

Government of Madras

DEVELOPMENT DEPARTMENT

G.O. No. 2101, 26th November 1929

Fisheries—Administration Report for 1928-29—Recorded,
with remarks.

READ—the following :—

Letter from Dr. B. SUNDARA RAJ, M.A., Ph.D., Director of Fisheries,
Madras, to the Secretary to Government, Development Department,
dated 23rd October 1929, Ref. No. 1697-G.

Order—No. 2101, Development, dated 26th November 1929.

Recorded.

2. The Committee appointed by the Government in June 1928 to examine the work of the department and report on the future policy to be followed for its working and improvement submitted their report in July 1929 after the close of the year under review and it has been published for the information of the public. The recommendations of the Committee are under the consideration of the Government.

3. The Cannery at Chaliyam suspended manufacture on 1st April 1925 and Sir Frederick Nicholson who offered to help in its revival could not take up the work owing to ill-health. Almost the entire stock has been disposed of and the cannery was kept on with a skeleton staff pending the report of the Fisheries Committee. The Government have since considered the possibility of successfully working the cannery and have come to the conclusion that it should be closed and its assets disposed of. Orders have recently issued to this effect.

4. The operations at the Tanur Experimental Station were hindered by the absence of fish shoals which usually visit the west coast from September onwards and the station worked at a loss of

Rs. 2,447 during the year. Owners of private oil and guano-factories were equally hard hit by the failure of the sardine fishery and only 193 factories out of 282 licensed worked during the year. The value of output from these factories dropped by nearly a third as compared with that of the last season which was itself a poor fishing season.

5. The fifteen years' lease of the Rāmnād chank fishery expired on 30th June 1928 and it was not renewed. The department concentrated its attention on the working of the Tuticorin chank fishery and obtained unprecedented results. The chanks fished reached the record figure of 431,127 and fetched a handsome revenue of Rs. 1,68,920. The chank fishery off the Tanjore coast is not worked departmentally but has been leased out since 1825 to contractors who make their own arrangements for fishing the chanks. On the recommendation of the Director, the Government sanctioned during the year an investigation of the chank fishery beds off the Tanjore coast with a view to ascertaining the position and extent of the chank beds and the economic possibilities of the chank and pearl fisheries off that coast. For the conduct of this investigation, an Inspector of Fisheries has been sanctioned for a period of two years.

6. The Inland section which is concerned with the improvement of fish in fresh water tanks and rivers earned a profit of Rs. 7,880 against the loss sustained by it of Rs. 1,948 during the previous year mainly owing to better seasonal conditions in certain districts of the Presidency. During the year all the four ponds at Praema fish farm were stocked with gourami from the ponds at Sunkesula fish farm. The deep-water fishing experiments at the Mopad farm were continued during the year with satisfactory results.

7. The operations at the fish-curing yards in Nellore, Chingleput, Tanjore, Tinnevely and Rāmnād were satisfactory during the year while those of the yards in the Northern Circars though better than last year resulted in a loss of Rs. 14,466. This loss is attributed partly to the adverse effect of the floods in October and November 1928. As regards the west coast, the operations in the yards in the Malabar District especially those in the northern section of it were poor owing to the failure of the fishing season while the fish catches in South Kanara District unlike those of last year were uniformly distributed throughout the season with the result that curing operations progressed there satisfactorily. During the year the working of the yards in the Presidency

cost Government Rs. 4,31,937 while the revenue amounted to Rs. 3,99,558.

8. The contract with Capt. Cribb, Assistant Director of Fisheries (Marine) having expired on 12th March 1929 the Government have renewed his contract for a further period of 3 years for continuing research and deep-sea fishing experiments with the trawler "Lady Goschen." During the year, the trawler was engaged in conducting fishing experiments for 19 weeks and she operated from six bases—Mangalore, Calicut, Cochin, Cape Comorin, Manapad and Tuticorin. The results of the experiments conducted are embodied in the Director's report. With a view to equip the vessel properly for conducting deep-sea fishing experiments and research certain alterations and additions at a cost of Rs. 44,123 are now being carried out to the vessel at Bombay.

9. There was a slight fall in the number of visitors to the Marine Aquarium at Madras with a corresponding decrease in receipts. The net profit during the year amounted to Rs. 1,273.

Sardine and mackerel investigations were continued at the West Hill Research Station, Calicut, and the work of collection and identification of the common food fishes in the Circars was carried on at Vizagapatam. At the laboratory attached to the Marine Aquarium at Madras, research was continued on the early stages of the edible oyster. While at the Krusadai Research Station research on pearl oysters and preliminary collection and identification of food fishes of the Pāmban area were started during the year.

10. In the absence of sufficient stock of saleable oysters at Ennur and Pulicat there were no sales of oysters during the year. The Government await the result of the investigations which the Director proposes to undertake for concerting measures for the culture and proper exploitation of the oyster beds in future. The section for the supply of zoological specimens sustained a loss of Rs. 1,930 during the year.

11. On the socio-economic side the Government note with satisfaction the continued interest shown by the fishermen community for the spread of education on the west coast, but regret to observe that the fishermen have not yet begun to realize the benefits of the co-operative movement. There are some signs of awakening of interest in Malabar, but in South Kanara the progress of fishermen societies continues to be very unsatisfactory. The suggestion made by the Fisheries Committee that a special staff should be

deputed to work under the Fisheries Department for organization and supervision of fishermen societies is under the consideration of Government.

(By order of the Government, Ministry of Development)

S. V. RAMAMURTI,
Secretary to Government.

To the Director of Fisheries.

„ the Local Self-Government Department.
„ the Board of Revenue (Land Revenue and Settlement).
„ the Collector of Salt Revenue Madras.
„ the Law (Education) Department.]
„ the Public Works and Labour Department.
„ the Public Department.
„ the Finance Department.
„ the Registrar of Co-operative Societies.
„ the Director of Agriculture.
„ the Accountant-General.
„ the Director-General of Commercial Intelligence (with C.L.).
„ the Government of India, Department of Commerce (with C.L.).
„ all Collectors.
Press.

FISHERIES DEPARTMENT.

Subject.

Fisheries—Administration Report—1928-29.

Ref. No. 1697-G/29.

STATION, MADRAS.

Dated the 23rd October 1929.

From

DR. B. SUNDARA RAJ, M.A., Ph.D.,
DIRECTOR OF FISHERIES,
MADRAS,

To

THE SECRETARY TO GOVERNMENT,
DEVELOPMENT DEPARTMENT.

SIR,

I have the honour to submit the annual report of the Fisheries Department for the year ending 30th June 1929. The most important event of the year is the production of a comprehensive report on all aspects of the work of the Department by the Committee on Fisheries which has been published since the close of the year.

The present report is on the same lines as last year's and describes the activities of the Department in the order of their importance. Due largely to the recommendations of the Retrenchment Committee in 1923 and to attempts at many quarters to assess the value of the Department's work by revenue earned, undue importance has, of late, come to be attached to financial statements in the annual reports. In chronicling the work of the year in recent years, those sections that brought in substantial revenues generally took precedence of others, without due regard to their intrinsic importance to a scientific department, the value

of whose work should not be assessed by revenue. The investigations of the Committee as well as their recommendations have, to a large extent, corrected this tendency and from last year the annual report aims at presenting the various activities in their true perspective. Investigation and research relating to food-fish being the primary object of a scientific department of Fisheries, it has been given the first place and all other works receive notice in the order of their importance and magnitude.

PART I.

ACTIVITIES OF THE DEPARTMENT.

I. MARINE FOOD FISHES.

A.—Sea Fishery Research.

Research on Marine Fisheries was conducted as in the previous year at sea by the trawler "Lady Goschen" and on land at the three shore-stations at West Hill (Calicut), Krusadai Island and Vizagapatam. The trawler had no laboratory on board and only defective equipment for the work. The West Hill laboratory is quite a small one. The Krusadai station is only partly equipped and Vizagapatam has no laboratory yet. The staff engaged are local graduates of no higher status than Inspectors in the subordinate service of the Department. The work done was, therefore, largely on the same lines as those of last year.

I. TRAWLER.—The survey of fishing banks commenced in September 1927, was continued by the trawler on her return from Bombay, from November 1928 to May 1929 with a break from 7th January to 15th February 1929 when she was engaged in the inspection of the Laccadives.

During the nineteen weeks of the survey, she operated from six bases:—Mangalore, Calicut, Cochin, Cape Comorin, Manapad and Tuticorin.

The experimental trawling was generally carried out in the off-shore belt extending from the 7th to the 40th mile from the shore, except on two occasions when trawling was done beyond these limits. In November 1928, a cruise was made to Bassas de Pedro Bank, 130 miles west of Mangalore and in March 1929, to the edge of the Wadge Bank, 70 miles south-west of Cape Comorin.

The extensive cruises from Mangalore to Cape Comorin have enabled Captain Cribb to obtain a general idea of the west coast, a detailed survey of which the trawler will undertake from next year onwards. A few of the interesting observations culled from the trawler's log are as follows:—

(1) In November and December 1928, the region extending from 15 fathoms to 55 fathoms opposite Calicut was found to abound in the young of many varieties of food fish, constituting a vast nursery at this time of the year. Similar fish abound along the coast as far north as Moolky in South Kanara where they were found from 10 to 40 fathoms. There were no sardines or mackerel among them, though as much as a ton of these small fishes was caught in $3\frac{1}{2}$ hours of trawling.

(2) A surprising fact which seems to emerge from the survey opposite Calicut in November 1928 and April 1929 is that the sea-bottom to the S. W. West and W. N. West of Calicut between 21 to 29 fathoms, is subject to great changes, apparently due to the drift of mud and sand. On the 30th November 1928, Captain Cribb met with rocks at depths varying from 21 to 29 fathoms in this area. But when fishing on the same grounds in April 1929, he found no rocks. It is quite possible that the strong southerly currents set up by the south-west monsoon sweep the sea-bottom of soft mud and sand, and leave the rocks exposed, thus accounting for the changes noticed by Captain Cribb. The matter, however, requires further investigation.

(3) The appearance of swarms of jelly fish off Calicut in 13 to 29 fathoms in the last week of November and beginning of December 1928 is another noteworthy observation. This agrees with their appearance south-west of Cape Comorin in the previous season (1st week of January 1928). This was a serious obstacle to fishing. At times the nets were so thickly laden with these jelly fish, that great difficulty was experienced in getting the net over-board again. The deck became thickly covered with them rendering it slippery. Fishing off Calicut was not continued after 3rd December 1928 on this account. In March and April 1929, Captain Cribb found the sea clear of jelly fish south-west of Cape Comorin and at Calicut respectively.

(4) The investigation of the southern portion of the Bassas de Pedro Bank reveals favourable conditions for trawling. The bottom appears to be smooth without serious obstruction in the shape of marine growths or rocks. In one haul made in this area

1,224 lb. of the important edible fishes, viz., *Lethrinus*, *Lutjanus*, *Diagramma* and *Epinephelus* were caught. This haul included one huge ray *Hypolophus sephen* weighing about 1,000 lb. A shoal of large rays was seen swimming past the ship just beneath the surface. The rays caught ranged generally from 89 to 123 lb. in weight. Nevertheless, the fish are not plentiful. In the northern portion, the bank is composed of immense coral tocks which are very destructive to fishing gear.

The chief kinds of fish caught in the hauls at different areas were the following :—

1. Off Calicut—

(a) During second half of November and beginning of December 1928 :

<i>Caranx malabaricus.</i>	<i>Hypolophus sephen.</i>
<i>Carcharias menissorah.</i>	<i>Arius sp.</i>
<i>Trygon kuhlii.</i>	

(b) During first half of April 1929.

<i>Pristis perrotteii.</i>	<i>Lactarius delicatulus.</i>
<i>P. cuspidatus.</i>	<i>Arius sp.</i>
<i>Caranx crumenophthalmus.</i>	<i>Sciaena bleekeri.</i>
<i>C. malabaricus.</i>	<i>Therapon quadrilineatus.</i>

2. In the southern portion of Bassas de Pedro Bank (approximately 130 miles west of Mangalore) during second half of November 1928 :

<i>Hypolophus sephen.</i>	<i>Diagramma punctatum.</i>
<i>Epinephelus angularis.</i>	<i>Lutjanus dodecacanthus.</i>
<i>E. sonnerati.</i>	

3. Off Mangalore during 1st part of December 1928 :

<i>Synagris tolu.</i>	<i>Hypolophus sephen.</i>
<i>S. bleekeri.</i>	<i>Aetobatis narinari.</i>
<i>Rhynchobatus djeddensis.</i>	<i>Lactarius delicatulus.</i>
<i>Zygaena blotchi.</i>	<i>Arius sp.</i>
<i>Carcharias menissorah.</i>	<i>Equula insidiatrix.</i>

4. Off Cape Comorin and Wadge Bank :

(a) March 1929

<i>Lethrinus karwa.</i>	<i>Trygon kuhlii.</i>
<i>Lutjanus lineolatus.</i>	<i>Carcharias menissorah.</i>
<i>Diagramma punctatum.</i>	<i>Rhynchobatus djeddensis.</i>
<i>D. lineatus.</i>	<i>Upeneus indicus.</i>
<i>Epinephelus sonnerati.</i>	<i>Myripristis murdjan.</i>
<i>E. angularis.</i>	

(b) During 2nd half of April and first half of May 1929 :

<i>Diagramma punctatum.</i>	<i>Aetobatis narinari.</i>
<i>Lutjanus lineolatus.</i>	<i>Caranx atropus.</i>
<i>Epinephelus angularis.</i>	<i>Upeneus indicus.</i>
<i>Lethrinus karwa.</i>	<i>Myripristis murdjan.</i>
<i>Carcharias sp.</i>	

The Inspector of Fisheries posted on board the trawler was engaged during the period when his services were not required on board, in identifying and preserving the numerous biological specimens collected by the trawler during her fishing cruises and this piece of biological work was done under the kind supervision of Dr. F. H. Gravely, Superintendent, Government Museum. The following is a list of specimens identified so far from the collection made during the year under review.

Crabs.	Locality.
<i>Neptunus gladiator</i>	... From Bassas de Pedro and Cape Comorin.
<i>N. sanguinolentus</i> ...	... From Cape Comorin.
<i>N. orbicularis</i> ...	... Bassas de Pedro.
<i>Charybdis crucifera</i> ...	... Bassas de Pedro and Mangalore.
<i>Goniosoma natator</i> ...	... Mannargudi.
<i>Calappa philargius</i> ...	... Cochin and Mangalore.
<i>C. lophos</i> ...	... Bassas de Pedro and Calicut.
<i>Doclea muricata</i> ...	... Muttum.
<i>Cryptopodia angulata</i>	... Cannanore.
<i>Randallia eburnea</i> ...	... Wadge Bank.
<i>Dromia rumphii</i> ...	... Cape Comorin.
<i>D. cranioides</i> ...	... Do.
<i>Xantho scaberimus</i>	... Mannargudi.

Molluscs.	
<i>Ostrea</i> ...	... Sankara Kovalam (Cape Comorin).
<i>Triton</i> ...	... Cape Comorin.
<i>Ranella</i> ...	... Cape Comorin.
<i>Rostellaria</i> ...	... West of Kasaragod.
<i>Phorus</i> ...	... Cochin.
<i>Cassis</i> ...	... Bassas de Pedro Bank.
<i>Harpa</i> ...	... Calicut.
<i>Voluta</i> ...	... Wadge Bank.

Alcyonaria.	
<i>Chironephthiya variabilis</i> ...	From Sankara Kovalam, Calicut,
(8 different varieties.)	Wadge Bank and Cape Comorin.

Echinodermata.

Locality.

Several specimens including an entire specimen of *Gorgonocephalus levigatus*. Off Calicut and Cape Comorin.

Duplicates of the above specimens are stored at the Museum and at Ennur for the benefit of future workers. Much work still remains to be done on the collections of marine organisms. The want of a laboratory on board the trawler and a qualified research staff hampered work considerably.

Several data relating to meteorological, hydrographical and biological observations are recorded in specially designed registers. Meteorological observations are noted every morning at 8 a.m., and also at the commencement and the close of each haul such as the conditions of sea, sky and wind and the temperatures of the air and of the sea water. Notes are made at the commencement and close of each haul regarding the bearing of the ship, the depth of the sea and nature of the bottom. Wherever any deviation or want of detail in the Admiralty charts were detected, soundings were taken in detail and recorded with their respective bearings. Biological data such as individual weights of a few large fish, their stomach contents and information regarding animals other than fish brought up in the trawl were also collected. As far as possible, important specimens have been preserved for further study.

2. WEST HILL LABORATORY, CALICUT.—The sardine and mackerel investigations were continued on the usual lines. The work has hitherto been threefold (i) the examination of sample fish obtained from daily catches, (ii) the examination of plankton collections made off Calicut and (iii) record of daily hydrographical and meteorological data. Attempts to arrive at more satisfactory methods of research, particularly in the study of plankton, were made during the year. A count of the numbers of the constituent organisms in 1 cc. of plankton has been attempted from January 1929. The number of mackerel examined during the year was 147 and of sardine 225. The plankton collections totalled 80. During the south-west monsoon (in July 1928 and in June 1929), collections only on four days were possible.

Fish statistics.—Very considerable work on statistics was done during the year. The monthly statistics prepared by the various yard officers on the West Coast relating to landings of fish continued to be received and analysed at the station for purposes of

tabulation. During the year 1928-29, 2,254,700 maunds of sea fish priced at Rs. 44,62,500 were caught in the districts of South Kanara and Malabar. Of this 48,300 maunds were sardine valued at Rs. 92,700 and 970,100 maunds mackerel sold for Rs. 19,35,300. The year though unfavourable stands third in the four years ending 1928-29 for which statistics are now available.

Year.	Sardines.		Mackerel.		Grand total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.
	MDS.	RS.	MDS.	RS.	MDS.	RS.
1925-26 ...	1,192,449	10,80,551	2,471,541	31,93,647	4,892,933	64,51,107
1926-27 ...	396,647	5,53,407	260,145	11,09,587	1,985,624	48,70,301
1927-28 ...	193,012	2,17,303	2,073,090	27,52,671	3,288,318	51,64,071
1928-29 ...	48,321	92,731	970,149	19,35,259	2,254,658	44,62,484

A detailed analysis of statistics for the year 1926-27 has been prepared and will be issued as a "Statistical Supplement" to the Annual Report for 1927-28. Due to my absence on leave and to the want of special statistical staff, the preparation of the tables was delayed. The Research Assistant also found it impossible to cope with all the duties at the station single-handed. With the appointment of a statistical clerk sanctioned in G.O. Mis. No. 247. Development, dated 9th February 1929, Mr. Moses has been able to prepare the statistics for the year 1926-27. It is hoped to publish also statistics for 1927-28 as a supplement to the present report before the close of the year. In the light of criticisms and suggestions received, I have recast some of the statements and corrected certain errors and inaccuracies. The report on statistics for 1926-27 will be a distinct advance over that for 1925-26, the first year for which statistics were published. The statistics for 1925-26 were published hurriedly for the purpose of the Committee on Fisheries. Some arithmetical errors as well as other mistakes have been corrected in a correction slip which is in the press.

3. KRUSADAI ISLAND—*Study on Fisheries.*—The preliminary collection and identification of food fishes of the Pamban area was started during the year. A regular collection of fishes of the locality is being made and the identification of the Research Assistant is checked at Madras. When the collections are worked out, they will help the research relating to the proposed publication

of a bulletin on the important marketable fishes of Madras sanctioned in G.O. Mis. No. 596, Development, dated 27th March 1929. A preliminary list of fishes of the Krusadai Island prepared by me will be shortly published in the Madras Museum Bulletin on the Fauna and Flora of Krusadai Island. Volume I of this series was published in 1926 and contains papers on various groups of animals by Dr. Gravelly, Professor Ramunni Menon and myself. A further report on a *Pycnogonum* sp. from Krusadai Island recorded for the first time in Indian seas is in the Government Press and will form part of the Second Museum Bulletin on the subject. A fish register is maintained at the station in which are entered the local vernacular and scientific names, size, stomach contents, sex, condition of gonads, method of capture, etc., of fishes examined. Besides, the Research Assistant has been instructed to study the important fisheries conducted in the vicinity of Krusadai Island and draw up reports. An exhaustive questionnaire was issued by me for the purpose and his reports answering the questions are recorded at Madras for further verification and elaboration when the full staff for the station is appointed. This preliminary investigation by the Research Assistant has brought to light the existence of a large sardine fishery in Palk Bay, extending from Dhanushkodi on Rāmēswaram Island along its northern shore to Pāmban and up the Rāmṇād coast as far as Uchippili. The sardine caught is *Clupea fimbriata* and the season is from May to September, just the period when the sardine fishery stops on the West Coast. One of the problems of the Chaliyam Cannery and other private fish canneries on the West Coast has been "idle time." If during the south-west monsoon, however, sardines can be had it will help the industry considerably. The discovery has therefore economic possibilities.

Plankton collection.—An attempt at some plankton research has also been made. Plankton is collected daily across the Kundugal Channel from opposite the Research Assistant's quarters to Kundugal Point. Two hauls are made, each lasting for fifteen minutes, one haul while going to Kundugal Point and the other on the journey back. The second haul is used for a qualitative examination and a record is maintained of the constituent organisms in each day's collection. The first haul is preserved in 5 per cent formalin for future quantitative study. The laboratory badly needs equipment and staff for efficient work—vide Part III, paragraph 1, below.



Launching a catamaran at Madras.



Shore seine net operations at Madras.

4. VIZAGAPATAM.—For the purpose of obtaining necessary data for the proposed bulletin on the important marketable fishes, the collection and identification of the common food fishes in the Circars is being carried on whenever practicable and a collection of data on fish and fisheries of the coast has also been attempted. The Inspector of Fisheries is so overwhelmed with routine office and administrative duties connected with the fish-curing yards that he is not able to devote attention to research.

A collection of fish was made and supplied during the year to Dr. S. L. Hora of Calcutta, for his proposed revision of volumes on fishes in the Fauna of India.

Fish statistics from all the East Coast yards are being collected and filed regularly. But, at least a Research Assistant and a clerk as at Calicut are required to tabulate and marshal the data in the returns from the yards on the East Coast. Only when the research section is properly organized, will it be possible to work out the accumulated monthly returns of statistics from the East Coast yards.

5. MADRAS AQUARIUM LABORATORY.—The Personal Assistant Dr. D. W. Devanesan continued his research on the early stages of the edible oyster (*Ostrea madrasensis*). A Benares University student Mr. M. S. Golwalkar deputed for training worked at the laboratory for eight months.

B.—Technological Research.

1. FISHING METHODS—*Trawling*.—In the course of her deep-sea fishing experiments, the only net used by the trawler was the otter trawl. The trawl catches only bottom fish. For complete work on the banks, mid and surface water fish including most of the best known and highly priced Indian food fish such as seer, pomfret, tunny fishes, bonito, sardine and mackerel must also be caught systematically during the survey. The Danish seine net which was intended to be used by the trawler could not be employed in the absence of a small motor boat. The motor boat "Pearl," originally intended to be used for this purpose, has been condemned as too old for the open sea. Proposals have been made to Government for the purchase of a small motor boat, and Captain Cribb now on leave in England has been authorized to buy suitable drift net and long lines for surface fishing.

It is the intention of the department ultimately to test all the available up-to-date gear. The chief among them are—

- A. The trawl.
- B. Drift net (for surface fishing).
- C. Seine net (for surface and middle depths).
- D. Purse net (for surface shoals).
- E. Long lines (for large fish which escape nets).

All the above except the purse net will be tried in the systematic survey of the off-shore water by the trawler from this year forwards, if Government sanction the purchase of the motor boat. The Purse net is an American net of great catching capacity and is specially suitable for large shoals of sardine, mackerel, etc. This net requires special equipment and its use will be deferred, for the present till the preliminary experiments in improving the indigenous sardine and mackerel nets of the West Coast by Captain Cribb have been conducted. For the investigation of pearl banks in depths beyond 11 fathoms up to which naked divers fish, some specially designed dredges were employed, but have not proved satisfactory—Vide Administration Report, 1927-28, page 26.

Improvement of indigenous gear.—Captain Cribb suggested improvements to the indigenous sardine and mackerel net. Government sanctioned the proposal in their Order Mis. No. 1444, Development, dated 31st August 1928. He was not able to get the net made locally at Tanur. The yarn in use locally as well as the workmanship was found to be unsuitable. He was asked to ascertain the possibility of making it in England while on leave. Sundry fishery accessories he wanted, such as glass balls, floats, etc., for these nets, have been ordered through the Director-General of Stores. I expect that Captain Cribb will be able to conduct the experiments with a view to introduce improvements of the indigenous fishing gear on the West Coast after his return.

2. TANUR EXPERIMENTAL STATION.—No experiments in oil refining or curing were done during the year as sardines were scarce. All the important lines of manufacture of cured fish, oil and fish meal at this station have reached a stage when, for further development, the services of a qualified bio-chemist are needed. I have recommended the appointment of a Fisheries Chemist. The immediate work to be done by him *inter alia* consists of—

(1) testing of fish oil for vitamin and devising new methods or modifying old methods of manufacture to conserve the vitamin content of the oil;

(2) analysis of cured fish with a view to improving curing methods including sodium hypochlorite;

(3) reduction of undue percentage of fat in fish-meal;

(4) softening of bones and scales in sardines in canning;

(5) elimination of the black discolouration in prawn tins;

(6) analysis of samples of sea water collected by the trawler;

(7) improved and economic methods of manufacture of potash, iodine, acetone, agar-agar and fertilizers, cattle and human food, etc., from sea-weeds;

(8) ascertaining the best methods of storing fish and the period up to which canned fish tins will keep and can be guaranteed as safe; and

(9) bacterial examination of "pink eye," "rusting," "salt excrescence" and other defects in cured fish and prawns that supervene on storage and devising of methods for their elimination.

