

MADRAS FISHERIES DEPARTMENT

ADMINISTRATION REPORT

FOR THE YEAR

1922-23

BY

JAMES HORNELL, F.L.S., F.R.A.I.

Director of Fisheries, Madras

Report No. 1 of 1924

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ADMINISTRATION REPORT OF THE DEPARTMENT OF
FISHERIES, FOR THE YEAR ENDING 30TH JUNE 1923

BY

JAMES HORNELL, F.L.S., F.R.A.I.,
Director of Fisheries.

I have the honour to submit herewith the Administration Report of my department for the year ending 30th June 1923.

2. The figures relating to Co-operation on the West Coast dealt with in paragraphs 106 and 107 will follow as soon as I receive them from the Assistant Director of Fisheries (Coast), Calicut.

ADMINISTRATION.

In view of the fact that this will be the last Administration Report I shall have the privilege of writing, it affords me particular gratification to be able to round off my 15 years' work in Madras with a highly satisfactory account of the results of my stewardship during 1922-23. In several respects the past year has proved a record; all the important revenue sections have prospered exceedingly and I can leave the department with the knowledge that it has successfully turned the corner of adversity caused by the aftermath of the Great War. My successor will find the department fully re-organized and the lines of further progress definitely marked out, so soon as the finances of the country justify renewed expansion.

2. In presenting the various statements of accounts for the past year's working in the different sections, I have sought to set them on such a really sound basis as will raise them beyond criticism from the business community. In all past years, with the express sanction of Government, a certain large percentage of the salaries of the permanent staff, usually 50 per cent, has been omitted from the debit side of all our semi-commercial undertakings. The argument for this was that a large proportion of the time of the staff was devoted to experiment and industrial research. This was allowable during the first few years when the foundations were being laid; I consider that in practically all cases this



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procedure is no longer to be justified and so, in the statements of the financial working of these sections given below, I have insisted upon all expenditure being debited. No exceptions have been permitted. The figures now presented are in consequence reliable indices of the actual financial state of each concern for the year ending 30th June 1923.

3. The profits derived from the various semi-commercial sections of our work are as follows:—

	Expendi- ture.	Receipts.	Profit, 1922-23.	Profit (+) or loss (-) 1921-22.
	RS.	RS.	RS.	RS.
Chank and beche-de-mer fisheries ...	51,546	97,913	46,367	+ 8,266
Inland Pisciculture	93,965	1,14,416	20,451	- 10,127 (loss)
Marine Aquarium	7,486	9,461	1,975	+ 1,842
Experimental Cannery	31,036	33,030	1,994	- 3,475 (loss)
Tanur Experimental Station	22,446	28,228	5,782	- 1,200 (loss)
	2,06,479	2,83,948	76,569	- 4,694 (loss)

Losses were sustained from—

	1922-23.	1921-22.
	RS.	RS.
Pearl Fishery section	8,350	24,043
Inshore fishing experiments	1,031	3,340
Zoological supply	681	807
Pulicat Oyster Farm	491	961
	10,553	29,151

4. The remodelling of the financial statements renders a comparison with the figures given in the Administration Report for the preceding year impossible; hence I have had the latter amended upon the same basis in order to show how great and substantial has been the advance in prosperity. This successful re-organization as will be noticed is not confined to certain sections; it is wholly consistent and characterizes all without exception. On the five most important productive sections a net profit of

Rs. 76,569 has been made as against a loss of Rs. 4,694 in the previous year—a net improvement therefore of over three-quarters of a lakh. On four other sections which however include pearl bank inspection, expenditure that will eventually be recouped when a fishery takes place, the deficit of Rs. 29,151 experienced in 1921-22 is reduced to Rs. 10,553. I wish to emphasize that this wonderful improvement in the financial aspect of our work is not due to blind retrenchment; every care has been taken to reduce expenditure not absolutely essential—no luxuries have been permitted—but taken generally 90 per cent of the improvement is due to the increased energy, experience and vigilance of the staff. Wherever I have judged it expedient, I have given promising officers greater responsibility and have encouraged them to exercise more personal initiative. In all cases they have responded splendidly to this treatment and it is this, more than anything else, that has contributed to the very satisfactory report I am now making.

5. The greatest advances were made in respect of the Chank Fishery and in Inland Pisciculture. The former gave Rs. 46,367 profit as against only Rs. 8,266 in the preceding year and the latter a profit of Rs. 20,451 as against a loss of Rs. 10,127. The work of the Cannery and of the Tanur station was most satisfactory, the former making a clear profit of Rs. 1,994, the latter one of Rs. 5,782. In both cases, the past year's working is the first on record in which they made an actual net profit. In every year previously 50 per cent of the salaries were omitted from the expenditure; in the present year this and supervision have been fully debited and in spite of this a profit, a real profit, is shown.

With regard to the four items that show a loss, the first, the Pearl Fishery section, is expenditure that will be recouped at the next fishery; this I expect will occur in 1926 or 1927 and should prove a very profitable one. My inspection in March and April of this year showed the banks to be stocked over an extensive area with vast multitudes of healthy young oysters. The second item, inshore fishing experiments, which I never favoured, has been brought to a conclusion and will entail no further cost. The third and fourth are small items and are fully explained on a later page.

6. The total expenditure for the year was Rs. 3,27,485, the receipts being Rs. 3,11,321. If from the former be deducted the sum of Rs. 44,541 spent upon the non-productive items of education, socio-economics and oil and guano inspection, and the amount of

supervision debitable to the control of public fish-curing yards, whereof the finance vests with the Salt Department, the expenditure on what may be termed the semi-commercial section of the department's operations, together with supervision and research will be reduced to Rs. 2,82,944; this shows that the department more than pays its way and brings in a substantial contribution to the revenue of the country.

7. *The Director's work apart from administration.*—Besides directly supervising the sardine and mackerel research at Calicut, and the work of zoological supply, I had to devote nearly six weeks to inspection of the Pearl Banks and the instruction of the Superintendent, Pearl and Chank Fisheries, in the methods to be followed in future, owing to the tragic death of Mr. Allan, the Assistant Director of Fisheries (Marine), on 23rd September 1922. This officer had the misfortune to fall from the first story of his bungalow, sustaining such injuries as caused his death a few hours later. In July I investigated the flying-fish fishery off the Coromandel coast and found that it is dependent upon the peculiar spawning habits of these fishes. An account has been published in Bulletin Volume XV.

8. Besides this, I was able to write the following reports, all either published in our Bulletin or now in the press, viz. :—

(1) The aims and achievements of the Madras Fisheries Department,

(2) A publicity leaflet on the use of "Fish-meal,"

(3) A revised account of "The Indian Pearl Fisheries of the Gulf of Mannar and Palk Bay" (Bulletin XVI),

(4) A report on the Inspection of Pearl Banks, 1923, and

(5) Jointly with Mr. M. Ramaswami Nayudu, an account of the first year's results of the investigation on the Life-History of the Oil-sardine.

9. Considerable attention was devoted to the collection of exhibits for the Empire Exhibition to be held in London next year. I have written an account of Fishing Methods on the Madras Coast, to serve as a descriptive guide to our exhibits and I hope to supplement this by a similar account of the methods used on the West Coast.

