

FISHERIES RESEARCH STATION
DEPARTMENT OF FISHERIES, CEYLON

Bulletin No. 11

THE 1958 PEARL OYSTER
FISHERY, GULF OF
MANNAR

BY

S. SIVALINGAM

1961

PUBLISHED BY THE FISHERIES RESEARCH STATION, CEYLON

THE 1958 PEARL OYSTER FISHERY, GULF OF MANNAR

By S. SIVALINGAM, Research Officer, Department of Fisheries

INTRODUCTION

THE continental shelf between the three and twelve fathom lines, off the Ceylon coast in the Gulf of Mannar is popularly known as the Pearl Banks. Though the area of this plateau is extensive the pearl oysters are concentrated on restricted areas known as "paars". The more productive of these are the Cheval Group of paars and the Moderagam Paar. The Peria Paar and Twynam's Paar though covering larger areas are not dependable as oyster beds. The True Vankalai, Peria Paar Karai and Muthuvarathu Paars are small in extent, but have yielded oysters on a commercial scale.

Although the Ceylon Pearl Banks has been commercially fished for centuries, the first scientific investigation of its pearl oysters on an intensive scale was started by Herdman in

1902 (1902-06) and later continued by Hornell (1905-41), Shipley (1904-06), Pearson (1911-33), Jameson (1912-13), Southwell (1910-14) and Malpas (1922-39).

The pearl fishery operations are normally limited to the months of February, March and April when the winds are lighter soon after the height of the north east monsoon in December. During the southwest monsoon i.e. from the latter part of May till the end of October no operations can be carried out because of bad weather conditions. Surveys of the pearl oyster beds are carried out twice a year, one in February or March and the other in November. While it is possible to carry out extensive surveys over a longer period during February and March, the November survey is often limited to a period of about two weeks towards the end of the southwest monsoon and before the northeast monsoon sets in.

SURVEYS OF THE PEARL BANKS SINCE THE LAST PEARL FISHERY UP TO 1955

THE last pearl oyster fishery was held in 1925. The fishery started on the 27th of February employing about 300 divers and 21 boats and continued till April 11th. During the peak period 1908 divers were operating on the Bank with 125 boats. Of these only 157 i.e. 8.5 per cent. were Ceylonese divers and the rest Arab and South Indian divers. Fifteen and three quarter million oysters were fished and the average price per thousand oysters varied from Rs. 22 to Rs. 74 (Pearson *et al.* 1929).

Repopulation of the Bank which resulted in the above fishery in 1925 was first detected in 1921 as two heavy spatfalls, the first before March and the other before November the same year. Further spatfalls occurred till November 1923. The final number of fishable oysters estimated in February 1925 was 88 million of which only $15\frac{3}{4}$ million were fished a month later i.e. 18 per cent. of original estimate.

During the actual fishery, only a few weeks after the final survey, the estimated number appeared to have been greatly reduced. The number estimated on the South Twynam's Paar was 9.76 million and the actual number fished was 0.24 million i.e. only 2 per cent. It was not possible to give a definite explanation for the disappearance, though various suggestions like shifting of the markers (buoys), were made (Pearson *et al.* 1929).

Immediately after the fishery another survey of the beds was carried out. The results of the survey showed that the disappearance of oysters was not confined to the areas fished,

but was true for the whole area. It was also found that a tremendous reduction in exposed hard bottom had taken place due to sand movement. After the survey in April 1925 the hopes of a fishery in 1926, anticipated in 1924, was abandoned. The same results were obtained in the survey in November the same year (Pearson 1926a).

The surveys carried out during the subsequent years did not show any improvement in the situation. In 1926 a patch of oysters (approximately 30 million in number) was detected on the Muthuvarathu Paars and was expected to be ready for a fishery in February 1927. This patch was found to be reduced to $\frac{1}{3}$ its original strength in six months' time and a fishery for February 1927 had to be abandoned (Pearson 1927a). But strangely, in March 1927 the population on this bed was found to have increased from 10 million to 19 million. This increase coincided with the complete disappearance of oysters from the Alanthurai and eastern area of Donan's Muthuvarathu Paar (Pearson 1928). It was suggested by Pearson (1928) that the increase in the number over the western part of Donan's Muthuvarathu Paar was a result of the missing oysters being carried to this Paar by the southerly current. These oysters were not fished at any stage, as their presence became known too late for a fishery.

A heavy spatfall was indicated by the survey in March 1928 on the northern paars. This was expected to be mature for a fishery in 1931 but had disappeared by 1930. Regular surveys carried out from 1931 to 1939 gave no signs of repopulation of the Bank. From 1939 to 1953 only 4 surveys were carried out, with the same results. No further surveys were carried out till 1955.

SURVEYS OF THE PEARL BANKS 1955-1957

Oyster Population.—Pearl oysters on the Banks were reported for the first time since 1930 in 1955 during the November dredge survey. This survey covered the northern Part of the Cheval Paar and areas north of this Paar. The estimated minimum population was 213 million (Sivalingam 1958). The next survey was in March 1956. This was a dredge survey assisted by divers and covered the entire Banks. The total population was estimated to be 1,500 million (de Zylva unpub. MS. and 1957). However, this figure was based on very limited data obtained by the skin divers only. Based on the dredge results alone and calculated on the same basis as that for 1955 the estimated minimum population in March

1956 should have been 114 million. Although the latter survey covered more ground than the earlier one, the estimated minimum population was reduced from 213 millions to 114 millions within a period of four months. This was due to the almost complete disappearance of oysters from the Twynam and Peria Paars. When the final dredge survey before the fishery was carried out in November 1957, the estimated minimum population on the Cheval and Motheragam Paars alone had increased to 258 million as a result of spatfall since March 1956 (Table I).

The disappearance of the oysters from the Twynam and Peria Paars is not unusual. It is rarely that oysters survive up to a fishable age on these paars. Unlike on these two paars, on the Cheval and Motheragam Paars a heavy spatfall often results in a fishery.

TABLE I—RESULTS OF THE SURVEYS 1955-1957

Year	Total area surveyed in sq. miles	Area of oyster beds in sq. miles	Total estimated population in millions	Year Class of oysters:
<i>Twynam's and Peria Paar</i>				
1955 (Nov.)	entire area	24	158½	1954 (July-Aug.)
1956 (March)	58	3.4	13	?
1957 (Nov.)	not properly surveyed			
<i>True Vankalai Paar</i>				
1955	entire area	2	5½	1954 (June-July)
1956	not properly surveyed			
1957	not surveyed			
<i>Peria Paar Karai</i>				
1955	entire area	Nil	Nil	—
1956	not surveyed			
1957	not surveyed			
<i>Cheval and Moderagam Paars</i>				
1955	Northwest Cheval only	3	48½	1954 (Feb. and 1954 (July-Aug.))
1956	74	9.6	76	?
1957 ^a	35	21	258	mixed
<i>Karaitivu Group</i>				
1955	not surveyed			
1956	37	4.9	25	
1957	not properly surveyed			

^a North Cheval and East Cheval not properly surveyed.

Age.—The oysters when first discovered in 1955 were found to belong to the 1954 and 1955 generations except those on the West Cheval Paar which were of the 1954 generation only. All these if they survived till maturity would have been between three and four years of age in November 1957. The percentage frequency of the long axis measurements of samples of oysters obtained from the Southwest Cheval Paar in November 1957 is given in Figure 1 and Table II. Although spatfalls appear to have been continuous two major age groups

are evident, the older with an average age of about $3\frac{1}{2}$ years and the younger about $1\frac{1}{2}$ years to 2 years on the same basis as that for the 1955 Survey (Sivalingam 1958). The former will be the 1954 generation which was first detected in 1955 while the latter will be a new 1956 generation. Each station on the West Cheval Paar had one or the other age group predominantly represented (Table II). The 1957 survey revealed that, as expected in 1955, the 1954 year class would be ready for fishing in early 1958.