Plant.—While the cement coating of fish-curing vats in a few cases have lasted several years, many vats recently constructed in fish-curing yards have shown rapid deterioration. Experiments have been devised for determining the penetration of salt in different brands of cement so as to ascertain the best cement for the construction of curing vats. It has been ascertained from the Harbour Engineer-in-Chief that masonry structures exposed to the action of salt-water should be rich in lime and low in alumina and should also be particularly low in impurities such as sulphur and magnesia. The "Char-Minar" cement manufactured by Messrs. Shahabad Cement Co., Ltd., Bombay, which appears to satisfy the above requirements has the following specifications:—

	PER CENT.
Lime	64.68
Silica	23.27
Alumina	5.73
Iron oxide	2.30
Magnesia	.78
Sulphur calculated as SO ₃	1.48
Total loss on ignition	.83
Insoluble residue	.85
	99.92
Net proportion of Lime to Silica and Alumina ...	2.56

A sample of this cement has been obtained from Messrs. Best & Co., for trial.

The question of purchasing a disintegrator for powdering fish-meal now done by hand at high cost is under consideration.

The balance of 20 shark skins left over last year were sold only at Re. 1 per skin to the Chrome Leather Company. The manufacture is not remunerative as there is no demand and will be given up.

3. **CHALIYAM CANNERY.**—The Chaliyam Cannery remained closed during the year pending the recommendations of the Committee on Fisheries. Here again the problems are highly technical and demand expert attention by a Bio-chemist.

C.—Licences for Fishing with fixed engines.

During the year under report, 65 free licences for fishing with submerged trees in the Palk Bay, off the Ramnad district coast, were issued under section 6, (3)(a) of the Indian Fisheries Act. The reasons which originally led to the system of licensing fixed engines in the Palk Bay were as follows:—(1) the trees are a danger to navigation especially to the Department motor boats that ply there; (2) they give to individuals prescriptive or proprietary rights in the particular spots in which they are placed; (3) they render other methods of fishing impossible as the obstructions are numerous; and (4) they prevent the proper exploitation of the chank beds where they are anchored. With the non-renewal of the Rāmnād chank fishery lease, the inconveniences referred to in item (4) disappeared, but the other reasons for the licensing system continue. It was, therefore, decided that the Assistant Director, Pearl and Chank Fisheries should continue to license such fixed engines although the lease of the chank fishery off the Rāmnād district has not been renewed.

D.—Fish-curing Yards.

1. **EAST COAST (NORTH) —General.**—This area comprises the 30 yards in the Ganjām, Vizagapatam and East Godāvari districts. The transactions in the southernmost yards were adversely affected by floods in October and November of last year. The Committee on Fisheries accompanied by the Director of Fisheries visited Cocanada, Uppada and Vizagapatam during the end of April and beginning of May 1929.

Improvements.—All the yards in the Northern Circars have been supplied with salt-measuring trays, similar to those in vogue on the West Coast with which any quantity less than a bag can be easily and quickly issued.

The second improvement introduced in one or two yards, is in the mode of drying. Shortly before the visit of the Committee to Uppada, one of the biggest yards on this coast, three drying flakes were constructed with split bamboos at departmental cost and a few of the curers were persuaded to use them. When questioned by the Committee regarding drying flakes, the curers pleaded poverty and desired that the Fisheries Department may provide them, free of cost. The feasibility of constructing flakes on a more permanent but cheap basis with wire net or expanded metal is receiving attention. A sum of Rs. 60 has been sanctioned for an experiment at the Mukkum yard.

The first well with baked clay rings mentioned in last year's report was constructed at Lawson's Bay fish-curing yard at a nominal cost of Rs. 25 to Rs. 30. This will ensure the use of clean water by curers and by the yard staff.

The scheme for substituting glazed earthen pots for insanitary mud pots and palmyra butts for curing fish did not materialize as cheap glazed pots of suitable size and shape are not available. The gentleman who promised to undertake the supply of these pots from Rangoon sent three sample pots, but all of them have been tested and found unsuitable for the purpose. Other methods of coating earthen pots in use with cement or other impervious material are under trial.

Yards closed or opened during the year.—The opening of a yard at Srirangapuram was sanctioned in G.O. Mis. No. 43I, Development, dated 29th March 1927; but the yard could not be opened this year also for want of a suitable cheap site.

Transactions.—It will be seen from Appendix II, statement 9, that the weight of raw fish brought to the yards for curing during the year was 76,911 maunds 19 seers. The quantity of salt issued was 10,032 maunds 8 seers, the revenue from the sale of salt, Rs. 12,540-4-0 and the weight of cured fish removed, 44,668 maunds as against 57,532 maunds 19 seers of fresh fish, 7,000 maunds 30 seers of salt, Rs. 8,750-15-0 revenue and 32,970 maunds 35 seers of cured fish respectively in the previous year. Thus the transactions were comparatively better than those of 1927-28. The operations at Patisonapur yard were stationary. At Peddakarivanipalem and Iskalapalem in the Ganjām district the transactions have slightly decreased. Though the transactions at Gedduro have been somewhat better than last year, it still continues to be poor as only 46 maunds 16 seers of salt have been consumed as against

36 maunds 38 seers consumed during the previous year. There was a satisfactory increase in transactions in Gopalpur in the Ganjām district, Montgomaripeta, Lawsons Bay, Jalaripeta, Pudimadaka and Pentakota in the Vizagapatam district and Konapapapeta and Uppada in the East Gōdāvari district. At Gopalpur the transactions on one occasion were so heavy that within a short space of about four or five days, nearly 250 maunds of salt was issued. At Manchineelapeta, large quantities of salt were consumed during the year owing to the immigration of certain fishermen of Pundi yard on account of some communal troubles there between Kundras and Kevities. The three southernmost yards which used to consume more than half the total quantity of salt used by the whole section suffered badly for some time for want of fish this year. Also on account of unprecedented damages by floods in the neighbourhood of these yards, during the close of October and beginning of November, the work had to be suspended for over a fortnight. At Pentakota, a few of the sheds collapsed completely and the yard itself was reported to have been under water for 36 hours, necessitating temporary evacuation by the yard staff.

Supply of salt.—Though there was no depletion of salt in the factories as in previous years except at Naupada, yet complaints from peons-in-charge of yards to the effect that salt was not supplied to them expeditiously were frequent both in northern and southern sections with the result that undue detention charges for cart-men and extra travelling allowance to peons had to be incurred on more than one occasion. Consequent on the depletion of Government salt at Naupada factory, the requirements for Althada fish-curing yard had to be obtained from Badjanapara factory which entailed extra expenditure for cartage. Excepting the four yards, viz., Mukkam, Bimilipatam, Kothuru and Montgomaripeta which are supplied with monopoly salt reserved in several Government factories, Gangavaram, Jalaripeta and Lawsons Bay got salt from the “dittum” stock of the modified excise factory at Balacheruvu. 84,520 maunds of Government salt at Rs. 2,359-15-0 and 1,400 maunds of Excise salt at Rs. 820-5-0 were purchased during the year. The rate per maund of monopoly salt varied from 3 annas to 6 annas and of excise salt from 7 annas to 10 annas. The “dittum” stock of the modified excise factory at Balacheruvu was purchased at 4 annas per maund.

Stock of salt.—The balance of salt on 30th June 1929 in the yards in this section was 1,508 maunds 28 seers.

2. EAST COAST (CENTRAL).—*General.*—The 10 fish-curing yards in this section worked under normal conditions during the year resulting in a surplus revenue of Rs. 1,208-11-6 against Rs. 24-14-0 in the previous year.

Supply and transport of salt.—The Collector of Salt Revenue was addressed during the year under report for the supply of monopoly salt for the yards, but he was unable to comply with the request. Excise licensees supplied salt to the Kadapakkam, Kondurpalaiyam, Kottapatnam and Nelathur yards, while the Madras Salt Depots supplied the yards in and around Pulicat. Salt transport was done departmentally in the case of the above-mentioned yards, while in the case of the other yards it was done by a contractor.

Curing operations.—From Appendix II, Statement 9, it will be seen that the transactions considerably improved during the year. The weight of fish brought to the yards was 64,207 maunds 1 seer, the salt issued was 9,431 maunds 6 seers, the revenue realized was Rs. 11,788-15-0 and the weight of cured fish removed from the yards was 34,253 maunds 10 seers. The corresponding figures for last year were 53,924 maunds 35 seers of fish, 8,607 maunds 17 seers of salt, Rs. 10,759-4-6 and 32,782 maunds 27 seers of cured fish respectively. Of the four yards, about whose unsatisfactory working mention was made in last year's report, namely, Kadapakkam, Sattankuppam, Pulicat and Nelattur, Sattankuppam recovered and worked at a gain during the year; Kadapakkam showed improvement in view of the fact that against 2,248 maunds of fish brought to the yard in the previous year, 2,459 maunds were brought during the year, while in the case of Pulicat there has been no improvement. There was a slight decline in transactions in the Nelattur yard, due mainly to the economic distress caused by the cyclone of 1927 from which the fishermen have not yet recovered.

Stock of salt.—The balance of salt on the 30th June 1929 was 708 maunds 25 seers.

3. EAST COAST (SOUTH).—*General.*—There are 14 yards in this section in the districts of Tinnevely, Rāmnād and Tanjore. In the Vanagiri yard, the sea is reported to be encroaching. It is feared that, at the reported rate of erosion, the yard may have to be removed to a new site soon. In the Rāmnād district at Nambutalai, the curers have complained that the yard is situated at a considerable distance from the place where they land fish and

petitioned for its removal to a nearer site. Attempts are being made to select a suitable site.

Opening of new yards.—The fishermen of Kuttankuli in the Tinnevely district have petitioned for the reopening of the yard there, which was closed for want of operations in the year 1910 when the Salt Department administered the fish-curing yards. The men are very poor and unable to meet the cost of the site and the erection of buildings. The matter is under consideration.

Supply of salt.—All the yards which could be served by sea, were supplied with salt from Tuticorin by ordinary cargo-lighters, this mode of transport being cheaper than buying salt from factories near those yards and transporting it over land.

Transactions.—The transactions in the yards were more satisfactory on the whole this year, than in the previous year, the net revenue being Rs. 4,083-13-3 against Rs. 2,750 8-9 in 1927-28. The weight of fish brought to the yards was 93,662 maunds 26 seers, salt issued 19,121 maunds 20 seers, the revenue realized Rs. 23,901-10-0 and the weight of dry fish removed from the yards 64,916 maunds 13 seers. The corresponding figures for last year were 80,785 maunds 33 seers of fish, 15,616 maunds 18 seers of salt, Rs. 19,520-9-0 and 56,333 maunds 38 seers of cured fish respectively.

Stock of salt.—The balance of salt on the 30th June 1929 was 5,287 maunds 25 seers.

4. WEST COAST—*General.*—There were 57 fish-curing yards working in this section at the beginning of the year and 59 at the end of the year. As in the previous year, 26 of these were in charge of Sub-Inspectors, 1 in charge of a Sub-Inspector during the fishing season and a Petty Yard officer during the monsoon months, 7 in charge of peons and the rest in charge of Petty Yard officers. As last year, three are private fish-curing yards, working only during the fishing months of the year.

Last year the Hosabettu fish-curing yard was opened only during the fishing season, but Government have since sanctioned the continuance of the yard throughout the year.

Yards closed and opened.—Fish-curing yards were newly opened at Nattika and Puthiakadapuram near Tanur. The fish-curing yard sanctioned for the Laccadives was opened on the Agathi Island on 16th February 1929. The yard at Uppala was closed on 1st November 1928. Thus, of the 57 yards that existed during the previous year, one was closed and with the new yards at

Nattika, Puthiakadapuram and Agathi, the total number of yards that existed at the end of the year was 59.

The Mogayar fishermen of Baikampady memorialised Government in November 1927 for the opening of a yard in their village; but a yard could not be opened during the year for want of budget provision. The Government have since agreed to open the yard during the current year, provided the Baikampady fishermen were prepared to meet all costs including establishment charges and leave and pensionary contributions. To this the fishermen have agreed and have requested that the yard may be opened on 1st September 1929.

Sanction has also been received for the opening of new yards at Edakad and Madakara. Sites required for the purpose are under acquisition.

The fishing season.—The fish catches in South Kanara district, unlike those of last year, were uniformly distributed throughout the season and the curing operations went on without much inconvenience both as regards supply of salt and the requirements of labour for curing work. The four big yards at Malpe, Gangoli, Hungarcutta and Udayavar had record operations and their consumption of salt exceeds all previous records. The fish cured was mostly mackerel. The demand in the market for mackerel cured in the ordinary way exceeded that for mackerel cured according to the Colombo method. Therefore there was a fall in operations under the Colombo system, and an increase of operations under the "Local" system. The unusual demand for the mackerel of the South Kanara district seems to have been due to the scarcity of fish in Malabar.

Transactions.—The weight of fresh fish brought to the yards was 1,171,848 maunds, the salt issued 194,861 maunds, the revenue realised Rs. 2,43,576 and the weight of dry fish removed from the yards 710,372 maunds. The corresponding figures for last year were 1,507,736 maunds of fresh fish, 244,081 maunds of salt, Rs. 3,05,101 and 881,040 maunds of dry fish.

The Kirimanjeshwar yard which commenced operations on 18th November 1927 consumed only 195 maunds 5 seers of salt for 1927-28, but this year the consumption rose to 925 maunds 5 seers. The Kumbala yard since its change of site from Shiriya has also been showing a steady increase in operations. The private fish-curing yards at Malpe, Moolky and Padu Thonse worked

satisfactorily. The Vekkode yard which was opened during the previous year showed satisfactory transactions.

In Malabar, however, the operations were poor especially in the northern yards. Madai was the only yard which showed an increase in operations. This yard is so well situated at the head of a small bay that it gets fish almost all the year round. Owing to heavy operations during the end of October, salt ran out of stock in this yard before the stock could be replenished. The yard was consequently without salt from 31st October 1928 to 3rd November 1928. It is estimated that about 50 bags of bazaar salt were used in the interval. Had salt been available, the Sub-Inspector has reported that about 400 bags would have been consumed. The depletion was due to the unexpected large catches of fish. There was a stock of 2,510 maunds of salt on 24th October 1928 and the whole was consumed by 31st October 1928. The minimum stock prescribed for the yard is only 2,000 maunds.

Badagara continues to suffer owing to the high issue price of salt. Meladi, Calicut (South) and Beypore (North) also showed a decline. The cause for their unsatisfactory working is under investigation.

Three yards are endangered by sea erosion, viz., Tellicherry, Quilandy and Parappanangadi. The Government sanctioned the shifting of the Parappanangadi yard to a new site. The site has been acquired and the work of constructing buildings will shortly commence. In Tellicherry and Quilandy, the danger to the fence is imminent. But there seem to be no suitable sites anywhere near for shifting these yards, unless very heavy expenditure is incurred.

The only yard in the Ponnani section that ran out of salt was the Blangad yard where there was no salt for three days, viz., the 17th, 18th and 19th October 1928. During this period, it was estimated that the curers of the yard had to purchase about 200 bags of bazaar salt for curing approximately 3,600 maunds of small kora (*Sciæna*) and miscellaneous fish. The sudden depletion of salt in this yard was due also to unexpected large catches of miscellaneous fish. 835 maunds 15 seers of salt was consumed in five days including 577 maunds in a single day.

Malpe II was the only yard where brine curing was done 201 maunds of fish were cured in 1,170 gallons of brine. The Ratnagiri system of curing was conducted in the Malpe I and Malpe II yards, the weight of fresh fish cured being 3,518 maunds



Fish hawkers mobbing a single boat on the Ponnani beach (West Coast).

12 seers, the salt issued 1,269 maunds 22 seers and the weight of the resultant cured fish 3,010 maunds 24 seers.

Demonstration curing.—Curing by departmental agencies to demonstrate improved methods evolved at Tanur to the curers in special model sheds in the yards was conducted at the Malpe fish-curing yard. Operations by the yard staff yielded a net receipt of Rs. 35-12-0. In the absence of a curing shed in the Fisheries Training Institute, the demonstration shed in the Calicut (North) yard has been placed at the disposal of the Headmaster who has been issued a ticket for curing fish caught by pupil teachers. Curing was done on two occasions. The yard staff also conducted curing operations in the shed on one occasion; but, owing to the high price that had to be paid for fish, the transactions yielded a net revenue of only 10 annas 4 pies.

Construction of sanitary curing sheds.—Thirteen masonry curing sheds according to approved type designs were constructed in the Malabar yards and twelve in the South Kanara yards. But for the poor fishing and the consequent scarcity of money among the curers, progress in the conversion of temporary thatched curing sheds into masonry ones would have been more rapid in Malabar.

Although Government have postponed the scheme of converting the combined office and guard sheds in yards into masonry buildings, they have sanctioned the erection of permanent additional store sheds for salt in the following yards:—Gangoli, Bekel, Madai, Cannanore, Tellicherry, Elathur, Tanur (North), Paravanna, Palapatty, Mannalamkunnu, Blangad and Chowghat yards.

Taxation by Local Bodies.—Unfair levies are still occasionally reported by fishermen and in one case a fisherwoman who did not keep a store house of fish, was fined for not taking out a licence. The Ernad Taluk Board has given retrospective effect to its resolution levying a licence fee of Rs. 5 for fish-curing yards. But the local Government Pleader having advised that the resolution was illegal, the matter has again been referred to the President. A curer in the Calicut South yard situated within the Municipality of Calicut, who owns a store house for cured fish outside the yard, had to pay a licence fee of Rs. 15 although his profit from fish curing during the period covered by the tax was below the amount. But, on a reference being made to the

Municipal authorities, the Council have reduced the licence fee to Re. 1 for every 500 square feet of area occupied by a store house.

Transport of salt from Tuticorin to West Coast.—The trawler "Lady Goschen" was not used for salt transport work during the year under report. As schooners were not available for hire, salt was transported by sea through a contractor on payment of freight. Rail transport was resorted to at the commencement of the season when there were heavy operations in the yards on the West Coast and subsequently from time to time throughout the year whenever unexpected demands arose. 143,498 maunds of salt was transported by sea and 76,540 maunds by rail.

Wastage of salt.—The total quantity of wastage ascertained and written off during the year was 594 maunds 13 seers against 1,359 maunds 25 seers in the previous year. There is a very satisfactory decrease of wastage which was common previously, in spite of the fact that bags weighing less than 1 maund 30 seers are now considered short-weight bags and are re-bagged, the difference in weight being included under wastage. The conditions in the present transport agreement are very strict and the officers of the department have been vigilant in enforcing the conditions and in observing regulations laid down for inspection of salt in storage such as check-weighing of sample and suspected bags, stacking of bags, etc., to facilitate inspection. Apart from the benefits to Government in the safeguard of duty free salt and the increased revenue by the prevention of undue loss of salt, the curers have greatly benefited by the issue of full bags of salt instead of varying quantities much below 2 maunds. The rules previously permitted the issue of all bags as full-weight bags to the curers; however much they may have lost in weight, the difference was never ascertained and taken into account as wastage; but now, those below 1 maund 30 seers whenever discovered are not issued but re-bagged and the deficit of salt is considered wastage.

E.—Private Oil and Guano Factories.

Oil sardines were again scarce during the year. In South Kanara, there was a great abundance of mackerel. Only 282 oil and guano factories were licensed against 470 in the previous year. Many of them did not work; only 193 factories had operations: 173 in South Kanara and 20 in North Malabar. In Ponnani, although the number licensed was 23, none of the factories worked for want of sardines. Approximately 70 tons of fish oil, 1,100 tons of fish guano, and 15,000 tons of fish manure were

manufactured during the year, against 200 tons of fish oil, 850 tons of fish guano and 10,000 tons of fish manure produced in the previous year. The value of fish oil ranged between Rs. 240 and Rs. 360 per ton and guano between Rs. 90 and Rs. 120 per ton. The price of fish manure was on an average Rs. 45 per ton in South Kanara and double that figure in Malabar. The total value of fish oil produced on the West Coast may be estimated at Rs. 21,000, guano at Rs. 1,10,000 and fish manure at Rs. 7,50,000. No systematic inspection of oil and guano factories was done in the absence of operations.

2. MINOR MARINE AND ESTUARINE FISHERIES.

A.—Prawns.

The report on the prawn-fishing at Dharmadam could not be completed during the year as the Research Assistant Mr. E. K. Madhavan who was engaged on it was transferred on 23rd August 1928 to work as Inspector on board the trawler. It was possible to permit him to continue his work only towards the end of September 1928 when he paid a visit to the prawn fields at Dharmadam as well as Palayangadi. Unfortunately the season had only commenced then and excepting a few photographs taken to illustrate in detail the design of the farms and a few more items of information gathered by verbal enquiry, no further work was done.

The prawn investigations in the Collair Lake were continued. A great deal of further investigation seems to be required before the disputed question of the breeding grounds of this commercially important prawn of the Collair Lake (*Peneopsis monoceros*) known locally as "Chakku Royya" is solved. The same prawn yields the valuable fisheries of the Chilka lake and the Palayangadi river in Malabar and this investigation will enable us to intelligently regulate and improve these valuable fisheries. In the absence of any research staff in the Northern Circars, only such observations as have been made were possible. No intensive research could be undertaken before the establishment of the Research Station at Vizagapatam.

B.—Edible Oysters.

In the absence of sufficient stock of saleable oysters at Ennore and Pulicat, it was decided not to sell any oysters from the oyster farm at Pulicat. A further depletion of the stock of oysters at Pulicat occurred owing to the negligence of the menial staff

attached to the farm. Considerable mortality occurred in May of this year in a portion of the Sinnaparaval bed, among the oysters raised by cultching. These oysters were left exposed for a long period during an unexpected lowering of the level of water in the Pulicat lake caused by the closure of the bar and the farm servants failed to remove them in time to sections covered by water ignoring standing instructions.

The exhaustion of beds at Ennore and Pulicat which necessitated the closure of oyster sales requires serious attention. The matter was taken on hand on my return from leave and I propose to make a personal investigation for concerting measures for the culture and proper exploitation of the oyster beds in future.

The following reaches of the Buckingham canal were reserved for oyster culture and brought under the control of the department:—

- (1) Ennore backwater (mile 10/2 to 11/4 of the Buckingham canal);
- (2) a section of the Pulicat lake backwater (mile 24/0 to 27/1 of the Buckingham canal).

Although Government in their order No. 2242, Revenue, dated 23rd July 1910, had reserved the Pulicat oyster-beds for oyster culture by the department, the Public Works Department had continued to auction for limeshells that part of the Buckingham canal and the water spread comprising the Pulicat oyster farm. The dual control of this area was found unworkable in practice. To continue oyster culture and conserve oysters in an area, where a shell pit contractor was also allowed to collect live and dead shells, was found to be an impracticable proposition. Dr. Gravely, therefore, reported that the interests of the two departments were conflicting and mutually exclusive and recommended that either the areas in Pulicat and Ennore should be handed over entirely to the Public Works Department for trading in lime shells or to this department for purposes of oyster culture. The culture of oysters as an article of food appears to have a greater claim than the collection of shells for chunam. While dead shells can be collected in various places along the Buckingham canal, oyster-beds are situated only in certain favourable spots in backwaters, and the Government were pleased to transfer the areas in question to this department in G.O. No. 2991 I., dated 27th November 1928. They also sanctioned the transfer to this department temporarily for a period of two years, of the reach of the Buckingham canal from miles 123/4 to 123/7, which comprises the extensive

oyster-beds at Gokulapalli (G.O. Mis. No. 283 I., dated 31st January 1929).

Edible Oyster Culture.—Owing to the absence of the permanent Director on leave out of India, the experiments under this head could not be continued during the 1928 season. In the course of the experiments hitherto conducted at Pulicat and Ennore from 1925 and during the inspections of the natural beds at Pulicat and Gokulapalli, several useful data pertaining to oyster culture have been collected. These with certain observations on the early development of oysters are expected to be published shortly in the Madras Fisheries Bulletins by me and my Personal Assistant.

C.—Beche-de-mer.

The 3,360 lb. cured in 1927-28 and shipped to Singapore were sold for \$985'93 (=Rs. 1,518-5-4). Since the termination of the Rāmnād chank fishery lease from 1st July 1928, the curing under departmental agency has ceased. A private yard as anticipated in last year's report is working now and the industry is conducted on a satisfactory basis on the model of the Government Factory.

The Departmental chank fishing investigations started for the first time this year on the Tanjore coast has brought to light the existence all along the Tanjore coast of abundance of suitable Holothurians for conversion into Beche-de-mer. Private curing on a small scale exists but is crude and insanitary. It may be desirable to start a departmental factory as was done at Tirupalakudi (Rāmnād district) previously, at a suitable centre on the Tanjore coast, to improve the Beche-de-mer industry there. The matter is under investigation.

D.—Turtles.

During 1928 season, 49 turtles were sold for Rs. 282-9-0 of which 36 were sent by the Research Assistant, Krusadai Island and 13 by the Research Assistant, Ennore. There is a good demand for turtles all round the year. But the supply cannot be made in full, as the turtle season in the neighbourhood of Krusadai closes for 5 months annually, from May to September. With a view to securing continuity in turtle supply, I am considering the question of establishing a turtle farm at Krusadai. The farm will also deal with rearing of the Hawksbill (*Chelone imbricata*) which yields the valuable tortoise shell of commerce. In the absence of staff and equipment at Krusadai Island, the preliminary study of the turtle fisheries at Pamban is proceeding slowly.

3. INLAND FOOD FISHES.

A.—Inland Fishery Experiments and Research.

