

Administration Report of the
Department of Fisheries

1957-58



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**ADMINISTRATION REPORT OF THE
DEPARTMENT OF FISHERIES
MADRAS**

**FOR THE YEAR
1957-58**

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GOVERNMENT OF MADRAS
1959

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FISHERIES DEPARTMENT.

(No. 6865-E2/58)

MADRAS,
10th March 1959.

From

SRI D. D. PETER DEVADAS, B.A.,
DIRECTOR OF FISHERIES IN-CHARGE,
Madras.

To

THE SECRETARY TO THE GOVERNMENT OF MADRAS,
FOOD AND AGRICULTURE DEPARTMENT.

[Fisheries of Madras---Administration Report
for the year 1957-58---Submitted.]

SIR,

I have the honour to submit the Annual Report on the Fisheries
of Madras for the year ended 31st March 1958.

D. D. PETER DEVADAS,
Director of Fisheries in-charge.

FISH—A

CONTENTS

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Handwritten notes:
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	PAGE
Introduction	1
Activities of the Department--	
Part I--Fisheries Research--	
(1) Marine Biological Station, Tuticorin	5
(2) Marine Biological Station, Cape Comorin	17
(3) Marine Biological Station, Krusadai Island	25
(4) Marine Biological Station, Ennore	29
(5) Fresh Water Biological Station, Bhavanisagar	34
(6) Fisheries Technological Station, Tuticorin	50
(7) Fisheries Technological Station, Cape Comorin	54
Part II--Expanded Technical Assistance Programme of the Food and Agriculture Organisation.	
Part III--Schemes included in the Second Five-Year Plan--	
(1) Assistance to Fishermen Co-operative Societies for marketing of fish.	56
(2) Salt Subsidy schemes	56
(3) Development of fishing harbours	57
(4) Improvement of fishing crafts	57
(5) Supply of nylon nets to fishermen	57
(6) Intensive seed collection and distribution	57
(7) Rural Fishery Demonstration	58
(8) Development and exploitation of Major Reservoir fisheries.	58
(9) Fish preservation--Provision of ice plant and cold storage facilities.	58
(10) Fish meal and fish manure production	58
(11) Establishment of a model estuarine fish farm	59
(12) Training of personnel	59
(13) Quick transport of fish from landing centres to marketing and consuming centres.	58
(14) Fish marketing--Construction of model fish markets	59
(15) Administrative staff at headquarters	60
Part IV--Development and exploitation of Marine Fisheries--	
(A) Pearl fisheries	60
(B) Chank fisheries	63
(C) Fish Curing Yards	69
(D) Shark liver oil extraction	71
(E) Fisheries Demonstration Factories	72
(F) Manufacture of semi dried prawns	72
(G) Fish meal and prawn shell meal	78

APPENDIX.

	PAGE
XLIV. Census of fisherfolk	161
XLV. Census of marine fishing crafts and tackle	161
XLVI. Census of inland fishing crafts and tackle	162
XLVII. Working of audio-visual van	163
XLVIII. List of films owned by the department	164
XLIX. List of films borrowed and returned	165
L. Important exhibitions participated	166
LI. List of publications	167
LII. Number of visitors and gate collections of Aquarium ..	168
LIII. Parties to whom specimens were supplied from Ennore Supply Station.	169
LIV. Parties to whom shell grit was supplied from Ennore Station.	170
LV. Fishing vessels and vehicles owned by the department ..	171
LVI. List of gazetted officers of the department on 31st March 1958.	171
LVII. Statement of expenditure and receipts	172
LVIII. Glossary of technical names and Tamil names	175

ADMINISTRATION REPORT OF THE FISHERIES DEPARTMENT FOR THE YEAR 1957-58.

INTRODUCTION.

Sri S. Aruldoss, I.A.S., was in charge of the Department till the afternoon of 15th June 1957, and Sri C. P. Keln Erady, I.A.S., till the end of the year.

Sri D. D. Peter Devadas and Sri S. Varadarajan continued as Deputy Directors incharge of Marine and Inland fisheries activities respectively throughout the year except for four months from 1st November 1957 to 28th February 1958 when Sri V. D. Spurgeon acted as Deputy Director (Marine) when Sri D. D. Peter Devadas was on leave.

During the year under report the activities of the Department was considerably expanded especially through the various schemes of the Second Five-Year Plan. Satisfactory progress was made in all directions.

Researches on various problems connected with the conservation, management, development, exploitation and utilisation of the Marine and Inland fisheries resources were continued at the Biological and Technological Stations at Tuticorin, Cape Comorin, Krusadai Island, Ennor and Bhavanisagar in accordance to the programmes set out by the State Fisheries Research Council. Full details of the working of the Research Stations are given in Part I of this report.

Under the Expanded Technical Assistance Programme of the Food and Agricultural Organization of the United Nations, the Department availed of the services of six Experts for conducting exploratory surveys of marine fisheries resources, designing and building of mechanised boats, establishment of boat-building yard, drawing plans for fishing harbours and for improvement of fish marketing conditions, as detailed in Part II of this report.

Fifteen schemes included in the Second Five-Year Plan were pursued during the year with satisfactory results as detailed in Part III of this Report. The total expenditure on these schemes was Rs. 11.25 lakhs. Rupees 3,75,330 were disbursed among 48 Fishermen Co-operative Societies and their District Federations as long-term and medium-term loans, and as loan and subsidy for construction of godowns. The Salt Subsidy Scheme gave a fillip for better fish-curing in the nineteen Fish-Curing Yards maintained by the Department, and this resulted in the production of 5,201.41 tons of cured fish. Fifteen Pablo boats were constructed

and distributed among Fishermen Co-operatives. The total strength of Pablo boats has now come to forty-two. One hundred and seventy four nylon net webbings and 2,792 lb. of Terylene yarn were also distributed. With the Pablo boats and nylon nets the fishermen are able to treble their catches and earnings. This has revolutionised the fishing methods in the coastal waters, and the demand for such boats and nets are increasing considerably. A total of 312.39 lakhs of fingerlings were collected and distributed in the various inland waters in the State. With the working of the Rural Fishery Demonstration Units, there was a general awakening among the public for undertaking fish culture in their own waters. Efforts were therefore made to supply fish seed to private fish culturists on a larger scale. The development of the Bhavanisagar and Amaravathisagar reservoirs was continued by systematic stocking. These waters can be expected to yield commercial fisheries within a few years. The construction of the ice plants and cold storages at Tuticorin and Mettur Dam and of the model estuarine fish farm at Adyar were commenced during the year. Sixty-five fishermen candidates were trained in modern methods of fishing at the Training Centres at Nagapattinam and Tuticorin. One large van and nine three-wheeler Lambrettas were purchased for supply to Fishermen Co-operative Societies under hire-purchase system, in addition to the three vans purchased and supplied last year. Eight vans operated on the hiring system. On the whole these vehicles transported 798 tons of fresh fish from landing centres to consuming centres. Seven Municipalities and Panchayats Boards were given a total subsidy of Rs. 38,212 for improving their fish markets.

A pearl fishery was started on 15th March 1957 and closed on 20th May 1957. The fishery was the third in the series started in 1955 after a lapse of 27 years. The pearl banks exploited during this fishery were the Kodamuthi, South Kodamuthi and Rajavukku Chippi Soditha Par, which were fished last in 1828, about 128 years ago. A total number of 11,175,214 oysters were fished and the Government's share of 7,487,580 oysters were auctioned and the sale proceeds came to Rs. 1,66,366.37 nP. and the gross revenue including other receipts was Rs. 1,68,807.31 nP. The total expenditure incurred was Rs. 22,264.24 nP. Another pearl fishery was started on 3rd March 1958 and lasted till 26th May 1958. During this fishery a total number of 21,476,514 oysters were fished of which 14,444,866 represented the Government's share. The gross revenue and expenditure were Rs. 4,74,096.27 nP. and Rs. 55,945.07 nP. respectively.

The chank fishery of the Tirunelveli coast was operated departmentally as usual and 860,472 full sized chanks were fished against 660,894 during 1956-57. The Ramanathapuram chank fishery was leased out during the year, and the lessee fished 690,519 full-sized chanks as against 392,573 during the previous year. The lessee of the Sivaganga chank fishery obtained 243,153 full-sized chanks

against 124,527 in 1956-57. The Tanjavor chank fishery was conducted departmentally between Point Calimere and Puthukuda and 41,341 full-sized chanks were fished as against 31,768 in the previous year. Besides, a lease amount of Rs. 19,786 was realised for the remaining portions. The South Arcot and Chingleput chank fisheries were re-leased for a period of three years from 1st July 1957 at an annual rental of Rs. 15,106. The chank fishery of the Kanyakumari was operated departmentally for the first time since the accession of this area to Madras State, and 2,032 full-sized chanks were fished. On the whole, the chank fishery operations in the coastal waters was a success during the year.

Nineteen fish-curing yards were maintained by the Department, and the facilities afforded in them were fully availed by the fish-curers. The yard staff continued to be vigilant over the operations of the yards, and consequently there was marked improvement in transactions in the yards and the quality of cured fish was very satisfactory. A total quantity of 5,201.41 tons of cured fish was produced in these yards, against 3,062 tons in 1956-57.

At 21 centres, 43,521 lb. of shark liver were treated and 23,000 lb. of oil extracted. Besides, 19,852 lb. of fish manure, 940 lb. of Skate liver oil, 2,879 lb. of sea-weed compost manure, 273 lb. of weed ash, 490 lb. of semi-dried prawns, 135 lb. of fish meal and 350 lb. of prawn shell meal were produced.

For the proper conservation of the Inland fisheries, the licensing system was successfully continued and extended during the year. A total number of 8,870 licences were issued for fishing in waters under Departmental control and Rs. 42,255.12 were realised as licence fees, against Rs. 42,771 in 1956-57. The revenue realised from the provincialised waters was Rs. 1,58,418 as against Rs. 1,52,549 during 1956-57. From the departmental waters I am glad to report that a total quantity of 1,63,752 lb. of fish were sold to the public, realising a revenue of Rs. 47,987.23 against 30,758 lb. and Rs. 8,035 in 1956-57. The Rural Fishery Demonstration units continued to work satisfactorily and promoted private enterprises in fish culture. During the year 2,100 private parties were supplied with 355,000 fingerlings. The Mettur reservoir was exploited through 244 licensed fishermen and the total landings from the reservoir was about 250 metric tons. The culture of Tilapia was extended to all districts from this year onwards, and this proved a great success in increasing fish production and making fresh fish available in several rural areas where fish could not be obtained earlier. A consignment of 25,000 fingerlings of the North Indian Carps, Rohu and Mrigal were imported from Calcutta and stocked in selected reservoirs and river sections with a view to establish them in the State. Popularisation of fish cultural procedures in the Community Project and National Extensions Service Blocks was also continued during the year.

The total production of fish in the State during the year was assessed as 107,840 tons valued at Rs. 810 lakhs. The pattern of utilisation of the catches for consumption in the fresh and processed condition, for export and for production of manufacture of by-products, together with imports were studied and the per-capita consumption of fish in this State was estimated to be 11.3 lb. when compared to 10.5 lb. in 1956-57. Fish marketing situation and fish markets in several important centres in the State were studied and inspected with special reference to handling, assemblage, transport and price structure. Special attention was paid to increase the fish supply to Madras City by fixing agencies with the city fish merchants and co-operatives with their counterparts in the mofussil. The model fish stall and a house-delivery system gained more popularity. Several fishermen co-operatives and their district federations were assisted in their marketing programme. Many local bodies were contacted and advice rendered to them for improving their fish markets with a view to make them attractive and thus make fish become more popular as an article of diet.

Statistical surveys of marine and inland fisheries were continued as usual. The total population of the fisher-folk was estimated to be about 277,220 living in 657 hamlets. The total number of fishing crafts and tackles were computed to be about 29,348 and 313,043 respectively.

Dissemination of information pertaining to various aspects of the fishing industry was carried on more vigorously. Meetings of fisherfolks in their hamlets were regularly held and the audio-visual van received under the TCM aid was used with full advantage. The Department participated in several exhibitions. The Aquarium and museum continued to be popular.

The total number of societies and federations at the end of the year was 195 and 6 respectively with a total membership of 24,761 and paid-up share capital of Rs. 2,06,628. District federations of these societies functioned in Madras, South Arcot, Tanjavoor, Ramanathapuram, Tirunelveli and Kanyakumari districts. As the several assistance and relief measures given by the Department were canalised through the societies and their federations, fishermen at various centres have expressed eagerness to form new co-operatives. The Department maintained three fisheries schools with a total strength of 230 pupils and eight teachers.

The total expenditure and revenue of the Department for the year was Rs. 26,94,844.26 and Rs. 25,06,814.51 respectively against Rs. 33,34,530.45 and Rs. 28,05,963.84 in 1956-57. The net expenditure of the Department was only Rs. 1,88,029.75 against Rs. 5,28,566.60 in 1956-57. The charges on account of supervision, education, welfare and research schemes was Rs. 4,16,177.76 and considering this and the implementation of the various schemes under the Second Plan, the working of the Department from the financial aspect was very satisfactory.

The details of the different activities of the Department are given below in eight parts, of which Part III describes the working of the schemes included in the Plan.

ACTIVITIES OF THE DEPARTMENT.

PART I—FISHERIES RESEARCH.

Researches on the biological, hydrological and technological problems of the fisheries of the State were continued during the year, and valuable data that are useful for the conservation, management and exploitation of the fisheries resources of the State were gathered. The State Fisheries Research Council met on 20-12-1957 and scrutinised the progress of work. The following are the details of work done at each station.

I. MARINE BIOLOGICAL STATION, TUTICORIN.

The State Fisheries Research Council issued the following programme of Marine Biological and Fisheries Biological investigations to be undertaken at Tuticorin :—

- (1) Studies on the Plankton off Tuticorin.
- (2) Studies on the Biology of Pearl oysters.
- (3) Evolving a new technique for the estimation of oyster population in the pearl banks.
- (4) Studies on the Biology and ecology of chanks.
- (5) Biological studies on the fishes, inhabiting the pearl banks.

During the year under review, good progress was made in all the above five lines of investigations. Systematic collections of off shore plankton was made throughout the year from the various pearl banks and chank beds. Estimation of the oyster population was done both in April 1957 and again during the period November 1957 to March 1958. A pearl bank inspection conducted in November 1957, December 1957 and January 1958 revealed the presence of fishable oysters in the various pairs and these were estimated and a fishery of a very high magnitude was declared, based on this valuation.

Good progress was made in the studies of the egg case of chanks during the months of January, February 1958. Regular random sampling of chanks from the commercial catches was made once in 3 days, during the chank fishing season and so far 2,000 chanks were measured and the size groupings, breadth and weights recorded. The chank fishery statistics for the past twelve years were analysed in detail for finding out the percentage of worming in each bed in each year. The analysis of stomach contents of the perches and of *Balistes mitis* showed the presence of juvenile oysters.

The progress made in the various lines are detailed below:—

(1) *Plankton studies*.—Plankton hauls were taken from inshore waters off Tuticorin throughout the period under study. Three areas were selected which covered north, east and southern sectors of the Tuticorin Bay. This was with a view to see that the area of collection was as wide as possible, so that the patterns of distribution may be evident uniformly throughout. The area covered was within a radius of 30 miles of Tuticorin. In order to minimise any possible effects of vertical migration of the Zoo-planktons the collections were made between 06.00 and 08.00 hours. A two meter plankton net made of organdie cloth (fine mesh) was used throughout from motor launch. The samples were preserved in 5 per cent formalin and the net plankton volume was estimated. Except in few instances in which the analysis was carried to species mostly the fluctuations are expressed in terms of numbers of particular genera or groups. The net plankton volume has been taken as an index of the total quantity of the standing crop. Considerable variations were observed in the net plankton volume from day to day from station to station. One of the objects of the present study was to assess the seasonable fluctuations of planktonic forms and invertebrate larvae. A close account of the immediately exploitable plankton, fish egg plankton, fish larval plankton, direct food plankton, indirect food plankton, water polluting plankton, spawn predatory plankton, symbiotic plankton, fish indicator plankton, adverse indicator plankton and luminous indicator plankton was maintained. The seasonal variations in the abundance of some of the genera of Diatoms, dinoflagellates and more common group of planktonic forms are given in Appendix I. It was observed that the Zoo-plankton was found to predominate each month haul from April to September and aphvto planktonic maxima noticed in August, September. The sedimentation of plankton in different months as appended in the tabular column also suggests that the increase in the volume noticed during the planktons swarming during that month. (Vide Appendix 1.)

Although observations on the seasonal variations of plankton in our coast are different and at variance with one another, yet a pattern of distribution in the various years is evident.

The following pattern of distribution is discernible in and around Tuticorin. The three selected stations from where plankton was collected are located in (1) *Tholayiram parr.* Latitude 78° 20' long. 8° 45', (2) *Kodamuthu Paar* Lat. 78° 15' and (3) *Karuvai Paar* Lat. 78° 15' long. 8° 30'.

Micro Plankton—Sagitta.—Very low in April, May and June. There is a peak in July and again in September there is a secondary peak. In October, November and December they are very scarce. But in January it appears again but comes down in February and March.

Krohnia and Spadella spp.—Appears only in the months of June and July and are absent in other months.

Cresis.—Appears in July and shoots to a peak in September there is a secondary maximum in January after which it falls down.

Lucifer.—Very little numbers in April, May and June. It appears in July profusely and declines in August and September. Again it appeared in October and attain a maximum in November. It is scarce in December but comes up in January; only to fall in the coming months.

Fish eggs.—Present throughout the year. There is a peak for the fish eggs in August and September. One important feature noticed in September plankton was the large scale spawning of *Anchoviella* spp.

Salpa.—Appears only in January.

Diphies.—Appears in May, June, July and August. It disappears for the rest of the months.

Beroe and Medusoides.—Appears in March and are common in April. This may be assumed as a peak month.

Doliolum.—Appears from February but very common from July to September. Absent from September to January.

Noctiluca.—Appears in August, September, October and November with a peak in October.

Trichodesmium.—Seen in abundance in April, May. Appears again in August. The peak may be assumed to be in April.

Zoo-Plankton—Copepods.—These are present throughout the year in abundance mainly represented by *Temora* spp. *Acartia* spp.

Oithona spp., *Corycaeus* spp, *Calanus* spp. and *Eucalanus* spp.—Copepods attain a maximum in July and again in March. Although the distribution does not follow any definite pattern it may be concluded that Copepods form one of the main components of the plankton.

Nauplii.—This also follows the pattern of copepod distribution. (The distribution of the other organisms are not detailed here as they are of minor importance so far as the fishery point of view is concerned.)

Phytoplankton—Rhizosolenia.—The most common phytoplankton in the plankton; appears in June, July and in August. But the swarming of this is noticed in September.

Chaetoceros.—Appears regularly from June, July and August, Peak in August.

Biddulphia.—Common from January to April, Appears again from the month of August when it begins to swarm.

These are the most important diatoms noticed in the waters around Tuticorin and the rest are not listed here although they occur in irregular numbers now and then without showing any definite pattern.

(2) *Studies in the estimation of oysters from the pearl banks off Tuticorin*.—The pearl banks inspection in 1955 revealed the presence of oysters of age 2-3 years in the southern beds off Tuticorin. Detailed inspection of these pearl banks and Tholayiram Paar was taken up in December-January 1957 to follow the conditions of the stock existing. Totally 7 'parrs' at depths varying from 8 to 9½ fathoms were inspected. Two thousand random samples of the oysters taken out by naked diving from different paars were analysed for length, breadth, weight age and pearl contents. The result brought to light an approximate population of nearly 127 lakhs of fishable oysters ranging in age from 3-4½ years. In addition a heavy spat fall over Tholayiram Paar in July-August 1956 was also noticed. This brood, if survives will sustain a bumper fishery in 1949-50.

Based on the estimation of oyster population a pearl fishery was started on 15th March 1957 and continued till the 20th of May lasting for 51 working days. Fifty-eight canoes with 733 divers participated in the fishery. 11,175,214 oysters were fished out during the period out of which Government share come to 7,408,031. The sale proceeds of oysters came to Rs. 1,66,366.87. The grand total revenue came to Rs. 1,68,807 adding the receipts from lease of sites for pearl bazaar, etc. The pearl yield was good this time. Similarly a detailed inspection of pearl banks ensued in December-January 1958.

The summary of salient features of the results of the pearl bank inspection conducted in December 1957 and January 1958 are hereunder furnished :—

Tholayiram paar—Middle section.—An area of 0.5 square mile was inspected. The average oyster lifted per dive was 17. The percentage of the size composition was 55-60 mm. 50 per cent 60-65 mm. 16.7 per cent; 65-70 mm. 31.8 per cent 70-75 mm. 15 per cent.

Two hundred and eighty mature oysters were retained for decay and washing pearls and the rest liberated alive, after measurement. Even though the percentage of fishable oysters in this region is about 50 per cent except for a negligible per cent of 1-5 per cent the rest are all between 60 to 70 mm. which will be 3 to

3½ years old. It will be better to allow them another year's growth before fishing them out. The growth of the oyster appears to be good. Plenty of sea weeds and less of star fishes (*Pentaceros Linckun*).

Tholayiram Paar—South Section.—An area of one square mile was inspected. The average number of oysters per dive was 20. One thousand seven hundred thirty-six oysters were lifted and after retaining 570 oysters for washing pearls, the rest was liberated after taking measurements. The size composition was 35-40 mm. 23.5 per cent; 40-45 mm., 32.5 per cent; 50-55 mm. 20.2 per cent; 55-60 mm. 4.1 per cent; 60-65 mm. 4.1 per cent; 65-70 mm. 2.1 per cent; 70-75 mm. 5 per cent. The percentage of fishable oysters is negligible.

Kudamuthi Paar—Middle section.—An area of 0.016 square miles was inspected. One thousand and seventy oysters were lifted and retained. The average was 13 oysters per dive and the percentage was 55-60 mm. 1.5 per cent; 60-65 m.m. 15.8 per cent; 65-70 mm. 40 per cent; 70-75 mm. 27 per cent; 75-80 mm. 11 per cent; 80-85 mm. 3.5 per cent; 85-90 mm. 1.4 per cent. The percentage of fishable oysters is 98.5 per cent with the major portion within the age group of 64-70 mm. The total fishable oysters in this area covering an extent of 3.3 square miles works out to 46.875 lakhs.

Saith Kudamuthu.—The area inspected was 0.03 square mile. A total of 1,754 oysters were lifted and retained. The average per dive was 12. The size composition was 55-60 mm. 1 per cent; 60-65 m.m. 16 per cent; 65-70 mm. 42 per cent; 70-75 mm. 30 per cent; 75-80 mm. 11 per cent. The percentage of fishable oyster in the region was 99 per cent with the major size ranging between 65-75 mm. as in the previous case. The total fishable oysters in this bank having an extent of 0.5 square miles is about 44 lakhs.

Tholayiram Paar—North Section.—The area inspected was 1 square mile. Three thousand seven hundred and eighty-six oysters were lifted out of which 654 were retained for washing pearls. The average per dive was 32 oysters. The size composition was 45-50 mm. 7 per cent. A very small percentage just 3 years old and so the area will be fishable in the next succeeding years.

Vadaombathu Paar.—An average of 6 oysters per dive was obtained 228 oysters out of 444 oysters were retained. The size composition was 40-45 mm. 4 per cent; 45-50 mm. 15 per cent; 50-55 mm. 31 per cent; 55-60 mm. 10 per cent; 60-65 mm. 32 per cent; and 65-70 mm. 8 per cent. The fishable oysters were just percentage of 40 per cent is just between 3 and 3½ years old.

Saithombathu Paar.—The average was 25 oysters per dive. One thousand three hundred and ninety-eight oysters were lifted and 115 oysters were retained for washing pearls. The age composition was 45–50 mm. 14 per cent; 50–55 mm. 20 per cent; 55–60 mm. 26 per cent; 60–65 mm. 34 per cent; 65–70 mm. 6 per cent; the fishable oysters were just 3 to 3½ years old forming 40 per cent.

Pulipoondu Paar.—The average was 31 oysters per dive. One thousand one hundred and sixty-six were lifted and 65 were retained as the fishable percentage was only 4 per cent (60–65 mm.) and the rest were 45–50 mm. 46 per cent and 55–60 mm. 50 per cent.

Karai Paar, Nagara Paar, Petha Paar, Ooduthi Paar and Kilathi Paar.—A total of 570 oysters were retained for washing pearls. The details of each paar are given below :—

Nagara Paar.—Extensive and thick oyster population was recorded throughout the banks attached to coral pieces and madrepores. The oysters are about two years in age. Sea weed and sponge of growth in the banks are sparse.

Petha Paar.—Oyster population dense as in Nagara Paar in the northern region only; in the southern region these were sparse. A fair growth of sponges was noticed.

Ooduthi Paar.—The oyster population is very sparse confined to the northern portion only. Sea weeds occurred along with the sponge in the bank.

Kilathi Paar.—No oyster population was recorded anywhere in the bank. The size composition was 45–50 mm. 3 per cent; 50–55 mm. 34 per cent; 55–60 mm. 11 per cent; 56–65 mm. 21.5 per cent; 65–70 mm. 0.5 per cent. The percentage of fishable oysters is 22 per cent between 3 to 3½ years old. It will be worthwhile to fish them next year.

Rajavukku Sippi Sothitha Paar.—An area of 0.2 square mile was inspected. One thousand six hundred and ninety oysters were lifted and retained. The average was 12 oysters per dive. The size composition was 50–55 mm. 0.5 per cent; 55–60 mm. 2 per cent and the rest being over 80 mm. with the major portion representing 71 per cent ranging between 65–75 mm. The fishable percentage is 97.5 per cent. This bank having an extent of 0.2 square mile is calculated to contain 24.16 lakhs of fishable oysters.

Pudu Paar.—The sea inspected was 0.126 square mile. Five hundred and thirty-six oysters were lifted and retained. The average was 6 oysters per dive. The percentage of fishable oysters form 90 per cent to 97 per cent. The major fishable size group ranging from 65–75 mm. The bank with an area of 0.2 square mile contains 10 lakhs of fishable oysters.

Karai and Valangu Karuval Paars.—The area inspected was 0.1 square mile. One thousand four hundred and thirty-five oysters were lifted and retained. The average was 17 oysters per dive. The size composition was 50–55 mm. 1 per cent; 55–60 mm. 17.5 per cent; 65–70 mm. 40.5 per cent; 70–75 mm. 31.5 per cent; 75–80 mm. 4 per cent; 80–85 mm. 1 per cent. The percentage fishable oysters was 94.5 per cent. The fishable oysters in these two banks having an extent of one square mile works out to 149 lakhs.

Periamalai Piditha Paar.—One thousand six hundred and seventy-seven oysters were collected with an average of 29 oysters per dive. The size composition was 45–50 mm. 1.5 per cent; 50–55 mm. 4.5 per cent; 55–60 mm. 10.5 per cent; 60–65 mm. 77.5 per cent being made up of oysters from 60–70 mm. The total fishable oysters covering 0.0625 square mile is 14.5 lakhs.

Vaipar Karai and Vilangu Paars.—Two hundred and forty-six oysters were lifted with the maximum of 34 oysters on an average of 1 oyster per dive. Only 4 per cent was above 66 mm. and so the banks are not fishable for the coming season.

The estimate of fishable oysters in these banks has been worked out and given under each day's inspection. After giving due allowance for mortality due to natural and other causes, varying efficiency of the divers, engaged for the inspection and differences in topography of the banks and other factors, the following estimate of fishing population of the pearl oysters was given for each bank for the pearl fishery that was conducted during March-May 1958 :—

	LAKHS.
1 Kodamuthi Paar	35
2 Saith Kodamuthi Paar	33
3 Rajavukku Chippi Sothitha Paar	18
4 Pudu Paar	7
5 Periamalai Piditha Paar	11
6 Karuvals	110
Total	214

Based on the above, a pearl fishery was inaugurated on 3rd March 1958 and it was conducted till 26th May 1958. The above estimate was almost perfect since it was possible to exceed it only by 75,514 oysters, the total being 24,176,514 oysters.

(3) *Studies on chanks—Population studies.*—During the year under review nearly 1,800 chanks were sampled at random from the commercial catches brought by the divers to the chank godown

and the size ranges of the chanks studied. The following inferences were drawn. Chanks ranging from 115 to 133 mm. predominated the catches of the divers. This formed nearly 47 per cent of the total catches while those ranging from 105 to 115 came next. The percentage of chanks above 140 mm. were fished from the southern beds near Kanava Paar during the month of February. The percentage of worming noticed during the year for all the chank beds stood at 3.5 per cent. It was noticed that the percentage of worming is too greater in the northern beds and in the southern beds it was almost negligible. Attempts were made to analyse the entire statistics available regarding the fishing for chanks from the year 1946 to 1957 (vide Annexure II) and already inferences have been drawn regarding the common beds fished; size group of chanks fished from each bed, percentage of undersized chank fished in each bed in different years, catch per diver, and the average weight of the chank of different sizes from each bed for the years. Useful particulars regarding the variations of chanks fished offshore and those fished in shallow waters called 'Pathalai' chanks were gathered and analysed. The following table will show the remarkable difference between the two:—

Pathalai chanks.			Offshore chanks.		
Size mm.	Breadth mm.	Average weight gms.	Size mm.	Breadth mm.	Average weight gm.
90—95	48	149	90—95	53	225
95—97	48	133	95—97	53	230
98—100	49	124	98—100	54	235
101—103	50	124	101—103	56	248
104—106	52	150	104—106	57	206
107—109	52	144	107—109	57	248
110—112	53	153	110—112	60	249
113—115	55	156	113—115	60	248
116—118	54	165	116—118	63	253
118—120	56	182	118—120	65	310

The above category of 359 chanks were measured and weighed in each variety and the results tabulated. It may be noticed that the Pathalai chanks are very light as revealed from the adequate number of chanks being weighed as above. This finding is of practical importance to determine whether any inferior quality shore chank are mixed with genuine offshore chanks which alone are useful for chank bangle industry.

Chank marking experiments.—From the commencement of the chank marking experiment in 1931 about 5,000 chanks have been marked with silver label and liberated in the chank beds of Tuticorin. Of these, (vide Appendix III) about 5 per cent have been recovered in different beds in different periods. This low percentage of recovery is due to reasons which are varied and many. It was supposed that the chanks migrated to Ceylon side, and that the possible course of migration would be along the Adam's bridge where the depth is not more than 10–12 fathoms and where the bottom is sandy. This suggestion posed the problems whether

there is really any migration of chanks from the peninsular coast to Ceylon and *vice versa*. If so, what factors are responsible for migration, the rate of migration, etc. Chank marking experiments were conducted with a view to solve the above problems. From a perusal of the available data, it was noticed clearly that chanks do migrate from place to place. But the records of the places of release and recovery were not accurate and reliable to arrive at a conclusion. For instance if a few chanks are tagged, released and refished in Tholayiram Paar, it was noticed that the chanks did not move to any appreciable distance. Secondly, the chanks were picked up from the commercial catches for marking experiments. Invariably this restricted the scope of marking chanks beneath 100 mm. size which meant that the rate of growth of the animal can be studied only from a later stage. Therefore the following system was followed in order to minimize the errors:—

Chanks of size length ranging from 65 mm. were specially brought to the laboratory by the divers in containers with sea water and sand and their measurements noted, chanks marked, the places wherefrom they are brought (with compass bearings) the place where released next day (safely) were all recorded. The present method adopted ensured definitely that the chanks reach the intended place without fail (alive) and based on the other accurate records a close watch over the entire process can be had. During the year under review, nearly 400 chanks have been marked and released. The length, breadth and weight measurements together with the date and places of release may also be found in the table. The growth and the movement of the chanks would be watched closely in the years to come.

(4) *Development of chanks.*—The work in this line was intensified during this year because of the availability of materials like Ram's horn and baby chanks. Profuse spawning of chanks was witnessed during the four weeks of the month of January. The divers reported that out of every 100 chanks that they laid their hands on one chank was definitely with Ram's horn protruding out. The chanks with the Ram's horn projecting above are reported to be buried under the sand, so to say on the egg case releases the case and the chank so p.s. In some cases, the Ram's horn was seen planted in the sand with its lateral wings while the free broad-end oscillating with the current. In such cases the chank had released the Ram's horn from its clutch as a mark of the chank case having advanced in its development. On 23rd January 1958, a few large-sized Ram's horn were brought to the laboratory and kept under observation. On an average they contained 33 chambers with a milky gelatinous fluid inside each chamber except for the last seven chambers which are usually thrust inside the sand to hold the case fast. The basal chamber is produced as two lateral wings which serve as an anchor. This chamber secretes copious amount of mucus with the help of which secretion is able to bind sand particles together making an effective

anchoring system. In the case of egg cases which have advanced in development of chanks inside they show two remarkable features on the upper surface of the chambers, one sees a rose tinge given due to the settlement of algæ and other epifanna. One could observe lot of *Hypnea spe.* and *Coelenterates* like *Thiuria*, *Obelia*, etc. The developing chanks (baby chanks) were seen clearly from outside through the translucent wall. A set of 9 egg cases like this were subjected to critical study; and some interesting factors like the way in which the baby chanks come out of the capsule, the total number of baby chanks from each capsule, etc., were gathered. The average length of each chamber was 250 μ m. and each chamber is the ovigerous receptacle. In this are laid a number of fertilized ova and in addition a transparent gelatinous nutritive material secreted by the walls of the oviduct. A microscopic examination of the gelatinous contents of the various chambers showed that the finely granular particles are really diatoms. These diatoms might serve as food for the growing baby chanks.

(5) *Studies on the 'Black Oyster' fished from Tholayiram Paar deeper waters.*—Five unusually big-sized 'black' cysters were brought by the French diver Dumas when he dived in March at 14 fathoms east of Tholayiram Paar. These oysters on examination, revealed that they are not pearl bearing. The size of these oysters exceeded 4 inches in hinge, 7 inches in the dorso-ventral axis. Reference to the literature on the oysters shows that this oyster belongs to the Genus *Pteria*. The species had been identified as *Penguin* (synonymus to *macroptera*). The cyster is non-pearl bearing as there were no pearls inside. But the nacreous layer inside the right and left valves is massive. Therefore it would be of practical importance if an all out search is made in the deeper waters for locating large number of these oysters. If our attempts are successful such finding will sustain an industry which will be peculiar to our country. Further investigations would be taken up on the subject shortly after the Underwater specialist finishes his preliminary surveys in which he is engaged now.

(6) *Biology of Balistes and Perches inhabiting the pearl banks.*—Although the Balistes landings by the handline fishermen was poor during this year all efforts were made to procure a few fishes and these were studied for the stomach contents and other biological factors. Apart from this, *Lathinus* was also examined. The analysis of the stomach contents proved beyond doubt that these fishes constitute a menace to the oysters.

(7) *Biology of Sardinella sirm.*—This fish has been found in the catches of Tuticorin fishery during the period from September to March. The weight in lb. of this fish landed at Tuticorin during the different months are as follows:—

September—40,299.

October—2,024.

November—110,918.

December—198,707 Peak season.

January—161,927.

February—71,645.

March—7,111.

It is seen from the above figures that the period between November and January is the peak season for the fish samples of *Sardinella sirm* were analysed for length frequency.

The maximum and minimum size attained by this fish in the different months is given below:—

Length.	September.	October.	November.	December.	January.	February.	March.
(1)	(2)	(4)	(3)	(5)	(6)	(7)	(8)
Maximum in cms.	20.7	19.2	22.3	23.9	23.3	22.3	20.1
Minimum in cms.	15.4	17.6	16.	16.7	17.	16.8	16.8

Study on the relative lengths of gonads.—The relative length of male and female of gonads were studied after cutting open the fish and dissecting out the right gonad which is invariably well developed than the left. The following table give maximum and minimum lengths of the gonad in the different months:—

Length.	September.	October.	November.	December.	January.	February.	March.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maximum in cms.	6.6	3.8	6.5	5.7	7.9	9.	5.8
Minimum in cms.	2.5	1.5	2.3	3.	4.5	4.3	3.7

It may be noticed that the maximum length of the female gonad attains 9 cms. in the month of February which may probably be the spawning season for the fish because in this length group gravid females were found in February. The minimum length is noticed in the month of October, showing thereby that the gonads are just developing. In the case of males,

Length.	September.	October.	November.	December.	January.	February.	March.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maximum in cms.	6.1	1.7	4.5	3.8	6.	5.8	4.6
Minimum in cms.	1.5	1.5	2.	2.2	3.5	3.8	2.8

it could be observed that the male gonad attains its maximum size of 5 cms. and 5.8 cms. in the month of January and February. Hence with all certainty we may fix the period January to March as the spawning season for the fish.

The relative weights of the fish in the different months are given in table below :—

	TABLE.						
	September.	October.	November.	December.	January.	February.	March.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maximum weight in gms.	96	86	132	150	150	128	92
Minimum weight in gms.	33	56	37	45	45	45	50

It is observed that the fish attains the maximum weight of 150 gms. in the months of December and January when they also attain their maximum length. It is also observed that the minimum weight recorded was in September and November. The increase in weight is proportionate to the length of fish, and also to the advancement in the gonadal maturity suggesting that the fish is voraciously feeding prior to spawning.

Stomach analysis.—The stomach analysis conducted so far has revealed the following organisms and their coincidence in the different months is briefly indicated in a tabular statement given below :—

	TABLE.						
	September.	October.	November.	December.	January.	February.	March.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Unidentifiable pulp like substance P		D	P	P	R	F	
2 Megalopa F			N	R			
3 Co-repods F			R	R			R
4 Small crabs							
5 Appendages of albi-repods			F	R	F	F	
6 Small fruit of							
7 Sand grains			R				
8 Gastropod post larvae				R			
9 Sea weeds R			R	F			
10 Nauplius				R	F	F	
11 Shell pieces				R			
12 Diatoms P			R	R		R	R

It is seen from the above table that the largest incidence of these organisms is in the month of December which coincides with the peak fishery and also the maximum length and weight attained by the fish. Hence during the month of December, the fish may be safely assumed to be feeding which is responsible for the maximum growth and relative increase in weight of the fish also. This voracious feeding is prior to spawning supporting the observations made (vide supra).

(8) *Statistics of fish landings at Tuticorin.*—The random sampling technique of survey was adopted throughout the study. A brief report of the total landings of fish is given below from June onwards when regular work on systematic lines was taken up on this. The tabular statement appended will give a clear picture of landings in various months :—

	TONS.						
June	...	...	...	...	...	...	109.2
July	...	...	...	...	...	...	210.6
August	...	...	...	...	...	...	430.6
September	...	...	...	...	...	...	549.3
October	...	...	...	...	...	...	336.5
November	...	...	...	...	...	...	269.1
December	...	...	...	...	...	...	294.7
January	...	...	...	...	...	...	250.3
February	...	...	...	...	...	...	264.4
March	...	...	...	...	...	...	51.5
Total	...	...	...	...	...	...	2,758.0

It is seen from the above that the months of August, September and October may be considered as the peak season for fishery at Tuticorin. And taking that 2,758 tons of fish were landed at Tuticorin during the course of 10 months, we get 275 tons for one month, which when multiplied by 12 gives the landings for the year as 3,309.6 tons for Tuticorin.

II. MARINE BIOLOGICAL STATION, CAPE COMORIN.

During the month of September 1957 the following programme of work was chalked out by the State Fisheries Research Council :—

- Study of the plankton of the region.
- Biological studies on the economical by important varieties of fishes.
- Investigations on the lobster fishery of the district.
- Compilation of fish landing statistics.

Before the allotment of this programme of work, a tentative programme of work consisting of studying the fishery of the locality with particular reference to varieties, mode of fishing and general trend of the fishery was being carried out. The programme made in the various spheres are outlined as detailed below :—

(1) *Plankton studies.*—This item of work could be started only by the end of September 1957. The main difficulty was the

craft for collection purposes. Collections depend to a very great extent on the availability of the craft and the time and convenience of the fisher folk. Further this limited the sampling to one or two particular areas especially because the local fishing crafts are all of the primitive crude boat catamarans. Throughout the period from September 1957 to March 1958 Zoo-Organisms were found in predominance in the plankton samples collected. Of these copepods formed the bulk and only a very minor part was contributed by group like Protozoans, Annulids, Coelenterates, etc. The population of the phyto-Plankton was always either negligible or nil. The reason may be ascribed to the coarse plankton net used.

In all the samples copepods formed the bulk. The common genera were *Acartia* spp. *Corycaeus*, *Microcalanus* and *Microsetella*. Crustacean larvae were present in all the collections the most common being Nauplii, and Zoea. Other larvae like Metazoea, Erythrus, and Phyllosoma also were met with. Molluscs contributed a numble share to the Zooplankton, the post larval forms of Gastropods and lamellibranche being present, in almost all the collections. Pteropods were met within the samples occasionally. From the month of December onwards Veliger larvae were met with.

Sagitta was present in all the collections. Polychaete larvae were also somewhat commonly seen in the plankton. So far Cyphonautes larvae were not noticed in the collections. From the month of November onwards Medusae began to appear. Among the Protozoans Acanthometron and Ceratium were seen.

In general Phyto organisms were very poor in the Plankton judged by the analysis—results. In some of the collections they were totally absent. When present, they were seen only in very small numbers. The common genera was *coscinodiscus* spp. Occasionally *Rhizosolenia* spp. and *Chaetoceros* spp. were met with. During the month of January 1958, *Bacteriastrum* was seen in fairly good numbers—the monthly average number per cc. of the standardised plankton being 137. Therefore after the month of January this genus was not seen in the plankton at all.

The absence of phyto organisms and the paucity of other common planktonic organisms do not reveal the exact condition of the Plankton during the various months. The conditions can be exactly studied only with the help of bolting silk Plankton net for which orders have been placed with foreign countries.

Fish eggs and larvae were met with during the months of September, October and December, with a maximum in September.

The average volume of plankton sediment varied considerably in the different months. The highest average volume was recorded

in November and the lowest in December. It may be observed that the fishing also was very poor in December.

(2) *Biological studies on lactarius lactarius*.—This item of work was started only in January 1958. The variety selected was *lactarius lactarius*. The total catches of this fish during the period under review amounted to nearly 96 tons forming about 12.5 per cent of the total output of fresh fish of the locality. The peak season of this fish tails during the month of October.

During the months of January and February length frequency studies, length-weight relationships, maturity condition of the gonads, age determination, etc., feeding habits and rate of feeding, etc., were conducted. During the month of March 1958 the catches of this variety were very poor and occurred only on one or two days. This rendered detailed examination impossible during this month. The details gathered from the observations made during the months of January and February are as follows :—

Length frequency studies.

Size groups in cms. (Standard length)	11	12	13	14	15	16	17	18	19	20	21	22	23
Percentage in January	0.5	4.5	9.9	13	23	17.1	12	7	4	4	1.3	0.5	1.8
Percentage in February	..	2	8.8	25	23	15	9	2	4.4	3.3	..	..	2.2
Size groups in cms. (Standard length)	24	25	26										
Percentage in January	..	5	..										
Percentage in February	..	..	..										

It is clear from these data that during the month of January the size groups 14, 15, 16 and 17 predominated in the catches whereas in the month of February, the size groups 11, 21, 22 and 25 were absent. The total landings of this variety during these two months amounted to 50.36 lbs.

Length weight relationship.—The rates of standard length weight in grams varied considerably. During the month of January for female specimens this ratio ranged from 2.57 to 1.93 with an average of 2.32 whereas for female specimens the ratio ranged from 2.37 to 1.77 with an average of 2.09. In the month of February the standard length weight ratio of males ranged from 2.46 to 1.16 an average of 1.90. The ratio in the case of females ranged from 1.79 to 1.10 with an average of 1.42. It has been noticed that the average weight for size group increased markedly in the month of February.

Maturity condition of Gonads.—Gonads of a number of specimens were closely studied and then weights and lengths were recorded. Signs of ovarian development were seen in the case of females of the size groups 17 and 19 cms. during the month of February. Others were immature. In the case of males gonads

of size groups 16 and 17 appeared to be maturing. The percentage of males during both months were from 75 per cent to 80 per cent.

Age determination studies.—Nothing much in this line could be accomplished during the short time of two months. However Otoliths and scale are being closely studied. The scale of *Lactarius lactarius* so far examined did not show any kind of zone formation in them. The rings were uniformly distanced.

(3) *Investigations on the small-scale lobster fishery of the district.*—During the period under review, some preliminary investigations were conducted about this important fishery. A comprehensive report of the fishery is given below :—

Locality.—Fishery extends from Colachel southwards up to Leepuram covering about 25 miles along the coast. In this district beyond Colachel, the fishery does not exist till the vicinity of Kovalam and Vizhinjam in Kerala State. At these two places there existed a prosperous fishery according to reports. The gap in the extension of the locality may be due to the various reasons like great depth, fury of the waves and comparative absence of the shelter-giving rocks.

The exploitation of this fishery on a large scale started only some two or three years ago. Before this a few firms at Cochin started quick freezing of lobsters and exporting them to America, which provided an excellent market at attractive prices. Encouraged by this market, the number of firms, handling export trade increased, and the exploitation of the lobster also shot up by leaps and bounds. Before this the value of this was not known to the fishermen of this district.

Varieties.—The main variety of lobster caught is *Palinurus dasypus*. Occasionally a few *Palinurus interruptus* also were met with.

Present condition of the fishery.—During the year 1956-57, the fishery was a prosperous one and very much concentrated in an area near Muttom fishing village. It was estimated that during the year 1956-57 during the month of November, December, January and February at the West Coast and during March and April at Cape Comorin, a total of about 1,000,000 lobsters have been caught. But this year so far only 250,000 lobsters had been fished. At present fishing at Cape Comorin is going on but the catches are very few when compared to the previous year. From the figures it is clear that the total catch of lobsters had decreased by 75 per cent. Another fact noticed was the absence of lobsters in the area in which lobsters were found concentrated during the previous year. This area has been more or less completely denuded by the last year's fishing. This year fishing was

mostly confined to areas south to Muttom like Pozhickarai, Puthenthurai, etc.

Mode of fishing.—This year some improvements have been noticed in the tackle used for lobster fishing. During the previous year the chief tackle used to be a modified hook called locally "Nankooram". This is six or seven hooks arranged radially at the end of a stout cylindrical rod of iron so that the whole thing resembled an open umbrella. This they used to operate in rocky area among holes and crevices. The hooks are baited with the flesh of *Mytilus* (*Edulis*(?)). The hooks get entangled with the continuous plates of the lobster when it feeds. Apart from the above tackle used two or three other methods of fishing which were followed by the fishermen in the locality were also studied in detail about which scientific note is under preparation.

During the period under review the data obtained by the sampling of catches were as follows :—

Percentage of males, 40.23. Females, 59.77. Almost all the male specimens examined were adults. The carapace length of these ranged from 60 mm. to 109 mm. Among the females 48 per cent were berried. The carapace lengths of these ranged from 57 mms. to 88 mms. Among the females 12.5 per cent were immature as judged by the absence of the sexual dimorphism. The carapace lengths of these ranged from 60 mms. to 80 mms.

Control measures.—It is high time that some restrictions are enforced in the fishing for lobsters. By enacting suitable laws and enforcing them effectively depletion may be prevented. The fact that there is unscrupulous overfishing is quite evident from the decrease in catches. A study of the composition shows that about 38 per cent of the total is undesirable catch. It is quite essential this is eliminated; for this the catching of berried females and immature specimens has to be prohibited. Unless early steps are taken in this direction it is felt that this may affect the fishery.

The larval history of the lobster was studied during the year under review. *Phyllosoma* larvae were seen in the Plankton from the month of November. But it is suspected that these larvae are subjected to wide dispersal owing to the prevailing north-east wind and the east-west current at that time. A thorough description of the larve found in the plankton is being prepared for publication.

During the ensuing period, more important aspect of this item of work are intended to be taken up. These are migration studies and a survey of the locality to which the fishery is confined. It will be of very great importance to determine the area to which the fishing is limited. It is also planned to release about 1,000 lobsters properly marked to study the habits of migrations.

The third item of work is the rearing of lobsters in the laboratory and studying some of the important biological aspects, like moulting, mating conditions, the time taken for catching and larval history.

(4) *Fishery at Cape Comorin*.—The place is situated at the southern tip of the Indian Peninsula (latitude $80^{\circ} 6' N$. Longitude $78^{\circ} 34' E$) at the confluence of the waters of the Arabian Sea on the west, the Bay of Bengal on the east, and of the Indian Ocean on the South.