TABLE II—PERCENTAGE FREQUENCY DISTRIBUTION OF LONG AXIS MEASUREMENTS, NOVEMBER 1957

Length in mm.	Station Number										Average Percentage ^a
	63	64	65	66	67	68	69	70	71	72	
39	—	4.5	—	—	—	—	—	—	—	—	0.56
40	—	4.5	—	—	—	—	—	—	—	—	0.56
41	—	4.5	—	—	—	—	—	—	—	—	0.56
42	—	4.5	—	—	—	—	—	—	—	—	0.56
43	—	4.5	—	—	—	—	—	—	—	—	0.56
44	—	4.5	—	3.6	—	—	—	—	—	—	1.91
45	—	4.5	—	3.6	—	—	—	4.0	—	—	2.41
46	—	13.6	—	3.6	—	—	—	8.0	—	—	4.05
47	—	9.1	3.3	7.1	—	—	—	8.0	—	—	5.62
48	—	—	—	10.7	—	—	—	12.0	—	—	5.51
49	—	9.1	6.7	10.7	—	—	—	16.0	—	—	8.82
50	—	9.1	—	14.3	—	—	—	12.0	—	—	8.00
51	—	—	—	7.1	—	—	—	4.0	—	—	3.16
52	—	—	—	—	—	—	—	—	—	—	—
53	—	—	—	7.1	—	—	—	4.0	—	—	3.16
54	—	—	13.3	14.3	—	—	—	8.0	—	—	9.69
55	—	—	—	—	—	—	—	8.0	—	—	1.00
56	—	4.5	6.7	3.6	—	—	—	—	—	—	3.59
57	—	—	—	—	—	—	—	4.0	—	—	0.50
58	5.1	—	—	—	—	—	—	4.0	—	—	1.12
59	—	—	—	3.3	—	—	—	—	—	—	0.82
60	—	—	—	—	—	—	—	—	—	—	—
61	2.5	—	—	—	—	—	—	—	—	—	0.31
62	2.5	4.5	6.7	—	—	—	—	—	—	—	2.55
63	7.7	—	3.3	—	—	—	—	—	—	—	1.79
64	—	—	—	3.6	—	—	—	—	—	—	1.35
65	5.1	—	—	—	—	—	—	—	—	—	0.64
66	5.1	—	10.0	—	—	—	—	—	—	—	3.14
67	7.7	—	3.3	—	—	—	—	—	—	—	1.79
68	2.5	—	3.3	—	—	—	—	—	—	—	1.04
69	2.5	—	6.7	3.6	—	—	—	4.0	—	—	3.84
70	10.3	4.5	10.0	—	—	—	—	—	—	—	4.35
71	7.7	4.5	3.3	—	—	—	—	—	—	—	2.35
72	12.8	4.5	3.3	—	—	—	—	—	—	—	2.99
73	15.4	—	3.3	—	—	—	—	—	—	—	2.75
74	—	—	3.3	—	—	—	—	—	—	—	0.82
75	5.1	4.5	3.3	—	—	—	—	—	—	—	2.02
76	—	—	3.3	3.6	—	—	—	—	—	—	2.18
77	2.5	—	—	—	—	—	—	4.0	—	—	0.81
78	2.5	—	—	3.6	—	—	—	—	—	—	1.66
79	2.5	—	3.3	—	—	—	—	—	—	—	1.14

^a Weighted by population size at each station.

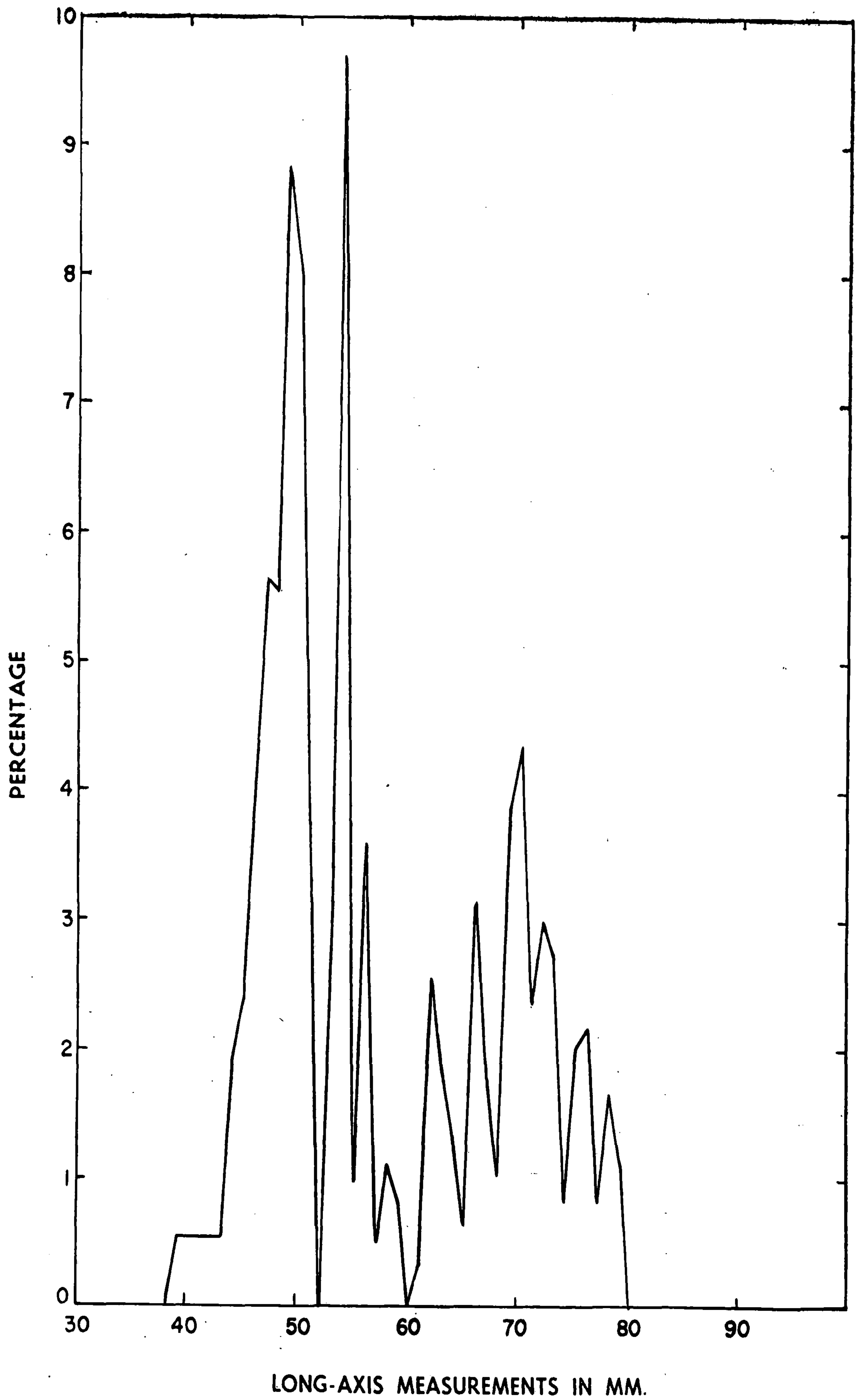


FIG. 1.—PERCENTAGE FREQUENCY DISTRIBUTION OF LONG AXIS MEASUREMENTS OF OYSTERS OBTAINED FROM THE SOUTHWEST CHEVAL PAAR IN NOVEMBER 1957.

Yield.—The very low value obtained for the pearl yield in the survey of 1955 (Sivalingam 1958) is to be expected, considering the fact that pearl production in the Ceylon oyster does not commence actively until the third year of life and progresses rapidly after the fourth year (Herdman 1906). The estimated age of the majority of the oyster population on the Banks in 1955 was less than 2 years. Unfortunately no valuation results are available from the 1956 survey for comparison. The pearl yield from three patches of oysters surveyed during November 1957 were, as expected from the results of the earlier surveys, quite

satisfactory (Table III). The three patches were from Southwest Cheval, North Motheragam and East Cheval Paars. The total population estimated in these patches was in the region of 7.5 million and the average value of the yield from these stations was Rs. 45 per thousand oysters. There has normally been an increase in value of the yield between the November survey valuation and the valuation during the fishery in February of the following year. The average increase recorded is 62 per cent. (Pearson *et al.* 1929). On this basis the expected price in February 1958 would be in the region of Rs. 74 per thousand oysters.