1. DEEP WATER TANK FISHING EXPERIMENTS.—The deep water fishing experiments in the Mopad reservoir were continued with satisfactory results. The introduction of new methods such as a backwater net from Ennore, drift nets of different meshes, long lines, etc., resulted in good catches. Though on account of the failure of the last north-east monsoon the tank became low in December and by the end of January last year, water went below the sill level of the irrigation sluice, yet deep-water fishing experiments were conducted in the old Manneru bed, where water is several feet deep throughout the year. The following statement gives details of the number of fish caught, their weight per net and the amount realised:—

Year and month.					Name of nets and number of pounds of fish caught by each net.		
					Name of nets.		
					Ennore net.	Drift net.	Cast net.
1928	July	...	...	...	LB.	LB.	LB.
	August	...	...	...	503½	235½	...
	September	...	...	...	348	348½	...
	October	...	...	...	82	618	...
	November	...	...	...	...	1,219½	...
	December	...	...	...	...	1,227½	...
1929	January	...	...	...	...	1,099½	...
	February	...	...	...	...	1,025½	...
	March	...	...	...	...	1,066	...
	April	...	...	...	...	699½	638½
	May	...	...	...	...	714	501½
	June	...	...	...	...	...	1,165
					933½	8,253½	3,148½

It will be observed from the statement that drift nets bring in more catches than any other net and that Rs. 1,185-8-1 was realised against Rs. 1,029-0-4 in the previous year. The system of keeping fish alive until disposal inaugurated last year was continued to the great satisfaction of the purchasers. Fish was supplied regularly to Fish Contractors at Udayagiri and Kanigiri as in the previous year and a small quantity was sold on credit to approved customers and to Government officials at Kandukur.

2. FISH BREEDING—*Hilsa*.—Experiments in hatching hilsa eggs could not be continued for want of communication between Vizagapatam and Bezwada due to heavy and unprecedented floods and consequent breaches in the railway line, just at the season when fish with ripe eggs were available in the Kistna river.

With the transfer of Headquarters of the Andhra University, the Police have agreed to build the lines in the land formerly reserved for the University, but the Public Works Department continue to give the Lock Bungalow for occupation of other officers of departments to whom the situation of the bungalow and site is not so indispensable as to this Department. There is no other suitable site for a Hatchery in Bezwada besides this and as the Lock Bungalow has been occupied by the T.R.S. (P.W.D.) Office, the Hilsa operations may have to be stopped in the forthcoming season for want of accommodation.

Gourami.—These are thriving well in all the farms except at Mopad, where the farm work had to be closed temporarily in January owing to the failure of the water supply in the reservoir.

Though the fish are thriving, yet breeding was not satisfactory at Sunkesula, Ippur and Perambur; at Sunkesula and Perambur, the main reason for this unsatisfactory condition is the overcrowding of the ponds; the stock of fish could not be thinned out for want of additional water area. At Ippur it is due to certain defects in the design and equipment of the farm (vide Part III, section E.).

Mullets.—The experiments conducted last year in connexion with mullet culture could not be continued during the year under report for want of a suitable pond in any of the fish farms. As the Kolavoy tank did not receive full supply, the Chingleput Fort Moat in turn received a precarious supply and consequently no section of this could be used for the experiment.

Catla.—The Catla fry for stocking used to be obtained hitherto from the Canal at Pippara, a town close to Tadepalligudem railway station. This year, Pippara had to be abandoned owing to the difficulty of securing Catla fingerlings. After a search, Nidadavole was selected. As a result of this change, it was possible to secure a large number of fingerlings which were carried over long distances. As usual the fry in impounded waters showed splendid growth, e.g., in the Attigunta tank which was stocked in August last with fingerlings 3" to 4" in length, the fish measured 20" when caught on 12 May 1929; the fingerlings placed

in one of the Chingleput Fort Moat sections at the same time measured 24" when fished in May last. But unfortunately in these two places most of the fish escaped for want of necessary screens and shutters to the inlets and outlets. In the case of Chingleput Fort Moat, the matter is in the hands of the Public Works Department, but in the case of Attigunta tank necessary shutters will be provided shortly by the Department.

Tench and English carp.—The small number of fish available in the Sunkesula farm was transferred to Praema, but unfortunately the stock could not be supplemented from Ootacamund during the year owing to a break-down of Nilgiri railway communication at the right time. This will be done next cold weather.

B.—Stocking, Protecting and Leasing of Tank and River fisheries.

1. STOCKING OPERATIONS.—Though the monsoon brought in good local rains during the year, yet in some parts of the presidency, the rainfall was very poor and consequently several provincialized tanks received very meagre supplies. The tanks in the taluks noted in the margin of the Chingleput and Nellore

Chingleput District.
Conjeeveram Taluk.
Nellore District.
Atmakur Taluk.
Udayagiri Taluk.
Kanigiri Taluk.
Kandukur Taluk.
Rapur Taluk.
Gudur Taluk.

districts received inadequate supply so much so that the tanks in the taluks of Atmakur, Udayagiri and Kanigiri could not be stocked. The rest were stocked as usual with fry of mullets, etroplus and suitable varieties of carp.

The following waters were successfully stocked with young Catla at a cost of Rs. 1,473:—

	Fry planted.
Cauvery river below Hoginkal fall	1,908
Attigunta tank	689
Vellore Fort Moat Fish Farm	625
Mopad Reservoir	832
Ippur Farm	151
Jeegur tank, Hosur Cattle Farm	100
Chingleput Fort Moat Fish Farm	160
Willingdon reservoir	910
Total	5,375

Unless some stringent measures are taken under the new amended Fishery Act to put an end to indiscriminate fishing in the Cauvery, below Hoginkal falls, referred to in the last year's report

it seems almost impossible to establish the new fish in the river successfully. A comprehensive survey of the river will have to be made from Bhavani up to Hoginkal falls next hot weather to find out remedial measures to prevent wholesale destruction of immature fry when the river is very low. This appears to be very necessary not only to establish catla but also to improve the river fishery in general.

Though the Mopad reservoir became very low during the year on account of the failure of rains, only a few Catla were caught. It is probable that some of the introduced fish were destroyed by the freshwater shark Wallago, which is found in large numbers in the reservoir. This requires close observation and investigation. Catla once having bred in the reservoir should breed hereafter also. The reservoir will continue to be stocked with catla. Catla fingerlings introduced into the Willingdon Reservoir in 1926 and 1928 have bred. Though a large number of catla fingerlings were sent to the Barur tank, yet owing to the breakdown of the bullock cart transport on the way, only nine fish could be released into the reservoir. The stocking of the tank with catla will be continued until the fish establish themselves at Barur.

At the request of the Agricultural Department, the Jeegur tank, Hosur Cattle Farm, which was reported to contain almost permanent water was stocked with 100 catla during the year in addition to Etroplus.

2. FISHERY LEGISLATION.—By the enactment of the amended Fishery Act and the publication of rules framed thereunder in the *Fort St. George Gazette* of the 16th April 1929, a long-felt want has been supplied. The object of the legislation is to give protection to lessees against poachers. Under this new Act, eight poachers in the Madurantakam tank were prosecuted and fined from Rs. 5 to Rs. 25 each and their nets were also confiscated. Though the fishery of this big irrigation tank was auctioned three times with sufficient intervals between each auction, the local people and the fishermen completely boycotted the sale. Their object was probably to enjoy the fishery for nothing by poaching during nights. The arrest and prosecution of poachers had an immediate effect in stopping illicit fishing and produced an atmosphere favourable for leasing the tank.

3. FISHERY SALES.—The new sale conditions and agreement standardized in G.O. No. 1240, Development, dated 13th August 1927 were adopted during the year and proved satisfactory.

Under G.O. No. 1862, Development, dated 3rd November 1928, Government ordered that fishery lease agreements need not be registered. This is highly advantageous both to lessees and the auctioning officers, inasmuch as it saves expenditure to the former and labour and trouble to the latter. Stringent terms in regard to payment of lease amounts had to be relaxed in exceptional cases, as for instance in the case of the newly formed Parvatharajakula Co-operative Society, Karunthattangudi, Tanjore, —vide G.O. Mis. No. 1284, Development, dated 4th August 1928.

Owing to determined opposition on the part of some villagers, the auctioning authorities and the Inland section staff had a strenuous time in breaking combinations. Apart from combination, the failure of rains resulted in poor rentals in some taluks of the Nellore and Chingleput districts. On the whole, the results of fishery sales during the year were much more satisfactory than in the previous year as will be seen from Appendix IV.

In the same Appendix, a list is given of the tanks which fetched no rentals in 1928–29 as well as of those that fetched low rentals on account of inadequate water-supply or combination among the bidders.

4. PROHIBITION OF FISHING BY PUBLIC WORKS DEPARTMENT.—Though G.O. No. 1, Irrigation (Public Works and Labour Department), dated 3rd January 1927, did not affect fishery rentals, yet the Deputy Registrar of Co-operative Societies, Trichinopoly, has reported that lessees were harassed by the anicut staff in several ways.

5. DISPOSAL OF FISHERIES BY PRIVATE TENDER.—With a view to counteracting local combinations among the villagers in the Kavali taluk, the Rev. S. D. Bawden on the advice of the Assistant Director (Inland) took up the lease of the fisheries of a number of tanks in the taluk. The rentals paid by Rev. Bawden for ten tanks were Rs. 837 against a compensation of Rs. 882–2–0 payable to the District Board in respect of these tanks. The Department is indebted to Rev. Bawden for the help he has rendered by taking up the fisheries on behalf of the poor Adi-Dravida Christians and thereby defeating local rings.

The Kalivetapalayam tank and the Penubarti tank, the fisheries of which could not be disposed of either by auction or by private tender, had to be fished departmentally. A sum of Rs. 140 was realized against a compensation of Rs. 25.

The tenderer for the Kanigiri-Duvvur tank referred to in last year's report having failed to pay the sum due to Government, sanction has been obtained for his prosecution. The matter is now in the hands of the Collector of Nellore.

The Ullams in the Kota Pennaka tank were inspected by the Assistant Director (Inland) with a view to fixing the rent for each Ullam. Since the close of the year, the Government have approved the rent fixed for each Ullam.

4. PEARL AND CHANK FISHERIES.

A.—Pearl and Chank Fishery Research.

Some live pearl oysters collected from the Tholayiram par (pearl bank) off Tuticorin were brought to the Krusadai Biological station on 17th November 1928 and are kept under observation in wire net cages securely anchored at a depth of about 6 feet in the sea opposite the laboratory. The experiment, small as it was, has proved the possibility of transporting and keeping oysters alive in captivity in comparatively shallow water.

The bulk of the spat-fall on the Tuticorin pearl banks occurred in 1922; by 1928 most of the oysters on the banks had died thus confirming the view that the average age of the South Indian pearl oyster is only six years.

The mystery connected with the sudden appearance and disappearance of pearl oysters in South Indian pearl banks continues unsolved. Though there were adult and mature oysters on the Tholayiram par for nearly six years at one stretch, there had been no evidence of any extensive fresh spat-falls. After the termination of the last pearl fishery, there were on the banks a large number of brood oysters sufficient to re-populate by their spawn the whole of the pearl bank region of the Madras coast and yet no young oysters have actually appeared and the adults are rapidly dying out. This proves beyond doubt that there are certain unknown causes at work, the detection of which will form subjects of extensive research at the proposed Krusadai Biological Station.

Recruitment of divers is a constant problem in conducting pearl and chank fisheries. Diving as a profession is dying out. The sons of divers no longer follow the profession of their fathers as the occupation is despised. There are far less divers available in South India now than ever before. From the history of chank

fisheries, I notice that, so far back as 1887, experiments in the use of diving dress for fishing chanks had been made by the firm of Messrs. C. H. R. Cocq, who were then the chunk fishery lessees. These experiments were continued to be tried by the Superintendent, Pearl and Chunk Fisheries after the departmental working of chunk fisheries was commenced. Necessary machine and dress were imported and skilled men from England were obtained. The experiment had to be given up as the number of shells picked up by helmeted divers was so trifling that it was acknowledged to be a failure. The skilled European diver is reported to have stated that he had to move about and then kneel before he could get hold of each separate shell as they do not lie close together. This was found to be very inconvenient. Captain G.A. Phipps, Superintendent of Pearl and Chunk Fisheries, who tried the experiment stated in one of his reports to Government, that he witnessed similar experiments in Ceylon and from all that he had done himself and seen others trying it, no good was likely to result from any further trial and expenditure.

Since December 1925, I have been in correspondence with the British Consul at Tokyo for a simple Japanese diving apparatus in the form of a mask combined with a couple of compressed air cylinders sold by Messrs. Nippon Ensui Kabushiki Kaisha Fukagawa-ku, Tokyo. After protracted correspondence, I was able to effect the purchase of one apparatus from this firm in November 1927 with the kind help of Mr. Kobayashi, a Japanese merchant in Madras.

My idea is to experiment with this apparatus and if found suitable, order more for divers specially trained by the department in the use of this mask.

If the Japanese apparatus succeeds, we can have a regular body of divers trained under our permanent employ. With the help of this device, the diver can remain under water much longer than a few seconds and could systematically fish the banks. A few divers in the place of the thousands now employed will probably then suffice. If necessary, a sufficient body of Arab divers who are far and out the best divers we have, could be recruited from the Persian Gulf and trained in the use of this mask.

B.--Inspection of Pearl Banks—October-November 1928.

An inspection of the Tholayiram par was carried out from 29th October to 3rd November 1928 with the help of the "Lady

Nicholson". The divers brought up 3-4 oysters per dive in different areas of the bank. On examination, the animals appeared to be unhealthy and yellowish in colour. Dead shells also were picked up in large quantities.

In the northern and middle sections of the bank, oysters were entirely absent over an area of $3\frac{3}{4}$ miles. In the course of the inspection, a good chunk ground was discovered and buoyed.

The following is briefly the result of the inspection:—

(1) Area examined	...	...	...	...	24,161,760 sq. yards.
(2) Area with oysters	...	...	...	...	1,799,280 „
(3) Estimated number of pearl oysters in the area	...	...	...	...	20 lakhs.
(4) Number of square yards to one pearl oyster	...	...	...	...	12.8 sq. yards.

The oysters were so scattered that it was obviously impossible to fish them profitably. There are, therefore, no prospects of a pearl fishery during the next few years and one even after a few years seems problematical.

A sample of 2,109 oysters were collected in the course of Inspections in March 1929 and in October and November 1928 which yielded pearls weighing 1 kalanji, 15-32 manjadis valued at Rs. 56-13-6.

With the disappearance of the oysters from the Banks, the pearling years have come to an end. In future, a general triennial inspection of the Pearl Banks alone is necessary till oysters reappear.

To systematise the inspection work, all the pearl banks off Tinnevely and Ramnad coasts will be divided into three groups and these will be inspected annually in rotation:—

- (1) the pearl banks lying off Cape Comorin to Tuticorin,
- (2) the pearl banks lying off Tuticorin to Pamban, and
- (3) the pearl banks lying off Pamban to Tondi.

The aim will be to watch for spat-falls. Should any occur on a bank, it will not escape notice as the bank will be inspected within a period of three years, before they have a chance to attain maturity. A general inspection of the pearl banks in the 1st group from Cape Comorin to Tuticorin was carried out during March-April of this year. Three out of four banks south of Manapad, (1) Kallam Pulli par, (2) Koil Piditta par and (3) Palli Kallu par, have not been examined for the last 25 years. The local "Par Mandadi" or the rock pilot found the location of these banks somewhat difficult as he had not examined these beds for years.

These were, however, picked up and the positions noted in the chart. None of these banks had any oysters.

From Manapad to Tuticorin, the following banks were inspected :—

A. Manapad group.—(1) Trichendur Puntoddam par, (2) Sandamacoil Piditta par and Teradi Puli Piditta par, (3) Semman Patta par and (4) Manappad par.

B. Tundu par.

C. Chodi par.

D. Karuwal group.—(1) Nadu Malai Piditta par, (2) Periya Malai Piditta par; (3) Karai Karuwal par; (4) Velangu Karuwal par; (5) Odakarai par.

E. Kadin group.—(1) Kadian par; (2) Kanava par.

F. Outer Kudamuthi group.—(1) Nilan Kallu par; (2) Sankuraiya pattu and Sattu Kuraiya Pattu pars.

G. Inner Kudamuthi group.—(1) Pinnacoil Seltan par and Sundamaram Piditta par; (2) Rajavukku Sippi Soticha par; (3) Kudamuthi and Saith Kudamuthi pars.

H. Nejurichan group.—(1) Par Kudanjan and Nejurichan pars; (2) Melonbadu par.

I. Puli Pundi group.—(1) Vada Ombadu par; (2) Saith Ombadu par; (3) Puli pundi and Kanna Puli pundi pars.

J. Kanna Tivu Arupagam par.

K. Tholayiram par group.—(1) Kuthadiar par; (2) Tholayiram par.

L. Pasi par group.—(1) Pasi par; (2) Athombadu par.

M. Utti group.—(1) Nagara and Petha pars; (2) Utti and Uduruvi pars; (3) Kilathi par; (4) Attuvai Arupagam par; (5) Pattarai par.

A detailed account of this inspection by the Assistant Director, Pearl and Chank Fisheries, was submitted to Government in June 1929.

Interdiction of ordinary Fishing on the pearl banks.—The notification prohibiting all ordinary fishing on the pearl banks for a period of two years from the 10th July 1927 expired on the 9th July 1929.

Pearl Fishery Camp Site, Silavathurai.—The lease of 141'97 acres of land at Silavathurai, Tuticorin, belonging to Sri Sankararameswara Temple and included in the site of the pearl fishery camp expired on 16th December 1927. The lease of an additional site of 43'30 acres belonging to the same temple also expired on

the 2nd February 1928. I urged the necessity for acquiring the pearl fishery site at Tuticorin under the Land Acquisition Act for the following reasons :—

(1) Since the acquisition of the pearl fishery by the British, there has been 18 fisheries. This works out to a fishery every ten years on an average, i.e., at sufficiently frequent intervals to justify the acquisition of the site.

(2) The present site is the only convenient one available on the coast adjoining Tuticorin for locating the camp, especially as the Tholayiram Par lying opposite Tuticorin is our most productive pearl bank and, in all the recent fisheries, this bank has been fished.

(3) The Department's total investment during the last 3 years on the site by way of improvements was Rs. 7,124. If the site is not acquired, this expenditure will be a recurring one; besides, with the discovery of fresh-water in the site, there is the probability of the site being used for permanent coconut plantations in which case leasing the site and clearing and levelling it will be more expensive.

(4) Great difficulty has been experienced in disposing of cadjan sheds put up during the last two pearl fisheries. It would, therefore, be worth while to consider the prospect of putting up more permanent structures in the shape of platforms and fire-proof roofings. Unless the land is acquired, this is not possible.

The Government preferred leasing the land for a long term of years, but they were informed that a long term lease will neither be financially beneficial nor solve difficulties stated above. Further consideration of the question has been postponed by Government for the present.

Pearl Oyster shells.—As a result of the recent pearl fisheries, several tons of mother-of-pearl shells have accumulated. I have been making attempts to dispose of them in two ways, viz., (1) by sale to mother-of-pearl merchants in Europe, and (2) by attempting to convert them locally into buttons.

The South Indian pearl oyster yields unfortunately the poorest class of mother-of-pearl classed in commerce as the "Lingah" shells. They are very thin and brittle and consequently difficult to export without breakage. I have not so far succeeded in interesting traders in Europe in buying the shells, as the freight charges exceed the actual cost of the material and the risk of loss by breakage is great.

These were, however, picked up and the positions noted in the chart. None of these banks had any oysters.

From Manapad to Tuticorin, the following banks were inspected :—

A. Manapad group.—(1) Trichendur Puntoddam par, (2) Sandamacoil Piditta par and Teradi Puli Piditta par, (3) Semman Patta par and (4) Manappad par.

B. Tundu par.

C. Chodi par.

D. Karuwal group.—(1) Nadu Malai Piditta par, (2) Periya Malai Piditta par; (3) Karai Karuwal par; (4) Velangu Karuwal par; (5) Odakarai par.

E. Kadin group.—(1) Kadian par; (2) Kanava par.

F. Outer Kudamuthi group.—(1) Nilan Kallu par; (2) Sankuraiya pattu and Sattu Kuraiya Pattu pars.

G. Inner Kudamuthi group.—(1) Pinnacoil Seltan par and Sundamaram Piditta par; (2) Rajavukku Sippi Soticha par; (3) Kudamuthi and Saith Kudamuthi pars.

H. Nejurichan group.—(1) Par Kudanjan and Nejurichan pars; (2) Melonbadu par.

I. Puli Pundi group.—(1) Vada Ombadu par; (2) Saith Ombadu par; (3) Puli pundi and Kanna Puli pundi pars.

J. Kanna Tivu Arupagam par.

K. Tholayiram par group.—(1) Kuthadiar par; (2) Tholayiram par.

L. Pasi par group.—(1) Pasi par; (2) Athombadu par.

M. Utti group.—(1) Nagara and Petha pars; (2) Utti and Uduruvi pars; (3) Kilathi par; (4) Attuvai Arupagam par; (5) Pattarai par.

A detailed account of this inspection by the Assistant Director, Pearl and Chank Fisheries, was submitted to Government in June 1929.

Interdiction of ordinary Fishing on the pearl banks.—The notification prohibiting all ordinary fishing on the pearl banks for a period of two years from the 10th July 1927 expired on the 9th July 1929.

Pearl Fishery Camp Site, Silavathurai.—The lease of 141'97 acres of land at Silavathurai, Tuticorin, belonging to Sri Sankararameswara Temple and included in the site of the pearl fishery camp expired on 16th December 1927. The lease of an additional site of 43'30 acres belonging to the same temple also expired on

the 2nd February 1928. I urged the necessity for acquiring the pearl fishery site at Tuticorin under the Land Acquisition Act for the following reasons :—

(1) Since the acquisition of the pearl fishery by the British, there has been 18 fisheries. This works out to a fishery every ten years on an average, i.e., at sufficiently frequent intervals to justify the acquisition of the site.

(2) The present site is the only convenient one available on the coast adjoining Tuticorin for locating the camp, especially as the Tholayiram Par lying opposite Tuticorin is our most productive pearl bank and, in all the recent fisheries, this bank has been fished.

(3) The Department's total investment during the last 3 years on the site by way of improvements was Rs. 7,124. If the site is not acquired, this expenditure will be a recurring one; besides, with the discovery of fresh-water in the site, there is the probability of the site being used for permanent coconut plantations in which case leasing the site and clearing and levelling it will be more expensive.

(4) Great difficulty has been experienced in disposing of cadjan sheds put up during the last two pearl fisheries. It would, therefore, be worth while to consider the prospect of putting up more permanent structures in the shape of platforms and fire-proof roofings. Unless the land is acquired, this is not possible.

The Government preferred leasing the land for a long term of years, but they were informed that a long term lease will neither be financially beneficial nor solve difficulties stated above. Further consideration of the question has been postponed by Government for the present.

Pearl Oyster shells.—As a result of the recent pearl fisheries, several tons of mother-of-pearl shells have accumulated. I have been making attempts to dispose of them in two ways, viz., (1) by sale to mother-of-pearl merchants in Europe, and (2) by attempting to convert them locally into buttons.

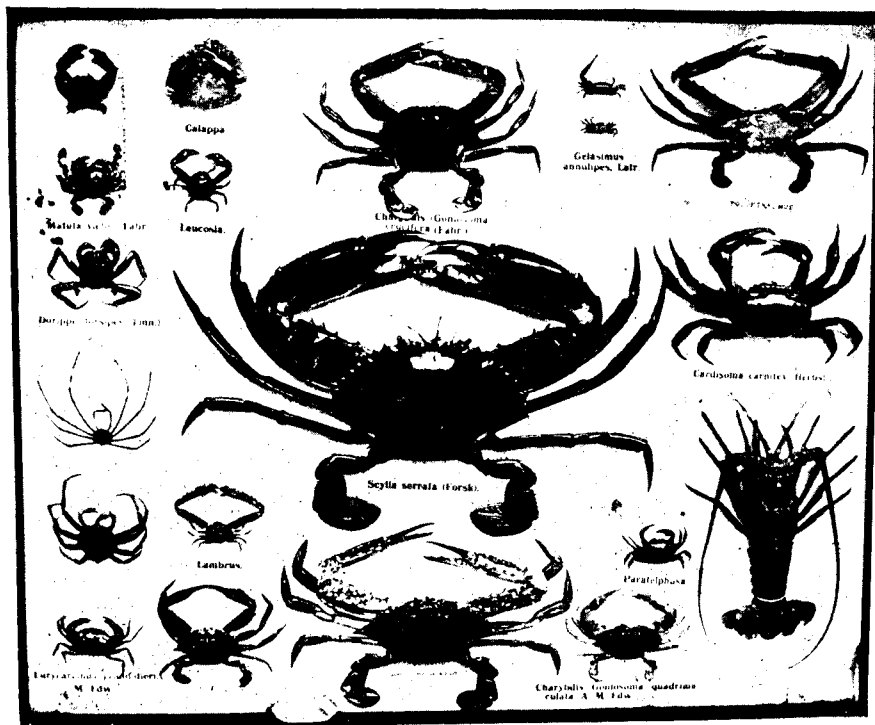
The South Indian pearl oyster yields unfortunately the poorest class of mother-of-pearl classed in commerce as the "Lingah" shells. They are very thin and brittle and consequently difficult to export without breakage. I have not so far succeeded in interesting traders in Europe in buying the shells, as the freight charges exceed the actual cost of the material and the risk of loss by breakage is great.

The Jadhi Thalaivanmore.—In modification of previous orders, Government in their order Mis. No. 1479, Development, dated 4th September 1928, were pleased to direct that the Jadhi Thalaivanmore be allowed as a matter of hereditary right, the privileges which his predecessors had enjoyed from time immemorial, viz., the take of two boats of 10 divers each per day whenever a pearl fishery is held off Tuticorin, as rights corresponding to certain equally customary duties which he has to perform if called on by Government to do so, in connexion with pearl banks and pearl fisheries.

