



DEPARTMENT OF
INDUSTRIES AND COMMERCE
MADRAS

REPORT ON THE FISHERIES OF MADRAS

FOR THE YEAR ENDED
30TH JUNE
1942

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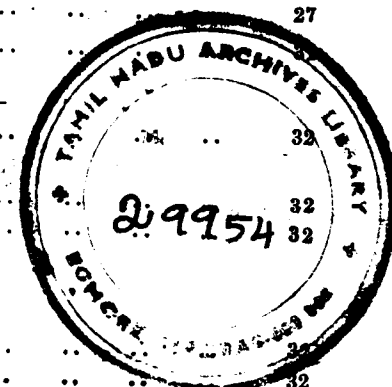
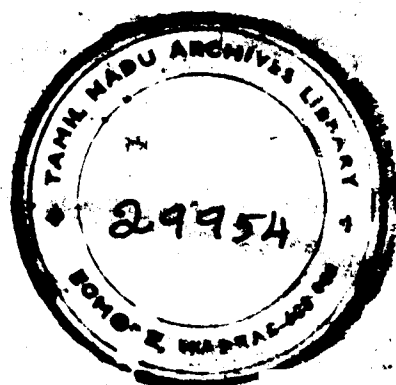
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DEPARTMENT OF INDUSTRIES AND COMMERCE.

Subject.

Fisheries of Madras—Annual Report for the year ended
30th June 1942—Submitting.

No. 351-F.G./42.

Station, MADRAS.

Dated the 21st September 1942.

From

P. MADHAVA MENON, ESQ., M.B.E., I.C.S.,

Director of Industries and Commerce,

Madras,

To

THE SECRETARY TO THE GOVERNMENT OF MADRAS,
DEVELOPMENT DEPARTMENT.

SIR,

I have the honour to submit the Annual Report on the Fisheries of Madras for the year ended 30th June 1942.

**REPORT ON THE FISHERIES OF MADRAS FOR THE
YEAR ENDED 30TH JUNE 1942.**

Mr. L. B. Green, O.B.E., was in charge of the Fisheries Branch up to 27th October 1941 when I took charge from him and continued to be in charge during the remainder of the year.

2. The shark liver oil industry was further developed during the year under report. A few more centres were opened for extracting the oil both in the East Coast and West Coast. An Inspector of Fisheries was appointed to supervise and guide the operations in the various extraction centres. The construction of a new building for the oil factory was completed early in January 1942 and most of the plant has been fixed. The services of the Research Assistant, Tanur, which were placed at the disposal of the Government Oil Factory, were dispensed with in December 1941 owing to the abolition of the Tanur Experimental Station to which he was originally attached. He was reappointed in May 1942 as a Research Assistant on a temporary basis to work in the Government Oil Factory. The sale of shark liver oil has shown some improvement over that of the previous year. Agents for the sale of the oil have been appointed in various provinces. The Director-General, Indian Medical Service, passed on very large orders for the supply of the

oil to the Medical Store Depots in Bombay, Karachi and Madras. The oil was supplied to all the Government hospitals and dispensaries in this Presidency at special rates. The demand for the oil is on the increase.

3. In spite of the present adverse economic conditions due to the war, the rentals from Inland fisheries have shown a progressive increase from Rs. 77,118 in 1939-40 to Rs. 87,635 in the year under report. Signal success attended the departmental fishing of the Valamadugu and Paraval items of the Veeranam tank in South Arcot district. At the auction sale held for the lease of these fisheries the bid was very low owing to strong combination among the villagers. By fishing the items departmentally for twenty-seven days a sum of Rs. 2,292-7-0 was realized. The scheme for the popularisation of Gourami fish in rural areas was actually put into operation during the year under report by stocking five out of six tanks selected for the purpose with fingerlings of Gourami and Catla fish. An officer of the status of an Assistant Director of Fisheries was selected to be in charge of the scheme of research in connexion with the freshwater fisheries financed by the Imperial Council of Agricultural Research. This officer entered upon his duties since the close of the year under report. A more prolific and cheaper centre for the annual collection of fingerlings of Catla was established at Samalkot.

4. The food of the economically important fishes continued to be investigated at the West Hill Biological Station. Mature oil sardines about 15 cms. in length constituted the oil-sardine fishery of the year under report. But the fishery was comparatively poor as only 115,231 maunds were landed. It is observed that immature oil-sardines are caught largely by the net known as "Mathikollivala." The question, therefore, of preventing the capture of immature oil-sardines by legislating against the use of this net is being investigated. Over-fishing, it is thought, takes place on two counts, viz., (1) shoals of immature oil-sardines (below 15 cms.) when they arrive are exploited indiscriminately, and (2) the oil and guano factories draft enormously on this harvest of the sea in the years of abundance. The prawn fishery is showing a progressive decline. At the Krusadai Biological Station, the spawning seasons of the Big-jawed Jumper and of the Rainbow-Sardine were investigated. The food of fishes of economic importance continued to be a subject for study. Investigation on the life-history of the chank was continued. The experiments in inducing the formation of cultural pearls resulted in some measure of success which is encouraging. It was ascertained by an experiment that marine mullets can be acclimatised to fresh-water within a minimum period of three days.

5. Operations in the fish-curing yards both on the East and West Coasts resulted in an increased surplus owing to a better fishing season, the consumption of salt being 238,860 maunds against 198,534 maunds in the previous year. A severe famine prevailed

during the year among the fishermen of the Coast, particularly of South Malabar, and to alleviate the distress caused, the department arranged the supply of free midday meal to the fisheries school pupils of the localities worst affected. In 1925 the Government sanctioned temporarily three Sub-Inspectors and three clerks for work in connexion with the fish-curing yards on the East Coast and sanction for these posts was being renewed year after year. The Government sanctioned the permanent retention of these posts with effect from 1st April 1942.

6. The Government have taken over the lease of the chank fisheries off the coast of Ramnad belonging to Ramnad Estate for a period of five years commencing from 1st July 1941. The fishery was worked in four centres, viz., Rameswaram, Irumeni, Kilakarai and Tirupalakudi and 485,780 chanks were fished.

7. The Fisheries Technological Institute was opened on the 29th January 1942 in a building provided by the Bharatha Mahajana Sangham.

8. The total revenue of the Fisheries section increased from Rs. 5,05,866 in the previous year to Rs. 5,93,088 in the year under review. The total expenditure for the year was Rs. 6,66,379 against Rs. 5,78,526 in the previous year. The net cost of the Fisheries section was Rs. 73,290 against Rs. 72,660 in the previous year.

PART I.

1. MARINE FISHERIES.

A. RESEARCH.

(a) Scientific Research.

9. (i) WEST HILL BIOLOGICAL STATION, SOUTH MALABAR—*Plankton investigation*.—Surface plankton was collected on 105 days during the year under report as against 80 days during the previous year. Off-shore plankton was collected on 8 occasions, 5 collections being made off Quilandy during August and September and 3 collections being made off West Hill during October. The collections of inshore plankton were made opposite the laboratory in latitude 11° 18' N. and longitude 75° 43' E. The study of plankton was made with reference to fish-eggs, fish-food and fisheries. The quantity of plankton was at its maximum on 13th September 1941 when it was 300 c.c. in 500 c.c. of sea water and at its minimum on 29th April 1942 when it was only 7.5 c.c. in 500 c.c. of sea water.

10. *Phytoplankton*.—The following table gives the groups of diatoms and their seasonal occurrence:—

Genus.	Occurrence.
<i>Chaetoceras</i>	Common in October, few in August, November, December, February and May and rare in other months of the year.
<i>Coscinodiscus</i>	Common in September, October, December, February and March, few in July, January, April and May and rare in other months.

Genus.	Occurrence.
Biddulphia	Few in October and May, rare from November to January, March and April; absent in other months.
Rhizosolenia	Plenty in January, common in February, few in May, rare in December, March and April and absent in other months.
Hemidiscus	Few in May, rare in March and April, absent in other months.
Pleurosigma	Few in October, rare in December and absent in other months.
Thalassiothrix	Plenty in October, few in July, rare in August and November and absent in other months.
Nitzschia	Few in October, rare in December and January.
Fragillaria	Few in March, rare in August, April and May and absent in other months.
Trichodesmium	Plenty in October, common in April, few in March and rare in November, and absent in other months.
Planktoniella	Common in August and October, few in December and May and rare in September, November, February and April, absent in other months.
Lauderia	Common in October, rare in July.

11. *Zoo-plankton*.—This was more abundant than the phytoplankton and the dominant organisms and their seasonal occurrence were as follows:—

Genus.	Occurrence.
Copepods	Abundant from September to January and common in other months.
Noctiluca	Abundant in July, August and September, common in October, April and May and rare in February, absent in other months.
Leucifer	Common from January to May, few in October, rare from June to September.
Evadne	Abundant in August and October, common in September, few in November, January and February, rare in other months.
Ctenophores	Abundant in May, common in March and April, few in January, February, rare in September and December, absent in other months.
Medusoids	Few in March, rare in July, October and December to February, April and May.
Ceratium	Common in August, few in October and February, rare in September, November to January and March to May.

Genus.	Occurrence.
Sagitta	Common in August, December, February, March and May; few in July, September, November, January and April and rare in October.
Larval crustacea	Common in March and May; few in October, November, February and April, rare in other months.
Fish-eggs	Common in July and October; few in September, November to February and May; rare in August and March.
Fish-larvæ	Common in October; few in January and rare in December and February to May.
Larval-bivalves	Abundant in April; common in October and February; few in September, November, January and rare in August, March and May.
Larval gastropods	Rare in November and March to May.
Appendicularia	Common in August and October; rare from November to May.
Larval polychætes	Abundant in July; common in May; few in February and April and rare in other months.
Daphnids	Common in October; few in November; rare in December, January, February, August and September.
Heliozoa	Abundant in October and common in November.

12. *Study of fish-eggs*.—Two types of horse-mackerel eggs occurring in the plankton were identified to be those of (1) *C. kurra* and (2) *C. kalla*.

The plankton examined in September of last year at Quilandy about 18 miles north of Calicut, at first appeared to contain nothing but noctiluca, a round microscopical organism looking almost like a fish-egg. But a more careful examination showed that about 10 per cent of the plankton was constituted by eggs of the mackerel. The spawning mackerels have probably exercised a choice in selecting an area where the inedible noctiluca abounded for laying their eggs. Fishes feeding on fish-eggs would be loathe to enter an area where the inedible noctiluca abounded. Thanks to the instinct of the mackerel spawners, their eggs thus derive protection and have a better chance of hatching and being liberated as larvæ which could grow into young fish and increase the livestock of the mackerel.

13. *Oil-sardine investigation*.—The oil-sardines were first examined during the year under review on 25th July when the fish appeared off Quilandy. They were caught first off West Hill on 29th July and they were last examined at the station on 18th June. From December 1941 onwards, the catches were scarce and there was

complete absence of the fish for about 2½ months from 11th March to 28th May. In June, oil-sardines appeared off Calicut in small quantities during the first three weeks and off Quilandy, Pudiappa and Madakkara during the third week. The occurrence of oil-sardines in June is rare generally.

The two remarkable features of the oil-sardine fishery under report are (1) the dominance of sizes above 15 cms. and (2) the early opening of the 1942-43 fishery in June (approximately 826 maunds of oil-sardine were obtained in this month alone). One thousand one hundred and nineteen specimens were examined during the year as against 3,080 during the previous year. The size frequency of the samples measured were as follows:—

Length overall.	July 1941.	August.	September.	October.	November.	December.	January 1942.	February.	March.	April.	May.	June.	Total.
9 cms.	..	..	3	..	..	..	..	..	..	..	..	..	3
10 cms.	..	..	62	..	..	..	..	..	..	..	..	..	62
11 cms.	..	2	3	..	..	..	..	..	..	..	..	..	5
12 cms.	..	1	..	..	..	..	..	..	..	..	..	..	1
13 cms.	..	1	..	..	..	2	..	..	..	..	..	..	3
14 cms.	..	1	2	2	..	9	..	1	..	..	..	..	15
15 cms.	..	..	40	..	46	15	3	..	..	..	..	..	104
16 cms.	..	..	2	107	..	57	59	4	..	..	6	11	246
17 cms.	6	3	..	50	3	25	48	1	..	..	14	54	204
18 cms.	61	32	44	4	8	6	10	..	..	..	7	14	186
19 cms.	33	32	66	16	11	4	8	..	..	..	7	..	177
20 cms.	15	33	16	12	4	1	13	..	..	..	..	..	94
21 cms.	1	5	2	5	1	..	4	..	..	..	..	1	19
Total	116	110	200	236	27	150	157	9	..	..	27	87	1,119

The size ranged from 9 cms. to 21 cms. and 16 cms. was the size best represented in the catches. Small sardines were caught in September but they measured more than 8 cms. The fishing this year consisted mainly of mature sardines. As expected last year, the fishery of immature sardines has affected the fishery and this year was a poor year for oil-sardines when only 115,231 maunds were landed on the West Coast.

The study on the fluctuation of the oil-sardine fishery was made in a more elaborate manner. In 1940-41 when the immature fish (11-14 cms.) dominated the commercial catches, it was thought necessary to find out whether the fluctuation in the oil-sardine fishery is or is not due to the destruction of immature fish in large numbers. With this end in view, an investigation of the meshes of the important nets used in the capture of oil-sardines and study of the sizes of sardines caught in each type were started. It is observed that immature sardines were caught largely by the net known as "Mathikollivala." The question, therefore, of preventing the destruction of immature oil-sardines by legislating against the use of this net is being investigated.

It was remarked in 1933-34 that "unless the Malabar sardine proves to be a distinct local race confined to that coast, the question of depletion by fishing does not arise, though this has often been alleged to be the reason for the scarcity of fish in some years." At present in the light of the comparative study of the exotic sardines in the Biological Station, it may not be unreasonable to suppose that the Malabar sardine is a distinct race or community with a restricted area of movement. If this view is conceded, then the shoals of the oil-sardines are likely to suffer by over-fishing. The race-theory is still under investigation. Over-fishing, it is feared, is taking place on two counts, viz., (1) shoals of immature oil-sardine (below 15 cms.) are exploited indiscriminately when they arrive, and (2) the oil and guano factories draft enormously on this harvest of the sea in years of abundance.

14. *Food of the oil-sardine.*—The eggs of herring-like fishes and of horse-mackerels were included in the stomach-contents of oil-sardines examined on 28th July off Quilandy, and on 4th, 21st and 29th August off West Hill. Another interesting feature noted was that all the seven specimens examined on the 4th August had scales of the Goggler included in their stomach contents. The diatom *Ornithocercus* was found in the guts of specimens examined on 24th October and 28th November off West Hill and on 23rd November off Tanur, and *Leucifer* in specimens caught off Quilandy, Puthiangadi and West Hill; *Oikopleura*, *Sagitta* and comb-plates of *Ctenophores* were observed in oil-sardines caught off Quilandy on 28th July; larval bivalves and bristle-worms (spionid larvæ) were plenty in those from West Hill examined on 28th May.

15. *Races of oil-sardines.*—In continuation of previous work, a comparative study of the oil-sardines received from Aden was made.

16. *Mackerel investigation.*—Forty-two samples consisting of 897 mackerels were examined during the year under report. The size ranged from 11 cms. to 24 cms. and the dominant size in the catches were 20 cms. and 21 cms. as will be seen from the size-frequency table below:—

Length overall.	July 1941.	August.	September.	October.	November.	December.	January 1942.	February.	March.	April.	May.	June.	Total.
10 cms.	..	..	..	..	..	..	..	..	..	..	..	..	1
11 cms.	..	1	..	..	..	..	..	..	..	..	..	..	1
12 cms.	11	..	..	..	..	..	..	..	..	..	..	..	11
13 cms.	..	18	..	..	..	..	..	..	..	..	..	..	18
14 cms.	..	15	..	..	..	..	..	..	..	..	..	..	15
15 cms.	..	41	..	..	..	..	..	..	..	..	..	..	41
16 cms.	..	82	15	..	..	..	..	..	..	..	..	..	97
17 cms.	..	97	41	..	..	..	..	..	..	..	..	..	138
18 cms.	..	32	44	..	..	..	..	..	..	..	..	..	76
19 cms.	..	2	35	9	..	..	..	..	..	..	..	..	51
20 cms.	9	14	6	61	28	1	33	..	..	..	..	..	152
21 cms.	8	24	21	27	3	8	38	5	1	..	..	..	140
22 cms.	..	19	51	15	..	..	..	..	..	..	..	..	96
23 cms.	..	5	27	1	..	..	..	..	..	..	..	..	35
24 cms.	..	..	2	1	..	..	..	..	..	..	..	..	3
Total	46	350	262	114	34	12	78	6	10	..	..	..	897

Off West Hill, the Mackerel Fishery commenced on 1st August 1941 and closed in the fourth week of April 1942. In August 1941, immature Mackerels were caught in large quantities on ten days along with Gogglers and White-bait.

17. *Food of the Mackerel*.—Phyto-plankton consisting of *Coscinodiscus*, *Fragillaria Trichodesmium* and *Planktoniella* and zooplankton consisting of copepods and the tiny phosphorescent *Leucifer* were common in the food. Besides, Swimming-bells (*Diphyes*) were included in the stomach-contents. The following shell-fish, Pteropod was met with this year also.

The systematic examination of the stomach-contents of the Mackerel during the year under report, confirms the previous observations that this fish feeds regularly on the eggs of horse-Mackerels, herring-like fishes, and flat-fishes. To mention but one instance, here is an analysis of the fish-eggs eaten by specimens examined on 26th March 1942 :—

Horse-mackerel eggs	..	107	} in ten specimens.
Anchovy eggs	..	33	
White-bait eggs	..	60	

18. *Food of fishes—I. Leucifer*.—Besides the oil-sardine, Mackerel, Anchovy, and the White-bait, the following fishes of economic importance were found to feed on *Leucifer*, a tiny prawn-like phosphorescent crustacean; small sardines (*Sardinella sindensis*), the White-sardine (*Kowala thoracata*), the Rainbow-sardine (*Dussumieria hasseltii*) the Indian Herring (*Pellona indica*), the Goggler (*Caranx crumenophthalmus*), the Silberbellies (*Leiognathus insidiator*), the Big-jawed Jumper (*Lactarius lactarius*) and the Soles (*Cynoglossus brachyrhynchus*).

II. *Bristle-Worms (Polychaetes)*.—These form the food of the Anchovies (*Engraulis mystax*), the Cat-fishes (*Arius falcarius* and *Osteogeniosus militaris*), the Jew-fish (*Sciaena caretta* and *Otolithus argenteus*), the Goggler (*Caranx crumenophthalmus*) the Mackerel (*Rastrelliger kanagurta*), the Whiting (*Sillago sihama*) and the Soles (*Cynoglossus semifasciatus* and *C. brachyrhynchus*).

III. *Larval Bivalves*.—These are young ones of clam-like shell-fish found at times in great profusion in the surface-plankton of the sea. The following fishes feed on them : the Oil-sardine (*Sardinella longiceps*), the Mackerel (*Rastrelliger kanagurta*), the small Sardines (*Sardinella brachysoma*, *S. fimbriata*, *S. sindensis*), the White-Sardine (*Kowala thoracata*), the Hilsa (*Hilsa ilisha*), the Gizzard-Shad (*Anodontosoma nasus*), the White-baits (*Stolephorus tri*, *S. commersonii* and *S. heterolobus*), the Cat-fish (*Arius falcarius* and *Osteogeniosus militaris*), the Silver-bellies (*Leiognathus bindus* and *L. splendens*), the Whiting (*Sillago sihama*) and the Soles (*Paraplagusia bilineata*, *Cynoglossus semi-fasciatus*, *C. dubius*, *C. brachyrhynchus*, *C. quadrilineatus* and *C. puncticeps*).