TABLE III—EXTRACTS FROM NOVEMBER 1957 PEARL VALUATION REPORT

Station No.	Estimated fishable population	Number of oysters in sample	Yield of pearls in carats	Total value		Value of yield per 1,000 oysters	
				Rs.	c.	Rs.	c.
63	300,000	200	2½	20	0	100	0
65	2,700,000	1,536	14	75	0	48	83
67	1,500,000	702	1½	45	0	64	10
88	1,800,000	1,085	5½	23	50	35	09
86A	1,200,000	602	3½	26	0	43	19

Stations 63–67—S. W. Cheval Paar
 88—N. Motheragam Paar
 86A—E. Cheval Paar

PROSPECTS OF A FISHERY

Maturity of the Oysters.—Maturity of the oysters is the major governing factor in deciding on a fishery. Various suggestions have been made regarding maturity and records show (Malpas 1933) that oysters were not considered fishable until they attain the age of five, six or even seven years. These suggestions were not based on the result of any scientific investigations. The divers and others connected with earlier fisheries considered a patch mature for a fishery if the edges of the shells of the oysters of that bed were worn away while the shells themselves appeared harder and thicker with widening of the scores at the back of the hinges.

In the case of a homogeneous bed the problem of determining the fishable year will be simple. But in the case of a heterogeneous bed it will depend on the percentage age composition which can be determined with some degree of accuracy at present. The other factors like mortality rate and rate of increase in pearl production of the various age groups that form the heterogeneous population have not been worked out precisely.

In connection with the optimum age for a fishery the observations made by Pearson (1931a) between 1924 and 1930 on Donan's Muthuvarathu Paar are important. According to him at no time did the average age of oysters exceed 3 years and 8 months, despite the bed being in existence for 7 years. He inferred from his observation that the average age a bed of oysters can attain does not exceed 4 years and concluded that the optimum age for fishing a bed of oysters is when they have reached an average of 3 1/3 years. Pearson (1933b) as a result of further investigations, concluded that oysters older than five years were very rare and that the best age for fishing was probably between 3 1/2 and 4 1/2 years.

Another criterion for deciding on a fishery is the value of the yield of a sample from the patch to be fished. This method of deciding on a fishery is very ancient and has been recorded as early as 1650 by Tavernier and in 1685 by Riberio (Kunz and Stevenson 1908).

If the value of the yield per 1,000 oysters averages Rs. 25 or Rs. 30, profitable results may be expected, provided there is a sufficient quantity of oysters on the bed. In this method it is the market price for pearls that decides the fishery and not the actual maturity of the bed. During the November 1957 survey, patches of oysters on the Southwest Cheval Paar were found to be 3 1/2 years old on the average, and the value of the pearl yield per thousand oysters from these patches was found to be Rs. 57.42. The results justified a fishery on the basis of both age and value of pearl yield. On these results it was decided to hold a fishery in February 1958.

Fishing Methods.—It has long been customary to use skin divers for pearl fisheries. Over 90 per cent. of the divers employed were from South India and Arab countries. During the 1925 fishery at no stage was the number of Ceylonese divers more than 167. The number of divers capable of working in depths up to 12 fathoms at present in Ceylon is negligible. Owing to the long interval between the last fishery and the present it was not possible to say whether the required number of divers could be recruited. As a result of increase in price of chanks (present price of 85 cts. compared to 20 cts. in 1930) it is more profitable for a diver to dive for chanks than for pearl oysters. The average number of oysters collected by a diver per day during the 1925 fishery was 378 of which the diver's one third share will be 126 oysters. The expected price per 1,000 oysters was Rs. 74. i.e., the diver will realise approximately Rs. 9.32 for his 126 oysters. Of this sum after giving one sixth share for the hire of the boat, collection from one dive to the Sammati, Tindal and Todai, and one third of the balance to the Manduck, all of whom work with him in the boat and have specific duties, the diver will be left with about Rs. 4.50—Rs. 5 for his day's diving. An average chank diver working in a depth of water less than half that on the Pearl Banks collects about thirty chanks per day and realises about 85 cts. per chank from the chank merchant. The total collection amounts to approximately Rs. 25 per day. Allowing about 25 per cent. for the boat, &c., the chank divers (most of whom work as pearl oyster divers

during pearl fisheries) gets a return of about Rs. 18·75 for a day's work in water less than 4 fathoms deep. It is unlikely that the average diver would be prepared to work harder in deeper waters for lesser returns.

One of the main reasons for the failures of certain earlier fisheries was the heavy overhead expenditure involved in (i) establishing a camp at the site for divers, officers, &c., and (ii) recruiting the staff necessary for supervisory work. It has also been mentioned by Pearson (1928) that it is not profitable to organise a fishery employing divers unless a minimum of about 15 million oysters are expected to be fished. The estimated fishable population for this fishery was only 7·5 million.

Most of the difficulties encountered by employing skin divers for fishing operations can be overcome by dredging the oysters with the help of mechanised boats. Capital expenditure on establishing camp is negligible and no extra staff is required for supervisory work for dredging operations. As a result of the very little expenditure involved for dredging operations, the loss to the Government is small in case of complete disappearance of oysters just before a fishery, as has happened earlier. From the experience gained during the dredge surveys, dredging was found to be very efficient. It was decided to dredge for the oysters in the 1958 fishery on an experimental basis.

FISHING OPERATIONS 1958

IT was decided to confine fishing operations to the three mature patches (Southwest Cheval, North Motheragam and East Cheval Paars) detected during November 1957. Of these, the Southwest Cheval Paar was surveyed in March 1956 with negative results using dredge lines one mile apart. In November 1957 due to strong winds the survey boat drifted between the original dredge lines and struck a mature patch of thinly distributed oysters. The presence of these oysters was taken as an indication of a good patch of mature oysters on the centre of Southwest Cheval Paar. To check this possibility and because of the fact that during earlier fisheries the pearl yield from this area fetched a higher price, this area was first explored for mature oysters. The results indicated that the assumption was correct and it was decided to fish this area first (Fig. 2).

Two 45 ft. mechanized boats "Canadian" and "North Star" (Fig. 3) Canadian west coast type boats, were available for the fishery and each was fitted with two hydraulic winches for simultaneous operation of two 6 ft. dredges (Fig. 4) specially designed for the fishery with the help of Mr. A. Barry, Skipper, "Canadian". They were similar to the ones used for the survey (Sivalingam 1958) except for the width which was 6 ft. at the lower edge and the rings for the bag which were 2 in. diameter (internal) and made out of $\frac{1}{4}$ " round iron (Fig. 4).

Dredging operations commenced on the 14th of February and continued till the 27th of March with 53 days of fishing between the two boats. Due to storage difficulties at Colombo, during the latter part of the fishery a limited number of bags of oysters were collected per day. 5,630 bags of oysters were collected in all with an average of 795 oysters in each bag. It may be noted that this total of 4.5 million oysters were fished from Southwest Cheval Paar only, which was estimated to be the minimum population in this area in November 1957. The area covered by the fishery was approximately 0.5 square nautical

miles. In the areas marked "A" (Fig. 2), fishing continued for eighteen days and 3,659 bags of pearl oysters were collected. When oysters on this area "A" became scarce adjoining areas were fished. Area "B" had oysters thinly distributed and only one day's fishing with a total collection of 210 bags of oysters was possible. In area "C" north-east of "B" a concentrated patch of oysters was found and a total of 1,455 bags were collected.

It is useful to compare the economics of dredging with that of employing divers for fishing oysters. During the 1925 fishery about 17 million oysters were fished which required 44,903 diver man days. On this basis to collect the 4.5 million oysters fished in 1958, it would have required about 11,904 diver man days. During this year's fishery, dredging operations were conducted on 32 days (some days only one boat was fishing). If the same quantity of oysters were to be obtained with the help of divers in the same number of days it would have required 372 divers per day and 447 co-workers comprising of 372 Manducks (men who attend to the divers' ropes), 25 Sammatis (boat owners' representatives), 25 Tindals (pilots), 25 Todai (water bailers), 25 vallams (boats) with an officer for each boat and at least two mechanized boats (of the same size as dredging boats) for towing the vallams. Divers and co-workers would require living quarters and other facilities. Dredging requires the same two mechanized boats as those required for towing the vallams, a few low priced dredges (Rs. 3,500 for the six used in 1958) and nothing more.