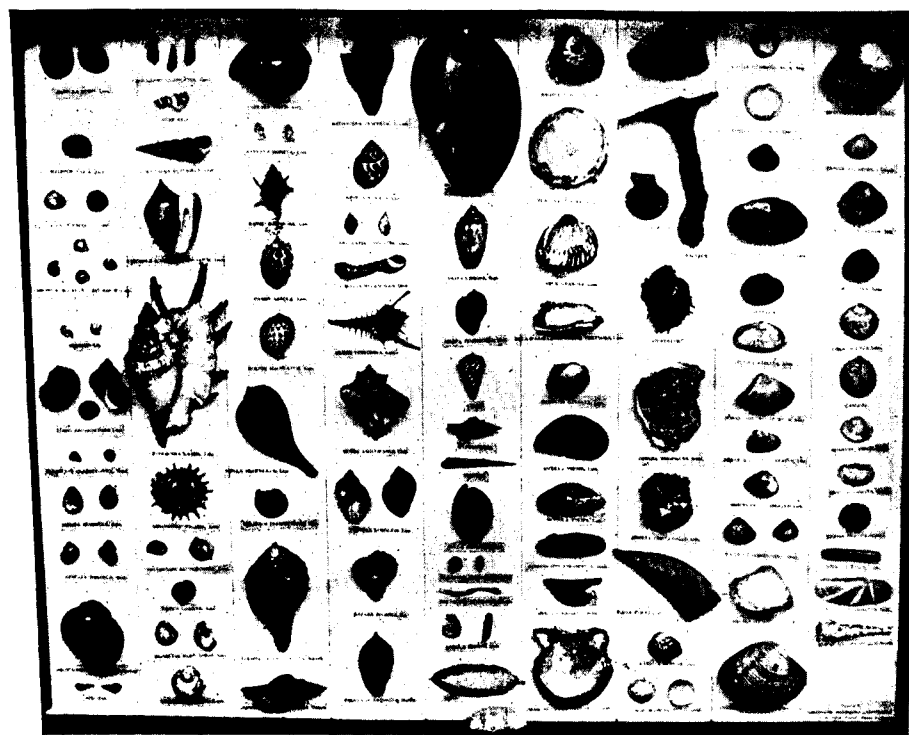
C.—Chank Fisheries.

1. TINNEVELLY CHANK FISHERY—*General.*—In the absence of a pearl fishery during the year under report and the non-renewal of the Rāmnād chank fishery, attention was concentrated on the Tinnevelly fishery. The results were very satisfactory. The catches and revenue obtained are the highest on record since the time the chank fisheries were brought under British Administration, viz., 1801–1802. The previous record was in 1878–79, when 388,064 chanks were fished and this number was exceeded during the year under report (1928–29) when 431,127 chanks were fished. The gross revenue realized this year was also the greatest on record, viz., Rs. 1,68,919-12-10 against Rs. 22,250-4-7 in 1878–79. But in 1878–79, the shells fetched only Rs. 83 per 1,000, whereas in 1928–29 the selling price was Rs. 400 per 1,000. Against this disparity in selling rates divers were paid only Rs. 20 per 1,000 shells in 1878–79 while we are now paying Rs. 93-12-0 per 1,000 with increased other expenses for running the fishery.

Advances to divers.—In the beginning of the season 1928–29, a sum of Rs. 2,144-9-5 was outstanding with the divers of Tinnevelly and Rāmnād districts. Of this, a sum of Rs. 296-4-5 was written off the accounts as irrecoverable under orders conveyed in G.O. No. 1837, Development, dated 30th October 1928. This left a balance of Rs. 1,848-5-0 as loans of which a sum of Rs. 184-5-8 was due from the Tinnevelly divers and Rs. 1,663-15-4 from the Rāmnād divers. No fresh advances were issued. Owing to special efforts made, a sum of Rs. 1,036-15-11 was recovered, being the highest recovery in a year on record, and the balance outstanding at the close of the 1928–29 season was Rs. 811-5-1 (Rāmnād Rs. 674-11-5 and Tinnevelly Rs. 136-9-8). Of this a sum of Rs. 646-15-0 has since been written off as per sanction accorded by Government in their orders Mis. Nos. 1452, Development, dated 22nd August 1929 and 1599, Development, dated 25th September 1929.



A crab case.—A case of typical South Indian Crabs suitable for High Schools prepared by the Fisheries Station, Ennur.



A shell case.—A case of typical South Indian Shells specially designed for School Museums by the Fisheries Station, Ennur.

There is only a balance of Rs. 164-6-1 (Tinnevely Rs. 100-12-1 and Rāmnād Rs. 63-10-0) yet to be recovered during the season 1929-30.

Boat loan to divers.—A sum of Rs. 309 was outstanding as loan with four divers. A fresh loan of Rs. 175 was issued to a chank diver at Tuticorin (G.O. Mis. No. 2047, Development, dated 5th December 1928). Out of the total loan of Rs. 484, a sum of Rs. 265 was recovered and the balance outstanding on 30th June 1929 was Rs. 219.

Increased rate for chanks.—On account of the series of pearl fisheries since 1925 in Ceylon and India, which generally interfere adversely with the chank fisheries, a shortage of chank shells began to prevail in the market. This coupled with the apparently rising demand for chank ornaments in Bengal, caused a great increase in the price of chanks. The Ceylon chank merchants evincing considerable interest in the trade, offered high rates to Tuticorin and Kilakarai divers with a view to recruiting them for their chank fishery. The conditions on the Indian coast are easily influenced by those prevailing in Ceylon and it was apprehended that unless a suitable increase in the rate was given to divers, they might migrate in a body to Ceylon to work in the chank fisheries there. In the event of such a contingency, the department will have to forego a large revenue which the current increase in prices was likely to yield. The situation was explained to Government who sanctioned the payment, as a temporary measure for the season commencing from 1st July 1927, of an increased rate of one anna six pies per shell instead of one anna per shell. Since the conditions necessitating the enhanced rate still continue, the Government have sanctioned the continuance of the increased rate during 1928-29 and 1929-30 seasons.

Recruitment of divers.—With the increased rate of Re. 0-1-6 per shell, I am glad to report that we were able to recruit a greater number of divers locally as well as in foreign places as Kilakarai, Periapattanam, etc. On the first day of enlistment (5th November 1928), 8 canoes of 47 local men got registered. In all, 15 canoes and 5 dhonies consisting of 162 divers participated in the fishery. They consisted of—

1. Kilakarai Muhammadan divers	...	...	102
2. Arabs from Persian Gulf	...	...	23
3. Local Christians	...	...	30
4. Local Palla Hindus	...	...	7
Total	...	...	162

The Palla divers worked some years back at Mundocks. All of them had since learnt diving and worked in a canoe of their own. The Arabs who came from the Persian Gulf expecting a pearl fishery either at Tuticorin or in Ceylon, seeing there was none, joined the chank fishery and made satisfactory earnings. All foreign divers seemed satisfied with their earnings and treatment given to them.

Fishing operations.—There were 163 working days. 23 days were lost on account of bad weather. There was fishing on all days throughout the week. The Muhammadan divers who did not work on Fridays went out to sea on Sundays and the Christians fished on Fridays and took rest on Sundays. The highest catch for any one day was 8,812 which is a record. The largest earning per day per diver was Rs. 9-2-3 the average being Rs. 2-15-9. The Par Mandadi (Bank Pilot) daily accompanied the boats to sea and located fishing grounds. Gauging the shells fished was done in two sections to facilitate quick disposal of work. Camping was done for 16 days at Tharuvaikulam and for 2 days at Pinnakayal.

The following are the details of shells fished during the season:—

	1928-29.	1927-28.	1926-27.
Fullsized	... 431,127	93,172	53,348
Undersized	... 15,090	9,240	3,903
Wormed	... 11,417	2,658	1,507
	457,634	105,070	58,758

Immature shells.—Great vigilance was exercised in dissuading divers from bringing ashore immature chanks. However, of the total brought ashore, as many as 28,237 shells were returned alive to the beds and the rest could not be put back into the sea as the divers had extracted the flesh in them. The flesh has a commercial value of food. It is boiled, cut into thin slices and dried. This is sold at Rs. 1-4-0 per Madras measure and there appears to be a good demand for the product. The horny operculum finds sale at 2 annas per palam.

Valampuri shells.—None was obtained.

Idinthakarai chanks.—As many as 344 shells were collected in nets against 502 during the last season.

Contract.—The season under report was the second year of the contract granted to the Dacca Industrial Union. The rate

accepted is Rs. 400 per 1,000 full-sized shells with a discount of $2\frac{1}{2}$ per cent for advance payment against Rs. 528-12-9 offered by Mr. Hem Chandrakar of Calcutta.

Casualties.—Of the Arab divers, one named Abdulla who went out for chank fishing in one of the local canoes lost his life while fishing. From his last dive, he did not come up. The other divers in the canoes made a search but his body could not be recovered. He had evidently overstayed at the bottom and had finally died. Another Arab diver named Sulaiman died of dysentery at Tharavaikulam.

Weather.—The weather was exceptionally good for operations throughout the fishing season. There were no long interruptions in work on account of bad weather. The south-west monsoon did not break out till the first week of June 1929. Consequently the chank fishery season was the longest on record. It was carried on from 9th November 1928 to 27th May 1929—a thing unknown in the past history of chank fisheries.

2. RAMNAD CHANK FISHERY.—The lease of the Rāmnād chank fishery ended on 30th June 1928 as the Raja of Rāmnād expressed his inability to accept anything less than $1\frac{1}{2}$ lakhs of rupees for a twenty-year lease of the fisheries off the Rāmnād coast and as the Government did not consider that the fisheries would bring in a revenue even approximately approaching the stipulated amount. All the buildings which were in charge of the Assistant Director, Pearl and Chank Fisheries, were transferred to the Revenue Department. It is understood that the Raja of Rāmnād has subsequently leased the fishery to a syndicate of chank merchants at Kilakarai for a period of three years on an annual rental of Rs. 8,210-15-0. The lessees are offering the Kilakarai divers two annas per chank, against one anna six pies at Tuticorin. They have purchased a motor launch for towing the boats. These advantages are bound to be attractive to Kilakarai divers. It remains to be seen whether, during the next season, our divers will continue with us at Tinnevely or will prefer to go to the Rāmnād District.

Rich and extensive Government chank grounds lie in the vicinity of the southern border of the Rāmnād coast. It will not be difficult, therefore, for poachers in that coast to smuggle shells from this area. No sooner did the syndicate obtain the lease of the Rāmnād chank fishery, than they despatched two boats of divers to the limit of the southern boundary who pitched their camps in the southernmost coastal village of the zamindari. The

Assistant Director, Pearl and Chank Fisheries, apprehending encroachment into Government beds, had to arrange for the patrolling of the boundary on several occasions by the motor launch "Leverett."

Sivaganga Chank Fishery.—The five years' lease sanctioned in G.O. Mis. No. 1145, Development, dated 30th August 1922, expired on the 30th June 1928. With the non-renewal of the lease of the Rāmnād chank fishery, the lease of this fishery was also given up—vide G.O. No. 1173, Development, dated 17th July 1928.

3. COROMANDEL FISHERY—*Tanjore Chank Fishery.*—The fishery brought in a rental of Rs. 6,811 during the season under report. This was both for collection of chanks caught in the nets of the fishermen and those fished by diving. No systematic attempts to employ boats and divers seem to have been made by the lessee, for want of precise knowledge of the chank beds on the coast.

The right to collect shells caught in nets has been leased out for two years at Rs. 3,755-8-0 per annum to M.R.Ry. K. E. Mohamad Sultan Maricar of Karikal, the previous lessee from 1st July 1929.

The Government approved the proposals for undertaking the survey and investigations of the chank beds with a view to their proper location and development without interfering for the present with the existing system of leasing out the right to collect chanks—vide G.O. Mis. No. 602, Development, dated 27th March 1929. As matters stand at present, there is no definite information available regarding the position and extent of chank beds off the Tanjore coast and there are no reliable charts to guide us. It is possible that there may also be pearl banks and the exploration of this coast will give valuable data as to the economic possibilities of the pearl and chank fisheries in the Tanjore District. Investigations have commenced and are in progress. As the services of a launch are indispensable, "Leverett" has been detailed for this work.

South Arcot Chank Fishery.—This fishery fetched a rental of Rs. 1,670 for the year under report. There is yet another year for the completion of the three years' lease.

Chingleput and Nellore Districts Chank Fishery.—The lessee duly paid the lease amount, viz., Rs. 1,003-5-4 for the year 1928-29. The lease continues for another year.

5. BIOLOGICAL SPECIMEN SUPPLY.

The institutions in the Native States of Jaipur and Jodhpur, the Osmania University College at Hyderabad, the Victoria College

of Science, Nagpur University, the Queen's University of Belfast and the Sheffield University mentioned in Appendix VI, are among the new customers.

It is proposed to supply a collection of exhibits on the model of the exhibits prepared for the Chidambaram Provincial Educational Conference to all High Schools which may require them. The collection contains about 40 specimens in fluid, either alcohol or formalin, and a small case of dried specimens. The complete set is priced at Rs. 150. This is specially designed with a view to widening the knowledge of natural history among secondary students.

A special catalogue of specimens generally suitable for secondary schools was published.

The Research Assistant went on a collecting tour to Tuticorin, Rameswaram, Pamban, etc., and secured several specimens necessary for the supply work of the station. Further valuable accessions to the "Named Collections" were made in the course of the year by Dr. F. H. Gravely in hydroids, marine crabs, etc., Mr. Winckworth in shells, Mr. Govindakutty Menon in jelly fish and Dr. D. W. Devanesan in sea urchins and star-fishes, most of which were dredged by the trawler "Lady Goschen" in her fishing expeditions.

A notable event of the year under review was the visit of members of the Zoological Section of the Science Congress which held its last session at Madras in January 1929. The opportunity was utilized for displaying to the best advantage all the useful and rare exhibits with explanatory notes wherever necessary.

6. ANTI-MALARIAL WORK.

The annual anti-malarial operations in the Nallamalais, Kurnool District, were conducted as usual and 47 permanent water holes were stocked with 10,700 larvicidal fish.

The Special Malaria Officer, Gudem Agency, was furnished with particulars regarding anti-malarial operations, such as the varieties of fish best suited for the purpose, the method of stocking, the locality where the fish could be got, etc. He was also supplied with preserved specimens of larvicidal fish.

Four wells in the Missionary Medical School for Women, Vellore, were stocked with larvicides. The District Health

Officer, Bellary, was supplied with 2,000 larvicidal fish for anti-malarial purposes.

Samples of larvicidal fish were sent to the Sub-Assistant Surgeon, Kolaba Works, Jeypore (Vizagapatam) and Captain G. V. Ram Mohan, I.M.S., Commanding, I. M. Hospital, Bombay.

Information was furnished to the District Health Officer, Masulipatam, regarding the supply of larvicidal fish for exhibition during the Health and Baby Week of 1929.

Anti-malarial operations were carried out at Sullia in South Kanara during September 1928, when the Research Assistant, West Hill, stocked several wells there with larvicidal fish.

The Fort Moats at Chingleput and Vellore have been kept free of mosquitoes and there has been no recurrence of malaria in the Reformatory and Police Training Schools.

In December 1928, the Special Malaria Officer, Madras, enquired whether this Department could make arrangements to breed "*Gambusia affinis*" which is available in Ceylon and live specimens of which the Ceylon Malariologist was prepared to give. "*Gambusia*" is an American fish popularly known as "The Top Minnow" and famous as a destroyer of mosquito larvæ. After considering the possibilities of breeding the fish here, a pond in the Krusadai Island was prepared for the purpose. Since the close of the year, about 600 live specimens of fish were brought over from Ceylon by the kind courtesy of the Medical Officer at Karunegala. There were a few casualties on the way and about 550 fishes were released into the pond.

In July of last year, the Special Malaria Officer, Madras, in the course of his inspection of the malaria infected villages of Mopad, Udayagiri, and Duttalore with a view to examining the question of carrying out anti-malarial measures, visited the Mopad fish farm also and reported that there were mosquito larvæ in some of the fish ponds. The Mopad fish farm consists of ponds, which are scattered over a wide area riddled with borrow-pits. The Malaria Officer did not inspect the ponds with the Assistant Inspector of Fisheries. If he had done so, he would have obtained correct information about the ponds and would not have confused them with abandoned borrow-pits. By converting some of the borrow-pits into fish ponds, the danger from malaria has, to some extent, been minimized and this department is not, therefore, contributing to the growth of malaria as apprehended by the Malaria Officer.

7. SOCIO-ECONOMIC WORK.

A.—Education.

I. FISHERIES TRAINING INSTITUTE, CALICUT.—The Fisheries Training Institute re-opened after the monsoon vacation on 6th August 1928 and closed for the year on 21st June 1929. The work was on the usual lines except for the inauguration of courses of study in the elements of navigation and practical exercises in handling and sailing boats and in fish-curing in accordance with the revised syllabus. The work of the institute continues to be hampered by the lack of facilities and additional class rooms. The Committee on Fisheries have recommended a comprehensive reorganization and expansion of the Institute which is receiving attention.

Pupil teachers.—The total number of pupil teachers in the Institute during the year was 29. Of these, 23 were Hindus, three Muhammadans and three Christians. Of the Hindus, 22 belonged to the fishing community and one was a weaver (Chalya). As regards Muhammadans and Christians, it is difficult to classify them into fishermen and non-fishermen. One of the Christians was a woman, the only lady student in the Institute. Eight of the students were of the secondary grade and the others of the higher elementary grade. The appreciable change in the educational qualifications of the students who seek admission to the Fisheries Training Institute is a good indication of the spread of higher education in the fishing community. In the early years (1919 onwards) immediately after the opening of the Fisheries Training Institute, it was difficult to get applicants from fishermen even of the lower elementary grade for admission, so that a large number of non-fishermen had to be taken for training. Soon, however, fishermen applicants of the lower elementary grade became available. Within a few years, young men of the fishing community who had read up to the higher elementary standard began to apply for admission in sufficient numbers that it was found possible to restrict admission to the higher elementary grade candidates. During the last five years, the number of secondary grade applicants has been gradually increasing. Among those who applied for admission in 1929, there were 25 fishermen students of the higher elementary grade and seven of the secondary grade. If this rate of progress continues, it should be possible within a short time to restrict admission to students of the secondary grade. The Director of Public Instruction has

recognized the secondary grade students who complete their training in the Fisheries Training Institute with pedagogy as additional subject as trained teachers of the secondary grade under paragraph 2 of rule 14 of the Madras Education Rules.

Twelve pupil teachers sat for the final examination of whom nine passed in all subjects (five being in the first class and four in the second class) and three passed partially.

By the death of Rao Sahib P. V. Gopalan, the Committee appointed by the Government to select students for admission to the Fisheries Training Institute lost one of its prominent members. Mr. A. V. Achuthan, another leading member of the fishermen community of Calicut, was appointed in his place. Owing to the small number of fisheries elementary schools sanctioned by Government in the last few years, there was some doubt whether any new students should be admitted in the Fisheries Training Institute in 1928. After some correspondence, it was decided to admit eight. As by that time the Government Higher Elementary Training School at Mangalore had opened, it was too late to send any students there. Therefore, the Selection Committee did not meet at Mangalore for the selection of Kanarese students. It met at Calicut on 10th September 1928 and selected eight Malayalee students.

School work.—The Fisheries Training Institute and the Model school were inspected by the District Educational Officer on 9th January 1929. His inspection report was received after the close of the year. The students were examined in carpentry by the Inspector of Industrial Schools on 10th June 1929. In the course of his remarks, he says, "I note an improvement in the type of students coming forward for this examination year by year and also a steady improvement in the work that is being done." Fishing was practised by students throughout the year whenever weather conditions permitted. The fish caught by the students fetched Rs. 242-11-9. In the absence of a curing shed and facilities for practical fish-curing in the Fisheries Training Institute itself, the Headmaster of the Fisheries Training Institute was permitted as a temporary measure to conduct curing in the model demonstration shed in the Calicut (North) fish-curing yard and the fish caught by the students on Saturdays was cured by them. As this is not convenient, proposals will be submitted to Government for a curing shed in the Fisheries Training Institute. This year, for the first time, instruction on the elements of

navigation according to the new syllabus was imparted to the students. Captain Cribb, the Assistant Director (Marine), delivered introductory lectures on the subject in the Fisheries Training Institute from 27th September to 6th October 1928. These lessons were continued by Mr. Gomez, tindal of the "Lady Nicholson" in May and June 1929. Owing to the comparatively short period during which the instruction lasted as well as the absence of a suitable vessel for practical teaching, only work of a very elementary character was done. Training in navigation can be made more thorough and practical, only if a suitable vessel is placed at the disposal of the Fisheries Training Institute. The Committee on Fisheries have proposed that "Sutherland," a 25-ton fishing boat built on Scotch type design, should be transferred to the Fisheries Training Institute. The students went on excursion to Tanur from 15th to 21st December 1928, to Malpe from 22nd to 31st December 1928, to the Chaliyam (Cannery) on 8th March 1929 and to Taliparamba (Agricultural Farm) on 2nd June 1929.

Dr. V. K. Vydier's offer to teach "Sanitation and First Aid" to students in the Fisheries Training Institute without any remuneration was accepted by Government.

The Literary Society attached to the Institute worked well throughout the year. The final meeting of the society for the year was held on 23rd March 1929, under the presidency of Rev. Dr. A. Munch, PH.D., of the Malabar Christian College. The Fisheries Training Institute Co-operative Society had, according to the last audit report, 35 members with a paid-up share capital of Rs. 765. It has a reserve fund of Rs. 131-10-0 and made a net profit of Rs. 140-13-0. The Games Club was also active throughout the year, but owing to the restriction now imposed on the age of competitors in the District Inter-school Sports, the pupil-teachers could not participate in them.

From January forwards, at the instance of the Headmaster, the students of the Fisheries Training Institute have been publishing a monthly journal in Malayalam called the "Fisheries Training Institute Magazine." Permission to publish this journal was granted in G.O. Mis. No. 1538, dated 13th September 1928. The articles are mainly written by the students and the staff and the old students of the Fisheries Training Institute. But, Mr. S. T. Moses, M.A., of the Research Station, West Hill, Mr. K. Gopalan Nayar, Sub-Inspector, and others also contribute occasionally interesting articles. The subjects dealt with are mostly on the

social and economic condition of the fisherfolk, the means of improving these, temperance propaganda, natural history, elementary education and co-operation. The magazine circulates not only among the students and ex-students of the Institute, but also among the educated members of the fishing community.

Visitors.—Besides departmental officers, the Fisheries Training Institute was visited during the year by Mr. Finlow, Director of Agriculture, Bengal, and Mr. S. Kasturiranga Ayyar, Senior Dewan Peishkar of the Cochin State.

2. VILLAGE SCHOOLS.—The total number of schools at the beginning of the year including the Vellayil Model School attached to the Fisheries Training Institute was 37. Of these 4 were night schools.

The Local Board school at Kirimanjeshwar which the Coondapur Taluk Board had decided to abolish was taken over by the Fisheries Department with effect from 13th September 1928. The private schools at Udayavar, Kaup and Bangre-Manjeshwar were also taken over by the Fisheries Department during the year, on 23rd July 1928, 1st April 1929 and 13th May 1929, respectively. Thus, at the end of the year 1928-29, there were 41 schools under the Fisheries Department. At the beginning of the year, the total number of pupils reading in the various schools was 3,000, of which 868 were girls. The number rose during the year to 3,443 consisting of 2,368 boys and 1,075 girls. The total number of teachers employed was 121 against 107 at the end of the previous year. Of these 121, 75 had received training at the Fisheries Training Institute, 34 were trained teachers from ordinary training schools and 12 untrained.

A statement showing the name and location of fisheries schools, the strength of each class in the several schools, the number of pupils that passed out of each school, the number of teachers employed with their qualification and the cost of upkeep of each school is appended as required in G.O. No. 1895, Development, dated 8th November 1928 (Appendix VII). The fisherfolk are slowly but steadily realizing the importance of education and are resorting in increasing numbers to the schools.

An unsatisfactory feature as compared with South Kanara is the bad accommodation of several of the schools in Malabar. The worst school shed is that of the Parappanangadi Day and Night school, an important school situated in a village which is one of the most educationally backward in Malabar. The sanction to build

a better shed has been obtained but the site is yet under acquisition. The Pudiappa school shed built by the local villagers is also a very unsuitable building. A new shed has been sanctioned by the Government, but the site is still under acquisition. The present shed has since been purchased by the Department and the site taken over on rent pending its acquisition. The new shed will be built during the Christmas vacation as, otherwise, the school will have to cease working while the old shed is being demolished and the new shed built on its site. The Chaliyam school is also located in a shed which has been condemned. A suitable masonry building has been sanctioned but the land has not yet been acquired. The construction of the Kuriyadi fisheries school building sanctioned by the Government long ago, is held up owing to the delay in getting possession of the site. The present school shed will accommodate 60 students, but 120 students attend the school. One of the villagers has been persuaded to build tentatively a temporary shed near the existing one for the 60 additional children. The school buildings at Kadavanad, Mannalamkunnu, Kundazhiyur, Nattika and Palapatty are temporary sheds which will eventually have to be made permanent. The owner of Kundazhiyur school building undertook to provide a masonry building three years ago but has not yet fulfilled his promise. The question of providing a permanent building for the school at Palapatty will be taken up when orders for its permanent retention have been received.

In the South Kanara district, the only school that exists for Mopla fishermen is the one at Kumbla. It was started in March 1925 with only one pupil on the roll; the present strength is 66 of whom 18 are girls. The construction of a permanent building for housing the school is under consideration. Two permanent buildings were constructed by the fishermen of Kodi and Hoode for their respective schools. A permanent building for the Udayavar school is under construction. Only three schools in South Kanara, viz., Kumbla, Kaup and Baidoor are housed in temporary sheds. The Bangaramanjeshwar school is conducted in the upstairs of a shop but there is hardly room for the increasing number of children attending the school. The present number is 71. The Sree Gnanodaya school has a strength of 90 pupils and is located in the Sree Gnanodaya Mandir, but the accommodation is insufficient.

Proposals have been submitted for the extension of the school buildings at Kottakadapuram, Blangad and Palapatti. These

buildings are owned by private individuals who have been asked to carry out the necessary extensions. The Talikulam school building owned by villagers also requires an extension. But the owners are awaiting the sanction of a revised rate of rent for the masonry building constructed in the place of an old temporary shed. Plans and estimates for extending the building at Kaipamangalam are under preparation.