IV. *Arrow worms (Chaetognatha)*.—Six fishes of economic importance were ascertained to be Arrow-worm eaters, viz., the Oil-sardine, the Mackerel, the two Gogglers (*Caranx crumenophthalmus* and *Caranx kurra*), a Small-sardine (*Sardinella brachysoma*) and a Silver-belly (*Leiognathus insidiator*).

V. *Fish-eggs*.—In addition to the Oil-sardine and the Mackerel, the following fishes were found to have fed on fish-eggs :—

A small Sardine (*Sardinella brachysoma*), the White-Sardine (*Kowala thoracata*), the White-bait (*Stolephorus zollingeri*) and the Goggler (*Caranx crumenophthalmus*), the Seer (*Cybius sp.*) and the Malabar Sole (*Cynoglossus semifasciatus*).

The dominance or otherwise of the abovementioned planktonic organisms in the food-chain of the sea will affect the various fisheries favourably or adversely.

19. *Prawns (Shrimps)*.—The importance of this shell-fish to fisheries in general may well be judged by the part it plays in the food-chain of the sea in all its various stages of life, from the first larval stage (*nauplius*) to the adult stage. The larval planktonic stages of which there may be several, form the food of pelagic fishes such as the Oil-sardine, the Mackerel, etc., the young and adult prawns are eaten by carnivorous and other fishes such as sharks, Jew fishes, the Ribbon fish, Thread-fins, Cat-fishes, the Cock-up, the Horse-Mackerel, the Big-jawed-Jumper, the Barracuda, the Soles, the Anchovy, the White-bait and the Rainbow-Sardine.

Among the carnivorous fishes, the White-bait was a common food of Jew fishes (*Sciaena sp.* and *Otolithus ruber*) the Ribbon-fish (*Trichiurus haumela*), Gogglers, a Horse-Mackerel (*Caranx rotterli*), and the Big-jawed-Jumper (*Lactarius lactarius*).

20. *Other fishery investigations*.—Eight thousand one hundred and sixty-nine specimens of fishes other than the Oil-sardine and the Mackerel were examined during the year; amongst these, studies on the following fishes were carried out in detail :—

(a) *The White-Sardine (Kowala thoracata)*.—Three hundred and sixty-one specimens were examined. The commercial catches comprised of specimens measuring 10 to 11 cms. Statistics available for the last sixteen years for this fish were studied. It is observed that a good year is followed by one poor year and then two good years are followed by three bad years. This has been the type of fluctuation in this fishery in the past. As in 1939-40 and 1940-41 the fishery of this sardine was good, if this type of fluctuation is constant then the fishery for 1941-42, 1942-43 and 1943-44 should be expected to be poor. The months in which the White-sardine is abundant are from August of one year to February of the following year. The spawning season of this fish, which is from October to February lies within the fishing season.

(b) *The Gogglers*.—It was ascertained that the 'Chamban' fishery of the West Coast consists of two species of Horse-Mackerels, i.e., *Caranx crumenophthalmus* and *C. kurra* called 'Kannan' or 'Aila chamban' and 'Kole chamban' respectively in Malayalam. One hundred and eighty-seven specimens of the former and 159 specimens of the latter were examined.

(c) *The Silver-bellies*.—Four thousand six hundred and fifty-four specimens were examined during the year of which 3,562 were *Leiognathus bindus*, 550 *L. splendens*, 409 *L. insidiator*, 60 *L. brevisrostris*, 46 *L. ruconius*, 23 *L. blochi*, 2 *L. edentula* and 2 *L. equula*. In a single specimen of *L. splendens*, examined on 16th July 1941, there were 1,500 *Evadne*, a tiny crustacean with large black eyes.

(d) *The White-bait* (*Stolephorus* spp.).—One thousand and fifty-one specimens were examined consisting of 536 *S. zollingeri*, 337 *S. tri*, 122 *S. heterolobus*, 50 *S. indicus* and 6 *S. commersonii*. The White-bait *S. zollingeri* was not only recorded for the first time from the Arabian Sea but also it was ascertained to contribute on a large scale to the White-bait fishery on the West Coast.

(e) *The Anchovies* (*Engraulis* spp.).—Two hundred and seventy-five specimens of Anchovies were examined during the year of which 220 were *E. mystax*, 24 *E. purava*, 16 *E. dussumieri* and 15 *E. kammalensis*.

(f) *The Jew-fish fishery*.—A study of the various kinds of Jew-fishes that comprise the 'Kora' fishery of the West Coast was started during the year, as they form a fairly important fishery.

(g) *Hilsa* (Mal. Paliya).—The record of this anadromous fish on the West Coast is of considerable interest. Seventy-four specimens from different localities (West Hill, Beypore, Kadalundi and Ponnani) were examined this year. In the sea off Ponnani, Hilsa appeared along with the Mackerel and the Big-jawed-Jumper (*Lactarius lactarius*). The food of the Hilsa in the sea examined till now consists of the following planktonic organisms:—

Coscinodiscus gigas.

C. lineatus

Chaetoceras coarctatum.

Fragillaria.

Planktoniella.

Nitzschia.

Biddulphia.

Rhysocolenia.

Dinophysis.

Ornithocercus.

Tintinnus.

Corycaeus obtusus.

Peridinium ovatum.

P. depressum.

Ceratium breve.

C. massiliense.

Euterpina.

Evadne.

Tested ciliates, Copepods,
and Larval bivalves.

Of the food of this fish in the sea, nothing was known hitherto. Now that it is evident that the Hilsa helps itself to a rich diet of marine plankton, one may infer that the adult Hilsa cannot halt for a considerable period even in perennial rivers like the Ganges and the Indus which they seek for the purpose of spawning under sheltered conditions. Their pasture ground is the surface of the sea where planktonic organisms abound. When the spawning instinct seizes them, the Hilsa gather into shoals. To avoid the inevitable ravages of carnivorous fishes on such an occasion or wholly impelled by natural instinct, the Hilsa shoals escape into large rivers such as the Cauvery, the Kistna and the Godavari in South India, to spawn unmolested and return to the sea—their natural feeding grounds—and here to disintegrate and to deploy into smaller groups, rendering the attack of their enemies less effective. This is an example where two factors are responsible for the migration of a fish-planktonic food at one end and spawning at the other extremity.

(h) *Prawn fishery*.—A preliminary examination shows that the following species constitute the prawn fishery of Malabar: *Penaeus semisulcatus* (Mal. "Valachemmeen"), *Parapeneopsis stylifera* (Mal. "Karikadichemmeen"), *Peneopsis dobsoni* (Mal. "Vellaichemmeen"), *Penaeus indicus* (Mal. "Kozhichemmeen") and *Metapeneus affinis* (Mal. "Vel-laikankadichemmeen"). The season of the fishery extends from May to October.

(i) *Miscellaneous fishes* ("Palatharam").—As this group forms a fairly good percentage in the total fish production of the West Coast every year, it was considered that a study of the various fishes that comprise this group should be useful. On 16 occasions, the miscellaneous groups of fishes were examined. The following fishes occurred in various percentages: "Small-Sardines," the White-Sardine, the Rainbow Sardine, Anchovies, White-baits, the Indian Sprat, Grunters, Threadfins, Jew fishes, the Ribbon-fish, Horse-Mackerels, Silver-bellies, the Big-Jawed-Jumper, Seers, Soles, a few Cat-fishes and the Whiting.

21. *Fish statistics*.—The statistics for the three years 1936–37 to 1938–39 are now ready for publication and those for the succeeding years are under compilation.

Of the six economically important fishes of the West Coast (Oil-Sardine, Mackerel, Cat-fish, "Chamban," Silver-bellies and Soles) only the Oil-Sardines and the Mackerel cause generally the rise or fall in the total production of fish on this Coast, as judged from the percentage of catches of the various fishes. The percentages of the Cat-fish, Gogglers, Silver-bellies and the Soles in the total quantity of fish landed on the West Coast each year vary from

1 to 6 per cent, 0.3 to 11 per cent, 1.3 to 6 per cent and 2 to 11 per cent respectively. Of these two fishes, the Oil-Sardine and the Mackerel, the catches of the Mackerels were far more heavy than that of the Oil-Sardine in the past fifteen years excepting three occasions. Favourable comments on the Fish Statistics of Malabar Fisheries were made by S. H. Prater in the Anglo-Indian Review, Volume XXXII, December 1941.

The total quantity of fishes landed on the West Coast during the year 1941-42 is 2,489,984 maunds valued at Rs. 33,86,654 as against 2,539,892 maunds valued at Rs. 30,26,164 in the previous year, thus showing a slight fall in the quantity though the value exceeded the previous year's figure which must be due to a favourable increase in prices. Of the important fisheries of this Coast, there has been a great fall in the catches of Oil-Sardines from 675,663 maunds in 1940-41 to 11,523 maunds in 1941-42; but there has been a slight increase in the catches of the Mackerel Cat-fish, Gogglers, Silver-bellies and Soles, thus more or less making up the fall in the total production caused by the scarcity of the Oil-Sardine.

22. The Prawn-Fishery which occupied the third rank steadily during the quinquennium 1929-30 to 1936-37 receded to the fourth rank in 1937-38, eighth rank in 1938-39 and 1939-40 and to the tenth rank in 1940-41. This reveals a progressive decline which is deplorable. The balance of Nature is becoming increasingly unfavourable to the prawn-fishery which is an important source of valuable sea-food. It is hoped that the demand for sharks (which commonly feed on prawns) in the fish-liver oil industry will create a reduction in their number and eventually restore the balance in favour of the prawn-fishery.

23. *Hydrographical and meteorological observations.*—The readings were recorded as usual excepting the salinity of sea-water by titration. As it is considered that ascertaining the phosphate contents of the sea has a more important and vital bearing on sea-fisheries than fluctuations of salinity, the analysis of the latter by chlorine titration was discontinued from 14th July 1941. Laboratory arrangements for ascertaining the phosphate contents have not yet materialized.

The maximum and minimum of various data are as follows :—

Surface temperature—

Maximum 31.4 C. on 20th April 1942.

Minimum 24.7 C. on 25th August 1941 and 30th June 1942

Specific gravity—

Maximum 1.0249 on 2nd June 1942 and 23rd June 1942.

Minimum 1.0159 on 13th August 1941.

The pH value ranged from 8.0 to 8.5.

Total amount of rainfall during the year from 1st July 1941 to 30th June 1942—106.75 inches.

24. *Museum.*—Several specimens of fishes and crabs were added to the museum.

25. *Miscellaneous.*—The building is shared by the office of the Assistant Director (Coast), Calicut, from December 1941 onwards. A winch wire-roll belonging to the trawler was disposed of during the year. As the collections of plankton made yearly and studied with reference to food of fishes and other data can be further studied in greater detail by Post-Graduates, it was decided to transfer them to the Zoological Research Laboratory of the Madras University. Accordingly the plankton collections of the station from 1930-31 to 1937-38 consisting of over a thousand bottles were sent to the Director, University Zoological Research Laboratory, Madras.

The Director, Board of Scientific and Industrial Research, Delhi, in his letter No. B. 300, dated 11th February 1942, requested for a collection of plankton preserved in different ways, for experimental purpose. A pound of sun-dried plankton was supplied.

Since the close of the year, the following papers have been submitted to the ensuing session of the Indian Science Congress at Lucknow :—

- (1) "On the alleged existence of races of the Oil-Sardine *Sardinella longiceps*"; and
- (2) "On two types of Horse-Mackerel eggs found in the plankton from the sea opposite West Hill (Malabar)."
- (3) "On the fluctuation of a few typical items of planktonic organisms in the sea opposite West Hill during the last quinquennium (1936-37 to 1940-41)."

26. (ii) **KRUSADAI BIOLOGICAL STATION, GULF OF MANNAR**—*Plankton investigation.*—Inshore plankton was collected from Kundugal Channel and Watchman's Bay on 104 days as against 83 in the previous year. Plankton from the open sea, off Pamban light-house, off Shingle Island and off Periathurai was collected on nine days as against 12 last year. As usual, zoo-plankton predominated in the hauls, copepods being the commonest forms. Of the phytoplankton, *Chaetoceras*, *Coscinodiscus*, *Thalassiothrix* and *Trichodesmium* were dominant genera. The seasonal occurrence of the various forms was as follows.

27. *Phyto-plankton.*—Diatoms were common from October to May. The relative abundance of the dominant groups of diatoms in the different months is shown below :—

Genus.	Occurrence.
Trichodesmium	Abundant in July, November, March, April, and May; common in September and October; few in February.
Biddulphia	Abundant in May; common in September, February, March and April; rare in other months.

Genus.	Occurrence.
Chaetoceras	Abundant in October and November; common in September, December, April and May; few in other months.
Coscinodiscus	Abundant in May; common from September to December, and in April and May; few in other months.
Rhizosolenia	Abundant from September to December; common in April and May; few in other months.
Thalassiothrix	Abundant in October and November; common from December to May; few in other months.
Nitzschia	Common in April and May; few from July to December.

The following diatoms were also met with, but were not dominant:—

Bacillaria, Bacteriastrum, Ditylum, Detonula, Asterionella, Pleurosigma and Thalassiosira.

29. *Zooplankton*.—This was more abundant than phyto-plankton. The seasonal occurrence of the various forms is noted below:—

Genus.	Occurrence.
Ceratium	Common in October; few from February to May.
Noctiluca	Plentiful in October; common from November to February.
Medusoids	Common from November to January; few from July to August, and from February to April.
Ctenophores	Common in July, August and May; common in other months.
Copepods	Plentiful in July, August and May; common in other months.
Leucifer	Common in January; few from July to December.
Crustacean larvae	Common from October to December; few in July to January; rare in other months.
Sagitta	Abundant in December and January; common in October and November, few from July to September and in February.
Pteropods	Common in November, February and March; few from September to January; rare in August, April and May.
Larval bivalves	Common from December to February; few from September to November and from March to May; rare in August and June.
Appendicularia	Common from November to January; few in September, October and February; rare in other months.
Fish-eggs and larvae	Rare throughout the year.

Just as in the case of the plankton collection of West Hill Biological Station (vide paragraph 25 supra) 1,352 collections of plankton collected from 1930 to 1940 were transferred to the Zoological Research Laboratory of the University of Madras for study by research students.

29. *Research on East Coast food-fishes*.—The special studies made and results obtained on certain fishes of economic importance contributing to local fisheries are summarised below:—

(a) The Big-jawed Jumper (*Lactarius lactarius*).—Eight hundred and forty-three specimens ranging in size from 13 to 25 cm. were examined as against 1,224 in the previous year. The bulk of the catches consisted of specimens of 18 and 20 cm. in size. The percentage of males in the shoals were very low and the males were of smaller size. The cause for this is being investigated. The females, which are larger in size and number, form the commercial catches; and they were found in roe in the months of September and October when the fishery was at its peak. Yet, the capturing of the females in roe does not seem to diminish or deplete the fishery. However, a watch is being kept over this. It is suspected that for spawning the fishes go far out into the sea beyond the reach of the fishermen. This is being investigated.

The fish shoaled from June to January. The length of the specimens examined in June 1942 ranged from 16 to 22 cm. The length-frequency of 843 specimens examined in the laboratory was as follows:—

Length overall.	July 1941.	August	September.	October.	November.	December.	January 1942.	February.	March.	April.	May.	June.	Total
13 cm.	..	6	..	..	..	1	..	..	..	..	..	..	7
14 cm.	..	6	..	4	..	8	4	..	..	..	..	..	17
15 cm.	..	8	..	13	7	..	2	..	..	..	..	..	30
16 cm.	7	10	..	20	20	3	9	..	..	3	..	7	79
17 cm.	5	8	..	9	14	3	19	..	..	3	1	23	85
18 cm.	21	52	..	4	8	6	8	..	..	7	1	26	133
19 cm.	26	35	..	..	19	3	6	..	..	6	..	14	109
20 cm.	42	42	22	..	..	6	3	..	..	7	..	9	131
21 cm.	64	13	26	..	..	3	..	..	..	..	..	13	119
22 cm.	27	27	24	..	..	3	1	..	..	..	..	11	93
23 cm.	7	..	14	..	..	..	..	..	..	..	..	..	21
24 cm.	..	3	10	..	..	..	..	..	..	..	..	..	13
25 cm.	..	2	4	..	..	..	..	..	..	..	..	..	6
Total	199	212	100	50	68	25	57	1	..	26	2	103	843

(b) The Rainbow Sardine (*Dussimieria hasseltii*).—1,805 specimens ranging in size from 9 to 16 cm. were examined during the year. Young specimens less than 9 cm. have not been found in the commercial catches which are mainly composed of individuals 13 to 15 cm. long. The food of

this fish consists entirely of plankton; but in the stomach of 100 specimens examined on 14th September 1941 fingerlings of the White-bait (*Stolephorus* sp.) were found.

Sexual maturity is attained when the fish reach a length of 14 cm. The spawning season roughly extends from March to December. It is only the right ovary and the right testis which are fully developed. The left ovary though vestigial, contains a few ova. On an average, the right ovary contains about 420 to 500 eggs, and the left ovary 25 to 80 eggs. The ovarian egg measures 0.84 mm. in diameter. All eggs in an ovary do not ripen at the same time. About 50 to 100 mature and transparent eggs are seen at a time. This indicates that several weeks should elapse before all the eggs are discharged. This kind of protracted and intermittent spawning probably helps the fish to have a wider area of distribution for its eggs and a series of gradations in the young ones.

Eggs of this sardine were found in plankton collections from Kundugal channel made on the following dates :—

3rd October 1941,	7th November 1941,
8th October 1941,	1st April 1942, and
3rd November 1941,	2nd April 1942.

These days fall on or around Full Moon days. Partly or fully spent specimens were also observed on Full Moon days and on one or two days following Full Moon. It, therefore, seems that this fish spawns during Full Moon.

(c) The Silver bellies (*Leiognathus* spp. and *Gazza minuta*)—Eight hundred and seventy specimens ranging in size from 4 to 16 cm. were examined. The fish shoaled from November to April. The following is the composition of the different species found in the catches :—

Leiognathus bindus, 40 per cent,
Leiognathus equulus, 15 per cent,
Leiognathus duara, 10 per cent,
Leiognathus ruconius, 5 per cent, and
Gazza minuta, 30 per cent.

Leiognathus bindus and *Gazza minuta* constitute the bulk (70 per cent) of the catches. The diet of Silver-bellies consists entirely of plankton; but *Gazza minuta* occasionally feeds on fingerlings of the White-bait (*Stolephorus* spp.).

The spawning season seems to be confined to the cold months of November, December and January, as specimens in roe and spent ones were found only during these months. The eggs are minute, the ripe ovarian egg measuring 0.4 mm. in diameter.

(d) Other fishes.—The following fishes were also examined periodically :—The Indian Sprat (*Sardinella gibbosa*), the Gizzard Shad (*Anodontosoma chacunda*), the Anchovies (*Engraulis* spp.) and the Jew-fish (*Sciaena* spp. and *Otolithus ruber*).

Balanoglossus as food of fishes.—Balanoglossid worms, at the lowest rung of chordates, are represented at Krusadai Island by three genera and four species. Specimens of the Whiting (*Sillago sihama*) and the Squeaking-Perch (*Therapon jarbua*) examined in July and August 1940 had fed on Balanoglossid worms. A systematic collection, therefore, of the following fishes, the Whiting (*Sillago sihama*), Mulletts (*Mugil waigiensis* and *Mugil troschelii*) and the Squeaking-Perch (*Therapon jarbua*) found both the Balanoglossus area and the Watchman's Bay was made. The stomach-contents of the above fishes were studied in detail; and it was found that nearly 10 per cent of *Sillago sihama* and 12 per cent of *Therapon jarbua* favoured Balanoglossus as food. It is strange that Balanoglossus is not an item of food of the Mulletts, though they are caught in the same areas along with the Whiting and the Squeaking-Perch. As the ravages by these fishes have not caused any appreciable decrease in the Balanoglossid population, the protection of this group of worms of great scientific interest, does not arise.