From the experience gained in the 1958 fishery it was found that, with proper incentive to the crew, it will be possible to fish a quarter million oysters with the help of two boats of the size of "Canadian" and "North Star" in a day—the work of 1,400 men per day if divers are employed.

Employing divers will no longer be economical. Dredging with the help of powered boats is much cheaper and can become very useful when the season is limited and when a large quantity of oysters have to be fished.

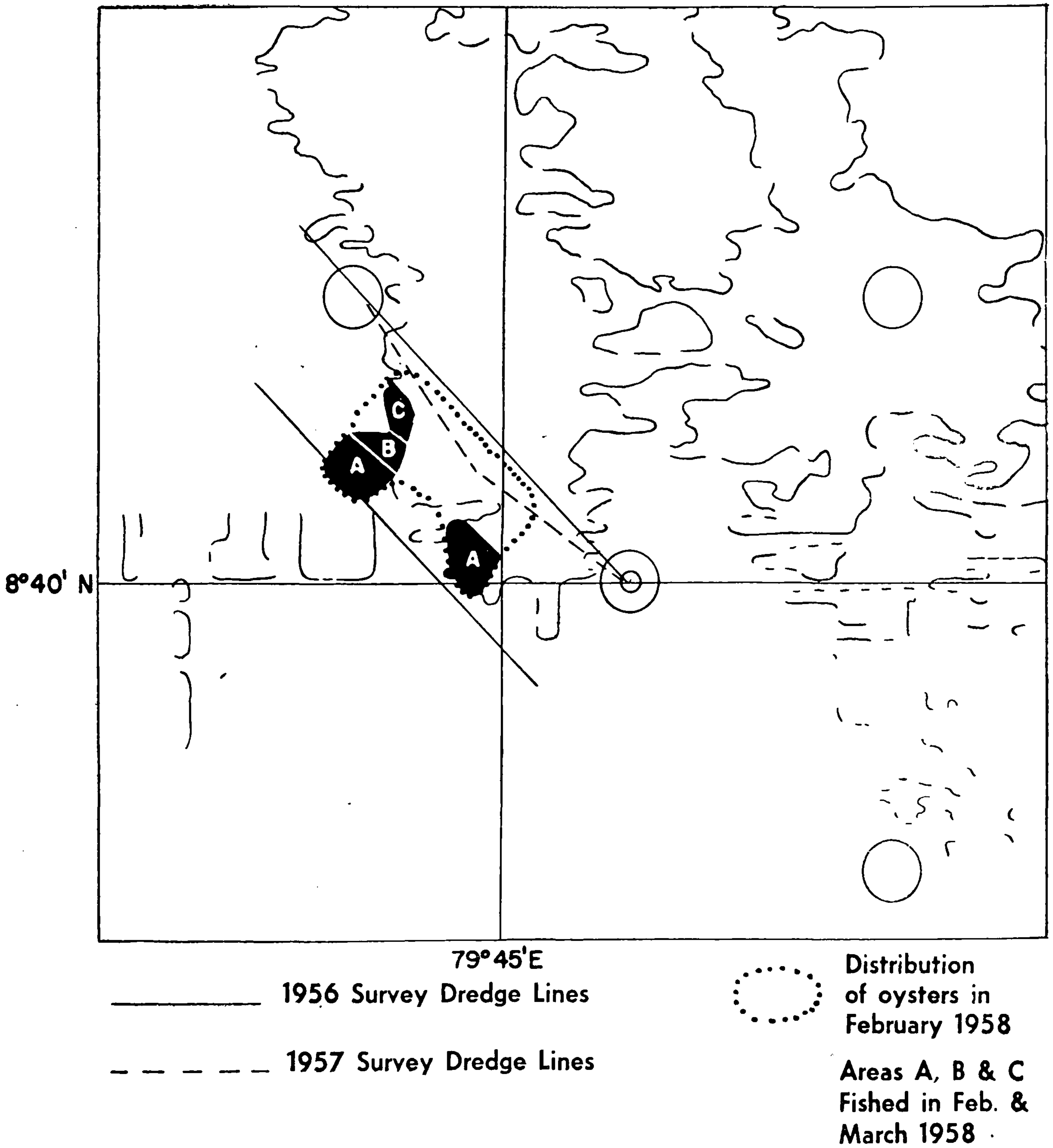


FIG. 2.—MAP OF SOUTHWEST CHEVAL PAAR SHOWING—
 (a) POSITIONS OF 1956 AND 1957 SURVEY DREDGE LINES.
 (b) DISTRIBUTION OF OYSTERS AND AREAS FISHED IN FEBRUARY-MARCH 1958.
 Scale : INCH = 1.25 NAUTICAL MILES.

Unlike the former years when the oysters were unloaded at Marichchukaddy and the sale conducted there, this year the pearl oysters were transported to Colombo in sealed bags and auctioned there. A few bags were however auctioned at outstations. The total sales for the 1958 fishery amounted to Rs. 364,000 and with an expenditure estimated to be Rs. 62,000 the net profit is Rs. 302,000. When compared with the results of the 1925 fishery when the nett profit was only Rs. 167,017 when the sales were in the region of Rs. 526,355 this experimental fishery can be considered a success.

The average price obtained for a bag of oysters was Rs. 64.56. Eight bags of oysters were sampled by the department and the

average yield was 11.3 carats per bag and the average value per bag was Rs. 47.15. Normally the average price obtained at the auction is slightly higher than the valuation price. In connection with pearl valuation it may be mentioned that the pearls obtained for valuation purposes, before commencing the 1925 fishery and valued at Rs. 370 (i.e., Rs. 37 per 1,000 oysters) were sold to an Indian merchant for Rs. 1,000 (Pearson 1926*b*). During the biggest fishery on record, i.e., the 1905 fishery when 81.6 million oysters were fished and sold for 2.5 million rupees the valuation price ranged from Rs. 8 to Rs. 24.65 per 1,000 oysters and were finally sold for an average price of Rs. 48.89 (i.e., ranging from Rs. 24 to Rs. 124) (Herdman 1905*b*). It was not possible to obtain valuation results in time to be made public before sales