The fishermen of Hungarcutta submitted a petition in 1928 asking for the opening of a school in their village, but as the Educational authorities objected, a school was not started. Recently they have started a school and submitted a petition praying that the Fisheries Department should take it over. The matter is under correspondence with the District Educational Officer. The Kharvis and Mogayars of Navunda in the Coondapur taluk have also petitioned the Department asking for the opening of a Fisheries school.

The two day-schools opened last year at Kadavanad and Palapatty show considerable improvement. The two other temporary schools at Mannalamkunnu and Veliangode also show improvement though not to the same extent. Both the latter schools are solely attended by Muhammadan fisher-boys and girls and the reason for their slow progress is the complete illiteracy of the parents. The permanent day-schools showed satisfactory progress. The best of them are Kaipamangalam, Talikulam and Kottakadapuram. There was a decrease in the strength of Kavvayi school. About 15 children who used to come to the school from the other side of the river have joined the new school opened recently there near their village.

The night schools at Chaliyam and Kadalundi are not working satisfactorily. The night school has become so bad that proposals are under consideration to convert it into a day-school and transfer it to another place where the Educational Department considers that it will be a real necessity.

The "*Mundus*" (a simple appliance for thread-twisting) supplied to South Kanara schools as an aid to technical instruction have not been put into use as the teachers are reported not to know how to work them properly. The Inspector of Fisheries has been asked to go to Calicut to study its working so that he may instruct the teachers how to handle them properly.

3. OTHER EDUCATIONAL WORK—*Scouts training*.—The scout movement in the Fisheries Training Institute received a set-back by the transfer from the Institute of the third assistant who was an

enthusiastic scout-master. The loss was made good only towards the end of the year when the second assistant, Mr. Elias, underwent the scout-master's training (25th April to 6th May 1929). The Fisheries Training Institute Rovers attended the District Scout Rally held at Cannanore on 20th January 1929. Two of the final-year students also underwent the cub-masters training in the training camp held at Chala near Cannanore.

Mr. Kunhianandan, while he was the scout-master of the Fisheries Training Institute troupe, had translated several extracts from Lord Baden Powell's book on "Scouting for Boys" in Malayalam, for the use of the scouts who do not know English. His notes have now been published in a book of nearly 600 pages by the Kanarese Mission Book Depot with the permission of Lord Powell. It is gratifying to note that the first book on scouting in Malayalam should have been produced by a member of the Fisheries Department.

Student's training.—Mr. M. S. Golwalker, M.Sc., of the Benares University who came to me for training in Embryology worked at the laboratory attached to the Marine Aquarium for about eight months under the supervision of Dr. D. W. Devanesan.

Mr. Velu, a Hindu pupil teacher belonging to the fishing community deputed by the Travancore Government is undergoing training at the Fisheries Training Institute, Calicut.

Krusadai Biological Station.—A party of zoology students with Dr. Gravely worked at the station for about a week in September for the collection and study of the local marine fauna. A batch of students from the Central College, Bangalore, visited the station for the same purpose in October.

Aquarium.—The number of visitors for the year was 96,042 as against 104,401, and the number of visitors admitted at the 4 annas rate in the evenings and on Fridays was 5,903 against 9,409 in the previous year. The Aquarium was specially reserved for purdah parties of Rajas and zamindars at an enhanced rate of Re. 1 per head on three occasions against nine in the previous year. The record attendance for the year was as usual on "Kannupongal" day, when 3,660 visited the Aquarium, i.e., 100 less than in 1927-28.

The daily average attendance for the year was 263 as against 286 of last year. This was due to the fall in the number of visitors on account of heavy rain during the Christmas and New Year

season and on the Vaikunda Duvadasi day, on which 142 visited the Aquarium as against thousands in the previous years. 909 students from different schools and colleges accompanied by their teachers visited the Aquarium for demonstration purposes. Out of this number 366 being students of the Madras Corporation schools were admitted free as per G.O. No. 468, Development, dated 16th March 1929, and the rest at half rates as usual.

Among the noteworthy visitors this year were Miss Edda Mussolini, Senator Lante, Col. M. Caccia, Sir John Bland Suttin, F.Z.S., of the London Aquarium, Sir P. S. and Lady Sivaswami Ayyar, Dr. R. S. Finlow, Director of Agriculture, Bengal, His Exalted Highness the Nizam and Party, Sir Arthur and Lady Froom, Lady Robb, London, and Her Highness the Maharani of Gwalior.

On account of the fall in attendance on the last Monday of every month set apart for Gosha ladies, the Aquarium is reserved for Purdah ladies since May 1929 from 7 a.m. to 12 noon only, instead of between 7 a.m. and 5-30 p.m. Owing to a rush of ordinary visitors during Christmas week, the Aquarium will be open to the general public on the last Monday in December as on ordinary days. These changes have been duly advertised in the important local dailies.

Improvements.—The extension to the Aquarium was completed but aeration tubes, lights and fans have not been fitted yet in the four newly constructed tanks. One more of the two large Rock Cods (*Epinephelus pantherinus*) in tank No. 10 died on 3rd May 1929 apparently due to the insufficient space in the tank. They were objects of great interest to all visitors not only on account of the large size to which they had attained but also because of their age. They had lived in the Aquarium from the very beginning, that is to say for a period covering nearly 20 years. Such a long span of life in captivity is exceptional among the exhibits.

Necessary estimate has been called for from the Public Works Department for replacing the two existing iron overhead reservoirs supplying water to the tanks in the Aquarium by concrete cement ones for the following reasons:—

(1) they are too small to provide sufficient water for the additional tanks newly constructed;

(2) the iron reservoirs which are exposed to the sun cause rapid changes in the temperature of sea-water which is undesirable;

(3) they render the water unwholesome by the formation of rust as a result of which, delicate organisms are affected;

(4) the life of an iron reservoir is short on account of the rust caused by the saline sea breeze outside and sea water inside; and

(5) the height of the reservoirs do not give sufficient pressure for the automatic aeration of water in the Aquarium tanks by the inflow pipes. This system of aeration if introduced will reduce the pumping charges.

During the year one large hawksbill turtle *Chelone imbricata* from Krusadai Island was exhibited for the first time. There was difficulty in finding out the proper food for feeding the animal. The turtle would not touch any of the animal food given to others in the tanks and starved for days. After continued experiments at feeding with different kinds of food-stuffs, it was discovered that the turtle was partial to a diet of sea-weeds (*Grateloupia cuneifolia* and *Ceranium miniatum*). With an abundant supply of this kind of food, from the harbour the turtle is now thriving well.

Several exhibits required for the Marine Aquarium are supplied free from the Madras Harbour by the contractors appointed for the purpose. The contractors have been granted four daily passes per month by the Port authorities for fishing within the harbour limits. Fish other than those required as exhibits are utilised by the contractors and this is the only compensation they have for the labour of netting, collecting exhibits and transporting them alive from the harbour to the Aquarium. Now that additional tanks have been constructed in the Aquarium, the supply of exhibits hitherto collected on the four daily passes is inadequate. The Port authorities have, therefore, been addressed for increasing the number of daily passes from four to eight per month.

B.—Co-operative Societies.

1. WEST COAST.—There were nineteen fishermen co-operative societies in the South Kanara District as in the previous year. The progress of fishermen societies in South Kanara continues to be unsatisfactory. Only fourteen societies have had some transactions during the year. The other five societies, Kasargod Bovis, Balla Aryajana, Gangoli Kharvis, Coondapur Kharvis and Upper Mogayars have had no transactions during the year. The books of the Kasargod Bovis society were not available for inspection.

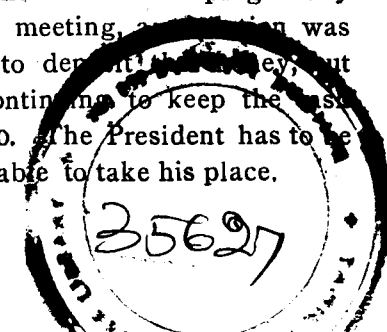
Both the President and the Secretary of the society are reported to be living away from Kasaragod. The Adakathbail Aryajana Co-operative Society which was the best among the larger societies of fishermen, has had very little transactions during the year under report. The transactions consist of an issue of a loan of Rs. 75 and recovery of loans to the extent of Rs. 654. The partial inactivity of the society during the year is attributed to a criminal case between the Adakathbail fishermen and the Kottikulam fishermen. The Kunhangad fishermen society seems to have done fairly good work during the year. But the time-barred loans amount to Rs. 562. Arrangements are being made to recover these loans.

At the instance of the Registrar of Co-operative Societies, two Sub-Inspectors of Fisheries were trained at the Co-operative training classes at Coimbatore with the sanction of Government. One of these Sub-Inspectors was given the work of reviving the fishermen societies in the South Kanara District. He visited all the fishermen societies during May and June 1929, but his services could not be indefinitely spared, and therefore he had to be recalled towards the close of the year. Unless the department gets additional staff for doing co-operative work, intensive supervision of fishermen societies is impossible and the societies are not likely to improve. In paragraph II of G.O. No. 1895, Development, dated 8th November 1928, the Government desired the Registrar of Co-operative Societies to advise them on the steps that should be taken to improve the fishermen co-operative societies. The Registrar of Co-operative Societies has submitted his report to Government.

The economic demoralization caused by the scarcity of fish has prevented progress of co-operation in Malabar. If the season had been normal, considerable improvement would have been effected. Nevertheless, the condition of most of the societies was comparatively satisfactory. The Kadalundi, Pudiayangadi, Kollam, Meladi and Kuriyadi societies have shown satisfactory work. The Kollam society has been taken in hand by the Sub-Inspector of the Quilandy yard and already signs of improvement are evident. The societies at Vekkode, Perinhanam, Kaipamangalam and Pallipuram had some transactions. The new society at Vekkode was very active. The members who are mostly curers of the Vekkode yard show great enthusiasm in working the society. The Vadana-palli fishermen society remitted during the year a sum of Rs. 59-5-7

to the District Bank towards the loan taken by it. The Talikulam society remitted Rs. 85 to the Bank towards its loan, disbursed Rs. 83 as loans to members and received a deposit of Rs. 50.

The Kadalundi society had been recommended for liquidation by the Inspector of Co-operative Societies, but a respite of six months was obtained within which the Inspector of Fisheries hopes to revive the society. If the fishing improves, the society is likely to work satisfactorily. But unfortunately the season has continued bad to the end. The only condition that the members require for making a fresh start is that the heavy accumulated interest on old loans should be excused and written off. Some difficulty is experienced in regard to the Pudiangadi society as there is no local fisheries officer who would pay constant attention to it. The Meladi fish curers' society has had a misfortune. The entire funds of the society were misappropriated by the Secretary who died soon after. The father of the deceased has executed a promissory note, to repay the amount to the society, and a partial payment has already been made. The task of reviving the Kuriyadi society is a difficult one. The scarcity of fish and the consequent distress is urged as causes preventing the repayment of loans. As the reasons are genuine, the Department was averse to advising the office-bearers to take coercive action to effect recoveries. A good fishing season would justify such measures, but no compulsion is necessary if the fishermen have money to pay their debts. It is expected that the condition of some of the societies will show further improvement next year as fisheries officers are likely to be appointed as office-bearers in some of them. The Pallipuram society, which was the best of fishermen societies in the Ponnani Taluk till some months ago, has become unsatisfactory owing to communal feuds among the members. The local Fisheries Inspector has effected a compromise recently. Communal dissensions still prevail among the members of the Kundazhiyur, Kottakadapuram, Arekeri, Bhagavathi and Puthenkadapuram societies and these societies are practically moribund. The President of the Puthenkadapuram society was in the habit of keeping heavy cash balances. At a general body meeting, a resolution was passed three years ago asking him to deposit the money, but nevertheless the President is still continuing to keep the cash balance which amounts to Rs. 156-4-0. The President has to be changed, but no other member is available to take his place.



The "chit fund" or "kuri system" prevailing in the Ponnāni Taluk is mainly responsible for the bad working of co-operative societies in that section.

I regret to report that the only society not susceptible to the beneficent influence of the department is the Thayyil Aryajana Co-operative Society, Cannanore, presided over by Mr. M. C. Govindan. He is a person of some importance in the village and was also an Honorary Assistant Registrar for some time. He is reported to have persistently refused to show the books of the society to fishery officers. The matter has been reported to the Registrar of Co-operative Societies.

The transactions of fishermen co-operative societies are given below :—

Particulars.	1927-28.	1928-29.
Male members	2,361	2,440
Female members	290	212
Total number of members	2,651	2,652
	RS.	RS.
Paid-up share capital	58,686	52,599
Total of loans disbursed	83,209	89,649
Total of loans for payment of prior debts	41,591	47,438
Total of loans for industrial purposes	23,322	21,320
Total of loans for other purposes	18,306	20,891
Total of loans received from Central Banks	17,908	14,532

Industrial societies.—As required in Government Memorandum No. 2302-II/29-I, dated 12th August 1929, a detailed report on the working, since their inception up to the end of June 1929, of the two co-operative societies which have been given loans by Government for the purchase of nets, boats and other accessories is given below :—

The two new societies were started on the 10th and 11th March 1927, respectively, at Blangad and Palapatti with the aid of the loan of Rs. 1,500 granted to each society by Government for the purchase of boats and nets. The number of members of the two societies now stands at 17 and 21, respectively; the number of shares is 36 and 85 and the amount of paid-up share capital Rs. 133 and Rs. 154-8-0, respectively. In both the societies, catches are sold and a living wage of eight annas is paid to each member of the crew, provided the sale proceeds are sufficiently large. If, however, the sale proceeds fall below the amount required to pay

the living wage, the sale proceeds are equally divided among the members. The President and the Secretary of the Blangad society do not go out to sea but they control the working of the society and therefore, after paying the living wage of 8 annas to the members of the crew and crediting half the balance to the society, they take a share in the distribution of the remainder along with the members of the crew. Sometimes, both at Blangad and at Palapatti when the members available to go to sea fall short of the required number, non-members are taken as workers; they are also given the living wage of eight annas and a share of the sale proceeds; but they are not entitled to other privileges of the members, e.g., they get neither dividend nor profit. On some occasions, coolies are engaged to haul up the boat and to do other menial work and they are paid wages separately for it; their wages also come out of the share remaining to be distributed to members after payment of the living wage and the share due to the society. In Palapatti, the society has admitted members who do not go out to sea and therefore get no share of the sale proceeds. The object of taking them was to enable the society to get a loan from the District Co-operative Bank to be distributed to members, who required the loan, during the non-fishing months to meet the cost of the bare necessities of life.

Although the societies were registered in March 1927, they really commenced work on 11th June 1927 and 16th July 1927, respectively. The number of days on which the societies sent their boats to sea, the quantity of fish captured and their value and distribution are given in Appendix VIII.

From the figures given there, it will be seen that the charge, that benefit of the working of the societies goes primarily to the President and the Secretary of the societies, is unfounded. It is only in Blangad that the President and the Secretary do not go out to sea, but for the work that they do ashore such as arranging for sending men to the sea, for the sale of the fish caught and for the distribution of the sale proceeds, they take a nominal share of the sale proceeds as their wages. Of the sum of over Rs. 4,000 realized by the sale of fish, the President and the Secretary of the Blangad Society took but Rs. 70-8-0. The fishermen who went out to sea got nearly Rs. 2,800 and the society's share was Rs. 1,161-7-0. In Palapatti the sale proceeds totalled Rs. 3,363-4-0. The society's share was Rs. 984-5-6. Over Rs. 2,100 was distributed as living wage and share of the members. Non-members got over Rs. 200 as

their share of the sale proceeds besides the living wage because there are more non-members going out to sea at Palapatti than at Blangad. The Palapatti society is not willing to admit these men as members of the society. Those who joined the society when it was started have put their share capital in it and have regularly paid a share of the catches towards the funds of the society and therefore they have an undoubted right to the properties belonging to the society. If new members are admitted later, the contribution of these new members to the society will be much less than the contribution of those who joined the society originally. It is therefore that the old members object to taking in new members. The question will have to be gone into later, a decision arrived at and the bye-laws suitably altered. The loan due to Government is repayable during the current fisheries year and the matter may be postponed for consideration till the loan is discharged.

The amount that ought to have been repaid by each society towards the loan of Rs. 1,500 borrowed from Government was Rs. 650 in 1927-28 and Rs. 500 in 1928-29. The Blangad society paid Rs. 575 towards the loan in 1927-28 and Rs. 89-9-6 towards interest. The Palapatti society was able to pay only Rs. 500 towards the loan that year and Rs. 101-15-0 towards interest. Of the Rs. 500 borrowed by the Palapatti society from the District Co-operative Bank for purchasing food-stuffs during the slack season, only Rs. 200 was paid in 1927-28 and nothing was paid in 1928-29. The Blangad society was able to pay only Rs. 425 in 1928-29 besides a sum of Rs. 71-5-2 towards interest. It has yet to pay Rs. 500 towards the Government loan of Rs. 1,500. The Palapatti society remitted in 1928-29 Rs. 350 towards principal and Rs. 78-10-7 towards interest and has yet to pay Rs. 650. These societies would have been able to pay the full sum stipulated towards the Government loan, had it not been for a bad fishing season and the utilization of part of the money during the year for the renewal of nets, which had become unserviceable the previous year owing to constant use in capturing heavy shoals of mackerel. The practical experience gained in working these societies is invaluable. We are able to gauge what profits the fishermen are actually able to make and how far their economic condition is affected by a precarious industry. Experience also teaches us that the period of repayment should not be so short as three years as the instalments fixed make no allowance for the society

to accumulate funds for such purposes as repair and renewal of nets and the purchase of implements. For the organization of new societies on similar lines in future, the experience so far gained is a great asset. The intensive supervision that was exercised by the officers of the Fisheries Department over the working of these two societies is largely responsible for their success. They were constantly inspected by the Sub-Inspector and the Inspector of Fisheries and once in six months by the Assistant Director (Coast). The Inspectors of Co-operative Societies also did their periodical inspection.

The Deputy Registrar of Co-operative Societies not only visited Blangad and Palapatti before the societies were started and gave the members instructions as to their proper working, but also visited Blangad immediately after the close of the fisheries year and went through the books and accounts of the societies very carefully. He was so pleased with the working of the societies that he suggested the desirability of starting similar societies elsewhere both in Malabar and in the South Kanara districts. If we are able to get members to work in the societies who are not indebted to capitalists and if the period of repayment of Government loan is extended to five or six years, instead of three years, the successful working of the societies seems assured. For Rampininet operations, however, the loans that will have to be paid to the societies will be much larger, but the repayment will be in bigger instalments and the period of repayment need not be made longer. The question where similar societies can be started will be investigated by the Assistant Director (Coast) during the current year in consultation with the Deputy Registrar of Co-operative Societies.

2. INLAND.—The Karunthattangudi Society of Tanjore and the Muhammadan Fishermen Society of Trichinopoly referred to in the last annual report were given fishery leases during the year and they are working satisfactorily. The Kundukur fishermen society in Nellore District was registered in August 1928 and began work in June 1929. Through the kindness of the Deputy Registrar of Co-operative Societies, Bellary, a new society was started in the Kurnool District for the fishermen of Mandalam village; another for the fishermen of Amalapuram is in process of formation. The former was given the lease of the Tangadancha tank of the Kurnool-Cuddapah canal, while the latter which wanted the Siddapuram tank fishery could not take it owing to too much water in the tank

and the consequent impossibility of fishing it during the year. Their claim will be considered during the fishery sales.

The fishermen of Conjeeveram and Walajabad have petitioned for the organization of societies for their community. The matter is under correspondence with the Assistant Registrar of Co-operative Societies, Conjeeveram. The men are keen and arrangements will be made to form societies and lease out to them some local provincialized fishery of the Conjeeveram taluk.

As on the West Coast, the officers of the Co-operative Department find it difficult to form fishermen societies and supervise them for want of sufficient staff under them. The Deputy Registrar of Co-operative Societies, Trichinopoly and Bezwada, both expressed their difficulty and they are of opinion that a special Fishery Officer (to whom they promise all help) should be deputed to supervise the societies. The formation of societies for fisherman does not appear to be very difficult when once the men show their willingness, but in the absence of efficient supervision, at least in their incipient stage, no permanent good can result. Unless the accounts are closely scrutinized at constant intervals and the advantage of thrift is brought home to the members by constant advice and persuasion, the fishermen seem incapable of laying by anything. The Committee on Co-operation and Fisheries have both recommended the appointment of a special staff of Co-operative Inspectors under the Fisheries Department for this purpose both on the East and West Coasts. In Appendix V are given the provincialized fisheries leased out to the various fishermen co-operative societies together with the lease period and the amount.

C.—Other Socio-economic Work.

WEST COAST.—All the associations, the activities of which were reported in the previous report, are continuing their work. Now that the Government have sanctioned a scheme of temperance work, it is expected that the Sree Gnanodaya Temperance Association will be able to quicken its activities. The anniversary meeting of this association was held on 14th April 1929 and was presided over by Mr. N. N. Suvarna, B.A., B.L., a leading lawyer at Mangalore who is well known in co-operative circles. The Inspector of Fisheries, Mangalore, presided over a similar function at Bombay on 16th April 1929 where the fishermen of South Kanara who are employed and residing at Bombay have started an association called "The Mogaveera Clerk Union" and the "Vyasthapaka Mandali". This is an association of 27 years standing. It

celebrated its silver Jubilee in 1927. The object of the society is the social amelioration of the community. It has also funds to grant scholarships for deserving students of the community. The association is running a night school for the South Kanara residents in Bombay where instruction up to III form standard is imparted. Commercial subjects also are taught in that school.

Useful social service work was done in Malabar by the officers of the Fisheries Department during the year. The Vellayil and South Beach welfare centres in which fishery officers are the leading spirits continued to do invaluable work. There was a daily average attendance of 165 children at both the centres. Medical treatment was given gratis to nearly 2,000 cases, lantern lectures on hookworm, drink and tobacco were given in the open air and on the road side. In one instance, after a lecture on nicotine danger, there was a bonfire of cigars and cigarettes and a large number of audience gave up using tobacco in any form thereafter. Free medical treatment once a week was also given at Pudiappa village to the local fishermen. A private night school was started by certain fishery officers at Calicut. A reading room was also opened at the Vellayil fishing village.

In the Thalayi fishing village, the local Sub-Inspector of Fisheries did a good deal of educative and social work. He assembled the villagers on the beach on bright evenings and read out to them useful and informative selections from Malayalam literature, translations from English works on sea and its products, story of the stars, alcohol and the human system, etc. Malayalam newspapers and Magazines were also read out to the people. The local fishermen co-operative society has made arrangements to start a reading room and a circulating library. A prayer hall is being built and a party of young men are being trained in western instrumental music to enable them to take part in marriage ceremonies and similar festive occasions. The Sub-Inspector is able to report that there are only about a dozen old men and four men below 40 years who are addicted to drink in this fishing village.

The Aryanjana Social Service League under the guidance of Mr. K. Sukumaran of the Fisheries Training Institute staff was very active during the year and did useful work improving the social and economic condition of fishermen.

In the Malabar District the failure of the fishing season had deepened the economic depression of the fishing population. Although there was no starvation or acute distress, poverty and

indebtedness continued. The barren months were tided over by reckless borrowing and pledging or sale of household utensils and goods. The economic condition of the fisherfolk in the Ponnani taluk was not, however, so bad as in the rest of Malabar. Towards the middle of the fishing season, shoals of fish began to appear in this section. The sudden improvement in fishing that occurred during the middle of the season was responsible for good prices both for raw and cured fish. The fishermen of the Ponnani taluk, unlike those in other places, work in coconut plantations and in garden cultivation. Hence they did not feel so much the distress caused by the paucity of catches.

A fisherman of Chowghat passed the B.A. (Hons.) examination during the year. He is the first among the fishermen of the Ponnani taluk to secure that degree. Two other fisher-boys are prosecuting their studies in the B.A., and Intermediate classes with help from the Labour Department.

The relations between the officers of the department and the fishermen are becoming more and more cordial and intimate and except for a few educated fishermen who, to serve their own selfish interests, are fomenting discontent, the fishermen as a class appreciate the efforts of the department to improve their moral and material well-being.

EAST COAST.—The Assistant Director, Pearl and Chank Fisheries, is also doing socio-economic work among the fishermen in his jurisdiction. There was a dispute in Tuticorin between the vala-valai fishermen and the hook-line fishermen as to the place of landing the catches. Both the fishermen appealed to the Assistant Director to settle the dispute. A meeting was called for and the matter amicably settled. At Pinnakayal, the co-operative society started at the instance of the Assistant Director is working fairly satisfactorily.

All the divers employed under the Assistant Director, Pearl and Chank Fisheries, started a "Mahamai" (common fund) and contributed towards it at one full-sized chank per working day per diver. This amounted to Rs. 500 at the end of the season. The money is meant to be used for the common good of the divers, such as, sickness, help to invalidated divers, funeral expenses, etc. A committee was formed consisting of a president, secretary and treasurer and an executive committee of members amongst themselves. Regular meetings were held and proceedings

recorded. As usual, a coffee stall was opened and coffee supplied to divers at cost price as soon as they landed ashore. Though this could not stop drinking altogether, it did help the men to be temperate.

8. PROPAGANDA.

A.—Fisheries Exhibitions.

With a view to affording facilities for the "study of animal life" to the secondary school students, a set of Biological specimens in fluid prepared in the best museum style prepared by the Biological Specimen Supply Section was exhibited at the Provincial Educational Conference held at Chidambaram in December 1928.

The Inland Section participated in the following exhibitions during the year and several fishery appliances and live fish specimens were exhibited :—

- (1) the Park Fair Exhibition held in December; and
- (2) the West Godavari Exhibition at Bhimadolu held in June, during the District Co-operative Conference.

B.—Miscellaneous.