Cape Comorin has a population of 6,007 (1956 census) of which the fishing community forms nearly 80 per cent. There are about 2,000 fishermen actively engaged in fishing. Cape Comorin has a good fishing throughout the year the south-east and the north-east monsoon. This is because of its unique geographical position at the land end, surrounded by sea on the three sides. This fishing village proper is situated on the eastern side of the promontory and extends over half a mile along the coast line towards the north of the Kanyakumari temple. This is a good landing place behind the local church and more or less protected from the fury of the waves by the Vivekananda and allied rocks on the southern side. Moreover rich fishing grounds exist within easy reach towards the east, south and west. The important fishing grounds usually exploited by the fisherman are: (1) Kothalamadai, (2) Kollannai Paar, (3) Uyarathannai Paar, (4) Velikannai Paar, (5) Karamannai Paar, and (6) Velliyaal Paar lying within a radius of five miles from the shore and having depths ranging from 10 to 16 fathoms. The only fishing crafts in use here at present are boat catamarans two types of which are present. One type is made of four logs and has a length of 25 to 30 feet. The other type is smaller made of 3 logs and having a length of 15 to 20 feet. There are 868 of the former and 600 of the latter. Both line fishing and net fishing are in progress and operations are confined to the sea within 10 miles. The line fishing operations are carried on throughout the year. Net fishing is carried on with four types of nets. Most important one among which is a boat name called "Thattamadi". Another type of net has a mesh of $1\frac{1}{2}$ inches to knot to knot. A third type is called "Iaccha Valai" to catch *Anchoviella* spp. The fourth type is called "Chala Valai" measuring 120 feet by 40 feet with a mesh of 1 inch knot to knot. The important commercial fisheries of Cape Comorin can be broadly classified into the following groups:—

- (i) Ribbon fish fishery.
- (ii) White Bait fishery.
- (iii) Perch fishery.
- (iv) Cat fish fishery.
- (v) Seer fish fishery.

(vi) Butter fish fishery.

(vii) Sardine fishery.

(viii) Silver bellies fishery.

(ix) Shark Ray and Skate fishery.

Ribbon fish fishery.—The season begins by the end of June and lasts till November. The peak period of the fishery falls within July, August and September. During this period the average daily catches comes to about 50,000 lb.; and the annual landings are estimated to be of the order of 6,000,000 lb. These are caught in Boat seines.

White bait fishery.—Season is from July to November. The various species landed are *Anchoviella heteroclobes*, *A. Commersonii*, *A. Tri* and *A. indicus*. These are caught mainly in Boat seines and also in Nethelli or Kaceha nets. The annual production is nearly 6,00,000 lb.

Perch fishery.—This fishery is constituted by *serranus* spp. *Lethrinus* spp. and *Lutjanus* spp. Of these *Serranus undulosus* is the most abundant variety. Other *serranus* spp. such as *S. miniatus* are also landed in small quantities. Four different species have been recorded in the catches. *Lethrinus*, *nuebulosus* and *Lutjanus* spp. also contributed to the perch fishery. The season for the perches is generally from June to August. Annual catches amount to 5,00,000 lb.

Cat fish fishery.—Large quantities of *Arius* spp. are caught in Boat seines as well as on hooks mostly during the months of October and November. Smaller quantities appear sporadically during the other months also. The major portion of the Annual catches is contributed by hook and line fishing. Annual production amounts to 5,00,000 lb.

Seer fish fishery (Cubium auttatum).—From the commercial point of view this is perhaps the most important fishery of Cape Comorin. Large quantities are caught by hooks and lines and also in boat seines. Generally the fish appears during the months of October, November and December. The species landed include *Cubium auttatum* and *C. Commersonii*. Nearly 90,000 lb. of this highly esteemed fish are landed annually.

Butter fish fishery.—*Lactarius lactarius* forms a major fishery at Cape Comorin and an estimated quantity of 80,000 lb. are landed yearly. This fish invariably caught in boat seines and is landed mostly during the months of March, April and May and also during October and November. Years back Butter fish fishery was a lucrative fishery in this locality. It is understood that this fishery has been on the decline for the past few years and this year also it is a failure.

Sardine fishery.—*Sardinella fimbriata* and *Dussumieria nasseltii* are the chief sardine varieties landed at Cape Comorin. Others such as *S. Sirm* + *S. gibbosa*, etc., appear in the catches once in a way. Usually Sardine season commences by the middle of April and lasts till November with a break in July, August and September. The major portion is landed by gillnet (Chalavali) and in boat seines also they are caught. Compared to previous years this year's sardine fishery also was a failure. Annual catch is estimated at 40,000 lb.

Chorinemus fishery.—Unusual season for this fishery coincides with that of the Seer fish fishery, i.e., during the month of October, November and December. These are mainly caught in hook and lines, and the catches amount to about 35,000 lb. in a year.

Silver Bellies fishery.—The silver Bellies fishery of Cape Comorin is constituted by *Leiognathus* species and the season falls during February, March and April. . . This fish appear also during September, October and November caught in boat seines. The silver bellies landed amount to 30,000 lb.

Shark ray and Skate fishery.—These are caught in hooks and lines and also in boat seines. It is available throughout the year, there being no specific season. The following varieties are landed from time to time, viz., *Carcharias* spp., *Scolidon* spp., *Zygaena blochii*, *Galcocerdo* spp., *Chiloscyllium*, *Pristis cuspidatus*, *Rhinochobatus* spp., *Pterolata* spp. Quantity caught yearly is estimated at 20,000 lb.

Besides the above a large number of varieties of fish are landed at Cape Comorin. These include *Stromateus niger*, *S. Sinenis* spp., *Chirocentrus dorab*, *Upeneoides* spp., *Sphyræna obtusate*, *Sciaena* spp., *Decanterus* spp., *Histiphorus* spp. All these contribute to about 2,50,000 lb. a year.

Other varieties of minor importance that are landed from time to time are *Coryphæna* spp., *Mugil* spp., *Chanos chanos*, *Diagramma* spp., *Otolithus* spp., *Pristipoma* spp., *Elacate nigra*, *Hemiramphus* spp., *Platax* spp., *Mene maculate*, *Teradon* spp., *Balistes* spp. etc., etc.

The usual annual catches of fish at Cape Comorin is around 3,200 tons of fresh fish on an average. Nearly 20 per cent of this is utilised for fresh consumption and the rest is cured. During this year under review the fishing had been a failure and the catches amounted to 850 tons only (vide Appendix IV).

(5) *Metrology and Hydrography of sea off Cape Comorin.*—The routine data collected are given in Appendix V and VI

III. MARINE BIOLOGICAL STATION, KRUSADAI ISLAND.

The progress of the work of this station was greatly handicapped during the beginning of the period under review owing to lack of personnel. The post of Supervisor was filled towards the close of June 1957 and the post of Research Assistant (Algology) was filled in by the beginning of September 1957. Prior to these period the Research Assistant, Kurusadai was in additional charge of the posts. From September onwards the station had its full complement of Research staff till the close of the period excepting for a brief period of two months when the Supervisor was on medical leave. The Research Assistant, Krusadai, was deputed for Pearl Fishery work as Inspector of Pearl Banks during the Pearl fishery at Tuticorin, during March to May 1957 and March to April 1958. During the latter period the Research Assistant (Algology) was in charge of the station attending to all items of work.

The various items of work carried on at Krusadai Biological Station during the period under review are presented below in detail :—

(1) **Planktology.**—Plankton collections were made regularly on all Mondays and Fridays during the year under review from the pearl oyster park and sandy point. The plankton collections were analysed both qualitatively and quantitatively for Zoo as well as phyto organic constituents. The details of the monthly average for the various constituents are shown in Appendix VII and VIII. The volume of plankton hauls were high during April, October 1957 and February 1958, March 1958. The maximum quantity of plankton was recorded during October 1957 and the minimum in June 1957. The volume of the plankton was moderate during November 1957 and January 1958. During the rest of the months the volume of the plankton was very poor. During the entire period under review the phyto plankton was found predominating over the Zoo plankton except during February 1958.

The zoo-organisms occurred in large numbers during October 1957, January and March 1958. They occurred in moderate quantity during November, December 1957 and February 1958. During the rest of the period they occurred in very small numbers. The poorest records of occurrence being during August 1957. The important groups that contributed greatly to the volume of zoo plankton were copepods, Molluscan and Crustacean larvae and protozoans, Larval and post larval annelids occurred in fair Nauplius, attained their zenith during October 1957 and January 1958. The copepods also were found to occur in great numbers from October onwards till January 1958. Among the other larval forms also we note that they occur in abundance from October onwards and extend till March. Fish eggs and larvae

occurred in small numbers during the first half year under review; a greater number of them occurred during the latter half. Among the Protozoans the Dinoflagellates were in prominence in almost all the hauls. The cystoflagellate *Noctiluca* occurred in larger number during January 1958 only.

The phyto-organisms occurred in abundant numbers during April 1957, October, November 1957. They were in large quantity during December 1957 and January, February 1958. During the rest of the periods as in the case of zoo organisms the phyto-organisms occurred in poor numbers. Among the phyto-organisms the important general which contributed generously to the volume were *Chaetoceros* spp. *Rhizosolenia* spp. *Oscillatoria*, *Bacteriastrium* and *Thaliastorthrix*. *Chaetoceros* spp. attained its maximum during October 1957 and occurred in fair quantity then onwards. In the case of *Bacteriastrium* there were two periods of peak occurrence, first in November 1957 and subsequently in January 1958. Remarkably enough during December 1957 *Bacteriastrium* occurred in fair quantities, *Oscillatoria* occurred in abundance during April 1957 and then onwards it was very poorly represented in the hauls till October 1957. During November however *Oscillatoria* was represented in considerable numbers and once again, as the period advanced, its occurrence declined in numbers. *Thaliastorthrix* occurred in large numbers during November 1957 and during the subsequent periods was represented in smaller quantities only. Apart from the above described genera which occurred in larger quantities, various other forms also occurred in the plankton hauls. A total of 42 different genera with various species in each have been identified and recorded in the different hauls collected during the year under review.

It is noted from the perusal of the Annexures that the volume of the plankton was generally in proportion to the number of organisms that occurred in each excepting during December 1957, January and February 1958. During December and January though the volume of the plankton was low, the number of organisms representation was only moderate. The discordant nature of the volume of the plankton and the total number of organisms can be attributed mainly to the fluctuations noticed among the major genera in the phyto and zoo organisms.

During the period under review no peculiar planktonic phenomena was noticed.

(2) *General fishery of Rameswaram Island.*—In Rameswaram island there are altogether six important fishing centres, i.e., Dhanushkodi, Rameswaram, Thangachimadam, Kundugal point, Kadarsanad and Rameswaram Road. Of these centres the fishing at places other than Dhanushkodi, Kadarsanad and Rameswaram is seasonal. The statistics of the fish landing of

the various centres were collected for the period under review and presented in Appendix XIX appended to this report. The centres on the Palk Bay side were found to land heavy catches during the south-west monsoon and the centres in the gulf of Mannar side during the north-east monsoon. Owing to the Unique situation of the Dhanushkodi centre it was found to have the best fishing records throughout the year. The tackle that were operated in different centres are as follows:—

Dhanushkodi:—Dunlop twine net, Olavalai and shore siene net and hooks and lines.

Rameswaram:—Olavalai, shore siene net and perch and crab traps.

Thangachimadam:—Madi valai and Dunlop twine net.

Kundugal Point:—Dunlop twine net and hooks and lines.

Kadarsanad:—Shore siene net.

Rameswaram Road:—Shore siene net and Olavalai.

From a perusal of the Annexure it may be seen that the maximum quantity of fish have been landed during March 1957 and fairly heavy quantities during July, August, September, October 1957 and February, March 1958. During the rest of the period the fishery activities were only moderate. The poorest fishing was noticed during April 1957.

A good number of species were found always represented in the catches. The most common were Sharks, Rays, Sardines, Silver bellies, Sabre fish and Seer Sharks and Rays constituted the major fishery of the year along with Sardines and Silver bellies and the Sahre fish. Other important varieties with respect to the total output were Horse mackerel (*Caranx*), Perches (*Seranus*, *Lethrinus*, and *Lutjanus*), Cat fish (*Arius*), etc.

(3) *Departmental D.S.P. Activities in Rameswaram Island.*—The Departmental Unit at Pamban operated around Rameswaram island, Nylon Bottom net and Nylon drift nets from Motor Fishing luggers and Tuticorin type canoes. They operated both on the Palk Bay and Gulf of Mannar side according to the monsoon and fishing seasons throughout the period under review. The landings made by the D.S.P. Unit are presented in Appendix X to this report. Fair quantities of various species were landed during the entire period but heavy catches were recorded during April 1957 and September 1957, February and March 1958. During the other periods fishing was only moderate. The operations could not at any time be carried

on for a considerable period continuously owing to failure of engines or repair to hull structures. From August 1957 onwards the Motor fishing luggers are removed from commission as they were to be transferred to the other states. The important species that were caught by the D.S.F. unit were cybium, chirocentrus, chorinemus, Arius carcharias and Roys. The D.S.F. crafts were manned by a crew of four and they operated at a distance of 6 to 10 miles off shore at depths varying from 5 to 10 fathoms.

During various periods in the year the Food and Agriculture Organisation boats under the direction of the F.A.O. fishing expert Sri Illugason and the T.C.M. boat of "M. V. Gudjon" operated around Rameswaram island with trawl nets. These operations were of an experimental nature to locate good trawling grounds in both Palk Bay and Gulf of Mannar. The exploring cruises yielded fruitful results and potential trawling bank was located off Shingle island at depths varying from 9½ to 13 fathoms.

(4) *Algology*.—During the period under review systematic studies of the algae occurring around Rameswaram and nearby islands were made. The various algae species were periodically collected, classified, identified and preserved for studies in the laboratory. Some slides were prepared with a view to study the morphology of Algae and Diatoms. Various species of alga collected from different centres were added on to the museum periodically.

(5) *Pearl Oyster Farming*.—The oysters kept in the pearl oyster park periodically cleaned and released back in fresh cages. The sedentary fowling organisms in the cages as well as on the oysters were removed, studied and preserved for supply to Ennore. Nothing much could be achieved during the year in the way of culture pearl experiments. The Deputy Director of Fisheries (Inland) who had visited Japan and studied the culture pearl experiments will be guiding the Research Assistant in the further conduct of this fruitful research.

(6) *Marine fish farming*.—The marine fish farm for culture of chanos at Krusadai has been renovated towards the close of the year under review, and steps have been taken to stock the farm with about 10,000 fry apart from the conduct of research on the rate of growth, food and feeding habits, etc., of the chanos, it is proposed to make the farm self sufficient by realizing fair sale-proceeds of fish of marketable size after a year or two.

(7) *Chank marking experiments*.—Chank marking experiments in Ramanathapuram waters were for the first time commenced during February 1958 when chanks collected from Galaxea lagoon in Krusadai were labelled and released there itself subsequently chanks collected from beds on the border of

Ramanathapuram and Tirunelveli waters were labelled and released in beds of Nallathanithee. It is gratifying to note that the Ramanathapuram chank lessees have extended their hand of co-operation for the successful prosecution of studies on the chanks.

(8) *Supply of specimens*.—Periodical collections of fauna and flora occurring around Rameswaram and nearby islands were made, preserved and despatched to Ennore for supply purposes, specimens were also supplied to visiting parties and other institutions at approved Government rates.

IV. MARINE BIOLOGICAL STATION, ENNORE.

The programme given by the State Fisheries Research Council was implemented during the year.

(1) *Meteorology and Hydrography of the Ennore Estuary*.—The meteorological data were recorded regularly and monthly averages are given in Appendix XI, the range of atmospheric temperature for the year has been from 83° F to 91° F. 83° F being in January the post-monsoon periods and 91° F in May, June the summer period. In 1956-57, the average range was 82° F-92° F. 82° F being October to January, i.e., the monsoon and post-monsoon periods and 92° F in May, the summer period. Average humidity ranges from 69 per cent in April to 84 per cent in November, the summer and monsoon periods respectively, which is normally to be expected. The total rainfall for the year is 34" 32 cents. There has been no rain in February and March 1958 and in April 1957 which is the summer period. The highest rainfall of 17" 48 cents has been in November, the monsoon period. The range of atmospheric pressure is 30.2" to 30.5". The usual direction of wind was either north-east or south-east though occasionally it has been varied.

The bar of the estuary closed in June whereas it closed in May in 1956-57. The bar opened in August in 1957-58, closed soon after in September and then opened again in November. In 1956-57 it was opened once and for all in October for that year by the Public Works Department. The closure of the bar twice in 1957-58 is unusual.

The hydrographical data collected from the Ennore Estuary Opposite Research Station are given in Appendix XII. The average surface temperature ranges from 81° F to 88° F. Highest temperature is found to be in summer paralleling the rise in atmospheric temperature. Similarly there is a parallel in the lowest temperature which is in the monsoon and post-monsoon period. Average specific gravities ranges from 1.006 to 1.026 in 1957-58. Average Pn ranges from 8.1 to 8.3 in 1957-58.

The hydrographical data collected over the edible oyster bed are given in Appendix XIII.

Average surface temperature ranges from 67.7°F to 88°F, from 1,005 to 1,024. Average Ph ranges from 8.1 to 8.3. Average turbidity ranges from 24 cm. to 66 cm., the water being clearest in the post-monsoon period and becoming very turbid in the summer period. Average salinity ranges from 30.37 per cent to 40.69 per cent. The lowest salinity is about September and October while the highest is about March and April. Average oyster content ranges from 3.22 per cent to 7.00 per cent. Highest oxygen contents are found in November which comes in the flood season, i.e., the monsoon period. The on-rush of flood waters from the upper reaches help to increase the oxygen contents.

Correlating the various meteorological and hydrographical factors, the following conclusions are drawn :—

(a) Increase and decrease of atmospheric temperature results in a parallel and similar increase and decrease of surface temperature, specific gravity and salinity.

(b) The various periods, viz., (1) Summer, (2) Pre-monsoon, (3) Monsoon, and (4) Post-monsoon, which form four quarters of the year show marked and definite meteorological and hydrographical factors for each of the periods enabling such classification and it is possible to forecast conditions, except for sudden and unforeseen changes, for each quarter. However it is found that no two years are exactly the same and each year has its own peculiarities depending upon rainfall, floods and opening and closure of the bar, although principally the four periods succeed each other like the four seasons of the year which are expected and foreseen.

(2) *Planktology of Ennore Estuary*.—Forty-seven hauls have been made and 848 cc. of plankton sediment was collected (vide Appendix XIV), 49 Phytoplanktonic organisms and 61 zoo planktonic organisms were recorded during the year. Largest number of organisms were found in August when the bar opened, the number of species being 45. The least number of species, viz., 26 were found in December. It is also found that no organism either phyto- or zoo occurs continuously throughout the year and that there are certain periods when they occur in large quantities other periods when they are found in moderate quantities and still other periods when they are totally absent. Certain organisms occur but rarely.

(3) *Mullet study*.—Six hundred and twenty-four specimens of mullets were examined as follows :—

Number examined.		Month.	Number examined.	
..	80	October 1957	..	45
May 1957	65	November 1957	..	49
June 1957	58	December 1957	..	28
July 1957	75	January 1958	..	6
August 1957	99	February 1958	..	34
September 1957	49	March 1958	..	66

The following species were examined. *Mugil ocur*, *Mugil belanak*, *Mugil spieglari*, *Mugil parsia*, *Mugil cunnesius*, *Mugil dussimreri*, *Mugil belaaathi*, *Mugil Jerdone* and *Mugil hoornensis*. Of these the two large-growing species are *Mugil ocur* and *Mugil belanak*, the latter being the more tasty table variety.

In the examination of sex, males were found to predominate over females. Species like *Mugil parsia*, *Mugil dussimreri* and *Mugil spieglari* were found mature even when quite small. *Mugil belaaathi* was found to mature at a moderate size while *Mugil ocur* and *Mugil belanak* grew to a large size before they were found in mature stages.

Algal filaments and diatoms form an important portion of the food of Mulletts. The type of organisms found in the stomach indicate that they browse on the epiphytes and epizooies of larger algae and rocks and on the small benthic organisms of sand and mud banks. Sand grains vary in abundance from 5 to 75 per cent of the stomach contents indicating their bottom-feeding habit. Sand grains are either fine or coarse-grained probably depending on their fortuitous finding of the required food concentration on such a coarse or fine-grained bottom. The following are the organisms which contribute to the diet of Mulletts of Ennore :—

Phyto Organisms.

- 1 *Gyrosigma*
- 2 *Thalassocera*
- 3 *Nitzschia Closterum*
- 4 *Coscinodiscus*
- 5 *Navicula*
- 6 *Diplonies Suboralis*
- 7 *Meloscia*
- 8 *Rhizosolenium Semispura*
- 9 *Gullatoria*
- 10 *Anahæna*
- 11 *Halosphæra Vinch*
- 12 *Asterconella Bleakley*
- 13 *Amphora*
- 14 *Mensmopedia*
- 15 *Scenedesmus*
- 16 *Achnanthis*
- 17 *Diplonos Interupta*
- 18 *Gracillaria*
- 19 *Polysiphonia*
- 20 *Enteromorpha*

- 21 *Amphiprora Paludosa*
- 22 *Biddulphia*
- 23 *Skeletonchina*
- 24 *Nitzschia Tryblionella*
- 25 *Var Levidensis*

Zoo Organisms.

- 1 *Namphi*
- 2 *Tintinnus*
- 3 *Prorocentrum*
- 4 *Gastropad Post Larva*
- 5 Limbs of Crustacean
- 6 Gastropod Shells
- 7 Cypris
- 8 Copepods—*Acarijs*
- 9 *Peridinium*
- 10 *Brachionus*
- 11 Veliger Larva
- 12 *Lamellibranch Post Larva*
- 13 *Polychæta Worms*
- 14 *Nematode Worms*
- 15 (Probably Parasite)

(4) *Edible Oyster Research.*—One hundred tiles placed in a specially made oyster box with crates has been examined every month and the results obtained are given in Appendix XV. Two hundred spat were measured lengthwise and breadthwise when there were more than 200 on the spot collectors. In the absence of 200 specimens the available was examined.

It has been possible to separate 12-size groups from the spat found in size group II than one. Size groups 10, 11, 12 are rare even at size groups VIII and IX oysters are found to break off easily from the clutch due to wave action and are thus dispersed from the deeper to the shallower areas or vice versa enabling natural repopulation and replenishment.

It is found that on the whole and especially when spot settlement is internal larger numbers of individuals are found in size groups of I, II and III. At certain times more individuals are found in size groups II than one. This may be due to the following reason: The tiles are examined once every month, cleaned and placed back. Probably spat settlement is best just after the tiles or settling substratum is cleaned and less after the cultch has been fouled. When the tiles are examined in the following month the

spot which settled in the previous month immediately the tiles were replaced, manage to outgrow the first size group and enter the second, resulting in a larger number of individuals in size group II.

The peak season for spat settlement is noticed to be in November and December, the monsoon period although the oyster spat begins in the premonsoon period and gradually enters the monsoon period of October when mortality is found to be highest.

It is also seen that after the closure of the bar in June, although there has been a small amount of spat settlement there has been a decline in the number of oysters on the cultch. This justifies a correlation between spat settlement, growth or mortality and seasons, then respective meteorological and hydrographical conditions and the presence or absence of other physical conditions such as the opening and closing of the bar, inflow and outflow of tides and on rush of inland flood waters.

Mortality in premonsoon and monsoon periods is due to the on-rush of fresh water floods and the sudden and undue lowering of the salinity. Peak spat fall in December is facilitated by the opening of the bar, and tidal action which follows, regulating the specific gravity and salinity adversely affected during the floods.

Again closing of the bar limits the much favoured tidal action which results in decline of spat fall and also oyster growth. Oyster examined after closure of the bar are not so large and luscious as those examined before closure. They are more fit for the table during the post-monsoon period and hence more fit for breeding also at that time. Hence the good spat fall from the end of November which continues till March.

Ten families of fouling organisms have been identified on the oyster cultch competing with the oyster spat initially for space and secondarily for space also. *Balanus amphitrite* ranks first as an enemy of oysters. *Hydroides moseleyi* ranks second and *Modiolus undulatus* third. Conditions favourable for oysters are found to be even more favourable for foulers while conditions lethal for oysters are equally lethal for the foulers as found from observation and it is this problem that confronts the research worker. The beauty however about oyster culture is that even if beds are completely depleted there is always 99 per cent of possibility for self replenishment. What man has to do is to help this natural replenishment by introduction of suitable substrata at level closer to the surface of the water where there will not be the smothering action of alluvial deposits which prevents spat settlement. The seeds after they have grown to a reasonable size may then be sown with the substrata in the deeper areas where growth will be good.

It is found by observation that spat settlement is best in the shallows but oyster growth is best in the deeper undisturbed areas.

V. FRESH WATER BIOLOGICAL STATION, BHAVANAGAR.

The following programme of work was allotted by the Research Council for the year under report :—

(1) Experiment on the segregation of carp fry and reduction in mortality.

(2) Bionomical studies of *Wallago attu* and *Catla catla*.

(3) Studies on *Chela clupeoides* and its utility in cyclopsidal work.

(4) Bionomics of *Barbus ticto*.

(5) Culture methods of microcystis and its effect on the growth and survival of Tilapia, labeo Cirrhina and Mirror carp.

(6) Effect of manuring on growth and survival of Hydrilla.

(7) Experiments on spawning of Mirror carp.

(8) Further studies on Tilapia.

(9) Studies on fishing gear.

(10) Oxygen requirements of fresh water fishes.

(11) Food value of fresh water fishes.

(12) Analysis of pond bottom deposits.

(13) Effect of fish poisons on fish life.

(14) Limnology of Bhavanisagar Reservoir.

The above programme of work was taken up and pursued during the year. The progress made under each is detailed below :—

(1) *Experiment on the segregation of carp fry and reduction in mortality.*—The segregation of the economic varieties of the carp fry from the mass of fry collections made in thousands from the rivers especially in the Cauvery and Bhavani rivers at Bhavani in Coimbatore district is a major problem in fish cultural operations and hence this work was taken up to evolve any easy method to segregate the fry from a mixed collection. The experiments carried out so far related mainly to—

(i) the reaction of the different varieties of fry to different coloured lights;

(ii) the capacity of the different varieties of fry to tolerate oxygen content by keeping the fry in an overcrowded container and segregating them according to the oxygen requirement of the different species as they come up to the water surface in stages as the oxygen gets depleted in the medium; and

(iii) the variable ability of the fry to swim against different velocities of water.

The results obtained are summarised below in seriatum :—

(i) *Effect of colours.*—The effect of different coloured lights on the grouping of fry in a tall glass jar was tried with violet, red, green, orange and white lights. The experiments did not clearly

reveal as to which species attracted by each colour. Fry of 10-15 mms. always preferred the surface layers, whatever colours there was.

(ii) *Oxygen depletion method.*—Fry 9 to 25 mms. were kept to overcrowding in a tall rectangular glass jar and the top was completely closed with a glass plate.

(1) For the first 10 minutes they were down at the bottom. After 15 minutes, they started moving up and in another 5 minutes a dense crowding at the surface was noted. In another 3 minutes they were found gasping and swooning off. This top layer was not ladled out. There were 300 fry in it. They composed of.

Nuria and Rasbora 60 per cent.

Chela 20 per cent.

Barbus spp and *Cirrhina reba* 20 per cent.

The top of the jar was closed after the ladling.

(2) Within another 3 minutes, another batch came to the surface. These were also ladled and the top of the jar again closed. They were about 200 fry in this batch composed of :—

Barbus spp. and *Cirrhina reba.* 60 per cent.

Nuria and *Rasbora* 30 per cent.

Chela 10 per cent.

(3) (a) All the remaining fry came to the surface in another ten minutes. These (about 100) consisted of :—

Nuria and *Rasbora*—40 per cent.

Barbus spp.—45 per cent

Chela—5 per cent.

Loaches and *Discognatus*—10 per cent.

(b) The experiments were repeated in a double tin carrier. The carrier was filled to the brim with water and fry 9 to 25 mm were put in to overcrowding. The carrier was closed with a glass sheet.

(1) After one hour a crowding of fry at the surface was noticed. These would not go down even when disturbed. These were scooped out and these consisted of—

B. Jerdoni and *B. Carnaticus*—45 per cent.

Rasbora, Nuria and *Chela*—55 per cent.

A sample of the water was collected for analysis.

(2) In another 10 minutes another crowding at the top was noted.

This was more in number than the previous batch and many had already started dying. They are scooped out and a water sample also was collected.

Loach 1 per cent.

Barbus 50 per cent.

Rasbora and Nuria 49 per cent.

(3) Many of the bigger fry and small ones were still remaining at the bottom even after two hours of first introduction. These were—

Barbus 88 per cent.

Nuria 6 per cent.

Cirrhina cirrhosa 6 per cent.

(iii) *Effect of velocity of water.*—Preliminary work carried out last year showed that by varying the velocity of water the fry could be segregated into three groups.

1. *B. Hexagonolepis*, *B. Carnaticus* and *Cirrhina cirrhosa*.
2. *Rasbora Nuria* and *Danio*.
3. *B. Filamentosus*, *B. ticto* and *B. Vittatus*.

The observations show a relationship between the body form of the fishes and the velocity of the water flow. The higher the body, the lesser is the capacity to swim against increased velocity. The fry could be segregated into different groups and the economic ones could be separated from the mixture by skimming out the economic minnows as they come to the surface at the earliest. Further visit will be done to study this in detail.

Another method for segregation has been contemplated. Observations made in the collection centres on the length frequency distribution of the different species have revealed that the fry and fingerlings collected on any particular day are generally of almost the same size suggesting the spawning of adult fish at regular rhythmic intervals. Hence the size of fry may form an indication of these species and grouping these fry into different size groups may lead to a successful segregation. A segregation therefore of the different size groups of the fry collected may bring about an easy segregation of the different varieties with this in view, suitable contrivances for this size segregation are under preparation and the work will be followed up on the spot during the next collection season.

Experiments on the mortality of fry showed that food is a major factor in keeping down mortality. Zooplankton seem to be more important than phytoplankton for a better survival of the fry in nurseries. A good growth of *Daphnids* could be obtained by manuring the water with cotton seed meal. Natural nurseries gave better survival than cement nurseries.

(2) *Bionomical studies on Wallage attu and catla catla.*—
(a) *Catla catla.*—Studies on this fish were undertaken with reference to its age and growth food and spawning.

Age and growth.—The growth of the fish under culture in ponds without artificial feeding is from 12.7 cms. to 22.9 cms. in 4 months. In certain departmental ponds they have been found to grow to about 36 cms. (6 lb.) in the first year and to about 25 cms. (15 lb.) in the second year.

The length frequency distribution of the commercial catch of Mettur Reservoir reveal the following major size groups :—

26 cms.

45 cms.

69 cms.

92 cms.

A few specimen that are above 100 cms. also were caught occasionally. For fixing up of the age groups the scales have been collected and are under examination.

Food.—Catla is found to feed on plankton and vegetable matter, Molluscan shells were also seen in the stomach contents probably ingested along with the vegetable debris (Myxophyceae—5 per cent, Chlorophyceae—10 per cent, Diatoms—25 per cent, Zooplankton—25 per cent water weeds like chara, Lemna and Hydrilla 40 per cent Molluscan shell and others—5 per cent).

Spawning.—The fecundity of catla is about 805,000 ripe ova of 1.03 mm. diameter. Catla breeds in the Mettur Reservoir between the last week of June and first week of July. In the river Cauvery, below Mettur Dam they seem to spawn later. A major factor for the spawning appears to be the flow of bulk water. Fry of catla start appearing in the River Cauvery in the first week of August. The length frequency pattern of the fry and young fish indicate the probability of the different stocks from different areas contributing to the annual recruitment. The spawning grounds of catla in River Cauvery appears to be—

(1) River Ayyar above upper anicut, and

(2) the confluence of river Noyyal and Amaravathy with river Cauvery.

Above the Mettur Dam Reservoir, the spawning appears to take place near the inflow of Thoppayar and Palar.

Catla recently caught in the lower Bhavani Project canal due to closure of shutters, were of the size of about 800 cms. and about 25 lb. each. These contained mature ova and spawn. As many as 63 catla were caught of which only 4 could be kept alive. These are stocked in Bhavanisagar fish-farm ponds for observation.

Since the catla caught must have come from fish stocked in Bhavani-sagar Reservoir, it is hoped to obtain successful results of breeding habits of catla in the course of next few years.

(b) *Wallago attu*.—The Fresh Water shark is found to be more riverine in its distribution. Because of this ecological habit their catches have gradually dwindled in Mettur Reservoir.

Age and growth.—The pectoral spines have been selected as an index for a study of its age and growth. A cross section of the spine 3 to 4 mms. from its base gives the best results. The length frequency pattern of the commercial catches Mettur Reservoir reveal the following size groups :—

31, 45, 58, 74, 84, 94, 104, 114, 125 and 132 cms. A pectoral spine of fish of 308 mms. show one clear ring and in a few an indistinct second ring. The spines are under examination.

Food.—The fish is highly piscivorous. Smaller wallago specimens have also been found in the stomach of larger fish indicating a cannibalistic habit. Wallago lie in ambush below dams, regulators and in rivers and gulps large numbers of carp fingerlings as they try to ascend up.

It was even observed that during our stocking time, the fishes crowd around the place at a distance and pray upon the stocked fish as and when the stocked fish move into deeper water.

Spawning.—The fish breed in the rivers towards the beginning of August. In river Cauvery they migrate up when flow of the old alkaline water takes place. When the acidic turbid water start flowing, the migrants start drifting down and spawn in inundated areas on the river banks. Their fry are available in good numbers above Grant Anicut in the Cauvery River.

(3) *Studies on Rasbora*.—Specimen from Madras were examined till June 1956 for the following studies :—

- (1) Length frequencies.
- (2) Individual weight and volume.
- (3) Sex and fecundity.

The gut contents were also examined. Sixty per cent of the total fishes examined showed cyclops and 80 per cent showed crustacean appendages and cyclops. The gut contents of all the size groups were identical. They are—

- | | |
|------------------|----------------------|
| 1 Cyclops. | 6 Other zooplankton. |
| 2 Planula Larvæ. | 7 Diatoms. |
| 3 Rotifers. | 8 Desmids. |
| 4 Daphnids. | 9 Filamentous algæ. |
| 5 Diaptomus. | |

Further studies had to be stopped as the approved programme of Research Council had to be taken up.

(4) *Studies on Barbus stigma*.—Six hundred and ten specimens were examined. Monthly measurements of samples have been made. Individual weight, volume, sex proportion and gut analysis have been noted. The gut contents have shown the following :—

- | | |
|--------------------------|--|
| 1 Crustacean appendages. | 2 Cypria larvæ. |
| 3 Rotifers. | 4 Scales. |
| 5 Other zooplankton. | 6 Diatoms. |
| 7 Insect larvæ. | 8 Amphipods. |
| 9 Cyclops. | 10 Diaptomus. |
| 11 Green algæ. | 12 Desmids (low per cent in a few fish). |

(5) *Studies on Trichogaster*.—Data on the studies of Trichogaster were analysed and rewritten. Further data required were being studies and gathered.

(6) *Culture methods of Microcystis and its effect on the growth and survival of Tilapia, Labeo Cirrhina and Mirror Carp*.—Further detailed work on the problem was carried out during the year under report. Culture experiments in inorganic solutions have shown that Microcystis thrive in Knop's solution (1/10N and lower dilutions even without substratum). Experiments in water and soil extract media without any substratum have shown that a pH of above 8 is found favourable for the substance of Microcystis. Addition of Glucose to the soil water culture medium increase the growth of Microcystis. Diffused sunlight appears to be more favourable for their growth.

Experiments on the effect of Microcystis on the growth and survival of fish could not be taken up as the culture methods of the alagæ had not yet been completely worked out so as to make available large quantities of Microcystis required for the feeding experiments. The work is being continued.

(7) *Effect of manuring on the growth and survival of Hydrilla*.—The macro. vegetation in a piece of water is equally important as the micro-organisms for the cultural operations as the water weeds either themselves form the food or harbour insects, their larvae, etc., which in turn also form food of fishes. Problems in fish management arise if either there is excess of vegetation or insufficient quantity. Experiments were therefore taken up to determine the optimum conditions for the growth and survival of one of the most common water weeds.

Hydrilla verticellata.—To start with the experiments were confined to a determination of the best manure required to effect good growth of Hydrilla. The experiments were conducted under controlled conditions in cement cisterns of 4×3×2 feet each. A substratum of soil to a depth of 2 inches was provided in each tank. A depth of 18 inches of the water was maintained throughout and ordinary tap water was used before letting in water. Two pounds each of the following manures were applied by mixing it in the substratum of each tank, fish manure, cowdung, groundnut cake, green leaves of calotropis, Indigofera, Glyricidia and Dalbergia. One cement tank was maintained as control. Hydrilla branches of the same size with the same number of whorls and weight were planted at the rate of two branches in each tank. The experiments were conducted for a total period of 69 days. Data on the lengths, number of whorls and weight attained by the plants were gathered once in 20 days. The results showed that fish manure gave the best growth rate over a longer period whereas Dalbergia (green leaves) though initially gave a better growth, ultimately the growth rate decreased. Groundnut oil cake and cowdung gave rise to algal blooms on the surface water and the growth rate of Hydrilla was poor. Calotropis leaves were also found to be not very satisfactory. The leaves of Glyricidia gave on uniformly increasing growth rate. As glyricidia leaves are easily available, thanks to the intensive cultivation by the Agriculture Department, may be used as manure for a good and sustained growth of hydrilla.

Further work on the rate and periodicity of the manuring for an optimum growth of hydrilla is under way.

(8) *Experiments on spawning of Mirror Carp*.—As the Mirror carp grew and bred in profusion in Nilgiris, attempts were made by the department to introduce them into waters on the plains and the results achieved were successful. Though they grow well in plains yet they do not breed. However stray cases of their breeding in the plains had been recorded at Polupally near Palghat in the pond of a private pisciculturist.

There are two maxima in their spawning in the cold waters of Nilgiris, viz., March–April and September–October observations have shown the availability of fingerlings of this fish almost all the year round.

Mirror carp have been observed to breed under the following conditions in the Nilgiris waters:—

(i) The banks of the tank should get exposed and become dry for a part of the year and should get suddenly inundated;

(ii) there should be a good growth of grass over this exposed area;

(iii) wherever there is rotting grass, the fish have even noted to be spawning; and

(iv) the spawning ground should be free from fine silt and clay which smother the eggs.

The above conditions were also noticed to be present in the Popupally tank near Palghat. Such conditions were created in a nursery at the Bhavanisagar fish farm but the experiments were not successful. As a part of the experiment 479 Mirror carp of 100, 145 and 180 mm. size groups were stocked in Odathurai tank, which had all the favourable conditions for the fish to spawn. Further observations made in September–October revealed both the males and females had matured gonads but they had not shed the eggs. The fish had not spawned even in March 1957. Another set of experiments were conducted to induce the fish to spawn in the Bhavanisagar fish farm by injecting pituitary extracts. Though the females developed ova, the eggs were not shed. The work is in progress.

A reported case of the non-breeding of Mirror carp in Kodai-kanal lake was investigated. The investigations revealed that the fish had bred once in the Bryant's park in 1947 and once in the Kodai-kanal lake too. The growth rate of the fish was found to be very poor only about 10 cms. per year, due to the poor planktonic content and low dissolved nutrients in the lake water. The low population of Mirror carp might therefore be due to the poor growth rate and lack of spawning beds and consequent low survival of the eggs. Hence intensive manuring of lake and restocking the waters with more fish from Nilgiris were suggested for further observations.

(9) *Further studies on Tilapia mossambica*.—During the year further work on Tilapia was continued with reference to the determination of the predator–prey ratio that should be adopted in fish cultural practices with Tilapia. The experiments were carried out under controlled conditions in cement cisterns at 4×5×2 feet. A bottom of sand and mixture in 1:1 proportion was provided in each tank to a depth of 8 inches. Each cistern manured with 50 gms. of cowdung and water was maintained to the same level. The pond predators selected were *Ophicephalus marulius* and *Glossogobius aureus*. The Tilapia and the predators were introduced in the following proportion:—

Cistern I—Tilapia alone 8 numbers (of 59.8 mms. size).

Cistern II—Tilapia 4 numbers (of 55.5 mms. size).

O. marulius 4 numbers (of 65.5 mms. size).

Cistern III—Tilapia 4 numbers (of 58.8 mms. size).

G. aureus 4 numbers (of 62.8 mms. size)

During the course of the experiments, the predators unfortunately died in cistern III and therefore the results could not be used to determine the exact numerical ratio of the predator-predated survival. The experiment confirmed the earlier view that the population pressure could be controlled by introduction of a predator like Murrels and Gobius. Field observations made during the survey of the Rural Fishery Demonstration tanks have also shown that in tanks containing predators like *Notopterus*, *Enteropneustus (saccobranchius) fossilis* and *G. giuris*, tilapia culture has not yielded any good results and with no result in certain tanks as in the case of the Gangadheeswaran tank in Madras.

Culture experiments of Tilapia with carps have shown that the growth rate of the carps are not at all affected by rearing Tilapia in combination. Further work on the exact numerical ratio of the predator and predated and with the carps will be followed up.

(10) *Studies on Fishing gear.*—The work was taken up very late due to want of sanction for the purchases of the required number of nets. Part of the gear were obtained in September and the first series of experiments were commenced with Rangoon nets and Uduvalai. Rangoon nets of 1½ inches and 3 inches sized mesh were used and Uduvalai of 1½ inch, 2 inches, 2½ inches and 3 inches sized mesh were operated. In both the types, nets made up of cotton and Nylon were operated to ascertain the comparative efficiency. The data gathered so far have revealed that Nylon nets give better results than cotton nets. The experiments are being continued as the full compliments of the required nets have not yet been obtained. The work will have to be continued for at least five years to find out the efficiency of each gear.

(11) *Oxygen requirement of fresh water fishes.*—The oxygen requirements of Tilapia, Mirror carp, *Barbus mahicola* and *Etroplus maculatus* were studied and it was found that the fishes started dying when the oxygen content was reduced to less than 0.3 mg/litre the percentage saturation being less than about 3.5 per cent. This lethal level was found to be almost similar for all the fishes tried. Further work with other fishes is under progress.

(12) *Food value of fresh water fishes.*—The proximate composition of 17 fresh water fishes were determined during the year. The percentage edibility, moisture, protein, fat, phosphorous, calcium and iron contents of the various fishes are given in Appendix

XVI. Salient points in this are—

(i) Protein content of *Barbus* spp. is lower than that of others,

(ii) *Labeo fimbriatus* is highly fatty; (18.99 per cent on fresh basis).

(iii) The moisture content of *labeo fimbriatus* is correspondingly low (63.87 per cent).

(iv) There is not much significant difference in the composition except the lower protein content of *Barbus* spp.;

(v) *Tilapia mossambica* is found to be as good as any other fish in nutritive value;

Further work on these lines for the other fresh water fishes will be continued.

(13) *Analysis of pond bottom deposits.*—(i) The bottom soil samples of the Bhavanisagar Reservoir from four different areas, viz., the inlets of river Moyar and Bhavani, above the confluence of these two rivers and below the confluence were analysed from weekly collections. A characteristic feature of all the four places was the high sulphate and calcium content.

(ii) The five ponds of the Bhavanisagar fish farm were manured with plant and animal matter and the water and soil samples collected from the ponds were analysed from weekly samples.

(iii) The pond bottom samples from the demonstration tanks were collected during the Rural Fishery Demonstration tank survey and 112 such samples were analysed.

More detailed work on this subject would be carried out when a personnel is posted to the newly sanctioned post of Research Assistant (Soil). The post was vacant throughout the year under report as no qualified candidate was available to take up the post.

(14) *Effects of fish poisons on fish life.*—To evolve a practical method of selective killings of predators, unwanted and uneconomical fishes, it was proposed to study in detail the effect of various fish poisons on the fishes.

(i) To start with the effect of soap-lye on Tilapia and Murrels was tried. Low doses did not have any effect. Mortality of Tilapia and Murrels occurred when the concentration was suddenly increased to 3,000 parts per million which in turn increased the pH to 9.2. As the concentration was increased gradually, the mortality was noted only when the concentration exceeded 6,000 p.p.m. It was therefore considered as uneconomical to be used as a fish poison since a high dosage is required for effecting the mortality.

(ii) The same was found to be the case with rotten potatoes also which had been recommended by certain earlier workers (H. K. Mukherjee) as a useful fish poison. This was found to

have no effect up to 500 p.p.m. on *Etrophus maculatus* and carps. Though the pH initially increased on the addition of rotten potatoes it came down within 24 hours.

It was therefore decided to try certain of the poisons that are reported to be commonly employed by villagers for illicit fishing.

(iii) The most commonly used indigenous poison, namely, "Karaikkai" (fruit of *Randia dumetorum*) was tried as a selective fish killer. A solution of this poison with 20 p.p.m. was tried on Murrels, *Barbus ticto*, *Danio*, spp. and carp fry from Tanjore for a period of 24 hours. *Barbus ticto* and *Danio* died within 24 hours. It was found lethal to Murrels. But there was no effect on Tanjore carp fry. When the concentration was increased to 25 p.p.m. there was 90 per cent mortality and which increased to 40 p.p.m. the mortality was raised 100 per cent. Thus this poison may be capable of yielding good results if an effective concentration is extracted and used. Further work will therefore be continued.

(iv) *Derris powder*.—Which is universally used as a fish poison was found to be effective in selectively eliminating Murrels without affecting carps. Contrary to the findings of other workers it was noted that Murrels were affected by smaller doses than carps. All Murrels died at 1.7 p.p.m. 90 per cent at 0.43 p.p.m. and 60 per cent at 0.35 p.p.m. with a combination of Murrels and carp fry from Tanjore Murrels died in 24 hours to the extent of 30 per cent at 0.177 p.p.m. itself and to the extent of 100 per cent at 0.354 p.p.m. while there was no death of carp fry. However 66 per cent of carp fry died at 0.708 p.p.m. Further work is under progress.

(15) *Limnology of Bhavanisagar Reservoir*.—A detailed study on the Limnology of the Bhavanisagar Reservoir was continued during the year. The studies were conducted from weekly samples of water plankton and soil collected from four ecologically different places in the reservoir, viz., the inlets of the rivers Moyar and Bhavani above their original confluence and below their confluence. The collections were made from the surface, middle and bottom zones at each station to know the conditions of existence and the inter-reactions of plankton at the different zones of the reservoir.

The chemical studies so far made reveal that the reservoir is not rich in nutrients. Wide fluctuations in the pH and dissolved oxygen was noted during the first week of November, the maximum difference being 2 units in pH and 77 per cent in dissolved oxygen content. Carbonates were absent in the reservoir excepting during the first week of November. A characteristic feature of the soil was the high calcium and sulphate content. Ammonia was present from April to July and absent thereafter. Very low phosphate content was noticed throughout the year.

Two maxima, viz., one in October and another in March were noted in the phytoplankton of the reservoir as a whole the latter being greater seventeen phyto organisms were noticed. *Ankistrodesmus*, *Staurestrum Ceratium*, *Peridinium*, *Melosira* and *Microcystis* were present throughout the year, the diatom *Melosira* being dominant. Besides a vertical distribution of plankton changing during different seasons were also noticed. During the months of July–August the middle zone of the reservoir was found to be the richest in phytoplankton. In September–October the bottom layers were the richest the surface was richest during in November–January. Again in the month of February, the mid zones became richest but in March the surface layer became richer. Similarly a horizontal distribution of plankton at four stations were also noted. The Moyar river portion was the richest in August and October, the Bhavani river portion during September, January and March the area above the confluence was the richest in July and December and portion below the confluence in November.

The zooplankton were poorly represented in the reservoir. They were represented by a few Rotifers and copepods only. Since the productivity of new reservoirs will increase, with age the work is to be continued over longer periods for any definite conclusions.

(16) *Other items of work*.—In addition to the programme of work carried out as detailed above, other items of special investigations, etc., were attended to.

(i) *Survey of Rural Fishery Demonstration tanks*.—A detailed survey of the Rural Fishery Demonstration tanks in the entire State was taken with a view to assess their productivity and classification according to the nature of the soil and water and to determine the optimum number and variety of fish to be stocked. 122 tanks situated in eleven districts of the State were surveyed as detailed below :—

Name of district.						Number of tanks.
1	Madras	..	..	..	..	9
2	Chingleput	..	..	..	..	30
3	North Arcot	..	..	..	..	6
4	South Arcot	..	..	..	..	11
5	Tanjore	}	..	..	..	26
6	Tiruchirapalli		..	..	..	
7	Madurai	}	..	..	..	14
8	Ramnathapuram		..	..	..	
9	Tirunelveli	..	..	..	..	11
10	Coimbatore and Nilgiris	..	..	..	..	6
11	Malabar	..	..	..	..	11
Total						124

Besides this work took away the services of the research staff of this station to a great extent. A major portion of the year was spent on the survey and collection of data like hydrobiological

conditions the stocking and exploitation particulars, etc. The volume of data that have been gathered await final consolidation and assessment.

