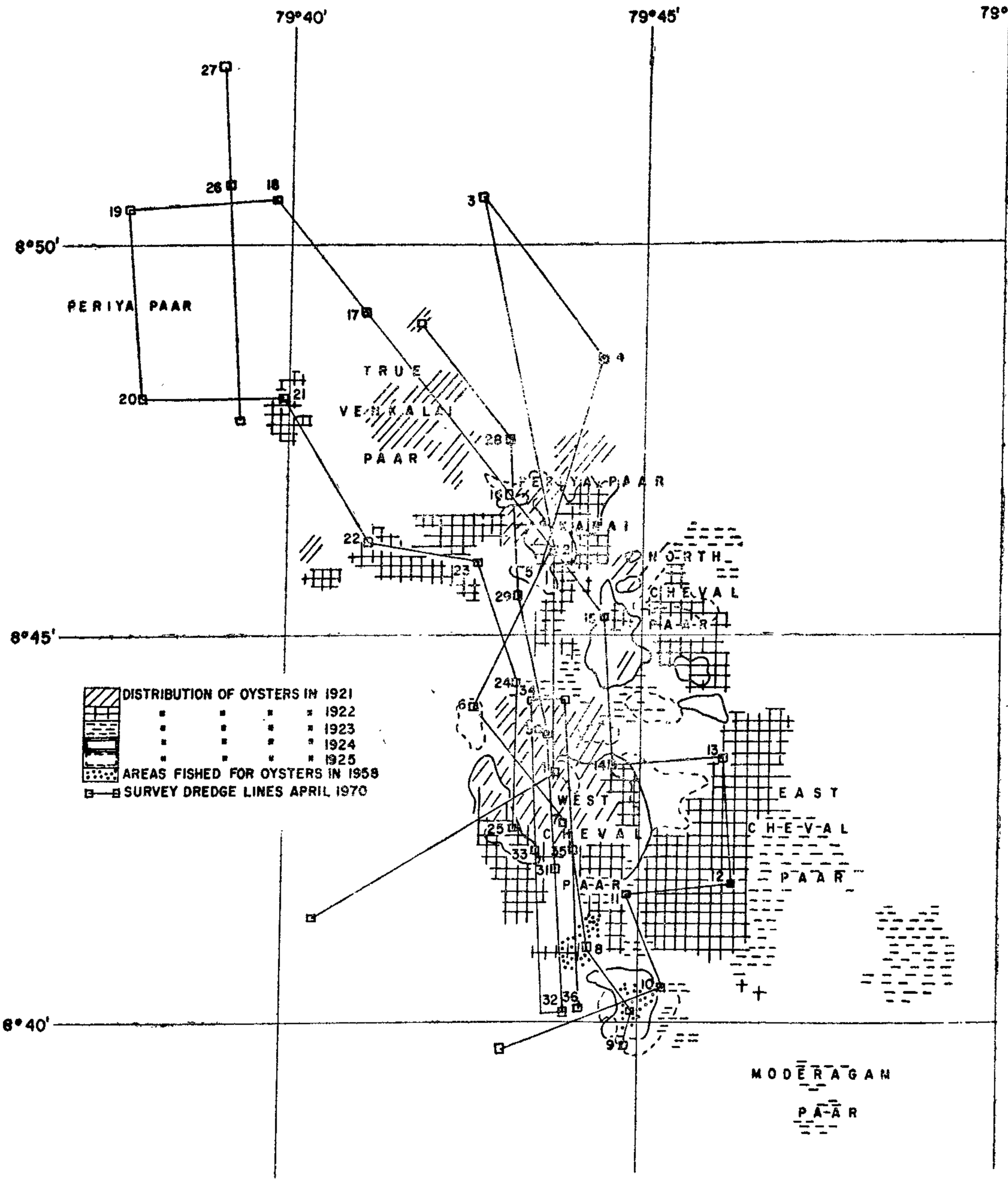

FIG. 1. CHART OF PEARL BANKS SHOWING—
(a) the 1970 (April Survey dredge lines and Stations
(b) disfribufion of oysters during the years 1921 to 1925 and 1958

On the first day the western and southern parts of West Cheval, Periya Paar Karai and East Periya Paara were inspected. On the second day the eastern parts of West Cheval and North Cheval, Periya Paar Karai, the central part of True Venkalai and Periya Paars were inspected. The third day's inspection was based on the findings of the first two days work, dredging in those areas of the banks where pearl oysters had been collected. (Fig. 1).