Advice.—Mr. W. Wise of Bombay was furnished with particulars about fishes suitable for stocking rivers and reservoirs.

Mr. E. N. House of the Puthuthottam estate, Anamalais was again supplied with 10 dozen Gourami fingerlings at a total cost of Rs. 170 for breeding, and the fish are reported to be thriving well.

The Honorary Secretary, Anamalais Game and Fishing Association, wanted the fingerlings of *Megalops*, a well-known sporting fish, for introduction on the Anamalais. This is a predaceous species which is not regularly bred in the fish farm. With difficulty 162 fingerlings were secured from brackish water in Madras and conditioned in a special way gradually varying the salinity of the water to fresh water and sent to the hills. The acclimatization, conditioning and transport was a great success attended with no casualty, notwithstanding the inclement weather which prevailed on the hills at the time. Seeing the fortunate results attending the first attempt, the Honorary Secretary has placed a second order for 2,000 *Megalops* which will be supplied this year.

Two wells in the compound of the Agricultural College, Coimbatore, were stocked again with 200 *Etiropus* and 1,000 *Aplocheilus*. The fish are reported to be thriving well.

Two thousand *Etiropus* were sent to the Deputy Chief Engineer, Loco Workshops, Freelandgunj, Panch Mahal District, Bombay Presidency. They were specially conditioned to stand the long journey of several days and sent in a special wagon in charge of a Fieldman. Up to Bombay, the fish seem to have travelled well, but during the journey from Bombay to Dohad, the weather became so cold that the unexpected fall in the temperature coupled with the jolts in the journey resulted in heavy mortality. Only about 100 fish could be released alive.

Fishery rights.—Government in their order No. 1632-I, dated 3rd July 1928, extended the application of G.O. No. 100-I, dated 20th February 1924, to the fisheries of new river canals and channels under construction or to be constructed by the Public Works Department.

Nilgiri Fisheries.—The Nilgiris Game Association, without reference to this department emptied the avalanche trout hatchery of the stock of breeders, apparently under the mistaken impression that the fish were too old. Stock trout often suffer from fungus disease in confinement, and the Association do not appear to have exercised the necessary care in turning out the hatchery stock into the streams. In consequence, anglers have complained of diseased fish in some of the streams, as well as the dearth of fish, directly due to the ill-advised closure of the hatchery. In view of the rapid decline of trout, the Association have resolved to re-start the hatchery this year with ova from England or New Zealand. Mahseer fishing in the closed area of the Bhavani as usual attracted a few fishermen. The avalanche trout hatchery which was in disrepair after the handing over of the same to the Nilgiris Game Association was renewed and placed in working condition at the request of the Nilgiris Game Association, in expectation of the arrival of trout ova from abroad.

Game protection.—Two cases of poaching were prosecuted and the accused were convicted and fined. In the leased area of the Bhavani, the President of the Fishermen Co-operative Society of Mettupalaiyam, who holds the lease was caught dynamiting fish. The accused were convicted by the Local Sub-Magistrate to pay a fine of Rs. 10, in default, simple imprisonment for two weeks. Further investigation and enquiry is proceeding.

9. FISH INDUSTRIES.

A.—At the Chaliyam Cannery.

As in the last three years, the Cannery continued closed with manufacture suspended.

The year opened with a balance of 3,162 tins of canned fish; 285 tins were taken to stock, 3,188 tins sold and 10 given away as samples. The number left at the close of the year was 249 tins.

The stocks of firewood and salt were sold; but the other stores, viz., tin plates, oil, empty containers, etc., could not be disposed of for want of reasonable offers.

B.—At the Tanur Experimental Station.

Purchase and manufacture.—20,499 lb. of fresh fish for curing was purchased for Rs. 684-15-10 (at an average price of 6'41 pies per lb.) against 81,675 lb. for Rs. 2,111-14-11 (at an average price of 4'96 pies per lb.) in the previous year. Of this 18,549 lb. were prawns, 1,505 lb. were podimeen and the remaining 445 lb. big fishes of different varieties. The difference in the rates paid and purchases made during the year is due to the season being poor. The total output for the year was 6,019¼ lb. cured fish, 3,774¾ lb. of fish meal and 60 lb. of manure valued at Rs. 1,337-15-6. No fish was purchased this year for making fish meal or fish-oil. 3,774¾ lb. of fish meal shown as output for the year was manufactured out of prawn shells and an old stock of cured "Podimeen."

Sales.—During the year 11,408½ lb. of cured fish, 13,437 lb. of fish meal, 824 lb. of manure and 784 lb. of fish-oil and other miscellaneous articles were sold for Rs. 7,745-5-11. As usual the demand for semi-dried prawns was greater than the output. Private merchants do not take the trouble to manufacture semi-dried prawns as there does not seem to be a ready sale for them locally. The demand for other varieties, viz., mackerel, seer, shark, etc., was poor due to the inability of the station to undertake regular supplies. For the second class or cheaper variety of fish meal, there was a fairly good demand; but for want of stock many orders could not be complied with. Poultry breeders are not in favour of using mackerel meal on account of its higher price (4 annas a lb.). In future the manufacture of mackerel meal will have to be regulated according to the demand. The Hosur Cattle Farm is regularly taking about 600 to 700 lb. of mackerel meal a month and if this farm continues to take this quantity, the station can

ADMINISTRATION REPORT OF THE

safely manufacture about 10,000 lb. a year if mackerel is available and cheap. The sale of fish meal has shown an increase this year by about 2,000 lb. There is every prospect of getting a good market for this in India if the price is cut down to about $1\frac{1}{2}$ annas a lb. which the present working cost will not permit. The proposal to introduce machinery for mass production when alone prices can be lowered and the great demand for tons at a time from outside met should await the appointment of a Fisheries Chemist and Engineer. 224 lb. of refined and 560 lb. of unrefined fish-oil purchased from the Kerala Soap Institute, Calicut, was disposed of to a Boot and Shoe Factory at Cawnpore and various Hunt Clubs after further refinement at the station. There were constant demands throughout the year for fish-oil and semi-dried prawns, but for want of stock many customers had to be disappointed.

Stock.—The year closed with a stock of 12 lb. cured fish and $5,000\frac{3}{4}$ lb. of fish meal of all sorts.

Factors limiting manufacture.—The fishing season was a very poor one. Sardines, the poor man's food, were conspicuous by their absence. They appeared only once. Mackerel which was available in large quantities during the last season was scarce in Malabar this year. The catches of prawns and big fishes were also poor. Big fishes make up about 20 per cent of the total catches; prawns about $12\frac{1}{2}$ per cent, mackerel another $12\frac{1}{2}$ per cent and miscellaneous small fishes the remaining 55 per cent. At Tanur for a fishing area of about 20 square miles and 150 pairs of boats and gear, the total catches for the year was roughly estimated at two lakhs of maunds valued at three lakhs of rupees for the whole year. Taking the population of fishermen at ten thousand, the average earnings per head per mensem comes to only Rs. 2-8-0 which is very poor. Poverty and distress was acute.

General.—The station worked at a loss of Rs. 2,447-1-6. The loss is mainly due to poor manufacture. The entire loss, however, is not really debitable to the Tanur station. The travelling allowance paid to the Research Assistant and the mechanic for their visits to the Cannery is not debitable to Tanur as this was due to the Research Assistant having charge of the Cannery. As recommended by Messrs. Fraser & Ross in 1924-25, the assets of the station should be revalued at an early opportunity. Slight alterations in the system of accounting also seem necessary.

The members of the Committee on Fisheries appointed by Government visited the station in July 1928.

C.—On board the trawler.

The trawler did the greater part of the experimental fishing at nights. This was both beneficial and convenient. It is well known that hauls by night yield more. The fish caught at night are not likely to taint in the absence of cold storage so rapidly as by day; they can be conveniently sent ashore early morning and sold. In the absence of harbours at most of the ports of call, there are no facilities for the trawler to approach the shore. For instance at Calicut, the trawler has to lie at anchor about 4 miles off the shore and at Tuticorin at 7 miles distance. For want of a refrigerator on board the trawler, quickness in landing the fish captured is an important factor for good sales. At present, much time is lost in hiring and employing private boats (dhonies) for landing the fish. As the trawler at present is engaged purely in research investigation and survey and not on experiments relating to preservation, transport or the best methods of marketing catches, she is not worked with the aim either of catching large quantities of fish when they are available or landing them at quick intervals and at suitable places for the market. Such fish as are in good condition whenever the trawler reaches a port are landed and sold in auction; otherwise they are cured on board for sale later. The trawler was engaged in fishing on 55 days. The average duration of a haul works to 3½ hours.

I append below a statement giving details of catches and their sale:—

Locality.	Season	Number of hauls.	Weight of fish.	Prices.
				RS. A. P.
Calicut, Basas de Pedro Bank, Cochin and Cape Comorin.	November and December 1928.	30	18,643 lb fresh and salted	97 15 0
Mangalore	December 1928.	10	8,757 lb. fresh (522 lb. salted).	78 4 0
Cape Comorin	March and April 1929.	22	10,573 lb. salted.	116 0 0
Calicut	April 1929.	13	10,429 lb. fresh.	268 14 0
Cape Comorin and north up to Tuticorin.	April and May 1929.	20	7,264 lb. salted.	146 7 0
		95	55,666 lb.	707 8 0



Gutting of fish on board the Government Fisheries trawler "Lady Goschen."

It will be seen from the statement that the prices realized do not bear a constant ratio to the weights of fish sold. This is because the fish have to be sold in auction and there is no organization to attempt sales at the best rates as this is not, at present, part of the duty of the trawler. The year was one of fish famine in Malabar and the fishermen were idle for the most part. Just when the fishermen could not get fish in inshore waters, the trawler obtained large catches amounting to tons in off-shore waters and thus helped to demonstrate to the general public at Calicut the value of improved craft and gear over local boats and nets. There were many enquiries as to how, when and where the fish were caught by the trawler by local fishermen.

PART II.

FINANCE.

Summary of financial results.—The total expenditure for the year was Rs. 8,62,836 and revenue Rs. 7,42,744. Due to a poor fishing season on the West Coast, the expenditure on fish-curing yards exceeded revenue by Rs. 12,804. For the same reason, the Tanur Experimental Station worked at a loss of Rs. 2,447 against a profit of Rs. 231 in 1927-28. There were no sales of oysters during the year. The Cannery also continued closed pending the recommendations of the Committee on Fisheries. The receipts from the Biological Specimen Supply Section amounted to Rs. 3,631-9-0 against Rs. 5,045-10-0 in the previous year. The apparent decrease is due to the fact that the cost of jars included in the selling price of mounted exhibits was much less than that of the previous year on account of the substitution of glass jars of Indian manufacture in place of costly foreign ones.

The usual financial statements are appended.

PART III.

STAFF AND EQUIPMENT.

I. BIOLOGICAL.

Scientific research in all sections, which is of crucial importance to the success of the department, continued to suffer from ill-qualified staff and inadequate equipment. The members of the

scientific staff—Research Assistants—all without exception belong only to the subordinate service which is not attractive enough to really distinguished students. The qualifications for Research Assistants are local degrees in Biology or Chemistry which, as explained by Dr. Gravely in last year's report, give them no idea of the possibilities of marine biological or technological research. The little research done is due to the training they get after entering the department. Heavily handicapped as I am, with administrative routine, I cannot also afford the time and personal attention which the badly staffed research section needs. Without a thorough reorganization of the research section of the department, there is not much hope of successful research work, on which all other activities depend for their success and usefulness. As stated in last year's report, fishery research has been pushed to the limit to which it can be carried out by the present unqualified staff and limited laboratory equipment. A larger and better qualified staff with well-equipped laboratories, in places where the problems have to be studied at first hand and in the natural habitat of the animals concerned, are essential to further progress. The laboratories at West Hill and Krusadai Island lack full equipment and aquaria. In the Madras Aquarium, there is no laboratory worth mentioning and absolutely no staff for research. I have, therefore, urged the need for the early establishment of four fully equipped marine biological stations at Vizagapatam, Madras, Krusadai Island and West Hill, besides a laboratory on board the "Lady Goschen" in my ten years' programme of research and subsequently in my evidence before the Committee on Fisheries. The Government have sanctioned the equipment of a laboratory on board the "Lady Goschen" this year.

There is no institution in the whole of India which teaches fisheries. For men in the subordinate ranks of the department who have to be trained locally, some local arrangement within the district or in co-operation with other departments seems urgently necessary. The department is indebted to Dr. Gravely for framing proposals for training the personnel of the research section. In propounding a scheme by which the raw graduates recruited to the research section of the department could be given a course of preliminary training in Fisheries science, Dr. Gravely made the suggestion that for taxonomic work—the correct classification and identification of various species of animals which necessarily forms the foundation for further studies relating to life-history, food, growth

etc.—the Museum will provide the best training ground. He stated:—"In the above scheme of training no special reference has been made to taxonomic work. This is not, strictly speaking fisheries work at all and the permanent Director agrees with me in thinking that for some time at least it could be much more readily and economically done in a laboratory at the Museum than in the proposed fisheries laboratory. On the other hand, as it necessarily forms the basis of all fisheries research of a biological nature, it cannot be divorced from it. Such work will have to be done more or less continuously by all those engaged in such research, and will probably always be the first subject in which new recruits will have to be trained. I am convinced that co-operation in this will be beneficial both to the Fisheries Department and to the Museum, but as to how far it will be possible in actual practice, I am not at present able to offer an opinion. It is a matter which must be discussed at length with the permanent Director. Probably we can only ascertain it by the slow process of actual experiment with it. But even to experiment with it additional laboratory and storage accommodation at the Museum would be required." He discussed the scheme further with me. In view of the urgency to train the newly recruited Inspector of Fisheries, Mr. E. K. Madhavan and Research Assistant, Krusadai Island, Mr. V. John, Dr. Gravely has kindly undertaken to give them such training as the facilities in the Museum, at present, will permit.

A.--At Sea (Trawler).

Captain T. G. Cribb continued as the Assistant Director (Marine) till the 15th June 1929 on which date he proceeded to England on six months' leave. Captain Cribb's term of service has been extended for a further period of three years from 13th March 1929.

The staff for biological research on board the trawler still continues, as last year, to consist of a single Inspector. Mr. Ramaswami Nayudu, on the score of health and other inconvenience, desired a transfer. Mr. E. K. Madhavan, B.A., Research Assistant, West Hill, was therefore posted to the trawler. Whenever the trawler was not engaged in research work, the opportunity was taken to summon the Inspector to Madras, for training in taxonomy and other biological work. The trawler was away in Bombay from July to October 1928, in the Laccadives in January and February 1929 and again in Bombay since June 1929. The Inspector,



Marine Biological Station, Krusadai Island.

therefore, underwent training at the Museum for a period of nearly seven months. For a few weeks recently, he has also worked in my office room. He has, therefore, received a fair amount of training for the work which he will have to undertake in the newly equipped laboratory on board the trawler. In the course of the training, the collections made by the trawler in the deep-sea cruises were partly worked out. In pursuance of the proposals mentioned in the foregoing paragraph, Dr. Gravely, even after severing his connexion with this department, very kindly undertook to train Inspector Madhavan whenever he could work at the Museum.

B.—On Shore.

1. WEST HILL RESEARCH STATION, CALICUT.—Mr. M. Ramaswami Nayudu was in charge of the West Hill Research Station till January 1929 when he took leave and Mr. S. T. Moses took his place.

2. KRUSADAI ISLAND RESEARCH STATION.—On the appointment of Mr. S. T. Moses as acting Assistant Director of Fisheries (Inland) in September 1928, Mr. V. John, a Zoology graduate, was posted to Krusadai Island station. No progress was made during the year in the consideration of the schemes relating to the purchase of additional equipment for the station or the construction of an aquarium at Rameswaram.

3. MADRAS AQUARIUM.—The Laboratory Assistant Mr. M. K. Giriappa continued in charge of the aquarium.

4. PROPOSED RESEARCH STATION AND AQUARIUM AT VIZAGAPATAM.—No progress was made with the scheme.

C.—Inland.

HILSA INVESTIGATION.—During the year, it was finally decided that the Andhra University should shift from Bezwada to Vizagapatam. The site allocated to the University, therefore, is now available for the construction of Police lines. The Lock Bungalow when vacated by the Assistant Industrial Engineer has been assigned temporarily to the T.R.S. Section of the Public Works Department who are now in occupation. As there is every chance of the building falling vacant when that office shifts, no steps were taken for the construction of a new hatchery building in the compound of the Lock Bungalow for the location of a hatchery.

2. TECHNOLOGICAL.

A.—Tanur Experimental Station.

The Tanur Station is a quasi-commercial concern. The accounts are maintained on commercial lines. The Research Assistant, Mr. O. Sankaranarayana Menon, was found incompetent to manage the business side of the station and had to be substituted by an officer with a knowledge of commercial accounts and business methods. Accordingly Mr. T. P. Baratan, Superintendent of the Chaliyam Cannery, was appointed temporarily to Tanur on 4th September 1928. The research in several directions at this station has reached a point where the expert attention of a Bio-Chemist and Engineer is required. I have urged for the appointment of a Bio-Chemist for the station.

B.—Chaliyam Cannery.

The Chaliyam Cannery continued closed throughout the year and the skeleton staff entertained at the station consisted of—

- 1 Clerk.
- 1 Watchman.
- 2 Coolies.

The oval dies which were got repaired in England were found, on trial, by the Industrial Engineer to require further alterations. The stamping of the tins by the dies is still unsatisfactory. The matter is receiving the attention of the Industrial Engineer.

3. EDUCATIONAL.

Fisheries Training Institute.—The Third Assistant Mr. M. Kunhi-anandan left the Institute on 9th August 1929, on transfer to the office of the Assistant Director (Coast) and Mr. A. G. Spadigam, the Headmaster of the Madapalli School, took his place. The classes in Elementary Biology were conducted as usual by the Research Assistant, West Hill. The model school shed erected in the previous year was provided with masonry walls at a cost of Rs. 475. The school building measures 100 feet by 20 feet with a 5 feet verandah on one side and was occupied on 24th January 1929. The old building, which belonged to the Calicut Municipality, was handed back to the Municipal authorities to be used as a dispensary in the fishermen quarters. The Headmaster's office (an enclosure on the verandah of the Fisheries Training Institute main building) was provided with masonry walls at a cost of Rs. 196. Proposals for constructing a net-room, a store room,

sheds for model oil and guano and canning and refrigeration plants and a building for the hostel and for the acquisition of a playground are under consideration. On 31st December 1928, the hostel which was located in a rented building was shifted to a large building which was available for the same rent.

Fifty-two English and 18 Malayalam books were purchased during the year for the Fisheries Training Institute library. A classified catalogue has been prepared and the question of printing it is under consideration. As the number of secondary students is increasing year by year, attention has been paid to stocking the library with English books suitable to their needs. The books purchased this year include some standard text-books on navigation, the teaching of which has been introduced in the Institute.

A set of preserved specimens of the common marine animals was supplied by the Specimen Supply Section, Ennur, at a cost of Rs. 129. A set of seventeen physiological models costing Rs. 394-8-0 was also purchased. Other apparatus bought in the year include six sets of carpentry tools, one paithu vala and one chala vala. As the maps purchased immediately after the institute was started had become worn out by constant use, a new set of maps was bought.

4. STEAM AND MOTOR VESSELS.

"Lady Goschen."—The trawler was sent to Bombay in June 1928 for inspection by the Royal Indian Marine Dockyard and for the preparation of estimates for the proposed alterations and equipment. The annual overhaul of this vessel including sundry repairs to the engine and boiler was carried out by the dockyard at a total cost of Rs. 18,631. The vessel returned to Tuticorin on 5th November 1928. Meantime, the Government ordered in October 1928 that, till provision was made for alterations in the budget for 1929-30, the trawler should be used for fishery research, deep-sea fishing experiments and the inspection of the Laccadive Islands only and not for salt transport. The work of towing schooners loaded with salt from Tuticorin to the ports of the West Coast was, therefore, eliminated from the trawler's programme and her services were solely devoted to the continuation of the research work commenced in the previous year. Thus, between 5th November 1928 and 15th May 1929, the trawler was engaged in fishing cruises excepting the period between 7th January 1929 to 15th February 1929 when her services were utilized by the Revenue

Department for the inspection of the Laccadive Islands. As there is no accommodation on board the trawler for the inspection party, while there is on the "Lady Nicholson," at the suggestion of Dr. Gravely, Government decided that the latter should be utilized for accommodating the inspecting officers and be taken in tow by the "Lady Goschen" to the islands. This arrangement seems to have worked satisfactorily.

Captain Cribb was examined and the trawler inspected by the Members of the Committee on Fisheries at Krusadai Island from 15th to 26th May 1929.

Additions and alterations to the trawler.—Government provided Rs. 76,000 in the budget for 1929-30 towards the cost of additions and alterations to the trawler at the Royal Indian Marine Dockyards, Bombay, whose estimate was Rs. 99,819. The alterations and additions to the trawler finally decided on were as follows:—

	RS.
(1) Port lights in forecastle on port and starboard sides; to provide improved ventilation for the forecastle	737
(2) To convert the present Master's cabin into a laboratory, the wheel house on the top of cabin into a Master's cabin and shift the wheel house to the extended deck over the trawl winch	7,475
(3) Engine room sky light to be raised to the height of the galley top and provided with two port lights on either side and usual engine room sky lights to provide for better ventilation to the engine room	649
(4) The lower deck house to be extended aft for a distance of 6 feet and built up from the main deck and an extended upper deck to be erected from the mizzen mast aft to the taffrail, extending from rail to rail for the construction of two cabins, a dining saloon and lavatory or a single saloon with accommodation for 3 officers and a bath room and lavatory	17,163
(5) Construction of crew's galley between the stern and upper deck at the taffrail	626
(6) Two life boats built in teakwood complete with derrick for hauling on engine room casting, for accommodating a crew of 28 men in case of an accident	5,575

(7) Two M.S. water tanks each of 1,500 gallons to be fitted in the after cabin lower deck	RS. 5,500
(8) Rearrangement of tiller to rudder	462
(9) Alterations and additions to ship's electrical installations consequent on structural alterations	5,936

The above items amount to Rs. 44,123. The installation of a refrigerator and cold store on board the trawler estimated by the Royal Indian Marine at Rs. 51,806 has been postponed for the present by Government on my advice. The Assistant Director (Marine) and I as well as the local refrigeration engineers at Madras and Colombo, entertain serious doubts as to the need for so elaborate and expensive an installation as the one recommended by the Royal Indian Marine. We believe that, if fish was not to be kept for too long a period, it was sufficient to chill than actually freeze them. As the trawler is not likely to keep fish on board for even a fortnight (unlike trawlers in Europe which have to keep fish for prolonged periods), an expensive freezing plant of the kind estimated for by the dockyard is likely to prove altogether superfluous besides hampering the vessel in other ways. Further, refrigeration on board the trawler is required to preserve the catches fresh and obtain for them the best market-value when sold. The trawler at present is engaged purely in research, investigation and survey. She is not concerned at present with questions of preservation, transport or the best methods of marketing catches except where this is compatible with the conduct of research and survey and the absence of a refrigeration plant would not materially handicap the work of the trawler for the present. I, therefore, recommended to Government that the provision of a cold storage plant on board the trawler might be postponed to a later date when we should be in a better position to decide on the exact nature of the refrigerating plant required.

The crew recruited from Tuticorin in October 1927 are still continuing with few changes necessitated by illness. In the absence of the Captain on leave out of India, the vessel is at the dockyards, Bombay, undergoing repairs and only a skeleton crew has been retained.

"*Lady Nicholson.*"—She was engaged for inspection of pearl banks during October-November 1928 and March-April 1929 and was lent to the Revenue Department for the inspection of the Laccadive Islands from 8th January to 15th February 1929.

The charges on account of this trip amounted to Rs. 3,602 and have since been recovered from the Revenue Department by adjustment. In accordance with the orders of Government that the vessel should be docked annually (vide Development Memorandum No. 1544-II/27-3, dated 29th June 1927), after her return from the Laccadives she was taken to Colombo for bottom cleaning. The docking and cleaning charges amounted to Rs. 897-3-9. The total charges of maintenance came to Rs. 12,717-1-6. Deducting the recovery made from the Revenue Department, viz., Rs. 3,602, the charges amounted to Rs. 9,115-1-6 against Rs. 10,964-9-11 during 1927-28.

"*Leverett*."—She was in actual service during the Tuticorin Chank Fishery. The cost of her upkeep amounted to Rs. 4,143-0-4 against Rs. 4,976-10-4 in 1927-28. She was in active commission for 154 days and was also employed in patrolling the chank beds in the vicinity of the southern border of the Ramnad Coast.

"*Sea Scout*."—During the season under report, she was engaged mainly for towage of chank canoes. She was in active commission for 125 days. Her upkeep came to Rs. 4,786-2-8 against Rs. 3,536-10-0 in 1927-28. Prior to 1928-29, this vessel had only a skeleton crew. The services of the crew of other vessels were utilized whenever there was need; but, Government in their Order Mis. No. 1849, Development, dated 1st November 1928, restored the full complement of crew for a period of one year. This accounts for the increase in the cost of her upkeep, while a corresponding saving has resulted in the case of "*Sutherland*" and "*Pearl*." As this vessel is required for the Tinnevely Chank Fishery for towage work, the permanent entertainment of the full crew is necessary.

"*Sutherland*."—Her engine has been condemned and dismantled. Her maintenance charges amounted to Rs. 210-2-4 against Rs. 1,118-14-11 in the previous year.

"*Pearl*."—Till a decision as regards the minimum fleet of motor vessels and boats required by the department is arrived at, the Government sanctioned the employment of a skeleton crew for this vessel. Her upkeep cost the department Rs. 770-9-4 against Rs. 2,462-8-6 in 1927-28. She was used as a tender to the "*Lady Goschen*" whenever the trawler was in Tuticorin Harbour. She will have to be continued on this duty till the trawler is provided with a motor boat for landing crew and cargo at ports and for conducting the fishing experiments with seine and drift nets and long lines. Vide page 9.