10. Other Fishery reports published or in the press are—

(1) Notes on the eggs and embryonic development of Flying Fish, by Mr. M. Ramaswami Nayudu, B.A.,

(2) A statistical account of the Fish Supply of Madras, by Mr. S. T. Moses, M.A., F.Z.S.,

(3) An account of the Anatomy of the Chank, by Mr. S. T. Moses, M.A., F.Z.S.,

(4) A statistical study of young fishes from Silavathurai Lagoon, Tuticorin, by Dr. R. H. Whitehouse, D.Sc., and

(5) A new copepod parasite of Wallago attu, by Dr. B. Sundara Raj, M.A., Ph.D.

11. *Health of the Staff.*—On the advice of Dr. J. F. Kendrick the headquarters staff were re-examined a year subsequent to the first treatment. A marked reduction in the number of those infected was noted, and the infection of such men was light. All were given a second course of treatment. It is impossible to assess the increase in efficiency brought about by the consequent improvement in the health of the staff, but it is undoubtedly considerable. The clerks work more briskly and as they have recently started a badminton club, they would appear to have gained some reserve of energy!

12. *The Superior Staff.*—Particulars of the personnel of the staff will be found in Statement No. I appended. The headquarters office was moved in November 1922 to a fine suite of rooms in Chepauk Palace, formerly occupied by part of the Engineering College. This has had a very favourable influence upon the conduct of office work and on the health of the clerical establishment.

13. As already noted we have to deplore the sad death of Mr. J. H. Allan, Assistant Director of Fisheries (Marine), a very capable officer with much seafaring experience. We had looked to him to carry out the detailed inspection of the pearl banks due this year, and to conduct the deep-sea fishing experiments when the new fishing launch arrives. Government eventually decided to subdivide the duties Mr. Allan had performed, making Rao Sahib J. A. Fernandez, Superintendent of Pearl and Chank Fisheries, and appointing a Master fisherman from home on a short engagement to look after the fishing experiments. The wonderful success of the Tinnevely fishery during the past year is due entirely to the energy and tact of the former.

14. Mr. B. Sundara Raj, Assistant Director of Fisheries (Inland), continued his studies in Fishery Science throughout the year at Liverpool University.

15. The Main West Coast operations were ably managed by Rao Bahadur V. Govindan, Assistant Director of Fisheries (Coast), whose interest in the social uplift of the fisher community continues as strong as ever. This section of the population owe him a great debt of gratitude, and I trust he may be spared for many years to come to continue this good work.

16. Mr. Chakrapani Ayyangar continued to act as Assistant Director of Fisheries (Inland) and has to be congratulated on the outstanding success that has attended his efforts to improve inland pisciculture. His work has been exceptionally good, and I consider him to be specially fitted for the duties he is now performing.

17. As in former years, the work of my Personal Assistant Mr. Karunakara Menon has been invaluable; indeed but for the great help I received from him, I should have been unable to spare time for duties outside of administration, such as the inspection of the pearl banks and the close supervision of the sardine research.

18. The conduct of the staff generally was highly satisfactory; it is with much personal regret that I have now to sever a relationship marked on their side by loyalty and willing service.

I consider that I have been most fortunate in regard to the men now serving in the department; there have been unsatisfactory officers and clerks, but they have been eliminated. The success of the department's operations during the past year is due, I am convinced, very largely to each officer having found his true *metier* and being the right man in the right place.

19. In conclusion I wish to draw the attention of Government to the fact that they possess a Fisheries Department which, in some respects, is unique in the world. The department has aims similar to those of sister departments in other countries, namely, the improvement and protection of the fishing industry in all its branches, increase of the food supplies derived from the sea and inland waters and the betterment by education of the fisher community. But whereas in nearly all other countries expenditure upon these objects is taken directly from the public purse without expectation or attempt to cover it by revenue earned separately and directly by the department's own activities, in the case of Madras, all but a small balance is covered by money earned within the department. Its work is carried on practically free of cost to the State.

I.—INDUSTRIAL SECTION.

A.—THE FISH CANNERY, CHALIYAM.

20. *General.*—During the whole of the year I exercised direct control, the Sub-Assistant Mr. Bharatan being in working charge. Under his energetic and economic management, the operations were carried on with marked success, both the output and the sales increasing. Sardines were abundant, but were small and deficient in oil and therefore less economical and satisfactory for canning purposes. Mackerel and prawns were unusually scarce and this reduced the output considerably. What prawns were obtained, came from Tanur, in a semi-dried condition. The high price that has to be paid for them absorbs nearly all the profit, but it is necessary to can them even without profit, in order to satisfy the requirements of regular customers. The additional machines due from Europe at an early date will largely increase the normal output; the premises, already cramped, will then become totally inadequate and a decision will have to be made either to restrict the output or to build more commodious premises. The cannery at present is too large for mere demonstration and too small as a commercial undertaking if profits of any real account to be made.

21. The accommodation for manufactured goods, general stores, and office is also inadequate. This is a serious impediment to progress. The manager can find no suitable house to rent in the neighbourhood and suffers much inconvenience and discomfort in consequence. A new site should be found and the cannery removed thereto at the earliest possible date if a commercial cannery is what Government desires this venture to blossom into. Poor results and uneconomic working cannot be avoided so long as the cannery is located at Chaliyam.

22. Output was increased from the 70,510 tins of 1921-22 to 79,783 which seems to be about the limit with the present machinery. The majority consisted of sardines in oil.

Sales rose from 31,243 * to 48,285, a result due to a vigorous advertising campaign carried out in India and Burma. The bulk of the business is on the V.P.P. system direct from the cannery to the consumer. A number of small agencies are being opened up,

* This figure is the actual sales made in 1921-22. Through a misunderstanding the sales figure given in last year's report included a very large wholesale consignment sent out for sale on commission but not actually sold.

but from the experience I have now gained, I consider it is useless to hope to dispose of our entire output in India under existing conditions. To do so requires such an intensive advertisement campaign and such large trade discounts, that Government would have to be prepared to face a considerable loss for several seasons before the market could be captured; this I understand they are not willing to do, though it is a policy that any big business house would endorse as the only one that would assure eventual success. The attitude of the big provision distributors is also most discouraging. Instead of encouraging this new industry which now turns out goods distinctly superior to a great deal of the so-called sardines now being imported, particularly those bearing Portuguese labels, these firms refuse assistance and for one reason or another prefer to push imported brands, even though the prices at which the cannery offers its goods are very much lower, quality for quality and weight for weight. Under these circumstances I consider the Government will be justified in increasing the duty upon imported goods to an extent sufficient to give the Indian manufacture a fair chance against this unpatriotic trade treatment. I commend this aspect of the trade to the consideration of Government with a view to the enhancement of the import tariff on this class of goods. If the wholesale firms in India will not help and if a considerable increase in the tariff on canned sardines be not enacted, the only satisfactory alternative will be to abandon the attempt to sell our goods in India itself and to concentrate upon an export trade. I have already been approached by a firm of Australian import agents who consider the quality of our products very suitable for the Australian markets. This line of development is now being investigated, and it is hoped to despatch a consignment shortly to test possibilities.