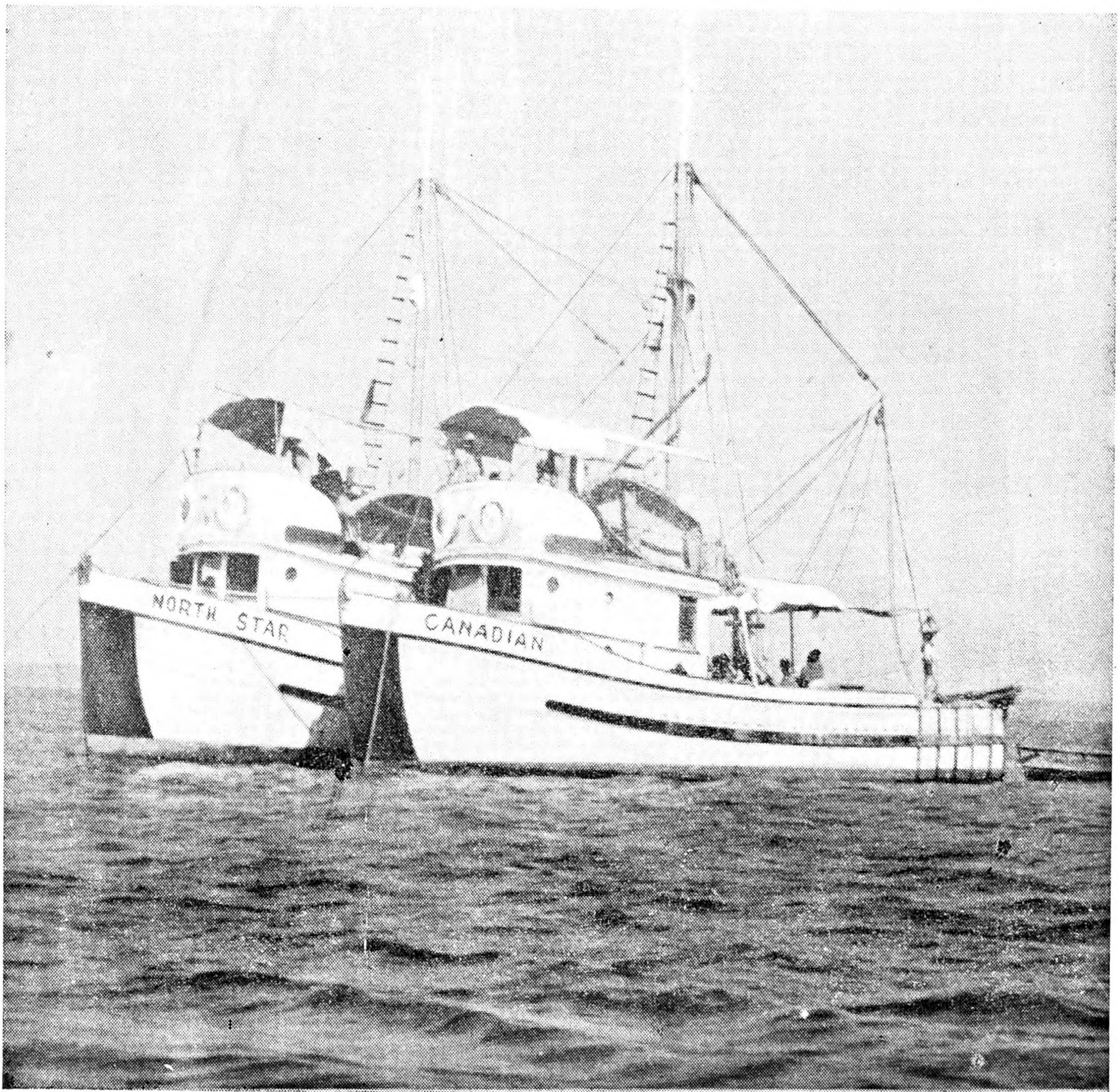


FIG. 3.—“CANADIAN” AND “NORTH STAR”, TWO 45 FT. CANADIAN WEST COAST TYPE BOATS, USED DURING THE FISHERY.

as is usually done. More than ninety nine per cent. of the oysters and pearls are normally bought by Indian jewellers (Herdman 1905*b*). This market for the sale of the oysters and pearls was not available and hence the fall in prices during the latter part of the fishery. Owing to the excitement of a fishery after the longest interval of blank years on record, the prices were very high at the start. The buyers were mostly those who bought them for personal use or out of curiosity or those who were trying their luck. The usual businessmen

who buy large quantities for trade purposes did not enter the picture.

It is necessary for the success of future fisheries that a suitable export market be found for the pearls. From the reports of the success of the pearl oyster fisheries conducted off Tuticorin there still appears to be a good market for natural pearls in India though cultured pearls offer a stiff competition. The economics of the fishery will probably depend on whether the Indian jewel merchants will be interested in the purchase of Ceylon pearls.

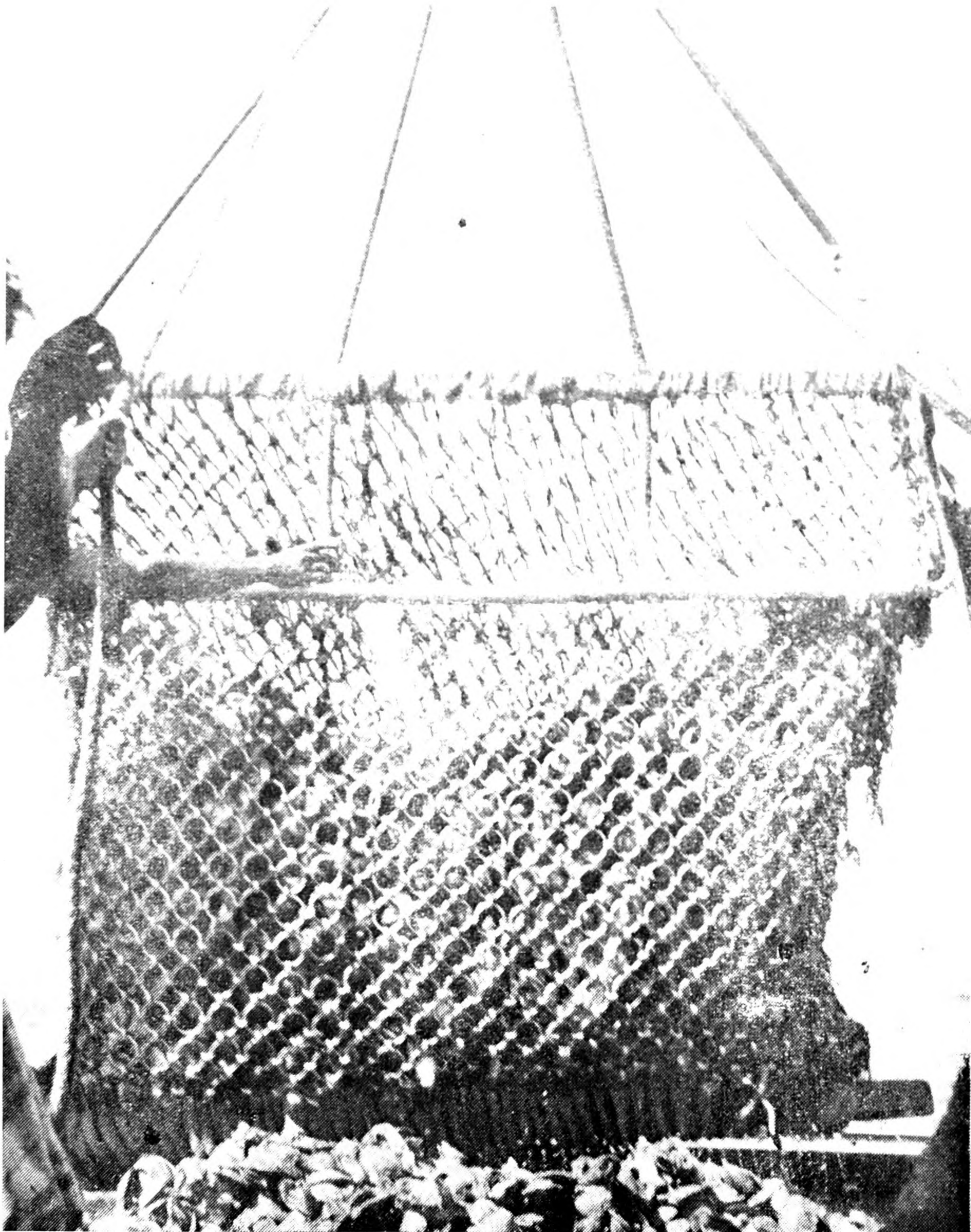


FIG. 4.—THE DREDGE USED DURING THE FISHERY.

AGE AND SIZE OF THE PEARL OYSTERS FISHED

LONG axis measurements of random samples of oysters fished for sale in 1958 were made for age determination. Figures 5 and 6 give the percentage distribution of the long axis* measurements recorded. The mean values are given in Table IV A.

The value for 1958 in Table IV A is the mean for all the three areas combined. These figures compare favourably with those of earlier years. Patch A from where the largest quantity of oysters were fished, was also the most mature of the three patches. The size of most of the oysters in patches A and B ranged between 60 and 80 mm. i.e., approximately

2½ years to 4½ years (Pearson *et al.* 1929) while there appears to be a small percentage of even younger oysters mixed with the mature ones in patch C which was fished during the latter part of the fishery. The estimated average age of the pearl oysters fished, from the mean value of the length measurements from random samples, is 3¼ years, which is the proper age for the oysters to be fished as discussed earlier (page 14). Postponing the fishery may not have resulted in better returns.