Results

Dredged material from the 36 stations was collected and examined for pearl oysters. Oysters were taken from the following stations : 3, 4, 6, 10, 18, 24 and 26. (Fig. 1). Particulars of area, the number and size of oysters are given in Table I (page 53). The most number of oysters, ten in a single dredge was from the Periya Paar Karai. South West Cheval yielded 4 oysters, North-West Cheval 4, and Periya 3. Venkalai Paar had only 1 oyster. The results indicated a scattering of oysters in very small numbers in five of the paars surveyed. The dredged material was more or less uniform with sea urchins and gorgonids predominating. The nature of the bottom varied from paar to paar and in some instances from station to station on the same paar. (For details of the material in the dredge at each station refer to appendix).

Discussion

The absence of a large number of oysters is not unusual. In the past too, there have been instances when only a dozen or so oysters had been collected during an inspection (Pearson—1929). Periods of barrenness followed by periods of abundance of oysters and vice versa have been a feature of the Pearl Banks.

The reasons for this may be many and varied. Studies by earlier workers have shown that there are two breeding seasons, one in July-August and the other in December-January (Pearson—1929), for which a sufficient number of sexually mature oysters on the beds is essential. The Ceylon pearl oyster is sexually mature at the age of 12 months and a prolific breeder (Pearson 1929). A few days after fertilization of the released ova, the pelagic larvae that emerge must find attachment to floating or rooted algae or perish (Herdman 1904). The presence of algae on the banks, therefore, is an important factor in their development. The young spat, as they are known at this stage of the life cycle, later drop off and sink to the bottom which if suitable for attachment, will help further growth of the oyster (Herdman 1904).