30. Hydrographical and meteorological data.—These were recorded throughout the year. In the Kundugal channel, the highest surface temperature of sea-water was 30.80°C. on 19th May 1942, and the lowest temperature was 24.4°C. on the 6th November 1941. The highest specific gravity was 1.0291 on 11th February 1942, and the lowest specific gravity was 1.0098 on 13th November 1941. Chlorine titration of sea-water for salinity was discontinued for the same reason mentioned in paragraph 23 supra. The pH value ranged from 8.4 to 8.7.

31. The Pearl Farm.—The Japanese model rafts and iron cages continued to give satisfaction. A cage containing 101 spats was irrecoverably lost in the sea on account of rough weather. Fresh stock of oysters could not be added to the farm as, owing to war conditions, the inspection of pearl oyster banks was postponed. At the close of the year, there were 785 pearl-oysters. The collection of data regarding rate of growth of pearl-oysters reared in the farm was concluded during the year. A report is under preparation.

32. Artificial culture of pearls.—During the year, experiments by different methods were conducted on a larger scale in inducing artificial formation of pearls. Altogether, 484 oysters were operated in October 1941, February, March and June 1942. The experiments conducted in February and March 1942 have resulted in some measure of success and they are being continued.

33. *Research on the chank*.—The research on the size and maturity stages of the chank was continued during the year. Altogether, 155 specimens collected locally were dissected in the laboratory. Their diameter ranged from 23 mm. to 113 mm. and their length from 47 mm. to 220 mm. Chanks of 67 mm. showed the highest percentage, namely, 8; 62 mm. diameter was 7 per cent. Next in order were 55 mm. and 66 mm. (both 6 per cent), 56 mm. 68 mm. and 70 mm. (all 5 per cent). The following are the important results for the year:—

- (i) The ratio of the diameter to length is nearly constant;
- (ii) the female chanks are slightly (by 2 mm. to 4 mm.) larger in diameter than males;
- (iii) only 27 per cent of the adult chanks retain the proto-conch;
- (iv) the breeding season extends from November to April;
- (v) the smallest size when the chank attains maturity was found to be 57 to 59 mm. in diameter and 112 to 116 in length; and
- (vi) the collection of chanks examined included a chank whose diameter was 113 mm. and length 220 mm. even larger than the size recorded last year.

A chank egg-capsule "Ram's Horn" was kept under observation in a table tank from 12th February to 25th March 1942. The sea-water was changed once a day. A chamber examined on 20th February 1942 showed only gelatinous matter with egg-clusters. A capsule examined on 10th March 1942 had shelled larvæ. After the shelled larvæ appeared, difficulties in respiration must have set in on account of lack of sea-water circulation in the Biological Station; for the shelled larvæ were found dead on 25th March. The incubation period may roughly be inferred as over six weeks.

34. *The Chanos (Milk fish) Farm*.—The dykes were extended and two more sluice gates were constructed. The surface temperature and specific gravity of water of the farm was recorded during the year. The highest surface temperature was 32.4° C. on 21st April 1942 and the lowest temperature was 22.4° C. on 13th November 1941. The highest specific gravity was 1.0320 on 19th September 1941 and the lowest specific gravity was 1.0001 on 24th November 1941.

The plankton in the water of the farm was collected on 7 days, and studied in the laboratory. The following organisms were found:—

Phyto-plankton.—Asterionella, Chaetoceras, Hemidiscus, Harmanianus, Navicula, Nitzschia, Pleurosigma, Rhizosolenia, Thalassiothrix, Trichodesmium, and algal filaments.

Zoo-plankton.—Medusoids, Tintinnus, Copepods, Rhopalphthalmus, Nauplius larvæ, Crab-Zoea, Erichthus larva of Squilla, Leucoifer, Amphipods, Sagitta moults of polychaete worms, larval bivalves, Spiratella Frittilaria Fish-larvæ and fish-scales.

Samples of the fingerlings of Milk-fish and Mulletts growing in the farm were captured periodically and studied for their stomach-contents. The following is the analysis of their food:—

Milk-fish (*Chanos chanos*).—Copepods, larval bivalves, Spiratella, Tintinnus, Frittilaria, Pleurosigma, Navicula, Memidiscus, Thalassiothrix, Nitzschia and algal filaments.

Mullet (*Mugil troschelii*).—Tintinnus, Ostracods, Nauplius, moults of polychaete worms, Chaetoceras, Hemidiscus, Navicula, Nitzschia, Pleurosigma, Thalassiothrix, sand particles, and algal filaments.

Mullet (*Mugil waigiensis*).—Copepods, moults of polychaete worms, Tintinnus, unidentifiable ciliates, Hemidiscus, Nitzschia, Pleurosigma, Thalassiothrix, sand and algal filaments.

From the observations it is fairly certain that the sea water, entering the farm at flood-tide, carries with it sufficient food for the growing fish-fry. Besides, at the bottom of the swamp, there is a natural growth of a small plant-complex, formed by a species of *Lyngbia* and a species of *Schizothria*. These algae form an important item of food for the growing fry. The sea-grasses, *Enhalus acoriodes* and *Cymodocea* sp., found in the shallow sea around Krusadai Island were transplanted into the farm to give shelter to the fingerlings.

The rate of growth of the fingerlings growing in the farm was studied by measuring samples captured periodically. The average size of the fry of the Milk-fish (*Chanos chanos*) impounded in June 1941 was 50 mm. By the end of August 1941, the fry measured 120 mm. on an average and by the end of October 1941, they measured 180 mm. and by the end of December 1941, they measured 220 mm. The growth, therefore, is 170 mm. in six months, or 28 mm. in a month, rather a good rate of growth for impounded fish. In the case of the Mulletts, the rate of growth is comparatively fast in the early stages, the rate being 10 mm. per month in the case of *Mugil troschelii*, and 8 mm. per month in the case of *Mugil waigiensis*.

35. *Study of adult Mulletts*.—A study of adult Mulletts from the neighbouring fishing centres has been undertaken with a view to studying the spawning season of the different species of Mulletts. There are three species, *Mugil troschelii*, *Mugil waigiensis* and *Mugil sehelii*, occurring in the neighbourhood. Of these, *Mugil troschelii* is the dominant species. Both *Mugil troschelii* and *M. waigiensis* attain a size about one foot; and are therefore of marketable value. *Mugil sehelii* is negligible in number and it also does not attain a good size.

36. *Experiments in acclimatising marine Mulletts to fresh water.*—With a view to helping the stocking of fry of Mulletts eventually in the fresh-water tanks of the neighbouring districts of Ramnad, Madura and Tinnevely, four experiments were conducted during the year. A suitable method of acclimatising the fry to and of conditioning the fry in fresh water before they could be transplanted had to be determined. Live fry were netted by means of a hand-net, and transferred into a long canoe containing sea water. The water in the canoe was changed every morning, gradually lowering the salinity by adding fresh water, but the volume of water in the canoe was maintained at 48 gallons; and it was anchored in the sea where the depth was 2 fathoms, and covered with plaited coconut leaves to provide shade for the fry. Casualties were removed every morning and studied.

In the first experiment the salinity of water was lowered from 32.12 per cent to 3.24 per cent in the course of 5 days. The percentage of casualty of fry of *Mugil troschelii* was only 3. In the second experiment, the salinity was lowered to 1.0 per cent from 33.39 per cent in the course of 3 days; and the percentages of casualty was only 1 for both *Mugil troschelii* and *M. waigiensis*. In the third experiment, the salinity was lowered from 33.75 per cent to 1.84 per cent in the course of one day; but the low salinity of 1.84 per cent was maintained for three days. The casualty in this experiment was 8 per cent and 2 per cent for *Mugil troschelii* and *M. waigiensis* respectively. The fourth experiment was more violent as the fry of *Mugil troschelii* were transferred direct to fresh water of salinity 4.15 per cent from the sea water of 36.09 per cent and kept in fresh water for 4 days; and the percentage of casualty for these four days was 10, 22, 8 and 12 respectively. The total casualty for this experiment was therefore 52 per cent.

The casualty in the fourth experiment was considerably heavier than in the other experiments where the casualty was practically negligible. Previous conditioning of the fry as in the second or third experiments before transplantation seems, therefore, necessary. *Mugil troschelii* is the commonest species. Adaptability to fresh water, rapidity of growth, non-cannibalistic habit and availability of the fry in large numbers make the Mullet the best marine fish for cultivating in fresh water tanks. However, it is feared that food may prove to be a serious obstacle.

37. *Study of fish-fry occurring in the sea around Krusadai Island.*—Observations are being made on the season of abundance and the distinguishing features of fish-fry found in the neighbourhood of Krusadai Island.

38. *Museum.*—The exhibits of the museum were arranged according to natural order; and a catalogue of the exhibits was completed during the year. Several notable additions were made during the year.

39. *Specimens supply.*—Various collections of specimens were sent to Ennur Station from time to time for supply to colleges. Large bleached blocks of the coral, *Porites solida* were sent to the Aquarium, Madras, to serve as backgrounds for certain exhibit-tanks.

40. *Visitors.*—The station attracted a large number of visitors during the year. Thirteen parties of college students and professors and four parties of school boys visited the station during the year.

41. Since the close of the year, the following papers have been submitted to the ensuing session of the Indian Science Congress:—

- (1) "On the acclimatisation of Marine Mulletts to freshwater."
- (2) "On the Bionomics of the Rainbow-Sardine, *Dussumieria hasseltii*."
- (3) "On the Life-History of the Sacred Chank, *Xarcus pyrum*."

42. (iii) *VIZAGAPATAM LABORATORY.*—Specimens of common and economically important edible fishes continued to be collected and a few were identified and stomach contents examined. With a view to improve the laboratory with a good supply of specimens, the Laboratory Attendant was deputed to the Zoological Supply Station, Ennur, for studying the methods of mounting and preserving specimens. One shell case was prepared and a few specimens were mounted by him.

43. (iv) *MARINE AQUARIUM LABORATORY.*—Preserved specimens of fishes and other specimens were supplied to the Zoological Supply Station, Ennur. Coral blocks were obtained from Krusadai Island and introduced into the sea-water tanks for neutralising acidity. The following specimens bred in the Aquarium during the year under report:—

- "Gold Sword Tails" (*Xiphophorus helleri*).
- "Silver Sword Tails" (*Xiphophorus brevis*).
- "Guppy" or "Barbasos Millions" (*Lebistis reticulatus*).

As there was demand for these fishes from the public, fishes worth Rs. 37-4-0 were sold.

44. (v) *TUTICORIN LABORATORY.*—Plankton was collected on one day in Pullipundu par during the chank fishery operations. Identification of specimens of fish, chank marking experiments and collection, preservation and supply of marine specimens were carried out.

(b) *Technological Research.*

45. (i) *FISHING METHODS.*—Lobster pots imported from England were tried in suitable localities off Gangoli, Hungarcutta, Cannanore, Edakkad and Tellicherry, but the catches were very poor.

46. (ii) **TANUR EXPERIMENTAL STATION.**—The question whether there was any justification for continuing the Experimental Station at Tanur was engaging the attention of Government and after reviewing the different items of work carried on in the station they stated that they did not find any justification for continuing the station and ordered that it should be closed at once and such small part of its work as would be worthwhile, continued at Calicut. They called for a report on the items of work to be transferred to Calicut. The station was accordingly closed and all manufacture stopped with effect from the 18th September. It was reported to Government that it would be worthwhile to continue experiments in packing prawns in carbon-dioxide medium and pickling of prawns in bottles at the West Hill (Calicut) Fisheries building compound. But the Government did not consider it worthwhile to continue any of the experiments at Calicut. The sale side of the business at Tanur was continued for sometime to dispose of existing stock. All the stock has since been disposed of.

47. *Purchase and manufacture.*—A total quantity of 7,848 lb. of fresh fish costing Rs. 161-13-3 was purchased for curing and fishmeal operations. Five hundred and twenty-one pounds of cured fish, 4,602 lb. of fishmeal and 871 lb. of fish bones were manufactured at a cost of Rs. 266-3-9.

48. *Sales.*—A total quantity of 8,397 lb. of fishmeal, 560 lb. of cured fish, 4,508 lb. of fish bones, 47 gallons of fish oil and 12 gallons of stearine and other miscellaneous articles were sold for Rs. 2,709-9-9.

49. *Outstanding.*—A sum of Rs. 76-13-0 due from other departments was outstanding on the last day of the year under report. A sum of Rs. 24-9-0 has since been adjusted and countersigned bills for Rs. 13-14-0 have since been received. A sum of Rs. 38-6-0 is still outstanding from the Agricultural Assistant, Bee Farm, Negrota.

50. *Fish oil.*—The Government sanctioned the opening of an Oil Factory at Calicut with necessary staff for the manufacture and sale of shark liver oil. A sum of Rs. 40,000 was sanctioned towards the construction and equipment of the factory. The work was completed early in January. Most of the plant has been fixed and some more may be put up according to requirements as work progresses. Messrs. Parry and Co., Ltd., Madras, have been appointed agents for the sale of the oil in this Presidency and the adjoining Indian States. Agencies for the sale of the oil in other provinces in India have also been fixed up. Messrs. Ramakrishna and Son, Delhi, are the agents for the Punjab, United Provinces and Rajaputana, while Messrs. Kripag, Ltd., Bombay, and Messrs. Devar & Co., Colombo, are the agents for the Bombay Presidency and Ceylon respectively. The question of appointing agents for Bengal is still under consideration. The Director-General, Indian Medical Service, passed on very large orders for shark liver oil (3,073 gallons) for supply to the Medical Stores Depots in Bombay,

Karachi and Madras. The oil was supplied to all the Government hospitals and dispensaries in this Presidency at special rates. During the year 14,630 gallons of refined oil were produced at the Government Oil Factory, Calicut, and 10,230 gallons were sold.

B. ADMINISTRATION.

(a) Public Fish-curing Yards.

51. The number of fish-curing yards at the beginning of the year was 104. One private yard was opened during the year at Pallikere in South Kanara. At the close of the year there were 105 yards. Of these 12 were in charge of Sub-Inspectors, 92 in charge of petty yard officers and 1 in charge of a peon.

52. The working of the fish-curing yards in the East Coast was reviewed and a report was submitted to Government in which it was pointed out that the transactions in the yards have greatly improved due to favourable fishing season and that the loss has steadily decreased. It was recommended that all the yards in the East Coast might be continued for a further period of two years. The Government accepted the recommendation and ordered the continuance of the fish-curing yards on the East Coast for a further period of two years at the end of which the position should be reviewed, and a report submitted to Government by the end of January, 1944.

53. (i) **EAST COAST (NORTHERN DIVISION).**—The number of fish-curing yards in this division continued to be 26.

54. *Review of the chief coastal fisheries.*—The fishing season during the year was better than that in the previous year both in the quantity of fish caught and in the value realized. Sardine fishery occupied the first rank in weight while Ribbon fish occupied that rank in value. Sardines occurred throughout the year and shoaled heavily in January 1942. The sardine fishery gave an estimated outturn of 150,531 maunds of fish valued at Rs. 3,07,907 against 109,475 maunds of fish valued at Rs. 2,69,201 in the previous year. Ribbon fish fishery continued to be second in importance and made its appearance in large quantities in all the yards during the months of July to October. This fishery gave an estimated yield of 147,937 maunds valued at Rs. 3,27,524 against 103,516 maunds valued at Rs. 2,39,395 in the previous year. Jew fish appeared throughout the coast during July to September. White-bait was caught in large numbers in December. Mackerel shoaled in fairly large quantities mostly in the north. Among other shoals, cat fish, pomfret, dussumieria, engraulis, seer and silver-bellies occurred fairly.

55. *Transactions.*—The year under review was a very successful one in regard to the fish-curing industry. The total quantity of fish brought to the yards for curing during the year was 261,129 maunds 26 seers against 221,941 maunds 6 seers in the previous year. The quantity of salt issued for curing was 32,575 maunds

15 seers against 28,845 maunds 7 seers in the previous year. The quantity of cured fish removed from the yards was 142,371 maunds 18 seers against 121,721 maunds 23 seers during the previous year. The number of ticket-holders at the beginning of the year was 930. Thirty-five tickets were cancelled and two new tickets were issued during the year so that at the close of the year, the number was 897.

56. *Supply of salt.*—The quantity of salt purchased and supplied to the yards was 4,300 maunds monopoly salt and 28,452 maunds excise salt against 600 maunds monopoly salt and 27,764 maunds of excise salt during the previous year. The rate paid for monopoly salt was 5 annas a maund whilst that for excise salt ranged from 3 annas to Re. 0-10-3 per maund. The average cost of salt including transport charges to the yards, worked out to Re. 0-8-2 per maund against Re. 0-9-2 per maund in 1940-41 and Re. 0-7-7 in 1939-40. There was depletion of stock of salt in the Mukkum fish-curing yard from 24th to 30th June 1942 due to delay in indenting on the part of the petty yard officer in charge.

57. *Wastage of salt.*—There was no wastage of salt in the year under report.

58. *Balance of stock of salt.*—The stock of salt in the yards at the close of the year was 1,790 maunds 33 seers against 1,614 maunds 8 seers in the previous year.

59. *Fence.*—In many yards fences cannot be said to be very effective. Cathedral cactus which grows up to a height of about 6 feet and has sharp and strong thorns all round the stem is proposed to be planted in all the yards.

60. *Improvements to yards.*—The cost of petty construction and repair works carried out during the year amounted to Rs. 967-14-5 against Rs. 1,549-9-3 in 1940-41, Rs. 1,912-15-0 in 1939-40 and Rs. 2,036-15-6 in 1938-39.

61. *Fish-oil.*—A total quantity of about 260 gallons of fish oil was manufactured during the year. The busiest months for the oil extraction were from May to August. Three new centres of oil extraction were opened during the year. Three lines and hooks were purchased for introduction in the oil-extracting yards in this division. Skate liver oil which was extracted in a yard was found to contain 1,500 international units per gram of vitamin A potency.

62. (ii) *EAST COAST (CENTRAL DIVISION).*—The number of fish-curing yards in this section continued to be the same as in the previous year, viz., nine and all of them were in charge of petty yard officers.

63. *Review of the chief coastal fisheries.*—The fishing season was more favourable this year than in the previous one except in two yards. The important shoaling fishes common were Sardines, mackerel, ribbon-fish, white-bait, pomfrets, mullets, Indian Salmon, Jew-fish and sharks. The prawn fishery was also equally important. Sardines were landed off Pulianjerikuppam from August to March. Mackerel was caught off Kadappakkam from June to

December, off Pulianjerikuppam in September and October, off Kondurpalayam from September to June, off Kothapatnam from July to October and off Nelaturpalayam from July to November. Ribbon fish was available at Kadappakkam from October to December, at Sathankuppam in January and February, at Pulianjerikuppam from July to March, at Kondurpalayam from November to February, at Kothapatnam in January and in Nelaturpalayam during December. Pomfrets appeared off Kondurpalayam during November to June, off Kothapatnam during March and off Nelaturpalayam from August to June. Mulletts were caught at Mongodu, Irakkam, Kondurpalayam and Nelaturpalayam throughout the year, at Medickalkuppam during May and June, Pulianjerikuppam during December and January and at Kothapatnam from July to May. White-bait appeared at Kadappakkam from February to May, at Sathankuppam during March and at Pulianjerikuppam from January to April. Shrimps were available at Kadappakkam from April to May and at Pulianjerikuppam from August to June. Jew-fish appeared at Kondurpalayam from August to June and at Nelaturpalayam during January and February. Prawns were available at Mongodu during September and October and March, at Medickalkuppam during May and June and at Pulianjerikuppam from September to March. Besides these silver-bellies were caught off Kadappakkam during August.