(For figs. 5 & 6 see p. p. 21 & 22)

The pearl oysters fished in 1958 from the Ceylon Banks are as mature as those fished in 1958 off Tuticorin by the Madras Government and definitely more mature than those fished earlier off Tuticorin (Table IV B).

TABLE IV A—AVERAGE SIZE AND AGE OF PEARL OYSTERS FISHED IN 1904, 1925 AND 1958 OFF MARICHCHUKADDY

	1904 ^d	1925 ^e	1958
Long axis (mm.)	73.79	a. 64.64 b. 66.15 c. 63.50	69.68
Short axis (mm.)	66.98	a. 57.83 b. 58.03 c. 57.20	61.25
Estimated Age (Years)	?	?	3¼

- a. West Cheval
- b. Peria Paar Karai
- c. Twynam's Paar
- d. Herdman 1905a
- e. Pearson 1929

TABLE IV B—SIZE, AGE AND NUMBER OF PEARL OYSTERS FISHED OFF TUTICORIN (INFORMATION OBTAINED FROM THE DIRECTOR OF FISHERIES, MADRAS)

Year	Size of oysters	Total quantity fished	Estimated Age (years)
1955	?	3,508,967	3½
1956	55	600,000	3 Paar A
		1,500,000	3 Paar B
1957	55-65	11,175,214	?
1958	60-75	21,400,000	?

*Distance from the umbo to the margin measured at right angles to the hinge.

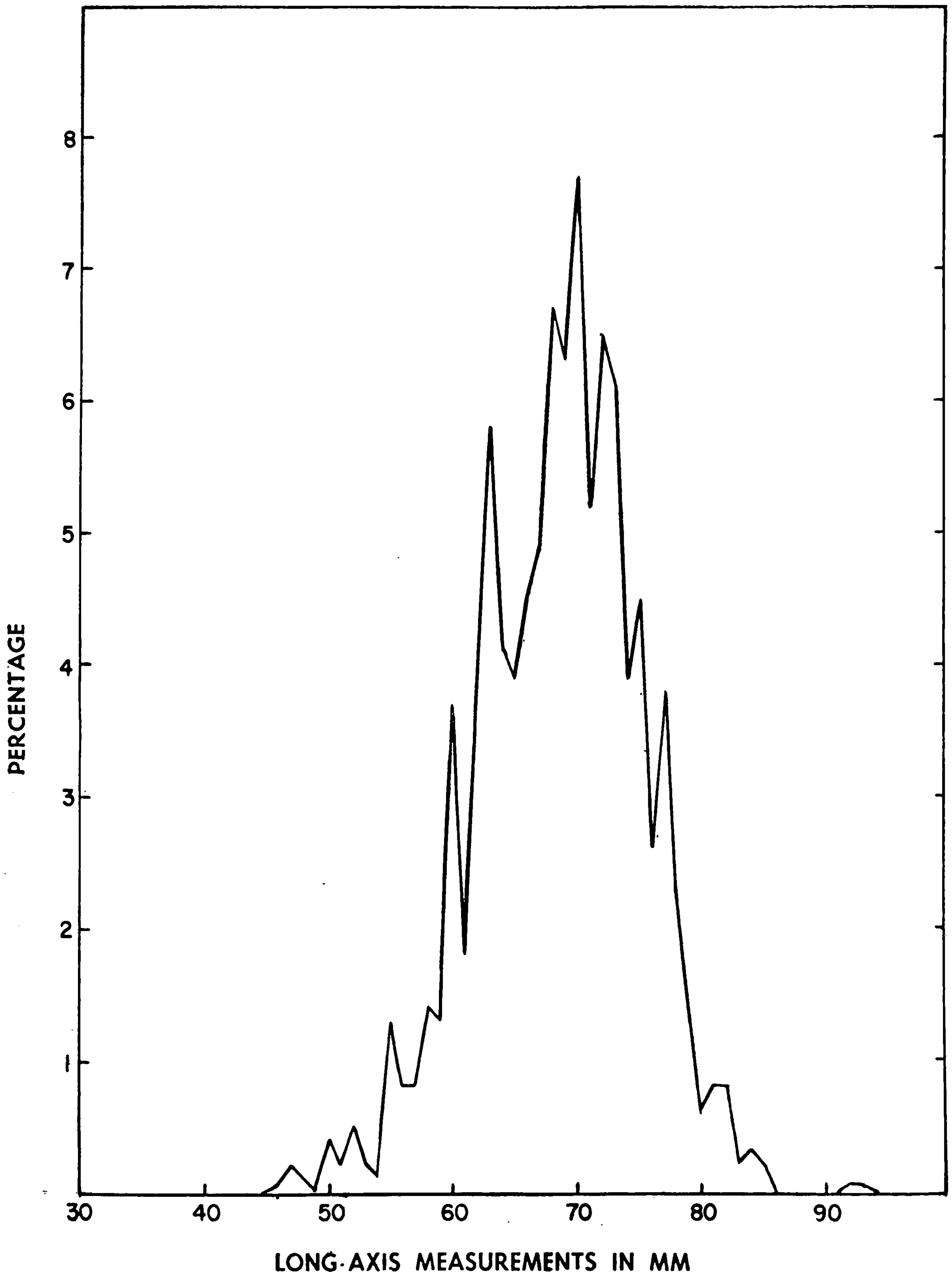


FIG. 5.—PERCENTAGE FREQUENCY DISTRIBUTION OF LONG AXIS MEASUREMENTS OF OYSTERS FISHED DURING THE 1958 FISHERY.