(ii) *Studies on the fisheries of impounded water.*—The Krishnagiri reservoir project was visited to study the possibilities of fishery development in the reservoir to be formed. Similar studies were conducted on Kundah Hydel Project areas. The bility of culturing coarse fishes like mirror carp, scale carp, etc., in the latter reservoir and their effect on the Trout population of these rivers were examined. A survey of the Manimuthar project revealed the presence of *Barbus curmuca* in the river. The future of this species when lacustrine conditions are affected after the formation of the reservoir is to be examined in detail. The admissibility of introducing *Tilapia* in large impounded waters like Hydel projects, was investigated in Hope lake and River Tambaraparan. A notable feature observed was that *Tilapia* introduced above the lower dam and below Hope lake were found to confine only to the non-flowing stagnant shallow portions. This ecological requirements of the fish, as was expected, is due to its peculiar breeding habits. Further observations will be continued.

(iii) *Investigations on the River Ullar fishery.*—Investigations were carried out to examine the request of the Fishermen Cooperatives of Tanjore to change the closed fishing season of the small stretch of river Ullar to May and June instead of June and October, to facilitate the migration of other fishes also like the carps and cat fishes which form the bulk of the fishery of the Cauvery system, revealing the necessity to have May, June and July as closed season in the Ullar by pass. Suitable recommendations were submitted accordingly.

(iv) *Hilsa Investigations.*—The hilsa fishery of the river Coleroon was heavy this year between May and June almost coinciding with the theory of the five years cycle. The fishery was maximum in the stretches of the river. In the mid stretches, the fish had been caught at the rate of about 4,000 per day on average for nearly 20 days of peak fishing. The percentage of females was higher in the population of the catches near the sea and the percentage of the sales were more in the catches of the upper portions of the river. The males ranged in size from 25-30 cms and females from 41-44 cms. The presence of small Hilsa of 15-20 cms was noticed near the upper Anicut.

(v) *Fish culture in Cholavaram lake.*—At the request of the water and sewage purification Committee, the Cholavaram lake was surveyed to find out the possibilities of fish cultural operation in the lake to keep down the organic growth in the water. The lake is an ideal one for fish culture capable of maintaining a population of more than 30 lakhs of fish of about 434 gm (1 lb.) size. Suitable recommendations were made. Though proposals were made many

times before for the stocking developing and exploiting this lake along with Red Hills, the Government have not thought fit to order the implementation of the scheme since it is a drinking water source and the Chief Engineer objected to the scheme. Again and again, authoritative information of water and sewage board in foreign countries recommending the culture of fishing in drinking water sources was also furnished to the Government but yet the proposals were not sanctioned. The water in such drinking water sources becomes very nutritious and potential, rich in plankton content as it gets aged, it becomes an ideal source for culture and maintenance of fish population. Periodical mixing up of bottom and upper waters by plying the nets for fishing will tend to remove besides removal of grown fish, to remove the unwanted gaseous and impurities held under pressure in the bottom water and make the water less odorous. Thus fishing in drinking water source is not harmful but beneficial as an anti fouling mechanism and purification, process for removal of unwanted living micro organisms for their own food leaving the water in a purer conditions. Hence the question of utilising the water sources now exclusively reserved as a drinking water source may be examined further to be used for pisciculture. To begin with the department can be entrusted with some of the major sources for a certain period and the effect of fishing may be studied in such reserved water and in reserved water side by side so as to draw definite conclusions on the utility or otherwise of pisciculture.

(vi) *Investigations on Tantipandal fish farm.*—Special investigations were carried out on the Tantipandal fish farm on its reported poor productivity. The farm situated as it is in a reserved forest gets its supply of water from the two natural springs. The water is very soft and clear devoid of any planktonic growth. The growth of Gourami was very poor being 2.5 to 12.7 cms per year. The hydrological studies revealed the acidic nature of the flowing water with low dissolved oxygen and poor nutrients. The nature of the water prevented the good growth of any water weeds and also any improvement work by way of fertilization. Since Gourami prefer acidic waters to breed, they were found to be breeding satisfactorily in the farm giving a minimum of about 200 fingerlings every year. Suggestions were made to increase the breeding intensity of the fish by providing suitable material for it to build more nests and artificial manuring of the pond waters and feeding the fish to improve their growth rate. Besides the farm compound has to be cleared of undesirable growth of weeds and shrubs, the ponds have to be deepened to retain more water and the water in the ponds have to be retained for longer period instead of allowing it to be drained by enabling the water to be retained.

(vii) *Studies on pollution.*—To find out whether the factory authorities follow the recommendations of the Station, the Mettur Chemicals and the Erode Cauvery Textiles Limited were visited

and the discharged effluents were checked. It was seen that the effluents were being treated properly as per recommendations, before being let into the river.

(viii) *Mortality of fishes in Vellore Fort Moat.*—Following heavy rains there was heavy fish mortality at Vellore Fort Moat. Though it was not possible to draw any definite conclusions it was decided to examine the water once in a quarter during the coming year to find out the real cause of mortality in a static water like the Vellore Moat. Such a check up of important departmental waters is necessary to prevent mortalities.

(ix) *Weed control experiments.*—Twelve per cent Pep emulsion (Pentachlorophenol) and copper phengicide were used to eradicate Hydrilla in cement cisterns and was found that they could be used effectively to eradicate Hydrilla without affecting the fish, the effective concentration being 4 p.p.m. in both the cases. The action is slow as it takes about 40-45 days to eradicate a thick, dense growth of Hydrilla. Further work is being carried out to confirm the results.

(x) *Fish population studies in Bhavanisagar Reservoir.*—Studies on the availability of young fish in the upper reaches of Bhavanisagar Reservoir commenced in January 1958, were continued. Fortnightly samples were collected both in the mornings and evenings, to find out the comparative abundance, seasonal and diurnal changes of young of different species. The studies carried out for eight months revealed the absence of the young of any economic variety. A diurnal variation in the distribution of forage fish was noticed. The plankton feeders were more abundant in the mornings, insectivorous fish in the evenings and those feeding on both plankton and insects being equally distributed. Certain species were found to be completely absent during certain period being replaced by others. Studies on *Barbus dubius* and *B. hexagonolepis* of the Bhavinsagar Reservoir were continued. The length weight particulars of the fishes of the departmental catches for 1954 and 1955 were tabulated. It was seen that the population of *B. hexagonolepis* was getting reduced. In both the species the bigger size groups were less in 1955 than in 1954.

(xi) *Studies on Bhavanisagar fish farm ponds.*—Plankton water and soil samples from the five ponds of the fish farm were collected once a week and studied as a routine item of work. There were two maxima in the plankton production, one in September-October and another in February-March.

Since the construction of ponds is defective, they do not retain water and considerable seepage occurs making it impossible to retain water and to study the effects of manuring and growth of plankton and fishes. The soil on which the ponds are constructed is rocky gravel, it was found difficult to stop the

seepage at the bottom and sides. This will increase the cost of maintenance and may not be admissable. Hence the only alternative now available is to maintain a regular and unrestricted supply of water to the ponds. The supply of water is, however stopped during the summer months consequent on the closure of canal sluice from April to June or July depending upon the outbreak of the monsoon and supply of water to the reservoir. Thus regular supply of water is also problematical. Thus the suitability of fish farm ponds to conduct experiments has to be given up.

(xii) *Exhibition.*—The station took part in the following exhibition :—

- (a) At the Block Development Meeting at Perundurai.
- (b) At Grama Sevak's Training Centre, Bhavanisagar.
- (c) Sixth Regional Basic Conference at Bhavanisagar.
- (d) At the Agricultural Research Station, Bhavanisagar on farmer's day.

(xiii) *Training.*—Training in fresh water fisheries and fish culture was imparted to the following :—

- (1) Fishery Officer of Madhya Pradesh.
- (2) Students from Kalamaserry Polytechnic, Travancore-Cochin State;
- (3) All-India Inland Fisheries Trainees;
- (4) Mr. Arthur Indrasena of Ceylon an F.A.O. Fellow;
- (5) Extension trainees from Bhavanisagar;
- (6) Orientation trainees from Kallupatti;
- (7) Grama Sevaks from the Grama Sevak Training Centre, Bhavanisagar; and
- (8) Grama Sevaks and Extension Officers (Women) from the Bhavanisagar Training Centre.

(xiv) *Visitors.*—(1) Sri N. Murugesu Mudaliar, Deputy Secretary to Government, in charge of Fisheries who visited the station, evinced very keen interest in the various aspects of research work carried out and gave helpful suggestions.

(2) Mr. Seegandeno, a World Health Officer, Fellow, visited the station and learnt with interest about the cyclopcidal and anti-malarial work of the station.

(3) Dr. Weight, Economic Geographer from West Germany on an F.A.O. Fellowship visited the station. He learnt with interest the margin of fishes in the river system of the State and their geo-graphic distribution according to the different ecological conditions.

(4) Dr. L. S. Ramaswamy of the Zoology Department, Mysore University, visited the station to study the experiments, carried out here on the spawning of carps.

(5) Sri Sundarraj, a Research Scholar from Mysore, also visited for the same purpose.

(6) Two experts on rice from Thailand.

(7) Sri Sivasubramaniam, Senior Entomologist, to learn about the anti-malarial and cyclospicidal work.

(8) Sri David, Executive Engineer, Amaravathi Project.

(9) Dr. P. Govindan, of the Zoology Department, Annamalai University, to study the research on age and growth of fishes conducted at the station.

(10) Sri D. Sunderaraj, Deputy Fishery Marketing Development Advisor.

(xv) *Extension work*.—Several enquiries from the interested pisciculturists and aquarists were answered. Lecture on pisciculture in rural parts were given to the extension trainees at the Orientation Training Centre at Bhavanisagar.

Intensive propaganda on the food value of fish, marketing of fish was done during the last quarter of the year in such a way that there is a great demand for Bhavanisagar fish in the Coimbatore and Nilgiris districts. Fish were regularly supplied to the staff of the Staff Training College, Wellington, during their annual camp at Bhavanisagar. Besides regular and daily supplies of fish from Bhavanisagar fish market in Mettupalayam, Karamadai, Coimbatore, Coonoor, Kundah and Kotagiri through the departmental agents.

VI. FISHERIES TECHNOLOGICAL STATION, TUTICORIN.

1. *Proximate composition of food fishes of the East Coast*.—With a view to assess the food value of the East Coast food fishes periodic samples of cured fish from the leading fish market in South India, namely, Koilpatty were taken and analysed, vide Appendix XVII. The samples included Ribbon fish from Ovari, Cat fish from Dhanushkodi, Stolephorus from Cape Comorin and Kayalpatnam, Pellona from Rameswaram and Sardines from Cape Comorin, Manapad and Dhanushkodi.

The protein, fat, total sodium chloride, Calcium (as Ca O) and phosphorus (as P₂O₅) were estimated (vide Appendix 11). Protein content was uniformly above 50 per cent in general and was maximum in Pellona from Rameswaram (79.88). In Stolephorus values up to 71.27 were obtained. Fat was ranging between 4 per cent and 7.0 per cent. In Cat fish it was very

low (1.7 per cent) and in Sardines the fat content was in the vicinity of 14.0 per cent. Values up to 19.85 per cent were obtained in Pellona from Rameswaram. P₂O₅ was ranging between 4 per cent and 8.0 per cent and CaO exhibited wider range of 2.0 per cent to 9.5 per cent. High values were obtained in Stolephorus. High values above 6.0 per cent for insolubles were met in the case of Stolephorus. Still higher values of 12.4 per cent of sand was met in the samples of Sardines from Cape Comorin. Steps will have to be taken to bring down the insolubles. The fishermen will have to be encouraged to sun-dry the Sardines and Stolephorus in cheaper mats of palmyra leaves and bamboos. This will not only ensure very low insolubles but the product will be free from the contaminants in the beach.

Stolephorus and Pellona, though small, are found to be highly nutritious. A regular dosage of this smaller, at the same time cheaper, food fish will ensure enriched health of the nation.

2. *Standardisation of cured fish products and to improve their quality*.—Tuticorin is the major salt-producing centre and it is from Tuticorin the salt requirement of the fish-curing industry in South India is met. It has been established that salts of high Sodium Chloride (above 96 per cent) and very little Chlorides and Sulphates of Calcium and Magnesium are ideal for fish-curing. It is therefore necessary to assess the quality of the salts used for curing fish and with this end in view samples of salt from the various salt manufacturing centres at Tuticorin were analysed. The details of analysis are furnished in Appendix XVIII.

The Sodium Chloride content of the salts produced at Tuticorin is rather low and it varies between 81.0 per cent and 94.0 per cent whereas the salt produced in Tamarakulam, Kanyakumari district, is very rich in Sodium Chloride. Separate report on this is given under the sub-station, Cape Comorin.

It is highly necessary to improve the quality of the salt. The Sodium Chloride content will have to be improved upon to a minimum of 96 per cent. Anything less than 90 per cent of Sodium Chloride will only result in the early spoilage of fish. The penetration of Sodium Chloride in the presence of chloride and sulphates of Calcium and Magnesium is much retarded.

Detailed investigation on the composition of salt and its penetration in fish muscle and the keeping quality are under way as a prelude to standardisation of cured product and improvement of their quality.

3. *Fat content of Sardinella Sirm*.—Sardinella Sirm is one of the economic fish of the East Coast and it constitutes appreciable percentage of the commercial catches. The peak season for the fish in the area is November to January.

The proximate composition of the fish with particular reference to the fat content of the fish was assessed by frequent sampling

of the fish. Simultaneously the Biological aspects of the fish like size, sex, gonadal condition were also studied with a view to co-relate the chemical composition and the biological conditions of the fish.

The fish contains an initial moisture ranging between 65.0 per cent to 70.0 per cent. The protein value is in the vicinity of 60 per cent (moisture-free basis). The fat content ranges between 5.5 per cent and 12.7 per cent.

Investigations on the composition of the guts and gills and fish muscles are also under way with a view to open out new avenues of income by producing suitable bye-products.

4. *Standardisation of fisheries bye-products—(a) Guts and gill manure.*—The manure is produced in the departmental demonstration factories at Adirampatnam, Rameswaram and Mallipatnam. Periodic samples of the manure from the various centres obtained and their composition determined with a view to standardise the product.

Fish manures prepared out of the whole fish during the glut and out of the guts and gills are very good sources of Nitrogen and Phosphorus. Besides, because of the organic origin they supply to the soil what is called 'Humus' which is essential to maintain the soil fertility and the organic balance of the soil.

The analyses conducted so far revealed—

	PER CENT.
1 Nitrogen varies between	3 to 5
2 Phosphorus (as P_2O_5)	2 to 6
3 Calcium (as CaO)	1 to 5
4 Potassium (as K_2O)	0.1–0.7
5 Insolubles	7 to 18

It is highly necessary to take effective steps to reduce the insolubles (sand) content. This is possible by taking necessary precaution during the manufacture. The product is getting popular among the agriculturists in Tanjore district. The product will be standardised soon.

(b) *Fish meal and Prawn shell meals.*—Gut of the fish is converted into useful bye-product known as fish meal which serves as a good cattle and poultry feed. The quality and yield of the meal from individual fish and from the commercial catches have been assessed.

The following is the yield from various fish:—

	PER CENT.
1 Silver Bellies	12.1
2 Cat fish	17.65
3 Sciaena	13.43
4 Sole fish	10.47
5 Commercial catches —	7.0

Steps were taken to improve the yield. A maximum of 18.9 per cent yield was obtained. Simultaneously the quality of the product has also been assessed with a view to standardise it. Results are shown in Table 13 appended. Work in the direction to improve the quality of the product and the yield is in progress.

The husk left behind during the process of preparation of semi-dried prawns are dried and powdered and the product known as "Prawn" shell meal is a good poultry feed. The proximate composition of the product is—

	PER CENT.
Moisture	13.91
Protein	43.30
Ca O	9.8
P_2O_5	3.6
Insolubles	5.6

The product will also be standardised soon.

(c) *Semi-dried prawns.*—Much work on processing the prawns in the West Coast for semi-dried Prawns have been done and a method to manufacture the product finalised. But the East Coast Prawns were not paid much attention. The trawling operations conducted off Tuticorin by the departmental trawlers M. V. 'Gudjan' and M. V. 'Meenakshi' resulted in location of good trawling ground off Tuticorin and a heavy catch of Prawns. Prompted by these, experiments were conducted to evolve a suitable method for converting the commercial catch of Prawns into semi-dried Prawns and their keeping quality studied.

The commercial catch at Tuticorin composed of big sized prawns, the processing of which presented a problem. Intensive investigation proved that a moisture content of 28.7 per cent to 30 per cent keeps the product well over a period of two months. But at this moisture content yield is much reduced.

The proximate composition of the product is—

	PER CENT.
Moisture	35.0
Protein	47.8
Fat	2.2
Ca O	0.8
P O	1.2
NaCl	12.5

Work on the improvement of the quality and the yield is in progress. This product will also be standardised soon.

5. *Bacteriological studies.*—The Unit for these studies has begun functioning only from the middle of November 1957 and during the short period at the disposal the bacteriology of the in-shore and off-shore waters off Tuticorin was taken up for investigation.

In-shore waters of the Tuticorin Bay and off-shore waters from the Pearl Banks and Chank beds were taken from the surface as well as from the bottom and plated out.

In the in-shore area the population was comparatively thick. Aerobic and unærobic types were represented in both in-shore and off-shore waters, ærobic forms predominating. Smooth moist, shining often with bluish and greenish iridescence and varying in capacity forms of colonies, were commonly observed in the sea water agar media. Gram positive *Bacillus* and *Micrococcus* were observed in plenty. These strains are all aerobic and grow luxuriantly in fresh water media at room-temperature. Gram negative non-sporing motile rods were also observed in both the waters.

Detailed investigations on the physiological and morphological features and on the quantitative aspect are under way.

VII. FISHERIES TECHNOLOGICAL STATION, CAPE COMORIN.

1. *Quality of the salt used for curing.*—Kanyakumari district is another Salt Producing Unit in India, and about 2 per cent of the total national out put of the salt is manufactured here. S. S. Allom, Tamarakulam, is the Chief Centre which caters the need of salt in the fish-curing industry in the district.

As many as 19 samples of salt used in the various fish-curing yards in the district were analysed with a view to assessing its suitability for fish-curing and to improve the quality of the cured product. The results of analysis are given in Appendix XIX.

In general the salt in this area is far superior to that available in the Tuticorin area and the Sodium Chloride content is uniformly above 96 per cent. There is impurity and chlorides and sulphates of calcium and magnesium retard the penetration of sodium chloride into the fish muscle and this reduces the keeping quality of the fish. The chlorides and sulphate of magnesium and calcium ranges between 2.0 to 3.5 per cent. This will have to be reduced further and the sodium chloride content improved upon so that the fish-curing is done satisfactorily and the product is ensured longer-keeping quality.

2. *Use of turmeric powder in fish-curing.*—A small percentage of turmeric powder as an anti-biotic is admixed in the salt used for curing fish and the investigations on the suitability of the mixture of salt and a small percentage of 0.5 per cent of turmeric powder for curing fish carried out. The experiments so far conducted is of preliminary in nature but the results obtained are quite encouraging. Details of the results are given in Appendix XX.

A higher rate of loss of moisture was observed in specimens cured with a mixture of salt and turmeric powder than that cured with salt alone. Moreover the use of turmeric as a preservative

enhances the keeping quality of the cured product indicated by the ammoniacal nitrogen in the product.

Further the work in this line extending the experiments to more fish is in progress so that a cheap and efficient method for preserving the valuable food for longer period is advocated to the fisherfolk.

3. *Fat content of important fatty fishes with reference to their food.*—Fat content of commercial fish like *Sardinella* and *Dussu-meiria* species with reference to their biological aspects such as length, weight, stomach content and gonadal conditions was estimated systematically since December 1957 with a view to finding out the possibilities of taking out Sardine oil in the East Coast.

The results are given in Appendix 15. The total length of the fish varied between 125 m.m. and 180 m.m. and weight between 15.8 gms. and 50.4 gms. The initial moisture was between 41.2 per cent and 75.9 per cent. The fat was varying between 1.40 per cent and 4.0 per cent.

PART II—EXPANDED TECHNICAL ASSISTANCE PROGRAMME OF THE FOOD AND AGRICULTURAL ORGANIZATION.

During the year under review, the State received the assignment of the services of the following experts :—

Serial number and name.	Designation.	Period.	Number of interviews conducted.
1 Mr. G. I. Illugason.	Fishery Engineer	April 1957 to January 1958	304
2 Mr. Paul Ziener ..	Naval Architect	.. April 1957	30
3 Mr. K. Rasmussen.	Do.	.. April and May 1957.	16
4 Mr. H. Barlind ..	Fish Marketing Econo- mist.	May and June 1957	31
5 Mr. C. R. Bjuke ..	Harbour specialist	April—Decem- ber 1957 and January 1958	0
6 Mr. Peter Gurtner.	Naval Architect	.. February and March 1958	36

The Pablo boat designed by Mr. Paul Ziener was further popularised during the year with the assistance of Mr. Illugason. The latter has surveyed and located some potential fishing grounds and has also demonstrated the possibilities of exploiting them with small mechanised boats employing nylon nets. He has also trained several groups of fishermen in this modern methods. Mr. Paul Ziener and Mr. Rasmussen assisted the Department in improving the original design of the Pablo boat, and Mr. Gurtner in the preliminaries for the establishment of a boat building yard. Mr. Bjuke completed his survey of sites for fishing harbours and

gave his recommendations and preliminary plans, and estimates for constructing harbours at Madras, Cuddalore and Nagapattinam. Mr. Barlind, made a rapid survey of the fish marketing situation in the State and gave his recommendations for improvements. These recommendations are being implemented by the Department.

PART III—SCHEMES INCLUDED IN THE SECOND FIVE-YEAR PLAN.

The following schemes included in the Second Five-Year Plan were implemented as outlined below. The total Plan provision and budget provision for the year was Rs. 18.07 lakhs and Rs. 14.06 lakhs respectively. The actual expenditure was Rupees 11.25 lakhs, resulting in a default of 20 per cent. The major cases of default were in respect of capital outlay such as construction of buildings and purchase of foreign exchange of machineries from abroad involving foreign exchange.

(1) *Assistance to Fishermen Co-operative Societies for marketing of fish.*—During the year the following amounts were disbursed among 48 societies :—

Kind of disbursement.	Number of societies.	Amount. Rs.
Long-term loans	28	2 95,630
Medium term loans	8	40,000
Loans for construction of godowns.	12	23,850
Subsidy for construction of godowns.	..	15,850
Total ..	..	3,75,330

The Plan provision for this scheme was Rs. 4.00 lakhs, the budget provision was Rs. 4.192 lakhs and actual expenditure Rs. 4.062 lakhs.

(2) *Salt Subsidy Scheme.*—Good quality powdered salt were issued to fish curers to salt and cure their surplus catches under hygienic conditions and other facilities were made available to them in 19 departmental fish curing yards. The market price of good salt was about Rs. 1.25 per maund and the subsidised price at which the department issued the salt was Rs. 0.62 nP. per maund. This resulted in creating incentive among the fishermen to resort to the departmental fish curing yards. A total quantity of 5,201.41 tons of cured fish was produced during the year and made available to the public for consumption.

The Plan provision was Rs. 0.51 lakhs (net), budget provision was Rs. 1.195 lakhs and actual expenditure was Rs. 1.22 lakhs, gross and Rs. 0.92 lakhs net.

(3) *Development of fishing harbours.*—The F.A.O. Harbour specialist conducted detailed survey of the river mouths at Cuddalore and Nagapattinam and submitted preliminary reports with plans and estimates for construction of fishing harbours at those centres. Negotiations were initiated with the Malayan Government for acquisition of the site required for the harbour at Nagapattinam. The adhoc committee constituted by Government submitted their recommendations on the suitability of the sites at Cuddalore and the reasonableness of their price as recommended by the Collector of South Arcot district. The construction work is expected to commence in 1958-59.

The Plan provision for this scheme was Rs. 0.25 lakhs and the actual expenditure was Rs. 12,132.

(4) *Improvement of fishing crafts.*—Fifteen Pablo boats were constructed during the year as per the programme and distributed among fishermen co-operative societies and their federations. Of these boats, twelve were constructed through Messrs. Brunton & Co. of Cochin and the other three constructed departmentally. Part of the machinery required for the boat building yard to be established at Royapuram was purchased. Necessary funds for acquiring the site for the yard was placed at the disposal of the Collector of Madras. The plans and estimates were finalised by the Chief Engineer in consultation with the F.A.O. Naval Architect, and the work is expected to commence in 1958-59.

The Plan provision was Rs. 2.25 lakhs, budget provision was Rs. 2.70 lakhs and the actual expenditure was Rs. 2.10 lakhs. The default was mainly due to incompleteness of land acquisition, commencement of construction of the boat building yard and delay in obtaining certain items of equipments which had to be imported from abroad.

(5) *Supply of nylon nets to fishermen at subsidized rates.*—Nets made of nylon and other synthetic yarn have become popular among the fisherfolk. These nets have been trebled their catches. During the year 174 webbings and 2,792 lb. of Terrylen yarn were procured and distributed. The Plan provision was Rs. 2.25 lakhs, budget provision Rs. 1.343 lakhs and actual expenditure Rs. 2.163 lakhs. The excess in expenditure was due to the fact that Rs. 1.205 lakhs was paid during the year towards cost of nylon webbings imported from United Kingdom against the sanction accorded in G.O. Ms. No. 92, Agriculture (Food Production), dated 29th February 1956.

(6) *Intensive seed collection and distribution for stocking inland waters.*—During the year 312.39 lakhs of fingerlings were collected from nursery areas and stocked in various inland waters in the State against a target of 300 lakhs (vide Appendix XXI). The Plan provision was Rs. 1.86 lakhs, budget provision was

Rs. 0.859 lakhs and the actual expenditure was Rs. 1,29,520. Of the five jeeps sanctioned by Government in G.O. Ms. No. 461, Food and Agriculture, dated 11th February 1958, only one could be purchased during the year due to paucity of stock with the dealers. As the stock of tin carriers was found old and insufficient, 1,635 round and 102 double tin carriers at a cost of Rs. 26,889 were purchased and distributed to the Regional Assistant Directors of Fisheries for facilitating their stocking operations.

(7) *Rural fishery demonstration.*—Through this scheme demonstration tanks were maintained at selected centres for popularising fish culture among the public and also to facilitate supply of fish seed to private parties. This scheme has given a fillip to fish rearing among the public and the number of private fish farmers has increased. Besides, a quantity of 140,458 lb. of fish was caught from the demonstration tanks realising a revenue of Rs. 40,631.

The Plan provision was Rs. 1.24 lakhs, budget provision was Rs. 1.48 lakhs and actual expenditure was Rs. 1.344 lakhs.

(8) *Development and exploitation of major reservoir fisheries.*—The Bhavanisagar and Amaravathinagar reservoirs were taken up during the year. The former reservoir was stocked with 3.93 lakhs of fingerlings against a target of 4 lakhs and the other reservoir was stocked with 4.19 lakhs of fingerlings also against a target of 4 lakhs. Experimental fishing in Bhavanisagar landed 21,460 lb. of fish realising a revenue of Rs. 6,036.08.

The construction of the fish farm at Amaravathinagar was completed towards the end of the year. Preliminary stocking of Manimuthar and Krishnagiri reservoirs with 1,007,840 and 54,652 fingerlings and carps respectively was also attended to. The Plan provision was Rs. 0.84 lakhs, budget provision was Rs. 0.866 lakhs and actual expenditure was Rs. 61,796.

(9) *Fish preservation—Provision of ice plant and cold storage facilities.*—The construction of the buildings to house the ice plant at Mettur Dam and Tuticorin has come above the ground level. It is expected to complete the work in 1958-59. The Plan provision was Rs. 2.49 lakhs, budget provision was Rs. 1.42 lakhs and the actual expenditure was Rs. 50,035. A cleaner and a watchman are the only staff employed for the Mettur plant. Since other staff sanctioned have not yet been appointed and as the building could not be completed, the funds provided could not be expended.

(10) *Fish meal and fish manure production.*—The fish meal and oil plants to be erected at Nagapattinam and Tuticorin were not available in India and they could not be imported from abroad also. Tenders furnished by Messrs. Binney & Co., Limited,

Madras, for the supply of these plants from United Kingdom were accepted, but the release of foreign exchange by the Government of India could not be obtained.

The Plan provision was Rs. 1.50 lakhs, budget provision was Rs. 1.92 lakhs and actual expenditure was nil.

(11) *Establishment of a model estuarine fish farm.*—The construction of the farm and buildings was taken up by the Public Works Department and was progressing well by the end of the year. Expenditure was incurred on a skeleton staff and on laboratory apparatus, equipments and books.

The Plan provision was Rs. 0.21 lakh, budget provision was Rs. 0.588 lakh and actual expenditure was Rs. 23,064.

(12) *Training of personnel.*—Twenty fishermen from Madras, Chingleput, South Arcot, Tanjavoor, Ramanathapuram and Tirunelveli districts and five fishermen from Pondicherry State completed their training at the training centre at Nagapattinam in the handling of mechanised boats and their engines and tackle. A twenty-two footer boat was allotted to the centre for conducting practical classes in the sea. During these practical fishing, the trainees landed 6,500 lb. of fish realising a revenue of Rupees 1,269.61.

The Plan provision was Rs. 0.2 lakh, budget provision was Rs. 0.208 lakh and actual expenditure was Rs. 0.224 lakh.

In addition to the Training Centre at Nagapattinam the Training Centre at Tuticorin trained two batches of 40 fishermen, i.e., 20 in each batch. These trainees obtained 8,064 lb. of fish during practical fishing operations realising a revenue of Rs. 1,635.75.

(13) *Quick transport of fish from landing centres to marketing and consuming centres.*—During the year one large Tata Mercedes Benz diesel oil operated vehicle at a cost of Rs. 35,000 procured and supplied to the Fishermen Co-operative Society, Ennore, on hire-purchase system. Besides, nine three-wheeler Lambrettas were also purchased and distributed among fishermen co-operatives. Eight vehicles under the hiring system operated during the month, and enabled fishermen co-operatives to transport 798 tons of fresh fish and thus obtain fair price for their catches.

The Plan provision was Rs. 0.60 lakh, budget provision was Rs. 0.60 lakh and actual expenditure was Rs. 0.68 lakh.

(14) *Fish marketing—Construction of model fish markets.*—During the year Rs. 38,212 was sanctioned as subsidy to seven Municipalities and Panchayats for improving their fish markets

and thus to attract people to them and to popularise fish as a wholesome article of food.

	Rs. nP.
Tuticorin Municipality	4,750-00
Mettur Township	6,500-00
Coimbatore Municipality	3,225-00
Tanjavoor Municipality	1,136-50
Kumbakonam Municipality	9,400-00
Virudhunagar Municipality	12,000-00
Rameswaram Panchayat Board	1,200-00

The grant of the subsidy was subject to the following conditions:—

(1) The plans and estimates should be approved by the Fisheries Department.

(2) The expenditure should be incurred only on the fish market and not on the general market.

(3) The subsidy be limited to a maximum of Rs. 12,000 in the case of Municipalities and Rs. 5,000 in the case of Panchayats, or 50 per cent of the estimate whichever is less.

(4) The fish market should be leased to the local fishermen co-operatives society as far as possible; and

(5) The fish market should be maintained on proper lines as required by the Fisheries Department from time to time.

The Plan provision was Rs. 0.52 lakh, budget provision was Rs. 0.17 lakh and the actual expenditure was Rs. 38,212.

(15) *Administrative staff at headquarters.*—For the successful implementation and effective supervision of the Plan Schemes, a Personal Assistant to the Director of Fisheries and one upper division clerk was employed at Headquarters. Besides, one Assistant Director of Fisheries and staff were employed in Kanyakumari district.

The Plan provision was Rs. 0.05 lakh, budget provision was Rs. 0.05 lakh, and actual expenditure was Rs. 0.07 lakh. The increased expenditure was due to the staff in the Kanyakumari district.

PART IV—DEVELOPMENT AND EXPLOITATION OF MARINE FISHERIES.

A. PEARL FISHERIES.

The pearl fishery of 1957 which was in progress at the beginning of the year under report was continued till 20th May 1957 for a period of 51 fishing days. In this fishery the pearl banks known

as Kodamuthi, Saithu Kodamuthi, Rajavukku Chippi Soditha Par and Karuval Par were exploited after a lapse of nearly 128 years. Against a target of 127 lakhs of oysters more than 111.75 lakhs of oysters were fished during this pearl fishery. The gross revenue of the fishery was Rs. 1,68,807.31 as against an expenditure of Rs. 24,000. The yield of pearls during this fishery was much better than the two previous fisheries conducted during 1955 and 1956. A special handicap due to the non-availability of powered vessels was a limiting factor of the entire operation and their results. The detailed report of the pearl fishery was submitted to the Government and the satisfactory results of the fishery have been commended in G.O. Ms. 1789, Food and Agriculture, dated 17th May 1958.

The pearl banks were guarded by prohibiting general fishing on the banks and regular patrol by special staff consisting of one Inspector and one Sub-Inspector sanctioned in G.O. Ms. No. 2193, Food and Agriculture, dated 30th August 1957. The special staff were assisted in their works by other executive and Research staff at Tuticorin. The vessels M.F.V. "Gohur Khaleeli" and M.V. "Meenakshi" were utilized for patrolling the banks combining the work with the programme of fishing operations to the extent possible.

Sanction was obtained for conducting a pearl bank inspection in G.O. Ms. No. 3432, Food and Agriculture, dated 11th November 1957. The inspection was conducted between 16th December 1957 and 11th January 1958. The pearl banks inspected were the "Tholayiram Par", "Kodamuthi", "Vedavombathu", "Saithombathu", Pulipoondur, Karaipar group, Rajavukku Chippi Soditha Par, Pudupar, Karai Karuval and Velangu Karuval, Periamalai Piditha Par, Vaippar Karai and Velangu Par. As a result of the inspection seven pearl banks, viz., Kodamuthi, Saithu Kodamuthi, Rajavukku Chippi Soditha Par, Pudu Par, Periamalai Pidichia Par and Karuval Par which were estimated to contain 214 lakhs of fishable oysters were selected for the pearl fishery during March-April 1958.

Based on the encouraging result of the pearl bank inspection proposals were submitted for declaring a pearl fishery during March-April 1958. Special emphasis was laid in the proposal for making available a good number of power vessels for towing of canoes and sharing of oysters on board the vessels at sea. The details of camp and operation arrangements were more or less similar to the arrangements of pearl fishery in 1957 except for the fact that the oysters washing thotties were located in the vacant site adjacent to the shore instead of in a private land as was the case last year. Another modification was the drafting of the staff

of offices of Assistant Director of Fisheries, Tuticorin, Superintendent, Fisheries Training Centre, Tuticorin, for the pearl fishery work which made possible the allotment of the necessary staff for the fishery. All other arrangements with regard to the temporary electrification of the camp, water-supply, sanitation, auction sale of oysters, kottu work, issue of gunnies and other matters were improved upon the previous year. The remarkable feature of this fishery was the absence of the fly nuisance. This was due to the effective fly control measures. Adult flies were killed by the spraying of Pyrethrum and the maggots were drained out of cisterns and burnt.

The oysters collected during the pearl bank inspection from the different pearl banks were washed for pearls. The pearls were valued by local merchants and the value was checked by independent diamond merchants at Madras. Government subsequently sanctioned the holding of a pearl fishery in G.O. Ms. No. 778, Food and Agriculture, dated 28th February 1958. Government fixed a revenue target of Rs. 4,51,000 to be realized by sale of oysters.

After all the arrangements for the fishery were over the pearl fishery was formally inaugurated by Srimathi Lourdhammal Simon, Minister for Fisheries and Local Administration, on the evening of Sunday, the 2nd March 1958. Sixty-five fishing canoes with a complement of 695 divers were registered at the commencement of the fishery. The vessels M.F.V. "Gohur Khaleeli" and the small T.C.M. vessel M.V. "Meenakshi" were the only two vessels available on the first day, viz., 3rd March 1958. Subsequently the T.C.M. vessel M.V. "Gudjon" was also used for the pearl fishery. Before the close of the fishery 86 canoes and 945 divers had registered. The vessel M.V. "Jamaliah" of Messrs. A.M.S.S.V.M. and Company, Kilakarai, was hired from 21st March 1958 for a period of one month at Rs. 500 per day as per G.O. Ms. No. 1493, Food and Agriculture, dated 23rd April 1958.

The pearl fishery which commenced on 3rd March 1958 was in full swing till the end of the year under report. Till 31st March 1958 it was in progress for 21 days and the total catches up to that date were 8,315,870 oysters. The Government share consisting of 557,500 oysters fetched Rs. 1,54,834.74 in auction. The fishery continued in full swing during April 1958. As weather conditions were favourable the fishery was extended to May 1958 and Government were pleased to sanction the continuance. The fishery was declared closed on 26th May 1958. On the whole the number of fishing days was 55. During this period a total of 21,476,514 oysters were fished as per details below :—

Serial number and name of pearl bank	Number of oysters fished.
1 Kattuval par	7,638,997
2 Saithu kodamuthu	5,547,977
3 Kodamuthu	4,604,872
4 Rajavukku chippi Soditha par	2,430,366
5 Pudu par	1,254,302
6 Periamalai piditha par	..

The catches of oysters were shared between the divers and the Government in the ratio 2 : 1. The Government share of oysters was auctioned daily in lots. Merchants from Bombay, Uttar Pradesh and Manipur participated in the fishery. Mr. S. Pack, a French citizen and exporter of oriental pearls from Bombay, attended the fishery. Besides, local merchants from Tuticorin, Kilakarai and Kayalpatnam participated in the fishery. All sizes, shape, colour and lustre of pearls were obtained. The biggest perfect pearl was a 7-carat pearl obtained during the fishery. Another perfect pearl of 6 carats with good lustre, but with a slight yellowish brown tint was also obtained in the fishery. Baroque pearls and blisters up to 23 carats were also collected. The total turnover of pearl business in the entire fishery is estimated to be not less than 10 lakhs of rupees. As against the target of 214 lakhs of oysters and estimated income of Rs. 4.51 lakhs, a total quantity of 21,476,514 oysters and an income of Rs. 4,65,097.77 was realized in the annals of the pearl fisheries in India.

Another notable feature during the above pearl fishery is the demonstration of diving operations with the use of Aqua lung by Mr. Daumas of the Frogmen's Divers' Association, Paris. In G.O. Ms. No. 868, Food and Agriculture, dated 3rd March 1958, Government accorded permission for the demonstration by Mr. Daumas. Apart from the diving demonstrations with Aqua lung and the combination of compressed air cylinder and breathing tubes in different regions of the pearl banks and in varying depths, Mr. Daumas was able to train two of the departmental divers in the use of the Aqua lung and connected appliances. The equipment was found to be useful and its popularization and adoption by local divers will open up a great future for the pearl and chank fisheries of the coast.

B. CHANK FISHERIES.

1. *Tirunelveli chank fisheries.*—The chank fishery of 1956-57 season actually came to a close along with the 1957 pearl fishery on 20th May 1957. Even though the main chank fishery operations of 1956-57 season were suspended with the commencement of the pearl fishery on the 15th March 1957, the collection of chanks made by the divers during their diving on the pearl banks

were also accepted after the routine examination and gauging. This continued from the beginning to the close of the pearl fishery. During the period from 1st April 1957 to 20th May 1957 in the year under report the following quantities of chanks were fished and taken to account:—

Full sized.	Under sized.	Wormed
4,299	114	596

After the close of the season also some of the divers who went for general fishing used to bring periodically some collection of chanks and these were also accepted and paid for at the sanctioned rates. In this way the following collections were made before the commencement of the actual chank fishery:—

Full sized.	Under sized.	Wormed.
2,628	130	449

The main chank fishery of 1957-58 commenced on the 21st November 1957. The main operations were continued till 27th February 1958 when these were suspended for the pearl fishery. The fishery had been in progress for 69 days. The season was good due to favourable weather and the divers covered the entire stretch of the banks from the northern boundary of the district up to Trichendur in the south. The total number of chanks fished during the season under each category is given below:—

Full sized.	Under sized.	Wormed.
860,385	30,858	30,458

The maximum number of chanks fished on a single day was 32,753 full-sized, and the maximum number gauged on a single day was 88,282 which is made up of four days' collection off Tiruchendur. The maximum daily catch of a diver was 151 full-sized chanks.

A "Valampuri chank" was fished off Tuticorin in the Madathundam Par on on 23rd December 1957. The shell was a perfect full-sized chank of the "Jadhi" variety measuring 4.15 inches long with a diameter of 2.4 inches and circumference of 7 inches. It weighed 15.5/16 tolas. The value of one thousand ordinary shells was paid for this shell, viz., 450 and a reward of Rs. 62 to the co-divers and thodai of the particular canoe as per sanction in G.O. Ms. No. 1087, Food and Agriculture, dated 19th March 1958. This appears to be the second recorded instance when a "Valampuri" chank was fished off Tuticorin, the first occasion being in 1929-30 season (vide Administration Report for the year 1929-30).

Though the chank fishery started with the tentative price of Re. 0-7-0 per full-sized chank and Re. 0-0-6 per wormed shell, Government sanctioned an increased rate of Re. 0-45 nP. per full-sized shell and 3 nP. for wormed shell for the season as per G.O. Ms. No. 10, Food and Agriculture, dated 2nd January 1958. The savings accounts was maintained for the divers and pass-books were

opened. A rate of Re. 0-1-0 for every full-sized chank was withheld from the daily payments due to the divers and credited in the savings accounts. This was later increased to 10 nP. per full-sized chank at the request of the divers. The accumulated savings were paid to the divers at the close of the fishery and according to necessity on emergent cases. On a representation made by the Divers' Union for maintaining similar savings accounts for the Thodai, Government accepted the proposal in G.O. Ms. No. 244, Food and Agriculture, dated 27th January 1958.

The following is a comparative statement of the number of canoes and divers participated in the fishery and the shells fished during the chank fishery of 1956-57 and 1957-58:—

Season	Number of canoes.	Number of divers.	Number of chanks.		
			Full-sized.	Under-sized.	Wormed.
1957-58	86	945	860,472	30,858	30,470
1956-57	67	733	660,894	35,051	27,396

A statement showing the names of beds fished and the quantity taken from each bed is also given below:—

Serial number and name of chank bed.	Number of full-sized chanks fished.	
1 Kattithirukkai	..	28,720
2 Sayathundam	..	6,648
3 Nagara Par	..	209,892
4 Vadaithundam	..	15,296
5 Siluva Par	..	56,555
6 Kulichan Par	..	8,663
7 Kadayam Par	..	56,709
8 Melakeluthu Par	..	7,325
9 Janathu Par	..	14,203
10 Melombathu	..	5,799
11 Karaithundam	..	19,787
12 Vadavalipathu	..	64,050
13 Attombathu	..	21,182
14 Kilavan Par	..	54,084
15 Aluva Par	..	15,108
16 Neelankilpatharai Par	..	20,169
17 Kanava Par	..	93,447
18 Poonthottam Par	..	131,447
19 Nenjurichan Par	..	9,935
20 Pudu Par	..	2,530

Serial number and name of chank bed.	Number of full-sized chanks fished.
21 Kodamuthi	5,023
22 Saithu Kodamuthi	3,242
23 Karuval	3,129
24 Rajavukku Chippi Sodicha Par.	7,755
	860,472

Buoys were laid in the sea during the year (on 25th November 1957) to demarcate the district boundary between the Tirunelveli and Ramanathapuram chank beds.

The construction of the chank gauging shed was undertaken during the year under report. The stock of chanks in the godowns as on 31st March 1957 was physically verified by an Assistant Director of Fisheries specially sanctioned in G.O. Ms. No. 2541, Food and Agriculture, dated 28th May 1957 for a period of two months from 19th November 1957.

All amenities were provided for the mufassil divers during the season of the fishery. A community radio set was also installed in the chank godown to entertain the divers returning from the sea besides providing facilities for sale of tea and light refreshments.

The following ex gratia payments were sanctioned by the Government to the divers who were particularly disabled on account of injuries sustained during diving operations:—

(1) Rs. 250 to Sri P. Asana Lebbai who lost one of his eyes as a result of the sting caused by a jelly fish during 1955-56 season—*vide* G.O. Ms. No. 1734, Food and Agriculture, dated 3rd June 1957.

(2) Rs. 50 to Sri K. Katchu Mohideen whose ear was bitten by a shark on 23rd March 1957—*vide* G.O. Ms. No. 2646, Food and Agriculture, dated 3rd September 1957.

In G.O. Ms. No. 10, Food and Agriculture, dated 2nd January 1958, Government passed orders creating a Welfare Fund of Rs. 2,500 to be utilized for the education of the children of the divers.

A statement showing the opening stock of chanks, deliveries effected to the purchaser and the closing stock of the year is furnished in Appendix XXII.

2. *Madurai Division.*—The Ramanathapuram and Sivaganga chank fisheries which were vested with the Fisheries Department consequent on the abolition of Estates, were leased out last year

to two private parties, viz., Messrs. K.T.M.T.M. and Company, of Kilakarai and Messrs. A.M.S.S.V.M. and Company of Kilakarai respectively. The Ramanathapuram lessees, viz., K.T.M.T.M. and Company have taken the lease for a period of 5 years from 1st July 1956 for Rs. 2,27,887 per annum and the Sivaganga lessees Messrs. A.M.S.S.V.M. and Company have taken the lease for 3 years only from 1st July 1956 for Rs. 30,156 per annum. Both the lessees fully paid the lease amounts for the year under review.

(a) *Ramanathapuram chank fishery.*—The Ramanathapuram chank beds extend from Kannirajapuram in the south to Karangadu in the north and the chank diving operations conducted by the lessee throughout the year are as detailed below:—

Name of centre.	Duration of fishery.	Variety of chanks fished.
Pamban	March to June ..	Jathi, Pathala and Patti.
Thangachimadam	Do. ..	Jathi and Pattala.
Rameswaram	Do. ..	Do.
Irumeni	May to August ..	Patti, Irupiravi and Pathala.
Karangadu	May to September..	Patti
Devipattanam	June to September..	Do.
Thiruppalakudi	Do. ..	Do.
Vedalai	September to December.	Jathi and Pathala.
Periapattanam	Do. ..	Jathi.
Kilakarai	Do. ..	Do.
Kannirajapuram	December to March..	Do.

The lessees fished 690,519 full-sized, 21,287 under-sized and 48,413 wormed chanks during the year.

(b) *Sivaganga chank fishery.*—This fishery extends from Karangadu in the south to Sundarapandiyanpattinam in the north for a distance of 18 miles. The lessees conducted chank diving operations during the year between April and October off Karangadu, Mullimunai and Tondi. The diving operations off pasipattinam and Vattanam were not successful. During the rest of the year chanks caught in the nets of fishermen were collected by the lessees. On the whole, the lessees fished 243,153 full-sized, 1,680 under-sized and 60,526 wormed chanks.

To safeguard the chank beds from over fishing and poaching, to demarcate the boundary between the waters of the two lessees and to settle the waters of the two lessees and to settle the disputes between the two lessees, the chank fishery supervisory staff of one Inspector of Fisheries with headquarters at Kilakarai and one chank fishery overseer at Karangadu were continued for one more year from 1st July 1957 in G.O. Ms. No. 1623, Food and Agriculture, dated 24th May 1957. The above staff checked the

lessees chank collections, their gauging of chanks, sorting, etc., during the year and ensured that the various conditions of the lease were fulfilled. The demarcation of the boundary between the waters off Karangadu was carried out on 30th August 1957 and the demarcation between Ramanathapuram and Tirunelveli waters off Roachmanagar on 25th November 1957.

3. *Tanjavoor district chank fishery*.—The departmental fishing of chanks in the portion lying between Point Calimere and Puthukuda was conducted. The comparative figures of chanks fished for the years 1955-56, 1956-57 and 1957-58 are given below :—

Year.	Full-sized.	Under-sized.	Wormed.
1955-56 ..	17,992	7,068	766
1956-57 ..	31,768	13,039	1,566
1957-58 ..	41,341	6,431	803

There is an increase in the number of full-sized chanks obtained during the year when compared with the previous years. Systematic purchase of "Porakku chanks" was made. The procurement of under-sized and wormed chanks was reduced to nearly 50 per cent over the previous year. Tenders for the disposal of accumulated chanks in the Adirampatnam godowns were called for during the year and action pursued in this direction. In addition the lease of the chank fishery excluding the portion operated departmentally fetched in a lease amount of Rs. 19,786.

4. *Vellore division—(a) Chingleput district chank fishery*.—The lease of the chank fishery of the Chingleput district was given for a period of three years from 1st July 1954 to 30th June 1957 at an annual rental of Rs. 4,711 to Messrs. K. T. M. T. M. Abdul Kayoom Hussain Sahib of Kilakarai and the lease expired on 30th June 1957.

(b) *South Arcot district chank fishery*.—The lease of the chank fishery of this district which was leased out to Messrs. A.M.S.S.V.M. & Co., Kilakarai, for a period of three years from 1st July 1954 to 30th June 1957 at an annual rental of Rs. 13,406. The lease expired on 30th June 1957.