64. *Transactions.*—The total quantity of fresh fish brought to the yards was 60,841 maunds 17 seers the quantity of salt issued was 9,239 maunds 29 seers and the quantity of cured fish let out from the yards was 34,036 maunds 24 seers. The corresponding figures for the previous year were 37,913 maunds 26 seers, 5,955 maunds 10 seers and 21,838 maunds 10 seers respectively. In spite of private curing with swamp salt, there was a rise in transactions due to better catches. The general increase in transactions in all the yards except two was also due to the attempts made by the fisheries staff in co-operation with the previous staff of the Salt department to prevent curing with swamp salt.

65. *Supply of salt.*—The total quantity of salt supplied to the yards during the year under report was 9,000 maunds against 5,970 maunds during the previous year. No monopoly salt was available during the year and the entire quantity of salt purchased was, therefore, excise salt. The rate paid per maund of salt remained the same as in the previous years, viz., two annas to four annas. But towards the close of the year there was a rise in price of salt in the Krishnapatnam circle and it went up to 4 annas 2 pies per maund.

66. *Wastage of salt.*—There was no wastage of salt during the year under report.

67. *Balance of stock of salt.*—The stock of salt in the yards at the close of the year was 712 maunds 8 seers against 951 maunds 37 seers in the previous year.

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68. *Transport of salt.*—As in the previous year, salt was transported to all the fish-curing yards by contractors.

69. *Fence.*—Attempts to raise a live fence with “Korukapalli” in the yards have not been quite successful. Fresh attempts will again be made.

70. *Fish oil.*—Fish oil was extracted in five out of the nine yards in this division. The total quantity of oil manufactured was about 44 gallons of which 26 gallons were from the Kadappakkam yard. To increase the output, it is proposed to use long lines and hooks.

71. (iii) *EAST COAST (SOUTHERN DIVISION).*—The number of fish-curing yards in the division remained the same as in the previous year, viz., 14, all in charge of petty yard officers.

72. *Review of the chief coastal fisheries.*—The fishing season was on the whole favourable and the fishermen of Vanagiri and Muthupet in the Tanjore district, and Ovari and Idinthakarai in the Tinnevely district had abundant catches of kendal, mullets, ribbon fish and cat fish throughout the season. Nambuthalai in the Ramnad district had a good big fish fishery. Sardine appeared in large quantities off Attankarai and Pinnakayal while sharks and rays were fair off Adirampatnam and Point Calimere. The following kinds of fishes also appeared prominently: Saw-fish, plough fish, and skates in Nambuthalai and Adirampatnam; sabre-fish, hilsa, pomfret and seer in Vanagiri and Attankarai; dorosoma, white-bait, pellona spp., dussumiera in Idinthakarai, Mukkur and Ovari; flying fish, jew-fish, in Vanagiri and Muthupet; horse mackerel in Nambuthalai.

73. *Transactions.*—The total quantity of fresh fish brought to the yards was 91,671 maunds against 72,452 maunds 4 seers in the previous year. The quantity of salt issued was 19,779 maunds 34 seers against 14,968 maunds 30 seers in the previous year. The weight of cured fish removed from the yards amounted to 65,228 maunds 22 seers against 50,529 maunds 2 seers in the previous year.

74. *Supply of salt.*—A total quantity of 21,618 maunds of salt was supplied to the yards from the Neidavasal, Tranquebar, Vedaranyam, Adirampatnam, Vattanam, Morekulam, Kayalpatnam and Tuticorin Headquarter factories. The quantity supplied during the previous year was 14,368 maunds. Salt from the Tuticorin Headquarter factories was transported by boats and in the other cases it was done by bullock carts. The transport charges ranged in the case of boat transport from 3 annas to 5 annas 3 pies per maund while in the case of transport by bullock carts it ranged from 11 pies to 5 annas 8 pies per maund of salt.

75. *Wastage of salt.*—No wastage occurred during the year.

76. *Balance of stock of salt.*—The stock of salt in all the yards at the close of the year was 7,013 maunds 4 seers against 5,174 maunds 38 seers in the previous year.

77. *Reforms in yards.*—There was no erosion of sea at Point Calimere and the question of shifting the yard from its present site did not arise.

78. *Fence.*—The live fence thrived well in all the yards except at Pinnakayal and Sippikulam. The fence in these two yards was strengthened with dry thorns.

79. *Miscellaneous.*—The usufructs of palmyra and coconut trees standing in the compounds of fish-curing yards were leased for a sum of Rs. 13-11-0 against Rs. 16-11-0 in the previous year.

80. *Fish-oil.*—A total quantity of 905 gallons 2 bottles of shark liver oil was extracted during the year as against 1,019 gallons 4½ bottles last year from 13 fish-curing yards and 5 oil-extraction centres. The total quantity of livers purchased was 24,430½ lb. at a cost of Rs. 886-6-8 against 33,877 lb. at Rs. 1,190-8-5 last year. The total charges incurred amounted to Rs. 1,339-11-0 against Rs. 1,471-2-0 in the previous year. Proposals for opening more centres are under consideration.

81. (iv) *WEST COAST DIVISION.*—There were 55 fish-curing yards at the beginning of the year including the three private yards at Kidiyur, Malpe and Padu Thonse. Another private yard was opened during the year at Pallikere in South Kanara. Thus at the close of the year, there were 56 yards. Of these 12 yards were in charge of Sub-Inspectors, 43 in charge of Petty yard officers and one, a private yard, in charge of a peon.

82. *Yards newly opened or closed.*—The opening of a private yard at Pallikere in Kasaragod taluk was sanctioned by Government and the yard was opened on 3rd April. Proposals for opening fish-curing yards at Punjavi, Tarapathy, Marvanthe, Manur and Udinur Kadapuram in the South Kanara district, and Edakkazhiyur in South Malabar are still under consideration. The curers of the Elathur fish-curing yard, which was closed on 1st June 1941 have asked that it should be re-opened. But as they have not yet paid the loss sustained by Government in 1940-41, the yard could not be re-opened. In G.O. No. 1022, Development, dated 23rd July 1934, the Government had laid down a definite policy that in view of the financial stringency, no proposals either for continuance of temporary yards or for the re-opening of yards temporarily closed should be submitted unless the curers concerned undertook to reimburse to Government the loss, if any, incurred in working the yards, to deposit in advance adequate security and to execute a bond making themselves jointly and severally liable for the loss. The Government ordered that the whole question of taking deposits from curers should be examined afresh and suggested that the sale price of salt should be so regulated as to make the yards self-supporting. When the practical difficulties involved in giving effect to this suggestion and also of constituting a fund out of the profits to subsidise such of the yards as work at a loss were pointed out, the Government were pleased to order that the Government Order of

1934 be cancelled. They have thus waived the conditions regarding recoupment of loss from the curers and lifted a burden that was hanging heavily on the poor curers of the smaller yards.

83. *Review of the chief coastal fisheries.*—The oil-sardine fishery was poor. In Malabar the fish appeared from July to October and in January. In South Kanara fairly large quantities of it were caught off Gangoli, Hungarcutta and Ullal between October and January. The total quantity of oil-sardine landed on the coast was only about one-sixth of last year. The mackerel season was fairly good, the fish appearing all along the coast in South Kanara from September to June, in North Malabar from July to March and in South Malabar from August to May. 863,880 maunds of mackerel were landed on the Malabar and South Kanara coasts during the year. Cat-fish appeared all along the South Kanara coast from July to May, the catches being abundant between Bockapatnam and Thaikadapuram. The catches in Malabar were not so good. Champan fishery was poor while Silverbellies appeared all along the coast in South Kanara almost throughout the year. Sole appeared all along the South Kanara coast except at Kirimanjeshwar from August to November. In Malabar the fish was scarce occurring in small quantities in September and October. The other important shoaling fishes occurring on the coast were chalamathi and tholiamathi (*Sardinella* sp.) appearing from August to May, Thalayan (Ribbon fish) and Nethal (*Stolephorus*) occurring in small quantities from July to September and Prawns appearing in small quantities all along the coast almost throughout the year.

84. *Transactions.*—The total quantity of fresh fish brought to the yards during the year was 1,100,842 maunds 37 seers, salt issued was 177,265 maunds 29 seers and cured fish removed 697,681 maunds 32 seers. The corresponding figures for the previous year were 930,432 maunds 19 seers fresh fish, 148,764 maunds 39 seers of salt and 595,742 maunds 24 seers of cured fish. In the South Kanara district there was a marked increase in salt consumption in all the yards south of Bockapatnam as a result of very good catches of mackerel, cat-fish sole, silverbellies and chalamathi. In Malabar, most of the yards had better operations than in the previous year as a result of a better fishing season. In Malabar though the fishing season was better, it was a short one lasting only till December, with the result that the fishermen were in great distress towards the latter part of the year.

85. *Systems of curing.*—The local curing system alone was being adopted in the fish-curing yards of Malabar. The concession to remove fish in moist condition was availed of by curers whenever there was a good demand for cured fish. The use of bamboo flakes for drying fish was not adopted by the curers this year. In the South Kanara district the local system of curing was in vogue in all the yards. In addition to this, Colombo curing system was being adopted at Kirimanjeshwar, Gangoli, Hungarcutta, Padu

Thonse, Malpe I and II, Kidiyur, Udayavar and Ullal fish-curing yards. There were operations under the Ratnagiri system of curing also in all the above yards except Kirimanjeshwar, Malpe II, Udayavar and Ullal. During the year under report a larger quantity of fish was cured under 'Colombo system,' while the fish cured under 'Ratnagiri system' was comparatively less than last year. Brine curing was not resorted to anywhere on the coast.

86. *Demonstration curing sheds.*—As in the previous year, demonstration curing sheds at the Malpe I and Calicut yards were used for the extraction of shark liver oil and no demonstration curing was conducted.

87. *Standard curing sheds.*—There were 727 standard curing sheds at the commencement of the year. Thirty-six sheds were constructed during the year and 26 cancelled. Thus at the close of the year the number of standard curing sheds was 737.

88. *Damage to yards.*—No great damage was caused to any of the yards during the year. The Vadanapalli yard, which was destroyed last year, by inundation of the sea, is being temporarily run on the same site with temporary curing sheds. The salt and records are, however, kept in the temporary shed constructed near the staff quarters. There was a slight inundation of the sea in June last but there was no damage. The question of shifting the yard to a safer site is under consideration.

89. *Supply of salt.*—A total quantity of 183,144 maunds of salt was transported to the West Coast during the year, against 159,200 maunds in the previous year. At Adakathabail yard there was depletion of salt from 1st to 6th December, when about 100 maunds of salt would have been consumed had there been salt in the yard. There was no depletion of salt in any other yard.

90. *Supply of salt to other institutions.*—The following institutions were supplied with salt as noted below :—

	MDS.
Sub-Jail, Mangalore	30
Central Jail, Cannanore	260
Mental Hospital, Calicut	90
Sub-Jail, Calicut	36
Total ..	416

Thirty maunds 15 seers of salt were utilized for preserving shark liver oil sediment and 5 seers of salt were supplied to the Yerumal Fisheries School. Due to scarcity of Government salt the Collector of Salt Revenue with the concurrence of the Inspector-General of Prisons, discontinued the arrangement by which the supply of salt to jails and hospitals has been made through the agency of the Salt department or from stocks in fish-curing yards.

91. *Wastage of salt.*—There was a total wastage of 283 maunds 15 seers of salt during the year as against 107 maunds 5 seers last year. Of this a wastage of 121 maunds 24 seers occurred in Tellicherry yard in June last year as a result of flood, but the wastage was ascertained only in July of the year under report. Two hundred and one maunds 26 seers of wastage was disposed of during the year and 81 maunds 29 seers remained to be written off at the end of the year.

92. *Balance of stock of salt.*—The stock of salt remaining in the fish-curing yards and salt gollahs on the West Coast at the close of the year was 188,761 maunds 28 seers against 183,600 maunds 31 seers in the previous year.

93. *Improvements to yards.*—The storage accommodation at the Thalayi yard was increased by converting the combined office and store shed into a store shed and a new temporary office, weighing and guard shed was constructed. The Kootayi and Mannalam-kunnu yards were provided with an additional store shed each. A new temporary store shed was constructed in the compound of the Vadanapalli yard staff quarters and the temporary additional store shed at the Palapatty yard was reconstructed. A well was sunk at the Azhicode yard.

94. *Miscellaneous—Pit manure.*—The brine manure collected in the pits at the Malpe I yard realized a revenue of Rs. 101 against Rs. 170 in the previous year.

95. *Fence.*—Experiments conducted in growing live fence with korakapulli were successful. The plants are thriving well in most of the yards except a few in South Malabar. The cactus at Kumbala, Ullal, Baikampadi, Hosabettu and Malpe are thriving well.

96. *Departmental salt factory on the West Coast.*—The Chief Commercial Superintendent, South Indian Railway, stated that it was not possible to make any reduction in the rates for transport of salt from Elimala Railway station near Payyanur to the stations nearest to the several fish-curing yards on the West Coast. He also stated that traffic in wagon loads cannot be booked at Elimala as it is open for traffic up to 81 maunds per day only. It was also reported by the Assistant Director of Fisheries (Coast) that it would not be practicable to reduce the charges for transport by sea. The prospects of reducing the transport charges are not, therefore, bright. But as this is not the only point to be taken into consideration in coming to a decision with regard to the establishment of a salt factory on the West Coast, it would be necessary to conduct experiments for a full season to see whether the establishment of a factory for the manufacture of salt for the West Coast fish-curing yards would be a business proposition. It is proposed to address Government for sanction for the conduct of a full season's experiment of salt manufacture at Payyanur from December 1942 to May 1943.

97. *Private curing.*—No private curing of fish with bazaar salt was reported within the jurisdiction of any yard.

98. *Misappropriation.*—A shortage of two maunds of salt was detected in the Karimpuram fish-curing yard on 13th September. The Petty yard officer was punished and the issue price of salt and double duty on it were recovered from him.

99. *Fish-oil.*—The manufacture of shark liver oil was conducted in 41 fish-curing yards and 2 fisheries schools on the West Coast. With a view to increase the output of shark liver oil and to economise the cost of production by more intensive supervision the Government sanctioned in G.O. Ms. No. 120/5, Development, dated 4th July 1941, a special staff consisting of an Inspector of Fisheries and a peon. The Inspector took charge on 8th August and continued throughout the year. A total quantity of 29,937 lb. and 13 oz. (3,326 gallons 2 bottles) of oil were manufactured during the year against 28,796 lb. and 1½ oz. in the previous year. The total expenditure incurred on the manufacture amounted to Rs. 7,583-4-0 against Rs. 8,692-8-11 in the previous year, reducing the average manufacturing cost of the oil from Re. 0-4-10 per lb. in the previous year to Re. 0-4-1 per lb. As in the previous year the Tellicherry yard manufactured the largest quantity of oil. The shark liver oil industry appears to have improved the lot of the fishermen and proposals to give them financial and material assistance to develop the industry are under consideration.

100. *Levy of licence fee by local bodies.*—No case of unfair taxation by local bodies was reported during the year. As the Government have amplified the rule and fixed the rate of fee to be collected, as referred to in paragraph 114 of last year's administration report, there is no likelihood of complaints in future.

(b) Private Oil and Guano Factories.

101. Out of the 179 oil and guano factories in the South Kanara district, only 33 worked during the year whilst last year 163 factories worked. Seventeen and a half tons of sardine oil and 93 tons of guano were produced against 300 tons of oil and 1,178 tons of guano manufactured in the previous year. The scarcity of oil-sardine was responsible for the fall in production of oil and guano. The price of oil ranged from Rs. 225 to Rs. 384 per ton and that of guano from Rs. 40 to Rs. 80 per ton. Two hundred and nine tons of beach-dried manure were produced in the district during the year, as against 1,345 tons of last year. The decrease in output was due to the failure of the Chamban fishery. The price of manure ranged from Rs. 32 to Rs. 75 per ton.

102. In Malabar only a single factory worked during the year against 40 in the previous year, producing 40 gallons of oil and 4 tons of guano and the price fetched for oil was Re. 1-1-0 per gallon and for guano Rs. 65 per ton. The quantities of oil and guano produced in the previous year were 151 and 878 tons respectively. The great fall in production was due to the very poor

catches of oil-sardine. The output of beach-dried manure in the district amounted to 30 tons against 56 tons last year and the cost ranged from Rs. 20 to Rs. 25 per ton.

II. MINOR AND MARINE ESTUARINE FISHERIES.

A. Prawns.

103. No investigation on the prawn fishery of the Kollair lake was carried out during the year under review.

B. Edible Oysters.

104. (i) OYSTER SUPPLY.—As in the previous year, oysters were supplied from the Ennur beds and the supply continued throughout the year. Owing to the prevailing unsettled conditions the demand was comparatively small. About 34,000 oysters were supplied during the year and a sum of Rs. 675-14-0 was realized.

105. (ii) SHELL-LEASE.—The right to collect dead 'matti' shells for producing lime, from the Ennur oyster beds was leased out for a period of five years from 1st August 1941 for an annual rental of Rs. 414-1-0. The lease in respect of the same from the Pulicat oyster farm was leased out for one year from 1st December 1941 for Rs. 200.

III. INLAND FISHERIES.

A. Research.

106. (i) RESEARCH ON RURAL PISCICULTURE.—*Ad hoc* rules for the post of Research Officer (Assistant Director of Fisheries) sanctioned in connexion with the Rural Pisciculture Scheme were issued by the Government and the post was advertised by the Madras Public Service Commission. Dr. T. J. Job was appointed to the post and he has taken charge of the post after the close of the year. A technical programme of work for the scheme was approved by the Imperial Council of Agricultural Research. Steps are being taken for the construction of the necessary buildings.

107. (ii) DEEP-WATER FISHING EXPERIMENT.—The new lessee who was granted the lease of the fisheries in the Mopad reservoir commenced fishing the reservoir towards the close of the year and daily reports of catches are being prepared. Deep-water fishing experiments with various types of nets and long lines and hooks were continued in the Mettur reservoir in different localities at various depths within a radius of 5 miles from the dam. Fishing was conducted on 221 days and unfavourable weather conditions prevented fishing on 7 days. In the absence of hemp nets from Malabar, which could not be procured as such nets were said to have been utilized for essential services, experiments were conducted with the local 'uduvai' (drift nets) and long lines and hooks. Nine hundred and eighty fish weighing in all 2,377½ lb. were caught during the year under report and sold for a sum of Rs. 148-1-3. This works out to an average of one anna per pound of fish. This poor price was due to the fish having had to be taken to the market

and sold to vendors as fish merchants were not willing to come and take the catches at the place of fishing as the catches were not generally heavy.

108. (iii) FISH BREEDING—AVALANCHE HATCHERY FOR TROUT—The Avalanche hatchery was worked as usual by the Nilgiri Game Association. Thirty thousand fry were hatched out and 7,740 including fish and fry were liberated into the streams.

The Research Assistant and the Assistant Inspector of Fisheries at Mettur visited the hatchery and the Mukerti stripping camp for study and were given necessary facilities by the Honorary Secretary of the Nilgiri Game Association.

109. *Introduction of mirror carp into the Nilgiri waters.*—The fish in the crescentic pond in the Government Botanical Gardens Ootacamund, are thriving well. A large number of fingerlings 3 to 6 inches long, presumably young ones of the mirror carp, was noticed in the pond. A collection of these fingerlings has been made for identification at Madras.

The fish have already outgrown the small pond at Ootacamund and the Executive Engineer, Coimbatore, was informed that as the fish would not grow to their normal size and might even die, since the pond at Ootacamund is not deep and being rocky cannot be deepened, it would not be desirable to postpone the improvements to the central pond in Sim's Park, Coonoor. Work is in progress. The diversion channel is completed including the foot bridge at the lower end. The headsluice surplus and other masonry works have been started.