5. ADMINISTRATIVE.

A list of the Gazetted Staff of the Department is given in Appendix I.

A.—Director's Office.

Director.—During my absence on leave from 8th June 1928, Dr. F. H. Gravely, D.Sc., Superintendent, Government Museum, acted as Director up to 1st March 1929 when I resumed charge.

Personal Assistant.—Dr. D. W. Devanesan, M.A., Ph.D., continued as Personal Assistant except for a short period when he went on leave from 3rd May 1929 up to the 30th June 1929 during which period M.R.Ry. M. Ramaswami Nayudu, Research Assistant, Krusadai Island, acted for him. There was no other change in the staff.

B.—West Coast.

Assistant Director.—M.R.Ry. U. Karunakara Menon Avargal B.A., continued as Assistant Director throughout the year.

Inspectors.—Mr. U. Nagappa, Mr. A. K. Krishnan and Mr. K. Ambady were in charge of the South Kanara, Central, and Ponnani sections, respectively, throughout the year.

Mr. K. Gopalan Nayar, a Sub-Inspector, was promoted as Inspector of Fisheries and deputed to the Laccadives for six weeks from 22nd January 1929. He proceeded to the Laccadives with the Inspection Party on the night of that date on board the "*Lady Nicholson*" and returned in a country boat which reached Manjeshwar on 5th March 1929.

C.—East Coast (South).

M.R.Ry. Rao Bahadur J. A. Fernandez Avargal, continued as Assistant Director, Pearl and Chank Fisheries, Tuticorin. In G.O. Mis. No. 978, Development, dated 7th June 1929, the Government directed that the designation of the "Superintendent, Pearl and Chank Fisheries" should be altered to "Assistant Director, Pearl and Chank Fisheries."

Inspector.—In connexion with the investigation of the chank beds off the Tanjore Coast, an Inspector of Fisheries on Rs. 70-250 has been sanctioned by Government from 1st July 1929 for two years in G.O. Mis. No. 602, Development, dated 27th March 1929.

D.—East Coast (North).

Inspector.—M.R.Ry. M. Jayaram Nayudu continued to be the Inspector of Fisheries.

Office accommodation.—Though the building occupied by the present office of the District Registrar of Vizagapatam has been assigned by the Collector for the location of the Inspector's office, it has not still been vacated for occupation with the result that great difficulty is felt in conducting the office in the present building which is narrow, damp and ill-ventilated. The white ant pest is so great especially during the damp weather that nothing could be kept on the floor without being damaged.

E.—East Coast (Central).

Assistant Director.—M.R.Ry. C. G. Chakrapani Ayyangar Avargal, Assistant Director (Inland), was granted leave on average pay from 18th September to 21st November 1928, and Mr. S. T. Moses, M.A., Research Assistant, Government Fisheries Station, West Hill, acted for him.

Fish farms—Sunkesula.—Owing to the postponement of the installation of an oil-engine at Sunkesula sanctioned in G.O. Mis. No. 464, Development, dated 13th March 1928, and the drying up of the Mopad Farm, the Sunkesula stock could not be distributed and the congestion at Sunkesula farm continues. Some of the provincialized waters in the Ceded Districts were stocked from this farm during the year. Mr. Finlow, Director of Agriculture, Bengal, paid a visit to the farm in January and was impressed with it and took notes of the method of working the farm, the fish bred there, etc.

Præma.—All the four ponds were stocked with gourami from the crowded ponds at Sunkesula.

The objection raised by the ryots of the Kadamalakalva village to the diversion of the Biruvani spring water to the Præma fish ponds was investigated. Owing to good rains during the year, agricultural interests were not affected by the supply of water to the farm. But as the ryots cannot always depend upon good seasonal rains, the question of alterations to the fish ponds to ensure a good supply for irrigation is engaging attention.

The quarters for the Sub-Assistant Inspector and staff do not provide the necessary conveniences. Some necessary additions and alterations are being made to them.

Ippur.—The buildings which were damaged by storm and which could not be repaired last year, were restored during the

year at a cost of Rs. 808. The store shed at Nellore which collapsed during the cyclone of 1927 was also rebuilt at a cost of Rs. 740.

There were some defects in the construction of this farm which called for remedies. Due to other important work, I have not been able to visit the farm and decide on the required alterations. The ponds are several acres in extent and this is one of the suspected reasons for the failure of gourami to breed freely at Ippur. The free flow of water and with it the coarse fish into the ponds without a silting or filtering reservoir and the absence of a wire net on the bund to exclude the predaceous murrel and large frogs from climbing over the bund from the surrounding Ippur Kamini tank have also had a prominent share in preventing the prolific multiplication of the gourami. The smaller ponds constructed as well as the other remedial measures adopted so far have not successfully overcome the difficulties. I hope to visit the farm and decide on the remedies to be adopted this year. During the year, the water level in the ponds went so low as to jeopardise the life of the gourami. By baling the small quantity of water available in one pond into the gourami pond, the danger was temporarily averted. The fish were found breeding and some 25 young gourami $1" \times 1\frac{1}{2}"$ were found.

Perambur.—The small pond is much congested and unless the stock is thinned out, breeding cannot be satisfactory. There are about 130 gourami of which more than 100 are very big ones and about 10 to 14 years old.

Though the Government have approved of the transfer of this farm to Chetput, the scheme was postponed pending receipt of the report of the Committee on Fisheries.

Vellore Fort Moat.—The northern section which contains marketable fish and another section which contains gourami had sufficient water-supply. Catla and etroplus grow splendidly in this farm. The right of catching fish in the northern section and in two other sections and the right of collecting grass in all the sections and lotus leaves in three sections (Gourami section excluded) was as usual auctioned in March. There was keen competition owing to the presence of big catla in the moat and the highest bid rose to Rs. 2,465 against Rs. 1,730 in the previous year. The grass and lotus leaves by themselves would have fetched only Rs. 500 to Rs. 700. The cost of stocking the moat with catla during the year was only Rs. 137.

Owing to good feeding due to the presence of luxuriant growth of lotus, gourami introduced are thriving exceptionally well and during the breeding seasons, a large number of nests were always in evidence. If this section alone is leased out, there is a probability of its fetching between Rs. 1,500 and Rs. 2,000. The Hon'ble Minister for Development paid a visit to the farm during the year.

Mopad.—All the constructional defects referred to in the previous report were rectified.

With the exception of six ponds which were brought into working order the rest could not be utilized during the year owing to failure of water-supply in the reservoir in January. The north-east monsoon failed in and around Mopad. The water-supply in the fish ponds became precarious in November; in January there was only a fortnight's supply and in February the farm work had to be abandoned and the fish had to be transferred elsewhere.

The provincialized waters in the taluks of Atmakur and Kanigiri were stocked with fish from here as they did not receive any appreciable supply of water during the monsoon.

A few of the members of the Committee on Fisheries visited the farm during the year. They were impressed with the success of the new fishing methods developed and by the fact that the scheme has materially added to food supply in the dry tract of country and has made fish available throughout the year in the markets all round.

Chingleput Fort Moat.—The work of rectifying the constructional defects of the farm was not undertaken by the Public Works Department, owing to the objection raised by the landholders under the Kolavoy tank to the putting up of a loose stone wall in front of the main sluice. Since the revenue authorities supported the ryots, the idea of having a stone wall in front of the main sluice was abandoned and it has been decided in consultation with the Public Works Department to have it only in front of the sluice in the first cross bund, through which water flows into the fish ponds; for this there is no objection. The matter stands here and it is hoped that the Public Works Department will resume work without further delay.

I have the honour to be,

Sir,

Your most obedient servant,

B. SUNDARA RAJ,

Director of Fisheries.

APPENDIX I.

Staff of the Fisheries Department.

Post.	Incumbent.	Period.
Director	Dr. F. H. Gravely ...	1st July 1928 to 1st March 1929.
	Dr. B. Sundara Raj ...	2nd March 1929 to 30th June 1929.
Assistant Director (Marine).	Captain T. G. Cribb ...	1st July 1928 to 14th June 1929. On leave for six months from 15th June 1929.
Assistant Director (Coast)...	M.R.Ry. U* Karunakara Menon Avargal.	1st July 1928 to 30th June 1929.
Assistant Director (Inland).	M.R.Ry. C. G. Chakrapani Ayyangar Avargal.	1st July to 17th September 1928 and 22nd November 1928 to 30th June 1929.
	M.R.Ry. S. T. Moses Avargal.	18th September 1928 to 21st November 1928.
Assistant Director, Pearl and Chank Fisheries.	M.R.Ry. Rao Bahadur J. A. Fernandez Avargal.	1st July 1928 to 30th June 1929.

APPENDIX II.—FINANCIAL STATEMENTS.

STATEMENT I.—Summary of Expenditure and Revenue of the Fisheries Department for 1928-29.

Particulars.	Expenditure.	Revenue.	Difference.
	RS. A. P.	RS. A. P.	RS. A. P.
I. Direction ...	32,729 12 9		- 32,729 12 9
II. Superintendent, Pearl and Chank Fisheries ...	91,212 2 2	1,91,408 0 5	+ 1,00,195 14 3
III. Assistant Director (Marine) ...	81,364 8 3	16,100 3 10	- 65,264 4 5
IV. Assistant Director (Coast) ...	10,692 10 6	197 1 0	- 10,495 9 6
V. Church Island Fish-curing Station ...	463 9 11		- 463 9 11
VI. Tanur Station ...	10,251 15 3	7,804 13 9	- 2,447 1 6
VII. Fisheries Training Institute ...	16,218 11 3	256 10 9	- 15,962 0 6
VIII. Schools for fishermen ...	45,487 7 11	1 11 0	- 45,485 12 11
IX. Assistant Director (Inland) ...	1,05,471 9 0	1,13,351 6 1	+ 7,879 13 1
Nilgiri fisheries ...	5,661 14 7	591 0 0	- 5,070 14 7
X. Oyster Farm, Pulicat ...	934 8 11	120 14 0	- 813 10 11
XI. Aquarium ...	6,905 10 2	8,178 6 0	+ 1,272 11 10
XII. Marine Biological Section—			
(a) Zoological Supply Section, Ennore ...	5,677 12 5	3,747 12 0	- 1,930 0 5
(b) Research Section, West Hill. ...	6,330 4 11	1 8 0	- 6,328 12 11
(c) Research Section, Krusadai Island ...	3,767 9 8	226 6 0	- 3,541 3 8
XIII. Fish-curing yards—			
(a) Voted ...	4,31,937 4 2	3,99,557 8 1	- 32,379 12 1
(b) Non-voted—Agathi Island ...	903 4 7		- 903 4 7
Fisheries Cannery (1st April 1928 to 31st March 1929).	6,825 10 8	1,201 1 8	- 5,624 9 0
Total ...	8,62,836 7 1	7,42,744 6 7	- 1,20,092 0 6

APPENDIX II—cont.
STATEMENT 2.—Details of Expenditure.

Particulars.	Salaries.	Establishment.	Allowances.	Supplies and services.	Contingencies.	Total.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
i. Direction ...	(1) 10,601 8 7	13,013 11 0	(2) 3,725 4 9	...	{ 5,064 14 5 } 32,729 12 9	
ii. Superintendent, Pearl and Chank Fisheries ...	(3) 3,289 9 2	15,465 9 5	(5) 816 8 1	67,734 4 7	324 6 0	
iii. Assistant Director (Marine) ...	10,200 0 0	13,451 5 0	3,855 13 0	53,079 3 3	3,906 2 11	
iv. Do. (Coast) ...	3,848 9 3	2,762 4 0	2,093 4 0	...	778 3 0	
v. Church Island Fish-curing Station ...	...	...	...	...	1,988 9 3	
vi. Tanur Station ...	(7) 549 12 9	1,235 10 6	...	254 8 11	209 1 0	
vii. Fisheries Training Institute ...	...	6,199 2 0	292 7 0	6,924 15 0	1,249 2 0	
viii. Schools for fishermen ...	...	35,795 8 0	564 6 0	5,702 15 2	3,662 4 1	
ix. Assistant Director (Inland) ...	4,676 15 0	13,088 3 0	238 4 0	1,984 15 3	7,468 12 8	
x. Nilgiri fisheries ...	...	13,088 3 0	8,076 13 0	76,172 3 5	3,457 6 7	
x. Oyster Farm ...	...	2,534 3 0	1,950 0 0	...	1,05,471 9 0	
xi. Aquarium ...	...	266 11 9	...	486 7 3	1,177 11 7	
xii. Marine Biological Section—	...	2,381 1 0	...	1,318 13 6	181 5 11	
(a) Zoological Supply Section, Ennore.	...	...	...	...	3,205 11 8	
(b) Research Section, West Hill	...	(10) 3,419 5 3	227 8 0	1,364 9 2	666 6 0	
(c) Research Section, Krusadai Island ...	...	(11) 4,756 1 6	521 5 0	707 9 3	345 5 2	
xiii. Fish-curing yards, Voted ...	(12) 1,060 13 3	(13) 89,307 14 4	(14) 10,938 7 6	452 12 11	369 5 9	
Do. Non-voted ...	...	(15) 799 10 9	220 12 0	3,01,244 0 0	29,386 1 1	
(Agathi) Fisheries Cannery (for year ending 31st March 1929).	...	...	1 14 0	235 11 7	228 2 0	
Total ...	34,227 4 0	2,07,258 10 6	33,904 6 4	5,23,667 7 2	63,778 11 1	8,62,836 7 1

(1) Excludes Rs. 107-1-5 being 1 per cent of the salary of the Director debited to the Chank Fisheries.
 (2) Excludes Rs. 23-10-1 being 1 per cent of the travelling allowance of the Director debited to Chank Fisheries.
 (3) Includes Rs. 107-1-5 being 1 per cent of the salary of the Director and excludes Rs. 1,060-13-3 being 25 per cent of the salary of the Assistant Director, Pearl and Chank Fisheries, debited to Fish-curing yards.
 (4) Includes Rs. 1,035-0-5 being leave and pensionary contribution of the permanent staff.
 (5) Includes Rs. 23-10-1 being 1 per cent of the travelling allowance of the Director and excludes Rs. 96-7-0 being 25 per cent of the travelling allowance of the Assistant Director, Pearl and Chank Fisheries.
 (6) Excludes 12½ per cent of the salary of the Assistant Director of Fisheries (Coast) debited to Tanur Station.
 (7) Represents 12½ per cent of the salary of the Assistant Director (Coast).

(8) Excludes 50 per cent of the pay of the Tanur Establishment debited to Research.
 (9) Represents 25 per cent of the pay of the Laboratory Assistant, Ennore.
 (10) Excludes 25 per cent of the pay of the Laboratory Assistant, Ennore, debited to Oyster Farm.
 (11) Includes Rs. 1,235-10-6 being 50 per cent of the pay of the Tanur Establishment and Rs. 860-7-0 being 50 per cent of the pay of the Inspector of Fisheries, Vizagapatam.
 (12) Represents 25 per cent of the salary of the Assistant Director, Pearl and Chank Fisheries.
 (13) Excludes 50 per cent of the pay of the Inspector of Fisheries, Vizagapatam, debited to Research but includes Rs. 7,226-6-4 for pensionary contribution in respect of permanent establishment.
 (14) Includes 25 per cent of the travelling allowance of the Assistant Director, Pearl and Chank Fisheries.
 (15) Includes Rs. 69-10-9 being leave and pensionary contribution.

APPENDIX II—cont.

STATEMENT 3.—Details of Supplies and Services.

Sub-head.	Amount. RS. A. P.	Sub-head.	Amount. RS. A. P.
(ii) Superintendent, Pearl and Chank Fisheries—			
A. Chank fisheries—			
(1) Tinnevely chank fisheries	47,288 2 1	(ix) Assistant Director (Inland)—	
(2) Rāmnād chank fisheries	710 0 5	A. Tank stocking—	
(3) Beche-de-mer fisheries	1,054 9 9	(1) Compensation to District Boards	61,764 7 0
B. Pearl fisheries—		(2) Stocking of tanks	2,831 11 0
(1) Examination of pearl banks	1,537 0 9	(3) Chingleput tank stocking scheme	617 10 3
(2) Pamban pearl farm	391 10 6	(4) Nellore tank stocking scheme	1,073 2 9
(3) Pearl fishery charges	1,801 7 11	B. Other works—	
C. Fisheries vessels—		(1) Sunkesula fish farm	4,129 15 7
(1) "Lady Nicholson"	8,005 0 6	(2) Ippur fish farm	1,106 8 3
(2) "Sutherland"	33 2 4	(3) Powder Factory fish farm	542 6 3
(3) "Leverett"	2,746 15 4	(4) Chingleput Fort moat fish farm	335 10 0
(4) "Pearl"	337 6 4	(5) Vellore Fort moat fish farm	417 8 0
(5) "Sea Scout"	3,828 12 8	(6) Mopad fish farm	2,155 9 4
	67,734 4 7	(7) House boat maintenance	291 14 9
		(8) Nallamalais scheme	803 14 3
		(9) Hilsa hatchery experiments	51 14 0
			76,172 3 5
(iii) Assistant Director (Marine)—			
Apparatus and materials	423 7 9	(xiii) Fish-curing yards—	
Coal, oil and fuel	19,000 10 0	(1) Purchase of salt	41,008 2 4
Provision allowance	4,599 0 6	(2) Charges for conveyance of salt	13,114 1 5
Deck stores	4,660 13 4	(3) Export and import of salt	1,30,629 3 3
Engine stores	700 4 0	(4) Apparatus and materials	24,115 4 0
Water	491 7 8	(5) Clothing and equipment	2,796 12 7
Repairs	20,708 12 9	(6) Opening stock of salt on hand on 1st July 1928	89,580 8 5
Pilotage	326 10 8		
Miscellaneous	1,056 10 2		
Customs duty	60 2 0		
Europe stores—trawl nets	451 4 5		
	53,079 3 3		

ADMINISTRATION REPORT OF THE

80

APPENDIX II—cont.

STATEMENT 4.—Details of Revenue.

Sub-head.	Amount. RS. A. P.	Sub-head.	Amount. RS. A. P.
(ii) Superintendent, Pearl and Chank Fisheries—			
(1) Revenue from all chank fisheries including Beche-de-mer fishery as per Statement No. 5, Appendix II			
(2) Revenue from Pearl fishery section as per Statement No. 6, Appendix II	1,80,056 3 9	(ix) Assistant Director (Inland)—cont.	
(3) Revenue from lease of right of fishing in salt factory channels	8,654 14 8	(4) Rentals from tanks and canals in other districts.	7,528 7 0
	2,696 14 0	(5) Receipts from fish farms by sale of fish, grass and miscellaneous receipts including rent of buildings	5,563 6 1
	1,91,408 0 5		1,13,351 6 1
(iii) Assistant Director (Marine)—			
(a) Deep sea fishing receipts	1,085 3 10	(x) Oyster Farm—	
(b) Charges on account of utilising the services of Lady Goschen recovered from the Revenue Department	15,015 0 0	Sale of oyster shell grit	120 14 0
	16,100 3 10		
(iv) Assistant Director (Coast)—			
Miscellaneous receipts	197 1 0	(xi) Aquarium—	
(vii) Fisheries Training Institute—		(1) Gate collections	7,604 7 0
Miscellaneous receipts	256 10 9	(2) Sale-proceeds of guides, picture post-cards, etc.	167 4 0
		(3) Aquarium shop rental	406 11 0
(viii) Schools for fishermen—			8,178 6 0
Miscellaneous receipts	1 11 0	(xii) Marine Biological Section—	
(ix) Assistant Director (Inland)—		(1) Zoological supply section, Ennur—	
(1) Rentals from Cauvery, Coleroon, tanks and canals	79,785 14 4	Sale of zoological specimens	3,631 9 0
(2) Rentals from the tanks in the Chingleput district	8,087 13 4	Sale of Turtles	56 3 0
(3) Rentals from the tanks in the Nellore district	12,385 13 4	Rent recovered from the Research Assistant, Ennur, for occupation of Ennur bungalow	60 0 0
			3,747 12 0
		(2) Research Station, West Hill—	
		Miscellaneous receipts	1 8 0
		(3) Research Station Kruasalai Island (Sale of Turtles)	226 6 0

FISHERIES DEPARTMENT

81

APPENDIX II—*cont.*

STATEMENT 5.—Expenditure and Revenue Account of the Chank and Beche-de-mer Fisheries for the season 1928-29.

EXPENDITURE.	Amount.	REVENUE.	Amount.
	RS. A. P.		RS. A. P.
Chank Fisheries—		By value of Chanks	
Tinnevely	60,094 12 8	fished—	
Rāmnād	1,399 13 5	Tinnevely	1,68,919 12 10
Sivaganga	...	Rāmnād	...
Leased chank fisheries...	...	Sivaganga	...
Beche-de-mer fishery ..	...	Beche-de-mer fishery.	1,518 5 4
Contingencies		„ Chank rentals real-	
incurred dur-		ized—	
ing 1927-28		Tanjore district ...	6,811 0 0
brought for-		South Arcot dis-	1,670 0 0
ward to this		trict ...	
season ... 968 15 7	...	Chingleput and	
		Nellore dis-	
Contingencies		tricts ...	1,003 5 4
incurred dur-		Miscellaneous re-	
ing current		ceipts	133 12 3
season ... 85 10 2	1,054 9 9		
Leave and pensionary			
contribution ...	690 0 3		
Interest on capital			
outlay	2,329 4 9		
Depreciation on fixed			
assets	4,181 5 4		
Supervision charges—			
50 per cent of the pay			
and travelling allow-			
ance of the Assistant			
Director, Pearl and			
Chank Fisheries ...	2,314 8 6		
Direction charges—1 per			
cent of pay and trav-			
elling allowance of			
the Director ...	130 11 6		
Law charges: Fees to			
Government Pleader in			
connexion with the			
petition of Mr. J. B.			
Dutt and Sons of Dacca			
to contend the decree			
in the Rāmnād Sub-			
Court	50 0 0		
	72,245 2 2		
Balance ...	1,07,811 1 7		
Total ...	1,80,056 3 9	Total ...	1,80,056 3 9

APPENDIX II—cont.

STATEMENT 6.—Trading and Profit and Loss Account of the Pearl Fisheries of the season 1928-29.

EXPENDITURE.		REVENUE.	
	Amount.	Amount.	Amount.
	RS. A. P.	RS. A. P.	RS. A. P.
Examination of the Pearl Banks	1,537 0 9		
Pamban Pearl Farm—Running expenses	391 10 6		
Contingencies	1,290 4 0		
Pay and travelling allowance of the establishment	2,180 6 0	4,524 9 8	
Pay, travelling allowance and running expenses of motor launches, Leverett and Sea Scout	1,785 13 5	150 0 0	
Share of running expenses (pay, travelling allowance and contingencies) of fisheries vessel "Lady Nicholson,"	8,478 1 0		
Leave and pension contribution of permanent staff	345 0 2	347 11 0	
Interest on capital outlay	"	30 10 0	
Depreciation on fixed assets	3,847 10 2		
Supervision charges—2½ per cent of pay and travelling allowance of the Assistant Director, Pearl and Chank Fisheries	1,157 4 3	3,602 0 0	
			8,654 14 8
Less value of expendible stores on hand			10,312 1 4
Total			18,967 0 0

APPENDIX II—cont.

STATEMENT 7.—Trading Account of the Tanūr Station for the year ending 30th June 1929.

Particulars.	Amount. RS. A. P.	Amount. RS. A. P.	Particulars.	Amount. RS. A. P.	Amount. RS. A. P.
To stock—30th June 1928.			By sales—		
Cured fish	960 4 7		Cured fish	2,898 14 1	
Fish meal	2,587 13 4		Fish meal	2,884 9 0	
Fish-oil and guano	53 10 8	3,601 12 7	Fish-oil	212 0 0	
Service stamps	...	40 2 0	Fish manur	32 9 10	6,028 0 11
			To Stock—30th June 1929 —		
Purchases—			Stock of cured products	...	841 5 2
Boats and nets	8 7 0		Service stamps	...	76 7 0
Service stamps	300 0 0	308 7 0	Profit and Loss account (Gross loss).	...	382 10 1
Manufacturing cost (from manu- facturing account)	...	3,378 1 7			
Total ...	7,328 7 2		Total ...	7,328 7 2	

ADMINISTRATION REPORT OF THE

APPENDIX II—cont.

STATEMENT 8.—Profit and Loss Account of the Tanūr Station for the year ending 30th June 1929.

Particulars.	Amount.	Amount.	Particulars.	Amount.
	RS. A. P.	RS. A. P.		RS. A. P.
To Trading Account ...	...	382 10 1	By Rent ...	...
Travelling allowance ...	...	292 7 0	Miscellaneous ...	...
Experiments ...	...	38 10 8	Packing ...	...
Packing ...	...	202 14 0	Net loss to balance sheet ...	...
Railway freight ...	...	477 11 0		
Petty coolie ...	...	60 8 0		
Advertisement ...	...	50 0 0		
Overtime ...	...	23 6 0		
Rates and taxes ...	...	40 0 0		
Miscellaneous ...	...	11 3 6		
Petty construction and repairs ...	...	357 4 0		
Salary, 25 per cent ...	...	617 13 3		
Reserve for bad and doubtful debts ...	...	104 15 2		
Depreciation--		687 0 7		
Plant and machinery (10 per cent).	326 7 11			
Buildings and sheds (10 per cent).	360 8 8			
Interest on capital at 5.30 per cent (fixed).	...	327 10 4		
Direction charges, 12½ per cent of Assistant Director's pay.	...	549 12 9		
Total ...	4,223 14 4		Total ...	4,223 14 4

FISHERIES DEPARTMENT

APPENDIX II—*cont.*

STATEMENT 9.—Statement showing the Operations of the Fish-curing yards of the Madras Presidency with Revenue and Expenditure for the year ending 30th June 1929.