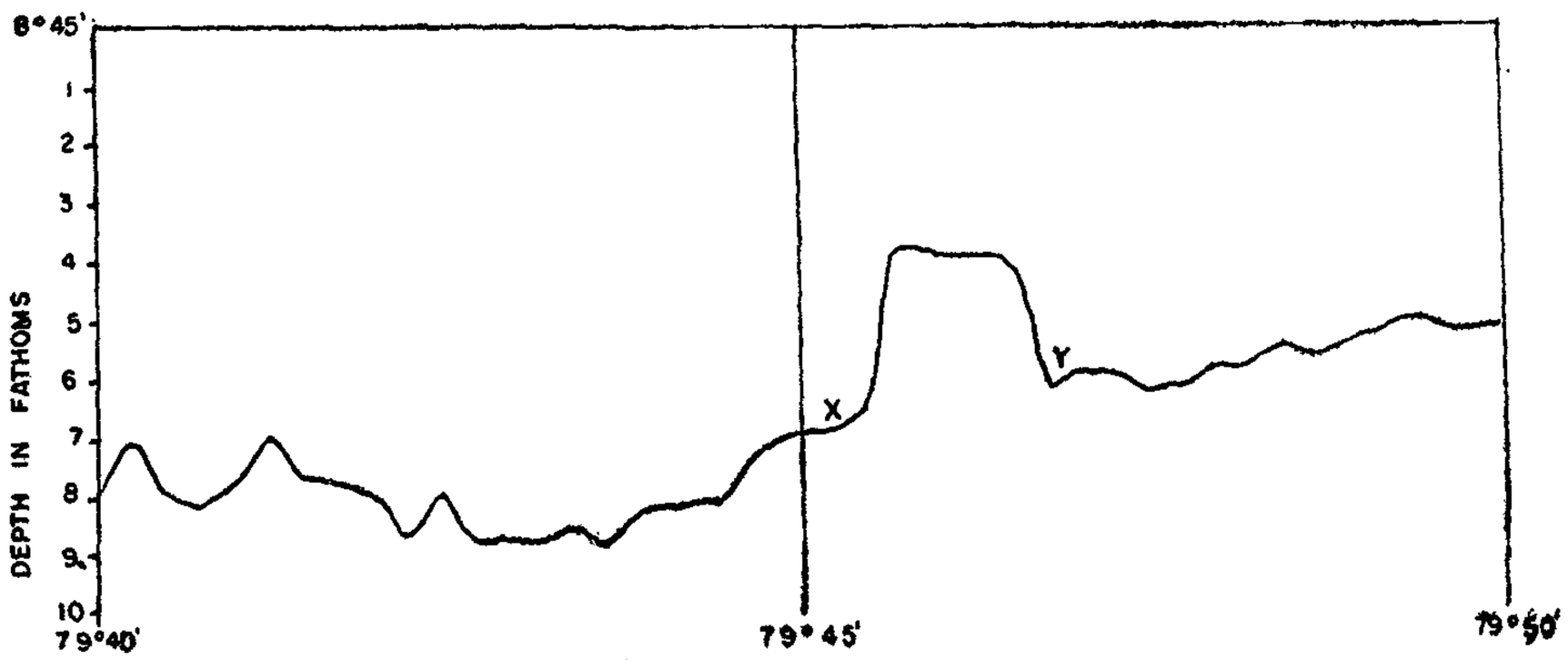

Fig. 2.—Bottom Profile of East and West Cheval Paar at 8°45′ Latitude.

The bottom profile in some areas of the banks is uneven with sudden rises and falls (Fig. 2). his was evident from the echo traces recorded during the inspection. If the young spat settle down n paar ground similar to "X" or "Y" in Fig. 2 there is a likelihood of the oysters being buried by ilting sand. Silting produced by tidal drifts will be in the direction of drift and is common both uring the South-West and North-East Monsoons. Tests made by Pearson have shown the presence f a movement of water on the bottom (Pearson 1929).

The reported disappearance of extensive beds of oysters within six weeks of detection once in 1902 (Herdman 1904) and again in 1925 (Persons 1929) on the South-West Cheveal paar gives credence to the suggestion that silting sand will cover oysters on ground with a bottom contour similar to that shown at "X" and "Y" in Fig. 2.

Destruction of young oyster beds can also be caused by predatory aminals such as skates which have been observed making frequent forays (Pearson 1929).

It has been suggested by earlier workers such as Southwell that the Indian (Tuticorin) and Ceylon banks may be inter-dependent in repopulating each other (Person 1929). While such a possibility does exist it seems more likely that repopulation, as far as the Ceylon banks are concerned, is by local pearl oysters (Hornell 1914). During the July–August breeding season at the height of the South West Monsoon it is likely that pelagic larvae having their origin in the Southern paars, namely, Donnans Muthuvaratu, Hamillon's Muthuvaratu, Alanturai and Karativu paars are swept north eastward by tidal drifts and may settle down as spat on the northern and eastern paars (Fig. 1). Similarly during the December-January breeding season larvae having their origin in the northern and eastern paars are swept south westward also by tidal drift and may settle down as spat on the southern paars. This will undoubtedly point to the inter-dependence of the southern and northern paars.

The southern paars have not produced many fisheries (Herdman 1904). Failure to inspect them at regular intervals in the past may be one reason, but the more plausible explanation is their location which, like the Periya Paar, is in close proximity to the continental slope. Most of the pelagic larvae having their origin in the northern and eastern paars are probably swept by the south westerly tidal drift beyond the southern paars and over the continental slope to perish for ever.