110. *Revival of the scheme for rural pisciculture.*—Five of the six tanks selected for demonstration and mentioned in paragraph 124 of the administration report for the year ended 30th June 1941, were completely drained, cleared of silt and predaceous fish, dried for a time after slaked lime treatment before refilling with water through wire net shutters provided with inlets to prevent ingress of predaceous fish. These tanks have been stocked with fish for culture. Gourami was stocked in one tank and the rest with Gourami and Catla. The sixth tank Sekkadykulam at Adirampatnam could not be drained during the year as it received its full supply of water. The fish in all the other five tanks are quite healthy and thriving well, the rate of growth being satisfactory. In the case of Catla stocked in the "Ayee tank" at Kumbakonam, the growth has been remarkable, the fish having grown in seven months to about 18" weighing 4 to 4½ lb. The scheme has shown to the villagers the great commercial possibilities of rural pisciculture. Several owners of ponds have made enquiries expressing their eagerness to start culture with Gourami and Catla. Scientific data are also recorded systematically and studied to determine the correlating factors for growth and maturity.

111. *Hilsa hatchery*.—The hatchery could not be worked as no suitable Hilsa in the spawning condition could be procured. Though 'oozing' eggs and milt were procured on 5th October 1941, the embryos which had developed in all the fertilized eggs died before hatching as the supply of water in the well failed. To ensure an adequate and continuous supply of water to the hatchery, a borewell has been sunk during the year under report. An outboard motor was fitted to the boat to facilitate procuring spawning male and female Hilsa simultaneously.

112. *Hilsa marking experiments*.—It was found difficult to get celluloid tags for marking young Hilsa in the sea and therefore it is proposed to mark Hilsa by clipping a fin, a method which seems to have been adopted in America successfully for Salmon.

113. *Gourami* continued to thrive well and breed in the Sunkesula fish farm as usual as well as at the Ippur fish farm. The fish has grown to 7½" in one year and 5 months at Ippur and this rate of growth compares satisfactorily with that in the farm at Sunkesula. One hundred and seventy-eight Gourami fingerlings were stocked in the B Section of the Vellore fort moat. Gourami introduced in the pond at Chetput are not giving satisfactory results and the causes for this are under investigation.

With a view to determine the relative productivity in different sizes of Gourami, two of the stock ponds in Sunkesula were divided with a temporary partition of wire netting and a dozen Gourami of four different sizes, viz., 9" to 10", 10½" to 11½", 12" to 13" and 13½" to 14½" were introduced in 1940 and refished on 17th December 1941. This experiment has yielded the following valuable data :—

- (a) That Gourami of 9" to 10" begins to breed for the first time when it is 9" and above.
- (b) that the percentage of productivity of each of these group sizes is progressively double and that the maximum breeding takes place in the last group 13½" to 14½". This gives a crop of about 60 fry per Gourami per year when the number in each sex is equal ;
- (c) that the rate of growth per year shows a decisive decline in different sizes starting with 1½" to 4½" to 1½" to 2½".
- (d) the presence of fry of less than ½", i.e., ¾" of an inch in large numbers indicates good breeding in November.

Gourami has been found to breed satisfactorily in Satyavedu pond and a collection of about 300 fry was made from this pond for supply to the Buckingham and Carnatic Mills pond and for stocking Chetput fish pond. Many more young ones are still available in the pond. This is the result of stocking the pond with 11 Gourami breeders in September 1940. In the irrigation well at Mopad where waterweeds were planted young Gourami were seen

showing that the fish has bred there. Gourami was stocked in all the five tanks selected for demonstration in the Tanjore district. While the growth in two of them has been very encouraging, that in others is fair.

114. *Catla*.—It has already been stated in paragraph 128 of the administration report for 1940-41 that Catla has established itself in the whole of the Cauvery river system and the connected tanks. In the course of fishing departmentally the Veeranam tank in the South Arcot district nearly 300 large-sized Catla weighing about 30 lb. (33 to 36 inches in total length) each were caught besides many weighing between 10 to 15 lb. Though several females in gravid condition were observed in the pond at Satyavedu, there has been no sign of the fish having bred in the pond. A pond in Rallakuppam in Chingleput district has been selected for continuing the experiments. The fish was introduced into four tanks in the Tanjore district and in some, viz., Ayee tank in Kumbakonam and Eachankulam in Nagore, the fish showed excellent growth.

115. *Etroplus*.—The fish is thriving well in all the fish farms and its fry are used for stocking provincialized waters. It is found to have established itself in the Veeranam tank (South Arcot district), where swarms of breeders and fingerlings were found. It is reported that poachers found it easy to catch this fish by feeling with their hands under water where it was waist deep and that it was not uncommon to detect baskets of *Etroplus* caught by poachers. The fishery is estimated to be worth about Rs. 200 judging from the catches made.

116. *Mullets*.—The fry of this fish along with other species were used in stocking the Ippur fish farm. Tanks in Kavali and Kandukur taluks of the Nellore district were either dry or contained insufficient water and they could not, therefore, be stocked with this fish.

117. *Chanos*.—The fish introduced into ponds at Ippur and Chetput are thriving well and most of them have attained a satisfactory size, 20 to 23 inches weighing about 2 lb. each.

B. Administration.

118. (i) *FISH FARMS—Sunkesula*.—The farm continued to work satisfactorily. The different reaches of the Kurnool-Cuddapah canal and the provincialized tanks of the Ceded districts were stocked with 5,000 fingerlings of Carp and with 500 fingerlings of *Etroplus* from this farm. About 1,400 fingerlings of Gourami and adults were collected and supplied for rearing purposes to Madras. Experiments to determine the relative productivity in different sizes of Gourami are being conducted and results recorded. Marking experiments by clipping fins of *Etroplus* have been started. The experiments to observe the effect of weeds on different fish are being continued. One crocodile which entered the farm was caught and killed. Some difficulty was experienced towards the

close of the year in getting supply of diesel oil for the engine engaged in pumping water to the fish ponds from the Thungabadra river and the question of utilizing other oils is being considered.

119. *Ippur Fish Farm*.—Experiments were conducted at the farm with important commercial food fishes such as Megalops, Mulletts, Labeo fimbriata, Cirrhina Reba and Wallago. Megalops have shown good growth. A trial was made to stock with the new species of Estuarine Perch, *Lates calcarifer* (Cock-up) but due to rains, the fish could not be procured in sufficient numbers, and only four fish ranging from 10 to 11½ inches were stocked in a pond. Gourami and Etroplus showed improvement with regard to breeding and a number of fry of the latter were obtained and used in stocking the provincialized waters in the Nellore district, avoiding expenditure in having to get this from Madras. New centres have been selected for the collection of fry of Mulletts and other fish for stocking the fish farm and other provincialized waters in the Gudur taluk.

120. *Mopad stocking centre*.—The Mopad reservoir was stocked with 25 young 8 to 12 inches of *Cirrhina cirrhosa* from Mettur Dam in December 1941, with a view to introducing another useful Carp found in fair numbers in the Mettur reservoir but absent here. Etroplus has established itself here and bred prolifically. Several hundreds of fish were caught from here for stocking provincialized tanks during the year. In June several males of Catla with oozing milt and several females in gravid condition were observed in the Vasili and Atmakur tanks which were stocked with this fish this year from the Mopad reservoir. There has, however, been no catch of fingerlings yet.

121. *Vellore Fort Moat Fish Farm*.—The various sections of the fort moat were stocked with fish. In section A, Catla belonging to the 1940 lot were caught and the fish had grown to 18 to 27 inches in the course of 16 months. During the year, 1937 fish (Catla) were stocked in this section. On an average the lessee catches fish worth not less than Rs. 4 per day thus maintaining a regular supply to the local markets. Certain repairs were carried out during the year to section B and during the course of baling out of water with the help of two oil engines, most of predaceous fishes which were in this section were caught and sold for Rs. 35-7-9. The section was then stocked with 178 fingerlings of Gourami. Lotus plants have been planted. The fishes are thriving well. The municipality was supplied with 492 live Etroplus for stocking the "Ottari tank" which is the source of the municipal water supply. The work of excavating a channel sufficiently deep to provide for silting for some years is expected to be taken up shortly (in 1942-43).

122. *Chingleput Fort Moat Fish Farm*.—The moat was stocked with 12,000 larvicidal fish during the year. The work of deepening two of the sections of the moat could not be carried out as the

moat did not dry up to enable removal of silt. About 2,800 fingerlings of Carp (*Cirrhina* sp.) were collected from the Palar and distributed to the provincialized waters in the district.

123. *Chetput Brickfields Fish Farm*.—The two ponds here have been stocked with 1,539 Catla, 93 Gourami and 30 Etroplus. The Public Health Department continued to use the circular pond as a nursery for cyclopocidal fish which is used in combating guinea worm. The scheme of rural pisciculture sanctioned by the Imperial Council of Agricultural Research is expected to commence work shortly, and the Research Officer appointed by Government to be in charge of the scheme has joined duty since the close of the year under report.

124. *Mettur Fish Farm*.—As the experiments conducted by the Public Works Department with a view to preventing the percolation of water in the ponds excavated by them were not conclusive the filling of the ponds to maximum capacity to enable further detailed observations to be made, was found necessary. Before doing so, certain repairs to the inlet channels were found necessary.

125. *Patrolling the Mettur reservoir*.—The engine of the coble 'Pinctada' has not yet been repaired for want of spare parts which are not available in India at present. Coracles are being used for patrolling the reservoir and for operating the drift-net in deep-water fishing.

126. *Poaching*.—Fifty-one cases of poaching were detected, of which 35 were charge-sheeted, of which 31 cases ended in conviction and 4 were pending trial. The fines imposed by the Magistrate ranged from Rs. 2 to Rs. 20. The total amount of fines imposed during the year came to Rs. 567 and the total collected to Rs. 467. A further sum of Rs. 32-6-11 was realized by the sale of confiscated nets and fishing tackle.

127. *Licensing of fishing in the Mettur reservoir*.—During the year under report 539 licences were issued for fishing in the reservoir and a sum of Rs. 1,300-12-0 was realized as against 564 licences issued and Rs. 1,270-4-0 realized during the previous year. The fees for fishing from coracles constituted the major part of the collection. The issue of free permits to coracles plying in the reservoir for purposes other than fishing, i.e., for (i) private use, (ii) public transport, and (iii) ferry, has been sanctioned by Government and the system will be introduced shortly. The necessary permit books have been got ready. It is expected that this will give the department complete control over the coracles plying in the reservoir and enable it to effectively control poaching.

128. *Stocking of the Mettur reservoir*.—The reservoir was stocked with 3,247 fingerlings of Catla from Samalkot. There was no trace of Gourami introduced in the reservoir in April 1940. Efforts to

reduce casualties among fish stranded at the time the sluices are closed are made and the question how best this could be effected is under correspondence with the Public Works Department.

129. *Fish identification*.—The identification of the fishes of the locality and the examination of their stomach contents and gonads were continued during the year under report.

130. (ii) *NILGIRI FISHERIES*.—Rule 6 of the Nilgiri Fishing Rules permitted fishing in the Ootacamund lake with rod and line (but not otherwise) throughout the year without a licence. It was reported that anglers resorted to the lake with more than one rod and line, sometimes ten to fifteen and that fishing with more than one rod resulted in the destruction of the fishery of the lake. The rule enabled the local fishermen to fish for purposes of trade, though the intention of allowing fishing with rod and line without licence, was only to give a concession to people who fish for sport. The Government, therefore, amended the rule by adding a proviso whereby the use of more than one rod at a time is prohibited. Two cases of poaching in the Ootacamund lake were detected and charge-sheeted before the Magistrate. One of them ended in conviction and the other is pending trial.

131. *Conservancy of the Bhavani and Moyar fisheries*.—The watchers patrolled the fisheries as usual. No case of poaching was detected during the year under report in the Bhavani area while three cases of poaching were detected in the Moyar. Two of these ended in conviction and the other is pending. No case of poisoning of water with the bark of the 'Ladapetta' tree, referred to in paragraph 146 of the previous year's report, was reported during the year.

132. (iii) *GOVERNMENT HOUSE PONDS, GUINDY*.—Gourami introduced into the Doctor's pond in the Government House, Guindy, were found to have been infected with a kind of larvicide (copepod) fish parasite. After a course of saline and mud bath treatment the parasites were cleared.

C. Stocking operations and results.

133. (i) *STOCKING OPERATIONS*.—Catla were stocked in the waters mentioned below during the period from August to November :—

(i) Ayee tank, Kumbakonam	180
(ii) West moat, Tanjore	416
(iii) Sengulam, Mannargudi	281
(iv) Grand Anicut (Cauvery)	1,520
(v) Vellore fort moat	1,937
(vi) Willingdon reservoir	715
(vii) Bhavani (Cauvery)	870

(viii) Lower Anicut (Cauvery)	532
(ix) Mettur reservoir (Cauvery)	3,247
(x) Chingleput fort moat	1,404
(xi) Mopad reservoir	1,652
(xii) Madurantakam	1,452
(xiii) Kaveripakkam	788
(xiv) Penukondapuram tank	445
(xv) Barur tank	555
(xvi) Chetput farm	1,539
(xvii) Chembarambakkam tank	900
(xviii) Attukunta tank	190
(xix) Tachankulam, Tiruturaipundi	129
(xx) Eachankulam, Nagore	200

In addition, some gentlemen and institutions were also supplied with 2,136 Catla.

134. *Catla collecting operations* commenced on 10th August and were continued until the 27th October when fry became scarce. The Laboratory Attendant, Vizagapatam, was in charge of the work. The general conditions were not favourable as exceptional draught prevailed with resultant high temperature on most days resulting in heavy casualties on some days. The first fry occurred on 29th July. A total of 30,200 fry was collected during the year under report as against 11,855 at Samalkota and 9,670 at Nidadavolu during the previous year. The mortality during conditioning was 20.2 per cent against 12.9 per cent during the year previous, the increase being due to extreme draught and the consequent high temperature of water in the canals and ponds. The total number of fry despatched was 24,102 against 17,083 last year. The expenditure on transport charges from Samalkota of fry worked at Re. 1-2-8 per 100 against Re. 1-3-10 per 100 last year.

135. *Provincialization of river fisheries*.—The Government passed orders to the effect that the proposal to assume control of the fisheries in the Godavari, Kistna and Tungabhadra rivers be dropped.

136. *Fisheries of the Kollair lake*.—With regard to the proposal to control the fisheries of the Kollair lake mentioned in paragraph 153 of the previous year's report, the reports received on the subject from the Collectors of West Godavari and Kistna were forwarded to the Board of Revenue and in doing so it was pointed out that the fact that some deep portions in the lake are already leased out every year would be sufficient to prove that the right of Government to the fishery in question should be absolute. The proposal is only to extend the system of leasing to other portions of the

lake, to which fishermen resort for illicit fishing. The leasing out of the new areas would be advantageous as it would not only safeguard the existing Government revenue but also the rights of lessees of the already leased out areas. It would also bring additional revenue which would offset any expenditure that might be found necessary to incur in future to conserve and develop the resources of the lake, both for the benefit of the State and the people. It is not sought to interdict any fishing but only to control it and restrict the use of injurious methods of fishing. There is not likely to be any serious inconvenience to local fishermen as they themselves are likely to take up the leases. The approximate value of the fish caught in the Kollair lake, which gets its supply of water usually in August and sometimes in July, and the catches in which are mostly prawns, has been estimated to be about Rs. 1,80,000 per annum. It is obvious that with the prevention of kattus which will minimize the destruction of small fish, there would be an increase in the fish contents of the lake. The removal of obstacles to the growth of fish and the improvement of the fisheries would enable the fishermen who take out leases to get larger fish in place of the small ones they now get and consequently increased earnings. The advantages accruing from eliminating the innumerable fixed engines in the lake and adopting cultural methods to augment its fisheries would outweigh any possible interference with long-established custom. It was, therefore, recommended that the Collector's proposal might be given a trial. The Board of Revenue has raised the question whether the situation would not be improved if the use of closely woven baskets or of fine meshed nets that hold every fish that gets into them is prohibited. This question is under investigation.

137. (ii) SALE OF FISHERIES.—There was again no satisfactory bid this year for the fishery of the Valamadugu and Paraval items of the Viranam tank in the South Arcot district and, therefore, the facilities afforded by the draining of the tank by the Public Works Department for repairs to the tank bund were availed of and departmental fishing conducted which resulted in a total revenue of Rs. 2,292-7-9 against the bid of Rs. 260 in the open auction. Probably as a result of this increased rentals were in evidence in the sales of other items of fisheries in the district. However, the amounts fetched by sale of fisheries were low owing to the present war conditions and lack of adequate transport facilities.

138. (iii) DISPOSAL OF FISHERIES BY PRIVATE TENDERS.—No private offer was entertained during the year for the disposal of the fisheries. In cases where private offers were received better rentals were forthcoming and resales were held with the private offers as the upset price.

139. (iv) FISHERY RENTALS.—The total income from provincialized fisheries during the year under report amounted to Rs. 87,634-12-0 against Rs. 86,386-15-1 in previous year.

IV. CROWN MONOPOLIES (PEARL AND CHANK FISHERIES).

A. Research.

140. (i) PEARL OYSTER.—Only three pearl oysters were collected during the chank fishery operations. These were found attached to the chanks brought by the divers. They were kept in wire-net bags suspended under water by the side of the "Lady Nicholson." They all died after a few days. As no inspection of pearl banks was conducted during the year, pearl oysters from pearl banks could not be collected.

141. (ii) CHANK MARKING EXPERIMENTS.—Four hundred and ninety-nine chanks were marked and liberated during the year under report against 432 in the previous year. The beds on which these chanks were liberated are noted below :—

Name of bed.	Depth in fathoms.	Numbers marked on chanks.	Total.
Aluva par	9	F 986 to F. 987 990 999 G 1 52 231 240 242 268 270 281 282 330	2 10 52 10 27 12 49
Kadayan par	8½	53 to 127	75
Vadambalathan par	9½	128 230	103
Athombathur par	9	331 419	89
Nagarai par	7½	430 489	79
Total ..			499

During the year 12 marked chanks were refished against 38 last year. Eleven of these were returned to the sea for further growth and the remaining one could not be returned owing to damage caused to it by divers. The total number of chanks marked and liberated from the commencement of the experiments in 1931-32 is 4,631 of which 221 have so far been re-fished.

Information in regard to the migration and rate of growth of the 12 refished chanks is given in Appendix I. It will be seen therefrom that the chank marked F. 825 showed the maximum rate of growth in length, i.e., 1.15 mm. per month and that the chank marked F. 543 had grown fairly large both in length and diameter.

142. (iii) DIVING EXPERIMENTS.—No experiments were conducted during the year.

B. Administration.

143. (i) ROUTINE INSPECTION OF PEARL BANKS.—The inspection was not conducted during the year.

144. (ii) TINNEVELLY CHANK FISHERY.—During the year under report, a total of 495,403 chanks, including 704 from Idin-thakara, Qveri and Pinnakkayal, was fished against 486,625 in the previous year.

145. *Recruitment of divers.*—No dhony or canoe either from Kilakarai or Periapatnam was brought to Tuticorin by Sammatties during the year. Divers from Periapatnam, Kilakarai, Vedalai and Pamban hired canoes at Tuticorin for the fishery. The number of boats which participated in the fishery was 24 against 30 boats (three dhonies and 27 canoes) in the previous fishery. One hundred and eighty-three divers enlisted themselves as against 194 during the previous year and of these 53 were from Kilakarai, 28 from Periapatnam and Vedalai and 11 from other places in the Ramnad district and the rest were local divers of whom 50 were Bharathas, 14 Valayas, 15 Pallas, 7 Muhammadans and 5 Arabs.