Division.	Districts.	Particulars of operations.						Revenue.		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Number of applica- tions for salt.	Weight of fish brought to be cured.	Weight of salt issued.	Value of salt issued.	Quantity of salt issued to each maund weight of fish.	Weight of cured fish removed.	Actual amount credited into Treasury.	Value of stock on hand on 1st July 1929.	Total revenue.
East Coast.	Ganjam, Vizagapatam and Godavari, East ... }	39,088	76,911 19	10,032 8	12,540 4 0	10'4	44,668 0	12,520 6 11	1,272 15 5	13,793 6 4
	Nellore and Chingleput ...	7,844	64,207 1	9,431 6	11,788 15 0	12'3	34,253 10	11,762 0 9	597 14 6	12,359 15 3
	Tanjore, Tinnevelly and Kannad ... }	12,152	93,662 26	19,121 20	23,901 10 0	17'3	64,916 13	23,846 1 6	4,461 6 11	28,307 8 5
	Total, East Coast ...	59,084	234,781 6	38,584 34	48,230 13 0	13'2	143,837 23	48,128 9 2	6,332 4 10	54,460 14 0
West Coast.	Malabar and South Kanara ...	111,262	1,171,847 37	194,860 26	2,43,575 13 0	14'0	710,372 4	2,46,230 7 4	98,866 2 9	3,45,096 10 1
	Grand total, East and West Coasts ... }	170,346	1,406,629 3	233,445 20	2,91,806 10 0	13'6	854,209 27	(a) 2,94,359 0 6	1,05,198 7 7	3,09,557 8 1

(a) Excludes cess collections of Rs. 2,264-4-4, on the West Coast, and Rs. 142-8-3 on the East Coast.

APPENDIX II—*cont.*STATEMENT 9.—Statement showing the Operations of the Fish-curing yards of the Madras Presidency with Revenue and Expenditure for the year ending 30th June 1929—*cont.*

Division.	Districts.	Expenditure.										Difference between columns 11 and 22.
		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
		Establishment pay, travel, allowance, overtime fees and supervision charges.	Pensionary contribution for permanent establishment.	Purchase of salt.	Export and import of salt.	Conveyance of salt.	Contingencies.	Clothing and equipment.	Value of salt on hand on 1st July 1928.	Total expenditure.		
East Coast.	Ganjam, Vizagapatam and Godavari, East ...	(a) 16,928 4 0	938 11 9	3,180 4 0	...	2,270 14 6	2,698 7 8	726 10 4	1,516 2 6	28,259 6 9	RS. A. P.	RS. A. P.
	Nellore and Chingleput ...	4,496 5 0	249 10 5	2,869 5 0	...	1,730 7 9	721 4 3	221 0 3	863 3 1	11,151 3 9	1,208 11 6	4,083 13 3
	Tanjore, Tinnevely and Ramanad ...	(b) 7,830 11 3	676 5 0	3,441 0 2	...	5,538 8 3	1,913 15 3	251 13 1	4,571 6 2	24,223 11 2	28,359 6 9	14,466 0 5
	Total, East Coast ...	29,255 4 3	1,864 11 2	9,490 9 2	...	9,539 14 6	5,333 11 2	1,199 7 8	6,950 11 9	63,634 5 8	9,173 7 8	3,630 6 1
	Malabar and South Kanara ...	64,825 8 6	5,361 11 2	31,517 9 2	1,30,699 3 3	3,574 2 11	28,591 11 7	1,597 4 11	82,629 12 8	3,48,727 0 2	4,12,361 5 10	12,803 13 9
West Coast.	Grand total, East and West Coasts ...	94,080 12 9	7,226 6 4	41,008 2 4	1,30,699 3 3	13,114 1 5	33,925 6 9	2,796 12 7	89,580 8 5	4,12,361 5 10	12,803 13 9	

(a) Excludes Rs. 269-7-0 being 50 per cent of the pay of Inspector, Vizagapatam, debited to "Research."

(b) Includes Rs. 1,157-4-3 being supervision charges—25 per cent of pay and travelling allowance of the Assistant Director, Pearl and Chank Fisheries.

(c) Excludes Rs. 19,575-14-4 being expenditure on repairs in the Fish-curing yards.

APPENDIX II—cont.

STATEMENT IO.—Government Fisheries Cannery, Chaliyam—Trading Account for the year ending 31st March 1929.

PART I.

	Amount. RS. A. P.	Amount. RS. A. P.	Amount. RS. A. P.
To opening stock— At Chaliyam and other places (217 tins)	...	...	21 9 0
To selling expenses— Railway freight	17 13 0		
Postage and telegrams	46 9 0		
Raw materials consumed	80 1 3		
Travelling expenses	1 14 0		
Advertisement charges	25 8 0		
Salaries	730 0 0		
Wages	414 12 3		
Miscellaneous expenses	63 3 0		
	1,379 12 6		
Total	1,432 2 6	Total	1,432 2 6

PART II.

To opening stock of tins returned from London (2,945 tins)	471 3 0	By sales of London returned stock (2,859 tins)	633 8 8
To Commission to agents	82 7 3	Less sales return	68 10 5
Profit on sales transferred to profit and loss account	11 10 0	Closing stock (8 tins)	564 14 3
			0 6 0
Total	565 4 3	Total	565 4 3

ADMINISTRATION REPORT OF THE

FISHERIES DEPARTMENT

APPENDIX II—cont.

STATEMENT II.—Government Fisheries Cannery, Chaliyam—Profit and Loss Account for the year ending 31st March 1929.

	Amount. RS. A. P.	Amount. RS. A. P.	Amount. RS. A. P.
To loss brought forward on sales from general stock	...	...	...
Less profit on sales on consignment stock	1,406 8 6	...	307 3 5
	11 10 0	House rent recovered	49 7 0
To repairs to buildings	275 10 0		356 10 5
Tools written off	105 11 0	By interest on depreciation reserve deposited with Government	258 0 0
Stores written off	624 3 5	Loss carried to balance sheet	5,624 9 0
Empty cans written off	481 10 0		
	1,487 2 5		
To standing charges— Audit fee	250 0 0		
Leave and pension contribution	69 10 9		
	319 10 9		
To depreciation on— Buildings	566 3 0		
Plant and machinery	572 4 3		
Furniture	72 0 6		
	1,210 7 9		
To interest on capital	1,827 0 0		
	6,239 3 5	Grand total	6,239 3 5

APPENDIX III.

Comparative statement of salt transported to West Coast Fish-curing yards from the year 1924 to 1929.

Year.	Total quantity of salt transported.	Quantity by contractor.	Cost.	Rate per maund.	Quantity by rail.	Cost.	Rate per maund.	Quantity by trawler.	Cost.	Rate per maund.
	MDS.	MDS.	RS. A. P.	RS. A. P.	MDS.	RS. A. P.	RS. A. P.	MDS.	RS. A. P.	RS. A. P.
1924-25	168,952	158,952	63,911 15 0	0 6 5'2	10,000	6,510 6 8	0 10 5	Nil.	Nil.	Nil.
1925-26	203,366	180,150	72,435 5 0	0 6 5'2	23,216	15,114 9 4	0 10 5	Nil.	Nil.	Nil.
1926-27	100,322	40,910	16,449 2 0	0 6 5'2	4,614	25,040 15 4	0 8 10	12,998	4,627 12 0	0 5 8'2
1927-28	231,080	21,396	8,604 0 3	0 6 5'2	147,430	77,554 5 2	0 8 5	62,254	22,113 2 2	0 5 8'2
1928-29	220,038	143,498	58,880 1 0	0 6 3	76,540	36,830 2 0	0 7 8	Nil.	Nil.	Nil.

APPENDIX IV.

Tanks not leased or leased on special terms.

1.—TANKS THAT FETCHED NO RENTALS IN 1928-29.

						Compensation.
						RS. A. P.
<i>Bellary District—</i>						
Daroji tank	...	...	...	...	...	155 0 0
<i>Chittoor District—</i>						
Tsadam	...	...	...	...	...	200 0 0
						for this and three other tanks.
<i>Kistna District—</i>						
Peddinayadu tank	...	...	...	...	...	Nil.
<i>Kurnool District—</i>						
Belegat tank	...	...	...	...	...	16 0 0
						for this and another tank.
Kochcheruvu	...	...	...	...	...	Nil.
<i>Nellore District—</i>						
Gattupalli	...	...	...	...	...	14 8 0
Ponnaluru	...	...	...	...	...	2 0 0
Pokkuru	...	...	...	...	...	7 0 0
Kanumalla	...	...	...	...	...	3 8 0
Somarazupalli Rajulu tank	...	...	...	...	...	2 0 0
Old and new Pakala tanks	...	...	...	...	...	10 8 0
Binginipalle	...	...	...	...	...	30 0 0
Maripadu	...	...	...	...	...	34 0 0
Rajavolu tank	...	...	...	...	...	5 0 0
Janakiamma tank	...	...	...	...	...	1 12 0
Naidu tank	...	...	...	...	...	0 12 0
Nadimi tank	...	...	...	...	...	0 5 0
Udayagiri Big tank	...	...	...	...	...	8 0 0

2.—TANKS WHICH FETCHED LOW RENTALS.

Name of the district and tank.	Rentals obtained.	Compensation.
	RS. A. P.	RS. A. P.
<i>Salem District—</i>		
Penukondapuram tank	20 0 0	118 0 0
<i>Nellore District—</i>		
Kadanuthala	7 0 0	25 0 0
Manganuru	11 4 0	25 0 0
Anemadugu	11 8 0	91 0 0
Jammulapalem	3 2 0	32 0 0
Budamagunta	5 12 0	15 0 0
Anumakondapalem	15 0 0	97 4 0
Bhimavar	1 5 0	8 0 0

APPENDIX IV—cont.

Tanks not leased or leased on special terms—cont.

2.—TANKS WHICH FETCHED LOW RENTALS—cont.

Name of the district and tank.	Rentals obtained.			Compensation.		
	RS.	A.	P.	RS.	A.	P.
<i>Nellore District—cont.</i>						
Vasili tank	29	0	0	165	0	0
Kadivedu	1	2	0	30	8	0
Kalegiri	0	11	0	6	8	0
Anamasamudram	1	0	0	35	8	0
Tadiparti	1	3	0	22	4	0
Zuvaladine	70	0	0	149	0	0
Purini	50	0	0	147	0	0
Chennur	10	0	0	246	0	0
<i>Chingleput District—</i>						
Vadamadurai	76	0	0	130	0	0
Tinnanur	125	0	0	615	0	0

3.—TANKS THAT WERE DISPOSED OF PRIVATELY FOR FAVOURABLE RENTALS.

Name of tank.	Highest bid in auction.			Amount obtained by private tender.			Gain.		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
<i>Nellore District—</i>									
Puduparti tank	...			20	0	0	20	0	0
Kavali tank	...			25	0	0	...		
Bhogavali	11	0	0	40	0	0	29	0	0
Musunur	...			180	0	0	...		
Juttur or Tallepalem	...			57	0	0	...		
Rudrakota Peddacheruvu and Rajacheruvu	...			30	0	0	...		
Chennayapalem	...			100	0	0	...		
Mannangidine	...			220	0	0	...		
Thummalapenta	...			80	0	0	...		
Brahmanakraka Krakamma tank.	...			25	0	0	...		
Papireddi cheruvu.	...			80	0	0	...		
Chagollu	...			113	0	0	...		
Atmakur	40	0	0	135	0	0	175	0	0
Kodur Ummidi tank	700	0	0	900	0	0	200	0	0
Varigonda Kasiraja tank	10	8	0	25	0	0	14	8	0

APPENDIX IV—cont.

Tanks not leased or leased on special terms—cont.

3.—TANKS THAT WERE DISPOSED OF PRIVATELY FOR FAVOURABLE RENTALS—cont.

Name of tank.	Highest bid in auction.			Amount obtained by private tender.			Gain.		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
<i>Nellore District—cont.</i>									
Madarajagudur	...			30	0	0	30	0	0
Idimipalli large tank	20	0	0	100	0	0	80	0	0
Allur and Ramanna tanks	...			1,500	0	0	...		
Rapur big tank	...			52	0	0	...		
Idagalli tank	...			23	5	4	23	5	4
<i>Chingleput District—</i>									
Tenneri tank	...			145	0	0	...		
Kuttirambakkam	...			40	0	0	...		
Nirvalur	...			40	0	0	...		
Sevilimedu	...			100	0	0	...		

APPENDIX V.

Inland fisheries leased to fishermen co-operative societies, 1928-29.

Name of society.	Year of formation.	Fishery leased out.	Period.	Annual rental.
1. Hampapuram Fishermen Co-operative Society, Coimbatore district.	1921	Three items relating to the Cauvery river in Kollegal taluk.	One year ...	RS. 70
2. Komarapalayam Society, Coimbatore district.	1925	Five items relating to the Cauvery in Gobichettipalayam taluk.	Three years ending 31st Mar. 1931.	650
3. Sirumugaipudur Society, Coimbatore district.	1927	Bhavani River.	One year ending 31st Dec. 1929.	225
4. Sunkesula Society, Kurnool district.	1924	Sunkesula Anicut and Edurur Swamp Fisheries.	Three years ending 31st Mar. 1931 and 31st Dec. 1930.	750
5. Nandyal Society, Kurnool district.	1926	Nandyal Tank Fishery	One year from 1st Apr. 1929.	515

APPENDIX V—cont.

Inland fisheries leased to fishermen co-operative societies,
1928-29—cont.

Name of society.	Year of formation.	Fishery leased out.	Period.	Annual rental.
6. Mandalam Society, Kurnool district.	1929	Tangadencha tank. ...	One year from 1st April 1929	RS. 300
7. Chidambaram Society, South Arcot district.	1926	Nine items relating to the Lower Anicut System, South Arcot district.	Three years from 1928 to 1930.	386
8. and 9. Udayargudi and Lalpet Societies, South Arcot district.	1926	Two items relating to the Lower Anicut System, South Arcot district.	Two years from 30th June 1929.	1,200
10. Lower Anicut Society, Tanjore district.	1927	(a) Two items relating to the Lower Anicut System, South Arcot district.	Three years from 1928-30.	271
		(b) Coleroon river in Kumbakonam taluk.	One year ending 30th June 1930	4,100
11. Karunthattangudi Society, Tanjore district.	1928	(a) Perar Fishery, Mannargudi taluk.	Two years ending 30th June 1930.	3,000
		(b) Vennar-Vettar Fishery, Tanjore taluk.	Three years ending 30th June 1931.	5,850
12. Tirumalavasa Society, Tanjore district.	1928	Four items in Shiyali taluk.	Three years from 1st July 1928.	1,387
13. Pappakoil Society, Tanjore district.	1925	Perar Fishery, Nega-patam taluk.	Three years ending 30th June 1930.	1,630
14. Trichinopoly Muham-madan Society.	1928	Cauvery river in Trichinopoly taluk and one item in Kulittalai taluk.	One year ending 31st Mar. 1930.	8,275

APPENDIX VI.

List of institutions supplied with zoological specimens during
1928-29.

			RS.	A.	P.
Agra ...	The Scientific Apparatus and Chemical Works, Ltd. ...	...	36	0	0
	St. John's College ...	...	21	14	0
Ahmedabad ...	Gujarat College ...	...	25	0	0
Aligarh ...	Muslim University ...	...	73	0	0
Bangalore ...	Central College ...	...	87	14	0
	Intermediate College ...	...	253	8	0
	Medical College ...	...	53	8	0
Allahabad ...	Intermediate College ...	...	59	7	0
	University ...	...	210	1	0

APPENDIX VI—cont.

List of institutions supplied with zoological specimens during
1928-29—cont.

			RS.	A.	P.
Benares ...	Hindu University ...	...	103	0	0
Calcutta ...	University ...	...	25	0	0
	Medical College ...	...	18	0	0
Delhi ...	Lady Hardinge Medical College for Women ...	...	6	4	0
Hoshiarpur ...	Intermediate College ...	...	49	0	0
Jaipur ...	Maharaja's College ...	...	62	0	0
Jodhpur ...	Jaswant College ...	...	42	5	0
Hyderabad ...	Oosmania University College ...	...	120	10	0
Lahore ...	Government College ...	...	433	0	0
	The Punjab Veterinary College ...	...	30	0	0
Lucknow ...	University ...	...	297	12	0
Mysore ...	Intermediate College ...	...	128	6	0
Nagpur ...	Victoria College of Science ...	...	191	4	0
Patna ...	The Prince of Wales Medical College.	...	126	0	0
Rangoon ...	Judson College ...	...	32	0	0
	University College ...	...	44	2	0
	Mr. Subrahmaniam Pillai ...	...	15	0	0
Srinagar ...	S. P. College ...	...	78	4	0
Belfast ...	Queen's University ...	...	29	8	0
Anantapur ...	Ceded Districts College ...	...	61	0	0
Calicut ...	Fisheries Training Institute ...	...	129	0	0
Changanacherry ...	St. Birchman's College ...	...	6	12	0
Cocanada ...	Pithapuram Raja's College ...	...	51	0	0
Coimbatore ...	Government College ...	...	8	4	0
Ernakulam ...	Maharaja's College ...	...	28	4	0
Kottayam ...	The College ...	...	19	4	0
Madras ...	Government Museum, Egmore ...	...	47	0	0
	Presidency College, Chepauk ..	...	36	12	0
	Madras Christian College ...	...	25	8	0
	Government Training School for Mistresses, Egmore ...	...	20	8	0
	Government Hobart Secondary and Training School for Mistresses ...	...	16	8	0
Mangalore ...	Government College ...	...	160	0	0
Nellore ...	Mr. Longly, Ramapatnam ...	...	16	8	0
	Miss Holman, Nellore ...	...	15	8	0
Palghat ...	Government Victoria College ...	...	37	0	0
Rajahmundry ...	Government Training College ...	...	30	0	0
Tellicherry ...	Government Brennen College ...	...	168	2	0
Trivandrum ...	Maharaja's College of Science ...	...	103	0	0
Total ...			3,631	9	0

APPENDIX

Statement showing the names of schools (district, taluk of teachers, cost of

Serial number.	Name of school.	Taluk.	Village.	Strength			
				I	II	III	IV
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Malabar District.</i>				* B. G.	B. G.	B. G.	B. G.
1	Kavayi ...	Chirakkal ...	Kavayi ...	12 11	1 5	2 2	0 1
2	Azhicoile ...	Do. ...	Azhicoile ...	16 16	6 6	4 5	2 2
3	Madapalli ...	Kurumbhranad. ...	Madapalli ...	19 23	15 7	24 3	16 7
4	Kuriyadi ...	Do. ...	Kuriyadi ...	30 40	11 7	6 8	7 6
5	Quilandy ...	Do. ...	Kovilkandi ...	36 19	13 10	20 7	7 4
6	Kannankadavu ...	Do. ...	Kannankadavu ...	24 13	1 7	7 2	5 2
7	Korapuzha ...	Do. ...	Korapuzha ...	16 16	6 3	11 3	5 1
8	Pudiappa ...	Calicut ...	Pudiappa ...	21 38	19 18	14 6	3 1
9	Model school, Vellayil.	Do. ...	Vellayil ...	41 11	15 8	11 6	8 1
10	Chaliyam ...	Ernad ...	Chaliyam ...	44 12	19 4	12 2	9 ...
11	Do. Night ...	Do. ...	Do. ...	6 ...	3 ...	4 ...	6 ...
12	Kadalundi ...	Do. ...	Kadalundi ...	28 20	6 3	4 3	0 3
13	Do. Night ...	Do. ...	Do. ...	9 ...	6 ...	5 ...	0 ...
14	Parappanangadi ...	Do. ...	Parappanangadi ...	25 2	22 2	16 1	13 ...
15	Do. Night ...	Do. ...	Do. ...	14 ...	2 ...	7 ...	
16	Tanur Night ...	Ponnani ...	Ryrumangalam.	20 ...	16 ...	17 ...	4 ...
17	Kadavanad ...	Do. ...	Kadavanad ...	37 31	21 5	15 4	
18	Veliangode ...	Do. ...	Velinagode ...	47 28	3 ...	4 ...	6 2
19	Palappatti ...	Do. ...	Ayiroor ...	76 36	18 7	3 ...	
20	Mannalamkunnu ...	Do. ...	Punnayoor ...	50 32	4 3	4 ...	2 ...
21	Puthankadapuram.	Do. ...	Thiruvatra ...	46 26	10 2	5 2	
22	Blangad ...	Do. ...	Manathala ...	38 30	14 9	5 1	5 4
23	Kothakadapuram ...	Do. ...	Engandiyoor ...	32 33	8 9	8 8	8 3
24	Kundazhiyur ...	Do. ...	Thoyakkavu ...	24 19	13 3	8 2	10 2
25	Talikulam ...	Do. ...	Talikulam ...	50 31	19 11	15 8	11 4
26	Nattika ...	Do. ...	Nattika ...	50 29	10 4	17 6	7 3
27	Kaipamangalam ...	Do. ...	Kaipamangalam.	38 19	16 10	17 10	20 6

* B=Boys; G=Girls.

VII.

and village in which they are situated), strength, number upkeep, etc.—West Coast.

Strength.				Total number of teachers.	Fisheries Training, Higher Elementary.	Fisheries Training, Lower Elementary.	Fisheries Training, Secondary Grade.	Ordinary Training, Secondary Grade.	Ordinary Training, Higher Elementary.	Ordinary Training, Lower Elementary.	Untrained.	Cost of upkeep.	Number that passed out of each school.
V	VI	VII	VIII										
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
B. G.	B. G.	B. G.	B. G.									RS. A. P.	B. G.
1 ...	...	...	...	2	2	...	...	...	...	...	...	846 0 0	2 2
...	...	...	...	2	1	...	...	...	...	...	...	846 4 0	2 2
13 2	18 2	17 ...	9 1	7	2	2	...	...	...	...	...	2,972 2 10	2 ...
6 ...	...	...	...	3	...	3	...	...	...	...	...	1,232 15 1	4 1
5 2	...	...	...	5	3	2	...	...	...	...	...	2,632 9 5	16 6
1 4	...	...	...	2	2	...	...	...	...	...	...	740 11 0	1 2
2 3	...	...	...	2	...	...	...	...	...	...	...	835 10 0	6 ...
...	...	...	...	3	2	...	...	...	...	...	...	1,454 14 9	1 ...
6 ...	...	...	...	5	2	...	...	...	...	...	...	1,841 7 0	4 ...
5 ...	...	...	...	4	2	...	...	...	...	...	...	1,371 9 0	1 ...
...	...	...	...	...	...	...	...	...	...	...	...	147 10 0	...
...	...	...	...	...	...	...	...	...	...	...	...	Two day school teachers on honoraria.	
3 2	...	...	...	3	1	...	...	...	...	...	...	1,086 15 6	...
...	...	...	...	...	...	...	...	...	...	...	...	120 10 6	...
...	...	...	...	...	...	...	...	...	...	...	...	One day school teacher on honorarium. One vacant.	
10 ...	...	...	...	3	...	2	...	...	...	...	...	1,166 1 10	3 1
...	...	...	...	...	...	...	...	...	...	...	...	76 0 10	3 ...
...	...	...	...	...	...	...	...	...	...	...	...	One day school teacher on honorarium. One vacant.	
...	...	...	...	2	1	...	...	...	...	...	...	629 10 4	...
...	...	...	...	4	4	...	...	...	...	...	...	1,646 14 0	...
...	...	...	...	2	1	...	...	...	...	...	...	743 8 0	...
5 ...	...	...	...	4	1	...	...	...	...	...	...	1,513 9 4	...
...	...	...	...	3	2	...	...	...	...	...	...	1,214 1 9	4 ...
2 ...	...	...	...	3	1	...	...	...	...	...	...	1,117 14 3	3 ...
1 1	...	...	...	4	1	2	...	...	...	...	...	1,534 11 0	3 ...
4 5	...	...	...	5	1	1	...	...	...	...	...	1,849 8 0	3 ...
4 ...	...	...	...	3	1	2	...	...	...	...	...	1,101 2 0	7 ...
7 2	...	...	...	6	3	2	...	...	...	...	...	1,799 6 0	6 0
6 2	...	...	...	5	1	2	...	...	...	...	...	1,778 10 6	2 ...
15 2	12 ...	6 2	9 1	8	4	2	...	...	...	...	...	3,138 13 10	2 0

APPENDIX

Statement showing the names of schools (district, taluk
of teachers, cost of

Serial number.	Name of school.	Taluk.	Village.	Strength			
				I	II	III	IV
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>South Kanara District.</i>				B. G.	B. G.	B. G.	B. G.
28	Byndoor ...	Coondapoor ...	Tarapati ...	22 5	9 1	5 1	3 1
29	Kiriman-jeshwar.	Do. ...	Kodiyeri ...	35 12	7 0	3 1	3 1
30	Uppoor ...	Udipi ...	Kallianpur ...	27 11	6 0	13 1	7 3
31	Polippu ...	Do. ...	Polippu ...	29 5	10 0	5 0	6 1
32	Malpe ...	Do. ...	Malpe ...	23 7	11 5	10 5	10 2
33	Udayavar ...	Do. ...	Kanakoda ...	29 12	...	...	...
34	Kaup ...	Do. ...	Kaup ...	20 8	8 0	10 1	5 0
35	Hooode ...	Do. ...	Hooode ...	11 7	5 1	2 0	3 1
36	Kodi ...	Do. ...	Kodi ...	29 2	11 0	15 1	5 0
37	Sri Ganano-daya.	Mangalore ...	Hoige Bazaar	21 22	12 5	9 5	4 4
38	Sandspit ...	Do. ...	Sandspit ...	16 9	3 5	3 1	5 2
39	Bangaraman-jeshwar.	Kasaragod ...	Bangaraman-jeshwar.	52 19	...	...	...
40	Kumbla ...	Do. ...	Arekadi ...	25 13	9 4	7 1	7 0
41	Kizhur ...	Do. ...	Kizhur ...	23 23	8 8	4 2	0 3
				1,211 690	396 172	351 108	213 69

R
KZ 332.2117N28
N29