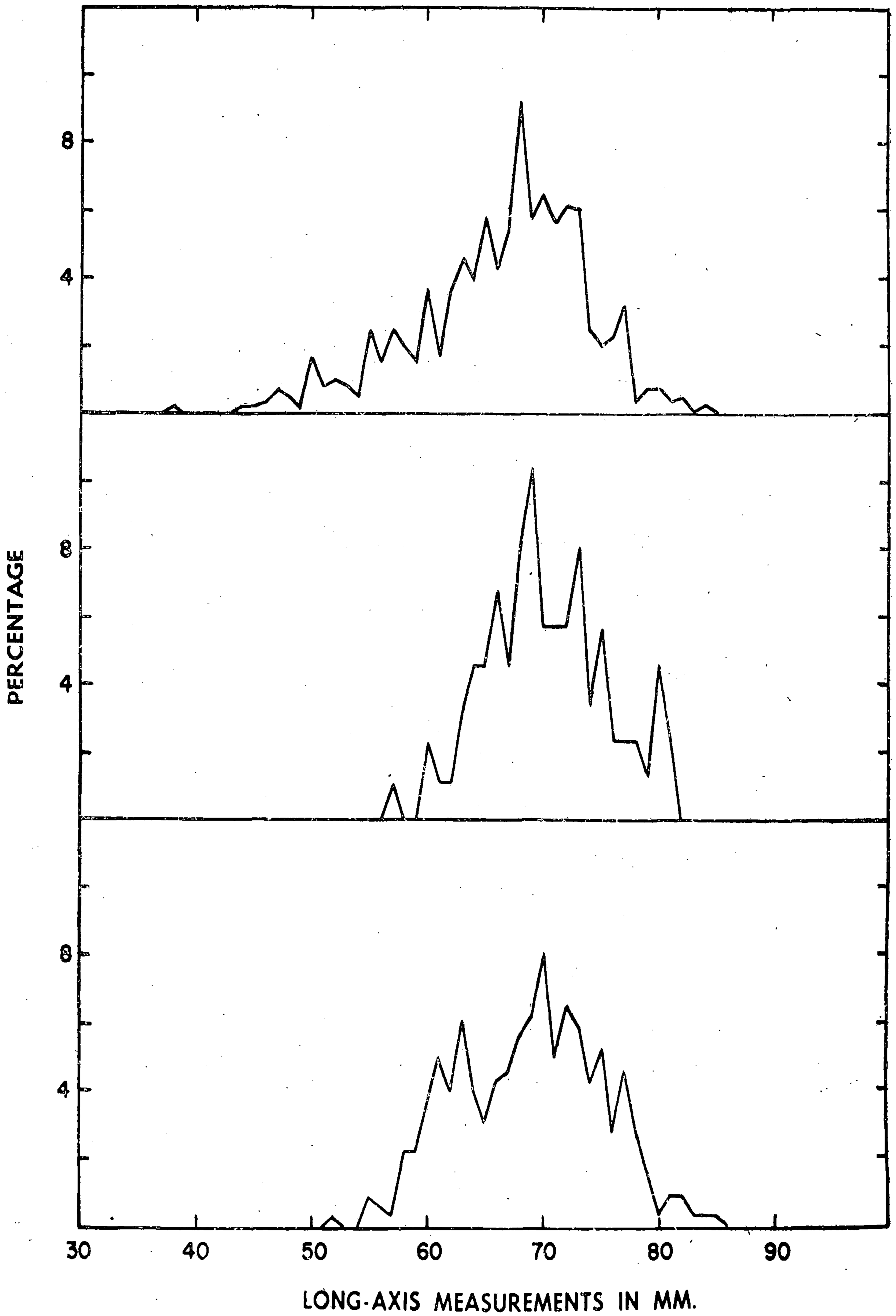


FIG. 6.—PERCENTAGE FREQUENCY DISTRIBUTION OF LONG AXIS MEASUREMENTS OF OYSTERS FISHED DURING THE 1958 FISHERY BY AREAS. (TOP AREA C, MIDDLE AREA B, BOTTOM AREA A).

SIZE OF CEYLON PEARLS

CRITICISMS voiced in the press that the oysters fished were not mature are not valid. Criticisms of this nature are not peculiar to this year's fishery. There is generally an outcry at every pearl fishery that the oysters are too young. Such was the experience in 1925 and Sir William Twynam has placed it on record that similar complaints were made even earlier (Pearson *et al.* 1929).

Pearls obtained from the oysters of the Gulf of Mannar are generally small compared to cultured pearls. Kunz and Stevenson (1908)

commenting on the size of the Ceylon pearls state that the quantity of seed pearls (very small pearls) obtained in a Ceylon fishery exceeds that of any other—probably all other parts of the world. In no fishery in the world is the average size of the pearls secured smaller, nor is the relative number greater than in that of Ceylon. It is rare that one is found weighing over ten grains, and the number weighing less than two grains is remarkably large. Thus although the oysters were mature they cannot be expected to yield large pearls. However, good prices were obtained from valuation samples as mentioned earlier (page 18)

ACKNOWLEDGEMENTS

THE fishery was held under different circumstances compared to the earlier ones, and the organization for conducting the fishery had to suit the present needs. The success of the fishery could not have been achieved without the co-operation of all the personnel involved. Special mention should be made of the two Skippers from Canada, Messrs. A. Barry and R. Pyne, who were working with the Ceylon Government under the Colombo Plan, who

were responsible to a great extent for the design of the gear and training the Ceylonese crew to handle the equipment efficiently. The author wishes to thank the Director of Fisheries, Department of Fisheries, Madras, for the information regarding size and quantity of oysters fished off Tuticorin. He wishes to express his gratitude to his colleagues in the Department of Fisheries for reviewing this paper and for the many suggestions made in preparation of this manuscript.

SUMMARY

THE last pearl oyster fishery was held in 1925. The two fisheries expected to be held in 1927 and 1931 were abandoned as a result of the disappearance of the oysters. Since then the surveys have been irregular. The survey in 1955 indicated the possibility of a fishery in early 1958. This was confirmed by the survey in November 1957.

It was decided to use the dredge for the fishery of 1958 and this was found to be very

efficient and economical for fishing pearl oysters. About 4.5 million oysters were fished from Southwest Cheval Paar and auctioned at Colombo. The total proceeds from the sales amounted to Rs. 364,000, and the net profit was about 83 per cent.

The mean for the long axis and short axis measurements of the oysters fished in 1958 are 69.68 mm. and 61.25 mm. respectively. These sizes compare favourably with the size of oysters fished earlier in the Gulf of Mannar and those fished off Tuticorin from 1955-1958.

LITERATURE CITED

- DE FONSEKA, D. T. E. A. 1957.—*Administration Report of the Director of Fisheries for 1956*: 1-28. Govt. Press, Ceylon.
- DE ZYLVA, E. R. A. 1957.—Pearl Fishery. In de Fonseka 1957. *Administration Report of the Director of Fisheries for 1956*. Govt. Press, Ceylon.
- HERDMAN, W. A. 1902.—Reports on the pearl fisheries of Ceylon. Preliminary Report. *Ceylon Sessional Papers* 1901 : 541-545. Govt. Printer, Ceylon.
- 1903.—Report on the pearl oyster fisheries of the Gulf of Mannar, with Supplementary reports upon the Marine Biology of Ceylon. Part I : 1-307. The Royal Society, London.
- 1904.—*Ibid.* Part II : 1-300.
- 1905a. *Ibid.* Part III : 1-384.
- 1905b. *Ibid.* Part IV : 1-324.
- 1905c.—Note on some points in the structure of the gill of the Ceylon pearl oyster. *J. Linn. Soc. (Zool)*. 29 : 226-229.
- 1906.—Report on the pearl oyster fisheries of Gulf of Mannar, with supplementary reports upon the Marine Biology of Ceylon. Part V : 1-452. The Royal Society, London.
- HERDMAN, W. A. and J. HORNELL. 1904.—Notes on pearl formations in the Ceylon pearl oyster. *Rep. 73rd Meeting Brit. Assoc. Adv. Sci.*
- 1905.—Notes on the pearl formation in the Ceylon pearl oyster. *Spol. Zeylan.* 2 (8) : 200-201.
- HORNELL, JAMES. 1916a.—An explanation of the cyclic character of the pearl fisheries of the Gulf of Mannar. *Madras Fish. Bull.* No. 8 : 11-22.
- 1916b.—Professor Huxley and the Ceylon pearl fishery, with a note on the forced or cultural production of free spherical pearls. *Ibid.* No. 8 : 93-104.
- 1941.—The causation of pearl formation in *Pinctada vulgaris*. *Proc. Linn. Soc. Lond.* 153 (2) : 144-149.
- HORNELL, J., T. SOUTHWELL and J. C. KERKHAM. 1905-11.—Reports from the Marine Biological Laboratory. Parts 1-6. Govt. Press, Ceylon.
- JAMESON, H. L. 1912a.—Studies on pearl oysters and pearls. *Proc. Zool. Soc.* 1912 : 260.
- 1912b.—An examination of causes which have led to the failure of the biological work recently undertaken on the Ceylon pearl fisheries. *J. Econ. Biol.* 7.
- 1912c.—Biological science and the pearling industry. *Knowledge* 35 : 421-431.
- 1913.—Some further remarks on the scientific work on the Ceylon Pearl Banks. *J. Econ. Biol.* 8.
- KUNZ, GEO. F. and C. H. STEVENSON. 1908.—*The book of the pearl ; the history, art, science and industry of the queen of gems* : 1-548. The century Co., N. Y.
- MALPAS, A. H. 1922.—*Administration report of the Marine Biologist for the year 1921*. Govt. Press, Ceylon.
- 1926.—The marine biological survey of the littoral waters of Ceylon. *Ceylon J. Sci. Sect. C.* 2 : 13-166
- 1929.—*Administration report of the Acting Marine Biologist for 1928* : 1-24. Govt. Press, Ceylon.
- 1930.—Preliminary account of the results of drift bottle experiments in the Gulf of Mannar. *Ceylon J. Sci. Sect. C.* 4 : 1-95.
- 1933.—Further observation on the growth rate of the Ceylon pearl oyster *Margaritifera vulgaris* with special reference to oyster on Donnan's Muthuvarathu Paar. *Ibid.* 5 : 21-48.
- 1934.—*Administration report of the Acting Marine Biologist for the year 1933* : 1-7. Govt. Press, Ceylon.
- 1935.—*Administration report of the Marine Biologist for the year 1934* : 1-7. Govt. Press, Ceylon.
- 1936.—*Ibid.* 1935 : 1-9.
- 1937.—*Ibid.* 1936 : 1-12.
- 1939.—*Ibid.* 1938 : 1-11.
- PEARSON, J. 1911.—*Administration Report for 1910-11. Marine Biology* : 1-4. Govt. Press, Ceylon.
- 1912.—*Administration Report 1911-12. Marine Report* : 1-14. Govt. Press, Ceylon.
- 1913a.—A review of the scientific work on the Ceylon Pearl Bank from 1902 to 1912. *Spol. Zeylan.* 8 (32) : 205-222.
- 1913b.—*Administration Report 1912-13. Marine Biology* : 1-52. Govt. Press, Ceylon.
- 1915.—*Administration Report 1914. Marine Biology* : 1-23. Govt. Press, Ceylon.
- 1916.—*Ibid.* 1915 : 1-10.
- 1921.—*Ibid.* 1920 : 1-16.
- 1923.—Marine Biology. *Administration Reports.* 1922 : 1-12. Govt. Press, Ceylon.
- 1924.—*Ibid.* 1923 : 1-3.
- 1925.—*Ibid.* 1924 : 1-16.
- 1926a.—*Administration Report of the Government Marine Biologist for 1925* : 1-16. Govt. Press, Ceylon.
- 1926b.—Reports on the Pearl Fishery of 1925. *Sessional Paper* No. 15 of 1926. Govt. Press, Ceylon.
- 1927a.—*Administration report of the Government Marine Biologist for 1926* : 1-26. Govt. Printer, Ceylon.
- 1927b.—The Ceylon pearl fisheries. *J. Bombay Nat. Hist. Soc.* 32 (2) : 274-280.
- 1928.—*Administration report of the Marine Biologist for 1927* : 1-27. Govt. Printer, Ceylon.
- 1930.—*Ibid.* 1929 : 1-18.
- 1931a.—*Ibid.* 1930 : 1-10.
- 1931b.—*Ibid.* 1931 : 1-10.
- 1933a.—*Ibid.* 1932 : 1-12.
- 1933b.—The maximum yield of a pearl oyster bed. *Ceylon J. Sci. Sect. C.* 5 : 1-20.