146. *Advance to divers.*—The amount outstanding with the divers at the beginning of the year was Rs. 126-7-0. A sum of Rs. 151 was advanced to the divers during the season bringing the total amount of advance recoverable to Rs. 277-7-0. A sum of Rs. 191-13-0 was recovered from them during the year. The balance outstanding at the close of the year was Rs. 85-10-0.

147. *Boat loan to divers.*—The amount outstanding at the beginning of the year was Rs. 79. No fresh loan was issued during the year. A sum of Rs. 69 was recovered during the year and the sum outstanding at the close of the year was Rs. 10.

148. *Quarters for divers.*—The divers brought from outside were as usual accommodated in the old Police lines and the Armoury buildings.

149. *Rate per chank.*—On a representation from the Tuticorin Sea Divers' Union, the Government sanctioned the payment to divers in Tinnevely district at the rate of Re. 0-1-3 per chank during 1941-42 season.

150. *Fishery operations.*—The fishery commenced on 28th November and closed on 22nd May. The boats were sent out to sea on 131 days as against 134 days in the previous year. Adverse weather conditions prevented fishing on 24 days and Sundays and other holidays accounted for 21 days. The largest catch made by an individual diver on any one day was 217 against 290 in the previous season. The average earning per head for the total number of working days and for the whole period of the fishery were Rs. 2-7-0 and Rs. 1-13-0 against Rs. 1-9-8 and Re. 1-0-8 during the previous season.

151. *Accident at sea.*—There was no case of any accident at sea during the year.

152. *Inspection of chank beds.*—Three chank beds were buoyed during the year for fishing. The names of chank beds fished and the number of chanks fished from each are given in Appendix II.

The beds at Aluvu par, Melombathu, Vadathundam, Neelankalpathrai, Vadaonbathu, Vettikaprawl, Japathu par and Seltan par yielded the maximum number of chanks during the year under report.

153. *Immature shells.*—The divers inadvertently brought ashore 50,181 under-sized shells, of which 29,972 were returned alive to the sea. The corresponding figures for the previous year were 34,465 and 20,965 shells respectively.

154. *Idinthakarai, Uvari and Pinnakkayal chanks.*—Five hundred and fourteen chanks from Idinthakarai, 18 from Uvari and 172 from Pinnakkayal were collected from fishing nets against 686 during the previous year.

155. *Catches.*—Statistics of the catches made during the three years ending with the year under report are given below :—

	1939-40.	1940-41.	1941-42.
Full-sized	539,662	436,625	495,403
Under-sized	7,987	13,509	20,377
Wormed	58,224	47,882	46,113

156. *Temperance.*—As usual, tea, coffee and rice kanjee were sold to divers within the premises of the chank godown with a view to preventing them from resorting to intoxicating drinks.

157. *Sale of chanks.*—The purchasers of the 1939-40 season's chanks took delivery of the chanks completely. The offer of the Shanka Shilpa Sanmilan, Ltd., of Dacca, for the purchase of the 1940-41 season's chanks was accepted. The rates accepted were Rs. 215 and Rs. 30 per 1,000 full-sized and undersized and wormed shells respectively.

158. (iii) *RAMNAD CHANK FISHERY.*—The Government took over the lease of the chank fisheries off the coast of Ramnad belonging to the Ramnad Estate for a period of five years from 1st July 1941. A total of 485,780 chanks as per details below was fished :—

Rameswaram quality	2,67,272 full-sized.
Irupiravi shells	36,988 ..
Kilakarai quality	7,171 ..
Tirupalakudi quality	174,349 ..
Total	4,85,780

The maximum number of canoes and divers employed in the different fishing centres were as follows :—

	Number of canoes.	Number of divers.
Rameswaram	66	675
Irumeni	15	149
Kilakarai	15	194
Tirupalakudi	45	436

159. *Advance to divers.*—A sum of Rs. 640-5-0 was advanced during the year and a sum of Rs. 528-7-0 was recovered leaving a balance of Rs. 111-14-0 at the close of the year.

160. *Boat loan to divers.*—The Government sanctioned the grant of a loan of Rs. 100 to Madar Mohideen of Devipatnam for the purchase of a canoe.

161. *Quarters for divers*.—Some of the divers who came for the fishery from Kilakarai and Periapattanam were accommodated in the divers' lines at Rameswaram.

162. *Rate per chank*.—Chanks fished off the coast of Ramnad were first paid at the following rates:—

Rameswaram (Jadhi) shells at Re. 0-1-3 each.

Tirupalakudi and Irupiravi shells at Re. 0-0-8 each.

Kilakarai shells at Re. 0-1-0 each.

Subsequently, these rates were increased as follows:—

	RS.	A.	P.	
1. Rameswaram Jadhi shells ..	0	1	6	each
2. Kilakarai (Irupiravi and Irumeni shells) ..	0	1	2	„
3. Tirupalakudi (patti) shells ..	0	0	10	„

163. *Fishery operations*.—The fishery commenced on 9th July and lasted till 18th June. The number of days on which fishing was conducted at the different centres is given below:—

Rameswaram	87	days.
Irumeni	47	„
Kilakarai	102	„
Tirupalakudi	152	„

164. *Inspection of chank beds*.—The chank beds off Rameswaram and Tirupalakudi were buoyed for fishing during the year under report.

165. *Immature shells*.—Out of 66,077 shells brought ashore inadvertently by the divers in the different fishing centres of the district, 22,057 were returned alive to the sea.

166. *Valampuri chanks (Sinistral shells)*.—Eleven valampuri chanks were fished during the year, the largest number of shells fished so far.

167. (iv) *OTHER CHANK FISHERIES*.—This is the first year of lease of the chank fisheries in the Tanjore, South Arcot, Chingleput and Nellore districts granted to Janab M. K. Shamsudeen Marakkayar of Pondicherry for three years from 1st July 1941.

V. BIOLOGICAL SPECIMEN SUPPLY.

168. The Zoological Supply Station, Ennore, continued to be popular as usual with the colleges teaching Natural Science all over India. In all 42 orders were received for the supply of scientific specimens and all of them except six were executed. In the case of these six orders they could only be partially executed for want of rare specimens. For want of facilities for collecting specimens from the Madras Harbour, certain specimens could not be obtained and supplied. During the year five sets of 40 museum

jars for Animal Life and one Invertebrate case of 38 dried specimens for a set were sold to different schools and colleges even from far away places like Dacca, Jubbulpore, etc. Four cases of beautifully mounted stuffed crabs and five cases of Molluscan shells were also sold.

The receipts from the sale of specimens during the year amounted to Rs. 2,789-12-0 as against Rs. 2,603-8-0 during the previous year.

169. *Oyster shell grit*.—About 2,900 lb. of oyster shell-grit were sold during the year and a sum of Rs. 161-11-0 was realized.

170. Permanent exhibits of the station were sent to the Industrial Museums at Rajahmundry and Chittoor and to the Cottage Industrial Museum, Tinnevely.

VI. ANTI-MALARIAL WORK.

171. The fort moats at Vellore and Chingleput were stocked with larvicidal fish obtained from the adjacent areas in order to reduce the mosquito nuisance in the localities concerned. The District Forest Officer, Salem, has asked for the supply of larvicidal fish for introduction into the ponds of Kolli and other hills and the fish will be supplied as soon as the wells are cleared and ready to receive the fish. The Health Officer, Tirupati Hills, has also asked for the supply of the fish which will be arranged.

VII. SOCIO-ECONOMIC WORK.

A. Education.

172. (i) *WEST COAST*—(a) *Village Schools*.—There were 45 schools at the beginning of the year. Four new schools were opened during the year at Yerumal and Kanhangad in South Kanara district and at Ponnani and Pallipuram in Malabar district. Thus at the end of the year there were 49 fisheries schools.

Standard VIII was opened in Vellayil school making it a complete Higher elementary school. Standard VI was opened in the Palapatty school, Standard V in the schools at Kavvayi, Puduponnani, Uppur, Udayavar West and Ajanur, and Standard IV in the Kesarkodi school.

173. *Strength*.—The number of pupils undergoing instruction in the schools was 6,099 (3,718 boys and 2,381 girls) at the beginning of the year. The number at the close of the year was 6,973 (4,148 boys and 2,825 girls). Thus there was an increase of 874 pupils in the strength. Improvement in strength was marked in the schools at Kesarkodi, Kirimanjeshwar, Udayavar West, Polippu, Uppur, Hejmadikodi, Adakathabail and Ajanur in South Kanara and Madapalli, Vellayil, Kadalundi, Parappanangadi and South Nattika in Malabar. The number of teachers employed in the schools was 183 at the beginning of the year and 208 at the close of the year.

174. *Conductresses*.—Conductresses continued to be employed in the schools at Vekkode, Kaipamangalam, Mannalamkundu, Palapatty, Veliangode, Puduponnani, Kadavanad, Puthenkadapuram, Kundazhiyur, Naduvattam and Kannankadavu schools. A conductress has been employed in the school at Kadalundi with effect from 26th October. Their employment has been beneficial to the schools in getting attendance. With a view to inducing them to do better work, the Government sanctioned the payment to them of remunerations in proportion to the attendance of pupils, i.e., that the conductress be paid Rs. 4-8-0 per mensem with a bonus of one rupee when the average attendance in a month is between 65 per cent and 75 per cent of the strength of the school and a further bonus of eight annas when the attendance is 75 per cent or more.

175. *Scheme of studies*.—English is now being taught in 21 schools and for this purpose eight posts of higher elementary grade teachers have been converted into an equal number of posts of secondary grade teachers. The syllabus followed in Fisheries schools has been revised in respect of non-fisheries subjects.

176. (ii) EAST COAST—FISHERIES TECHNOLOGICAL INSTITUTE.—The Bharatha Mahajana Sangham completed the construction of the building for housing the Fisheries Technological Institute at Tuticorin and handed it over to the Department on the 2nd December. The Government sanctioned the opening of the institute. The institute would provide for the training of teachers in fishery technology after their regular training in teachers' training schools and at the same time provide courses of instruction to fishermen and others interested in different branches of the fishing industry including navigation. The duration of the training will be one year and for those who desire to specialize it will be extended to two or three years. Short courses for a few months will also be provided. The Bharatha Mahajana Sangham and others will award 15 scholarships for the students of their community and the Government will provide for the grant of six stipends. A fee of Rs. 5 a month will be charged for the students from outside the Presidency. The Government also sanctioned temporarily for a period of three years the appointment of a Superintendent, three instructors and one lascar for the institute. Thirteen applications were received from trained teachers. For the navigation course 46 applications were received. The Selection Committee constituted for the purpose selected in all 25 candidates, 19 for the special course in navigation and 6 trained teachers for the course in fishery technology. Of the 19 students for the navigation course, 15 were stipendiaries paid by the Bharatha Mahajana Sangham and others and four were non-stipendiaries. The six trained teachers were paid stipends by Government. The institute was opened on the 29th January 1942 by Mr. (now Sir) H. M. Hood, K.C.I.E., C.S.I., I.C.S., Adviser to His Excellency the Governor of Madras. The institute has commenced regular work.

177. (iii) MARINE AQUARIUM.—On account of war emergency as the building was required for other purposes Government ordered the closure of the Marine Aquarium and it was closed on 8th March. The Aquarium worked for 8 months and 7 days during the year and continued to be popular till its closure. A total of 65,236 visitors visited the Aquarium as against 118,383 during the previous full year. The record attendance was as usual on the Kannu Pongal day when 965 persons visited the institution as against 3,079 on the corresponding day in the previous year. The number of visitors on the Dwadasi Day, another festival day, was 1,039 against 884 on the corresponding day in the previous year. The daily average attendance was 261 against 324.33 during the previous year. For the benefit of the poor class of visitors on the festival occasion both on the Dwadasi and Kannu Pongal days, the admission fee for the whole day was fixed at one anna. Sixty batches of school children visited the Aquarium against 102 last year. Of these, 12 batches of 888 children were from the Corporation and Aided schools within the City who were admitted free, and 48 batches of 2,145 children were admitted at the usual concession rates.

178. *Receipts*.—The gate collections amounted to Rs. 5,025-12-0 for the period the Aquarium was kept open. The sale-proceeds of books and picture post cards, fish and miscellaneous receipts amounted to Rs. 139-7-9. The total receipts for the incomplete year were Rs. 5,165-3-9. The corresponding receipts for the previous full year were respectively Rs. 9,072-14-0, Rs. 212-7-0 and Rs. 9,285-5-0. The total expenditure amounted to Rs. 5,059-11-2 leaving a surplus revenue of Rs. 105-8-7.

179. With the closure of the Aquarium, the sea-fishes were released into the sea and the freshwater fishes were transferred to the Chetput fish-farm. There was no suitable place to which the marine fishes could be transferred. At the time of closing, there were in the Aquarium :—

57 varieties of marine fishes totalling	687
4 varieties of backwater fishes totalling	131
15 varieties of ordinary freshwater fishes	133
8 varieties of foreign fishes such as	
<i>Xiphophorus helleri</i>	176
<i>Xiphophorus brevis</i> , <i>Lebistis</i>	
<i>Xiphophorus reticulatus</i> , etc.	
5 varieties of turtles	7
Crustaceans such as <i>Lysiosquilla</i> , <i>Palinurus</i> sp., etc., totalling	20
Total ..	1,154

The oldest specimen of rock-cod (*Epinephelus pantherinus*) which was acquired in 1912 as a young fish, got its freedom in 1942.

A span of life of 30 years is unusual among fishes in captivity; but the rock-cod is a hardy fish and is well-known for its longevity of life in Marine Aquaria.

Ten kinds of selected items are shown in the statement below with percentage of mortality in the Aquarium:—

Name of fish.	Fishes released.	Purchased during the year.	Total.	Casualty.	Percentage of mortality.
(1) The butterfly-fish (<i>Heniochus macrolepidotus</i>).	26	29	55	23	41.8
(2) The red-banded snapper (<i>Lutjanus sebae</i>).	14	27	41	13	33.3
(3) The scorpion-fish (<i>Pterois rugellii</i>).	85	325	410	264	64.4
(4) The rock-cods (<i>Serranus spp.</i>).	36	15	51	15	29.4
(5) The blotch-eye (<i>Myripristis murdjan</i>).	13	11	24	10	41.6
(6) The sea-horse (<i>Hippocampus spp.</i>).	36	246	282	208	74.1
(7) The trigger-fish (<i>Balistes spp.</i>).	38	49	87	42	48.2
(8) The yellow angler (<i>Antennarius sp.</i>).	3	146	149	146	98.0
(9) The globe-fish (<i>Tetodon lineatus</i>).	5	54	59	54	91.5
(10) The sea-snakes (<i>Hydrophis spiralis</i>).	20	50	70	60	85.7

The hardiest fish is the rock-cod, then follow in order the red-banded snapper, the butterfly fish and the blotch-eye, the trigger-fish, the scorpion-fish, the sea-horse, the globe-fish and the yellow-angler. The last seems to be the most delicate fish.

B. Co-operative Societies.

180. (i) WEST COAST.—(a) *South Kanara*.—There were 19 societies at the commencement of the year. Three societies were organized during 1941-42. Of these the Marvanthe Fishermen Society started work during the year. The remaining two were registered only since the close of the year. The registration of no society was cancelled during the year. Thus at the close of the year there were 20 societies. The registration of the Punjavi Fish Curers' Society referred to in paragraph 204 of last year's report is still under consideration as the proposed fish-curing yard at the locality has not yet been sanctioned.

181. *Members and paid-up share capital*.—During the year 88 members were admitted and 76 removed. A sum of Rs. 1,624-1-0 was collected towards share capital and Rs. 1,014-2-0 was paid off. Thus at the end of the year there were 917 members with a paid-up share capital of Rs. 15,582 as against 905 members and Rs. 14,972-1-0 respectively that existed at the end of the previous year. The number of members admitted and removed and the amount of share capital collected and paid off during the previous year were 109 and 64 and Rs. 2,919-15-0 and Rs. 1,715 respectively.

182. *Deposits and borrowings*.—During the year fixed deposits amounting to Rs. 960 were received in two of the societies and a sum of Rs. 331-8-0 was paid off from three of the societies. Thus at the end of the year there was a sum of Rs. 1,625-3-0 as fixed deposits in four of the societies as against Rs. 996-11-0 that existed at the end of the previous year. In the Uthil Bovis Society Rs. 24-8-0 was received towards monthly deposits and Rs. 20 was paid off, leaving behind Rs. 73-4-0 as against Rs. 68-12-0 that existed at the beginning of the year. In the Coondapur Kharvis' Thrift Co-operative Society a sum of Rs. 1-8-0 was received towards the Anna Fund deposits and a sum of Rs. 137-2-0 was paid off. Thus at the end of the year there was only Rs. 4-8-0 left in the society under this head as against Rs. 140-2-0 that existed at the end of the previous year.

183. *Borrowings*.—At the beginning of the year eleven societies were indebted to the South Kanara Central Co-operative Bank, Mangalore, to the extent of Rs. 11,760. During the year seven societies borrowed in all Rs. 110,996 and repaid Rs. 11,408-8-0 towards principal alone as against Rs. 9,759 and Rs. 7,123 borrowed and repaid during the previous year. Thus at the end of the year Rs. 11,267-8-0 was due to the Central Bank from 11 societies. Of this amount, only Rs. 376-8-0 was overdue from one of the societies as against Rs. 1,904 overdue at the end of the previous year from two of the societies. As was the case last year no interest was overdue to the Central Bank during this year. The Central Bank has been generous and prompt in granting loans to the fisherman co-operative societies and the societies in their turn have reciprocated this gesture of goodwill.

184. *Loans to members*.—During the year Rs. 21,049-10-0 was issued as loans to members and Rs. 19,821-1-0 was collected as against Rs. 17,182-9-0 and Rs. 13,179-4-0 issued and collected during the previous year. The purpose for which loans were granted during the year are noted below:—

	RS.	A.	P.
Prior debts	8,987	6	0
Boats and nets	3,217	15	0
Trade	2,028	13	0
Rice and other necessities of life	5,624	9	0
House and other building account	406	0	0
Others	790	15	0
Total	21,049	10	0

At the end of the year Rs. 49,822-12-0 was outstanding against members. Of this amount, Rs. 12,076-2-0 was overdue. Amounts outstanding and overdue at the end of the previous year were Rs. 41,094-3-0 and Rs. 15,454-6-0 respectively. It will be seen that collections during the year increased and overdue decreased. Overdues in three of the societies alone amounted to Rs. 5,767-4-0.

This was due to the apathy of the members and partly to poverty. A good portion of this overdue amount is locked up in the hands of leading and influential members of the societies.

185. *Investments.*—All the societies of the district, except three, have reserve funds amounting to Rs. 9,851-13-0. Including an amount of Rs. 59-9-0 invested in excess by four of the societies, the total amount that stood invested at the end of the year in the South Kanara Central Co-operative Bank, the financing Bank of the district, was Rs. 4,324-8-0. Societies are being induced to invest the balance of Rs. 5,586-14-0 also. An amount of Rs. 213-10-0 was invested during the year as against Rs. 191-4-0 in the previous year. Three of the societies have invested their entire reserve funds. The uninvested reserve fund is made use of by the respective societies as working capital. None of the societies affiliated itself to the financing bank of the district during the year but two societies took three more shares paying in all Rs. 30. Hence the number of societies affiliated at the end of the year and the total amount invested in the shares of the Central Bank were 15 and Rs. 520 respectively. Eleven societies had on the last day of the year a sum of Rs. 562-1-0 in their savings bank accounts. The Uthil Bovis' co-operative society had a fixed deposit of Rs. 150 in the South Kanara Central Bank. The Nileshwar Fishermen society owed the Kanhangad Fishermen society, Rs. 327 on account of loans of certain members transferred to it from the latter society. The Ajanur Fishermen society owns a fish-curing building valued at Rs. 503 in the Hosdrug fish-curing yard. This was constructed during the year. The building in which the Government Fisheries school at Kizhur is housed is owned by the Kizhur Fishermen Co-operative society. Its value is about Rs. 520.