The new label design is very attractive and enhances the appearance of our goods greatly.

23. *Finance*.—In accordance with my decision that every section of the work shall bear the full burden of all charges incurred in the same way that any private commercial concern would shoulder them, the results this year are not comparable with those of previous years, when only 50 per cent of the pay of the permanent staff was debited and no part of the Director's salary was included in the overhead charges. This year the whole of the labour and supervision charges have been debited. It is therefore highly

satisfactory to record that a clear net profit has been made of Rs. 1,994. Had the accounts been made out on the same principle as in previous years the profit that would have been shown would have been not less than Rs. 6,500.

The value of the goods sold during the year amounted to Rs. 24,740-12-10.

The staff worked well and Mr. Bharatan deserves special credit for his efficient and businesslike conduct of the affairs of the cannery.

B.—THE TANUR EXPERIMENTAL FISHERY STATION.

24. The fishing conditions during the past season were the reverse of those prevailing in 1921-22, for whereas sardines were very abundant, mackerel and large fish were extremely scarce. The fish-guano factories prospered, but fish-curing suffered; these erratic fluctuations are most discouraging to all connected with the trade and emphasize the urgent need on the West Coast for the introduction of methods that shall enable adequate supplies of fish to be brought ashore in seasons when shoals do not come close inshore. At present this latter factor is necessary to success. The fishermen have no boats suitable for other than inshore fishing close to their homes, and hence cannot go afield to look for shoals. Means are urgently needed to ascertain where supplies of fish are to be had when the inshore fishing fails. Once this is certified, the capitalist may then be induced to provide sea-going boats and the means to preserve the catch during transport ashore. In India as elsewhere, the lesson must be learnt by the fisherfolk that the time is past when it sufficed to sit and wait for fish to come to a convenient place to be caught; the Indian fisherman must prepare to go afield and bear with patience the severance of home ties for a few days at a time if he is to take adequate and fairly regular toll from the sea. The shoals must be hunted far afield when necessary and more efficient and larger nets used in their capture if the industries that hinge upon the sardine and mackerel are ever to be set on a stable basis, and the present disastrous fluctuations minimized. The experimental fishing launch now on its way from England should help materially in solving this fundamental difficulty.

25. The year's operations at the station have been the most satisfactory on record. As most of the operations have now

emerged in their main features from the experimental stage, I have decided that the time has come when it is no longer desirable to take advantage of Government's permission to debit the working with 50 per cent only of the salaries of the permanent staff and to charge nothing for supervision. Accordingly in the accounts annexed, the whole of the pay of the permanent and temporary staff has been charged and in addition 20 per cent of the Assistant Director's (Coast) pay has been made a debit to provide adequately for the charge incurred under the head of supervision. In spite of the large increase thus made to the debit of the station, its accounts for the year show a net profit of Rs. 5,782, a result that reflects the greatest credit upon the Sub-Assistant Mr. O. Sankaranarayana Menon who has had charge of the operations. This is the first time that the station has made any *actual* net profit. In 1921-22 Rs. 1,070 of profit was indeed shown, but this was attained by omitting 50 per cent of the pay of the permanent staff and without any debit for supervision. It would seem then that here as elsewhere my efforts to put the semi-commercial enterprises of the department on a sound financial basis have been at last crowned with success.

One assistant yard officer and one petty officer of the Salt section, who were newly appointed, were trained at the experimental station in the improved methods of curing as well as an apprentice student from Travancore.

The station was brought under the Factory Act during the year and it is now worked under the provisions of that Act.

26. *Curing operations.*—The total quantity of fish purchased for curing was 249,293 lb. The largest supply of cured fish, amounting in value to Rs. 5,401-1-0, was made to the Jails. The moist curing of fish with Korakapuli was continued and besides mackerel, seer slices and sardines were also treated with success.

27. *Oil and guano operations.*—The total quantity of fresh sardines treated was 417,053 lb. (186 tons) at a cost of Rs. 1,459 4-6 as against 113,244 lb. (50 tons) for Rs. 315-13-2 during the previous year. The average price per ton was Rs. 8-4-3 as compared with Rs. 6-5-0 of 1921-22. In addition to whole fish, there were 68,901 lb. (31 tons) of sardine offal resulting from the curing operations. The total output of guano was 84,720 lb. or about 38 tons, equal to a proportion of 18 per cent of the weight of raw fish treated. The guano obtained was mainly supplied to the Madras Agricultural

department and various co-operative societies at Rs. 95 per ton f.o.r. Tanur, as against Rs. 140 per ton realized during the previous year. The proportion of oil varied from 2'2 to 7'7 per cent except in the case of a small batch of 385 lb. which yielded a phenomenally large percentage (19'7) on 7th November 1922. The poor percentage of fat was very unfavourable for the preparation of the superior grade of oil (A-1), the outturn of which was only 815 gallons; of this 300 gallons only had an acidity below 1 per cent and the rest up to 2'5 per cent. Most of it was supplied to the cannery at Chaliyam at Rs. 2-8-0 per gallon. The second grade, i.e., pressed oil, about 1,350 gallons, was supplied to the Controller of Contracts, Simla, who placed orders for about 20 tons. Though every effort was made to secure the quantity required, we were able to supply only 12 tons, including purchases from private manufacturers of about 2,500 gallons. As most of this oil had an acidity varying from 3 to 12 per cent it had to be refined before despatch to the Controller of Contracts.

The arrangements for refining are very imperfect for want of proper boiling tubs, neutralising vats and a filter press; hence the process of refining was not only tedious, but also involved much wastage of the material. It is for consideration whether the station should any longer endeavour to carry on work of this kind, which is a legacy from the late war, when every effort had to be made to meet the requirements of the Munitions Department.

Supplies of specially prepared oil were furnished to the Medical Officer in charge of the Ophthalmic Hospital under an arrangement with Major R. E. Wright, who has kindly agreed to test the oil for the oil-soluble Vitamin A. If successful, this oil may then be used for therapeutic purposes as a substitute for the much more expensive cod-liver oil, wherever the presence of Vitamin A is essential.

28. *Fish meal.*—The preparation of fish meal was an important feature of the past year's operations. It was conducted on a much larger scale than in 1921-22; the quantity of fish treated in the raw was 71,706 lb. (32 tons) of sardines, and 1,200 lb. of horse mackerel and ribbon fish (*Trichiurus* sp.) costing in all Rs. 342-13-0. This gave 12,876 lb. (5 $\frac{2}{3}$ tons) of dried cake yielding about 10,300 lb. of fine meal. Its preparation involved much extra labour for want of proper plant and utensils. The greatest difficulty was felt in drying the pressed cake. Unless it was 50 per cent dried, putrefaction

could not be arrested, hence to ensure quick and uniform drying, the cake had to be disintegrated and dried for six to eight hours at 90° F to 100° F in the sun and for two to three hours at 140° F to 150° F in the artificial drier. Powdering arrangements were also imperfect and most of the stuff had to be powdered with a wooden mortar and pestle. In spite of the above difficulties, as fish (sardines) were cheap this season, it was possible to reduce the price to 2 annas per lb., allowing 12½ per cent discount on large orders. The meal is mainly taken by European owners of farms and piggeries and by poultry breeders, as well as Government cattle farms. The number of customers is gradually increasing. As the ordinary Indian feels it is a sacrilege to feed his live-stock with fish in any form, it will take considerable time to overcome this prejudice. It is however interesting to note that, in certain parts of India, fish has been in use with other ingredients from time immemorial as a tonic for live-stock in poor health, e.g., on the west coast elephants employed in the forest for dragging logs are occasionally given as a tonic, a preparation in which the fish called mullan (*Equula*) is the chief ingredient.