The chank fishery of Chingleput and South Arcot districts was leased out in one lot to Sangu company, Kilakarai, for three years from 1st July 1957 to 30th June 1960 at an annual rental of Rs. 15,106.

5. *Kanyakumari district chank fishery*.—Government sanction was requested for the departmental operation of chank fishery off Kanyakumari coast during 1957-58. The fishery was commenced in anticipation of Government orders on 24th January 1958. Subsequently sanction was accorded in G.O. Ms. No. 749, dated 26th February 1958 to conduct departmental fishing operations and

necessary funds were also provided for the same. A special staff of one Chank Fishery Overseer and two peons was also sanctioned to work under the direct supervision of the Sub-Inspector of Fisheries, Enayamputhenthurai. The fishery was declared closed on 10th May 1958. The total number of chank fished were as follows :—

Full-sized.	Under-sized.	Wormed.
2,032	282	361

The chank divers were paid at 45 nP. per full-sized chank and 3 nP. per wormed chank. The chanks were collected and stored in the Fish Curing Yard at Enayamputhenthurai.

C. FISH-CURING YARDS.

1. *Tuticorin division*.—There were four fish curing yards in this division at the beginning of the year, viz., Idinthakarai, Ovari, Periathalai and Kootapuli. These yards were continued during the year as per G.O. Ms. No. 655, Food and Agriculture, dated 1st March 1957. In addition to the above, two more yards, one at Sippikulam and the other at Koothanguli were sanctioned in G.O. No. 2553, Food and Agriculture, dated 26th August 1957 and were opened on 26th October 1957 and 6th November 1957 respectively. The issue price of salt was fixed in G.O. Ms. No. 2086, Food and Agriculture, dated 11th July 1957, as follows :—

MAUND.	nP.	MAUND.	nP.
1	62	1/10	6
1/2	31	3/40	5
1/4	16	1/20	3
1/8	8	1/40	2

In the Periathalai and Kootapuli yards cess at the rate of 1 pie per seer or Re. 0-3-4 per maund of salt was initially being conducted towards the advance made for the construction of curing sheds. As this cess was affecting the transaction in the yards on account of the increase in price to the curer proposals were submitted to Government to waive the outstanding cess. Orders were accordingly received in G.O. Ms. No. 1258, Food and Agriculture, dated 31st March 1958. The salt subsidy scheme for the year under report was received in G.O. No. 1850, Food and Agriculture, dated 15th June 1957. The transactions in the six fish curing yards are given below :—

Name of the yard.				Salt issued.		Fish let in.		Fish let out.	
				MDS.	SR.	MDS.	SR.	MDS.	SR.
1	Idinthakarai	..	..	6,049	10	25,838	35	19,183	35
2	Periathalai	..	..	558	00	3,274	27	2,116	29
3	Kuthanguli	..	..	219	00	1,004	28	711	17
4	Sippikulam	..	..	350	00	2,081	27	1,304	00
5	Kootapuli	..	..	1,279	10	7,350	01	5,509	14
6	Ovary	..	..	4,462	30	20,700	09	14,635	27
				12,918	10	60,250	07	43,467	02

2. *Tanjavoor division*.—All the three fish curing yards in this division were maintained during the year. There was a good increase in the transactions at Adirampatnam and Muthupet yards. There was a fall in the transactions at Arcotthurai yard due to the unfavourable fishing conditions. The question of the reopening of the fish curing yards at Vanagiri and Sethubavachatram is under active consideration. The comparative figures of transactions in the three fish curing yards of the division for 1955-56 and 1956-57 are furnished below :—

Yard.	Year.	Fish let in.		Fish let out.		Salt.	
		MDS.	SRS.	MDS.	SRS.	MDS.	SRS.
Adirampatnam ..	1956-57	4,770	15	3,499	37	968	30
	1957-58	7,990	09	5,686	34	1,555	05
Muthupet	1956-57	10,665	20	7,421	08	1,962	25
	1957-58	14,457	25	9,673	13	2,421	55
Arcotthurai ..	1956-57	1,104	25	839	38	275	30
	1957-58	1,042	14	773	05	260	05

3. *Vellore division*.—Salt at subsidised rates was issued in the fish curing yards of the department at Sathankuppam and Kadapakam so as to enable the fishermen to cur their catches of fish under hygienic conditions. The issue price of sale remained to be the same as previous year, viz., Re. 0.62 nP. per maund. The transactions of the above two yards during the year with comparative figures for 1956-57 are furnished below :—

Yard.	Year.	Fish let in.		Fish let out.		Salt.	
		MDS.	SRS.	MDS.	SRS.	MDS.	SRS.
Sathankuppam ..	1956-57	5,346	35	3,323	10	843	00
	1957-58	5,200	04	3,175	03	734	30
Kadapakam ..	1956-57	2,951	10	2,066	25	630	00
	1957-58	3,573	00	2,552	35	807	00

4. *Kanyakumari district*.—At the commencement of the year only five fish-curing yards were in existence, viz., Cape Comorin, Muttom, Kadiapatnam, Colachel and Thothoor. One more yard commenced to work at Enayamputhenthurai with effect from 2nd August 1957 with a Sub-Inspector and peon. Of the six yards mentioned above two yards at Cape Comorin and Enayamputhenthurai served as model fish curing yards with store rooms for storing the fish cured and provided with washing and curing tubs. These store rooms and tubs are rented out to the ticket holders of the yard. A sum of Rs. 7.50 nP. is collected each month for a store room with curing and washing tubs at Cape Corin. There are 20 store rooms available in the yard. Similarly a sum of Rs. 5 has been collected from each curer for a store room and curing tub at Enayampathenthurai yard. The rent at Enayamputhenthurai was fixed low in view of the small size of the store room in the yard. Thus a sum of Rs. 1,764.24 nP. was collected towards rent

of the store rooms at Cape Comorin yard and Rs. 211 from the ticket holders at Enayamputhenthurai during the year. Steps are being taken to construct fish-curing yards at Kadiapatnam and Thoothoor. It may be mentioned here that salt is being issued at these two places for curing fish outside the store sheds of the yards since there are no separate curing sheds. New buildings at suitable localities are expected to be constructed at the two places during 1958-59. Salt was sold to the curers in the different yards at Rs. 0.62 nP. per maund. A total quantity of 17,948 maunds of salt was issued in the six yards of the district during the year for curing 85,980 maunds of fish. A statement of transactions in the different yards of the district is furnished below :—

Name of yard.	Fish let in.		Fish let out.		Salt issued.	
	MDS.	SR.	MDS.	SR.	MDS.	SR.
1 Cape Comorin	25,905	00	19,128	00	6,402	00
2 Muttom	5,008	00	3,446	00	1,024	00
3 Kadiapatnam	5,512	00	5,845	00	1,608	00
4 Colachel	20,078	00	14,085	00	3,362	00
5 Thoothoor	23,269	00	17,774	39	4,812	00
6 Enayamputhenthurai ..	3,208	00	2,137	00	740	00
	85,980	00	62,415	39	17,948	00

5. *Madurai Division*.—The two fish-curing yards at Mookur and Athankarai in Ramanathapuram district were continued during the year. The selling price of salt continued to be Rs. 0.62 nP. per maund. The following are the transactions in the yards :—

Yard.	Fish let in.		Fish let out.		Salt issued.	
	MDS.	SR.	MDS.	SR.	MDS.	SR.
Mookur	12,521	03	5,333	24	2,317	05
Athankarai	1,767	17	1,358	21	440	10

General.—At the beginning of the year, there were 17 yards in the State. With the opening of yards at Sippikulam and Koothanguli in Tirunelveli district there were a total of 19 fish-curing yards in the State at the close of the year. The question of re-opening some of the old fish-curing yards in Tanjavoor district is under consideration. The maintenance of the fish-curing yards and their transactions during the year were on the whole satisfactory.

D. SHARK LIVER OIL EXTRACTION.

There were 21 centres in the State where procurement of shark liver oil extraction were conducted during the year. There was a general decline in the shark catches off the Ramanathapuram and Tirunelveli districts coasts during the year due to the fact that more fishermen gave up shark fishing in preference to chank diving which has become more remunerative. A list of the centres where procurement of liver and extraction of oil were conducted as furnished to Appendix XXIII. On the whole, 43,521 lb. of liver were procured and treated and 23,000 lb. of oil extracted.

E. FISHERIES DEMONSTRATION FACTORIES.

The two demonstration factories at Adirampatnam and Rameswaram were in full swing during the year. Bye-products like fish manure, sea-weed, ash, skate liver oil, Shark liver oil, were prepared and popularized. A stir has been created among the agriculturists in the Tanjore district by distributing the fish manure to the ryots. There is great demand for the product. Skate liver oil was also supplied to some of the leading tanneries like the Western India Tanneries, Bombay, Messrs. Chingam Chettiar and Sons, Pallavaram, Madras, etc., with a view to popularize the product in the tanning industry. There is growing demand for the product.

Sea-weed compost manure and sea-weed ash are also getting popularity among the ryots in the Ramanathapuram district.

The details of production and disposal during the year are :—

Name of manure.					Production.	Disposal.	Balance.
					LB.	LB.	LB.
1	Fish manure	..	..	..	19,852	27,888	9,389
2	Skate liver oil	..	..	..	940	1,098	498
3	Shark liver oil	..	..	..	4,718	5,229	Nil
4	Sea weed compost manure	..	..	..	2,879	2	8,035
5	Weed ash	..	..	..	273	..	527

F. MANUFACTURE OF SEMI-DRIED PRAWNS.

A semi-dried prawns unit was sanctioned by the Government to investigate the possibilities of production and popularization of semi-dried prawns in the East coast and the unit came into existence in March 1957. The unit started functioning at Nagapattinam in June 1957.

With the location of trawling grounds by the departmental trawlers "M. V. Gudjon and M. V. Meenakshi" off Tuticorin and landing of good quantity of prawns, work on the processing of prawns for semi-dried prawns were taken up at Tuticorin also. The entire quantity of prawns landed by both the trawlers were utilised for semi-dried prawns production. But subsequently when the vessels moved out of Tuticorin availability of prawns was a problem. The same difficulty was met with the unit at Nagapattinam also. Moreover the competition in the open market for fresh prawns were so keen that it was not at all practicable to take to this commercial scheme.

A total of 3,000 lb. of prawns were processed and 490 lb. of finished product produced. The product was widely popularized locally and in places, like Madras, Ootacamund, Madurai, Tiruchirappalli, Salem, Yerkaud, Mettur Dam and Kodaikanal.

The total revenue out of the scheme is Rs. 768 as against the total expenditure of Rs. 1,525. Because of the non-availability of raw materials at competitive rates, the scheme had to be wound up by December 1957.

G. FISH MEAL AND PRAWN SHELL MEAL.

Glut of fish was profitably utilized for preparing fish meal which is a very good cattle and poultry feed. Similarly the husk left out during the manufacture of semi-dried prawns was dried and powdered and the powder was known as the prawn shell meal which is also a good poultry feed.

There is a great demand among the farmers of poultry and dairy. Of these, mention may be made of poultry development office, Madras, Superintendent, Hosur cattle-farm, Superintendent, District Livestock Farm, Orathanad and the District Veterinary officer, Tanjore.

A total of 550 lb. of miscellaneous fish were processed and produced about 135 lb. of fish meal. About 350 lb. of prawns shell meal was also produced. The entire quantity of fish meal and prawns shell meal were disposed of at Re. 0.62 and 0.37 nP. respectively.

PART V—DEVELOPMENT AND EXPLOITATION OF INLAND FISHERIES.

A. LICENSING AND CONSERVATION.

1. *Adyar river, Madras.*—The following were the monthly rates of licence fees charged :—

			RS.	AS.
1	Rod and line		0	3
2	Katcha		0	3
3	Cast net		0	6
4	Kondavalai		1	11
5	Siruvai		1	11
6	Boovalai		1	11

A total number of 2,887 licences were issued and a sum of Rupees 1,743.32 was realized during the year as against 2,334 licences issued and Rs. 1,944-14-0 realized during the previous year. The increase in the number of licences issued is due to the strict watch by the departmental staff to prevent unauthorized fishing and the favourable fishing conditions which prevailed during the year. A statement of licences issued is given in Appendix XXIV.

2. *Ramanathapuram district.*—Fishing by trees (or submerged vegetation) in the inshore waters off Ramanathapuram district in Palk Bay and Gulf of Mannar was controlled as usual by the issue

of permits. During the year under review, 38 licences were issued at Nambuthalai, Pudupattanam, Karangadu, Tirupalakudi, Verkottu, Olaikuda and Sudukattanpatti and a revenue of Rs. 193 was realized as against 57 licences and Rs. 57 during the previous year.

3. *Kodaikanal lake (Madurai district).*—The Kodaikanal lake is situated at an altitude of 6,800 feet above mean sea level. The lake was taken over by the department from the Palni Hills Game Association in 1952 for a period of ten years at an annual compensation of Rs. 25. Since 1952, the lake was periodically stocked with exotic varieties of fishes like Mirror carp, Golden carp and Tench from Ootacamund. Of the above only Golden carp has bred and established well in the lake. A few Tench fingerlings were also caught from the lake indicating that the Tench also has commenced to breed in the lake. Though Mirror carp is seen to grow well, there has not been evidence of its breeding in the lake. Hence large-scale exploitation of Mirror carp was not attempted. Ever since the angling was permitted in the lake, it has become popular with the local public as well as the seasonal visitors. During the year, 242 licences were issued and an amount of Rupees 407.50 was realized as licence fees as against 234 licences and Rs. 403.50 realized during the previous year.

4. *Manalar Estate Waters.*—The 'Highways' range of mountains near Chinnamanur in Madurai district with an elevation of 5,500 feet have a number of cold-water streams suitable for the culture of Mirror Carp and other cold-water fishes. The Mirror Carp fingerlings supplied in 1949 by the department to the Tea estates in this range have grown well and so the Government were pleased to sanction in their order No. Ms. 284, Food and Agriculture department, dated 31st January 1957, of the development of the fisheries of these cold-water streams and the appointment of one Fieldman and one Fishermen-cum-Watcher for the purpose. The streams in the range were duly brought under the Indian Fisheries Act, 1897 during the year for the purpose conservancy of their fisheries, after due notification.

5. *Hope lake (Tirunelveli district).*—Fishing in the Hope lake was continued to be permitted under licences at the following rates:—

	RS.
1 Rod and line ..	0.50 per day or 2.00 per month.
2 25 Hooks and line (set)	2.00 per month.
3 Nachu valai ..	2.00 per month.

A total number of 62 licences were issued for fishing in the lake and Rs. 115.50 was realized towards licence fees. Systematic fishing was conducted in the lake by the departmental unit with Rangoon nets, hooks, nduvalai and eel traps and a total quantity of 2,828½ lb. of fish was caught and sold for Rs. 1,065.90 as against 2,600 lb. of fish and Rs. 929.25 during the previous year.

6. *Kadamba tank (Tirunelveli district).*—Fishing in the Kadamba tank is permitted under the licencing system as sanctioned in G.O. Ms. No. 4114, Development, dated 21st August 1947. The rates of licence fees are as follows:—

	RS.
1 Cast net	7.50 for six months.
2 Nachu valai ..	7.50 per year.
3 Ootha	1.00 per year.

A total number of 416 licences were issued and a sum of Rs. 1,807 was realized during the year as against 457 licences and Rs. 2,130.50 during 1956-57. The decrease is due to very low water-level in the tank during the summer months. Departmental fishing was conducted using cast nets, Rangoon nets, Eel traps, Nachu valai and Hooks. The catches by the Departmental units amounted to 3,649 lb. and the value realized by sale was Rs. 927.66 as against 3,159 lb. and Rs. 698-11-0 in 1956-57.

7. *Backwaters of Tirunelveli district.*—The fishing of immature fry and fingerlings in the backwaters and channels at Idinthakarai, Kulasekharapatnam, Tiruchendur, Punnakayal, Tuticorin and Veppalodai which was prohibited in G.O. Ms. No. 1787, Agriculture, dated 31st May 1954, was enforced during the year. The control which aims to prevent immature fry and fingerlings and breeders is much appreciated by the fishermen since they are now able to enjoy a better harvest of grown-up fishes.

8. *Yercaud lake (Salem district).*—The Scheme for the exploitation of Yercaud lake was continued during the year. The lake was stocked with 400 fingerlings during the year. The Kakabans were checked periodically but no eggs of Mirror carp were noticed as evidence of its breeding in the lake. Four hundred and seventy-four and half lb. of fish was caught in the lake and sold for Rupees 236.57 as against 526 lb. of fish and Rs. 263 realized during the previous year. Only a few fishing licences were issued for angling in the lake and Rs. 6.50 was realized as licence fees against Rs. 5 during 1956-57. Rupees 323.50 was realized towards hire-charges of the departmental boat for pleasure cruise in the lake as against Rs. 176 in the previous year.

9. *Mettur reservoir.*—The original licence fee of Rs. 100 which was reduced to Rs. 72 as per orders in G.O. Ms. No. 587, Agriculture, dated 2nd March 1956, continued to be in force during the year. A total number of 268 licences were issued for fishing in the reservoir during the year which fetched a total revenue of Rs. 18,971.80 as against 227 licences issued and Rs. 15,515-14-6 realized during 1956-57. It is evident that the increase in revenue was due to the reduced licence fees and the concession to pay it on instalmental basis. The fish sanctuaries at Mettur and

Hogainikal were protected by effective patrolling by the staff, and the offenders were charge-sheeted. During the year a total number of 123 cases ended in conviction, 1 in acquittal, 984 lb. of fish confiscated from offenders was sold for Rs. 129.13.

10. *Poondi reservoir (Chingleput district).*—The scheme to conserve the fishing of the reservoir and its rational exploitation through licencing system was continued during the year. A total number of 2,421 licences were issued during the year under report realizing an amount of Rs. 7,978.50 as licence fees, as against 2,304 licences issued and Rs. 8,432 realised during 1956-57. The following are the rates of licence fees levied for fishing in the reservoir :—

Serial number and kind of tackle.	Number of licences issued.	Rate.		Amount realised.
		RS.	NP.	
1 Picking	271	05	0	152 50
2 Ootha	127	1	00	134 00
3 Rod and line	42	1	00	42 00
4 Madavalai	43	2	00	102 00
5 Cast net	474	2	00	934 00
6 Cast net with craft	24	12	00	258 00
7 Drag net	1	20	00	20 00
8 Floating line	272	1	00	569 00
9 Murrel noose	51	(per 10 hooks)		58 00
10 Kanni valai	1,038	1	00	4,377 00
11 Mani valai	41	(per 25' length)		820 00
12 Entha valai	7	2	00	14 00
Total ..	2,421			7,978 50

11. *Kolavoy lake (Chingleput district).*—The scheme of issuing licences in Kolavoy lake which was in existence since 1950 was kept in abeyance from 14th August to 19th November 1957 under orders of the District Collector, Chingleput. Representations were made to Government to revive the scheme and orders were accordingly issued in G.O. Ms. No. 3514, Food and Agriculture, dated 19th November 1957. Hence during the brief period only 32 licences were issued for fishing and a sum of Rs. 31.50 was realized. The following are the details of licences issued :—

Serial number and kind of tackle.	Number of licences.	Rate of fee.		Amount.
		RS.	NP.	
1 Cast net	18	1	00	18 00
2 Kanni valai	4	1	25	5 00
3 Kanni kodi	2	1	00	2 00
4 Ootha	4	1	00	4 00
5 Handpicking	4	0-10-0		2 50
Total ..	32			32 50

12. *Vellore fort moat.*—The fort moat at Vellore is maintained by the Department since 1918. A total number of 138 licences were issued and a sum of Rs. 122.50 was realised as licence fees during the year 1956-57. The details of licences issued are as below :—

Serial number and type of net.	Number of licences.	Rate.		Amount realised.
		RS.	NP.	
1 Cast net	55	1	00	55 00
2 Rod and line	68	0	50	35 00
3 Drag net	10	3	00	30 00
4 Katcha	5	0	50	2 50
Total ..	138			122 50

13. *Veeranam lake and connected channels (South Arcot district).*—Intensive patrolling was carried out by the departmental staff to enforce the conservancy measures in the lake and licences for fishing were issued. Nine hundred and ninety-eight licences were issued and a sum of Rs. 8,402 realised during the year as against 893 licences and Rs. 6,175 during 1956-57. The particulars of the licences issued are furnished below :—

Serial number and kind of tackle.	Number of licences.	Rate.		Amount realised.
		RS.	NP.	
1 Rangoon nets	56	30		1,680
2 Kattu valai	54	30		1,770
3 Cast net	194	3		1,757
4 Cast net with craft	64	5		344
5 Ootha	149	2		1,359
6 Varu valai	83	2		331
7 Kappu valai	104	1		491
8 Kanni kodi	110	1		326
9 Katha valai	..	1		..
10 Rod and line	150	1		223
11 Hooks and line	34	1		111
Total ..	998			8,402

14. *Vadavar river at lower anicut (South Arcot).*—The conservancy and licensing in the Vadavar was controlled as in the previous years. During the year 384 licences for Rs. 1,421 were issued as against 337 licences and Rs. 1,267 realised during 1956-57.

Details of licences issued are as follows :—

Serial number and kind of tackle.	Number of licences.	Rate.		Amount realised.
		RS.	NP.	
1 Cast net	106	3		671
2 Cast net with craft	12	5		84
3 Ootha	19	2		50
4 Varu valai	93	2		312
5 Kappu valai	38	1		104
6 Katcha valai	..	1		..
7 Rod and line	108	1		121
8 Kattu valai	2	30		60
9 Kanni kodi	1	1		4
10 Thuri valai	5	3		15
Total ..	384			1,421

15. *Vellar river (South Arcot district).*—The conservancy and licensing system in the Vellar estuary at Porto Novo was enforced during the year also. A total number of 798 licences were issued and a sum of Rs. 812 was realised as licence fees as against 635 licences and Rs. 1,325 during 1956-57.

16. *Ullar by-pass (Tiruchirappalli district).*—The Ullar by-pass in the grand anicut was closed for fishing during June and October, and the breeders were protected with special staff.

17. *Screen-fishing in the Tanjavoor delta.*—Unauthorised erection of sarra (fixed engines) in the innumerable channels in the Cauvery delta was prevented with the co-operation of the District Revenue authorities. During the period under report 37 cases of unauthorised fishing were detected. Of these 22 were charge-sheeted and the cases ended in conviction.

18. *Nilgiris district waters.*—Licences for angling were issued for Ootacamund lake, Moyar river and its tributaries. Proposals for the issue of licences in Pykara lake is under scrutiny by the Government. The Sim's park pond at Coonoor was handed over to the Department of Agriculture. The dense gambusia population in the Ootacamund lake very much affected the breeding of Mirror Carp and this resulted in a fall of licence fees during the year. A Statement furnishing the details of licences issued and the amounts realized are given below :—

Month.	Ooty lake.				Moyar river.	
	Daily		Monthly.		Number.	Value.
	Number.	Value.	Number.	Value.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
April 1957	15	7.50	16	48.00	..	..
May 1957	9	4.50	12	36.00	..	..
June 1957	6	3.50	3	9.00	1	14.00
July 1957	4	2.00	..	..	..	..
Aug. 1957	1	0.50	5	15.00	2	..
Sept. 1957	1	0.50	13	39.00	..	..
Oct. 1957	1	0.50	18	54.00	1	10.00
Nov. 1957	3	1.50	14	42.00	..	..
Dec. 1957	..	..	4	12.00	..	..
Jan. 1958	3	1.50	2	6.00	2	6.00
Feb. 1958	1	0.05	4	12.00	..	..
Mar. 1958	3	1.50	8	24.00	..	..
	47	24.00	99	297.00	6	38.00

19. *Bhavanisagar (Coimbatore district).*—The Bhavanisagar Reservoir, 30 square miles in extent, is formed by the construction of a dam just below the confluence of rivers Bhavani and Moyar which take their origin in the Nilgiri Plateau. Since the

formation of the reservoir in 1955 the department has taken steps to stock this reservoir with exotic and indigenous fishes to develop the fishery. It is necessary to conserve the fishery of the reservoir for some years initially with a view to allow the fish so stocked to breed and establish themselves well. As such intensive conservancy measures were taken and unauthorised fishing was checked by special staff of 11 watchers posted at Salaiyur, Sundapatti, Mettupalayam, Niralai, Vychinampalayam, Sirumugai, Petikuttai, Bhavanisagar and Gajalhatti. The work was supervised by an Assistant Inspector with headquarters at Sirumugai. During the year under review 53 cases of illicit fishing were detected. Of these, 44 cases were charge-sheeted resulting in the conviction of 40 cases. The total of fine levied in the cases amounted to Rs. 465. Besides an amount of Rs. 35.29 was realised by the sale of confiscated fish. Since the conserved area lies in thick forest areas, the supply of a S.B.B.L. gun was sanctioned by Government in G.O. Ms. No. 2246, dated 24th July 1957, of Food and Agriculture Department.

It is observed that the Bhavani and Moyar rivers are thickly infested with crocodiles. These animals are a source of danger to the fish population of the reservoir. So proposals were submitted for the issue of licences for hunting crocodiles in the Bhavanisagar Reservoir (Bhavani and Moyar river limits) and the GOVERNMENT WERE pleased to accept the proposals in G.O. Ms. No. 2592, Food and Agriculture, dated 30th August 1957. The licence fee levied is Rs. 10 per month for each person engaged. Two licences for crocodile hunt were issued during the year and the sum of Rs. 20 was realised by way of licence fees.

B. PROVINCIALIZED WATERS.

1. *Madurai district.*—The six Periyar fed tanks in the district were stocked intensively with Tilapia and Carp fingerlings from Tanjore. A total number of 615,675 fish seed were stocked in these tanks. Their fisheries were disposed off in public auction, and the details of stocking operations, rentals realised from each are furnished in Appendix XXV. It will be seen that a total rental of Rs. 16,315 was realised in 1958 from these six tanks as against Rs. 9,501 only in 1957. The considerable increase in revenue is mainly due to the intensive stocking of fish carried out by the department during the year and the wide propaganda regarding the fishery wealth of these waters. Steps were also taken to provincialise seven more tanks in the district with a total extent of 2,407 acres.

2. *Tirunelveli district.*—The tanks in Tiruchendur and Srivai-kuntam taluks provincialised in G.O. Ms. No. 1215, Agriculture, dated 11th May 1956, were stocked with Cirrhina, Labeo, Etroplus, Mulletts, Eels and Tilapia fingerlings. The fishery rights of the tanks were leased by the Revenue Department and a total sum of Rs. 2,715 was realised. A statement showing the names of the

provincialised waters, their extent, number of fish stocked and rentals realised for the year 1957 in the case of tanks and fasli 1367 in the case of rivers and channels is given in Appendix XXVI.

3. *Chingleput district*.—All the tanks in the district were stocked with the adequate number of suitable fish seed and the fishing rights were leased. The tanks were sold in public auction as per the modified mode of lease contained in G.O. Ms. No. 1237, Food and Agriculture, dated 16th April 1957. Timely action was taken to lease the tanks in question and a total sum of Rs. 15,602 was realised as rentals towards the same. Details of rentals realised from the provincialised waters, their extent, compensation payable, etc., are furnished in Appendix XXVII.

4. *North Arcot district*.—Fourteen tanks in the district were sold by public auction which realised a sum of Rs. 9,928-07. A statement showing the details of their extent, compensation payable and rentals realised, etc., is given in Appendix XXVII.

5. *South Arcot district*.—The 37 items of river and channels fisheries in the district were leased out for Rs. 8,056. The details are furnished in Appendix XXIX.

6. *Tanjavoor and Tiruchirappalli districts*.—This is the first year in which the fisheries of the Cauvery river system and tanks of the districts were disposed off in public auction as per Government Memorandum No. 11485-E1/57, dated 2nd February 1957, of the Food and Agriculture Department. The river fisheries of Tanjore and Tiruchirappalli districts were disposed off for rupees 1,00,242 as against Rs. 1,01,408 during 1956-57. The tank fisheries of Tanjore district excluding Pattukottai, Orathanad and Aranthangi taluks were disposed off for Rs. 5,560-25 as against Rs. 5,970-05 during the previous year.

7. *Kanyakumari district*.—There are about three thousand irrigation tanks in this district besides three reservoirs. Ever since the district came under the control of the Madras State consequent to the reorganisation of States, steps were taken to survey all important water pieces with a view to develop their fisheries. Necessary action is being taken to provincialise the two important reservoirs in the district at Pechipparai and Perinjari, besides some irrigation tanks. It is also proposed to acquire the Manakudy Kalimar backwaters in the district with a view to develop its fishery by stocking it with suitable fish seed and Government orders are awaited.

8. *Salem district*.—A list of provincialised waters in the district is given in Appendix XXX. These waters were stocked with 808,922 fingerlings during the year.

9. *Coimbatore district*.—A list of the provincialised waters of the district is furnished in Appendix XXXI. These waters were stocked with 3,281,000 carp seed collected as Bhavani.

C. DEPARTMENTAL WATERS.

1. *Poondi reservoir*.—This reservoir was stocked with 68,885 fingerlings during the year which includes the 48,000 Tilapia seed released in the waters. As a fairly good water level was maintained in the reservoir major departmental fishing could not be conducted. Only a quantity of 1,522 pounds of fish was landed by departmental unit by conducting fishing operations and a sum of Rs. 538-38 was realised by the sale of catches.

2. *Model fish farm at Poondi*.—The model farm was stocked with 2,399 fingerlings of different varieties. A quantity of 289 pounds of fish was caught from the farm and sold for Rs. 132-86.

3. *Vellore fort moat*.—The moat was stocked with the following varieties of fish seed:—

Labeo sp. and Cirrhina sp.	...	...	...	36,264
Catla	...	...	...	1,815
Chanos	...	...	...	45,596
Tilapia	...	...	...	1,801
Mirror carp	...	...	...	3,366
Total	...	...	...	88,842

The mirror carp stocked in the moat continued to give very good results as in the previous year. Systematic fishing yielded 22,931 pounds of fish and a sum of Rs. 6,977-76 nP. was realised as against 11,985 pounds of fish caught and Rs. 3,092-36 nP. during 1956-57. Besides, a sum of Rs. 880 was realised towards the lease of the grass and lotus in the moat, as against Rs. 710 obtained during the previous year. Thus the total revenue from the moat amounted to Rs. 7,857-76 for the year.

4. *Chingleput fort moat farm*.—The moat was stocked with 7,112 Labeo and Cirrhina, 243 Catla, 585 Chanos and 7,368 Tilapia fingerlings during the year. Two thousand one hundred and thirty-six pounds of fish were caught from the moat and rupees 872-15 was realised by sale of catches.

5. *Buderi tank*.—Departmental fishing was conducted in the tank and 639 pounds of fish was landed which realised a sum of Rs. 228-44 as against 100 pounds and Rs. 33-44 during 1956-57.

6. *Kodaikanal Lake*.—No systematic or large scale exploitation of the lake was attempted with a view to enable the Mirror carp stocked to establish well in the lake. However a total of 161 pounds of fish was caught and an amount of Rs. 120-83 realized during the year. The wire mesh shutters at the outlet of the lake were renewed in March 1958 at a cost of Rs. 710 to prevent the

escape of fish from the lake. The deweeding of the lake was entrusted to the Boat Club at a cost of Rs. 800 and all the weeds were removed.

7. *Kodakunal fish farm*.—This consists of six small ponds which are being utilised as fish nurseries for keeping a ready stock of Golden carp fingerlings for supply to private parties and other divisions in the department. It is also proposed to utilise two ponds in the farm as marketing ponds.

8. *Hope lake (Tirunelveli district)*.—Systematic fishing was conducted both in the upper dam and lower dam by departmental units with Rangoon nets, Nachu valai, Hooks and Eel traps. A total quantity of 2,828½ pounds of fish was caught and sold for Rs. 1,065·90 as against 2,600 pounds and Rs. 969·25 during 1956-57.

9. *Kadamba tank (Tirunelveli district)*.—Six fishermen-cum-watchers attended to the patrolling and checking of licences and stocking and fishing of Kadamba tank, under the control of Assistant Fishery Demonstrator, Srivaikuntam. Departmental fishing was conducted using cast nets, Rangoon nets, Nachu valai, Eel traps and hooks. Three thousand six hundred and forty-nine pounds of fish was caught and the amount realised by sale was Rs. 927·66 as against 3,159 pounds and Rs. 698·11·0 in 1956-57.

10. *Nilgiris waters*—(a) *Ootacamund lake*.—Fishing was conducted daily in the Ooty lake with cast nets, Rangoon nets, and Udu valais and 4,432½ pounds of fish were landed and sold to the public for Rs. 2,215·74. Since the breeding of Mirror carp was said to be affected by the presence of *Cambusia* in large numbers, experiments were conducted to eradicate them from the lake.

(b) *The Crescent pond, Ootacamund*.—The pond is a concrete structure and is situated in the Botanical gardens. It serves as a source of attraction to the visitors during the season. A quantity of 40¾ pounds of fish was taken out of the pond and sold for Rs. 20·37.

(c) *Wellington Lake*.—During the year 68½ pounds of fish was landed and sold for Rs. 34·12. Since the lake has not been remunerative it has been proposed to fish it out completely and surrender it to the Cantonment Board.

(d) *Katteri Dam*.—This is mainly a mirror carp seed collection centre. Occasional trial nettings brought out 28¾ pounds of fish which was sold for Rs. 12·87.

(e) *Pykara lake*.—No exploitation has been undertaken. This is only a fish seed collection centre.

(f) *Snowdone lake and stew pond at Pykara*.—Both these waters were not exploited as they have highly silted up and the renovation of these tanks is under scrutiny.

(g) *Maravakandy lake*.—This is a reservoir formed by the damming up of a hill stream. As the lake is full of submerged trees and forest vegetation, it has not been possible to conduct fishing with nets. The lake is expected to be cleared of all submerged vegetation when it is next emptied by the Electricity Department. The stocking and exploitation of the lake will be taken up only when it is made suitable for the operations.

(k) *Masinagudy tank*.—This tank situated in Masinagudy village was fishing out and a total quantity of 596½ pounds of fish was sold for Rs. 298·50.

D. RURAL FISHERY DEMONSTRATION UNITS.

The Rural Fishery Demonstration scheme which was originally sanctioned in 1945 with a view to demonstrate the principles and methods of scientific pisciculture with advantage was continued to be implemented in the various districts. The salient features of the working of the different units during the year were as follows :—

(1) *Tirunelveli district*.—Sanction for the continuance of the two units at Ambasamudram and Srivaikuntam was accorded in G.O. Ms. No. 674, Food and Agriculture, dated 2nd March 1957. One nursery pond at upper dam was newly acquired for a period of five years as per G.O. No. 3109, Food and Agriculture, dated 6th October 1957. One pond at Srivaikuntam, one pond at Thirupuliangudi and two ponds at Valliyoor were taken over from the Devasthanam concerned for a period of three years as per G.O. Ms. No. 800, Food and Agriculture, dated 13th March 1957. A total number of 153,050 fish seed were stocked in the demonstration ponds of the district during the year. Four thousand four hundred and one pounds of fish caught from these tanks fetched Rs. 1,099·44 towards the sale proceeds.

(2) *Tanjavoor district*.—There were 23 demonstration tanks in the district at the beginning of the year. Out of these one tank at Tiruvanaikoil (Ramatheertham) was handed over back to the Devasthanam on 16th July 1957 as it was not suitable. The different units landed 63,374 pounds of fish fetching a revenue of Rs. 17,860·73 as compared with 64,967 pounds of fish sold for Rs. 16,718·69 during 1956-57. Details of waters run as demonstration farms in the district are furnished in Appendix XXXII.

(3) *Vellore division*.—Under the scheme nine tanks in North Arcot district, seven tanks in South Arcot and 12 tanks in Chingleput district were maintained. A total number of 86,631 fish seed were stocked in the different tanks during the year. All the demonstration tanks were fished systematically and a total quantity of 15,362 pounds of fish was sold to the public which realised a sum of Rs. 4,008·50 as against 29,990 pounds of fish sold for Rs. 6,515·39 during 1956-57. Details of the tanks and their working is given in Appendix XXXIII.

(4) *Madurai division*.—There were four demonstration units in the division with headquarters at Madurai, Kodaikanal, Virudhunagar and Kallupatty. During the year the 'Tenkal Pond' which was mainly taken up for breeding larvicidal fishes was returned to the Revenue Department on 28th September 1957. The Municipal Sewage Fish Farm was newly acquired during the year under the scheme. The Mariamman Teppam at Madurai alone accounted for 26,397 pounds of fish. All the sixteen waters were departmentally fished and the total fish production from all these tanks during the year was 34,127 pounds valued at Rs. 9,537.30. Particulars of the working of these tanks are furnished in Appendix XXXIV.

(5) *Coimbatore district*.—(a) The Odathurai tank situated in the Bhavani taluk was taken over by this department for pisciculture as per G.O. Ms. No. 3433, Agriculture, dated 27th November 1954, on payment of an annual compensation of Rs. 18 to the district board for a period of five years on an annual compensation of Rs. 18 to the district board. Exploitation of this tank during the first year yielded a revenue of Rs. 1,885-13-9 and rupees 1,646-14-0 during the next year. A quantity of 6,317 pounds of fish was caught in the tank during the year 1957-58 and a revenue of Rs. 1,713.99 was realised by the sale of fish. The results so far obtained from this tank have been quite encouraging and profitable in view of the low compensation payable and the interest created in the minds of the public about the value of fish farming. The tank was stocked during the year with the adequate number of Tilapia from Madurai, Mirror carp from Ootacamund and other carp fingerlings from the Cauvery.

(b) *Anantasagaram tank*.—The tank situated in the Gobichettipalayam taluk was taken over by this department on 16th February 1957 for purposes of Rural Fishery Demonstration. The tank was stocked with fingerlings of Tilapia and Carp fingerlings. Exploitation during the year yielded 852 pounds of fish and a revenue of Rs. 321.69 by sale of fish. Fishing in the tank was not effective due to the high water level. It is interesting to note that this tank as a provincialised piece of water fetched a rental of Rs. 150 for the year 1955-56. Now that the tank is under the control of this department, the fishery wealth is bound to be enriched in future. The period under report marks the first year of control over the tank by the department.

(c) *Avanashi temple tank*.—This tank in Avanashi taluk was taken over from Sri Avanashilingeswarar Devasthanam as per G.O. Ms. No. 1888, Food and Agriculture, dated 26th June 1957, for a period of three years on payment of compensation of one-third of the net receipts realised from the tank. The tank was acquired on 23rd August 1957 and stocked with 244 Tilapia, 370 Mirror carp and 1,960 carp fingerlings from Tanjore. The Fishery of this tank will be exploited in the course of the ensuing year.

(d) *Coimbatore town*.—The small temple tank in the town was maintained by the department and stocked with 591 Tilapia fingerlings.

The small pond in Chidambaram Pillai Park was used as a nursery for fish seed.

(e) *The Pollachi Municipal tank* was stocked with 400 Tilapia fingerlings during the year. It is expected to yield good results during the ensuing year.

(6) *Salem district*.—The Relief tank at Pennagaram with an extent of 0.52 acre was stocked with Tilapia, Cirrhina, Labeo and Chanos fingerlings. The carp fingerlings stocked in the tank have not attained marketable size and there is evidence of Tilapia having bred since its introduction. It is proposed to conduct departmental fishing in the tank during 1958-59.

E. SURVEY OF WATERS AND SUPPLY OF SEED TO PRIVATE PARTIES.

1. *Madurai division*.—An intensive survey of 362 water pieces, both private and public, with an extent of 466.29 acres was carried out by the demonstration units. The owners of the private waters were contacted and advised on the advantage of pisciculture as a subsidiary occupation. As a result 521 private parties were supplied with the following number and varieties of fish seed :—

Tilapia	...	...	...	...	125,145
Chanos	...	...	...	...	8,141
Labeo	...	...	...	...	6,646
Murrels	...	...	...	...	6,688
Etroplus	...	...	...	...	23
Gourami	...	...	...	...	115
Golden carp	...	...	...	...	743
Mirror carp	...	...	...	...	11
Catla	...	...	...	...	60
Total	...	...	...	...	147,572

A sum of Rs. 4,148.48 was realized towards the sale-proceeds of seed.

2. *Madras*.—The following are the details of fish seed supplied to private parties at Madras :—

Labeo sp.	...	...	...	...	865
Chanos	...	...	...	...	500
Tilapia	...	...	...	...	532
Gambusia	...	...	...	...	2,500
Catla	...	...	...	...	100
Etroplus	...	...	...	...	96
Total	...	...	...	...	4,593

A sum of Rs. 111.26 was realised towards the sale proceeds of seed supplied.

3. *Vellore division*.—As many as 247 private parties were contacted during the year and advised on pisciculture. The parties were supplied 77,864 fingerlings of economic importance and a sum of Rs. 1,621.93 was realised towards the sale proceeds.

4. *Tirunelveli district*.—One hundred and fifty-seven private waters in the district with a total extent of 354 acres were surveyed and 189 parties were contacted to render advice on piscicultural matters. A total number of 12,777 fish seed were supplied to the parties and a sum of Rs. 434.12 was realised towards the sale proceeds.

5. *Tanjavoor division*.—Seventy-seven thousand and three fingerlings were supplied to private parties in the district. This includes the supply made to Block Development and National Extension areas.

6. *Kanyakumari district*.—Several tanks were surveyed in the district with the assistance of Block Development officers. Instructions were issued to villagers and gramsevakhs by the departmental staff regarding piscicultural methods. A total number of 12,154 fingerlings were supplied to parties in block areas for stocking both public and private waters.

7. *Coimbatore district*.—Most of the seed supplied was to parties in Block Development areas. A total number of 21,680 fish seed was thus supplied during the year. The entire supply constituted Murrel fingerlings from the Bhavani station.

8. *Salem district*.—Ten thousand two hundred and fifty-six fingerlings were supplied to private parties and Block Development Officers in the district during the year.

9. *Nilgiris district*.—One thousand five hundred Mirror carp fingerlings were supplied to the Kerala Government during the year. Besides 42 private parties were supplied with 589 Mirror carp and Golden carp fingerlings and a sum of Rs. 202.59 was realised.

F. METTUR RESERVOIR FISHERIES.

The reservoir fishery continued to be exploited by the licenced fishermen. A total number of 244 licences for fishing with coracle and nets and 5 English rod and line licences were issued during the year which brought in a total revenue of Rs. 17,603.80. During the last week of September 1957 and in the middle of the first fortnight of January 1958, large number of fish and fingerlings of different economic species like *Cirrhina*, *Cirrhus*, *Labeo*, *Kontius*, *Barbus dubius*, *B. hexagonalepis*, etc., ascended the Mettur Reservoir through the surplus gates when they were widely opened while the reservoir level was falling from 104 to 100 feet. It is inferred that the optimum velocity during the period of surplus discharge of

water from the reservoir afforded easy ascent for thousands of fish and fingerlings to the reservoir during the year. The replenishment of the Mettur Reservoir by such an odd bestowal of nature was an encouraging phenomenon during the year.

The water level in the reservoir was 83.5, on 1st April 1957 and it went down to 77.85, on 22nd May 1957. But the level gradually rose up to the maximum full level of 120 feet on 3rd July 1957. The same level was maintained up to 1st August 1957. Subsequently the level gradually fell and finally at the close of the year the reservoir water level was 73 feet on 31st March 1958.

Two departmental units operated during the year under report with a view to study the composition and fluctuations of the catches in the reservoir by using different tackles. The units landed 11,667 lb. of fish and the catches were sold for Rs. 2,264.51 nP. A total quantity of 246.04 metric ton of fish was estimated to be landed by the licensees in the reservoir during the year.

Two fish vans stationed at Mettur Dam worked during the year to transport fish for the Mettur Dam Fishermen Co-operative Marketing Society. This society which commenced marketing with effect from 10th April 1957, took the vehicles for transporting fish on payment of hire charges. Particulars of the quantity of fish on payment of hire charges. Particulars of the quantity of shed below :—

Month.	Raw fish (in lb.)	Iced fish (in lb.)
April 1957	23,311	14,935
May 1957	46,034	39,957
June 1957	37,924	21,439
July 1957	37,700	25,475
August 1957	33,788	22,830
September 1957	28,647	17,735
October 1957	46,518	27,575
November 1957	28,620	13,888
December 1957	28,308	11,602
January 1958	32,580	14,788
February 1958	26,085	22,112
March 1958	25,627	16,808
	<u>3,94,142</u>	<u>249,074</u>

G. CULTURE OF TILAPIA.

Originally the culture of Tilapia was restricted to the waters south of the river Vaigai. It was only during the period under report, in April 1957 Government permitted the culture of Tilapia throughout the State. As a result this species has multiplied profusely in the stocked waters of all districts. All the departmental tanks and farms have now an inexhaustible stock of Tilapia which is being distributed to other waters. Tilapia was reared only

with other carps in almost all the waters, and it was found that there was no adverse effect on the other species stocked. In the Madurai division the Tilapia contributed to a major percentage of the catches and the total yield from the departmental waters amounted to 32,000 lb. during the year. Besides a total number of 33,94,000 fingerlings collected from the departmental tanks were distributed to other waters in the State. Experiments were conducted at Bhavanisagar to determine the effect of the association of Tilapia with other varieties and they are being continued to arrive at definite conclusions.

H. PUBLIC HEALTH FISH FARMING.

The Public Health Fish Officer at Madras continued to look after the survey of mosquito and guinea worm affected waters of the State. The unit collected 5,160 public health fishes of the following varieties during the year:—

Kind of fish.	Number.
Barbus stigma.. .. .	871
Rasbora.. .. .	979
Ambassis	103
Loaches.. .. .	182
Oryzias	150
Nuria	750
Macropodus	550
Brachydanio	100
Trichogaster	1,300
Etrophus maculatus	150
Chela	25

The above fishes were stocked in the Chetput Fish Farm and supplied to the private parties and other departmental officers whenever required. A total number of 3,230 Public Health fishes were sold to 16 parties and the details of supply are given below:—

Gambusia	3,000	Loaches	3
Barbus stigma	24	Amblypharyngodon	12
Barbus aurelius	2	Trichogaster	33
Brachydanio	10	Rasbora	21
Danio sp.	30	Macropodus	12
Etrophus maculatus	82		

Total .. 3,230

Survey on the availability of Public Health Fish Seed in the districts was undertaken during the year. The Public Health Fish Officer conducted experiments on the biological control of guinea worm disease in Alampoondi village of South Arcot district in consultation with the Public Health Department authorities. The results of the experiments revealed the possibilities of certain fishes stocked. The spread of dracontiasis infection can thus be checked to some extent. It was also found to be relatively advantageous over the Chemical method of periodic chlorination of waters

I. INTRODUCTION OF ROHU AND MRIGAL.

The stocking of quick growing upper Indian carps Rohu and Mrigal in the waters of this State was continued during the year. This annual stocking is done regularly with a view to establish the fish in the river systems of our State. During the year under review, the Inspector of Fisheries (Estuarine) was deputed to Calcutta to purchase the seed and transport them to Madras. Two consignments of 13,000 and 12,000 fingerlings were transported by rail and the third consignment of 5,000 fingerlings by Air. The total casualty in transit was 4,395 fingerlings. The balance of 25,605 fingerlings were distributed for stocking reservoirs and other important water pieces in the State. The details of distribution to the different divisions are noted below:—

Vellore Division	5,000
Mettur Dam Division	7,700
Bhavanisagar Division	5,555
Tuticorin Division	3,900
Tanjavoor Division	2,450
Madras Division	1,000
Total	25,605

J. COMMUNITY DEVELOPMENT PROJECT AND NATIONAL EXTENSION SERVICE SCHEMES.

As during the previous years the staff bestowed special attention to the development of fisheries in Community Development Project and National Extension Service areas. The survey of water sources in the different blocks and supply of suitable fish seed was the main activity. Advice on pond management and other matters relating to fish culture was readily given to the interested parties. The department participated in the various fairs and exhibitions conducted in the different blocks to carry out propaganda on fish culture. The Officers took part in the several block advisory committee meetings in the district.

(1) *Madurai district.*—The following are the details of fish seed supplied and stocked in the various tanks, ponds and wells of the Community Development and National Extension Service areas in the district.