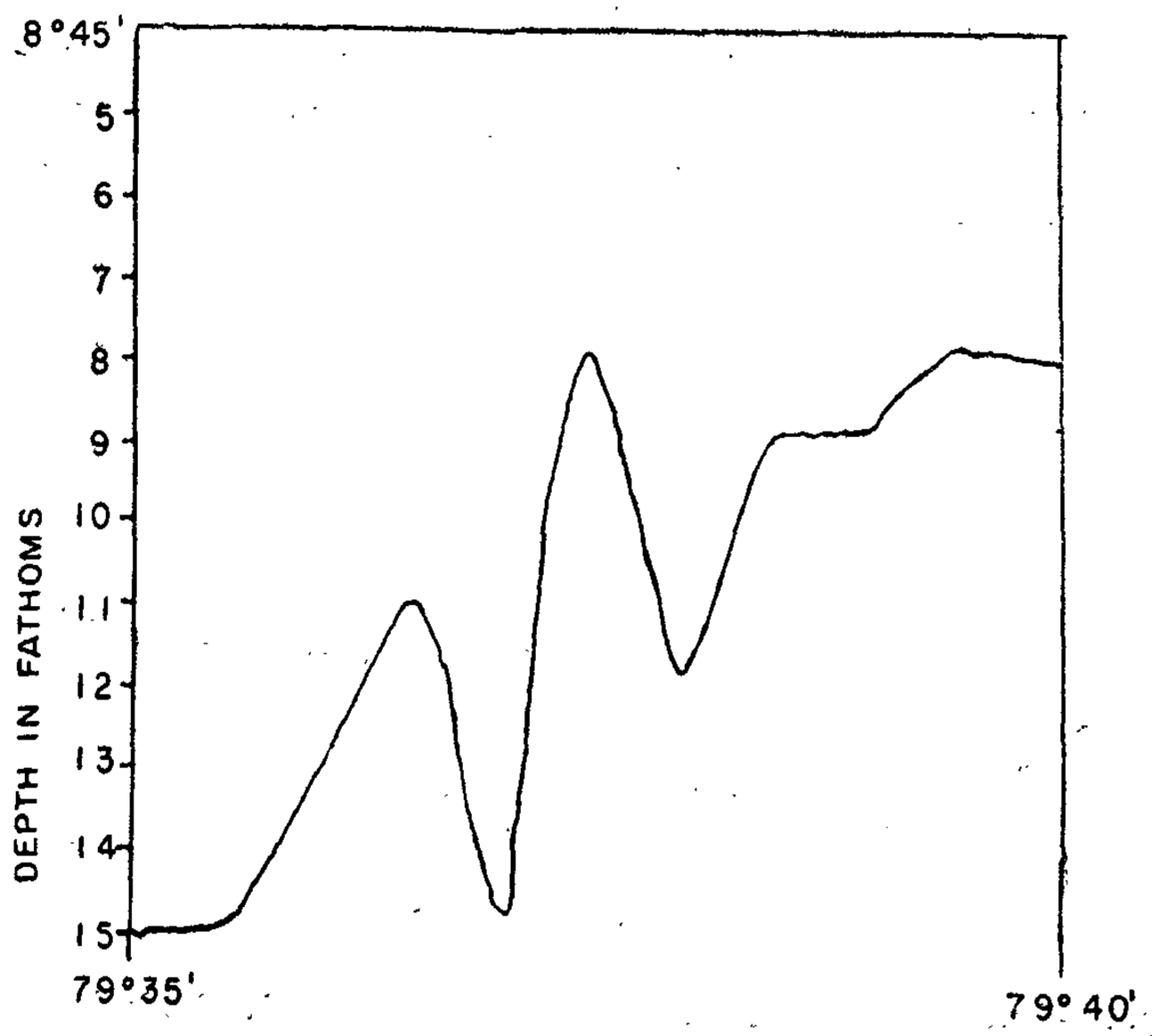

Fig. 3.—Bottom Profile of Periya Paar at 8°45′ Latitude

The Periya paar (Fig. 1) however, receives more deposits of spat than any other paar (Herdman 1904), but has not produced a fishery. The bottom profile (Fig. 3) is uneven with a rapid drop from 8 fathoms to 10 and 15 fathoms. In these circumstances, silting sand, during a south westerly tidal drift, will completely cover the young oysters deposited as spat druing a July-August breeding season.