To help in bringing the value of fish meal to the notice of breeders of live-stock and poultry, I wrote a short explanatory pamphlet, which has also been translated into several vernaculars and is now being extensively circulated.

29. *Fish-curing yards*.—Another public yard (at Adakathabail) under the control of this department was opened during the year bringing the total of yards managed directly by "Fisheries" to eleven. Two others are nearly completed and will be opened before the beginning of next fishing season.

The total quantity of fish brought into the eleven yards during the year under report was 355,913 maunds and 34 seers and the cured weight 208,201 maunds 6 seers against 389,674 maunds and 220,701 maunds respectively, during the previous year. The decrease in the quantity was due to the unfavourable fishing season and especially because of the phenomenally low catches of mackerel in most places, particularly at Malpe. The price of mackerel rose from Rs. 3 to Rs. 12 per 1,000.

30. The total quantity of salt issued was 47,071 maunds 14 seers as against 57,403 maunds in the previous year. Brine curing has become popular in all the yards. The total quantity of filtered brine used during the year was 37,973 gallons and the quantity of

fish cured with it was 8,298 maunds 34 seers as against 91,575 gallons and 16,883 maunds during the previous year. The reason for the decrease is the abnormally low catches of fish already referred to. Many of the curers now understand the value of brine curing and lose no opportunity to use it whenever available as there is much saving of time and labour, not to speak of money, especially in times of glut when labour is insufficient. The quality of brine cured fish has been appreciated by consumers both local and abroad. Taking the average proportion of salt used in dry salting to be 1 maund of salt to every 7 maunds of fish, it would have taken 1,185 maunds 22 seers of salt to cure 8,298 maunds 34 seers of fish and hence there is a saving of nearly Rs. 741. Savings have also been effected by careful reduction in the proportion of salt issued for curing. All the curing sheds in the yards at Malpe, Thannerbavi, Adakathabail, Madapalli, Meladi and Mangalore (excepting those of a few women curers) and Calicut (excepting one shed) have been made permanent with cemented floors and masonry salting troughs. A dozen similar sheds were put up at Tanur during the year under report and half a dozen more are under construction. Some of the sheds are substantial structures with tiled roof and wooden trellis work, costing Rs. 700 to 800. The curers having at last come to appreciate the advantages of these improved sheds have not been parsimonious in making them presentable and substantial. This is the more gratifying in view of the fact that it was these very curers who not only refused to put up such sheds but even went on strike when they were told they must do so.

The ticket holders of Cannanore yard have also applied for loans from Government for constructing improved sheds and the amount of the loans required will be included in the next year's budget. Most of the ticket holders of the Thalayi yard have also agreed to put up new sheds at their own cost; six of them are already completed and of ten others the construction has begun.

The Assistant Inspector who has posted for duty in connexion with these yards continued to work in this department throughout the whole year. All the newly-appointed yard officers underwent training in improved methods of curing, etc., at the Tanur experimental station.

The year was on the whole very unfavourable to the fish curing industry all along the coast. As shoals of mackerel and the larger

kinds of fish were absent during the year, the operations in the yards were comparatively poor, and the curers especially at Malpe have in many cases sustained heavy losses.

31. *Private oil and guano factories.*—During the past season, 1922-23, sardine shoals were abundant in the inshore waters along the whole coast of South Kanara and Malabar, but the fish were small, lean and deficient in fat. As a consequence although there was a large increase in the number of factories at work and a great production of fish guano, the output of oil was comparatively small. So far as can be estimated, the total production of guano may be approximately placed at 32,000 tons and that of oil at 12,000 tons. Taking the average price of the former at Rs. 75 per ton ex-factory and the latter at Rs. 100 per ton, the total value of the industry during the year amounted to Rs. 36,00,000. Most of the guano was exported, as usual, to Ceylon, but 2,000 tons were shipped direct to Japan. The oil went in the main to Calcutta, but demand was slow and prices ruled low. Towards the close of the season an improvement was experienced, owing to demand from Europe.

32. The total number of private factories increased from 542 in 1921-22 to 647 (457 in South Kanara and 190 in Malabar). Of these 349 in South Kanara and 141 in Malabar took out licences from the taluk boards concerned. Besides these the municipalities of Telli-cherry and Cannanore licensed 42 factories situated within the 3-mile limit, the former levying fees varying from Rs. 4-15-5 to Rs. 33-3-2 according to the area occupied by each factory, and the latter at a uniform rate of Rs. 15 per factory. All the taluk boards except Mangalore and Kasaragod charged a uniform fee of Rs. 10 per factory. The Taluk Board of Kasaragod levied a fee of Rs. 5 per factory, while that of Mangalore charged according to the number of fish boilers in each factory; levying Rs. 2 for the first one and an additional rupee for every extra boiler put up, subject to a maximum fee of Rs. 10 per factory. A few cases of prosecutions were instituted by the Taluk Boards of Chirakkal, Kurumbranad and Calicut against factory owners who did not take out licences or who worked their factories without any regard to sanitary requirements. The Calicut municipality also instituted a few prosecutions against certain factories lying within 3 miles outside the municipal limits, but subsequently withdrew these charges, because there was conflict of law, as the Taluk Board of Calicut had also charged these very individuals for the violation of the

self-same-by-law. In G.O. No. 2465, L. & M. of 9th December 1922, the taluk boards were advised not to exercise the powers conferred upon them over factories lying within 3 miles outside municipal limits, pending the necessary legislation to modify the present dual control.

33. As a result of the scarcity of sardines during the previous two years, many of the factory owners, especially in South Kanara, having closed their works for two years, were ill-prepared to resume work on the re-appearance of large shoals of sardines in October and November, 1922; hence valuable time was lost in effecting the repair of their plant, etc. The catches were also so abundant that many of them found it extremely difficult to finance their operations, with the result that a considerable quantity of raw material had to be either beach-dried as fish manure or buried as pit manure.

34. At the commencement of the season heavy rains interfered with manufacture and later on excessive catches contributed to upset the arrangements of the factory owners. They paid also higher rates for the raw fish in the expectation that there would be good demand as there was no balance left from the previous season's stock. But exporters were reluctant to buy and as the manufacturers have seldom a sufficiency of capital they could not wait and were obliged to sell the guano at low rates; as the season advanced these ultimately came down to Rs. 45 per ton ex-factory. The fish being mostly lean the proportion of oil obtained was also small and even for this there was hardly any demand but towards the end of the season the price went up to Rs. 125 per ton as shipments began to be made to Europe.