Name of block.	Kind of seed.	Number supplied and stocked.
Madurai block	Tilapia	112,000
Do.	Labeo	3,900
Melur block	Tilapia	9,420
Dindigul block	Tilapia	33,000
Do.	Labeo	766
Tirumangalam block	Tilapia	852
Do.	Murrels	1,440
Do.	Golden carp	106
Do.	Chanos	3,612
Bodi block	Tilapia	7,750
Do.	Gourami	82
Athoor	Murrels	2,700
Do.	Tilapia	20

(2) *Ramanathapuram district*.—The following are the details of seed supplied and stocked in the different blocks of the district :—

Name of block.	Kind of seed.	Number stocked.
Virudhunagar block	Tilapia	7,962
Srivilliputhur block	Do.	6,638
Kariappatti block	Do.	3,452
Sivakasi block	Do.	12,574
Rajapalayam block	Do.	21,870
Do.	Gourami	12
Devakottai block	Labeo	276
Do.	Tilapia	9,350
Kalupatty block	Do.	5,155
Paramakudi block	Do.	14,700
Do.	Chanos	2,750
Kamuthi block	Tilapia	1,000
Kalayar Koil block	Do.	6,750

(3) *Tirunelveli district*.—There were altogether ten National Extension Service and Community Development Project areas in the district. Out of these ten blocks the Valliyur and Radhapuram Blocks included the coastal fishing villages of Ovari, Idinathakurai, and Kootapuli. The Tuticorin Block does not include the Tuticorin municipal limit and hence no fishing hamlet is included in the same. The remaining seven blocks are purely inland. In the coastal blocks there were no schemes for development of fisheries within the Block plan. However the departmental schemes under the Second Five-Year Plan, viz., Salt Subsidy Scheme and Scheme for grant of loans to fishermen operated in the coastal blocks. In inland areas, the supply of fish seeds to private parties was the main activity. The Fisheries activities in the Blocks are furnished in the statement in Annexure.

(4) *Tiruchirappalli district*.—A total number of 15,840 fish seed were supplied to private parties in the Seven Blocks areas of the District. The details of supply are furnished below :—

Name of block.	Kind of seed.	Number supplied for stocking.
(1)	(2)	(3)
Thottiam block	Murrels	3,324
Kulithalai	Do.	336
Do.	Labeo	400
Perambalur	Tilapia	200
Vallianai	Murrels	5,244
Tirumanur	Carp	4,800
Lalgudi	Do.	724
Do.	Murrels	96
Do.	Tilapia	344
Musiri block	Murrels	372
Total		15,840

(5) *Tanjavoor district*.—The following are the details of fish seed supply to private parties in the block areas :—

Name of block.	Kind of seed.	Number supplied for stocking.
(1)	(2)	(3)
Kiavaloor block	Tilapia	7,800
Sirkali	Do.	538
Kumbakonam	Carp	527
Kuttalam	Do.	543
Mayuram	Do.	420
Total		9,832

Besides the above, a total number of 45,57,800 fish seed was stocked directly by the department in the Revenue and provincialised tanks in the block areas.

(6) *Vellore division*.—The departmental staff in North Arcot, South Arcot and Chingleput districts contacted the Block Development Officers and ryots with a view to develop the fisheries in the waters of the three districts. All the Block Advisory Committee Meetings were attended by the Officers. During the year under report the Department supplied 42,145 fish seed in the Block areas for stocking tanks and wells. The department also took part in 9 fairs and exhibitions conducted by the National Extension Service Administration.

(7) *Salem district*.—All the indents placed by the various Block Development Officers for fish fingerlings were compiled with and the several advisory committee meetings were regularly attended. The Inspector of Fisheries, Mettur Dam, attended a Leader's Camp at Thimmanaickenpatti during the year and explained the village leaders about the projects of fish culture. A total number of 2,126 Murrel fingerlings and 2,960 Tilapia were supplied to the ryots in the different blocks.

(8) *Coimbatore district*.—All co-operation and assistance was extended to the Animal Husbandry Extension Officers attached to the Block Offices in all matters relating to Fisheries. The several Advisory Committee meetings were attended by the regional staff and fish seed was supplied to the private parties. Fish culture is gaining ground in the Community Development and National Extension Service areas of the district and many irrigation wells were stocked for the first time with suitable fish seed. A total number of 7,536 fingerlings were supplied during the year.

(9) *Nilgiris district*.—There are three Block areas in the district, viz., Coonoor, Ootacamund and Gudalur. One hundred and eighty-eight fingerlings and twenty-four fingerlings were supplied to the private parties in the Gudalur and Coonoor Blocks respectively. The Ooty lake which comes under the Ootacamund Block was fished regularly and 4,432 lb. of fish was made available to the public during the year.

PART VI—FISH MARKETING, STATISTICS, INFORMATION AND PROPAGANDA.

The post of Fisheries Marketing and Information Officer was continued during the year as per G.O. Ms. No. 404, Food and Agriculture, dated 9th February 1957. Dr. P. I. Chacko continued to be in charge of the post throughout the year.

The following are the salient features of work done :—

A. MARKETING.

1. *Overall Production of fish in the State.*—By surveys and computations it was estimated that the total fish landings along the entire coastline of 620 miles during the year was computed to be about 65,540 tons valued about Rs. 570 lakhs. Ribbon fishes, Clupeids and cat fishes contributed to the bulk of the marine catches (vide Appendix XXXV). Landings of inland fishes from the various inland waters was estimated to be about 40,300 tons valued about Rs. 240 lakhs. The chief varieties were carps, cat fishes, and murels (vide Appendix XXXVI). The bulk of the inland catches were from rivers and deltaic waters and from ponds, lakes and irrigation tanks (vide Appendix XXXVII). The total production of both sea and inland fishes was thus 107,840 tons. The monthly fluctuations in production were as in Appendix XXXVIII.

2. *Utilization of fish catches.*—Of the sea fish landings of 67,540 tons, 27,140 tons were consumed in the State itself in the fresh condition and 40,000 tons were cured. Four hundred tons of fresh fish and 2,000 tons of cured fish were exported to other States in India. Twenty one thousand one hundred and forty tons of cured fish were consumed in the State and 16,860 tons of cured fish were exported to foreign countries. Of the inland fish landings of 40,300 tons, only 240 tons were exported to other States and the rest was consumed in the State itself. The import of fresh and processed fish from other States and foreign countries was 2,592 tons. On the whole 90,932 tons of fish appeared to have been consumed in the State, giving a per capita consumption of 11.3 lb. Details of utilization are given in Appendix XXXIX. It will be seen that there was an increase in both production and consumption of fish than in the previous year.

3. *Fish Marketing in Madras City.*—Efforts were made to increase the supply of fish to Madras city by assisting fish merchants, retailers and fishermen co-operatives. The total supply to the city was 13,917 tons in the previous year. The quantity of cured fish supply was 2,074 tons. The supply was received in several centres in the State as well as from Kerala and Mysore States as detailed in Appendix XL. There are 47 markets in the city in which fish are sold. (vide Appendix XLI) and in which there are 1,336 fish stalls on the whole. There are 1,583 wholesale and retail merchants. The per capita consumption increased to 30.4 lbs. Details of marketing are given in Appendix XLII.

The model fish stall in Moore Market continued to function throughout the year. House delivery of fish was also continued on a larger scale. Arrangements were also continued to effect supply of fish to Raj Bhavan Household.

4. *Co-operative Fish Marketing at Mettur Dam.*—Till now the catches from the large Mettur Reservoir were sold by the fishermen to several merchants to whom they were indebted. But on 10th April 1957 the fishermen co-operative marketing society of Mettur Dam (constituted on 7th October 1956) was initiated to undertake marketing by itself by pooling the catches of all the members. Though inexperienced in this venture the society was assisted and guided by the departmental staff; and it was able to overcome most of its difficulties. During the year 246.04 metric tons of fish landed by the members of the society were marketed directly and through select agencies in 17 places in Madras State, one centre in Kerala State, three centres in Mysore State, three centres in Andhra State and in Calcutta in West Bengal. Details are given in Appendix XLIII.

5. *Fish Marketing in Salem district.*—The chief centre of production in the district is Mettur Dam reservoir. A part of these catches are marketed in the district itself and the rest in other centres within and outside the State as mentioned in the previous paragraph. The local consumption in Mettur Dam is about 150 lb every day. The important centre of marketing in the district is Salem which has a population of about 2.03 lakhs, fifty per cent of which are non-vegetarians. The average daily supply of 500 lbs. of fresh water fish from Mettur and 100 lbs. of sea fishes and prawns from Tanur in Kerala State is inadequate. The Chidambaram Pillai Market owned by the Salem municipality is not up to the standard and the Municipal authorities were advised to improve it. The retail price ranged from 50-62n P. per lb. for carps, 62.75 nP. for large cat fishes and 23.50 nP. for other varieties. About 20 lbs. of dried and salt fish are sold daily in this market.

The Namakkal town, with its population of about 20,000, seventy-five per cent of non-vegetarians received a very poor weekly supply of 500 lbs. of fresh water fish from Salem and Tiruchirappalli and 40 lbs. of iced sea fish and 100 lbs. of dried and salted fish from Malabar. Rasipuram has a population of about 30,000 of which 75 per cent are non-vegetarians. The present daily fish supply is only about 30-50 lbs. of fresh water from Salem or Tiruchirappalli. The fish supply to Dharmapuri which has a population of about 25,000 of which fifty per cent are non-vegetarian is inadequate. An experimental daily supply of 120 lbs. of fish from the Hogainkalkal was therefore arranged. The Idapadi Panchayat town has a population of about 25,000 of which 75 per cent are non-vegetarians. About 150-200 lb. of fresh water fishes brought from the villages of Poolampatti, Kondayarpalayam and Mookanari are sold in this town daily. In Tiruchengode town, about 25 lbs. of freshwater

fish brought from Kikarpattai are sold daily. The population of this town is about 20,000 the majority of whom are non-vegetarians. Krishnagiri town has a population of 2,500 of which 27 per cent are non-vegetarians. The daily supply of fresh fish is only about 75 lbs. of carps and cat fishes from nearby rivers. Yercaud town, situated in the Shevroys, has a population of about 20,000 of which 95 per cent are said to be non-vegetarians. The supply of fish consists of about 10 lbs. from the local lake and 50 lbs. from Mettur every day and of 300 lbs. of iced sea fish from Malabar in a week. There is also supply of about 600-700 lbs. of cured fish from Malabar every week.

6. *Fish Marketing in Coimbatore district.*—The Coimbatore town receives a fairly good supply of 400 tons of fresh fish a year chiefly sea fishes from Kerala State. Besides, about 80 tons cured fish are also received. About 25 per cent of these supplies are sold on a house delivery system and the rest in the Municipal fish market. The average retail price for smaller varieties is 19-20 nP. per lb. and for the larger varieties 50-112 nP. per lb. Pollachi town receives daily a small supply of about 100 lbs. of freshwater fish from the Aliyar river and about 300 lbs. of iced sea fish from Malabar. But about a ton of cured fish is sold in the weekly shandy at varying rates. For Udumalpet town the supply is poor. About 70-150 lb. of freshwater fish obtained from the Amaravathi river and neighbouring tanks every day. The retail price is about 32-80 nP. per lb. Besides about 50 lbs. of iced sea fish from Malabar are also sold in the town daily. The price varies from 62-125 nP. per lb. in accordance to the varieties. About 100 lbs. of cured fish are sold in the weekly shandy, at prices ranges from 0.50 nP. to Re. 1.50 nP. Dharapuram receives a small supply of about 100-200 lbs. of fresh water fish from Amaravathi and Shanmuga rivers. The retail price varies from 38 nP. to 75 nP. per lb. About 1,000 lbs. of dried and salted fish are sold in the weekly shandy at prices ranging from 12 nP. to 38 nP. per lb. About 200 lbs. of freshwater fish and 200 lbs. of iced sea fish are sold daily at Mettupalayam. The price varies from 38 to 88 nP. per lb. Besides about 100 lbs. of cured fish are sold in the weekly shandies. The Bhavani town receives daily 100-150 lbs. of freshwater fish from the local river. The Erode town receives about 1,000 lbs. of freshwater fish and 500 lbs. of iced sea fish every day. The retail price varies from 25 nP. to 75 nP. per lb. About 5 tons of cured fish are also sold in this town, at prices ranging from 19 to 31 nP. per lb. In Arasur, about 100 lbs. of fresh fish and 150 lbs. of dry fish are sold at the weekly shandy. At Puliampatti, 150 lbs. of fresh fish and 200 lbs. of dry fish are sold at the weekly shandies.

7. *Fish Marketing in the Nilgiris.*—About 5,200 lbs. of fresh fish from the departmental waters were sold in Ooty town during the year. Besides about 500 lbs. of iced sea fish were received every day. The Coonoor town receives a supply of 50-100 lbs. of freshwater fish and 1,200 lbs. of iced sea fish daily. Kotagiri and suburbs

received on an average about 30 lbs. of iced sea fish daily. Gudalur received only a small quantity of about 50 lbs. of iced fish daily. The retail price ranged from 30 to 75 nP. per lb. All the centres received a fair supply of cured fish also the retail price of which varied from 30 nP. to Re. 1.75 nP. per lb.

8. *Marketing through Fishermen Co-operatives.*—Special emphasis was paid to development of fish market through Fishermen Co-operative Societies and their district Federations. The Madras Federation was assisted in running the model fish stall in Moore market, to procure fish from nearby landing centres and to undertake house delivery of fish in the City. The societies at Fannore, Vallambedu, Pulicat, Andikuppam, Sadras, Mahabalipuram and Kanathur-Reddikuppam were assisted to transport and market the catches of its members. The district federations at Cuddalore, Ramanathapuram, Tirunelveli, Kanyakumari and Tanjavor were also assisted in their marketing programmes. Several individual societies in various parts of the State were also assisted in several ways to organise marketing. The Plan scheme for giving assistance to fishermen co-operative societies for marketing fish (see Part III—item 1) has greatly benefitted the fishermen. Many fishermen have redeemed their prior debts and have commenced to market their catches without the help of middlemen. With the gradual implementation of this scheme, it is expected that the fishermen would be able to market a large part of their catches themselves and thus obtain a better earning.

9. *Quick transport facilities.*—Eight motor vans under hiring scheme and four vans and nine three-wheeler lambrettas were operated during the year for the benefit of fishermen co-operative societies. These vehicles transported 798 tons of fresh fish without spoilage. (Also see Part III item 13.)

10. *Improvement of fish markets.*—Several fish markets in various parts of the State were visited and the owners concerned were advised in matters concerning improvements to lay-out, display of fish, water supply, drainage and sanitation. A marked improvement was effected in most of the markets. Type designs and plans were furnished to many Municipalities and Panchayat and also to private parties. Through the Plan scheme for construction of model fish markets, the Municipalities of Tuticorin, Coimbatore, Tanjavor, Kumbakonam and Virudhunagar the Panchayat Board of Rameswaram and the Mettur Township Committee were given a total subsidy of Rs. 38,212 towards fifty per cent of cost for improving their fish markets (see Part III item 14). This has created an enthusiasm among other local bodies to improve their fish markets. This is bound to attract more people to fish markets and thus to make fish more popular as a wholesome article of food.

11. *Fish trade enquiries.*—During the year 87 enquiries pertaining to various aspects of the fishing industry and trade from various parts of India and also from United States of America, Italy, France, Pakistan, Zanzibar and Malaya, were attended.

B. STATISTICS.

1. *Census of fishery, etc., and their craft and tackle.*—There are 415 inland fishing villages with a total population of 40,567 of which 14,315 are active fishermen. There are 242 coastal fishing villages with a total population of 2,36,653 of which 84,148 are active fishermen. The details on district-wise basis are given in Appendix XLIV. There are 27,919 marine fishing crafts consisting of 42 motor boats, 4,716 sail boats and 23,161 catamarans and a total number of 2,94,668 tackles as detailed in Appendix XLV. There are 1,429 inland fishing crafts and 18,375 tackles as shown in Appendix XLVI.

2. *Statistical reports.*—The marine fish statistics of the West coast have been printed up to 1954–55, and of East coast up to 1950–51. Inland fisheries statistics have been published up to 1956.

3. *Statistics of weekly price variations.*—Weekly variations in the price of fish in Madras City are compiled and regularly furnished to the Director of Statistics for incorporation in statements of weekly wholesale and retail prices of commodities, published in the Statistical Supplements to the *Fort St. George Gazette*. The data are also included in the periodical price reports sent to the Economic and Statistical Adviser to the Government of India in the Ministry of Food and Agriculture.

C. INFORMATION AND PROPAGANDA.

Dissimination of information and publicity were given attention during the year as recounted below :—

(1) *Publicity.*—Close liaison was maintained with the Director of Information and Publicity and with representatives of the Press and periodical information was furnished. Relief and rehabilitation work and progress of implementation of the Five-Year Plan schemes were announced regularly through the local newspapers. The representatives of the leading papers like the *Hindu*, the *Mail* and the *Indian Express* were frequently invited and appraised of the progress in the activities of the department. Special mention may be made of the wide publicity about the pearl fishery. Articles on Fisheries of Madras State were supplied to the *Asylum Press Almanack Directory* and to the *Times of India Directory* and *Year Book*.

(2) *Propaganda.*—The propaganda unit visited various fishing hamlets and explained to them the department's activities, with special reference to the socio-economic rehabilitation of the fisherfolk and the objectives and benefits of the Five-Year Plan schemes. Such meetings enabled the department to gain first-hand knowledge about the requirements of the fishermen and to take necessary steps to ameliorate them.

(3) *Audio-visual methods.*—One audio-visual van received from the United States of America under T.C.M. aid in December 1957 was put to proper use for projection of fisheries and cultural films among fisherfolk, school children and the general public. During the year, the van operated at 25 places in Madras, Chingleput and Tirunelveli districts, attracting an audience of 3,38,100 as detailed in Appendix XLVII. The department possessed 76 films of which 35 were in Tamil, 24 in English, 1 in Hindi, 9 in Malayalam and 7 in Kannada as shown in Appendix XLVIII. Besides, 27 films were borrowed from the Film Division of the Ministry of Information and Broadcasting, Government of India, F.A.O., Rome and United States Information Service, and returned after use, as shown in Appendix XLIX.

(4) *Advertisements.*—Advertisements about departmental products like semi-dried prawns and shell-grit were published in the *Ind-com. Journal*. Advertisements about the pearl fishery were also made in important papers throughout India, besides arranging projection of slides in cinema theatres in Madras City and other important towns in the State. Advertisements were also made inviting enquiries on fisheries matters to the Marketing and Information Officer.

(5) *Enquiries.*—About 46 important enquiries pertaining to various technical matters from the public, research workers and institutions in India as well as other countries like United States of America, Italy, Ceylon, Pakistan, Malacca and Russia were answered during the year.

(6) *Library.*—The Fisheries Library in Madras continued to cater to the needs of departmental officers, trainees, students, research workers, and the public. During the year 329 additions were made to the library and 489 books and journals were issued for reference and return and 242 readers actually attended the library. A monthly list of additions was regularly issued to all departmental staff and also to the Central Fisheries Research Stations at Mandapam and Calcutta and also to the Director of Animal Husbandry and Fisheries of Andhra Pradesh. Regular exchange was also maintained with fisheries libraries and institutions in India and other countries.

(7) *Museum.*—The Fisheries Museum in Madras continued to be popular and as an effective medium of propaganda for the various activities of the department.

(8) *Exhibitions.*—During the year, the department participated in 30 important exhibitions as shown in Appendix L. Live and preserved specimens, models, charts, photographs, by-products and departmental publications were exhibited. In all these exhibitions the departmental stalls attracted large crowds.

(9) *Publications*.—During the year 23 scientific and popular articles prepared by departmental officers were published. These publications are listed in Appendix LI. Special mention may be made of a booklet in Tamil on fish farming. The departmental publications were deposited in the three National Libraries at Bombay, Calcutta and Madras and to libraries of all Universities in the country and to fisheries institutions in India and abroad on exchange basis.

PART VII—SOCIO-ECONOMIC WORK.

A. FISHERMEN CO-OPERATIVE SOCIETIES.

Tanjore Division.—There were 9 inland fishermen co-operative societies, 6 in Tanjore district and 3 in Tiruchirappalli district of this division with a total membership of 2,931 members and paid up share capital of Rs. 20,966. Applications were received from the fishermen of Vandal and Averikadu villages in Tanjore district and from Kulittalai and Musiri in Tiruchirappalli district requesting the department to form new societies. The feasibility of formation is being examined. The societies continued to be supervised and regularly inspected by the co-operative staff. The panchayat in all societies was reconstituted during the year under report. The details of lease of fisheries in the water courses in Tanjore and Tiruchirappalli districts obtained by some of the societies and distributed to their members are given below :—

Serial number	name of the society.	Lease amount.
(1)		(2)
		RS.
1	Parvatharajakula Fishermen Co-operative Society, Tanjore.	25,000
2	Kumbakonam Fishermen Co-operative Society, Kumbakonam.	19,900
3	Papanasam Fishermen Co-operative Society.	4,640
4	Nalavedapathy Fishermen Co-operative Society.	235
5	Tirumalaivasal Fishermen Co-operative Society.	..
6	Maravakadu Fishermen Co-operative Society.	..
7	Srirangam Fishermen Co-operative Society.	3,500
8	Karur Fishermen Co-operative Society.	880
9	Kodalikarupur Fishermen Co-operative Society.	..

There were 26 Marine Fishermen Co-operative Societies in the division during the year with a total membership of 2,885 and a paid up share capital of Rs. 19,467.25. The following societies were selected and granted long-term loans under the Second Five-Year Plan, as indicated below :—

Seril number and name of the society.	Amount.
(1)	(2)
	RS.
1 Chandrapadi Sea Fishermen Co-operative Society.	12,000
2 Muthupettai Thuraikadu Co-operative Society.	12,000
3 Kalumanguda Fishermen Co-operative Society.	12,000
4 Kaveripattanam Fishermen Co-operative Society.	12,000
5 Muthukkuda Fishermen Co-operative Society.	11,100
6 Pudukudy Fishermen Co-operative Society.	7,450
	(Medium term loan.)

The total Government loan paid up to 31st March 1958 is Rs. 1,25,250 (including the sum of Rs. 66,550 during the year under report).

Madurai Division.—The present position of the fishermen co-operatives in Madurai and Ramanathapuram districts are as follows :—

	Ramanathapuram district.	Madurai district.	Total.
(1)	(2)	(3)	(4)
(1) Number of inland fishermen co-operative societies.	7	3	10
(2) Number of Marine co-operative societies.	21	..	21
(3) Number of Federations	1	..	1
(4) Total number of fishermen co-operative societies.	29	3	32
(5) Number of members in the societies.	2,230	..	..
(6) Paid-up share capital as on 31st March 1958—Rs. 41,410.91			

The Ramanathapuram District Co-operative Central Bank sanctioned during the year short-term loans to the various fishermen co-operative societies of Ramanathapuram district as detailed below

for the purchase of fishing implements, etc., by the members and for taking fishery leases :—

Name of fishermen co-operative society						Amount sanctioned.	Amount repaid.
(1)						(2)	(3)
						RS.	RS.
1	Tiruppuvanam	..	..	..	..	1,800	1,800
2	Manamadurai	..	..	..	..	1,500	1,500
3	Mookaiyur	..	..	..	..	4,590	1,352
4	Tondi Padayachi	..	..	..	..	4,750	352
5	Kilakarai	..	..	..	..	1,900	nil.
6	Rameswaram	..	..	..	..	1,054	nil.
7	Thengachimalam	..	..	..	..	234	100
8	Kankollanpattinam	..	..	..	..	1,945	1,945
Total						17,773	7,049

Government sanctioned medium term loans of Rs. 3,400 to the Muthupettai Fisheries Co-operative Society (Marine) and Rs. 2,600 to the Thiruppuvanam Fishermen Co-operative Society (inland) during the year for clearing prior debts of their members and for the purchase of yarn, ropes and other fishing implements required by the members. The amounts were drawn and disbursed to the societies. Under the scheme for the assistance to fishermen co-operative societies for marketing of fish under Second Five-Year Plan the following three Fishermen Co-operative societies received long-term loans as detailed below :—

	RS.
1 Pasipatanam Fishermen Co-operative Society	12,000
2 Kankollanpattinam Co-operative Society	12,000
3 Thiruppalakudy Co-operative Society	12,000
Total	36,000

To attend to the proper recovery of these long-term and medium-term loans issued to the societies one additional Junior Inspector (Co-operative) was sanctioned during the year in addition to the two Junior Inspectors and one Senior Inspector (Loans) sanctioned last year. A Co-operative Sub-Registrar was also sanctioned during the year with Headquarters at Madurai to effectively supervise the working of societies coming under the long-term and medium-term loan schemes and direct the special co-operative staff implementing the scheme in the four southern districts of Madurai, Ramanathapuram, Tirunelveli and Kanyakumari.

Tuticorin Division.—During the year, three new co-operative societies for the fishermen were organized and registered at Sippikulam, Palayakayal and Amalinagar. Thus, there were 19 fishermen co-operative societies and one District Federation in the division. The membership of the societies increased to 2,118 and the

share capital to Rs. 22,372. There were 15 members with a share capital of Rs. 3,805 in the Federation at the close of the year. A scheme to assist the Fishermen Co-operative Societies by the grant of long-term loans was sanctioned in G.O. Ms. No. 1045, Agriculture, dated 20th April 1956 and G.O. Ms. No. 2347, Agriculture, dated 1st October 1956. In the first year of the scheme during 1956-57 the District Federation of Fishermen Co-operative Societies was organized and registered. The federation was granted a long-term share capital loan of Rs. 2,000 repayable in 5 years. Four primary societies were also granted long-term loans to the tune of Rs. 48,550 during 1956-57. The sanction for the renewal of the scheme during 1957-58 and granting long-term loans to three more societies was accorded in G.O. Ms. No. 3365, Food and Agriculture, dated 2nd November 1957 during the year and additional Junior Inspector was sanctioned. The following societies were granted loans during 1957-58 and the amounts paid to each are noted against the society :—

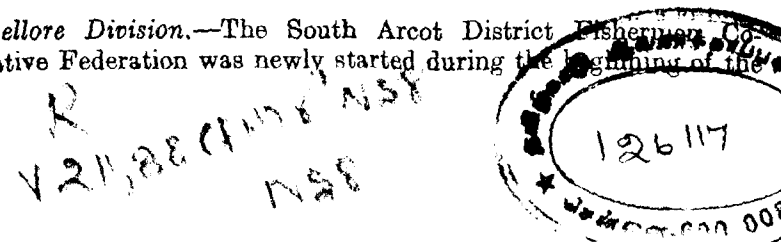
	RS.
Ratchanyapuram Fishermen Co-operative Society	11,400
Alenthalai Co-operative Society	11,650
Idinthakarai Co-operative Society	12,000
Total	35,050

Mettur Dam Division.—The Mettur Dam Fishermen Co-operative Marketing Society, Limited (K.K. 98) which began its activities with 125 members and 375 members at the end of the year. The paid-up share capital of the society increased from Rs. 690 to Rs. 2,045. Long-term loan and medium-term loans totalling Rs. 20,000 were drawn and paid to the society by the Government for distribution among the members during the year.

The lease of the fisheries of the Right Bank canal of the Mettur Reservoir was leased out to the Mettur Dam Fishermen Marketing Society for Rs. 200.

The departmental vans were hired out to the society for transporting fish and a sum of Rs. 6,537.12 was collected as hire charges during the year. It is also proposed to supply a Lambretta three-wheeler to the society on hire-purchase system. The Mettur Dam Fishermen Co-operative Marketing Society was able to show net profit of Rs. 7,733.38.

Vellore Division.—The South Arcot District Fishermen Co-operative Federation was newly started during the beginning of the



year at Cuddalore with a total share capital of Rs. 2,100. A total sum of Rs. 49,780 was drawn and disbursed to the South Arcot District Federation and members of the following Fishermen Co-operative Societies to purchase catamaran logs, etc., and to clear their debts :—

Name of society.	Amount disbursed to the Fishermen co-operative societies.
	RS.
1 South Arcot District Fishermen Co-operative Federation.	2,000
2 Kille Fishermen Co-operative Societies	12,000
3 Devanampatanam Co-operative Societies	11,780
4 Koonimadu Co-operative Societies	12,000
5 Subrikattukuppam Co-operative Societies (Chingleput).	12,000
Total	49,780

Besides the above the Uppalavadi Fishermen Co-operative Society was paid Rs. 2,000 as loan and Rs. 2,000 as subsidy so as to enable the society to remodel and repair its own fish market at Manjakuppam (South Arcot district).

B. RELIEF MEASURES TO FISHERMEN AFFECTED BY FIRE ACCIDENTS.

1. Eight families of fishermen who lost their houses in a fire accident at Tuticorin on 29th November 1956 were granted a loan of Rs. 100 each at 4½ per cent interest repayable in two annual instalments besides a subsidy of Rs. 50 each, as per G.O. Ms. No. 847, dated 19th March 1957. The Revenue Department also paid Rs. 30 per family as relief.

2. In a second case of fire accident at Tuticorin a loan of Rs. 100 each at 5½ per cent interest (repayable in one year) was sanctioned to three fishermen besides a free supply of yarn worth Rs. 250 to the three fishermen to enable them to make new nets.

C. FAILURE OF FISHING SEASON.

As a relief to the fishermen affected by the Kola (flying fish) fishery, the supply of yarn and coir was sanctioned in G.O. Ms. No. 2976, Food and Agriculture, dated 24th September 1957. A staff consisting of two Junior Inspectors of Co-operative Societies and one watchman were also sanctioned to assist in the work from the date of their employment up to 31st January 1958 or till the necessity ceases whichever is earlier.

An amount of Rs. 48,000 as detailed below was sanctioned for the purchase of coir and yarn for supply to fishermen at 50 per cent subsidy :—

	RS.
20's yarn 35 bales at Rs. 750	28,250
10's yarn 15 bales at Rs. 650	9,750
6's yarn 10 bales at Rs. 500	5,000
Coir	4,000
Transport and freight charges	2,000
Total	48,000

Deduct recoveries of cost at 50 per cent from the fishermen co-operative societies. 24,000

Yarn and coir worth Rs. 44,548.22 as detailed below was purchased and distributed to the affected fishermen and an amount of Rs. 22,274.17 was recovered from the societies and remitted into the treasury.

Fair price shops were also run by some fishermen co-operative societies as per the directions of the Collector. The details of expenditure towards yarn and coir is detailed below :—

	RS.
Cotton yarn 6's 10 bales	38,296.06
Cotton yarn 10's 15 bale	
Cotton yarn 20's 35 bales	
Coir yarn 25 candies	5,000.00
Trade charges, etc.	1,279.16
Total	44,548.22

D. REHABILITATION OF FISHERMEN RENDERED HOMELESS IN NORTH MADRAS.

The question of rehabilitating the fishermen rendered homeless by sea erosion in North Madras and those evicted from the military land was taken up during the year under orders of the Government. The land acquired for them was developed through the Madras Corporation. The issue of the plots to 282 fishermen families of construction of their houses was completed during the year under report also with the co-operation of Corporation authorities and the office bearers of the North Madras Sea Erosion Defence Committee, Tondiarpet. Proposal for the acquisition of new sites for the remaining fishermen were also submitted to Government.

E. FISHERIES SCHOOLS.

During the year under review, the department continued to maintain the fishery elementary schools at Alambarikuppam, Sathankuppam and Kaveripatnam.

There was a total strength of 146 pupils in the schools at Alambarikuppam and Sathankuppam of Chingleput district comprising of 98 boys and 48 girls. There were four standards (from 1st to 4th) at Alambarikuppam and 5 standards (from 1st to 5th) at Sathankuppam. Six teachers were employed in the two schools. The Adult Literacy Night School which was started on 15th January 1957 at Sathankuppam continued to function during the year with an average attendance of 21 adults per day.

The Fisheries School at Kaveripatnam in Tanjore district functioned with a total strength of 84 pupils (67 boys and 17 girls). An adult literacy school was also conducted at this centre with an average attendance of 24 adults per day.

PART VIII—GENERAL.**A. AQUARIUM.**

The freshwater aquarium on the Marina continued to be one of the foremost popular resort in Madras. The number of visitors was 90,074 during the year under report and the total gate collections was Rs. 8,647.08 nP. The monthly details are given in Appendix LII.

B. BIOLOGICAL SUPPLY STATION. ENNORE.

The Biological Supply Station at Ennore near Madras, continued to supply biological specimens to colleges and Universities throughout India. During the year 76 orders from 56 parties listed in Appendix LIII were executed, realising a revenue of Rs. 10,164.89 nP. Besides 29,687 edible oysters were supplied to hotels, clubs and private individuals realising a revenue of Rs. 955.14 nP. A total quantity of 4,955 lb. of shell grit were supplied against 52 orders from 45 parties realising Rs. 466.35 nP. (Appendix LIV). The total revenue for the station was Rs 11,586.38 nP.

C. STATE FISHERIES ADVISORY BOARD.

In G.Os. Ms. No. 568, Food and Agriculture, dated 22nd February 1957, and Ms. No. 1823, Food and Agriculture, dated 14th June 1957, the Government constituted a State Fisheries Advisory Board with the following officials and non-officials :—

Chairman—Minister for Local Administration and Fisheries.

Secretary—Additional Director of Industries and Commerce.

Official Members—Deputy Secretary to Government, Food and Agriculture Department.

The Registrar of Co-operative Societies.

The Chief Engineer (General) Public Works Department.

The State Port Officer.

Non-official Members—Sri O. Machado, President, Tirunelveli District Fishermen Co-operative Federation, Limited, Tutuorin.

Sri P. Thangaraj, Corporation Councillor, Royapuram Madras.

Sri A. M. Simon, President, Colachel Fishermen Co-operative Society, Colachel, Kanyakumari district.

Sri B. Sunderamcorthy, President, Killai Fishermen Co-operative Society, Killai, South Arcot district.

Sri V. M. Natesa Nattar, President, Madras State Parvatha Rajakula Sangam, Madras.

Sri A. Mariappa Maniyakarar, President, Parvatharajakula Fishermen Co-operative Society, Limited, Karunthattankudi, Tanjore.

Sri M. D. T. Kumaraswamy Mudaliar, President, State Co-operative Bank, Madras.

The objectives of the Board are the following :—

(1) The conservancy and development of fisheries resources with reference to the results of research and experience gained by the Fisheries Department.

(2) Improvement of fishing technique especially improvement of indigenous crafts and tackle.

(3) Improvement of marketing methods and marketing premises and expansion of markets for products of the industry.

(4) Assistance to the fishermen and fishermen co-operative societies and promotion of co-operative societies, schools and other socio-economic measures for the fishermen.

The first meeting of the Board was held on 23rd August 1957 in the Governor's room, Secretariat, Fort St. George, under the chairmanship of Srimathi Lourdhammal Simon, Minister for Local Administration and Fisheries. All the members of the Board attended the meeting. Sri P. P. I. Vaidyanathan, I.C.S., Secretary to Government, Food and Agriculture Department, was also present. Sixteen items on the agenda pertaining to various aspects of the fishing industry were considered and discussed.

D. STATE FISHERIES RESEARCH COUNCIL.

The second meeting of the State Fisheries Research Council was held on 24th April 1957 under the chairmanship of Sri S. Aruldoss, I.A.S., the following members attended the meeting:—

Dr. C. P. Gnanamuthu,
Sri D. D. Peter Devadas,
Sri S. Varadarajan,
Dr. P. I. Chacko,
Sri R. Venketaraman,
Sri T. M. Arumugham, and
Sri G. K. Kuriyan.

Consequent to the reorganisation of the States and the resultant loss of the Marine Biological Station at West Hill and the Technological Station at Kozhikode to Kerala State and the starting of a new technological station at Tuticorin and Cape Comorin, the Council drafted a fresh three-year programme of research for all the fisheries research stations in Madras State.

The third meeting of the Council was held on 20th December 1957 under the chairmanship of Sri C. P. Kelu Erady, I.A.S., Dr. C. P. Gnanamuthu, Sri S. Varadarajan, Sri V. D. Spurgeon, Sri R. Venkataraman, Sri T. M. Arumugham, Sri A. Sreenivasan and Dr. P. I. Chacko (Secretary) attended the meeting. The Council reviewed the work done at the research stations during the half year April-September 1957 and found that the progress was satisfactory.

E. DEPARTMENTAL OFFICERS' CONFERENCE.

A conference of the departmental officers was held on 15th and 16th October 1957 in the Hall of the Old Legislators' Hostel, Government House Estate, Madras, under the chairmanship of Srimathi Lourdhammal Simon, Minister for Local Administration and Fisheries. Sri C. P. Kelu Erady, I.A.S., Additional Director of Industries and Commerce, Sri N. Murugesu Mudaliar, Deputy Secretary to Government, Food and Agriculture Department and all gazetted officers of the Fisheries Department were present. The conference considered ways and means of implementing the recommendations of the State Fisheries Advisory Board, implementation of the schemes included in the Second Five-Year Plan and other general and administrative matters.

F. INDIAN SCIENCE CONGRESS.

The forty-fifth session of the Indian Science Congress held at Madras in January was attended by Sri S. Varadarajan, Deputy Director of Fisheries, Dr. P. I. Chacko, Fisheries Marketing and

Information Officer, Sri R. Venketaraman, Superintendent, Fisheries Technological Station, Sri T. M. Arumugam, Assistant Director (Freshwater Biology), Srimathi J. G. Abraham, Public Health Fish Officer, and Sri S. Mahadevan, Research Assistant.

G. MEETING OF FISHERIES RESEARCH WORKERS IN INDIA.

Dr. P. I. Chacko, Assistant Director of Fisheries, attended the meeting of the Fisheries Research Workers of India held at Mandapam from 10th to 14th January 1958 under the chairmanship of Dr. N. K. Panikkar, Fisheries Development Advisor to the Government of India. Dr. G. L. Kesteven, Head of the Fishery Biology Division of the F.A.O., Rome, and Mr. Charles Wade, United States T.C.M. Extension Officer, were present. Sixty Fisheries Research officers of the Central Marine and Inland Fisheries Stations of State Fisheries Department; and University Professors teaching marine biology at post-graduate level and officers of the Central Fisheries Extension Unit attended the meeting. About 30 papers on fisheries subjects were discussed and uniform methods of application for pursuing various items of fisheries research were outlined. Dr. Chacko served on the committees appointed to make recommendations (1) on the work to be done on sardine fisheries of the East coast and (2) on the various aspects of Tilapia culture.

H. DEPUTATIONS.

Sri S. T. Chari, Assistant Director of Fisheries, who was deputed to Canada on 14th March 1957 for training in fish processing under the Colombo Plan returned on 31st October 1957 when he was posted to act as Assistant Director of Fisheries, Nagercoil.

Sri S. Varadarajan, Deputy Director of Fisheries (Inland), was deputed to Japan for study and observations of all aspects of fisheries in that country as sanctioned in G.O. Ms. No. 2320, Food and Agriculture, dated 31st July 1957. He left on 28th July 1957 and returned on 9th September 1957.

I. MOTOR VEHICLES AND FISHING VESSELS.

During the year the department purchased 29 motor vehicles and 51 fishing vessels as shown in Appendix LV.

J. GAZETTED OFFICERS.

Including the Additional Director of Industries and Commerce and his Personal Assistant, there were 20 gazetted officers in the department at the end of the year as shown in Appendix LVI.

APPENDIX II

STATISTICS OF CHANK FISHERY AT TUTICORIN FROM 1946 TO 1957.

Year.	Month.	Number of working.	Number of full sized chanks.	Number of under sized chanks.	Number of wormed chanks.
1946-47	September	1	211	409	3
	November	1	19	2	18
	April	1	631	27	78
	May	1	7	230	4
1947-48	December	18	154,452	8,169	10,820
	January	18	141,961	8,525	8,619
	February	23	196,228	8,475	5,952
	March	19	185,495	2,683	2,532
	April	20	114,857	4,592	2,275
	May	4	3,895	166	100
1948-49	November	14	61,005	5,033	4,730
	December	22	265,077	16,741	12,018
	January	19	135,279	29,897	24,949
	February	10	61,832	4,519	3,998
	March	15	128,583	5,336	1,416
1949-50	November	6	16,909	1,365	2,264
	December	22	183,121	12,855	7,67
	January	21	128,972	8,379	6,373
	February	19	161,791	9,720	4,432
	March	24	319,093	15,239	4,892
	April	19	169,191	7,724	3,929
	May	16	30,012	1,472	457
1950-51	December	3	17,537	943	2,582
	January	21	137,033	5,098	9,583
	February	22	150,083	11,813	6,735
	March	21	301,865	19,550	5,692
	April	19	199,050	14,005	3,320
	May	25	154,303	11,826	2,611
1951-52	November	9	19,291	1,722	1,294
	December	21	93,292	9,149	4,203
	January	18	97,083	6,805	3,083
	February	20	156,143	10,519	3,655
	March	20	153,557	8,502	3,181
	April	16	95,312	2,811	1,578
	May	13	52,917	2,412	1,195
1952-53	December	21	73,103	7,531	2,494
	January	22	99,459	9,872	7,796
	February	9	210,133	11,943	16,005
	March	26	275,827	18,096	6,292
	April	22	2,260,705	14,035	5,885
	May	16	58,998	2,903	1,371

APPENDIX II—cont.

STATISTICS OF CHANK FISHERY AT TUTICORIN FROM 1946 TO 1957—cont.

Year.	Month.	Number of working.	Number of full sized chanks.	Number of under sized chanks.	Number of wormed chanks.
1953-54	November	3	8,073	1,132	360
	December	26	153,324	16,360	9,148
	January	21	137,081	17,302	9,090
	February	24	160,274	12,315	13,966
	March	24	249,866	19,827	17,671
	April	19	140,634	12,913	8,501
1954-55	May	20	50,319	4,029	2,418
	December	8	29,625	3,447	2,975
	January	17	58,405	6,890	1,718
	February	20	132,163	9,666	2,198
	March	22	108,090	8,060	1,641
	April	23	11,722	..	793
1955-56	May	13	8,997	119	659
	November	17	39,512	2,775	4,153
	December	19	111,611	5,492	2,149
	January	21	105,799	6,795	1,688
	February	25	121,125	8,589	3,450
	March	21	48,499	1,954	1,420
1956-57	April	19	104,872	5,745	3,480
	May	7	13,473	988	298
	November	13	31,990	2,338	3,393
	December	20	170,058	11,453	8,356
	January	22	173,418	6,460	4,790
	February	21	189,515	10,718	6,377
1957-58	March	22	91,528	3,950	3,860
	April	21	3,415	80	421
	May	14	945	40	190
	November	18	69,130	5,464	4,189
	December	15	124,845	9,894	8,716
	January	24	356,136	15,464	11,606
	February	..	..	..	..
	March	..	..	..	..
	April	..	..	..	..
	May	..	..	..	..

APPENDIX III

NUMBER OF CHANKS MARKED AND FISHED
FROM 1931-32 TO 1957-58.

Year.	Total chanks fished at Tuticorin.	Number of marked chanks.	Chanks recovered.
1931-32	309,943	113	2
1932-33	369,228	485	3
1933-34	441,520	551	15
1934-35	821,199	429	5
1935-36	323,475	511	16
1936-37	298,782	375	25
1937-38	276,257	365	27
1938-39	3,3960	387	15
1939-40	59,612	484	63
1940-41	46,627	432	38
1941-42	45,403	499	13
1942-43	458,894	..	..
1943-44	436,274	..	11
1944-45	18,318	610	2
1945-46	476,302	25	4
1946-47	..	225	6
1947-48	6,813,919	120	6
1948-49	599,193	1,793	13
1949-50	1,034,677	54	3
1950-51	933,815	1,612	26
1951-52	631,006	..	41
1952-53	..	..	62
1953-54	900,315	279	14
1954-55	546,680	34	19
1955-56	503,365	..	8
1956-57	..	..	..
1957-58	..	241	..

APPENDIX IV

STATISTICS OF FISH LANDED AT CAPE COMORIN IN 1957-58 (IN POUNDS).

Variety.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
Trichirus spp.	666	4,599	2,628	10,662	327,840	18,765	46,750	..	745	1,033	..	300
Lactarius lactarius	297	21,663	912	492	6,465	16,300	146,000	5,926	1,110	3,416	1,700	875
Anchoviella spp.	84	5,625	915	15,300	23,215	129,950	96,200	6,610	670	5,590	2,600	240
Caranx spp.	..	720	16,332	8,814	127,840	23,562	11,000	..	2,579	11,330	4,000	1,650
Serranus spp.	12,215	5,025	2,826	24,943	2,532	705	65	..	..	6,649	2,01	9,000
Lethrinus spp.	57	630	2,196	4,021	765	210	66	601	..	1,341	12,00	15,000
Lutjanus spp.	918	..	105	1,497	..	300	5,900	..	476	125	875	1,100
Sardinella spp.	318	13,995	1,476	1,080	3,600	..	..	7,307	90	..	..	11,500
Dussumeria	75	..	..	..	..	7,722	27,100	1,391	6,610	320	60	..
Cybius spp.	54	384	260	432	7,200	..	6,860	1,453	1,885	14,768	18,000	900
Leiognathus spp.	420	3,440	426	..	..	6,256	3,575	1,795	765	9,193	8,750	750
Chirocentrus spp.	261	1,040	243	..	6,060	..	4,575	142	442	1,008	1,250	300
Stromateus spp.	..	1,028	880	960	1,440	870	360	2,410	75	2,368	2,700	150
Sciaenids	540	1,670	2,330	1,932	1,275	1,665	3,200	6,456	1,101	5,739	751	1,750
Sharks, Rays and Skates	645	3,010	3,445	6,875	8,076	14,619	3,200	1,842	3,044	12,212	3,50	2,800
Arius spp.	21	783	6,345	18,650	9,795	49,000	..	4,728	5,142	5,815	7,750	2,100
Sphyræna	..	..	30	978	207	25	11,200	643	80	720	1,700	1,705
Chorinemus spp.	..	1,137	1,262	120	..	..	580	1,368	2,472	2,402	2,700	2,450
Drepane spp.	..	..	4,392	..	..	315	..	..	..	..	..	..
Decapterus spp.	..	..	11,925	12,819	7,470	811	11,680	3,927	1,786	14,075	6,955	4,685
Miscellaneous*	2,196	2,971	1,417	3,125	615	..	..	..	..	..	..	..
Total	19,370	64,134	49,041	111,695	539,712	286,164	374,132	50,315	29,400	80,810	87,330	71,000

* Includes Upeneoida, Diagramma, Mene maculata, Ophichthopterus, Pristipoma, Otolithus, Chanos, Mastrelliger, Mugil, Eleotro, Platex, and Balistes spp.

Total for the entire year is 340 tons.

APPENDIX V.

MONTHLY MAXIMUM, MINIMUM AND AVERAGE ATMOSPHERIC, TEMPERATURES AND PRESSURE AT CAPE COMORIN FROM NOVEMBER 1957 TO MARCH 1958.

Month.	Particulars.		Maximum.	Minimum.	Average.	Remarks.
1957—						
November	Temperature (°C)	..	27.8	26.5	27.05	..
	Pressure (cm)	..	76.55	72.54	75.05	..
December	Temperature (°C)	..	28.5	27.00	27.5	..
	Pressure (cm)	..	76.17	76.15	76.30	..
1958—						
January	Temperature (°C)	..	28.5	27.00	27.6	..
	Pressure (cm)	..	76.55	76.33	76.45	..
February	Temperature (°C)	..	30.2	27.5	28.9	..
	Pressure (cm)	..	76.52	76.35	76.45	..
March	Temperature (°C)	..	32.00	29.00	29.9	..
	Pressure (cm)	..	76.61	76.24	76.42	..

APPENDIX VI.

HYDROGRAPHY OF THE SEA OFF CAPE COMORIN (MONTHLY AVERAGE) FROM APRIL 1957 TO MARCH 1958.

Month.		Surface temperature. (°C.)	Salinity. (per cent).	Carbonate. (Mgm/100 ml.)	Bicarbonate. (Mgm/100 ml.)	Dissolved Oxygen (Ml/Litre).	PH
1957—							
April	..	27.25	34.95	1.5	12.5	..	..
May	..	28.00	35.47	1.5	12.12	..	..
June	..	27.00	34.13	1.5	12.58	..	..
July	..	27.00	35.13	1.5	12.89	..	..
August	..	27.25	35.19	1.575	13.34	..	..
September	..	27.25	35.50	1.575	13.25	..	..
October	..	26.9	36.35	1.5	13.72	4.71	..
November	..	29.8	36.60	1.5	13.10	4.74	8.5
December	..	26.80	36.62	1.5	13.70	4.51	8.5
1958—							
January	..	27.33	36.72	1.5	13.70	4.32	8.5
February	..	26.75	35.89	1.5	13.12	4.04	8.5
March	..	25.75	33.93	1.5	13.12	3.80	8.5

APPENDIX VII.

APPENDIX VII.

OCCURRENCE OF ZOO-ORGANISMS IN PLANKTON AROUND KRUSADAI ISLAND IN 1957-58.