186. *By-laws.*—Nineteen out of the 20 societies have adopted the latest model by-laws.

187. *Non-credit work.*—During the year rice and paddy were purchased wholesale and distributed among the members of the Kasaragod and Ajanur Fishermen Co-operative societies. A total of 291 muras of rice and 4 muras of paddy were purchased for a sum of Rs. 2,083-7-0 (including conveyance charges) and the approximate financial benefit derived by members was Rs. 79. All the rice was purchased from the Mangalore branch of the South Kanara Agriculturists' Co-operative Wholesale Society and the paddy from its Kasaragod branch.

Joint sale of fish of various kinds was effected by the Kasaragod, Kanhangad, Nileshwar and Ajanur societies. The sale-proceeds of fish realised amounted to Rs. 9,206 in all and the commission or administrative charges collected to Rs. 553-13-0. One-fourth of the latter amount goes to the society to meet godown rent, cost of curing materials and stationery charges, etc., and the balance to the members of the society engaged in the collection, curing and drying and sale of the fish. This item of work has been self-supporting. It has also provided labour to some of the fishermen

and enabled them to earn a living and learn fish trade. The members have, by the joint system, derived benefit to the extent of Rs. 818-12-0. This amount is only in comparison with the then prevailing market rates of the commodities. Had the members received their supply of rice and paddy from fish merchants, they would have had to deliver their catches of fish to them as is the custom. In that case they might have had to pay at the rate of about Rs. 1-8-0 more per mura of rice and received about 25 per cent less towards the value of fish. The members must have benefited to the extent of about Rs. 493-8-0 in respect of rice and paddy and Rs. 2,301-10-0 in respect of fish sold by them. Thus as stated in paragraph 210 of the previous year's report, the transactions have enabled the fishermen to obtain the profits that would ordinarily have gone to the fish merchants. This work will be continued and extended to other societies.

In the Ajanur and Nileshwar societies members were provided with coir mattings to enable them to cure their fish. The Aila Bovis' society purchased, cured and dried fish to the value of Rs. 27 from the Ajanur society for distribution to its members. The latter society has also sold fish to the members of the Keekan Tobacco Growers' Co-operative Society for manurial purposes.

In the societies where rice and paddy had been distributed to members and fish collected in lieu of money, there had been good collections and good repayments of Central Bank loans. The introduction of this system of collecting fish and their sale by the co-operative societies has improved the social and economic condition of the members of the concerned societies.

188. It is necessary for the societies which undertake the collection of fresh fish to have facilities for curing it in the local fish-curing yards. Otherwise they will be compelled to sell the fish at low price. The Ajanur society which was granted a ticket in the Hosdrug fish-curing yard during the year under report has already put up a good curing shed at a cost of Rs. 503-13-0 in the Hosdrug yard and has begun curing fish. This is the first time a co-operative society is granted a ticket in a fish-curing yard. This society is attempting to produce first-class varieties of cured fish with a view to cater to the needs of the higher classes of fish-eaters. Seeing the benefits the Ajanur society has derived the Kasaragod and the Nileshwar societies have also applied for tickets in the Adakathabail and Taikadapuram fish-curing yards. Since the closure of the Tanur Experimental Station, customers who used to get from the station their requirements of cured fish, prawns, fish meal and fish manure are finding it difficult to get supply from reliable dealers. The fishermen societies have been asked to undertake the supply and this is expected to benefit the consumer as well as the producer.

Mukkuva fishermen generally neither grow hemp nor prepare the nets they require for their occupation. They generally borrow money from the fish merchants and purchase the nets required.

This is one of the main causes of their indebtedness and the custom requires to be eradicated. Attempts to this end are being made through the co-operative societies. This should also provide the members with subsidiary income.

189. The Deputy Registrar of Co-operative Societies, Mangalore, visited six societies during the year. His visits stimulated collections and were thus useful to the societies.

190. The scheme referred to in paragraph 211 of the last year's report for the better and more effective working of the fishermen co-operative societies was given effect to in a few societies with success. The opening of depots in outside markets for marketing the products has not been undertaken. Since the collection of fish will be the main and a very necessary item of work of the fishermen co-operative societies, the opening of depots in markets outside the district will have to be considered as early as possible. When the Senior Marketing Officer of the Government of India visited Mangalore and Calicut, the Inspector of Co-operative Societies in charge of the societies in North Malabar and South Kanara met him and discussed with him the possibilities of obtaining better markets for prawns, cured fish, etc. Fishermen have been told of the good prices offered for shark liver and they are being induced to take up shark fishing.

191. *General.*—The petty yard officers of the Bekal and Adakathabail fish-curing yards continued to be the ex-officio secretaries of the Bekal and Kasaragod fishermen co-operative societies respectively. The Headmasters of the Hejmadikodi, Bekal, and the Kizhur schools are the ex-officio presidents of the Mulki Mogers, the Kottikulam and the Kizhur fishermen co-operative societies. In all the four Mukkuva fishermen societies of the Kasaragod taluk, viz., Nileshwar, Kanhangad, Ajanur and Kasaragod where rice was distributed as loans to members and fish was collected, transactions have improved to a remarkable extent. All the three Bovis' societies of the district, viz., the Kadangot, the Ailaand the Utchil, have also worked well. Three out of the four Kharvis' societies, viz., the Gangoli, Maravanthe and Kirimanjeshwar, show signs of bright future. Among the societies for Moger's all except two, are working well. Attempts are being made to revive the dormant societies of the district.

192. Almost all the societies of the district require the personal attention of the Co-operative Inspector. Collections of fish, getting them prepared for the market and division and distribution of their sale proceeds, have taken much of the Inspector's time. As a result of the strenuous efforts made, it has been possible to bring about a general improvement in the working of a good number of societies. The Inspector has now 35 societies in his charge and two more will be added soon. The question of a separate Inspector to supervise the societies of South Kanara is under consideration.

193. (b) *Malabar.*—There were 34 societies at the beginning of the year. The Vengalam Fishermen Society was registered and started work during the year under report. Three societies were organised during the year. Of these, the South Talikulam Mukkuva Fishermen Society was registered and started work. Of the remaining two the one organised for the benefit of the ticket holders of the Calicut North fish-curing yard is pending registration. The other organised for the benefit of the fishermen of Tellicherry to encourage among them net making as a cottage industry, was registered during the year. The registration of the Blangad Purchase and Sale Co-operative Society was cancelled towards the close of the year. Its appeal time was not over before the close of the year, and including it there were 36 societies at the end of the year.

194. *Membership and share capital.*—At the beginning of the year there were 1,225 members with a paid-up share capital of Rs. 19,625-12-0. During the year 162 members were admitted and 54 removed. A sum of Rs. 943-10-0 was collected towards share capital and Rs. 992-13-0 was paid off. Thus at the end of the year, there were 1,333 members with a paid-up share capital of Rs. 19,576-9-0.

195. *Deposits.*—At the beginning of the year there was a fixed deposit of Rs. 465 and a recurring deposit of Rs. 16-14-0. No deposit was received during the year. A sum of Rs. 5-12-0 out of the recurring deposit was repaid. Hence at the end of the year there was a balance of Rs. 476-2-0 under deposits.

196. *Borrowings.*—At the beginning of the year a sum of Rs. 3,255 was due to the Malabar District Co-operative Bank. During the year Rs. 2,710 was borrowed and Rs. 1,138 was repaid, leaving a balance of Rs. 4,827 at the end of the year. Of this amount Rs. 641-11-0 was overdue from seven societies. The amount of interest overdue was Rs. 121-12-0.

197. *Loans to members.*—The amount outstanding against members at the beginning of the year was Rs. 42,306-12-0. During the year loans to the extent of Rs. 11,571-8-0 were issued for the following purposes :—

	RS.	A.	P.
Prior debts	5,728	0	0
Purchase of boats and nets ..	1,026	0	0
Trade purposes	2,766	0	0
Household expenses	1,203	8	0
Industrial purposes	336	0	0
Housebuilding repairs, etc. ..	387	0	0
Other purposes	125	0	0
Total	11,571	8	0

A sum of Rs. 11,888-3-0 was collected. Thus at the end of the year, a sum of Rs. 41,990-1-0 was outstanding as loans against members, of which Rs. 21,998-2-0 was overdue. The amount overdue at the end of the previous year was Rs. 25,345-10-0. In spite of the bad fishing season in the district and low prices of fish due to want of transport facilities and war conditions it has been possible to reduce the overdues by strenuous efforts.

198. *Investments.*—The total reserve fund of all the societies was Rs. 18,963-8-0. Including Rs. 89-10-0 invested in excess by three of the societies, the total amount of reserve fund separately invested in the Malabar District Co-operative Bank was Rs. 4,750-2-0. The amount pending investment was Rs. 14,303. The amounts pending investment are now merged in the working capital of the respective societies.

199. *Shares in the Central Bank.*—At the beginning of the year 26 societies had affiliated themselves to the Malabar District Co-operative Bank. They had invested Rs. 1,570 in the shares of that Bank. During the year Rs. 80 was invested. There were neither affiliations nor disaffiliations during the year. So at the end of the year the number of societies affiliated to the Bank was 26 and the amount invested in the shares of that Bank was Rs. 1,650. Twenty-one societies had public accounts and at the end of the year there was Rs. 1,668-1-0 in those accounts. The Thalayi Fish-curers', Madapalli fish-curers' and the Velur Mogers' societies have buildings of their own valued in all at Rs. 1,059-4-0. All the fish-curing sheds in the Thalayi fish-curing yard are owned by the Thalayi Fish-curers' Society. That society has already a store building. The construction of a second building has been permitted by the Registrar of Co-operative Societies. The Blangad Purchase and Sale Society owned fishing boats and nets, valued at Rs. 341-3-0.

200. *By-laws.*—Model by-laws were adopted in 15 societies.

201. *General.*—The Sub-Inspectors of the Quilandy and Cannanore fish-curing yards continued to be the ex-officio Secretaries of the Quilandy Fishermen and the Cannanore Women Fish-curers' societies respectively. The petty yard officers of the fish-curing yards at Meladi, Thalayi, Blangad and Beypore, are the ex-officio Secretaries of the societies situated in the respective places. The petty yard officer of the Pudiappa yard is the ex-officio President of the Pudiappa society. The Headmasters of the Kavvayi and Blangad schools are the ex-officio office bearers of the Kavvayi and Blangad Kadapuram fishermen societies. One of the assistant teachers in each of the Fisheries schools at Chaliyam and Nattika is the ex-officio Secretary of the societies situated in the respective stations. Scriptorial grants amounting to Rs. 170 were sanctioned by the Registrar of Co-operative Societies to 18 societies. This was a great help to the societies in meeting the clerical charges.

In spite of the poor fishing season and the low price of fish due to the lack of transport facilities and loss of foreign fish markets, some of the societies worked satisfactorily.

202. *Non-credit work.*—The three non-credit societies in the district continued to work during the year. In the Thalayi Fish-curers' and the Madapalli Fish-curers' societies, no joint sale of fish or wholesale purchase and distribution of fish was undertaken. In the Blangad Purchase and Sale Society 987 maunds of fish costing Rs. 990-3-0 were caught during the year. The society's share was only Rs. 132 while the expenditure was more. The working of the society was not satisfactory and attempts made to improve its working proved futile. Hence the registration of the society was cancelled towards the end of the year. The society had, on 30th June 1942, 12 members with a paid-up share capital of Rs. 258-12-0. There was in the society a fixed deposit of Rs. 465. The boats and nets owned by the society have been valued at Rs. 341-3-0. In the Quilandy society, for want of sufficient capital, the members were compelled to sell their cured fish at low prices. To overcome this difficulty loans on the pledge of cured fish are being issued in this society and this arrangement has given the necessary relief to the members. During the year 249 loans amounting to Rs. 1,726-8-0 were issued under this arrangement and of these 244 loans amounting to Rs. 1,674-8-0 were collected leaving at the end of the year five loans amounting to Rs. 52 outstanding. The society has realized a commission of Rs. 52-5-0 at the rate of six pies on every rupee of the loans collected. The commission collected is to be distributed equally among the society, the directors and the clerk. The society's share was sufficient to meet the godown rent and other incidental charges. Korapuzha in Vengalam village is one of the biggest prawn fishing centres in the district. The right of fishing prawns in the Korapuzha river was being auctioned by the Revenue Department. The stake-net fishermen engaged in this fishing were delivering their catches to the lessee receiving from him their industrial and domestic requirements. Thus the actual fishermen were working as mere coolies. As a result of representations made by the fishermen, Government ordered that licences should be issued to individuals through this department. It was considered that preference should be given to the members of a fishermen co-operative society but as no society was existing, the Vengalam Mogers' Co-operative Society was formed. During the year, out of 100 licences, 93 were issued to the society for distribution to its members. The society is paying to the department the licence fee of its members. Arrangements have been made to pool and cure the catches and sell them through the society.

203. One of the 36 societies in the district, viz., the Cannanore Women Fish-curers' Society is composed only of women. The Sub-Inspector of the local fish-curing yard is its ex-officio secretary. At the end of the year, it had 36 members with a paid-up share capital of Rs. 697-3-0. The total reserve fund is Rs. 336-4-0 and a sum of Rs. 339-12-0 was the reserve fund separately invested including excess amount. A sum of Rs. 924-15-0 was outstanding

against members and of this Rs. 216-12-0 was overdue. The affairs of the society have improved in the year under report. The West Coast Fisheries Subordinate Officers' society continued to work satisfactorily during the year. Six members were admitted and four removed. A sum of Rs. 1,368 was collected towards share capital and Rs. 287 was paid off. Thus at the end of the year there were 201 members in the society with a paid-up share capital of Rs. 9,712. The amount of deposits of various kinds all received from members was Rs. 3,656-6-0. The total reserve fund was Rs. 353-10-0. Including loans on the security of pay earned, a sum of Rs. 19,932 was issued as loans to members during the year and a sum of Rs. 18,951 was collected, leaving at the end of the year Rs. 12,459 as loans outstanding against members. Of this amount a loan of Rs. 18 was overdue. The principal borrower of the loan is dead. During the year articles of domestic requirements of members worth Rs. 6,499-2-0 were purchased and distributed. The society has earned a net profit of Rs. 481-7-0 in the year 1940-41 and had been classed under A.

204. *War effort.*—When His Excellency the Governor of Madras visited Kasaragod in January, the Nileshwar, Kanhangad, Ajanur, Kizhur and Kasaragod Fishermen Co-operative societies presented him a combined purse of Rs. 51 towards the War Fund. The members of the societies took active part in the War Propaganda celebrations. The following contributed towards War Fund during the year :—

	RS.
(1) Hejmadi and Mulki Mogers' societies.	4
(2) Kuriyadi Fishermen Society ..	25
(3) Kaipamangalam Fishermen Society	10

The Special Co-operative Inspector (North) was awarded a good-service entry for services rendered in connexion with war propaganda.

205. (ii) *EAST COAST.*—A fishermen co-operative society has recently been formed at Kumbakonam in the Tanjore district and certain items of fisheries in that taluk have been leased out in favour of the society for a rental which is equivalent to the average of the previous five years' rentals. Eight other societies for inland fishermen and three panchayat boards were granted leases of fishery rights in inland waters for varying terms during the year.

206. *Co-operation among sea fishermen.*—The Lawson's Bay Fishermen Co-operative Society had 74 members on the roll with a paid-up share capital of Rs. 249-14-0. The loans outstanding at the beginning of the year amounted to Rs. 2,116, loans collected during the year amounted to Rs. 331 and the amount outstanding at the close of the year was Rs. 1,785. No loan was distributed during the year. The Petty-yard officer of the local fish-curing yard continued to be the ex-officio Secretary of this society.

C. Other Socio-economic Work.

207. (i) *WEST COAST.*—The various fishermen organizations continued to do good work for the betterment of the fisherfolk. The officers of the department were rendering all possible help to improve the social and economic condition of the fishermen. Teachers of fisheries schools have been carrying on propaganda on education by frequently meeting the parents, explaining to them the benefits of literacy and inducing them to send their children to school.

208. *Famine relief work.*—As a result of last year's disastrous cyclone and the unusually long lull periods in the fishing season of the year under report, very great distress prevailed among the fishermen. The famine was most acute in the villages of Puduponnani, Kadavanad, and Veliangode in South Malabar. The servants of India Society started relief work at Puduponnani and gave midday meal to the pupils of these fisheries schools from 18th November to 14th December. The necessity for continuing this work in these schools and also extending it to other schools where the condition was getting equally bad was represented to Government who were pleased to sanction the expenditure and free midday meal was supplied to the pupils of the following schools for the period noted against each :—

1 Puduponnani	} From 15th December onwards.
2 Kadavanad	
3 Veliangode	
4 Puthenkadapuram	} From 11th May onwards.
5 Kundazhiyur	
6 Talikulam	

A sum of Rs. 2,091 was spent on this item during the year. The average daily expenditure per pupil comes to only 5 pies. There is every reason to consider that the amount has been well spent. The work has yielded good results. The children have regained their health and the attendance in schools has greatly improved. Since the close of the year, this system has been extended to 35 other schools.

209. *War efforts.*—The inspecting officers, yard staff and school teachers have been carrying out the orders received from time to time in respect of war activities to be taken up by Government servants. The teachers of fisheries schools have been holding fortnightly meetings in villages with a view to explain the progress of the war, to disseminate correct news and to drive away panic from the minds of the masses. Recruiting officers have gratefully acknowledged the help rendered by some of the fish-curing yard officers in recruitment of men for the war. The staff of the section contributed towards the War Fund a sum of Rs. 839-12-0 including the voluntary contributions collected by them. Four Sub-Inspectors, two clerks, two teachers, three Petty-yard officers and two peons have offered their services for the army.

210. (ii) **EAST COAST.**—The Edupur Fishermen Co-operative Society, consisting of 217 members with a paid-up share capital of Rs. 350, has been granted the lease of the fishery in the Edupur swamp for a period of three years. The society has been able to build a *mantapam* in memory of an ancient poet of the community and the place is now utilized for holding bhajana parties and society meetings. The society has been able to collect and subscribe Rs. 125-8-0 towards the War Fund.

211. (iii) **PROVISION OF MARKETING FACILITIES.**—The Survey report on the marketing of fish in the Madras Presidency was received from the Provincial Marketing Officer, Madras, and it was returned to him with remarks and suggestions. The printing and publication of the report was deferred by Government till the end of the war.

The Assistant Marketing Officer, Government of India, visited Tuticorin and the Assistant Director of Fisheries furnished him with the information required.

212. **War efforts.**—The Chank Fishery Supervisor and the Sub-Inspector in the Office of the Assistant Director, Pearl and Chank Fisheries, Tuticorin, have offered their services in connexion with the war. A sum of Rs. 356-9-5 was contributed towards the War Fund from Tuticorin section.

VIII. PROPAGANDA.

A. Rural Pisciculture.

213. Particulars of tanks, etc., in Kistna district, with information regarding their ownership, the period for which they hold water, etc., were obtained from the Revenue Department. The possibility of stocking these waters is under investigation. Twenty-six persons were supplied with information as regards the suitability of stocking their private ponds and necessary advice was given.

214. Live specimens of *Etiopius* (592), Gourami (133) and Catla (30) were supplied to various persons and institutions both for food and for rearing purposes.

B. Exhibitions.

215. This section participated in the following exhibitions:—

- (1) Madras Park Fair Exhibition (22nd December to 11th January).
- (2) Katpadi Rural Service Exhibition (27th and 28th March).
- (3) Commercial and Industrial Exhibition, Vizagapatam (1st to 30th November).
- (4) Tuticorin Holy Cross Convent Exhibition (4th to 7th September).