35. Only three Sanitary Inspectors were employed by the taluk boards, i.e., one in Udipi, South Kanara, and two in Malabar district, to inspect fish oil and guano factories. The retention of the temporary Inspector and of the fitter of the Oil and Guano factories was sanctioned for a further period of two years from 18th November 1922. A systematic tour was made by these men, instructing and demonstrating at various stations how to prepare better grades of oil and guano. Almost all the factories lying between Rairimangalam amsam in the Ponnani taluk and Bindoor in the extreme north of South Kanara were visited. It was a common complaint at most places that delay in the issue of licences by the respective taluk boards had necessitated the beach-drying of a

considerable quantity of raw fish to the disadvantage both of the factory owners and of the fishermen who supplied it.

C.—THE OYSTER FARM AT PULICAT.

36. Except on the financial side, where circumstances beyond our control entailed heavy exceptional expense, the season was the best on record, 184,350 oysters being supplied. The 1922 season lasted unusually long, the oysters remaining in good condition till 28th October 1922, due to the extreme dryness of the summer, which gave insufficient rain to cause spawning in August and September as is usual. The 1923 season opened on 13th February and still continues. This late closing of one season and early opening of the new one enabled us to supply an exceptionally large number of oysters. Unfortunately the cost of collection and treatment was much higher than usual in consequence of the destruction of our main bed of oysters at Pulicat by the action of a shell contractor holding a collecting lease from the Collector of Chingleput. Owing to the omission in the lease of any clause to exempt our beds from damage, this man concluded he had a right to the oysters and was so expeditious in his operations that before steps could be taken to convince him otherwise, the whole of the oyster bed had been broken up and the shells dumped in rotting piles on dry land. After considerable correspondence, it was decided in G.O. No. 738, Development, dated 23rd May 1923, that no action against the contractor need be taken. To prevent any recurrence of the disaster, a safeguarding clause is to be inserted in future leases.

37. The chief consequence of the loss of this bed was that we had to collect oysters from other sources, chiefly from Ennur; as sewage contamination is possible there, rigorous and somewhat expensive means had to be taken to sterilize them, namely by suspending them in bags for ten days bathed in pure sea-water. This enabled us to supply all the oysters that were ordered, but it increased greatly the expenditure. As a result the handsome profit we should have had, had our Pulicat bed not been destroyed was eaten up by the extra expenses incurred for collection and sterilization, and the hard work of the Zoological Assistant was deprived of its just reward.

38. After inquiry, it appears to me possible to add the supply of shell-grit suitable for use in poultry runs, as a minor industry,

to that of oyster culture. I have accordingly instructed the Zoological Assistant to prepare a quantity and place it on the market in bags of suitable size.

39. The finance of the oyster operations for the past year is as follows:—

	RS.	A.	P.
Labour and expenses of sterilization	2,231	5	5
Supervision (20 per cent of the pay of the Zoological Assistant and his peon)	480	0	0
Travelling allowance of same	332	5	0
Total	3,043	10	9
Sale-proceeds of oysters	2,552	11	7
Debit balance	490	14	10

In addition to this a capital expenditure of Rs. 1,000 was sanctioned for the construction of a store and watchman's room at Pulicat. This building was completed in March last, and will be a great convenience in future, as soon as the destroyed beds be re-established.

D.—THE PEARL AND CHANK FISHERIES.

40. The results of the reorganization of this section which I effected last year have been wholly satisfactory. Instead of the deficit of Rs. 18,771 in 1921-22, a net profit of Rs. 38,286 was made. As an expensive pearl bank inspection had to be paid for and as the entire cost of superintendence has been debited, this large net profit is most satisfactory, and reflects very great credit upon Rao Sahib J. A. Fernandez who had charge of the chank fishery from which the whole of this profit has been derived.

Apart from the success of the latter fishery, the outstanding features of the year were the re-appearance of pearl oysters in vast abundance on the majority of the banks off the Tinnevely coast and the utilization of the *Lady Nicholson* by the Revenue Department for the inspection of the Laccadive Islands.

41. The general finance of the section is clearly set forth below. As will be seen the pay and charges of the Superintendent have been divided equally between the Chank and the Pearl Fishery sub-sections. The revenue under Pearl Fisheries consists almost entirely of the charges against the Revenue Department for their

use of the *Lady Nicholson*, the sum charged being less than one-fourth of what they would have to pay had a Royal Indian Marine steamer been chartered; the arrangement is therefore profitable to both sides.

	Expenditure.	Revenue.	Profit.	Loss.
	RS.	RS.	RS.	RS.
1. Tinnevely chank fishery	28,396	66,269	37,873	...
2. Rāmnād chank fishery	20,023	26,974	6,951	...
3. Sivaganga chank fishery	306	270	...	36
4. Tanjore chank fishery	...	2,750	2,750	...
5. South Arcot chank fishery	...	900	900	...
6. Chingleput and Nellore chank fisheries	...	750	750	...
7. Fifty per cent of pay and travelling allowance of the Superintendent debited to chank fisheries	2,821	...	...	2,821
8. Pearl fishery (including fifty per cent of the pay and travelling allowance of the Superintendent).	19,452	11,102	...	8,350
9. Sea-going launch	32	...	...	32
10. Miscellaneous	...	301	301	...
Total	71,030	1,09,316	49,525	11,239

42. *The chank fishery—Summary.*—The following tabulation brings out the salient features of the results in comparison with those of the preceding six years. Had the contract rate for the shells been the same as in 1918–21, the financial results would have been compared still more favourably with those of preceding years. As will be seen the net profit made was Rs. 46,367 as against Rs. 8,266 in the preceding year, an advance that proves how satisfactory has been the recent reorganization.

Year.	Net profit.	Number of shells fished.	Rates per 1,000 for chanks.	
			Tuticorin.	Rameswaram.
	RS.		RS. A. P.	RS. A. P.
1916–17	53,938	418,314	121 0 0	301 0 0
1917–18	57,122	391,137	121 0 0	301 0 0
1918–19	82,611	435,262	325 0 0	301 0 0
1919–20	46,029	339,805	325 0 0	215 0 0
1920–21	36,537	283,869	325 0 0	215 0 0
1921–22	8,266	228,198	210 5 0	215 0 0
1922–23	46,367	466,540	210 5 0	205 7 0

43. *The Tinnevely chank fishery.*—The year's catches of full-sized shells amounted to 311,826 as against 68,383 in the preceding season; judged by this standard the past season is the most successful of any since the department took over charge in 1909. Indeed on only five occasions since 1876 has this number been exceeded. In this connexion it has to be remembered that the difficulties of getting an adequate labour force are infinitely greater now than in the nineteenth century. Diving is considered a low caste occupation and all divers try to educate their sons to some other occupation than their hereditary one. As a consequence the local diving force at Tuticorin is now reduced in great part to greybeards who are gradually dying off. The attempt to induce lads to join has proved a failure and so, last year, the only alternative was to offer inducements to divers from other centres to join. The recent advance to one anna per shell in the rate paid for chanks was a determining factor; besides this, other minor advantages were offered: the result was that 124 Kilakarai divers were persuaded to join. These men formed the mainstay of the fishery, for our utmost efforts could not induce more than 25 Tuticorin divers to participate. The industry in future must look to the employment of a non-local labour force.