Zoo-organisms. (Number of per e.c.)	April	May	June	July	August	September	October	November	December	January	February	March
Copepoda	33	13	13	15	9	38	529	256	303	285	149	207
Nauplius larvae ..	19	10	9	19	5	39	209	107	138	104	62	99
Zoea larvae	1	1	1	2	1	1	1	2	29	48	8	14
Metazoa	..	..	1	1	1	..	1	..	..	..	..	..
Eryethus larva ..	1	1	..	..	..	..	..	..	..	..	..	..
Actinula larva ..	1	..	..	1	1	8	291	24	19	40	49	254
Spinula	..	..	..	1	1	5	100	19	3	36	17	18
Mitrisia larvae ..	..	..	..	..	..	..	..	3	11	..	..	4
Pluteus larvae ..	..	..	..	..	..	1	1	2	3	..	..	10
Cyphonautes larvae	..	..	..	..	..	..	..	12	24	5	16	18
Larval bivalves ..	14	14	3	3	2	25	50	17	32	36	107	205
Larval Gastropods	12	8	2	3	2	12	61	37	5	41	128	168
Annelids	4	1	1	1	1	2	..	..	..	..	..	..
Fish larvae and fish eggs	1	..	1	1	1	1	43	16	12	4	9	10
Acanthometron ..	..	..	1	10	1	5	101	3	..	4	14	2
Foraminifera	1	..	1	..	..	3	8	..	..	..	4	10
Ceratum	3	5	2	1	1	4	99	41	14	100	115	44
Foridium	1	1	1	1	..	3	43	52	13	31	9	61
Vintianus	..	..	..	..	..	4	44	9	22	51	25	41
Dinophysis	..	..	1	1	..	..	..	..	..	..	..	15
Radiolarian	..	..	..	..	..	..	..	3	15	..	..	..

Medusae	..	..	1	..	1	..	..	..	..	..	..	..
Evadne	..	..	1	1	..	..	1	..	..	..	..	..
Lucifer	..	..	..	1	..	1	..	..	..	..	..	..
Sagitta	..	..	1	1	..	1	..	1	1	2	..	..
Onkopleura	..	1	1	1	1	1	10	9	7	50	40	124
Ditylimum	..	1	..	..	..	..	..	..	..	..	..	..
Noctiluca	..	..	1	1	1	70	..	..	..	825	75	..
Pteropods	..	..	..	..	..	..	..	2	1	..	..	4
Average sedimentation reading in cc.	..	65	4.25	6.4	4.5	8.4	133.8	89.3	14.3	40.1	141.9	107.2
Total average number of Zoo-organisms	145	55	42	65	29	224	1,592	615	670	1,665	855	1,405
Total average number of Phyto-organisms.	4,155	126	57	79	45	615	6,995	7,034	2,176	2,798	597	1,279

APPENDIX VIII. OCCURRENCE OF PHYTO-ORGANISMS IN PLANKTON AROUND KRUSADI ISLAND IN 1957-58.

Phyto-Organisms (Number per c.c.)	April	May	June	July	August	September	October	November	December	January	February	March
<i>Oscillatoria</i> spp.	..	2,487	86	3	1	47	87	861	63	72	5	86
<i>Trichodesmium</i> spp.	..	11	..	18	2	165	194	18	1	..	..	..
<i>Rhizosolenia</i> spp.	..	19	6	12	4	81	4,445	348	809	139	29	77
<i>Chaetoceros</i> spp.	..	1,604	8	22	9	225	1,175	3,471	136	470	131	445
<i>Bacteriasterum</i> spp.	..	..	1	2	4	29	237	1,010	51	1,133	243	294
<i>Fragilaria</i> spp.	..	..	..	2	1	1	..	..	..	..	..	..
<i>Coscinodiscus</i> spp.	..	7	7	3	2	12	109	40	366	131	12	26
<i>Hyalodiscus</i> spp.	..	..	..	1	1	..	..	184	12	2	1	..
<i>Halophaxera</i> spp.	..	..	..	..	..	..	..	..	..	3	5	..
<i>Melosira</i> spp.	..	..	..	1	1	..	..	..	..	..	..	..
<i>Leudoria</i> spp.	..	..	..	1	1	..	..	..	..	..	..	..
<i>Leptocylinders</i> spp.	..	5	..	1	1	..	75	..	2	..	..	4
<i>Eucampia Zoodiceus</i>	..	..	..	1	1	..	..	..	..	3	8	34
<i>Gomphonema</i> spp.	..	..	..	..	..	..	..	..	..	..	..	..
<i>Pleurosigma</i> spp.	..	3	4	1	1	12	465	65	57	..	..	..
<i>Navicula</i> spp.	..	1	1	1	1	..	19	2	1	59	16	19
<i>Nitzschia</i> spp.	..	1	1	1	1	3	54	1	10	4	6	26
<i>Triceratium</i> spp.	..	6	9	2	4	8	25	7	12	255	15	16
<i>Thalassiothrix</i> spp.	..	2	1	1	2	15	41	836	85	1	5	..
<i>Bacillaria Paradoxa</i>	..	..	..	..	..	..	9	2	8	71	16	72
<i>Thalassiosira</i> spp.	..	..	1	1	1	2	..	..	..	2	2	..
	..	..	..	..	..	..	..	..	..	..	..	7

<i>Ditylimum</i> spp.	..	1	..	2	1	1	..	9	342	16	2	13
<i>Hemidiscus</i> spp.	..	1	1	1	1	..	..	..	..	..	2	4
<i>Campyrodiscus</i>	..	..	1	1	1	..	..	..	..	..	..	..
<i>Asterionella</i> spp.	..	..	..	1	1	..	1	..	2	257	6	23
<i>Asterolampis</i> spp.	..	..	1	1	..	..	..	..	..	..	..	..
<i>Biddulphia</i> spp.	..	4	2	13	3	7	58	123	159	72	15	44
<i>Corethron</i> spp.	..	..	..	..	..	1	..	..	..	..	..	..
<i>Isthmia</i> spp.	..	..	..	..	..	2	..	40	13	..	3	..
<i>Pinnularia</i> spp.	..	..	..	..	..	1	..	..	15	7	1	7
<i>Coscinocira</i> spp.	..	..	..	..	..	..	..	7	..	..	..	..
Other Diatoms.	..	1	..	..	..	3	..	7	103	103	75	72
Average sedimentation reading in cc.	..	175	6.5	4.25	4.5	8.4	138.8	89.3	14.3	40.1	141.9	172.2
Total average number of Phyto-organisms.	..	4,155	126	57	45	615	6,995	7034	2,176	2,798	577	1,279
Total average number of Zoo-Phyto-organisms.	..	145	55	42	29	224	1,592	615	670	1,665	835	1,406

APPENDIX IX.

SHOWING STATISTICS OF FISH LANDED AT RAMASWARAM INLAND IN 1957-58 (IN MAUNDS).

Species landed	April.	May.	June 1956.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
Carcharias	304	475	448	301	82	42	140	117	1,052	1,763	663	192	5,579
Pristis Cuspidata. .	..	..	..	..	3	..	..	..	5	93	85	..	186
Rhynchonotus Spp. .	10	53	7	61	11	..	1	12	4	3	36	17	215
Rays Spp.	206	148	56	178	84	..	116	324	246	134	569	570	263
Arius Spp.	217	130	62	57	45	3	..	89	167	139	295	777	1,884
Chirocentrus Spp ..	765	587	31	47	615	364	1,351	742	433	231	1,911	404	7,481
Cybius Spp	210	149	77	206	1,594	1,547	1,530	109	153	38	49	36	5,498
Caranx Spp	153	15	7	22	11	..	14	23	34	..	12	60	351
Chorinemus Spp. . .	2,208	83	..	23	7	313	16	..	..	41	193	885	3,763
Drepane Punctata Spp.	115	103	25	30	28	8	..	17	..	..	6	13	345
Dugong and Dolphins.	..	..	..	72	..	..	..	..	..	..	..	..	72
Elasmobranchs.	..	13	..	..	..	..	..	..	..	..	..	..	13
Lutjanus Spp. . . .	113	..	..	..	..	..	..	..	..	..	..	..	123
Polynemus Spp. . .	41	..	..	..	..	..	16	..	..	37	75	21	190
Rastrelliger Kanagurta.	110	..	..	..	..	..	..	..	..	..	14	..	124
Sardinella Spp. . .	..	..	..	..	..	1,207	73	..	10	..	..	9	1,290
Sphyræna Spp. . .	..	7	..	..	4	..	..	..	5	24	18	31	88
Stromateus Spp. . .	..	3	..	..	..	..	..	12	13	17	4	..	49
Serranus Spp. . . .	100	72	..	39	17	..	..	13	18	47	428	210	944

APPENDICES

Mugil	..	..	..	..	..	..	..	..	..	..	..	..	9
Hemiramphus Spp. .	..	..	..	..	..	..	18	..	..	..	..	..	18
Lactarius Spp. . .	..	..	..	8	..	..	..	11	8	4	178	54	255
Lates Calcarifer. .	..	..	..	..	..	..	..	7	..	..	..	..	7
Hilsa Spp.	..	..	..	..	..	..	..	..	..	4	4	..	8
Lobsters	..	..	..	..	..	..	..	..	12	13	..	159	184
Leiognathus Spp ..	..	..	..	..	..	..	..	..	..	76	..	..	76
Chanos Chanos. . .	..	..	..	..	..	..	..	..	..	37	170	321	528
Silene Spp.	..	..	..	..	..	..	..	..	..	..	248	..	248
Otolithus Spp. . .	..	..	..	..	..	..	..	..	..	..	..	110	110
Miscellaneous. . .	..	283	490	468	432	460	46	275	294	194	906	363	4,211
Total	4,554	2,121	2,012	2,304	2,733	3,961	3,321	1,741	2,454	2,895	5,864	4,233	38,193

APPENDICES

APPENDIX X.

STATISTICS OF FISH CAUGHT (IN POUNDS) BY DEPARTMENTAL DEEP SEA FISHING UNIT AT PAMBAN IN 1957-58.

Fish landed.	April	May	June	July	August	September	October	November	December	January	February	March
<i>Sardinella</i> spp. ..	162	375	531	248	168	125	426	190	300	462	78	227
<i>Dusumieria</i> spp. . .	15	224	68	83	61	43	82	197	49	5	5	2
<i>Anchorella</i> spp. . .	..	42	11	15	8	4	30	7	5	8	6	35
<i>Leiognathus</i> spp. . .	43	487	247	365	209	140	290	18	95	93	30	215
<i>Lactarius</i> spp. . .	29	189	42	149	53	92	64	3	9	3	33	..
<i>Chirocentrus</i> Dorpb	165	62	389	520	670	536	263	162	20	18	63	127
<i>Caranx</i> spp. . .	45	48	12	18	26	37	125	37	66	114	115	171
<i>Cybum</i> spp. . .	312	524	160	187	238	70	277	41	90	328	518	675
<i>Chromomus</i> spp. . .	10	52	4	7	83	16	16	8	16	6	21	146
* <i>Ela ate-nigra</i> ..	..	7	3	18	2	2	3	1	1	2	3	..
<i>Dr. pane punctata</i> ..	..	49	30	45	28	15	49	4	2	3	33	..
<i>Arius</i> sp? ..	..	..	31	116	111	102	41	29	10	6	98	101
<i>Lethrinus</i> spp. . .	6	24	4	10	10	2	4	6	6	36	148	..
<i>Lucianus</i> spp. . .	..	..	1	7	14	3	11	10	8	21	104	..
<i>Otolithus</i> spp. . .	..	..	..	13	14	20	6	5	8	12	91	..
<i>Serranus</i> spp. . .	5	56	39	16	21	5	1	2	2	60	126	..
<i>Sciaena</i> spp. . .	..	105	5	18	9	19	3	12	60	22	60	..
<i>Sp. lysena</i> spp. . .	49	26	3	5	2	10	15	7	5	46	18	85
<i>Stromateus</i> spp. . .	..	189	67	9	99	9	66	5	7	16	44	75
<i>Sillago</i> spp. . .	..	79	2	3	2	193	377	100	4	16	8	8
<i>Pellona</i> spp. . .	..	..	..	2	11	14	101	2	6	3	36	..
* <i>Elaeate nigra</i> .												

<i>Carcharias</i> spp. . .	49	958	647	763	819	707	632	139	60	123	314	250
<i>Rhynchobatus</i> spp. . .	22	..	3	29	86	95	66	8	14	49	5	..
Rays ..	..	205	141	284	396	358	243	66	25	156	337	112
Miscellaneous ..	109	3	95	65	155	92	147	151	130	257	362	319
Total ..	1,021	3,890	2,236	3,126	3,614	2,727	3,474	1,216	1,004	1,966	2,701	2,548

APPENDIX XI.

METEOROLOGICAL DATA RECORDED AT ENNORE IN 1957-58.

Month.	Atmosphere temperature.			Maximum Air temperature.			Minimum Air temperature.			Humidity per cent.			
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	
1957—													
April	..	92	79	88	87	84	86	85	82	83	76	62	69
May	..	93	88	91	89	84	87	87	83	85	84	68	79
June	..	93	88	91	89	86	88	87	82	85	84	69	77
July	..	94	81	88	91	80	86	86	78	82	91	62	74
August..	..	91	82	87	88	82	85	84	78	81	84	68	76
September	..	92	80	86	92	82	87	90	78	84	91	69	80
October	..	91	79	85	89	80	85	86	76	81	84	76	80
November	..	90	78	84	87	78	83	85	74	80	92	75	84
December	..	88	79	84	84	80	82	82	77	80	91	75	83
1958—													
January	..	89	76	83	84	82	83	82	78	80	92	67	80
February	..	90	78	84	84	82	83	83	78	81	91	66	79
March ..	..	91	83	87	90	83	87	85	80	83	92	68	83

Month	Rainfall.		Barometre reading (inches).			Wind Direction		Remarks.
	Inches.	Centis.	Maximum.	Minimum.	Average.	Morning.	Evening.	
1957—								
April	..	..	30.5	30.2	30.4	N.E.	S.E.	Bar closed on 14th June 1957.
May	..	0	30.4	30.1	30.2	N.E.	S.E.	
June	..	0	30.2	30.4	30.2	N.E.	S.E.	
July	..	4	30.3	30.1	30.2	N.E.	S.E.	Bar opened on 28th August 57.
August	..	0	30.3	30.1	30.2	N.E.	S.E.	
September	..	4	30.3	30.1	30.2	N.E.	S.E.	Bar closed on 27th September 1957.
October	..	6	30.5	30.2	30.4	S.W.	E.	
November	..	17	30.6	30.3	30.5	E.	N.E.	Bar opened on 4th November 1957.
December	..	0	30.6	30.4	30.5	N.E.	N.E.	
1958—								
January	..	0	30.6	30.4	30.5	N.E.	N.E. or E.	
February	..	..	30.6	30.4	30.5	Varied.		
March	..	..	30.6	30.3	30.5	Varied.		

APPENDIX XII.

HYDROGRAPHY OF ENNUR ESTUARY OPPOSITE RESEARCH STATION, 1957-58.

(1)	Surface temperature			Specific gravity			PH			Turbidity		
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1957—												
April	..	88	78	85	1,027	1,022	1,025	8.2	8.0	8.1	28	25
May	..	91	84	88	1,027	1,025	1,026	8.2	8.0	8.1	50	25
June	..	91	85	88	1,027	1,025	1,026	8.2	8.0	8.1	50	42
July	..	91	80	86	1,026	1,023	1,025	8.2	8.0	8.1	55	35
August	..	90	81	86	1,024	1,002	1,013	8.3	8.0	8.2	42	38
September	..	90	79	85	1,022	1,018	1,020	8.4	8.1	8.3	60	40
October	..	90	78	84	1,012	1,000	1,006	8.3	8.1	8.2	74	49
November	..	89	80	85	1,020	1,001	1,010	8.2	8.0	8.1	66	36
December	..	85	77	81	1,022	1,020	1,021	8.3	8.0	8.2	56	37
1958—												
January	..	86	77	82	1,023	1,022	1,023	8.3	8.2	8.3	72	56
February	..	86	78	82	1,022	1,021	1,022	8.3	8.1	8.2	60	48
March	..	88	83	86	1,023	1,022	1,023	8.4	8.2	8.3	68	50

APPENDIX XIII. HYDROGRAPHY OF ENNORE ESTUARY AT THE OYSTER BED AREA, 1957-58.

	(1)	Surface temperature.			Specific gravity.			PH		
		Maximum. (2)	Minimum. (3)	Average. (4)	Maximum. (5)	Minimum. (6)	Average. (7)	Maximum. (8)	Minimum. (9)	Average. (10)
1957—										
April ..	..	79	75	77	1,025	1,022	1,024	8.2	8.0	8.1
May ..	..	90	83	88	1,025	1,026	1,026	8.2	8.0	8.1
June ..	..	88	86	87	1,026	1,025	1,026	8.2	8.2	8.2
July ..	..	86	83	84	1,025	1,023	1,024	8.2	8.0	8.1
August ..	..	86	76	81	1,023	1,002	1,013	8.2	8.0	8.1
September ..	..	86	81	84	1,021	1,020	1,021	8.2	8.0	8.1
October ..	..	90	84	87	1,010	1,000	1,005	8.3	8.0	8.2
N vember ..	..	84	78	84	1,020	1,000	1,010	8.2	8.0	8.1
D e c e m b e r ..	..	86	83	85	1,022	1,020	1,021	8.3	8.0	8.2
1958 —										
J a n u a r y ..	..	85	82	84	1,022	1,022	1,022	8.2	8.2	8.2
F e b r u a r y ..	..	83	82	83	1,023	1,022	1,023	8.2	8.2	8.2
M a r c h ..	..	89	86	88	1,023	1,022	1,023	8.4	8.2	8.3
			Turbidity					Oxygen percentage		
		Maximum. (11)	Minimum. (12)	Average. (13)	Maximum. (14)	Minimum. (15)	Average. (16)	Maximum. (17)	Minimum. (18)	Average (19)
1957—										
April ..	..	26	23	24	45-11	42-81	43-96	5-18	2-8	3-63
May ..	..	65	46	56	46-33	43-89	40-11	5-18	4-48	4-83
June ..	..	47	43	45	44-31	41-84	47-07	6-36	4-76	5-81
July ..	..	48	40	44	45-07	42-20	43-79	9-63	4-76	6-92
August ..	..	40	38	39	34-03	26-70	30-365	5-88	3-93	4-90
S e p t e m b e r ..	..	54	36	45	40-24	34-26	37-25	3-78	2-16	3-22
O c t o b e r ..	..	69	60	60	3-85	20-20	31-93	5-67	3-98	4-98
N o v e m b e r ..	..	54	38	46	35-91	17-17	26-84	10-92	3-08	7-00
D e c e m b e r ..	..	50	42	46	39-83	27-92	35-142	5-04	3-78	4-41
1958 —										
J a n u a r y ..	..	60	55	58	43-08	39-70	41-39	6-30	3-08	4-69
F e b r u a r y ..	..	68	64	66	44-16	43-76	43-76	4-62	3-08	3-85
M a r c h ..	..	65	60	63	47-14	44-77	45-96	5-74	2-94	4-34

APPENDIX XIV.
NUMBER OF SAMPLES AND VOLUME OF PLANKTON COLLECTED FROM ENNORE ESTUARY IN 1957-58.

Months, (1)	Number of hauls, (2)	Total Sediment co., (3)	Number of species.			Remarks, (7)
			Phyto. (4)	Zoo. (5)	Total. (6)	
1957—						
April	5	57	21	12	33	
May	4	56	14	25	30	
June	4	78	17	23	40	Bar closed on 14th June 1957.
July	5	62	14	20	34	
August	4	100	21	24	45	Bar opened on 28th August 1957.
September	4	164	13	16	29	Bar closed on 27th September 1957.
October	4	37	12	21	33	
November	3	103	16	20	36	Bar opened on 4th November 1957.
December	3	75	10	16	26	
1958—						
January	5	33	20	24	44	
February	3	37	14	20	34	
March	3	46	13	20	33	

APPENDIX XV.

DETAILS OF EDIBLE OYSTERS MEASURED, 1957-58.

Months, (1)	Size groups 0-1, 1-10 mm., (2)	I. (3)	II. (4)	III. (5)	IV. (6)	V. (7)	VI. (8)	VII. (9)	VIII. (10)	IX. (11)	X. (12)	XI. (13)	XII. (14)	Total oysters measured. on tiles. (15)
1957—														
April	20	40	44	11	12	19	7	6	5	0	0	1	171	256
May	0	6	18	35	21	17	9	5	2	1	1	0	116	116
June	18	86	35	17	12	25	14	3	2	1	1	0	214	214
July	0	10	23	17	16	13	16	13	10	5	3	1	127	127
August	0	13	52	46	29	13	10	8	2	3	0	0	176	176
September	30	3	7	23	31	17	8	5	7	2	0	0	133	133
October	0	1	5	5	5	4	1	0	0	0	0	0	21	21
November	50	0	0	0	0	0	0	0	0	0	0	0	50	50
December	41	145	14	0	0	0	0	0	0	0	0	0	200	388
1958—														
January	7	59	92	35	6	1	0	0	0	0	0	0	200	341
February	1	22	69	70	23	4	3	0	0	0	0	0	192	503
March	0	3	36	78	58	19	5	1	0	0	0	0	200	478

NUTRITIVE VALUE OF FRESH WATER FISHES.

Serial number and name of fish (1)	Approximate per cent edibility. (2)	Moisture.							Fat. (5)	Protein. (6)	Calcium. (7)	Phosphorus. (8)	Iron in Mg. in 100 grms. (9)
		PER CENT.	(3)	PER CENT.	(4)	PER CENT.	(5)	PER CENT.					
1 Barbus hexagonolepis ..	..	46.6	80.0	1.172	1.158	1.158	18.80	0.1280	0.8892	14.860			
2 Barbus dubius ..	..	45.16	82.39	1.616	2.150	2.150	15.92	0.2500	0.4819	5.173			
3 Barbus carnaticus ..	..	31.30	80.32	1.323	1.00	1.00	16.89	0.1788	0.6243	6.201			
4 Barbus tor ..	..	48.46	82.05	3.029	1.914	1.914	14.35	0.2773	0.6092	9.625			
5 Cirrhina reba ..	..	36.11	79.52	1.227	1.184	1.184	19.49	0.2642	0.5334	6.286			
6 Cirrhina mrigala ..	..	40.54	74.96	1.689	4.176	4.176	10.12	1.008	0.7228	9.640			
7 Cirrhina latia ..	..	47.78	72.64	1.234	1.606	1.606	18.22	0.1782	0.5418	7.721			
8 Scale carp ..	..	48.97	79.60	1.177	2.510	2.510	18.11	0.2110	0.5266	5.207			
9 Labeo fimbriatus ..	..	19.05	61.67	1.052	18.990	18.990	17.24	0.1207	0.4794	11.360			
10 Labeo kontius ..	..	47.30	77.82	1.682	0.991	0.991	15.85	0.2748	0.6873	6.274			
11 Catla catla ..	..	..	80.97	1.924	0.780	0.780	17.83	0.1903	0.7661	16.980			
12 Scaphiodon ..	..	..	79.14	1.290	4.235	4.235	19.00	0.1667	0.2052	10.070			
13 Macrones aor ..	..	40.7	79.21	1.109	2.482	2.482	18.45	0.1401	0.5330	5.067			
14 Wallago attu ..	..	40.0	80.50	1.449	0.970	0.970	18.93	0.1623	0.6039	5.832			
15 Mastacembalus ..	..	48.57	75.490	1.172	1.797	1.797	16.62	0.2083	0.5178	5.632			
16 Tilapia mossambica ..	..	44.8	78.39	1.464	2.055	2.055	19.10	0.2612	0.6369	4.350			
17 Ophicephalus marulius ..	..	42.5	80.2	3.739	1.648	1.648	19.42	0.1669	0.4609	9.760			

APPENDIX XVII.

NUTRITIVE VALUE OF CURED FISH OF THE EAST COAST (MOISTURE-FREE BASIS).
(Sample collected at Kolipatti Fish Market.)

Serial number and name of sample.	Local name.	Original moisture. PER CENT.	Protein. PER CENT.	Fat. PER CENT.	Na Cl. PER CENT.	Ca O. PER CENT.	P 2 O5. PER CENT.	Insolubles PER CENT.
1 Ribbon fish from Dhanuskodi ..	Chavalai	44.74	56.35	4.18	27.02	2.37	8.33	2.57
2 Cat fish from Dhanuskodi ..	Keliru	38.41	55.63	1.71	29.44	2.54	4.87	4.58
3 Sardines cured from Manapad ..	Choodai	40.14	55.06	14.30	20.71	4.70	4.82	0.70
4 Sardines from Tuticorin ..	Do.	39.85	49.98	14.52	23.4	6.60	5.40	0.60
5 Sardines dried from Dhanuskodi ..	Do.	16.22	67.31	7.51	1.86	8.94	8.60	4.76
6 Sardines from Cape Comorin ..	Oluguchalai	18.31	56.24	5.68	11.26	6.65	7.67	12.36
7 Pelona from Rameswaram ..	Thiuvengannam	8.73	79.88	19.95	2.00	5.90	6.01	6.54
8 Stolephorus from Cape Comorin ..	Nethili	15.66	71.27	4.10	1.40	8.00	8.26	6.65
9 Stolephorus from Kayalpatnam ..	Do.	17.54	68.54	4.78	2.85	9.50	8.11	6.25

APPENDIX XVIII.

ANALYSIS OF SAMPLES OF SALT OF DIFFERENT MANUFACTURERS.

Particulars. (1)	Moisture.		Insolubles.		Sulphate.		Chlorine.		Calcium.		Magnesium.		Calcium sulphate.		Magnesium sulphate.		Magnesium chloride.		Sodium chloride.	
	(2)	PER CENT.	(3)	PER CENT.	(4)	PER CENT.	(5)	PER CENT.	(6)	PER CENT.	(7)	PER CENT.	(8)	PER CENT.	(9)	PER CENT.	(10)	PER CENT.	(11)	PER CENT.
Salt Manufacturers and Merchants' Association Samples I.	6.319		.3909		.9486		53.7		1.1730		.3233		3.982		.8366		6.045		81.2	
Salt Manufacturers and Merchants' Association Samples II.	10.30		.0181		.0142		58.87		0.5513		.0090		1.873		.1200		3.48		92.7	
Salt Manufacturers and Merchants' Association Samples III.	7.582		.2016		.5531		56.19		1.961		.5182		6.561		1.042		1.204		89.0	
Rajamani Nadar	7.632		.4224		1.607		57.76		.4742		.9426		1.611		.5889		3.225		94.19	
P. S. P. Rajapandian Sample I	11.87		.0834		3.019		57.82		.7526		.5723		2.557		1.531		1.014		94.04	
P. S. P. Rajapandian Sample II	6.433		.1169		4.021		64.13		.8888		.5204		3.018		2.37		.1636		93.11	
V. V. Dhanapalan	8.141		1.148		.7968		65.36		1.129		.4373		3.126		0.1592		1.193		93.17	

APPENDICES

APPENDIX XIX.

ANALYSIS OF 19 SAMPLES OF SALT.

Serial number and particulars. (1)	Moisture.		Insolubles.		N chloride.		Calcium chloride.		Magnesium sulphate.		Calcium sulphate.	
	(2)	PER CENT.	(3)	PERCENT.	(4)	PERCENT.	(4-a)	PER CENT.	(5)	PER CENT.	(6)	PER CENT.
1 Fish-curing yard, Cape Comorin September 1957	..	3.2	0.56		97.4		0.06		0.04		0.32	
2 Fish-curing yard, Cape Comorin October 1957	..	4.0	0.20		96.5		0.12		0.12		0.28	
3 Fish-curing yard, Cape Comorin	..	3.44	0.16		94.80		0.43		0.20		0.75	
4 Fish-curing yard, Cape Comorin	..	2.04	0.35		97.1		0.05		0.08		0.70	
5 Fish-curing yard, Cape Comorin	..	1.80	0.40		97.25		0.10		0.03		0.24	
6 Fish-curing yard, Cape Comorin November 1957	..	4.40	0.44		96.8		0.14		0.16		0.26	
7 Fish-curing yard, Cape Comorin	..	4.30	0.40		97.0		0.12		0.15		0.30	
8 Fish-curing yard, Cape Comorin	..	4.00	0.38		97.10		0.16		0.14		0.32	
9 Fish-curing yard, Cape Comorin December 1957	..	4.00	0.40		96.76		0.12		0.18		0.28	
10 Fish-curing yard, Cape Comorin	..	4.00	0.32		97.50		0.16		0.20		0.22	
11 Fish-curing yard, Cape Comorin January 1958	..	3.14	0.37		96.44		0.10		0.21		0.32	
12 Fish-curing yard, Cape Comorin	..	2.18	0.16		95.96		0.26		0.20		0.39	
13 Fish-curing yard, Cape Comorin	..	4.7	0.20		97.20		0.10		0.10		0.25	
14 Fish-curing yard, Cape Comorin	..	2.96	0.34		97.15		0.19		0.14		0.36	
15 Fish-curing yard, Cape Comorin February 1958	..	3.83	0.46		96.00		0.32		0.16		0.46	
16 Fish-curing yard, Cape Comorin	..	2.40	0.32		96.54		0.28		0.23		0.82	
17 Fish-curing yard, Cape Comorin	..	4.65	0.40		95.80		0.17		0.26		0.50	
18 Fish-curing yard, Cape Comorin March 1958	..	1.08	1.244		96.21		0.1210		0.4200		0.2804	
19 Fish-curing yard, Cape Comorin	..	2.341	0.8214		95.94		0.3120		0.2874		0.532	
AVERAGE	..	3.32	0.417		96.60		0.176		0.179		0.399	

APPENDICES

APPENDIX XX.

RESULTS OF STUDIES ON THE EFFECT OF TURMERIC ADDED TO SALT ON THE RATE OF DRYING OF THE CURED FISH--CARANX.

Particulars of processing.	Serial number	Initial weight of fishes after curing.	Weight after drying.	Percentage of loss of weight.	Average.	Weight after final drying (Gms.).	Percentage of loss of weight.	Average.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
"A" Fish cured with salt only (Salt fish ratio 1:5) and dried in the sun.	1	54-1106	43-200	10-923		42-7630	29-971		All weights in grams, all samples were gutted, heads removed, washed, cleaned,
	2	53-0686	47-62	10-267		41-9742	20-905		removed, washed, cleaned,
	3	44-8986	40-65	9-362	11-031 per cent.	36-3768	18-98	21-08 per cent.	mixed with salt and kept under water for 24 hours.
	4	48-3976	42-46	12-278		37-8142	21-866		The weights in column (1) are determined after a slight sun drying following treatment with salt.
	5	49-0576	48-01	13-327		37-9182	22-705		
"B" Fish cured with a mixture of salt and turmeric containing 2 per cent by weight of latter (time under cure, duration of drying, etc. exactly as in 'A' above).	1	56-0076	48-4300	13-529		40-7634	27-208		
	2	49-8626	44-0500	11-658		38-8992	21-99		
	3	41-4276	37-0000	10-886	11-369 per cent.	33-3-66	19-61	21-896 per cent.	
	4	56-7476	49-2600	13-194		43-3374	23-621		
	5	53-5456	49-3800	7-779		44-4182	17-045		

APPENDICES

APPENDICES

APPENDIX XXI.

DETAILS OF FISH SEED COLLECTION AND DISTRIBUTION 1957-58.

Division	Collection	Received	Total	In Departmental waters.	In provincialised waters.	Supplied to other Divisions.	Supply to private parties.	Mortality.	Kept in Nurseries.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tanjore ..	17,698,843	..	17,098,843	59,856	15,839,700	887,345	77,003	65,616	169,323
Madurai ..	3,696,206	109,461	3,805,667	33,331	3,166,000	200,039	147,572	168,675	..
Vellore ..	395,097	334,176	729,273	422,235	200,363	8,787	90,863	7,025	..
Madras ..	186,260	..	186,260	15,200	125,000	19,300	3,628	273	22,859
Tuticorin ..	1,974,543	128,161	2,102,704	1,708,867	347,964	..	16,861	20,000	9,012
Bhavanisagar ..	139,463	268,077	397,545	397,399	..	..	146	..	..
Mettur Dam ..	7,749,355	391,907	8,141,262	4,656,152	3,381,922	77,163	26,025	..	..
Total	31,239,772	1,221,782	32,461,554	7,343,010	23,093,999	1,192,634	362,098	271,589	201,194

APPENDIX XXII.

STOCK POSITION OF CHANKS DURING THE YEAR 1957-58 IN TUTICORIN GODOWNS.

Season.	Opening stock as on 1st April 1957.			Deliveries during the year.			Closing stock as on 31st March 1958.		
	Full sized.	Under sized.	Wormed.	Full sized.	Under sized.	Wormed.	Full sized.	Under sized.	Wormed.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1954-55	221,999	18,904	5,286	85,000	7,680	2,560	136,999	11,224	2,729
1955-56	54,963	1,452	118	30,000	1,000	..	24,953	462	..
1955-56	656,509	34,925	26,776	..	..	..	2,065	1,935	118
	4,383	220	631						
1957-58	660,892	35,145	27,407	..	..	..	660,892	35,145	27,407
	845,242	30,493	29,290	..	..	..	845,242	30,493	29,290

APPENDIX XXIII.

DETAILS OF SHARK LIVER OIL PRODUCTION IN MADRAS STATE DURING THE YEAR 1957-58.

Division.	Name of centres.	Shark liver obtained.		Total.	Weight of liver treated. (lb.)	Weight of oil extracted. (lb.)
		Departmental supply.	Local purchase.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tuticorin	6	392	21,511	21,903	21,903	10,602
Madurai	..	..	1,059	1,059	1,059	584
Tanjore	4	78	9,508	9,586	9,586	5,899
Madras	1	..	3,700	3,700	3,700	2,105
Vellore	4	..	7,273	7,273	7,273	3,810
	21	470	43,051	43,521	43,521	23,000

APPENDIX XXIV.

ANNUAL STATEMENT OF LICENCES ISSUED FOR FISHING IN ADYAR RIVER IN 1957-58.

Month.	Bcd and line.		Katcha.		Cast net.		Konda valai.		Siru valai.		Boo valai.		Total.
	NUM- BER.	RS. NP.	NUM- BER.	RS. NP.	NUM- BER.	RS. NP.	NUM- BER.	RS. NP.	NUM- BER.	RS. NP.	NUM- BER.	RS. NP.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1957-													
April	32	8 06	88	17 06	84	31 50	3	5 06	10	18 56	7	11 81	224 92 05
May	22	4 13	6	1 12	86	32 62	16	33 75	8	15 19	3	5 06	141 91 87
June	3	0 56	22	4 50	45	16 88	21	40 50	2	3 37	3	5 06	96 70 87
July	59	11 25	17	3 19	55	22 50	6	10 12	7	11 81	4	6 75	148 65 62
August	92	27 37	22	5 06	100	54 38	14	23 62	19	35 44	5	8 44	252 154 31
September	131	33 75	17	4 31	115	51 75	17	37 13	14	27 00	7	11 82	301 165 75
October	78	24 00	62	22 50	147	117 75	18	37 12	15	25 31	6	15 19	326 241 87
November	45	12 56	19	4 31	121	55 12	26	43 87	10	23 63	7	11 81	231 151 30
December	65	14 06	57	11 25	165	79 87	33	57 38	6	10 12	6	11 81	332 184 49
1958-													
January	41	9 00	13	2 62	134	54 00	36	70 88	7	13 50	4	6 75	235 156 75
February	14	3 00	139	27 37	99	39 38	32	82 69	13	21 94	8	15 19	305 189 57
March	21	4 50	83	17 25	132	52 50	42	70 87	11	21 94	7	11 81	296 178 87
Total	604	162 54	545	120 54	1,286	608 25	264	512 19	122	227 81	67	121 50	2,887 1,743 32

APPENDIX XXV.

LIST OF PROVINCIALISED WATERS IN MADURAI DIVISION IN 1957-58.

Serial number and name of the tank.	Taluk.	Village.	Extent.			Stocking particulars.			To whom payable.	Compensation payable.	RS. NP.	Rental realised.
			Acres.	Cents.		Acres.	Cents.					
(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)	(11)	(12)
1 Natchikulam ..	Nilakottai ..	Nachikulam ..	122	20		30,000	..	132 00	District Board, Madurai.	132 00	155 00	155 00
2 Vadagarai tank ..	Do. ..	Sho'avandan ..	757	67		132,000	..	2,739 00	Panchayat Board, Sho'avandan.	2,739 00	8,400 00	8,400 00
3 Thenur tank ..	Madurai ..	Thenur ..	195	39		72,000	..	120 00	Panchayat Board, Thenur.	120 00	550 00	550 00
4 Vandiyur tank ..	Do. ..	Vandiyur ..	572	25		90,000	5,675	3,060 00	Panchayat Board, Vandiyur.	3,060 00	6,800 00	6,800 00
5 Kunnathur tank ..	Do. ..	Kunnathur ..	1,066	25		202,000	..	142 00	Panchayat Board, Kunnathur.	142 00	350 00	350 00
6 Varichiyur tank ..	Do. ..	Varichoor ..	271	53		81,000	..	11 00	District Board, Madurai.	11 00	60 00	60 00
Total ..			2,895	29		610,000	5,675	6,244 00				16,315 00

APPENDIX XXVI.

DETAILS OF PROVINCIALISED WATERS IN
TIRUNELVELI DISTRICT, 1957-58.

Serial number and name of provincialised water.	Extent		Number of fingerlings stocked.	Rental realised.
	Acres.	Cents.		
(1)	(2)	(3)	(4)	(5)
				RS. NP.
1 Kaapa tank	433	37	16,370	137 00
2 Perur tank	219	58	34,575	250 00
3 Althoor tank	330	72	31,010	1,325 00
4 Keeranur tank	84	80	31,230	
5 Yellappa Naicken tank ..	121	27	15,485	25 00
6 Nathaikulam	195	15	6,050	13 00
7 Thulukar kulam	159	43	6,400	15 00
8 Avudayar kulam	40	00	14,975	50 00
Channels—				
1 Nathiyunni	..	..	..	..
2 Kanadiyan channel	..	..	..	44 50
3 Kodagam channel	..	..	..	443 00
4 Paliyam channel	..	..	..	150 00
5 Tirunelveli channel	..	..	..	202 50
6 Marudur Melakal	..	..	..	..
7 Srivaikuntam North Main channel.	..	..	..	..
8 Authoorankal	..	..	..	..
9 Kotta Modakki Uppodai ..	..	..	..	..

APPENDIX XXVII.

DETAILS OF PROVINCIALISED WATERS IN CHINGLEPUT DISTRICT, 1957-58.

Serial number and name of water.	Tank.	Extent.	Compensation payable.	Average rental of five years.	Amount realised during	
					1957.	1958.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		ACS.	RS. NP.	RS. NP.	RS.	RS.
1 Perumbedu tank	..	414	17	553 00	1,500	1,060
2 Kattur tank ..	..	331	67	34 00	46	48
3 Medur tank ..	..	389	97	32 00	50	120
4 Thattamanji tank	..	227	80	18 50	25	25
5 Nayar tank ..	..	300	54	56 50	120	125
6 Rallakuppam tank	..	10	00	5 50	35	10
7 Kambakkam tank	..	183	66	17 00	30	10
8 Noidavoyal tank	..	126	75	139 00	130	125
9 New Gummidipundi tank	..	83	42	34 00	76	25
10 Old Gummid poondi tama eri	..	46	11	30 00	28	33
11 Old Gummid poondi hissa tank	..	80	65	30 00	27	50
12 Alamada; tank	..	..	..	..	..	..
13 Karunkuli backwaters	..	482	67	580 00	289	..
14 Nagalapuram Karuperi	..	361	58	168 00	115	40
15 Vadamadurai tai k	..	572	08	140 00	600	..
16 Kannigai pair tank	..	593	92	165 00	800	..
17 Tinnalore tai k	..	765	62	615 00	5,000	2,050
18 Nemanhissa tank	..	1,579	06	610 00	750	825
19 Maninangalam tank	..	877	08	..	1,100	300
20 Siperumbudur tank	..	806	15	..	635	1,520
21 Chembarambakam	..	12,029	00	2,280 00	2,100	4,600

APPENDICES

22 Veliyur peria eri	..	388	69	2 62	31 00	45
23 Parandur tank	..	777	77	5 00	178 00	85
24 Tenneri tank ..	..	922	36	32 00	217 00	..
25 Kuthirambakam tank	..	523	33	1 00	18 32	nil
26 Nirvalur tank ..	..	327	31	2 25	30 00	50
27 Uthiramerur tank	..	1,282	42	903 00	..	610
28 Edamecheri tank	..	406	76	..	48 66	930
29 Govindavadi peria eri	..	372	61	28 75	27 19	15
30 Vallathur tank..	..	329	30	1 75	14 00	370
31 Sevilamedu tank	..	369	68	17 25	111 60	160
32 Demal tank ..	..	610	61	6 06	147 75	..
33 Kuram tank ..	..	548	34	16 12	16 94	..
34 Thenambakam tank	..	..	..	8 06	98 87	130
35 Madurantakam tank	..	2,412	76	228 00	2,120 00	1,000
36 Oratui tank ..	..	389	46	2 25	32 83	22
37 Guruvanmedu tank	..	38	65	20 00	362 00	225
38 Oragadam tank	..	175	00	2 00	21 17	5
39 Sirukundram tank	..	295	86	3 00	30 00	12
40 Kondangi tank	..	881	36	20 00	110 50	252
41 Chinambadu tank	..	1,161	62	2 00	63 50	725

APPENDIX XXVIII.

PARTICULARS OF PROVINCIALISED WATERS IN NORTH ARCOT DISTRICT.

Serial number and name of water.	Taluk.	Extent.	Compensation payable.		Average rental of five years.	Rentals realised.			
						1957.		1958.	
						RS.	NP.	RS.	NP.
1 Purasi peria eri ..	Cheygar ..	457 79	225 00	593 00	600 00	240 00	..	..	
2 Vakkadai Mukkur ..	Do. ..	635 71	191 50	851 31	85 00	210 00	..	..	
3 Dusimamandur tank ..	Do. ..	1,012 49	1,088 22	2,365 00	2,500 00	9,000 00	..	..	
4 Chettikulam ..	Tiruvannamalai ..	0 83	..	15 00	10 00	..	..	..	
5 Kee'veedhi tank ..	Arkonam ..	437 00	32 31	37 00	75 00	..	..	..	
6 Agnitheertham tank ..	Tiruvannamalai ..	0 80	..	..	7 00	6 00	..	..	
7 Parayankulam ..	Do. ..	0 60	..	..	..	..	..	..	
8 Indiratheertham ..	Do. ..	0 83	..	..	..	..	..	..	
9 Mahendravathi tank ..	Arkonam ..	293 00	70 81	28 00	100 00	..	..	..	
10 Parani tank ..	Do. ..	300 00	5 56	7 08	14 00	5 50	..	..	
11 Kaveripakkam tank ..	Walajah ..	5,073 42	1,506 00	3,752 50	2,750 00	243 09	..	..	

APPENDIX XXIX.

DETAILS OF PROVINCIALISED WATERS IN SOUTH
ARCOT DISTRICT.

Serial number and name of water.	Taluk.	Rental realised.	
(1)	(2)	(3)	
		RS.	NP.
1 New Coleroon from mile 92/6 ..	Chidambaram.	4,285	00
2 Killai, Pitchavaram, etc. ..	Do.		
3 Pitchavaram New Coleroon up to sea ..	Do.		
4 Ellis Choultry Anicut ..	Do.		
5 New Coleroon ..	Do.		
6 North Rajan channel ..	Do.		
7 Gourapet channel ..	Do.		
8 Khansaheb channel ..	Do.		
9 Vellar and other items ..	Do.		
10 Old Coleroon ..	Do.		
11 Perumal eri ..	Cuddalore.	1,780	00
12 Vellar (2 stretches) ..	Do.		
13 Melatar river ..	Do.		
14 Tiruva hur Anicut channel ..	Do.		
15 New Alangal channel ..	Villupuram.		
16 Marsuthapuram channel ..	Do.	842	00
17 Kandambakam channel ..	Do.		
18 Eralumain channel ..	Tirukoilur.		
19 Tirukoilur Anicut ..	Do.		
20 Marudur channel ..	Do.		
21 P. mbai channel ..	Do.		
22 Thuringalam channel ..	Do.		
23 Raghavan channel ..	Do.		
24 Melattur channel ..	Do.	545	00
25 Siddalingamedu channel ..	Do.		
26 Vriddachalam and Toludur anicut ..	Vriddachalam.		

APPENDIX XXX.

LIST OF PROVINCIALISED WATERS IN SALEM DISTRICT.

1 Salem district—

Name of water.

- 1 Mettur Dam—Nerinjipet (below the conserved area licensed for fishing up to Perumpallam).
- 2 Mettur Dam—Nerinjipet (conserved area about 3 miles within the Mettur Township).
- 3 Barur tank.
- 4 Eluppaikuttai.
- 5 Barur tank surplus channel.
- 6 Pungampatti eri.
- 7 Pennugondapuram.
- 8 Raja Channel.
- 9 Komarapalayam Channel.
- 10 Mohanur Channel.
- 11 Cauvery, Lot I.
- 12 Cauvery, Lot II.
- 13 Cauvery, Lot III.
- 14 Mettur Canal (right bank).
- 15 Mettur Reservoir.
- 16 Mettur Canal Left Bank, Lot I.
- 17 Mettur Canal Left Bank, Lot II.
- 18 Kumbalapadi Jabuku.
- 19 Nagavathi river in Avakasanahalli.
- 20 Hanumantharayan Pallam.
- 21 Sekkiligudupallam.
- 22 Nagavathi river in Chinnampalli.
- 23 Chakkiligudupallam in Chinnampalli.
- 24 Nagavathi river in Perumbalai.
- 25 Nagavathi river in Kendarahalli.
- 26 Thoppiar river in Thorppiar.
- 27 Thoppiar river in Kammampatti.

APPENDIX XXXI.

LIST OF PROVINCIALISED WATERS IN COIMBATORE DISTRICT.

- 1 Aliyar River—From Arupuram Anicut to Vaddakulam Anicut.
- 2 Aliyar River—From Vaddakulam Anicut to Ambrampalayam.
- 3 Aliyar River—From Ambrampalayam to Korapattithurai.
- 4 Kalakathur tank.
- 5 Amaravathi River—Kangayampalayam to Kattamankoil.
- 6 Amaravathi River—Kattamankoil to Padupalayam.
- 7 Shamugha River—From its confluence with Amaravathi up to Dharapuram limits.
- 8 Amaravathi River—From Kallapuram to Kannadiputhur Eswaran Koil.
- 9 Amaravathi River—From Sarcar Kannadiputhur Eswaran Koil to Ottamangai.
- 10 Thevadakkulam.
- 11 Sular Tank.
- 12 Oddarpalayam.
- 13 Mannarai.
- 14 Andarpalayam.
- 15 Hanumadmpalayam.
- 16 Bhavani River—Vyachananpalayam.
- 17 Nayar River.
- 18 Bhavani River (From Sirumugai Ferry to Junction with Nayar.)
- 19 Bhavani River (From Thailannalai Stream and Nallathurai to Sirumugai Ferry)
- 20 Bhavani River (From Mulukkanthurai to Koduveri.)
- 21 Arkkankottai Channel.
- 22 Nagakombaipallam.
- 23 Elahur.
- 24 Koduveri Anicut to Peyanthurai.
- 25 Peyanthurai to Nallaipulampatti.
- 26 Nallaipulampatti to Perundalayur.
- 27 Todappali Channel.
- 28 Lower Bhavani Channel (Miles 1-10.)
- 29 Lower Bhavani Channel (Miles 11-20.)
- 30 Lower Bhavani Channel (Miles 21-30.)
- 31 Lower Bhavani Channel (Miles 31-40.)
- 32 Two odaipallam.
- 33 Cauvery River (From Kanaimerkuttai to Erode Railway Station.)
- 34 Kalingarayan Channel.
- 35 Bhavani River (From Peruadaliyur to Oricherri).
- 36 Oricherri to Seethapalayam.
- 37 Sithaur.
- 38 Nerinjipet.
- 39 Soodampatti to Peyyani.
- 40 Mettur West Bank Canal.
- 41 Mettur West Bank Canal (From 8.3 miles to 21st mile.)
- 42 Mettur West Bank Canal (From 21st mile to tail end.)

APPENDIX XXXII

FISHING DEMONSTRATION TANKS IN TANJAVOOR DIVISION, 1957-58.