CONCLUSION

Only after an inspection of the EAST CHEEVAL, SOUTH CHEVAL and MODERAGAM paars will it be possible to establish whether the entire banks are deplete of oysters. Depletion of the oyster population can be caused by one or a host of reasons :—

(1) The absence of a breeding stock ;
(2) The failure of the pelagic larvae to settle down as spat on paar ground ;
(3) Pelagic larvae being swept by tidal drifts into areas too shallow or too deep for survival;
(4) The absence of floating or rooted algae for attachment ;
(5) Oysters being covered by silting sand ;
(6) Destruction of oyster beds by predators, and generally—
(7) Unfavourable natural conditions.

This has been well summed up by Pearson ; "There is no guarantee that a bed of oysters once established will produce a spatfall on the bank . The floating larvae are at the mercy of the elements and no one can say in a specific case what will happen."

Any future inspections using a boat that can operate in shallow depths should be extended to include the Southern Paars ; Donnans MUTTUVARATU, HAMILTONS MUTTUVARATU, ALANTURAI and KARATIVU paars which have not been inspected in the recent past.

A fishery for pearl oysters can only be held when an inspection of the banks reveals the presence of mature oysters in sufficiently large numbers to make fishing them economically feasible ; and as oysters are fished for their pearls, a good market price for pearls is essential. However, with improvement in methods and techniques in pearl culture, the market for uncultured natural pearls has progressively declined This was evident during the 1961 fishery by the difficulty experienced in disposing of the oysters fished. (De Fonseka. 1960–61).

Canned pearl oysters, however, may prove to be a virtual money spinner in foreign markets and for any future pearl fishery to be an economic success a demand for them in those markets will have to be encouraging.

TABLE I

Particulars of Oysters Collected

Station No.	*Paar*	*No. of Oysters*	*Long Axis in mm.*
3 ..	Periya Paar Karai ..	10 ..	48, 39, 38, 27, 26, 25, 24, 23, 22, 19
4 ..	Venkalai ..	1 ..	39
6 ..	N. W. Cheval ..	3 ..	46, 40, 40
10 ..	S. W. Cheval ..	4 ..	51, 50, 47, 43
18 ..	Periya ..	2 ..	60, 37
24 ..	N. W. Cheval ..	1 ..	58
26 ..	Periya ..	1 ..	34

M.S. received—18th June, 1970.

ACKNOWLEDGMENTS

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M. S. Received 22.6.1970

APPENDIX

Particulars of Dredged Material

Station 1.—West Cheval

Mostly Gorgonids, red cup sponges, biscuit urchins, a few dead pearl oyster shells, 1 brittle star and 1 star fish. Pieces of limestone with quartz encrusted to it by carbonate of lime. A little algae also present.

Station 2.—Cheval

Mostly gorgonids, brain coral 10 star fish and a little sea weed. A few dead oyster shells, large size biscuit urchins and 4 Holothurians.

Station 3.—Periya Paar Karai

Biscuit urchins both large and small and heart urchins. Brain coral, stag horn coral and calcretes encrusted with polyzoa and nullipors. *10 live pearl oysters* and plenty of dead shell.

Station 4.—Venkalai

Both biscuit and heart urchins. 1 chank and a few shells. Some coral and dead oyster shells. *1 live pearl oyster.*

Station 5.—Periya Paar Karai

Mostly Gorgonids biscuit and heart urchins, pencil urchins, a little sea weed and about 30 star fish. 2 small skate and one recently dead shell.