44. Incidentally this utilization of Kilakarai men is an outcome of my recommendation to consolidate the local chank fisheries by the acquisition of the lease of the Rāmnād fishery. Even then I contemplated the use of the Rāmnād divers for the Tinnevely fishery; this end has now been attained and in future we shall have to rely on the arrangement for success. This fully proves my contention that the acquisition of the Rāmnād fishery was necessary for the purpose of co-ordinating our chank fishery operations, even apart from its own intrinsic value.

45. The importation of the Kilakarai divers had an excellent moral effect on the Tuticorin men, who now learn to their chagrin that they are no longer indispensable. They worked much better and with greater content once they realized this, and gave far less trouble than usual.

46. The Kilakarai divers worked on an average for two months in this fishery. Out of the total of 311,826 shells fished these men brought in 165,363. The department provided them with free towage, free house accommodation, and a reasonable sum for the religious ceremonies on which they set great store. The

consideration shown them was appreciated and there is every hope that they will return in still greater numbers when the next season begins.

47. The bulk of the shells were fished on the chank sands near the Vaippar Periya Par, an area which had not been fished since 1920, when work there was stopped owing to the death of a diver from a shark's bite.

The season opened on 18th October 1922 and closed on 10th May 1923. Fifty-seven days were lost owing to bad weather and holidays.

48. The average earnings were Rs. 2-2-0 per head per day, as against Rs. 1-8-0 in 1921-22. Emulation caused the Tuticorin men to work harder and more regularly than usual, but in spite of this, they made consistently less per day than their Muhammadan brethren. The Tuticorin men spend the bulk of their earnings on drink; the Kilakarai men, whatever their faults, have not this vice, and as a consequence are stronger, hardier, and more energetic, as well as more regular in going to sea.

49. Our small fleet of motor launches were invaluable for towage. Their respective shares at Tuticorin were as follows:—

Leverett	...	...	...	80 days.
Sutherland	...	...	...	36 "
Pearl	...	...	...	7 " (before being sent
Minto (hired)	...	...	...	5 " to Rāmnād)
Total	...	...	...	128 days

The assistance of these launches is invaluable. Without them the Kilakarai men would not have joined; for, work would then have been unremunerative owing to the loss of time and energy entailed by the long run to the principal chank bed fished, distant 15 miles from Tuticorin. Only on 20 days out of the total of 148 was towage not considered necessary.

50. A small chank bed was found during the year close to the shore just north of Tuticorin (Silavathurai). It is proposed to transplant thereto most of the under-sized chanks fished next year, so that this bed may be held in reserve for fishing when weather conditions preclude the off-shore beds being worked. In the past season 44,848 under-sized shells were fished; of these 8,555 were returned alive to the sea. More could not be put back, as the

divers persisted in removing the flesh on the run home in spite of all warnings. The demand for this flesh is great and good prices are given for it in the fishing quarter.

Five hundred and seventy shells were fished at Idinthakarai.

51. *The Rāmnād chank fishery.*—The total of shells fished was 154,714 as against 156,780 in the previous year. The sectional particulars are as under—

	1922-23.	1921-22.
Rāmēswaram and Mandapam ...	111,906	107,393
Kilakarai and S. Vedalai ...	12,492	11,845
Tirupalakudi, etc. ...	30,316	37,542
Total ...	154,714	156,780

The weather conditions at Tuticorin being more favourable than at Rāmēswaram in February and March, many of the Kilakarai men who usually take part in the latter fishery preferred to continue work at Tuticorin and as we are concerned to get a large total of shells irrespective of whether these come from the Tinnevely or the Rāmnād beds, it was not considered wise to press them to go to Rāmēswaram. Hence the Tinnevely fishery profited to some extent at the expense of that of Rāmnād. The maximum number of divers who worked at Rāmēswaram was 157.

The profit obtained from this fishery after allowing Rs. 4,000 as the year's rental, came to Rs. 6,951 as against Rs. 2,654 in 1921-22, an advance which is creditable to the staff in view of the competition of Tuticorin for labour and the generally adverse weather conditions that characterized the season in Palk Bay.

The *Leverett* did towage work on 45 days, the *Pearl* on 10.

52. The fishery at Tirupalakudi is handicapped by the low rate paid (six pies per shell). Unfortunately the quality of the shells on these beds is poor and it is impossible to give the same rate as at Rāmēswaram and Tuticorin (one anna per shell). 27,001 shells were fished by the men of this village as against 34,507 last year. I fear that the fishery will still further decrease unless the rate paid be increased. I shall make separate proposals regarding this.

53. *Sivaganga chank fishery.*—A total of 3,315 shells were fished as against 3,035 in the preceding year. As however the rate received from the contractors is at present only Rs. 81-5-0 per 1,000 as against Rs. 101 in 1921-22, a loss of Rs. 36-3-9 has been sustained, a matter of no moment as our object in taking this

fishery on lease from the Zamindari is to prevent poaching on adjacent Rāmnād beds.

54. *Advances*.—Rather heavier advances than usual had to be given in 1922-23 as we had to induce Kilakaraī men to join the Tuticorin fishery as well as the Rāmēswaram one. The total of outstanding at the end of the season was Rs. 1,405-5-1 which I consider to be a reasonable sum.

55. *Beche-de-mer fishery*.—Eight hundred and fifty-five lb. were cured, a comparatively small amount due partly to adverse weather conditions and partly to the divers of Tirupalakudi giving less attention to the chank fishery (to which beche-de-mer is an incidental) owing to their discontent with the low rate given for shells. The amount cured has not yet been sold.

56. *The rented-out chank fisheries*.—The amounts realized are given in the table under paragraph 41. They call for no comment.

57. *The Pearl Fishery Section* came into unusual prominence in 1922-23, as young pearl oysters were reported in November to be abundant on the beds off Tuticorin. As a consequence as soon as the "Lady Nicholson" became available, I conducted a very exhaustive inspection of the beds and took advantage of this opportunity to instruct the Superintendent of Pearl and Chank Fisheries, in the details of the methods of inspection. A full report has been submitted separately to Government; hence it will suffice if I state that 28 out of 54 banks inspected bore large numbers of young pearl oysters which at the present time (July 1923) I estimate to be nearly one year old. They should be ready to fish either in 1926 or 1927. The most prolific banks are those directly off Tuticorin, which will facilitate both supervision and fishing. The prospects are brighter than any I have ever seen on this coast, and I am particularly gratified to think that I am leaving such a handsome legacy to my successor.

58. *The Fishery fleet*—"Lady Nicholson".—The new engines in this vessel have proved most satisfactory. Not only has the working speed increased from four to seven knots by the change, but the new type of engine, two twin-sets sitting lower than the old one, appears to have improved her trim. I spent over a month aboard in March and April and I found the vessel perfectly suited for the work she was designed for.

59. From 8th December 1922 to 9th February 1923, she was lent to the Revenue Department for the inspection of the Laccadive Islands. It was unfortunate that she went aground on a rock in Minicoy lagoon whereby the false keel was stripped off, together with extensive damage to the keel and copper sheathing which entailed a heavy bill for partial repairs (Rs. 3,700); the false keel has yet to be replaced, there being insufficient facilities for this at Kundagal. I understand that the Royal Indian Marine officers who were in charge during the cruise were well pleased with her behaviour and considered her well suited for the work. In an ordinary season two months' service is all that the Fisheries department requires from this vessel for pearl bank inspection. When a pearl fishery occurs in any year, this period of service will be increased to four months. It will therefore be in the interest of economy to share the upkeep expenses with the Revenue department and to accord them the use of the vessel for any length of time they may require her, provided she be at the disposal of Fisheries by 1st February in any year there be no pearl fishery.