Serial number and name of the tank. (1)	Stocking.		Exploitation.		Weight of fish caught (6) LB.	Receipts. (7) RS. RP.	Expenditure. (8) RS. RP.
	Kind. (2)	Number. (3)	Kind. (4)	Number. (5)			
1 Wester moat	Labao and Cirrhina Catla	7,200 1,890	Labao and Cirrhina Catla	14,572 1,280	..	..	..
	Mirror Carps	1,000	Mirror Carps	13	31,123	9,289 21	1,401 00
	Kohu and Mrigala	2,307	Gourami	4	..	..	..
	Chanos	3,000	Chanos	7,307	..	..	..
	Gourmai	39	Tilapia	22,246	..	..	..
2 West moat	Labao and Cirrhina	11,280	Labao and Cirrhina	19,735	..	..	..
	Catla	400	Catla	1,506	..	..	..
3 Ayyankulam	..	..	Gourmi	20	4,533	1,002 50	530 50
	..	..	Labao and Cirrhina	24,400	..	..	..
	..	..	Catla	1,582	..	..	..
	..	..	Chanos	13,442	..	..	..
	..	..	Gourami	24	6,577	1,224 77	675 25
4 Pideri Tank	Catla	2,148	Catla	542	..	..	..
	Labao and Cirrhina	4,000	Labao and Cirrhina	3,155	1,145	301 42	..
5 Anayadi Tank	Catla	610	Catla	690	..	..	..
	Labao and Cirrhina	2,000	Labao and Cirrhina	2,991	601	187 15	1 25
6 Aji Tank	Catla	40	Catla	362	..	..	..
	Labao and Cirrhina	1,000	Labao and Cirrhina	1,658	528	163 13	..
	..	..	Chanos	48	..	..	..
7 Baburajapuram Tank	Catla	400	Catla	415	..	..	..
	Labao and Cirrhina	2,000	Labao and Cirrhina	3,970	592 8 oz	175 35	6 00
8 Pattaikulam	Catla	593	Catla	..	1,968 12 oz	483 31	590 64
9 Pillaikulam	Catla	87	Labao and Cirrhina	..	..	..	..
	Labao and Cirrhina	2,600	..	..	6 0 8 oz	138 74	155 00
10 Sakkedikulam	Catla	50	..	..	..	..	..
	Labao and Cirrhina	3,000	..	..	..	..	..

11 Aladikulam	Labao and Cirrhina	1,500	..	..	210	125 65	7 25
12 Arabattankulam	Labao and Cirrhina	2,000	..	..	..	..	..
13 Eechankulam	Labao and Cirrhina	3,500	Catla	306	..	..	..
	..	18	Labao	220	..	..	..
	..	500	Tilapia	165	911	221 87	63 05
14 Pachanthuandakur tank	Labao and Cirrhina	1,500	..	..	583 8 oz	147 12	25 00
15 Sengulam	Labao and Cirrhina	25	..	..	..	..	..
	..	2,000	Catla	657	..	..	..
16 Katcheri tank	Labao and Cirrhina	955	..	..	7,596	1,910 07	401 80
17 Ramatheertham tank	Labao and Cirrhina	3,000	..	..	..	..	..
	..	8	Catla	63	135	41 37	18 00
18 Kummundankulam	Labao and Cirrhina	..	..	..	1,10	448 75	198 75
	..	290	Labao and Cirrhina	543	..	..	..
	..	3,400	Catla	291	..	..	..
19 Kilanazeri	Labao and Cirrhina	150	Labao and Cirrhina	2,785	..	..	..
	..	20	Tilapia	3,086	1,728	459 61	54 51
	..	350	Catla	265	..	..	..
	..	2,600	Labao and Cirrhina	1,429	..	..	..
	..	125	Tilapia	1,685	..	..	..
	..	10	..	..	971 4 oz	221 76	21 21
20 Valavanachi Urani	Labao and Cirrhina	40	Labao and Cirrhina	22	268	40 52	1 81
	..	50	Tilapia	53	..	..	..
21 Palaniyandi Urani	Labao and Cirrhina	2,000	Labao and Cirrhina	195	1,633 6 oz	424 12	16 08
	..	300	Catla	202	..	..	..
22 Sarvarayankulam	Labao and Cirrhina	2,320	Labao and Cirrhina	915	..	..	..
	..	150	Tilapia	1,117	6 9 3 oz	156 96	4 59
	..	25	..	..	51 12 oz	19 32	4 86
23 Sivankoil Pushakavani	Labao and Cirrhina	..	Labao and Cirrhina	193	63,374 10	1,860 73	..

APPENDIX XXXIII.

WORKING OF RURAL FISHERY DEMONSTRATION TANKS IN VELLORE DIVISION.

Serial number and name of water.	(1)	Area.	Total number of fish seeds stocked.		Weight of fish caught.		Amount 1950-57.	RS. NP.	RS. NP.	Revised 1957-58.
			During 1950-57.	During 1957-58.	During 1950-57.	During 1957-58.				
North Arcot district—										
1 Suriyankulam—Arni ..	..	8 00	9,061	9,139	530 05	676 06	108 70	139 02	..	..
2 Velvikulam—Arni ..	..	30' x 10'	500	1,851	30 00	112 00	3 75	20 61	..	..
3 Melanuli tank ..	..	1 00	1,000	..	No fishing.	..	..	..	..	..
4 Ayyankulam Tiruvannamalai ..	..	3 27	25,449	26,774	2,553 03	5,021 10	924 89	1,447 39	..	..
5 Elapillyarkulam ..	..	1 50	1,195	1,160	197 02	509 09	61 50	102 25	..	..
6 Ho mathakulam ..	..	5 00	..	..	..	..	..	..	..	..
7 Chakkariheertham ..	..	0 83	These tanks have been proposed to be surrendered to the respective municipalities as they are not productive besides the fact that they are dry.							
8 Chunnammurramakulam ..	..	0 50	..	..	..	..	..	..	..	..
9 Bootharaya kulam ..	..	0 50	..	..	..	..	..	..	..	..
South Arcot district—										
10 Theerthakulam Tindivanam ..	..	3 00	8,702	14,863	1,009 12	2,637 02	368 56	805 61	..	..
11 Asiku am Gingee ..	..	0 32	7,875	1,611	78 08	104 08	17 51	57 90	..	..
12 Chakkarakulam Gingee ..	..	0 47	10,100	6,400	155 06	212 12	18 52	27 22	..	..
13 Cetykulam Gingee ..	..	2 89	12,348	9,160	1,119 02	1,504 04	168 52	279 27	..	..
14 Venkatavaram temple tank ..	..	0 82	..	..	62 08	119 00	4 47	7 44	..	..
15 Kanakanniamman tank ..	..	0 20	1000	..	..	42 00	..	10 50	..	..
16 Cuddalore tank ..	..	1 00	25,000	3,295	659 08	156 00	104 37	25 88	..	..
Chingleput district—										
17 Karpurachetty kulam ..	..	..	16,256	2,000	301 08	478 04	72 50	247 52	..	..
18 Thimmaraykulam ..	..	..	1,867	2,000	69 12	576 08	19 47	..	..	..
19 Keerupur Waters ..	..	..	..	..	320 00	500 00	80 00	80 00	..	..
20 Chettykulam Kancheepuram ..	..	2 50	3,426	2,000	133 00	302 14	45 59	170 34	..	..

APPENDIX XXXIV.

DETAILS OF DEPARTMENTAL WATERS FISH FARM AND TANKS UNDER THE RURAL FISHERY

DEMONSTRATION SCHEME IN MADURAI DIVISION, 1957-58.

Serial number and name of the water. (1)	District. (2)	Tank. (3)	Extent. (4) ACS. CTS.	Authority for taking over. (5)
Madurai Unit—				
1 Mariyuman teppa ulam, Madurai	Madurai	Madurai	17 00	G.O. No. 1978, Agriculture, dated 9th August 1955.
2 Vaiveesi teppakulam, Madurai.	Do.	Do.	0 75	G.O. No. 785, Development, dated 19th February 1953.
3 Tirumakkulam, Madurai	Do.	Do.	4 00	G.O. No. 4625, Development, dated 4th November 1952.
4 Race course pond Madurai	Do.	Do.	0 49	G.O. No. 257, Development, dated 11th April 1953.
5 Kallukatti tank, Karaikudi	Ramanathapuram	Tirupathur	1 00	G.O. No. 27, Agriculture, dated 7th November 1953.
6 Mandai Oorani, Vadugapatti	Madurai	Nilakottai	2 24	G.O. No. 2423, Development, dated 25th May 1953.
7 Kallukatti teppam, Melur	Do.	Melur	0 19	G.O. No. 1456, Revenue, dated 6th May 1953.
8 Sewage fish farm, Avaniyapuram	Do.	Madurai	1 00	G.O. No. 383, Food and Agriculture, dated 5th February 1958.
9 Chettinad fish farm	Ramanathapuram	Tirupathur	20 00	Given by the Chettinad Raja.
Kallupatti Unit—				
10 Peria teppam, Kallupatti	Madurai	Tirumangalam	1 45	G.O. No. 257, Development, dated 7th April 1953.
11 Karan Ooranai	Do.	Do.	1 28	Do.
12 Agneswar temple tank	Do.	Do.	0 05	Do.

Virudhunagar Unit—

13 Quarry pools I, II and III.	Ramanathapuram	Sattur	2 64	Ramanathapuram Collector's R. Dir. No. 355/50, dated 28th March 1951, and G.O. No. 91, Agriculture, dated 12th January 1956.
14 Chettineeravi tank, Palayampatti.	Do.	Aruppukottai	3 52	G.O. No. 2932, Agriculture, dated 15th December 1956.
15 Sarsakudi	Do.	Mudukalashur	1 32	Proceedings Additional Director's D. Dir. No. 3815 No. Z 3/56, dated 9th March 1956.
Kodalkanal Unit—				
16 Kodalkanal lake	Madurai	Periakulam	96 63	G.O. Ms. No. 2062, Development, dated 8th May 1951.

APPENDIX XXXIV—cont.
DETAILS OF DEPARTMENTAL WATERS FISH FARM AND TANKS UNDER THE RURAL FISHERY
DEMONSTRATION SCHEME IN MADURAI DIVISION, 1957-58—cont.

Serial number and name of the water.	Number of seeds stocked.	(6)	Whether leased or licensed or tally billed.	(7)	Number of licence issued.	(8)	Rate of licence.	(9)	Total amount of licence collected.	(10)	Weight of fish caught.	(11)	Value of fish.	(12)	Total receipts.	(13)	Remarks.	(14)
Madurai Unit—																		
1 Mariamman teppakulam, Madurai.	..	..	Labeo and Cirrhina 5,279, Catla 2,000, Gold and Mirror Carp 640, Murrel 74, Chanos 500.	Do.	..	..	..	..	..	..	26,397	6,137	15	6,137	15	..	..	..
2 Valaiveesi teppan, Madurai	..	..	..	Do.	..	..	..	..	..	..	131	26	76	26	76	..	..	..
3 Tirumikkulam, Madurai	..	..	..	..	..	..	..	..	..	..	774	230	17	230	17	..	..	..
4 Race course pond, Madurai	..	..	Fls 537, Tilapia 3,000.	Do.	..	..	..	..	..	..	7	1	69	1	69	..	..	..
5 Kallukatti tank, Karaikudi	..	..	Murrels 1-0	Do.	..	..	..	..	..	..	3,262½	1,224	19	1,224	19	..	..	..
6 Mandai Oorani, Vadagupatti	..	..	..	Do.	..	..	..	..	..	..	160½	60	02	60	02	..	..	..
7 Kallukatti teppam, Melur	..	..	Labeo and Cirrhina 500, Tilapia 500	Do.	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8 Savage Fish Farm, Avaniyapuram.																		
..	..	..	Tilapia 500, Labeo 7,020, Chabua 2,000, Cat'a 145, Mirror Carp 510	Do.	..	..	..	..	..	..	185½	38	26	38	26	..	..	..
9 Chettinad Fish Farm, Chettinad.																		
..	..	..	Tilapia 600, Catla 338, Labeo and Carps 3,650	Do.	..	..	..	..	..	..	10	3	51	3	51	..	..	..
Kallupatti Unit—																		
10 Peria teppam, Kallupatti	..	..	Catla 148, Labeo 897, Tilapia 2,021, Chanos 3,384	Do.	..	..	..	..	..	..	422 3/3	181	65	181	65	..	..	..
11 Kaman Ooranai	..	..	Tilapia 4,875	Do.	..	..	..	..	..	..	16½	6	27	6	27	..	..	..
12 Agneeswarar temple tank	..	..	Tilapia 5,434	Do.	..	..	..	..	..	..	52	19	43	19	43	..	..	..
Virudhunagar Unit—																		
13 Quarry Pools I, II and III	..	..	Murrels 3,841, Labeo 338	Do.	..	..	..	..	..	..	2,334½	1,022	31	1,022	31	..	..	..
14 Chettineeravi tank, Palayampatti.	..	..	Murrels 360, Tilapia 500	Do.	..	..	..	..	..	..	109½	41	12	41	12	..	..	..
15 Sayalkudi	..	..	Tilapia 600	Do.	..	..	..	..	..	..	102½	36	44	36	44	..	..	..
Kodaikanal Unit—																		
16 Kodaikanal lake	..	..	..	Do. and Licensed.	242	0 50 per day 3 00 p.m. 20 00 p.a.	407	50	162½	120	83	528	33	..	..	..	..	..

APPENDIX XXXV.

QUALITATIVE AND QUANTITATIVE ANALYSIS OF MARINE
FISH PRODUCED IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

Kind of fish.	Quantity.
	TONS.
Sharks, Skates, and Rays	4,700
Car fishes	10,380
Clupeids (Sardines, Hilsa, Anchovies, White baits) ..	10,133
Ribbon-fish	11,060
Jew fishes	2,300
Mullet	1,500
Sabre-fish	1,610
Mackerel	2,110
Pomfrets	2,020
Ser	4,680
Horse-mackerels	1,240
Flying fish	140
Porbeys	2,600
Sturgeon-bellies	2,400
Laternus	2,400
Prawn and other crustaceans	3,300
Miscellaneous varieties	4,720
Total quantity	67,540
Total value	Rs. 570 lakhs.

APPENDIX XXXVI.

QUALITATIVE AND QUANTITATIVE ANALYSIS OF INLAND
FISH PRODUCED IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

Kind of fish.	Quantity.
	TONS.
Carp	22,500
Car fishes	5,200
Mullet	4,200
El	500
Hilsa	160
Chanos	250
Mullet	2,520
Prawns and other crustaceans	2,570
Miscellaneous varieties	2,400
Total	40,300
Total value	Rs. 240 lakhs.

APPENDIX XXXVII.

APPROXIMATE ACREAGE OF TYPES OF INLAND WATERS IN MADRAS
STATE AND FISH PRODUCED FROM THEM IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

Types.	Fresh water.	Brackish water.	Total.	Quantity of fish produced in tons.
	ACRES.	ACRES.	ACRES.	TONS.
1 Ponds	21,200	200	21,400	11,200
2 Lakes and irrigation tanks	154,800	1,800	156,600	
3 Reservoirs	98,000	..	98,000	46,000
4 Rivers and Deltaic waters	84,200	..	84,200	18,500
5 Back water	..	36,000	36,000	5,400
6 Other like wells and swamps	3,900	..	3,900	600
Total	362,100	38,000	400,100	40,300

APPENDIX XXXVIII.

MONTH-WISE FISH PRODUCTION IN MADRAS STATE IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

Month.	Quantity of fish produced.	
	Marine.	Inland.
	TONS.	TONS.
1957—		
April	5,920	3,551
May	5,380	4,613
June	5,010	2,876
July	5,662	2,685
August	6,155	3,929
September	5,666	3,916
October	6,423	3,924
November	7,960	3,482
December	7,267	2,858
1958—		
January	316	2,734
February	3,368	2,907
March	5,413	2,902
Total	67,540	40,300

APPENDIX XXXIX.

PRODUCTION, IMPORT, EXPORT AND CONSUMPTION OF FISH
IN MADRAS STATE IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

I. Marine Fish—

	TONS.
(a) Total productions	67,549
(b) Quantity consumed in fresh condition in the State..	27,140
(c) Quantity exported in fresh condition to other States ..	400
(d) Quantity of fish cured	40,000
(e) Quantity of cured fish consumed in the State	21,140
(f) Quantity of cured fish exported to other States	2,000
(g) Quantity of cured fish exported to other countries outside India (Ceylon, Singapore and Malaya).	16,860

II. Inland fish—

(h) Total production	40,300
(i) Quantity consumed in State (fresh and cured). ..	40,080
(j) Quantity exported to other States	240
(k) Quantity exported to other countries	Nil

III. Fish imported—

(l) Marine fish from Andhra, Kerala and Mysore States ..	2,500
(m) Inland fish from above States	10
(n) From foreign countries	82

IV. Fish consumption—

(o) Total quantity consumed I (b), II (i) III (l), (m) (n) ..	90,932
(p) Per capita consumption for 60 per cent of the population of the State.	11.3

APPENDIX XL.

FRESH FISH SUPPLY TO MADRAS CITY IN 1957.

(Compiled by P. I. Chacko and J. Shanmuganadam.)

Orig'n.	Quantity. TONS.
<i>Mysore State—</i>	
Kanara coastal area (1)	80
<i>Kerala State—</i>	
Malabar coastal area (1)	812
<i>Madras State—</i>	
(a) Mostly from South Arcot and Ramnathapuram area (1).	200
(b) From coastal landing centres within a radius of 20 miles (except Ennore and Navaoore) (3).	9,825
(c) Transported by Fisheries Departmental vans given to Fishermen co-operatives under hiring or hire-purchase system (2).	1,244
(d) Transported by private owned vans (fish merchant) (2)	160
(e) From Pulicat lake (Partly by boat and partly by pony cart) (3).	1,237
(f) Catches by "Samudra" with trawl nets. This vessel was received under TCM Aid (4).	23
(g) Catches by mechanised boats (8) 7 boats operated by Fishermen co-operative and 1 boat operated by individual fisherman in Madras district (3).	86
(h) Local fresh fish catches (from Adayar, Cooum rivers) (3)	250
Total ..	13,917

NOTE.—(1) By railways.

(2) By motor vans.

(3) By bicycle, three wheeled cycle, pony-carts, boats and head-loads.

(4) Fishing vessel "Samudra" was handed over to Kerala State on 7th May 1957, it fished from 1st January to 6th May only.

APPENDIX XLI.

LIST OF FORTY-SEVEN MARKETS IN MADRAS CITY
WHERE FISH ARE SOLD.

(Compiled by P. I. Chacko and Shanmuganadan.)

- 1 New Washermenpet market or Habib market.
- 2 Tondiarpet market.
- 3 P. M. Rathnasabapathy Mudaliar market or Kalmandapam market.
- 4 Royapuram market.
- 5 Pitchandi market—Old Washermenpet.
- 6 Venkata Krishnan Street market or Old Washermenpet.
- 7 Laxmi market—Perambur.
- 8 Kondithope market—Kondithope.
- 9 Sevnwells market—Georgetown.
- 10 Mannady market—Georgetown.
- 11 Ola adai market—Georgetown.
- 12 Chengam bazaar—Georgetown.
- 13 Otteri market—Shutans Road.
- 14 Choolai market.
- 15 D'ellows Road Market—Otteri.
- 16 Smithfield Market—Choolai.
- 17 P. Varadharaja Chettiar Market—Perambur.
- 18 Sembian Market—Perambur.
- 19 Corporation Market—Vyanavaram.
- 20 Corporation Market—Mechnichol Road.
- 21 Aminjikarai Market.
- 22 Purasawalkam Market.
- 23 Moore Market.
- 24 Kandaswamy Devasthanam Market or Kosapet Market—Kosapet.
- 25 Eilamm Devasthanam Market—Peimmet.
- 26 Kakumini Adhikesavalu Chetty chaities Market—Park Town.
- 27 S. A. B. Baluswamy Iyer Market—Chintadripet.
- 28 Connemara Market—Pudupet.
- 29 Egmore Market—Egmore.
- 30 Thousand-lights Market.
- 31 Corporation Market—C. I. T. Nagar.
- 32 Corporation Market—Jagannadhapuram, Chetpet.
- 33 Thirukirani Sri Kurneeswarar Devasthanam Market—Saidapet.
- 34 Mowlana Market—Chopauk.
- 35 New Zonde Market—Triplicane.
- 36 Zam bazaar Market—Triplicane.
- 37 Corporation Market—Nadikuppam.
- 38 Sultan Market—Royapettah.
- 39 Mirsahibpet Market—Mirsahibpet.
- 40 Mylapore Market.
- 41 Sri Balasubramaniaswami Devasthanam Market—Vannia Teynampet.
- 42 Azeez Market—Teynampet.
- 43 Mandavalli Market.
- 44 Nungambakkam Market.
- 45 Vadapalani Market—Kodambakkam.
- 46 Kandha Pillai chary Meenakshi Market—Kodambakkam.
- 47 Govindaswamy Chettiar Market or Vyasarpadi Market—Vyasarpadi.

APPENDIX XLII.

STATISTICS PERTAINING TO FISH MARKETING
IN MADRAS CITY IN 1957.

(Compiled by P. I. Chacko and J. Shanmuganadan.)

- 1 Area—49.84 square miles.
 - 2 Population—1,810,500.
 - 3 Market—

Total number of markets	52
Number of markets where fish is sold	47
 - 4 Merchants—

Wholesale fresh fish merchants	25
Wholesale dry fish merchants	12
Fresh fish retailers	1,289
Cured fish retailers	257
 - 5 Stalls—

Whole sale fresh fish stalls	10
Retail fresh fish stalls	1,100
Retail cured fish stalls	226
 - 6 Condition of supply—

90 per cent fresh fish—90 per cent fresh fish (not iced).	
10 per cent fresh fish (iced).	
Nil frozen.	
10 per cent Cured fish.	
 - 7 Means of transport—

	<i>Per cent- age of supply.</i>
(a) Fresh fish (iced) by rail (1)	10
(b) Fresh fish (not iced) by motor vehicles (2)	10
(c) Transportation of fresh fish (not iced) by bicycles, three wheeled cycles, pony carts (3), head-loads and boats.	70
(d) Cured fish by rail, boat, motor vehicles, head-load	10
Total	100
 - 8 Eating habits—

Vegetarians	35 per cent.
Non vegetarians	65 per cent.
 - 9 Fish consumption for 1957—

Fresh fish	13,917 tons.
Cured fish	2,074 tons.
 - 10 Per capita consumption—30.4 lb.
- Note.*—(i) From distances over 100 to 550 miles.
(ii) From distances over 10 to 60 miles.
(iii) From distances 1 to 15 miles.

APPENDIX XLIII.

QUANTITY OF FISH MARKETED AND THE CENTRES OF MARKETING
BY THE FISHERMEN CO-OPERATIVE MARKETING SOCIETY,
METTUR DAM, SALEM DISTRICT, 1957-58.

(Compiled by P. I. Chacko and M. P. Sekharan.)

Month.	Quantity of fish.
(1)	(2)
	METRIC TONS.
1957—	
April	12.84
May	31.58
June ..	43.14
July ..	26.93
August ..	17.95
September ..	14.53
October ..	25.66
November ..	15.02
December ..	14.48
1958—	
January ..	16.34
February ..	18.59
March ..	14.98
	<u>246.04</u>

Centres of marketing—

(a) Madras State, Mettur Dam, Salem, Coimbatore, Madras, Tambaram, Vellore, Katpadi, Tirupur, Guditham, Kodaikunal, Erode, Yercaud, Vaniambadi, Mettupalayam, Arani, Ranpet and Kangayam.

(b) Kerala State—Ernakulam.

(c) Mysore State—Bangalore, Oorgam and Mangalore.

(d) Andhra State—Anantapur, Guntakal and Chittoor.

(e) West Bengal State—Calcutta.

APPENDIX XLIV.

NUMBER OF FISHING VILLAGES AND FISHERFOLK

POPULATION IN MADRAS STATE, 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

District.	Number of important fishing villages.	Inland		Number of important fishing villages.	Marine.	
		Total population.	Active adult fishermen.		Total population.	Active adult fishermen.
Chingleput ..	42	3,612	1,410	45	19,155	6,202
Madras ..	14	2,833	985	13	28,880	9,600
South Arcot ..	37	2,188	860	15	15,308	6,026
Tanjore ..	64	17,184	5,468	67	45,367	17,755
Ramanathapuram ..	13	383	140	45	30,304	11,250
Tirunelveli ..	53	4,110	1,795	22	30,531	10,326
Kanayakumari ..	19	821	284	35	67,208	22,989
North Arcot ..	36	3,054	1,055	..	..	..
Salem ..	28	..	465	..	..	..
Coimbatore ..	41	..	459	..	..	..
Tiruchirappalli ..	25	..	903	..	..	..
Madurai ..	31	..	395	..	..	..
Nilgiris ..	12	..	96	..	..	..
Total ..	415	40,527	14,315	242	236,653	84,148

APPENDIX XLV.

CENSUS OF MARINE FISHING CRAFTS AND TACKLE

IN MADRAS STATE, 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

District.	Fishing crafts.			Total	Fishing tackles of all types.
	Motor boats.	Sail boats.	Catamarans.		
Chingleput ..	2	285	2,464	2,751	3,639
Madras ..	9	63	3,000	3,072	3,001
South Arcot ..	5	202	2,415	2,622	3,371
Tanjore ..	5	988	2,979	3,972	135,487
Ramanathapuram ..	4	1,577	854	2,435	115,754
Tirunelveli ..	10	374	1,425	1,809	17,204
Kanyakumari ..	7	1,227	10,024	11,258	16,212
Total ..	42	4,716	23,161	27,919	294,668

APPENDIX XLVI.

CENSUS OF INLAND FISHING CRAFTS AND TACKLES IN MADRAS STATE IN 1957-58.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

District.	Craft.			Cast net.	Drag net.	Drift and gill net.	Tackle.			Bag nets.	Encircling nets.	Traps.	Hooks and line sets.
	Oracles.	Dhoni and boats.	Rafts and catamarans.				Rangoon net.	Dip net.					
1 Chingleput	..	40	210	765	345	82	..	420	..	85	280	350	
2 Madras	..	8	71	735	244	38	..	725	..	92	..	185	
3 North Arcot	..	..	..	610	215	60	..	..	..	..	120	70	
4 South Arcot	..	25	82	416	250	175	..	..	121	46	210	382	
5 Salem	..	4	2	280	65	238	65	..	..	..	80	450	
6 Coimbatore	..	4	25	216	164	160	..	..	..	..	235	220	
7 Tanjore	..	22	120	1,086	1,454	315	..	..	..	..	460	464	
8 Madurai	..	..	10	187	141	..	..	..	..	..	185	105	
9 Ramanathapuram	..	..	15	98	24	62	..	..	..	..	102	25	
10 Nilgiris	..	..	..	80	32	36	..	..	..	..	..	60	
11 Tiruchirappalli	..	2	10	315	285	180	..	..	..	..	86	188	
12 Tirunelveli	..	15	95	1,310	355	725	..	..	..	55	230	122	
13 Kanyakumari	..	4	15	94	36	30	..	..	..	..	..	54	
	650	124	655	6,192	3,610	2,101	265	1,145	121	278	1,988	2,675	

APPENDIX XLVII.

WORKING OF THE AUDIO-VISUAL VAN.

Serial number.	Date.	Place.	District.	Number of audience
1	16-12-57	Choolerikattukuppam.	Chingleput	400
2	2-2-58	All-India Khadi Swadeshi Industrial Exhibition.	Madras	2,62,000
3	25-12-57 to 6-2-58	Thayamkuppam.	Chingleput	2,000
4	14-2-58	Mattankuppam.	Madras	1,500
5	15-2-58	Thayamkuppam.	Chingleput	2,000
6	16-2-58	Purasawakam.	Madras	500
7	17-2-58	Andikuppam, Pulicat.	Chingleput	2,000
8	18-2-58	Vepery.	Madras	500
9	19-2-58	C.S.I. School, Kellys.	Madras	600
10	20-2-58	Kasimedu-kuppam.	Madras	1,000
11	24-2-58	Narayanaswamy Gardens.	Madras	1,000
12	2-3-58 to 8-3-58	Pearl camp, Tuticorin.	Tirunelveli	15,500
13	12-3-58	Kizavaippon Sippikulam.	Do.	800
14	13-3-58	Punnakayal.	Do.	1,000
15	14-3-58	Amalinagar.	Do.	500
16	15-3-58	Atantalon.	Do.	1,000
17	16-3-58	Manaparai.	Do.	1,500
18	17-3-58	Periathalai.	Do.	2,500
19	18-3-58	Ovari.	Do.	2,000
20	19-3-58	Idinthakarai.	Do.	2,500
21	20-3-58	Palayamkottai.	Do.	4,000
22	21-3-58 to 26-3-58	Pearl Fishery camp.	Do.	10,500
23	27-3-58	Srivaikuntam.	Do.	2,500
24	28-3-58	Shermadevi.	Do.	2,000
25	29-3-58	Tuticorin.	Do.	16,400

APPENDIX XLVIII.

LIST OF FILMS OWNED BY THE DEPARTMENT IN 1957-58.

<i>Serial number and title of films.</i>	<i>Serial number and title of films.</i>
Tamil.	
1 Better Breeds.	18 Tomorrow is ours.
2 Project for Plenty.	19 Rightman for the job.
3 Tungabhadra.	20 Taming the Silt.
4 Khet ka Sunar.	21 Benefits of Bhakr nangal.
5 Improved seeds.	22 Minor Irrigation works.
6 Fight the floods.	23 Kashmir looks ahead.
7 Ripening seeds.	24 Sangeet Bharat.
8 Pastens for plenty.	25 Kisan Sammelan.
9 Wheel of Prosperity.	26 Earth and water.
10 River of Hope.	27 For Better travel.
11 Grind the rice the New Way.	28 Importance of Pure water.
12 A fund in need.	29 Villages and women.
13 Busy herds.	30 Marine Marvels.
14 Food for health.	31 Wealth of our water.
15 The case of Mr. Critic.	32 Fishing for food.
16 Health for millions.	33 To bring earning alive.
17 Shoulder to shoulder.	
English.	
1 Shoulder to shoulder.	13 Wheel of prosperity.
2 Taming the Silt.	14 Tomorrow is ours.
3 Fights the floods.	15 Rightman for the job.
4 Project for plenty.	16 Bring earning alive.
5 Ripening seed.	17 Better travel.
6 Tungabhadra.	18 Food for health.
7 Pastens for plenty.	19 Minor Irrigation works.
8 Busy Herds.	20 Importance of Pure Water.
9 A fund in seed.	21 Kashmir looks ahead.
10 Better breeds.	22 River of Hope.
11 Benefits of Bhakra Nangal.	23 Sangeet Bharat.
12 Health for millions.	24 Earth and water.

Hindi.

1 Sangeet Bharat.

Malayalam.

1 Earth and water.	6 Pastens for plenty.
2 Kashmir looks ahead.	7 To bring earning.
3 Fund and need.	8 Health for millions.
4 Rightman for the job.	9 Villages and women.
5 Ripening seed.	

Kannada.

1 Fund and need.	5 Pastens for plenty.
2 Earth and water.	6 To bring earning.
3 Rightman for the job.	7 Villages and woman.
4 Health for millions.	

APPENDIX XLIX.

LIST OF FILMS BORROWED AND RETURNED DURING 1957-58.

<i>Serial number and title of film.</i>	<i>Language.</i>	<i>From whom.</i>
1 Indian olympics	Tamil	Film Division, Ministry of Information and Broadcasting, Government of India.
2 Road sense	Do.	Do.
3 Railways belong to Government ..	Do.	Do.
4 Wealth of our waters	Do.	Do.
5 True of wealth	Do.	Do.
6 Seven islands	Do.	Do.
7 Spirit of the loom	Do.	Do.
8 Light in the darkness	Do.	Do.
9 Marine Marvel	Do.	Do.
10 Fitness first	Do.	Do.
11 Blood Banks	Do.	Do.
12 Holy Himalayas	Do.	Do.
13 Tanjore	Do.	Do.
14 Wings over India	Do.	Do.
15 Children of God	Do.	Do.
16 Community singing	Do.	Do.
17 Six years of freedom	Do.	Do.
18 Importance of Pure Water	Do.	Do.
19 Konkani	Do.	Do.
20 Our Prime Minister	Do.	Do.
21 Saga in stone	Do.	Do.
22 Your eyes	Do.	Do.
23 Our Navy	Do.	Do.
24 Purse seining	English.	F.A.O.
25 Our travelling	Do.	Do.
26 Kutter	Do.	Do.
27 Mine Sardine	Tamil.	U.S.I.S.

APPENDIX L.

LIST OF IMPORTANT EXHIBITIONS IN WHICH THE
DEPARTMENT PARTICIPATED IN 1957-58.

1	Salem district	..	All India Khadi, Handloom, Swadeshi and Industrial Exhibition — Salem — August '57 (Received gold medal certificate).
2	Do.	..	All India Khadi and Industrial Exhibition—Dharmapuri.
3	Do.	..	Exhibition at the Block Development area at Kolthur.
4	Coimbatore district	..	Exhibition at the Block Development area at Kodumudi.
5	Nilgiris district	..	Flower show at Ootacamund—May 1957.
6	Do.	..	Exhibition connected with the Political conference at Ootacamund.
7	Tirunelveli district	..	Industrial Exhibition, Tuticorin, July-August 1957.
8	Do.	..	Block Development Exhibition at Munchira—September 1957.
9	Do.	..	Exhibition in connection with "Adi Tapas" festival at Sankaran Koil.
10	Do.	..	Exhibition during 'Masi Makham' at Tiruchendur.
11	Do.	..	Cattle show at Tirunelveli.
12	Madurai district	..	Chirai Exhibition—Madurai April 1957 (received gold medal certificate).
13	Do.	..	Exhibition at the Tamilnad Co-operative 13th Conference, Madurai.
14	Do.	..	Science Exhibition in American College, Madurai.
15	Do.	..	Exhibition organised by S.P.C.A., Madurai.
16	Do.	..	Exhibition under the auspices of National Extension Service—Melur August 1957.
17	Ramanathapuram district.	..	Village Leaders' Camp and Exhibition, Chinna, Kattalai.
18	Do.	..	The 11th All India-Industrial Exhibition—Virudhunagar.
19	Tanjore district	..	Masi Makham Exhibition — Kumbakonam February-March 1958.
20	Do.	..	Thula festival Exhibition, Mayuram.
21	Chingleput district	..	Tirukalikundram Block Exhibition, Kulpanthandalam, April 1957.
22	Do.	..	Firka Level conference Exhibition, Pagalmedu May 1957.
23	Do.	..	Community Development Mela Thirukalikundram—May 1957.
24	Do.	..	Agricultural Exhibition during inauguration of Alandur Block 14-10-1957.
25	Do.	..	Adi Festival Exhibition—Periapalayam—August 1957.
26	Do.	..	Village Leaders' Camp Exhibition (Velliyur) January 1958.
27	South Arcot district	..	Agricultural Exhibition Gingee—April 1957.
28	North Arcot district	..	Block Development Seminar of North Arcot and Salem Districts Tiruvannamalai (June) 1957.
29	Do.	..	All India Swadeshi and Agricultural Exhibition, Tiruvannamalai—November-December, 1957.
30	Madras	..	All India Khadi, Swadeshi and Industrial Exhibition — Madras—December 1957—January 1958.

APPENDIX LI

LIST OF PUBLICATIONS IN 1957-58.

1. Fish Statistics of East Coast of Madras State for 1950-51. By P. I. Chacko and S. George. *Madras Fisheries Statistics Report*, No. 43, 1957, 1-68.
2. Fish Marketing in Tanjore town. By P. I. Chacko and S. George. *Madras Fisheries Marketing Report*, No. 1, 1957, 1-4.
3. Fish Marketing in Cuddalore town. By P. I. Chacko and S. George. *Madras Fisheries Marketing Report*, No. 2, 1957, 1-4.
4. கீதாபிஷேகம் பற்றி வரலாறு. By P. I. Chacko. *கீதாபிஷேகம்*, III, 2, 18-19, 1957.
5. Census of the sea fisherfolk and fishing crafts and gear in Madras State, 1957; By P. I. Chacko, S. George and P. P. Krishnaswamy. *Madras Fisheries Statistics Report*, No. 53, 1-29, 1957.
6. Fishery Wealth in Kanyakumari District. By P. I. Chacko, *Madras Information*, XII, 4-5, 1958.
7. Fisheries of Madras State. By P. I. Chacko, 1-16.
8. Hydrobiology of the Yercaul lake, Shevroy Hills, South India, with special reference to its suitability for culture of the carp, *Cyprinus carpio*. By S. V. Ganapathi and P. I. Chacko. *Contrib. Freshwater Biological Station, Madras*, XIV, 1-17, 1958.
9. Development of brackishwater fisheries in Madras State. By P. I. Chacko and A. D. Venkataswamy. *Ind-Com Journal*, XIII, 1, 157-159, 1958.
10. An appraisal of the sea fisheries resources of the Kanyakumari district. By P. I. Chacko and S. George. *Madras Fisheries Statistics Report*, No. 54, 1-6, 1958.
11. Statistics of Inland Fisheries of Madras, January-December, 1955. By P. I. Chacko and S. George. *Madras Statistics Report*, No. 86, 1, 7, 1958.
12. Statistics of Inland Fisheries of Madras State, January-December, 1956. By P. I. Chacko and S. George. *Madras Fisheries Statistics Report*, No. 55, 1-7, 1958.
13. பீதா பண்ணை. By P. I. Chacko. Tamil booklet in fish-farming, pp. 30, 1958.
14. Report on culture-pearl experiments at the marine Fisheries Biological Station, Krusadai Island, Gulf of Mannar. *Contrib. Marine fish. Biological Stat. Krusadai Island, Gulf of Mannar*. No. 5, 1-26, 1958.
15. Fish Statistics of West Coast of Madras State for 1951-52. By P. I. Chacko and S. George. *Madras Fisheries Statistics Report*, No. 44, 1-137, 1958.
16. For statistics of West Coast of Madras State for 1954-55. By P. I. Chacko and S. George and M. I. Mathew. *Madras Fisheries Statistics Report*, No. 50, 1-80, 1958.
17. Fish Statistics of West Coast of Madras State for 1952-53. By P. I. Chacko and S. George. *Madras Fisheries Statistics Report*, No. 46, 1-95, 1958.
18. Studies on utilisation of the scattered resources of Madras State. By P. I. Chacko and C. Malu Pillai. *Contrib. Marine Fisheries Biological Stat. Gulf of Mannar*. No. VI, 1-12, 1958.
19. Better organisation of fish trade by C. P. Kulu Erady. *A symposium on the Second Five-Year Plan of Madras State*, issued by the Director of Information and Publicity, pp. 74-79, 1958.
20. The Plan and the State Fisheries, Co-operative help for better marketing of fish. By S. Aruldoss. *Madras Information*, XI, 23, 1957.
21. An investigation of large scale fish mortality in a temple tank in Madurai. By B. Krishnamurthi, K. A. Dorairajah and A. D. Venkataswamy. *Proc. Indian Academy Science*. XLV, 1957.
22. The Fishermen Co-operatives in the Madras State and the Second Five-Year Plan. By S. Aruldoss. *Ind-Com Journal*, XII, 332-335, 1957.
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APPENDIX LII.

NUMBER OF VISITORS AND GATE COLLECTIONS OF AQUARIUM,
1957-58.

Month.					Number of visitors.	Gate collections.
(1)					(2)	(3)
						RS. NP.
1957—						
April	..	..	..	..	8,180	843 46
May	..	..	..	..	12,702	1,238 37
June	..	..	..	..	7,104	711 64
July	..	..	..	..	5,818	579 09
August	..	..	..	..	6,496	627 58
September	..	..	..	..	5,882	584 81
October	..	..	..	..	6,556	602 48
November	..	..	..	..	3,865	372 43
December	..	..	..	..	10,372	941 83
1958—						
January	..	..	..	..	9,717	874 95
February	..	..	..	..	7,037	657 60
March	..	..	..	..	6,345	612 84
Total					90,074	8,647 08

APPENDIX LIII.

LIST OF PARTIES TO WHOM SUPPLY OF SPECIMENS WERE
MADE FROM THE ENNORE STATION IN 1957-58.

- 1 M. J. Science and Arts College, Jalegaon.
- 2 Messrs. Biological Supplies, Kottayam.
- 3 Principal, Ahmednagar College, Ahmednagar.
- 4 Assistant Fisheries Officer, Manamkonde.
- 5 Messrs. Jainsons & Sons, Ambala.
- 6 Government Arts College, Ootacamund.
- 7 Ranchi College, Ranchi.
- 8 Messrs. Wortex Biological Supply House, Delhi.
- 9 Mr. Venkatesh Jamb Vidya Bhavan, Udaipur.
- 10 Principal, Sri Shivaji Vidya Prasarak Sanathas Arts College, Dhulia.
- 11 Messrs. Biological Supply Concern Ltd., Calcutta.
- 12 Principal, Government College, Chandigarh.
- 13 Principal, Ranchi College, Ranchi.
- 14 Messrs. Horgolal and Sons, Ambala Cantt.
- 15 India Educational Stores, Mathura.
- 16 Messrs. Laboratory Equipment Trades, Ambala Cantt.
- 17 Principal, Government College, Gurdespur.
- 18 Principal, D.S.B. College, Nainital.
- 19 Principal, Government College for Women, Guntur.
- 20 Messrs. Ravindra and Co., Hoshiarpur.
- 21 Principal, St. Thomas College, Kozhencherry.
- 22 Messrs. Scientific Equipment Works, Delhi.
- 23 B.D.O. Sauganar.
- 24 Principal, Central College, Bangalore.
- 25 Mr. E. L. Jordon Christian College, Lucknow.
- 26 Messrs. Monty's Natural Science Estt., Allahabad.
- 27 Bursar American College, Madurai.
- 28 Principal, S.M. College, Chaudasi.
- 29 Principal, Government College, Photak.
- 30 Messrs. Rajasthan Scientific Co., Jaipur.
- 31 Gayatri Traders, Madras.
- 32 Messrs. Shankar and Co., Hyderabad.
- 33 Bursar, Hislop College, Nagpur.
- 34 Principal, Sri G. V. G. Visalakshi College for Women, Udumalpet.
- 35 Head of the Department of Zoology, Sagar.
- 36 Professor of Biology, Shreya's College, Shah Bang, Ahmedabad.
- 37 Principal, Government Arts College, Coimbatore.
- 38 Messrs. Hindusthan Minerals and Natural History Specimens Supply Co., Calcutta.
- 39 Principal, Government Art College, Cuddappah.
- 40 Professor of Zoology, Ferook College, Feroke.
- 41 Principal, Science College, Saifabad, Hyderabad.
- 42 Principal, Auxilium College, Katpadi.
- 43 Headmistress, Ladyhill Girls' High School, Uruva, Mangalore.
- 44 Zoology Department, Ajmer.
- 45 Messrs. S. Rathv and Sons, Madras.
- 46 Head of the Biology Department, D.A.V. College, Jullundur City.
- 47 Head of the Department of Zoology, University College of Science, Osmania University, Hyderabad.
- 48 Principal, M.J.K. College, Bettiah.
- 49 Principal, Peoples College, Mandel.
- 50 Loyola College, Madras.
- 51 Principal, Ravenshaw College, Cuttack.
- 52 Superintendent, Sree Narayana College, Marine Station, Tangasseri.
- 53 Messrs. Prakash Industries, Agra.
- 54 The Principal, Rural Extension Training Centre, Arni.
- 55 The Principal, Extension Training Centre, Samalkot.
- 56 Assistant Director of Fisheries, Mettur Dam.

APPENDIX LIV.

LIST OF PARTIES TO WHOM SHELLGIRT WAS SUPPLIED FROM
ENNORE STATION IN 1957-58.

- 1 Superintendent, Government Dairy Farm, Vizagapatnam.
- 2 Block Development Officer, Kotauratla.
- 3 Veterinary Assistant Surgeon, District Livestock Farm, Cattle Farm, Koilai.
- 4 Block Development Officer, Araku Valley.
- 5 Block Development Officer, Badvel.
- 6 Superintendent, Livestock Farm, Orathanad.
- 7 Mr. A. C. Lawlor, Hyderabad.
- 8 Block Development Officer, Nakkapalli.
- 9 Mrs. Donald Maclyntre, Peermade.
- 10 Assistant Director of Fisheries, Vellore.
- 11 Veterinary Assistant Surgeon, District Poultry Farm, Cuddappah.
- 12 Block Development Officer, Koyyalegudam.
- 13 Block Development Officer, Subbavaram.
- 14 Superintendent, District Livestock Farm, Guntur.
- 15 Block Development Officer, Perambalur.
- 16 Principal, Double Shift Extension T. C. Kaleshasli.
- 17 District Veterinary Officer, Ootacamund.
- 18 Superintendent, Agricultural Farm, Bapatla.
- 19 Superintendent, Basic Agricultural School, Bapatla.
- 20 Veterinary Assistant Surgeon, District Poultry Farm, Chittoor.
- 21 District Veterinary Officer, East Godavari, Kakinada.
- 22 Veterinary Assistant Surgeon, Vayalpad.
- 23 District Veterinary Officer, Erode.
- 24 Block Development Officer, Pulicherala, Chittoor District.
- 25 Headmaster, Junior Certified School, Tanjore.
- 26 District Veterinary Officer, South Arcot, Cuddalore.
- 27 Block Development Officer, Koilpatti.
- 28 Miss C. K. Subhapradha, Nellore.
- 29 Block Development Officer, Agasteeswaram, Suchindram.
- 30 Superintendent, Basic Agricultural School, Anakapalle.
- 31 Project Executive Officer, Hukumpeta.
- 32 Principal, Madras Veterinary College, Madras.
- 33 Block Development Officer, Radhapuram.
- 34 Superintendent, Government Livestock Farm, Guntur.
- 35 Block Development Officer, Balapanur.
- 36 Block Development Officer, Jamalamadugu.
- 37 Block Development Officer, Muddipad.
- 38 District Veterinary Officer, Tanjore.
- 39 District Veterinary Officer, Tinnevely.
- 40 District Veterinary Officer, Tanjore West.
- 41 District Veterinary Officer, Kakinada.
- 42 District Veterinary Officer, West Godavari, Eluru.
- 43 District Veterinary Officer, Vizagapatnam.
- 44 Sri G. Ramadas, Grema Sevak, Vandalur R.S.
- 45 Sri T. P. John, Tambaram.

APPENDIX LV.

PARTICULARS OF FISHING VESSELS AND VEHICLES POSSESSED
BY THE DEPARTMENT.

Description.	Number.
1 Motor fishing vessel, 'Gohur Khalseli'	1
2 Motor launch for Marine Biological investigations at Krusadat Island	1
3 Pablo boats	42
4 Mechanised Tuticorin canoe	1
5 F. A. O. Surf landing boats	3
6 Motor boats at Training Centres at Nagapattinam and Tuticorin	3
7 Quick transport vans (hiring scheme)	9
8 Do. (hire-purchase scheme)	4
9 Land rovers for fish seed transport	4
10 Vans for fish seed transport	5
11 Jeeps for fish seed transport	5
12 Propaganda van	1
13 Audio-visual van (obtained under TCM aid from U.S.A.) ..	1

APPENDIX LVI.

LIST OF GAZETTED OFFICERS OF THE FISHERIES DEPARTMENT AS ON
31ST MARCH 1958.

1. Sri C. P. Kelu Erady, I.A.S., Director of Fisheries and Additional Director of Industries and Commerce.
2. Sri P. Venkataraman, B.A., Personal Assistant to the Director of Fisheries.
3. Sri D. D. Peter Devadas, B.A., Deputy Director of Fisheries (Marine), Madras.
4. Sri S. Varadarajan, M.A., Deputy Director of Fisheries (Inland), Madras.
5. Sri V. D. Spurgeon, B.A., Assistant Director of Fisheries (TCA), Madras.
6. Dr. P. I. Chacko, M.A., PH.D., Assistant Director of Fisheries (Marketing and Information), Madras.
7. Sri N. V. Choodamani, B.Sc. (HONS.), Assistant Director of Fisheries, Tuticorin.
8. Sri V. Ranganathan, M.Sc., Assistant Director Fisheries, Tanjore.
9. Sri R. Venkataraman, M.Sc., Superintendent, Fisheries-Technological-cum-Biological Station, Tuticorin.
10. Sri S. Thyagarajan, B.A., Superintendent, Fisheries Training Centre, Tuticorin.
11. Sri J. Solomen, B.A., Assistant Director of Fisheries, Mettur Dam.
12. Sri R. Srinivasan, M.A., Assistant Director of Fisheries, Madurai.
13. Sri S. Thiravenkatachari, B.Sc., Assistant Director of Fisheries, Nagercoil.
14. Sri S. H. Hussainy, B.Sc., Assistant Director of Fisheries, Training Centre, Nagapattinam.
15. Sri S. X. Arokiaswamy, B.A., Assistant Director of Fisheries (Nylon), Madras.
16. Sri T. M. Arumugam, M.A., Assistant Director of Fisheries (Fresh Water Biology), Bhavanisagar.
17. Sri D. A. S. Gnanadas, B.A., Assistant Director of Fisheries (Craft and Tackle), Madras.
18. Sri D. Sunderarajan, B.Sc., Assistant Director of Fisheries, Vellore.
19. Sri R. K. Mani, B.E., Assistant Engineer (Fisheries), Madras.
20. Sri A. Srinivasan, B.Sc., Hydrologist, Bhavanisagar.

APPENDIX LVII.

STATEMENT OF EXPENDITURE AND RECEIPTS OF THE FISHERIES
DEPARTMENT FOR THE YEAR 1957-58.