C. Museums.

216. The Government accorded sanction for incurring an expenditure of Rs. 170 and Rs. 90 respectively in connexion with the supply of fishery exhibits for display at the Industrial and Commercial Museum, Rajahmundry and the Cottage Industries Museum, Tinnevely.

IX. FISHERY LEGISLATION.

217. (i) **LICENCES FOR FIXED ENGINES.**—Eighty-four free licences were issued to fishermen of the Ramnad Coast for placing 355 submerged trees in Palk Strait for catching fish during the year against 74 licences for 330 trees in the previous year.

218. (ii) **STAKE-NET FISHING.**—Ninety-eight free licences were issued during the year for stake-net fishing in the Valarpatnam and Taliparamba rivers in the Malabar district. Though the licensing system was introduced to help the fishermen by liberating them from the clutches of the middlemen, it was found that their condition was not improving as they were heavily indebted to the middlemen. To remedy the defect the fishermen were advised to join the Madai Fishermen Co-operative Society. But they were reluctant to do so. At Korapuzha in South Malabar where also similar conditions existed, a society was started for the stake-net fishermen and 93 licences were issued to the members on a fee of Rs. 4 per licence. Nineteen licences were issued for the first time this year for stake-net fishing in the Cheruvathur river in South Kanara.

219. (iii) **FISHING IN THE METTUR RESERVOIR.**—Necessary forms have been printed for the issue of free permits for coracles plying in the reservoir for purposes other than fishing.

X. PUBLICATIONS.

220. **Fish statistics.**—The question of printing and publishing the statistics of landings on the West Coast for the years 1931-32 to 1935-36 is still under consideration. The statistics for the years 1936-37 to 1938-39 have been almost compiled and statistics for the years 1939-40 and 1940-41 are under compilation.

221. **Bulletin on marketable fishes.**—The draft of the bulletin on marketable fishes was completed and submitted to Government during the year and its publication has been ordered by Government.

222. The following papers were published during the year:—

- (1) A paper on "Fish-eggs hatched in the laboratory of the West Hill Biological Station, Calicut, 1940-41" by Dr. D. W. Devanessen and Sri S. Varadarajan (read before the 29th Session of the Indian Science Congress, Baroda, 1942).

- (2) "Commensalism in Sponges" by Dr. D. W. Devanesen and Mr. P. I. Chacko (published in the 'Current Science').
- (3) "A note on rearing the larvæ of the Milk-Fish (*Chanos chanos*)" by P. I. Chacko (published in the 'Current Science').
- (4) "Balanoglossus as food of fishes" by Dr. D. W. Devanesen and Mr. P. I. Chacko (published in the 'Current Science').
- (5) The Third Trawler Report by Dr. B. Sundara Raj and Dr. D. W. Devanesen was printed without the charts and the distribution of the copies is also withheld, as per orders of Government.
- (6) "A brief investigation into the causes of the fluctuation of the annual fishery of the Oil-sardine of Malabar, *Sardinella longiceps* (Cuv. and Val.) Determination of its age and an account of the Discovery of its eggs and spawning ground" by Rao Sahib Dr. D. W. Devanesen was published during the course of the year and copies are awaiting distribution.

PART II.

FINANCE.

223. *Summary of financial results.*—The total revenue for the year was Rs. 5,93,088 against Rs. 5,05,866 in the previous year. The increase was mainly under (1) Fish-curing yards owing to favourable fishing season both on the East and West Coasts, (2) pearl and chank fisheries, due to the acquisition of Ramnad Chank Fisheries, and (3) inland fisheries due to better rentals realized for the river fisheries in Cauvery and Coleroon. The sale of stores belonging to the trawler 'Lady Goschen' brought in a revenue of Rs. 10,823 while the closure of the Aquarium in March 1942 was responsible for a decrease of about Rs. 5,000. The Oyster Farm and the Biological Specimen Supply Section at Ennur taken as a whole continued to be self-supporting.

224. The total expenditure for the year was Rs. 6,66,379 against Rs. 5,78,526 in the previous year. The increase was mainly under Pearl and Chank Fisheries and Fish-curing yards owing to the increase in the catches and consumption of salt respectively.

225. The net cost of the Fisheries Branch of the Department was Rs. 73,290 as compared with Rs. 72,660 in the previous year.

226. A statement showing the total expenditure and revenue of the department is appended to the report as Appendix No. III. The rest of the statements are submitted in manuscript.

PART III.

STAFF AND EQUIPMENT.

I. BIOLOGICAL.

A. Assistant Director (Biology).

227. Rao Sahib Dr. D. W. Devanesen, M.A., PH.D., D.I.C., held the post of Assistant Director of Fisheries (Biology) throughout the year.

B. Research Stations.

228. Sri S. Varadarajan, M.A., F.Z.S., was the Research Assistant in charge of the West Hill Biological Station till 25th September when he was relieved by Sri T. M. Arumugam, B.Sc. (Hons.). When the latter was transferred to Tuticorin, Sri K. Chidambaram, B.Sc. (Hons.), took charge of the station on 31st January and continued to be the Research Assistant for the rest of the year. Mr. P. I. Chacko, B.A., B.Sc. (Hons.), was Research Assistant, Krusadai Biological Station, throughout the year.

II. TECHNOLOGICAL.

Tanur Experimental Station.

229. The station continued to be in charge of the Inspector of Fisheries, Calicut, till its final closure. The mechanic who was served with three months' notice was discharged from service on the 15th February. He has since been reappointed as a driller in the Engineering branch. The clerk and peon have been absorbed in the department. All the chemicals, apparatus and furniture were transferred to the Government Oil Factory, Calicut. Such of the machinery and other articles that were useful for the oil factory were also transferred. The engine and compressor of the Ascu plant were transferred to the Industrial Engineer. The auto-clave, one stove and a galvanized vat used for steaming fish for fish-meal have been transferred to the Fisheries Technological Institute, Tuticorin. The remaining articles were disposed of in auction. The land and building were handed over to the Revenue department. The proposal of transferring the travellers' bungalow to the Public Works Department has been dropped. The question of retransferring it to the district board is under consideration.

III. EDUCATIONAL.

230. (i) **FISHERY ELEMENTARY SCHOOLS.**—The number of teachers employed in the schools rose from 183 at the beginning of the year to 208 at the end. Of these, one was a graduate (trained), 27 secondary grade trained, 168 higher elementary grade trained, and 12 lower elementary grade trained. One hundred and forty-four of these were fisheries trained, 61 ordinary trained, and 2 untrained teachers.

231. *Accommodation*.—Of the 49 schools, 25 are housed in buildings owned by Government, 22 in rented buildings, one in a rent-free building provided by a fishermen association and the remaining one in a rent-free building provided temporarily by a fish merchant. The Government building of the Navunda school in South Kanara was burnt down by fire on the night of the 24th June. The cause of the fire could not be traced. The school is now conducted in a rent-free building provided by a fish merchant of the place. A building for housing the Sri Gnanodaya school at Mangalore has been constructed. The work of extending the Kottakadapuram school building has been taken in hand and steps are being taken to extend the Kaipamangalam school building. The Mogaveera Samaj, Malpe, has constructed a spacious building for the school there. The Ajanur school has been provided with a new building.

232. (ii) *Co-OPERATIVE SOCIETIES*.—Sri U. Parameswara and Sri M. G. Nair, the two Special Co-operative Inspectors, deputed for the supervision of fishermen co-operative societies, continued to be in charge of the northern and southern sections respectively throughout the year.

IV. NAUTICAL.

233. (i) "*Lady Nicholson*."—This vessel was not employed for the inspection of pearl banks as the inspection was held over during the year owing to war conditions. During the season, the vessel was hired to the Telegraph Department for carrying out certain repairs to the telegraphic Indo-Ceylon cable lying on the sea-floor between Rameswaram and Ceylon. The vessel left the Tuticorin anchorage on the 4th August and returned to her moorings on the 23rd August. Hire charges amounting to Rs. 2,497-11-4 were collected from the Telegraph Department.

234. (ii) "*Sea Scout*."—The keel of the vessel was found to be in need of renewal as well as the copper bottom. These were attended to at a cost of Rs. 1,288-3-11. After these repairs, she was employed on routine chank fishery operations in Tuticorin till 4th February when she was sent to the Ramnad coast for towage work in the Rameswaram chank fishery. After her return to Tuticorin on 6th May, the vessel was employed in the Tuticorin chank fishery operations.

235. (iii) "*Leverett*."—This vessel was employed in chank fishery operations in the Ramnad District from 2nd August to 8th November and afterwards in the chank fishery operations at Tuticorin. Certain repairs were carried out to the vessel.

236. (iv) "*Pearl*."—This vessel continued to be stationed at Kruasalai Island for use at the Biological Station. It was used by the Naval Officer, Mandapam, for five days in April.

237. (v) "*Pinctada*."—This vessel was employed on patrol work in the Mettur reservoir. The engine could not be repaired for want of spare parts which were not available in India.

238. (vi) "*Sutherland*."—This has no engine and was used in the Fisheries Technological Institute, Tuticorin, in connection with practical lessons in sailing, etc.

V. ADMINISTRATIVE.

A. Inland Fisheries.

239. *Inland Fisheries*.—Sri N. V. Choodamani, B.Sc. (Hons.), continued as Research Assistant at Mettur throughout the year.

B. East Coast (Northern Division).

240. Sri A. Somayaji continued as Inspector in charge of the division till 3rd October when he was transferred to Tuticorin. Sri S. Varadarajan took charge of the division on the 4th October and continued till 17th January when he was relieved by Sri N. D. Kemptur. During the absence on leave of Sri Kemptur, Mr. P. K. Jacob, M.Sc., a candidate selected by the Madras Public Service Commission, acted as Inspector from 23rd March to 15th May. Sri Kemptur returned from leave on 16th May and continued to be in charge of the division throughout the year.

C. East Coast (Central Division).

241. Dr. M. Ramaswami Nayudu, B.A., PH.D., continued as Assistant Director (Inland) throughout the year.

242. Sri K. Chidambaram was Research Assistant till 21st January when Sri S. Varadarajan took charge and continued for the rest of the year.

243. Out of the two posts of one clerk and one typist abolished, the post of typist was revived with effect from 1st April.

D. East Coast (Southern Division).

244. Mr. D. D. Peter Devadoss, B.A., continued as Assistant Director, Pearl and Chank Fisheries, throughout the year. Mr. V. D. Spurgeon, B.A., was Inspector of Fisheries till 9th July when he was transferred to Mettur and Sri E. K. Madhavan took charge. The latter continued as Inspector till 21st July when he was relieved of the post to take up an appointment under the Government of Sind as Superintendent of Fisheries. The post was vacant from 22nd July to 12th October. Sri A. Somayaji took charge on the 13th October and continued till 14th January when he was posted as Superintendent of the newly opened Fisheries Technological Institute, Tuticorin. Sri T. M. Arumugam, B.Sc. (Hons.), joined as Inspector on the 9th February and continued as such for the rest of the year.

245. Sri A. Somayaji was appointed Superintendent of the Fisheries Technological Institute, Tuticorin, and held the post from 15th January to the end of the year.

E. West Coast.

246. Mr. V. John, B.A., acted as Sub-Assistant Director till 27th September when Sri M. Jayaram Nayudu, B.A., returned from leave and resumed charge. The Government were pleased to revive the gazetted post of Assistant Director (Coast) and the permanent Sub-Assistant Director Sri M. Jayaram Nayudu was appointed to the post on 31st July. He continued as Assistant Director till 11th April when he went on leave. Mr. V. John acted as Assistant Director (Coast) from 12th April until the end of the year.

247. Sri N. D. Kemptur was Inspector of Fisheries, Mangalore, until 6th October when he was transferred to Vizagapatam. Mr. V. John acted as Inspector, Mangalore, from 6th October to 9th April, Sri A. M. Achuthan from 10th April to 9th June and Mr. P. K. Jacob from 9th June till the end of the year. Sri K. Ambady continued as Inspector, Central Section, from the beginning of the year till 17th October when he was transferred to Chowghat and Sri T. P. Baratan succeeded him. Sri Baratan continued as Inspector in the Central section during the remaining part of the year. He was in charge of the Southern section till 8th October when he was transferred to the Central section. Sri K. Ambady took up the place and continued as Inspector for the rest of the year.

248. Mr. V. D. Spurgeon, B.A., was Inspector of Fisheries (Oil Extraction) throughout the year.

I have the honour to be,

Sir,

Your most obedient servant,

Director of Industries and Commerce.

FISHERIES OF MADRAS

APPENDIX I.

Clank Marking Experiments.

Particulars of marked chanks re-fished during the year 1941-42.

Date of				Interval		Beds		Distance travelled.		Length when		Diameter when		Rate of growth per month.	
Liberation.		Recovery.				In which the shells were liberated.		From which recovered.		Recovered.		Recovered.		Length.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
Serial number.	Number on shells recovered.			Y. M. D.			MILES.	MM.	MM.	MM.	MM.	MM.	Diameter.		
1 D. 975	4th February 1937	18th December 1941.	4 10 14	Melonbathu	..	Athonbathu	3 (N.E.).	98	98	48	53	0.00	0.09	0.18	0.18
2 M. 189	10th March 1937	12th February 1942.	4 10 23	Kanavan par	..	Vettikal par	3 (S.W.).	99	110	48	59	0.18	0.18	0.18	0.18
3 M. 920	21st May 1939	18th December 1941.	2 8 27	Janatha par	..	Athonbathu	3 (N.W.).	101	99	52	55	..	0.09	0.09	0.09
4 F. 12	17th April 1939	Do.	2 8 1	Melonbathu	..	Do.	3 (N.E.).	110	108	54	56	..	0.06	0.06	0.06
5 F. 233	2nd January 1940	19th February 1942.	2 0 29	Aluva par	..	Vadaonbathu	3 (N.E.).	99	96	52	58	..	0.24	0.24	0.24
6 F. 542	10th April 1940	12th February 1942.	1 9 25	Neealanak pathu.	..	Vettikal par	2 1/2 (S.W.).	105	119	51	60	0.64	0.41	0.41	0.41
7 F. 862	18th February 1941	Do.	0 11 24	Passi par	..	Do.	2 1/2 (S.S. W.).	103	106	53	59	0.25	0.09	0.09	0.09
8 F. 725	20th April 1941	19th December 1941.	0 7 20	Vadaonbathu	..	Melonbathu	3 (S.).	105	109	55	56	0.52	0.13	0.13	0.13
9 F. 732	30th April 1941	14th March 1942	0 10 14	Vadaonbathu	..	Nenjurchan	3 (N.W.).	101	105	52	55	0.4	0.27	0.27	0.27
10 F. 745	Do.	Do.	0 10 14	Do.	..	Do.	3 (N.W.).	102	103	51	55	0.1	0.4	0.4	0.4
11 F. 728	1st May 1941	22nd February 1942.	0 9 22	Melonbathu	..	Janatha par	3 (N.).	106	108	56	57	0.2	0.1	0.1	0.1
12 F. 835	Do.	18th February 1942.	0 9 18	Do.	..	Vadaonbathu	3 (N.).	99	110	53	55	1.15	0.21	0.21	0.21

APPENDIX II.

Statement of chanks fished.

Name of chank bed.	Number of chanks fished.	Name of chank bed.	Number of chanks fished.
Siluvai par	26,312	Pudu par	5,281
Janathu par	46,714	Badaolipathu	3,839
Nenjuriathan par	4,336	Katti Thirukkai	6,301
Kilavan par	3,479	Saithkilathi	5,132
Tholayaram par	9,359	Neelankalpathrai	28,899
Selton par	32,763	Vada Thundam	60,311
Erietti	8,018	Vadakalpathrai	8,715
Kanawa par	10,318	Karai Thundam	4,397
Athonbathu	8,193	Melakilathi	3,482
Pulipundu	4,704	Velangu Thundam	1,892
Vettikalprawl	88,998	Aluva par	26,961
Kolikunju Theevu	10,301	Katti Thirukkai	4,529
Kadayan par	16,238	Melonbathu	20,421
Vadaonbathu	35,510		
		Total	495,403

APPENDIX III.

Revenue and Expenditure of the Fisheries section of the Department of Industries and Commerce for the Fisheries year 1941-42.

Sections.	Expenditure.			Revenue.			Difference.		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
A. Direction	16,512	4	2	10,829	7	0	— 5,683	13	2
B. Pearl and chank fisheries.	1,23,073	12	3	1,65,882	8	5	42,808	12	2
C. West Coast fisheries.	10,737	13	7	92	11	0	— 10,645	2	7
D. Tanur station	5,377	6	0	2,697	0	3	— 2,680	5	9
E. Technological Institute, Tuticorin.	5,275	14	9	4	0	0	— 5,271	14	9
F. Fisheries schools	92,064	8	3	1,086	5	1	— 90,978	3	2
G. Inland fisheries	1,03,842	1	6	92,155	14	6	— 11,686	3	0
The Nilgiri fisheries.	8,017	11	4	6,531	11	0	— 1,486	0	4
Palni Hills fisheries.	49	0	0	44	0	0	— 5	0	0
H. Oyster farm	812	8	0	1,089	15	0	277	7	0
J-1. Marine Biological section—									
Zoological Supply Section, Ennur.	3,013	6	6	2,953	11	0	— 59	11	6
Research Station, West Hill.	12,110	6	8	151	11	9	— 11,958	10	11
Research Station, Krusadai Island.	5,696	0	8	971	5	6	— 4,724	11	2
J-2. Aquarium	5,059	11	0	5,165	3	9	105	8	7
K. Fish-curing yards.	2,78	1	0	2,432	12	5	30,238	11	2
Fish liver oil industry.							— 1,542	2	0
	50,978	12	1	5,92,063	8		— 73,290	7	5



G.O. No. 2583, 12th December 1942

Administration report—Fisheries of Madras—1941-42—
Recorded with remarks.

READ—the following paper :—

From the Director of Industries and Commerce, dated 21st
September 1942, No. 351-F.G./42.

Order—No. 2583, Development, dated 12th December 1942.

Recorded.

2. The report deals at length with matters pertaining to investigation and collection of scientific data. It does not appear, that this work, which has been going on for years, has yielded results of practical value. On the other hand the stocking of tanks and other waters with fish which will add materially to the food-supply of the country does not appear to have received adequate attention.

3. During the year under report 14,630 gallons of shark-liver oil were manufactured at the Government Oil Factory at Calicut and 10,203 gallons of oil were sold. The Government consider that the output of oil and the quantity sold might be increased with advantage.

(By order of His Excellency the Governor)

T. SIVASANKAR,
Deputy Secretary to Government.

To the Director of Industries and Commerce.

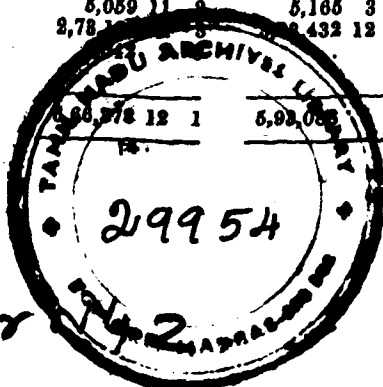
.. the Local Administration Department.
.. the Board of Revenue.
.. the Collector of Salt Revenue.
.. the Commissioner of Labour.
.. the Chief Engineer for Irrigation.
.. the Registrar of Co-operative Societies.
.. the Director of Agriculture.
.. the Accountant-General.
.. the Education and Public Health Department.
.. the Public Department.
.. the Finance Department.
.. all Collectors of districts.
.. the Statistical Officer.
.. the Secretary, Madras Legislature.
.. the Director-General of Commercial Intelligence and Statistics (with C.L.).
.. the Government of India, Department of Commerce (with C.L.).
.. the Superintendent, Government Press.

From.

Forwarded to the Public department

(By order)

Lodged
29/12/42
Superintendent



332-211

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