60. The motor-launches "Leverett" and the "Pearl" were in constant use throughout the chank fishery. The former did towage work on 125 days, the latter on 114 days. Besides towage work the "Pearl" was utilized throughout the pearl bank inspection in March and April as a general utility boat.

61. "Sutherland".—Government sanctioned a sum of Rs. 6,000 for the installation of a new engine on the recommendation of the late Assistant Director (Marine). After careful examination of the hull the Superintendent of Pearl and Chank Fisheries and myself agree that the hull is worn out and that it would be unwise to put a new engine in her. It would simply mean going to Government in another year, to ask permission to fit a new hull to the new engine. She was built 13 years ago as a sailing vessel and has had a strenuous life; the hull was not built to stand the vibration of a heavy type of engine—a 15-h.p. one cylinder engine—and I consider it preferable to patch her up for the time being and get a few more year's service out of her and then to break her up. We use her now chiefly as a stand-by. She did duty on 52 days.

62. *Miscellaneous*.—The routine of work was varied by various excursions into the law courts in connexion with the law suits which Government have had to institute against Messrs. J. B. Dutt & Sons for payment of chank godown rent and interests on delayed

payments. In the Tuticorin case the suit was for Rs. 2,261-3-10 and in the Rāmēswaram one for Rs. 10,044-0-5. The courts decreed Rs. 1,849-3-10 plus Rs. 258-8-0 costs in respect of the former and in full in the latter case. These amounts are yet to be realized.

E.—EXPERIMENTAL SEA-FISHING.

63. *Inshore experiments on the Coromandel coast with Malabar canoes.*—These experiments which were initiated some years ago in spite of my advice to the contrary, were finally abandoned in November 1922; the four canoes employed in the final experiments which took place at Negapatam were eventually sold at auction in order to obviate the cost of transporting them back to Calicut. They realized Rs. 540. No offers were received for the nets which were returned to Malabar.

The working cost of experiment from 1st July 1922 till the experiment was closed is shown below—

	RS.
Receipts	601
Expenditure	1,632
Net loss	1,031

This experiment was conducted under the control of the Assistant Director of Fisheries (Coast).

64. *Introduction of the Danish seine.*—The motor fishing-launch referred to in the Administration report for 1921-22 has been completed in England and is now on her way to India. On the measured mile the speed attained with a "Kitchen" rudder installed instead of the ordinary form was 8'216 knots per hour. As this was slightly less than that contracted for (8½ knots), the price was reduced to £2,250 at which it was accepted. With an ordinary rudder the trial-run speed was 8'425 knots per hour. Negotiations are taking place for the engagement of an English master-fisherman able to teach the Indian crew how to work the various forms of Danish seine on the improved methods now devised by English fishermen; he will also be able to teach our men how to make and put together the parts of these nets, a matter which is by no means simple.

The launch has been named "Sea-Scout" with reference to the duties she is expected to perform in the development of our sea-fisheries.

65. It may not be inappropriate to mention here that my advocacy of a trial of the Danish seine for this purpose in preference to steam-trawling is due to an appreciation of four facts, viz.:—

(a) that India, and Madras in particular, are not yet ready to consume greatly increased catches of fish owing to the lack of cold storage facilities at the ports where trawlers would have to be based,

(b) that trawled fish cannot possibly be sold remuneratively at low rates, owing to the high running costs of this type of vessel,

(c) that the only market capable of absorbing largely increased catches is the low-priced one—the better classes who demand prime fish and can afford good prices are very limited in this Presidency, and

(d) that the present methods of fishing are extremely economical because of the low standard of living of the fisherfolk and the cheapness, simplicity and comparative efficiency of their gear.

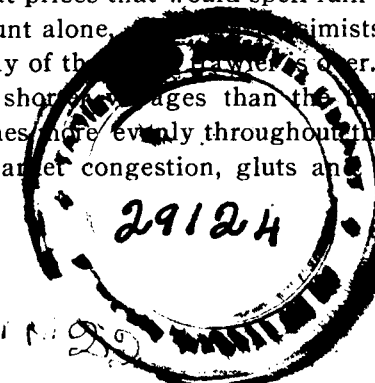
It was lack of appreciation of these fundamental limitations that led the Bombay Government astray over their recent trawling experiments and landed them in a dead loss of three lakhs.

A much more cautious policy is needed in a country so unready commercially as India. Steam-trawlers will come eventually, but they are not commercially practicable till extensive cold storages accommodation is available, till cold storage fish vans can take the catches inland, and till cold storage depots are erected at the big inland centres of population.

Pending the provision of these facilities, it is folly to attempt to use the costly steam trawler in Indian waters.

66. But these arguments do not apply nearly so strongly to the motor-cutter using such nets as the Danish seine. These boats can be handled by a small crew, their running cost is low and as the catching power of their nets is great in suitable localities, they can land their catches at prices that would spell ruin for the steam trawler. On this account alone, optimists in England who declare that the day of the trawler is over.

These boats make shorter voyages than the trawlers and so they spread their catches more evenly throughout the week; this goes far to obviate market congestion, gluts and the slump of prices.



K. Z. ...
N. 9/11/11

II.—MADRAS MARINE AQUARIUM.

67. The Aquarium continues to be the great popular feature of Madras and in spite of its restricted size, its fame is now world-wide for the wonderful diversity of form and colour characterising the fishes there gathered together. Unfortunately the political unrest in certain districts and the great increase in railway fares have largely diminished the number of country cousins who come to Madras. The attendance for the year was 102,349 as against 125,161 in 1921-22. By an adjustment of the rates of admission, now one anna from morning till 5-30 p.m., and then 4 annas till closing time, the revenue has not suffered, being Rs. 9,461 from all sources as against Rs. 9,111 in the previous year. Expenditure amounted to Rs. 7,486 as against a recorded amount of Rs. 4,795 in 1921-22. There is, however, no real comparison possible, for in the present year a large amount for supervision formerly omitted, has been included, in accordance with my desire that each section of our work shall bear its full share of supervision expenditure.

The figures are—

	RS.
Pay of staff	1,863
Electric current	1,268
Fish food and miscellaneous contingencies	3,755
Supervision (25 per cent of the pay of the Zoological Assistant and his peon)	600
	7,486

As the receipts totalled Rs. 9,461 the net profit on working was Rs. 1,975.

The record attendance was as usual, on Kannu Pongal (16th January 1923) when 4,135 visitors paid for admission as against 4,023 in 1921-22.

One thousand nine hundred and thirty-six copies of the English Guide and 444 copies of the Tamil one were sold.

68. The first set of coloured picture post-cards depicting six of the most interesting fishes in Madras, reproduced from water-colour sketches by Miss D. L. Hornell, was put on sale in January of this year, at the low rate of one anna per card. They have been greatly praised and form an excellent advertisement. Four hundred and fifteen sets and a number of loose cards have been sold. The colour printing was done at the Government Press and

is a good instance of the advance that has been made in India in this line of printing in recent years.