Head of account.	Expenditure.		Receipts.	
(1)	(2)		(3)	
40. Agriculture—m. Fisheries.				
	RS.	NP.	RS.	NP.
I. Direction	1,08,493	86		
II. Pearl and Chank Fisheries	4,83,962	85	7,80,188	14
V. Inland Fisheries	1,51,175	29	2,29,012	39
VI. Exploitation of Mettur Reservoir Fisheries.	28,084	24	6,594	77
VII. Inland Fisheries Research including Chetput Farm and Statistical Section.	30,833	15	503	10
VIII. Oyster Farm Pulicat	1,234	00	3,486	22
IX. Marine Biological Section and Aquarium.	58,960	05	9,871	32
X. Manufacture of Semi-dried Prawns ..	1,534	27	75	65
XI. Mirror Carp Fish Farm at Ootacamund.	19,742	29	13,535	00
XIII. Fishery Marketing and Information Officer and staff.	46,758	92		
XV. Fisheries Schools	9,562	94		
XVI. Madras Rural Pisciculture Research Scheme (F.W.B.) Station.	22,148	75		
XVII. Scheme for Marine Fishery Development with T.C.M. Aid.	28,294	41	8,589	09
XIX. Scheme for the provision of Technological Assistance by F.A.O.	54,495	86	5,896	08
XX. Internal Audit Staff	12,050	08		
XXI. Establishment of a Training Centre at Tuticorin under the T.C.M. Aid.	57,656	08	7,318	51
XXII. Shark Liver Oil Extraction Centres.	22,304	60		
XXIII. Scheme for Mahabalipuram Fishermen Co-operative Societies.	1,658	46		
XXIV. Fresh Water Aquarium	4,358	34	7,863	27
XXV. Fish Curing Yards	1,21,283	73	29,738	17
XXVI. Intensive Cultivation Schemes—Headquarters staff.	6,979	26		
XXVII. Intensive Seed Collection and Distribution for stocking inland waters.	1,43,533	72	19,621	46
XXVIII. Supply of yarn and other essential materials at subsidised rates to fishermen—Distribution of nylon nets.	2,19,748	36	25,477	82
XXX. Training of personnel in the use of new types of operation of engines.	27,084	53		
XXXI. Schemes for the development of Major Reservoir Fisheries.	36,529	21	3,507	22
XXXII. Assistance to Fishermen Co-operative Societies for marketing of fish.	57,450	91		

APPENDIX LVII—cont.

STATEMENT OF EXPENDITURE AND RECEIPTS OF THE
FISHERIES DEPARTMENT FOR THE YEAR 1957-58—cont.

Head of account.	Expenditure.		Receipts.	
(1)	(2)		(3)	
40. Agriculture—m. Fisheries—cont.				
	RS.	NP.	RS.	NP.
XXXIII. Establishment of an Estuarine Fish Farm.	9,209	64		
XXXIV. Construction of mechanised fishing boats.	1,48,764	91	1,387	00
XXXV. Rural Fishery Demonstration Units.	1,36,267	56	50,235	49
XXXVI. Public Health Fish Unit	7,834	09		
XXXVII. Fisheries Engineering staff	2,566	36		
XXXVIII. Fisheries demonstration factories ..	5,590	30	5,484	96
XXXIX. Fisheries Welfare Scheme	23,915	23		
XL. Provision of quick transport facilities.	1,25,424	61	63,974	82
XLI. Deep-sea fishing operations	88,143	39	19,296	38
XLII. Improvement of Indigenous Crafts and Tackles.	31,657	46	13,009	95
XLIII. Installation of ice making plant for providing cold storage of fish.	1,480	81		
XLIV. Fisheries Technological-cum-Biological Station, Tuticorin.	74,372	11		
XLV. Grant of subsidies to local bodies and Co-operative Societies.	33,461	50		
XLVI. Development of fishing harbours at suitable river mouths.	15,549	31		
XLVII. Assistance to fishermen in coastal areas affected by failure of fishing season.	64,236	66	14,383	97
40. Agriculture—n. Works. C.—Fisheries.				
81. a. Capital Account of civil works outside the Revenue Account a.—Original works—Buildings—H. Agriculture and Fisheries—5. Construction of a fish farm in the Amara-vathi Reservoir.	40,290	42		
82. Capital Account of other works outside the Revenue Account.				
III. Suspense and Misc.—b. Agriculture and Fisheries				
(ii) Construction of mechanised fishing boats—Construction of a boat building yard.	68,805	00		
(iii) Installation of ice-making plant for providing cold storage of fish	47,152	00		
(V) Establishment of a model Estuarine Fish Farm	13,403	00		
Other Schemes.				
Nilgiris fisheries			4,379	94
Production			61,536	90
Fish Meal and Fish Manure production			2,183	82
Recovery of overpayment			933	28
Collection of payment for services rendered ..			4,069	91

APPENDIX LVII.—cont.

STATEMENT OF EXPENDITURE AND RECEIPTS OF THE FISHERIES
DEPARTMENT FOR THE YEAR 1957-58.

Head of account. (1)	Expenditure. (2)		Receipts. (3)	
	RS.	NP.	RS.	NP.
<i>Grants from Government of India for schemes in Second Five-Year Plan.</i>				
(1) Training Centre at Tuticorin	..	..	11,087	00
(2) Establishment of an Esuarine Fish Farm.	..	..	2,080	00
(3) Fisheries Technological Station, Tuticorin.	..	..	12,678	00
(4) Fishermen's Training Centre at Nagapattinam.	..	..	5,464	00
(5) Salt Subsidy Scheme	..	..	11,875	00
(6) Supply of Nylon nets	..	..	14,166	00
(7) Provision of Quick Transport facilities ..	..	..	11,220	00
(8) Development of Major Reservoir Fisheries.	..	..	15,075	00
(9) Construction of harbours at suitable river mouths.	..	..	15,062	00
(10) Intensive seed collection and distribution.	..	..	23,850	00
(11) Strengthening of staff in Kanyakumari district.	..	..	517	88
(12) Additional staff for assistance to Fishermen Co-operative Societies.	..	..	525	00
Total ..	26,94,844	26	25,06,844	51
<i>Deduct—Charges on supervision, education welfare and Research Schemes.</i>				
			RS.	NP.
			(-) 1,88,029	75
			(+) 4,16,177	76
Hence net profit			(+) 2,28,148	01

APPENDIX LVIII.

GLOSSARY OF TECHNICAL NAMES AND TAMIL NAMES.

(Compiled by P. I. Chacko and P. P. Krishnaswamy.)

<i>Anguilla</i> spp. (Eel).	விலாங்கு
2 <i>Amblypharyngodon</i> .	உளரி ; பச்சைதலை கெண்டை
3 <i>Anabas Scandens</i> (Climbing perch).	பனயேரி கெண்டை
4 <i>Ambassis</i> sp.	கண்ணாடி மீன்
5 <i>Arius</i> spp.	கெள்று ; கெளுத்தி
6 <i>Anchovies</i> .	பொருவா
7 <i>Acanthurus</i> sp.	கோழி மீன் ; ரண வைத்திய மீன்
8 <i>Belone</i> spp. (Gar fish).	மூரல்
9 <i>Bonito</i>	குரை
10 Butter fish (<i>Scomberoides</i> spp).	கட்டா ; தோல் பாரை
11 B'g Jawed jumer (<i>Lactarius</i>).	குதிப்பு ; அடுப்பு
12 <i>Barbus tor</i> (Masheer).	பொம்மீன்
13 <i>Barbus dubius</i> .	கோழிமீன்
14 <i>Barbus hexagonalepis</i> .	கரம்பை
15 <i>Barbus Sarana</i> .	பஞ்சனை ; சாணி கெண்டை
16 <i>Barbus Mahecola</i> .	செவ்வாலி கெண்டை
17 <i>Barbus Filamentosus</i> (Spotted Barb).	மச்ச கெண்டை ; செவ்வாலி
18 <i>Barbus Stigma</i> .	குள்ள கெண்டை
19 <i>Barbus Vittatus</i> .	சின்ன குள்ள கெண்டை
20 <i>Barbus Carnaticus</i> (Carnatic carp).	பெளரி
21 <i>Barbus Chrysopoma</i> (Olive carp).	பஞ்சனை
22 <i>Chanos chanos</i> (Milk fish).	பால மீன் ; துள்ளு கெண்டை
23 <i>Carcharias</i> spp. (Shark).	சுரு
24 <i>Chirocentrus dorab</i> (Sabre fish).	முள்ளு வானை ; கரி வானை ; துப்பு வானை
25 <i>Clupea longiceps</i> .	நொண்டலை
26 <i>Clupea finl'riata</i> .	குடை ; நொண்டலை
27 <i>Cyprinus</i> spp. (Seer fish).	வஞ்சரம் ; சீலா ; மாவுலாசி
28 <i>Cynoglossus</i> sp.	நாக்கு மீன்
29 <i>Varana</i> spp. (Horse mackerel).	பாரை
30 <i>Chorinemus</i> spp. (Leather jacket).	கட்டா ; தோல்பாரை ; அக்கம் பாரை
31 <i>Cypsilurus</i> sp. (Flying fish).	பரவை கோலா
32 <i>Chela</i> sp. (Silver fish).	வெள்ளி
33 <i>Catla catla</i> .	தோப்பா மீன்
34 <i>Cirrhina cirrhosa</i>	வெண் கெண்டை
35 <i>Cirrhina latia</i>	குள்ள குஞ்சான்
36 <i>Cirrhina reba</i>	அரிஞ்சான்
37 <i>Cirrhina mrigala</i>	மிருகாலா
38 <i>Cyprinus carpio</i> (mirror carp)	கண்ணாடி கெண்டை
39 <i>Carassius vulgaris</i> (golden carp)	பொன் கெண்டை
40 <i>Clarius magur</i>	கறுப்பு தேனி
41 <i>Diagramma</i> spp. (Rock Perch)	மதனம் ; தோலான்
42 <i>Dussumieria</i> spp. (Rainbow sardine).	தொண்டான் ; பூண்டு விரிஞ்சான்
43 <i>Danio</i> sp.	சேலைப் பரவு
44 <i>Elops</i> .	ஆலாட்டி
45 <i>Eleutheronema</i> spp.	காலா
46 <i>Elacate nigra</i>	கடல் விரால்
47 <i>Equula</i> sp.	காரல் ; காரை ; காரைப்பொடி
48 <i>Etiopius suratensis</i> (pearl spot)	செத்த கெண்டை
49 <i>Etiopius maculatus</i>	புராடி ; செல்லா காசு
50 <i>Exocoetis</i> spp.	பரவை கோலா ; கோலா
51 <i>Engraulis</i> spp. (Anchovies)	பொருவா
52 <i>Epinephelus</i> spp.	கலவா
53 <i>Gourami</i> (Osphronemus)	குராமி ; சங்கரா
54 <i>Galeocerdo articus</i> (Tiger shark)	வள்ளுவன் சுரு
55 <i>Gerres</i> spp.	ஊடான்
56 Gold fish	பொன் மீன்
57 <i>Glossogobius</i> spp.	உளுவை
58 <i>Hemiramphus georgii</i> (halfbeaks)	கொழுத்த மூரல் ; கள்ள மூச்சு
59 <i>Hilsa ilisha</i>	உள்ளம்
60 <i>Hilsa tili</i>	கருவுள்ளம்

APPENDIX LVIII—cont.

GLOSSARY OF TECHNICAL NAMES AND TAMIL NAMES—cont.

61 <i>Kowala thoracata</i> .	சூடை
62 <i>Lactarius</i> spp.	சுடும்பு ; குதிப்பு
63 <i>Leiognathus</i> spp. (Silver bellius)	காரல் ; காரைப்பொடி
64 <i>Lates calcarifer</i>	கொடுவா
65 <i>Lutjanus</i> spp. (snapper)	செப்பிலி
66 <i>Lethrinus</i> spp. (sea bream)	வேலா மீன்
67 <i>Lepidecephalichthys thermalis</i> .	அசரை
68 <i>Labeo fimbriatus</i> .	சேல் கெண்டை
69 <i>Labeo kontius</i> .	கருமுழி கெண்டை
70 <i>Labeo rohita</i> .	ரோஹு
71 <i>Labeo calbasu</i>	காக்கா மீன்
72 <i>Mast cembelus</i> spp.	ஆரால் ; கல் ஆரால்
73 <i>Macropodus (Polyacanthus) cupa-</i> <i>nus</i> .	பன்னா
74 <i>Mystus Seenghala</i> .	குறுந்தலை கெளுத்தி
75 <i>Mystus aor</i> .	நெந்தலை கெளுத்தி ; பூனை கெளுத்தி
76 <i>Mystus vittatus</i>	சோங் கெளுத்தி ; நாட்டு கெளுத்தி
77 <i>Mugil</i> spp. (Mullet)	மடவை
78 <i>Mackerel</i> .	காணங் கெளுத்தி ; குமலா
79 <i>Megilops cyprioides</i> (Ox-eyed herr ng)	மோரான் கெண்டை
80 <i>Notopterus</i> .	சொட்ட வாளை ; அம்பட்டன் வாளை
81 <i>Nuri danrici</i> (flying barb)	மீசப்பரவை
82 Oil sardine	நொண்டி
83 <i>Osteogobius militaris</i> .	மனவ கெளுத்தி ; மனவ கெளறு
84 <i>Ophiocephalus marulius</i> (river murel).	அவுரி
85 <i>Ophiocephalus</i> spp.	விரால்
86 <i>Pellona</i> spp	கொதுவா
87 <i>Pomfrets</i>	வாவல்
88 <i>Polynemus</i> spp. (thread-fin)	காலா
89 <i>Pambano</i> (<i>Trachynotus</i> spp.)	வாவல் பாரை
90 <i>Pristipoma</i> spp.	புள்ளிகுறி மீன் ; குருமுட்டி ; குறுகுறுப்பை
91 <i>Pink-perch</i> (<i>synagris</i> spp.)	லோமியன் ; செங்கரா
92 <i>Pristis</i> spp.	வேலா மீன்
93 <i>Pseudorasbora</i> spp. (<i>Tonguefish</i>)	நாக்கு மீன்
94 <i>Pinctada vulgaris</i> (Pearl oyster)	முத்து சிப்பி
95 <i>Pangasius</i> .	ஐ கெளுத்தி
96 <i>Perilampus</i> spp. (minnow)	பச்சை மீன்
97 <i>Phaeophycea</i> (brown algae)	பழுப்பு பாசி
98 <i>Rastrelliger Kanagurta</i> (Mackerel)	காணங் கெளுத்தி
99 Ribbon fish.	சாவாலை ; ஓலை வாளை
100 <i>Rhynchobatus</i> spp. (Plough fish)	படங்கான்
101 Red Mullet (<i>upeneoides</i> spp.)	சென்னகரை ; நகரை
102 Rock Perch (<i>Diagramma</i> spp.)	மதனம்
103 Rainbow sardine (<i>Dussunierie</i>)	தொண்டான்
104 <i>Rohtee cotio</i> (Rohtee)	பட்ட குஞ்சு
105 <i>Sardinella</i> spp. (Sardine)	சூடை
106 <i>Sphyrna</i> spp. (Hammer Hed)	கொம்பன் சுரு
107 <i>Stromateus</i> spp (pomfrets)	வெளவால் ; வாவல்
108 <i>Scomberoides</i> spp. (Leather jacket)	கட்டா ; தோல் பாரை
109 Silver bellis <i>Leiognathus</i> spp. and <i>Giza</i> spp.)	காரல் ; காரைப்பொடி
110 <i>Sciaenidae</i> spp. (croaker fish)	கத்தாளை
111 <i>Sillago</i> spp. (whiti g)	கொங்கான்
112 <i>Serranus</i> spp. (Sea Bass)	கலவா
113 <i>Scomberomorus</i> spp. (<i>Cybius</i> spp.)	வஞ்சிரம்
114 <i>Sting ray</i> (<i>Trygon</i>)	அடத்திருக்கை , எலத்திருக்கை
115 Seer fish (<i>scomberomorus</i> spp.)	வஞ்சிரம் ; மாவுலாசி
116 Squeaking perch (<i>Therapon</i> spp.)	கீச்சான்
117 <i>Stoleporus</i> spp. (white bait)	நெத்தலி
118 <i>Sphyræna obtusata</i> (<i>Barracuda</i>)	ஊலி
119 <i>Scylla serrata</i> .	பச்சை நண்டு
120 <i>Saccobranchius</i> spp.	தேவி
121 Star fish	தட்சத்திர மீன்

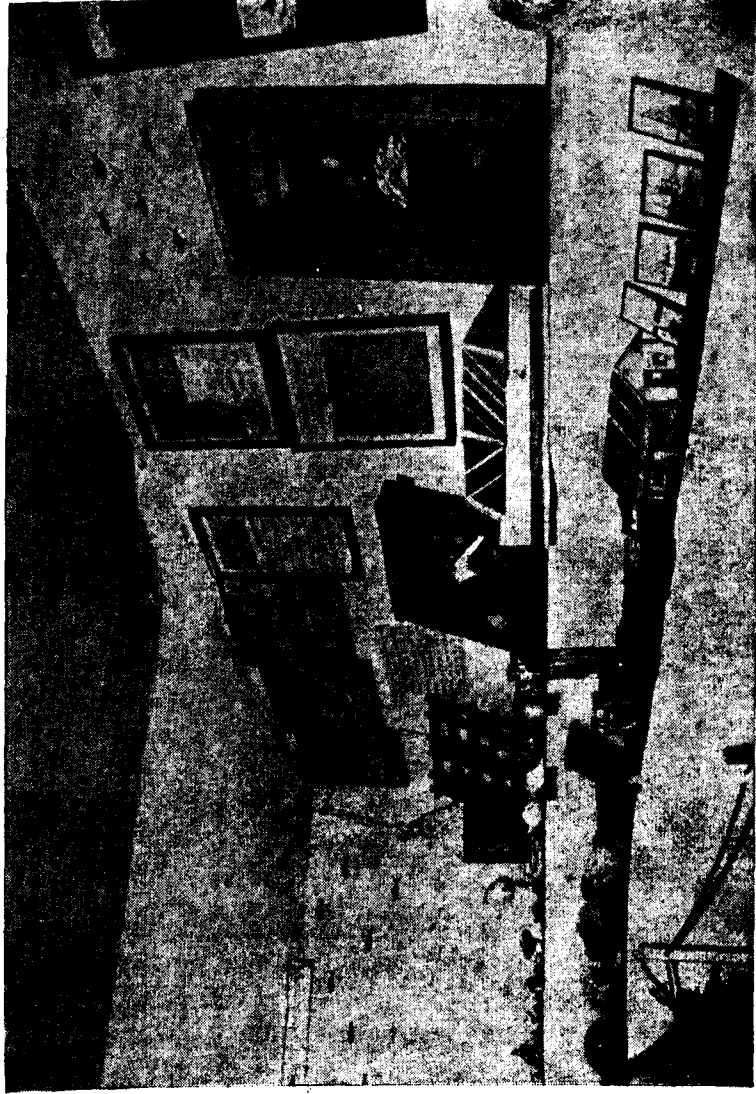
APPENDIX LVIII—cont.

GLOSSARY OF TECHNICAL NAMES AND TAMIL NAMES—cont.

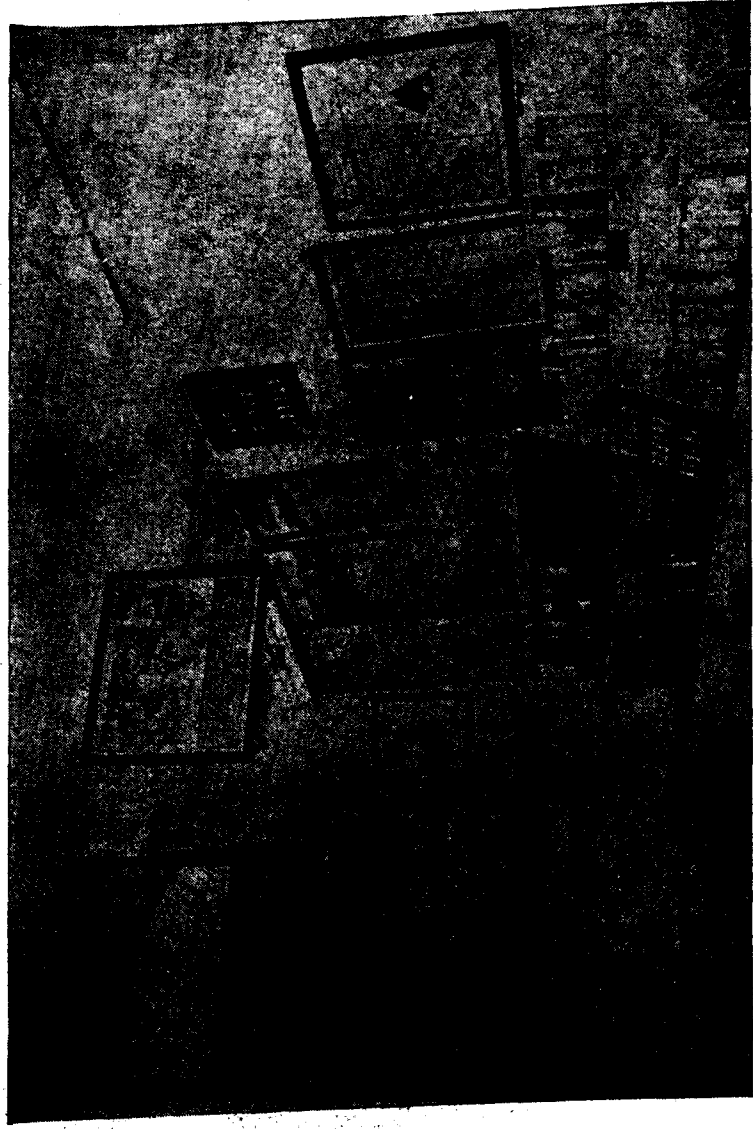
122 <i>Silundia Silundia</i>	பொணத்தி
123 <i>Thynnus</i> spp. (<i>tunny</i>)	சூரை
124 <i>Trichiurus</i> s p. (ribbon fish)	சாவாளை
125 <i>Trachynotus</i> spp. (Pambano)	வாவல் பாரை
126 <i>Therapon</i> spp. (squeaking perch).	கீச்சான்
127 <i>Tilapia</i> spp. (<i>Tilapia</i>)	திலேப்பியா
128 <i>Tinca</i> p. (<i>Tench</i>)	சீமை கெண்டை
129 <i>Wallagonia attu</i> (Freshwater shark).	வாளை
130 Zebra fish	வரி மீன்



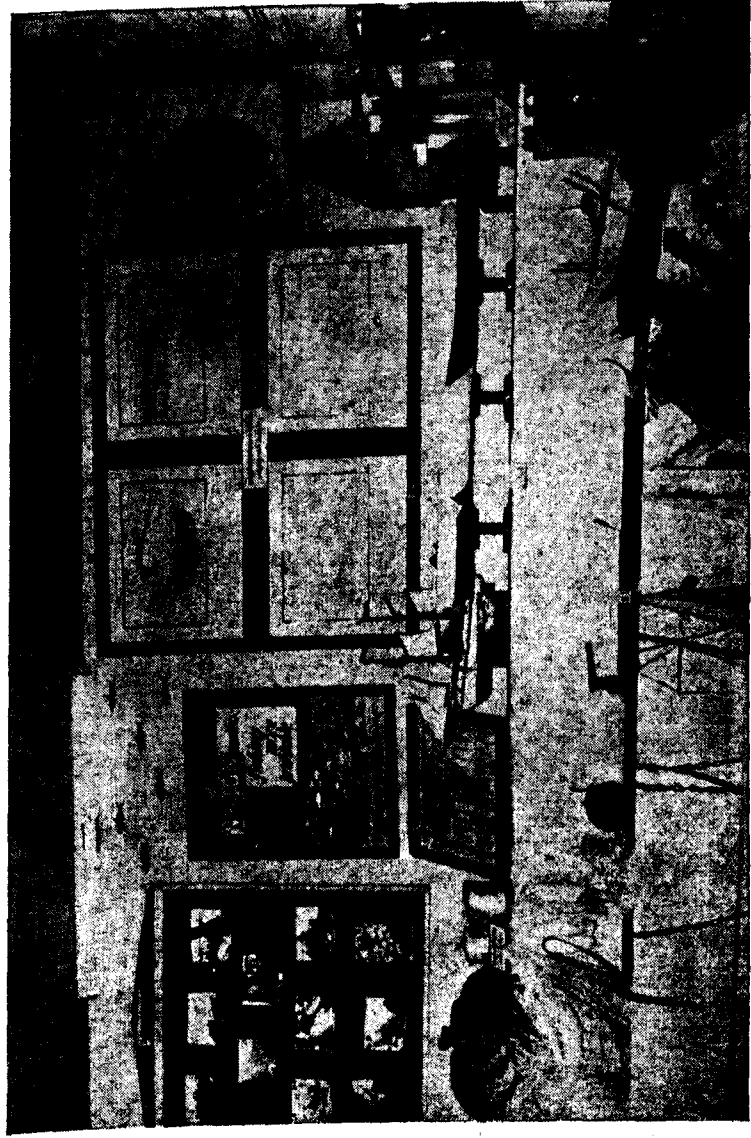
Frontage of Fisheries Pavilion in the All-India Khadi, Swadeshi and Industrial Exhibition,
December 1957-January 1958—DESIGNED BY P. I. CHACKO & K. J. JOSEPH.



Socio-economic and by-products section in the Fisheries Pavilion.



Biological section in the Fisheries Pavilion.



Craft and tackle section in the Fisheries Pavilion.



MAP SHOWING IMPORTANT FISHERY CENTRES IN MADRAS STATE

MISCELLANEOUS



FOOD AND AGRICULTURE DEPARTMENT

G.O. No. 3318, 21st September 1959

Administration Report—Fisheries Department—1957-58—
Reviewed and recorded with remarks.

READ—the following paper :—

Letter from the Director of Fisheries, dated 23rd March 1959,
No. 6365 E-2/58.

Order—No. 3318, Food and Agriculture, dated 21st September 1959.

The Report on the working of the Fisheries Department during the year 1957-58 submitted by the Director of Fisheries is recorded with the following remarks.

2. *Administration.*—The year under report was the fifth year after the Fisheries Department was amalgamated with the Department of Industries and Commerce. Sri S. Aruldoss, I.A.S., was in-charge of the Department till the afternoon of 15th July 1957 and Sri C. P. Kolu Erady, I.A.S., till the end of the year. During the year under report the activities of the Department were considerably expanded, especially, through the various Schemes of the Second Five-Year Plan. Quite a notable feature of the administration this year is that the Fisheries Branch of the Industries Department has been decided to be made as a separate Department with effect from 1st April 1958. This decision was taken with reference to the recommendation made by the All-India Fisheries Conference held at Madras in September 1956 and also with reference to the recommendation made by the State Fisheries Ministers' Conference convened by the Government of India at Bombay. The Government have also decided in March 1958, that with effect from 1st April 1958, the Fisheries Department so constituted should work under a whole-time Director in order to carry out its activities with full vigour and undivided attention.

Sri S. T. Chari, Assistant Director of Fisheries, who was deputed to Canada in March 1957 for training in fish processing under the Colombo Plan returned at the end of October 1957. Sri S. Varadarajan, Deputy Director of Fisheries (Inland), was deputed to Japan for study and observations of all aspects of fisheries in that country and he returned in September 1957.

The first meeting of the State Fisheries Advisory Board was held at Madras in August 1957, when it made several useful suggestions for the development of the fishing industry. A conference of departmental officers was also held in October 1957 at Madras when all the Gazetted Officers of the Department were present and it considered ways and means to implement the recommendations of the State Fisheries Advisory Board, implementation of schemes included in the Second Five-Year Plan and other general and administrative methods.

3. *Fisheries Research*.—Research on various problems connected with the conservation, management, development, exploitation and utilization of the marine and inland fisheries resources were continued at the Biological and Technological Stations at Tuticorin, Cape Comorin, Krusadai Island, Ennore and Bhavani-sagar. During the year under report, two meetings of the State Fisheries Research Council were held. In the earlier meeting held in April 1957, a fresh three-year programme of research was drawn up consequent to the reorganization of the States and the resultant loss of Marine Biological Station at West Hill and the Technological Station at Kozhikode to the Kerala State and starting of a new Technological Station at Tuticorin and Cape Comorin. As its meeting held in December 1957, the Council reviewed the work done at the Research Stations during the half-year ending 30th September 1957 and found that the progress was satisfactory.

(i) *Marine Fisheries Research*.—During the year under review, good progress was made under the following investigations under the Marine Biological Station, Tuticorin:—

- (1) Studies on the Plankton off Tuticorin;
- (2) Studies on the Biology of pearl oysters;
- (3) Evolving a new technique for the estimation of oyster population in the pearl banks;
- (4) Studies on the Biology and ecology of chanks; and
- (5) Biological studies on the fishes, inhabiting the pearl banks.

At the Marine Biological Station, Cape Comorin, intensive studies on plankton, investigation of the lobster fishery of the district, and compilation of the fish landing statistics were

attended to. The progress of work at the Biological Station, Krusadai, was handicapped during the beginning of the period under review owing to the lack of personnel. This Station however had the full complement of Research staff from September 1957 onwards. Studies on planktology were conducted but no peculiar planktonic phenomena were noticed. The general fishery development work around Rameswaram and the departmental deep sea fishing activities were continued. During various periods in the year, the Food and Agricultural Organization boats under the direction of the Food and Agricultural Organization fishing expert Sri Illugason and the Technical Co-operation Mission boats of M. V. "Gudjon" operated around Rameswaram island with trawl nets. These operations were of an experimental nature to locate good trawling grounds in both Palk Bay and Gulf of Munnar. The exploring cruises yielded fruitful results and a potential trawling bank was located off Single island at depths varying from 9½ to 13 fathoms. Studies on the Algology, pearl oyster farming, marine fish farming, chank marking experiments were also done. At the Marine Biological Station, Ennore, besides conducting research on mullets and edible oysters, work on the meteorology and hydrography of the Ennore Estuary was undertaken. Proximate composition of the food fishes of the East Coast, standardization of cured fish products, and fisheries by-products like gutts and gill manure, fish meal and prawn shell meal and semi-dried prawns received due attention at the Fisheries Technological Station, Tuticorin. During the period under review, bacteriological studies of inshore and offshore fishing off Tuticorin were also taken up for investigation at the above station. At the Fisheries Technological Station, Cape Comorin, as many as 19 samples of salt used for fish curing yards in the district were analysed with a view to assess their suitability for fish curing and to improve the quality of the cured product. Systematic studies on fat content of commercial fish like *Sardinella* and *Dussumeiria* species were also taken up with a view to find out the possibility of commercial extraction of sardine oil in the East Coast.

(ii) *Inland Fisheries Research*.—The segregation of economic varieties of carp fry from the mass of fry collections made in thousands from the rivers, especially from Cauveri and Bhavani in Coimbatore district is a major problem in fish cultural operations. The experiments on the segregation of carp fry and reduction in mortality were therefore carried at the Fresh Water Biological Station, Bhavani-sagar. Studies on *Reshora*, *Wallago*, *Attu*, *Catla catla*, and *Borbus ticto* were also undertaken. Effect of manuring on the growth of *Hydrilla* and on spawning of mirror carp were also studied. The oxygen requirements of fresh water fishes, studies on fishing gear, effects on fish poison on fish life, food value of fresh water fishes are some of the other items of work undertaken at the station. A detailed survey of the

Rural Demonstration Tanks in the entire State was taken up and the volume of data that have been gathered await final consolidation and assessment. Studies on the impounded waters like Krishna-giri Reservoir Kundah Hyal Project, the Hope Lake and River Thambarapanni were carried out. Investigation on the Ular River Fishery, Tanjore, and the Hilsa fishery of Coleroon river were also carried out. Fish Culture in Cholavar m lake, investigations on the Tantipandal fish farm, mortality of fish in the Velioore Fort Moat, weed control experiments, fish population studies in Bhavanisagar Reservoirs and also studies on the Bhawanisagar fish from ponds are some of the other important items of work attended to by this Station.

4. *Development and exploitation of marine fisheries.*—A Pearl fishery was started on 15th March, 1957 and closed on 20th May 1957. The fishery was the third in the series started in 1955 after a lapse of twenty-seven years. The pearl banks exploited during this fishery were the Kodamuthi, South Kodamuthi and Rajavukku Chippidi Soditha Par, which were fished last in 1828, about one hundred and twenty-eight years ago. A total number of 1,11,75,214 oysters were fished and the Government's share of 74,87,580 oysters were auctioned and the sale proceeds came to Rs. 1,66,366.37 and the gross revenue including other receipts was Rs. 1,68,807.31. The total expenditure incurred was Rs. 22,264.24. Another Pearl fishery was started on 3rd March 1958 and lasted till 28th May 1958. During this fishery a total number of 2,14,76,514 oysters were fished of which 1,44,44,866 represented the Government's share. The gross revenue and expenditure were Rs. 4,74,096.27 and Rs. 55,945.07 respectively. The turnover of Pearl business in the entire fishery is estimated to be not less than 10 lakhs of rupees. As against the target of 214 lakhs of oysters and estimated income of Rs. 4.51 lakhs, a total quantity of 2,14,76,514 oysters and an income of Rs. 4,65,97.77 was realised. This is one of the land-marks in the annals of the Pearl fisheries in India.

The chank fishery of the Tirunelveli coast was operated departmentally as usual and 8,60,472 full-sized chanks were fished against 6,60,894 during 1956-57. The Ramanathapuram Chank fishery was leased out during the year, and the lessee fished 690,519 full-sized chank as against 3,92,573 during the previous year. The lessee of the Sivaganga chank fishery obtained 243,153 full-sized as against 1,24,527 in 1956-57. The Tanjore Chank fishery was conducted departmentally between Point Calimere and Puthukuda and 41,341 full-sized chanks were fished as against 31,768 in the previous year. Besides, a lease amount of Rs. 19,786 was realised for the remaining portions. The South Arcot and Chingleput chank fisheries were leased for a period of three years from 1st July 1957 at an annual rental of Rs. 15,106. The chank fishery of the Kanyakumari was operated departmentally for the first time since the accession of this area to

Madras State, and 2,052 full-sized chanks were fished. On the whole, the chank fishery operations in the coastal waters was a success during the year.

The Director of Fisheries is informed that the following statistical information should also be incorporated in his future reports:—

(1) Year-wise results of Tuticorin Pearl fishery from 1889 indicating the total number of oysters fished in each year, the total expenditure incurred in each year, the total receipts realised and the net profit in that year;

(2) year-wise results of the various chank fisheries leased out to private parties, the length and breadth of the coast of each fishery, the total number of chank fished by the parties in each year, the rate of lease per each year, the parties to whom leased, and the total number of chanks fished in this State as a whole in each year;

(3) year-wise results of various chanks fisheries operations conducted departmentally, the total expenditure, total revenue, the net profit and the parties to whom the chanks fished in each year were disposed off; and

(4) a map with definite scale showing the place where pearl and chank fisheries operation are conducted, exhibiting the various villages and towns covered.

Nineteen fish-curing yards were maintained by the department and the facilities afforded in them were fully availed of by the fish-curers. The yard staff continued to be vigilant over the operations of the yards and consequently there was marked improvement in transactions in the yards and the quality of cured fish was very satisfactory. A total quantity of 5,201.41 tons of cured fish was produced in these yards, against 3,062 tons in 1956-57. It is observed that the transactions of the Sathankupparam Yard in Vellore Division have registered a fall compared to the transactions of the previous year. The Director of Fisheries should take necessary steps to see that the yard is worked with more vigour.

In all the 21 centres where shark liver oil is extracted, 42,521 lb. of liver were procured and 23,000 lb. of oil extracted. There was a general decline in the shark catches off the Ramanathapuram, Tirunelveli Districts' Coasts during the year due to the fact that more fishermen give up shark fishing in preference to Chank fishing which is more remunerative.

The two Fisheries Demonstration factories at Adirampatnam and Rameswaram were in full swing during the year. By-products like fish manure sea weed, compost manure, sea-weed

ash, skate liver oil, shark liver oil were prepared and popularised. A stir has been created among the agriculturists in the Tanjore district by distributing the fish manure to the ryots. There is great demand for the product. Skate liver oil was also supplied to some of the leading tanneries like the Western India Tanneries, Bombay, Messrs. Chingam Chettiar and Sons, Pallavaram, Madras, etc., with a view to popularise the product in the tanning industry. There is a growing demand for the product.

Sea-weed compost manure and sea-weed ash are also getting popularity among the ryots in the Ramanathapuram District.

A semi dried prawns unit was sanctioned by the Government to investigate the possibilities of production and popularisation of semi-dried prawns in the East Coast. The unit started functioning at Nagapattinam in June 1957.

With the location of trawelling grounds by the departmental trawlers, M. V. "Gudjon" and M. V. "Meenakshi" off Tuticorin and landing of good quantity of prawns, work on the processing of prawns for semi-dried prawns were taken up at Tuticorin also. The entire quantity of prawns landed by both the trawlers were utilized for semi-dried prawns production. But subsequently when the vessels moved out of Tuticorin, availability of prawns was a problem. The same difficulty was met with the Unit at Nagapattinam also. Moreover the competition in the open market for fresh prawns were so keen that it was not at all practicable to take to this commercial scheme. The Director of Fisheries should watch the situation carefully and send in due course tangible proposals to tackle this problem.

A total of 3,000 lb. of prawns were processed and 490 lb. of finished product produced.

Glut of fish was profitably utilised for preparing fish meal which is a very good cattle and poultry feed. Similarly the husk left out during the manufacture of semi-dried prawns was dried and powdered and the powder which was known as the prawn shell meal is proving to be a very good poultry feed and has also created a great demand among the farmers of poultry and dairy.

A total of 550 lb. of miscellaneous fish were processed and about 135 lb. of fish meal were produced. About 350 lb. of prawns shell meal was also produced.

5. *Development and exploitation of inland fisheries.*—For the proper conservation of the inland fisheries, the licensing system was successfully continued and extended during the year. A total number of 8,870 licences were issued for fishing in water under departmental control and Rs. 42,255.12 were

realized as licence fees, against Rs. 42,711 in 1956-57. The revenue realized from the provincialized waters was Rs. 1,58,418 as against Rs. 1,52,549 during 1956-57. From the departmental waters a total quantity of 163,752 lb. of fish were sold to the public, realizing a revenue of Rs. 47,987.23 against 30,758 lb. and Rs. 8,035 in 1956-57. The Rural Fishery Demonstration units continued to work satisfactorily and promoted private enterprises in fish culture. During the year 2,100 private parties were supplied with 355,000 fingerlings. The Mettur Reservoir was exploited through 244 licenced fishermen and the total landings from the reservoir was about 60 metric tons. The culture of Tilapia was extended to all districts from this year onwards, and this proved a great success in increasing fish production and making fresh fish available in several rural areas, where fish could not be obtained earlier. A consignment of 25,000 fingerlings of the North Indian Carps, Rohu and Mrigal were imported from Calcutta and stocked in selected reservoirs and river sections with a view to establish them in the State. Popularization of fish cultural procedures in the Community Projects and National Extension Service Blocks was also continued during the year.

6. *Fish marketing, statistics, information and propaganda.*—By surveys and computations it was estimated that the total fish landings along the entire coast-line of 620 miles during the year was computed to be about 65,540 tons valued about Rs. 570 lakhs. Ribbon fishes, Clupeids and cat fishes contributed to the bulk of the marine catches landings of inland fishes from the various inland waters was estimated to be about 40,300 tons valued about Rs. 240 lakhs. The chief varieties were carps cat fishes, and murrels. The bulk of the inland catches were from rivers and deltaic waters and from ponds, tanks and irrigation tanks. The total production of both sea and inland fishes was thus 107,840 tons valued at Rs. 810 lakhs.

Of the sea fish landings of 67,540 tons, 27,150 tons were consumed in the State itself in the fresh condition and 40,000 tons were cured. Four hundred tons of fresh fish and 2,000 tons of cured fish were exported to other States in India. Twenty-one thousand one hundred and forty tons of cured fish were consumed in the State and 16,860 tons of cured fish were exported to foreign countries. Of the inland fish landings of 40,300 tons, only 240 tons were exported to other States and the rest was consumed in the State itself. The import of fresh and processed fish from other States and foreign countries was 2,592 tons. On the whole 90,932 tons of fish appeared to have been consumed in the State, giving a per capita consumption of 11.3 lb. as against the per capita consumption of 10.5 lb. during the previous year. Considering the lower nutritional standard of this State, steps should be taken to increase by all possible methods the per capita consumption.

Several fish markets in various parts of the State were visited and the owners concerned were advised in matters concerning improvements to layout, display of fish, water supply, drainage and sanitation. A marked improvement was effected in most of the markets. Type designs and plans were furnished to many municipalities and panchayats and also to private parties. Through the Plan Scheme for construction of model fish-markets, the Municipalities of Tuticorin, Coimbatore, Tanjore, Kumbakonam and Virudhunagar, the Panchayat Board of Rameswaram and the Mettur Township Committee were given a total subsidy of Rs. 38,212 towards fifty per cent of cost for improving their fish markets. This has created an enthusiasm among other local bodies to improve their fish-markets and is bound to attract more people to fish markets and thus to make fish more popular as a wholesome article of food. The Director of Fisheries should also see that the model fish markets constructed are properly maintained by effective supervision by the Fisheries Department officials. Statistical surveys of inland and marine fisheries were continued as usual. The preparation of statistical reports of marine and inland fisheries and statistics of weekly price variations were also attended to. Dissemination of information pertaining to various fishing industry was carried on more vigorously. Meetings of fish-folk in their hamlets were regularly held and the Audio-Visual Van received under the Technical Co-operation Mission Aid was used with full advantage. The department participated in several exhibitions. Though the aquarium continued to be popular, the collections have gone down to Rs. 8,647.08 as against Rs. 11,607 during the previous year. It is hoped that more effective propaganda will be carried by the department to see that the aquarium is attracted by large number of visitors.

7. *Socio-Economic work.*—The total number of societies and federations at the end of the year was 195 and 6 respectively with a total membership of 24,761 and paid-up share capital of Rs. 2,06,628. District federations of these societies functioned in Madras South Arcot, Tanjore, Ramanathapuram, Tirunelveli and Kanyakumari districts. The Government note with satisfaction that several relief measures were taken up promptly by department to alleviate the distress of the fishermen caused by fire, famine and failure of seasons in Tuticorin, Tanjore and Madras during the year. Several assistance and relief measures given by the department were canalised through the societies and their federations as a result the fishermen at various centres have expressed eagerness to form new co-operatives. As a relief to the affected fishermen by the failure of the Kola (flying fish) fishery in Tanjore district a sum of Rs. 48,000 was sanctioned for the purchase of coir and yarn for supply to fishermen at 50 per cent subsidy. Fair price shops were also run by some Fishermen Co-operative Societies under the direction of the

Collector of Tanjore. The issue of plots to 282 fishermen families under the scheme for rehabilitation of fishermen displaced by sea-erosion in Royapuram in North Madras and those evicted from Defence Department lands was completed. The Government however observe that there is considerable delay in the occupation of these plots. The Director of Fisheries is requested to see that the colony is settled completely as quickly as possible. The Commissioner of Madras should also see that the residuary items of work to be carried out in the colony are expedited. During the year under report, the department continued to maintain the fishery elementary schools at Alambarikuppam, Sathankuppam and Kaveripatnam.

There was a total strength of one hundred and forty-six pupils in the schools of Alambarikuppam and Sathankuppam of Chingleput district comprising of 98 boys and 48 girls. There were four standards (from 1st to 4th) at Alambarikuppam and five standards (from 1st to 5th) at Sathankuppam. Six teachers were employed in the two schools. The Adult Literacy Night school which was started on 15th January 1957 at Sathankuppam continued to function during the year with an average attendance of 21 adults per day. The fisheries school at Kaveripatnam in Tanjore District functioned with a total strength of 84 pupils (67 boys and 17 girls). An adult literacy school was also conducted at this centre with an average attendance of 24 adults per day.

8. *Schemes included in the Second Five-Year Plan.*—The Government note with satisfaction that the fifteen schemes included in the Second Five-Year Plan were pursued during the year with satisfactory results. The total expenditure on these schemes was Rs. 11.25 lakhs. Rs. 3,75,320 were disbursed among 48 fishermen co-operative societies and their district federations as long term and medium term loans and as loan and subsidy for construction of godowns. The Salt Subsidy Scheme gave a fillip for better fish curing in the 19 fish curing yards maintained by the department and this resulted in the production of 5,201.41 tons of cured fish. Fifteen Pablo boats were constructed and distributed among fishermen co-operatives. The total strength of Pablo boats has now come to 42. One hundred and seventy-four nylon net web-bings and 2,792 lb. of Teryene yarn were also distributed. With the Pablo boats and nylon nets the fishermen are able to treble their catches and earnings. This has revolutionized the fishing methods in the coastal waters, and the demand for such boats and nets are increasing considerably. A total of 312.39 lakhs of fingerlings were collected and distributed in the various inland waters in the State. With the working of the Rural Fishery Demonstration Units, there was a general awakening among the public for undertaking fish culture in their own waters. Efforts were made to supply fish seed to private fish culturists on a larger scale. The development of Bhavaniagar and Amaravathisagar reservoirs was continued by systematic stocking. These waters can be expected

to yield commercial fisheries within a few years. The construction of the ice plants and cold storages at Tuticorin and Mettur Dam, and of the model estuarine fish farm at Adyar were commenced during the year. Sixty-five fishermen candidates were trained in modern methods of fishing at the Training Centre at Nagapattinam and Tuticorin. One large van and nine three-wheeler Lambretas were purchased for supply to Fishermen Co-operative Societies under Hire-purchase System, in addition to the three vans purchased and supplied last year. Eight vans operated on the hiring system. On the whole, these vehicles transported 798 tons of fresh fish from landing centres to consuming centres. The Government however, feel that some delay has been made in respect of the schemes relating to the development of fishing harbours, construction of ice-plants and in the erection of fish meal and fish manure production units but it is hoped that by taking speedy and vigorous efforts, the schemes will be completed during the ensuing year. The Director of Fisheries should closely watch over these schemes and see that delay is avoided.

9. *Expanded Technical Assistance Programme of Food and Agricultural Organization.*—Under the Expanded Technical Assistance Programme of Food and Agricultural Organization, the department availed of the services of six foreign experts. Mr. G. S. Illugason of Iceland apart from training several groups of fishermen in modern methods has surveyed and located some potential fishing grounds and has also demonstrated the possibilities of exploiting them with small mechanised boats employing nylon nets. Mr. Paul Zinenr of Norway and Mr. U. Rasmussen of Denmark assisted the department in improving the original design of the pablo boat and Mr. Gurtnr in the preliminaries for the establishment of a boat building yard. Mr. C. R. Bjuke of Sweden and Mr. H. Barlind have completed the survey of sites for fishing harbours and markets and it is hoped that the recommendations made by them will be successfully implemented by the department with greater advantage.

10. *Finance.*—The total expenditure and revenue of the department in the year under report was Rs. 26,94,844.26 and Rs. 25,06,814.51 respectively as against Rs. 32,34,530.45 and Rs. 28,05,963.84 in 1956-57. The loss to the department this year was only Rs. 1,88,029.75 against Rs. 5,28,566.60 during 1956-57. Even this loss is negligible when compared to the charge on supervision, education, welfare and research schemes for which an expenditure of Rs. 4,16,176.67 has been incurred. If this expenditure is also deducted, the department would have worked on a profit of Rs. 2,28,148.01.

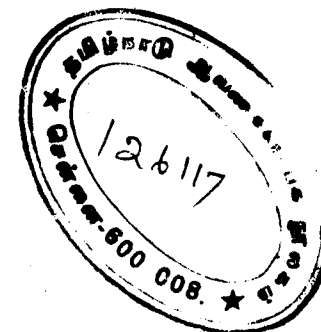
11. *General.*—The working of the department on the whole was satisfactory. With a long range broad based policy there is considerable scope for the development of fisheries resources of

this State into an important food industry, giving better employment to many and increased earnings to the State. The Government are pleased to record that the activities of the Fisheries Department have been carried on in the right direction. The Government have recently appointed a technical officer as the head of the Fisheries department, in order to work the several schemes with more vigour and undivided attention. It is hoped that with the successful implementation of all the fifteen development schemes and with the assistance of the Government of India in securing for this State sufficient foreign exchange, the development of fisheries in this State would gain a hall-mark in the history of Fisheries department in this State.

(By order of the Governor)

K. MUTHUVENKATACHALAM,
Deputy Secretary to Government.

- To the Director of Fisheries, Madras.
 " the Board of Revenue, Madras.
 " the State Port Officer, Madras.
 " the Controller of Stationery and Printing, Madras, (for printing the report).
 " the Director of Information and Publicity, Madras.
 " the Secretary to Government of India, Ministry of Food and Agriculture, New Delhi.
 " the Fisheries Development Advisor to the Government of India.
 " all Collectors.
 " the Commissioner, Corporation of Madras (through Mayor.)
 Copy to E.I. Section.



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