Station 6.—Cheval

Mostly brain coral and sponges as well as 7 star fish and *3 live pearl oysters.*

Station 7.—West Cheval

Mostly lime stone coral sea urchins and a lot of dead shells, sea weeds and sargassum weed, 2 flat fish (small).

Station 8.—South West Cheval

Gorgonids, sea urchins, 5 star fish, dead oyster shells and sand.

Station 9.—South Cheval

Large quantity of small biscuit urchins, 9 star fish, dead shells including sand ; shell gravel cockles, dead coral and balls of Lithothamion.

Station 10.—South Cheval

Brain coral, stag horn coral, a few gorgonids, sponges and shell conglomerate, *4 live oysters.*

Station 11.—West Cheval

Biscuit urchins and heart urchins, 23 star fish, a few dead oyster shells, 2 Holothurians, 3 Crinoids and a little sand and lime stone coral.

Station 12.—East Cheval

Mostly gorgonids, biscuit urchins, both large and small, heart urchins, dead coral with cemented quartz grain and 4 star fish.

Station 13.—East Cheval

Biscuit urchins, heart urchins 10 star fish, 4 brittle stars, sand and dead shell.

Station 14.—West Cheval

Heart urchins, biscuit urchins, 8 star fish sand and algae.

Station 15.—North Cheval

A few pieces of dead coral, sponges and sand. A crinoid and I Holothurian.

Station 16.—Periya Paar Karai

Sand and calcretes encrusted with nullipors. Pencil urchins and Crinoids.

Station 17.—True Venkalai

Stag horn coral, sponges dead shell and a little sea weed.

Station 18.—Periya

Mostly sponges, dead shell and dead coral, *2 live pearl oysters.*

Station 19.—Periya

Mostly coral and sponges. *1 pearl oyster* partly damaged.

Station 20.—Periya

Mostly coral and sponges. A few biscuit urchins as well.

Station 21.—Periya

Coarse sand, various types of sponges, biscuit urchins, 2 Holothurians and 9 star fish.

Station 22.—True Venkalai

1 Holothurian and a few molluscs with a little sand, 1 star fish (*Pentaceros sp.*).

Station 23.—True Venkalai

Sea weed, a few biscuit urchins and dead shell with sand.

Station 24.—N. W. Cheval

Mostly gorgonids, biscuit urchins both large and small limestone coral and *1 live pearl oyster.*

Station 25.—West Cheval

Limestone coral, sand urchins, 22 star fish both large and small.

Station 26.—Periya

Coarse sand and a few sponges and biscuit urchins, *1 pearl oyster.*

Station 27.—Periya

Heart urchins, biscuit urchins, 18 star fish and a little coral formation, 1 small *Pegasus druconius* and a few molluscs, including 2 chanks.

Station 28.—Venkalai

Biscuit urchins, a few conus shells and a large chank.

Station 29.—Periya Paar Karai

Some calcrete, star fish (including 2 *Pentaceros* spp.) and biscuit urchins.

Station 30.—N. W. Cheval

Limestone coral, biscuit urchins, gorgonids, 2 crinoids, dead shell and sargassum weed.

Station 31.—W. Cheval

Biscuit urchins, 1 *Pentaceros* sp. star fish, 2 small spider crabs and 2 flat fish.

Station 32.—S. W. Cheval

Biscuit urchins and heart urchins, cockels and dead coral including balls of Lithothamion.

Station 33.—W. Cheval

Mostly sea urchins and deadshells. 5 star fish a pencil urchin sand and a little sea weed.

Station 34.—N. W. Cheval

Mostly biscuit urchins, limestone coral ,5 star fish, a chank and a little sea weed.

Station 35.—W. Cheval

Gorgonids, biscuit urchins, a Holothurian, stag horn coral a little sea weed and dead shell.

Station 36.—S. W. Cheval

Mostly biscuit urchins and heart urchins, 5 star fish, Gorgonids, dead pearl oyster shells and pieces of calcareous rock and shell conglomerate.