- PEARSON, J. A. H. MALPAS and J. C. KERKHAM. 1929.—The pearl fishing of 1925. *Ibid.* 3 : 1-90.
- SHIPLEY, A. E. and J. HORNELL. 1904.—Parasites of the pearl oyster, in Herdman (1904). *Report on the Pearl Oyster Fisheries*. Part 2 : 77-106.
- 1905.—Further report on the parasites of the pearl oyster in Herdman (1905). *Report on the Pearl Oyster Fisheries*, Part 3 : 49-56.
- 1906.—Cestode and Nematode parasites, in Herdman (1906). *Report on the Pearl Oyster Fisheries*. Part 5 : 49-96.
- SIVALINGAM, S. 1958.—Survey of the Pearl Banks, Gulf of Mannar, 1955. *Indian J. Fish.* 5 : 308-325.
- SOUTHWELL, T. 1910a.—On the relation of certain predatory fish to pearl oysters (*Maragaritifera vulgaris*) on the Ceylon Pearl Banks. A description of a large ray, *Taeniura melanospiles* (Bleeker) from the Ceylon Pearl Banks. *Rep. Ceylon Mar. Lab.* 1 (4) : 175-178 and 185-186.
- 1910b.—Specific fauna of the Pearl Banks with notes on the nature of the sea bottom. Description of nine new species of cestode parasites including new genera from marine fishes of Ceylon. *Ibid.* 5 (1) : 200 and 216.
- 1911a.—Some notes on the Ceylon pearl inducing worm. *Spol. Zeylan.* 7 (27) : 124-134.
- 1911b.—A description of ten new species of cestode parasites from Marine fishes of Ceylon, with notes on seven other species from the same region. *Rept. Ceylon. Mar. Lab.* 6 (22) : 259.
- 1913a.—A brief review of the scientific work done on the Ceylon Pearl Banks since the year 1902. *J. Econ. Biol.* 8.
- 1913b.—Remarks on Dr. Pearson's review of the scientific work done on the Ceylon Pearl Banks from 1902 to 1912. *Spol. Zeylan.* 9 (34) : 124-133.
- 1914.—Appendix I. Notes on the Ceylon Pearl Banks and Appendix II. Notes on the food of certain Marine fishes from Ceylon in Pearson (1913). *Marine Biology—Administration Reports 1912-13.* Govt. Press, Ceylon.

Records of Sales at the 1958 Fishery

Date	No. of bags fished	No. of bags sold	Total Value		Avg. Price		Place of Sale
			Rs.	c.	Rs.	c.	
13.2.58	55	—	—	—	—	—	—
14.2.58	87	—	—	—	—	—	—
15.2.58	107	—	—	—	—	—	—
17.2.58	166	178	26,124	0	146	76	Colombo
18.2.58	183	94	10,100	0	107	45	do.
19.2.58	160	83	7,605	0	91	64	do.
20.2.58	185	128	12,576	0	98	25	do.
21.2.58	235	132	12,137	0	91	94	do.
22.2.58	—	115	10,260	0	89	21	do.
23.2.58	—	172	11,780	0	68	48	do.
24.2.58	219	129	8,025	0	62	21	do.
25.2.58	226	189	12,525	0	66	27	do.
	—	50	4,051	0	81	02	Kalutara
26.2.58	294	229	16,370	0	71	48	Colombo
27.2.58	284	239	16,790	0	70	25	Colombo
28.2.58	295	263	18,690	0	71	06	do.
	—	50	4,020	0	80	40	Kurunegala
1.3.58	102	234	16,880	0	72	14	Colombo
	—	50	4,205	0	84	10	Kandy
	—	50	3,311	0	66	22	Galle
2.3.58	—	75	6,345	0	84	60	Colombo
3.3.58	308	67	6,575	0	87	67	do.
	—	50	4,469	0	89	38	Kegalle
4.3.58	307	253	19,395	0	76	66	Colombo
5.3.58	216	140	7,870	0	56	21	do.
	—	50	4,805	0	96	10	Kandy
6.3.58	263	163	8,415	0	51	63	Colombo
7.3.58	267	149	7,810	0	52	42	do.
	—	50	3,445	0	68	90	Kurunegala
8.3.58	—	175	9,298	0	53	13	Colombo
	—	50	4,870	0	97	40	Kandy
9.3.58	—	79	3,999	0	50	62	Colombo
9.3.58	—	50	2,873	75	57	48	Ratnapura
10.3.58	210	133	7,033	0	52	88	Colombo
	—	50	1,595	0	31	90	Kegalle
11.3.58	255	62	3,084	0	49	74	Colombo
	—	50	1,215	0	24	30	Kalutara
12.3.58	150	54	2,279	0	42	20	Colombo
	—	50	2,125	0	42	50	Kandy
13.3.58	—	72	2,931	0	40	71	Colombo
14.3.58	—	95	3,571	0	37	59	do.
	—	50	1,653	0	33	06	Kurunegala
15.3.58	—	110	4,096	0	37	24	Colombo
16.3.58	—	46	2,244	0	48	78	do.
	—	40	2,633	50	65	84	Ratnapura
17.3.58	94	—	—	—	—	—	—
18.3.58	94	70	3,864	0	52	20	Colombo
19.3.58	97	68	3,351	0	49	28	do.
20.3.58	101	74	2,647	0	35	77	do.
	—	50	2,277	50	45	55	Kandy
21.3.58	200	90	3,216	0	35	73	Colombo
22.3.58	80	81	2,973	0	36	70	do.
	—	95	3,325	0	35	0	Jaffna
23.3.58	—	46	1,671	0	36	33	Colombo
	—	50	2,062	0	41	20	Ratnapura
24.3.58	97	40	1,717	0	42	93	Colombo
25.3.58	99	67	2,448	0	36	54	Colombo
26.3.58	96	43	1,581	0	36	77	do.
27.3.58	92	42	1,487	0	35	40	do.
28.3.58	—	70	2,556	0	36	51	do.
29.3.58	—	85	3,162	0	37	20	do.
30.3.58	—	77	1,715	0	22	27	do.
		<u>5,596</u>	<u>360,130</u>	<u>75</u>	<u>64</u>	<u>36</u>	