Owing to the reluctance of the large provision-dealers to push the sale of our canned goods, a sales depot was opened last year at the Aquarium for the convenience of the public, and has had some success in bringing the goods before the notice of many who had never before seen them.

69. *Statistics of the fish supply of Madras.*—This inquiry, initiated at the instance of the Hon'ble Sir K. Venkata Reddi, Minister for Development, was carried on till 15th July 1922, the particulars gleaned being then tabulated and analysed by the Zoological Assistant, Mr. S. T. Moses. The results are most interesting. They have been published as report No. 6 of our Fisheries Bulletin, Volume XV. The information gleaned will have great practical value when our motor-seining experiments are under weigh as we shall then see whether the new methods compete with the old in the catching of the same classes of fish, or whether the deep-sea seine will tap a distinct source of supply, as I expect and hope it will.

III.—FISHERY RESEARCH AND BIOLOGICAL SUPPLY.

70. *Fishery Research.*—The work of investigating the problems connected with the migrations, food and life-history of the oil-sardine (*Clupea longiceps*) and the Indian mackerel (*Scomber microlepidotus*) was carried on continuously throughout the year. Very important data were obtained and these have already conclusively settled some of the most important of the problems that required solution. These concern the oil-sardine mainly. The past year while marked by the great abundance of this fish, was equally conspicuous for the scarcity of mackerel and this latter fact has hampered the enquiry. A long report on the facts ascertained regarding the sardine has been drawn up and was submitted to Government recently. Among the most important facts ascertained are, (a) that these sardines spawn when one year old, (b) that few survive a second spawning, (c) that the extreme span of life is approximately $2\frac{1}{2}$ years, (d) that annual rings are apparent on the scales, (e) that these rings mark periods of arrested growth which recur annually from February to April inclusive, caused by decrease in the phytoplankton and protozoan plankton on which these sardines feed mainly.

71. Flagellate infusorians and peridinians were found to be the favourite food of these sardines, sources rich in oil and probably also in fat-soluble Vitamin. Messrs. M. Ramaswami Nayudu and Jayaram Nayudu are to be congratulated on the great and early success of their investigations.

72. *Biological supply.*—The progress recorded for 1921-22 was well maintained last year, the value of the specimens sent out being Rs. 4,740 as against Rs. 2,361 in the preceding year. The list given below of the institutions served, is an index of the high educational value of the service. Unfortunately it is extremely difficult to cover expenditure as desired by Government as any increase in the rates charged will diminish the demand greatly; either the poorer colleges will try to do with lessened supplies, or they will revert to the outside sources from which they obtained their specimens previous to our attempt to cater for Indian Colleges with Indian material. Much of this was obtained from the Naples Biological Station or from the Plymouth Marine Laboratory which are both heavily subsidized by Government and public bodies, and which run their supply departments from altruistic motives. The service is an educational one and should not be wholly commercialized, for this will lay an intolerable burden upon the officer-in-charge. What is wanted is a small subsidy which will enable the supply to be carried on upon improved lines and meet any small deficit on working. Seeing that the supply is an All-India one, the Educational Department of the Imperial Government might well be asked to provide the small sum that is necessary. Rs. 3,000 per annum would suffice.

73. *List of supplies of Zoological Material during 1922-23:—*

			RS.	A.	P.
Agra ...	...	Agra College ...	139	0	0
Do. ...	...	St. John College ...	105	10	0
Ahmedabad ...	...	Gujarat College ...	6	12	0
Aligarh ...	...	Muslim University ...	228	12	0
Allahabad ...	...	Allahabad University and Muir Central College ...	204	12	0
Bangalore ...	...	Central College ...	201	6	0
Do. ...	...	Vani Vilas Institute ...	151	8	0
Baroda ...	...	Baroda College ...	7	12	0

			RS.	A.	P.
Benares ...	...	Hindu University and Cen- tral Hindu College ...	408	12	0
Bombay ...	...	St. Xavier's College ...	140	7	0
Calcutta ...	...	Calcutta University ...	202	4	0
Do. ...	...	Medical College ...	39	12	0
Do. ...	...	Presidency College ...	51	14	0
Do. ...	...	Workingmen's Institution ...	119	4	0
Delhi ...	...	Hindu College ...	36	8	0
Do. ...	...	Ramjas College ...	106	4	0
Karachi ...	...	Victoria Museum ...	498	5	0
Lahore ...	...	Government College ...	30	12	0
Do. ...	...	Punjab Veterinary College.	66	4	0
Lucknow ...	...	Lucknow University and Canning College ...	267	0	0
Murshidabad ...	...	Mr. Jagatpati Singh ...	49	0	0
Nagpur ...	...	Hislop College ...	54	4	0
Patiala ...	...	Mohindra College ...	338	2	0
Poona ...	...	Fergusson College ...	191	8	0
Rangoon ...	...	Judson College ...	35	6	0
Madras ...	...	Government Museum ...	70	8	0
Do. ...	...	Women's Christian College.	86	2	0
Tirupati ...	...	Srimahant's Devasthanam High School ...	133	12	0
Trivandrum ...	...	Maharaja's College ...	35	12	0
Vizianagram ...	...	Maharaja's College ...	58	0	0
	...	11 High schools in Madras Presidency (shell cases) ...	468	0	0
Edinburgh ...	...	The University of Edin- burgh ...	71	12	0
Glasgow ...	...	The University of Glasgow.	100	0	0
	...	Other foreign institutions..	16	0	0
	...	Miscellaneous sales (shells, etc., in India) ...	19	4	0
Total ...			4,740	4	0

74. The finances of the section are shown below :—

	RS.
Salaries of permanent establishment	3,043
Travelling allowance	513
Collection, Materials and Miscellaneous charges	1,823
	5,379
Value of specimens sold	4,698
Debit balance	681

The deficit on working is however covered fully by the stock of specimens on hand, collected during the year. No rent is however debited for the occupation by this section of the Ennur Biological Station.

I am well satisfied with the work accomplished during the past year by the staff, and am pleased to be able to commend the officer-in-charge, Mr. Ramaswami Ayyangar, for his zeal and devotion under what have been at times very trying conditions.

IV.—INLAND PISCICULTURE.

75. This section of our operations consolidated its position most satisfactorily during the past year. It has the satisfaction of being able to show a fine record of achievement and progress together with such an advance in the financial position that it managed to pay its way and also to contribute the sum of Rs. 20,450-13-5 of net profit to the revenues of the country. I wish to emphasize that this sum is the actual credit balance after the deduction of all capital expenditure incurred during the year and of the whole of the supervision charges as well. No items have been debited to the separate head of supervision and research, as I am of opinion that the section is now sufficiently organized to stand independent of any artificial aids to solvency, in spite of the fact that a substantial portion of its work is concerned with subjects which give little or no monetary return, viz., the breeding of larvicides for the antimalaria campaign, the encouragement of co-operation among the inland fisher-folk and the gratuitous advice and help given both to private persons and public bodies on piscicultural subjects. This section like several others in the Madras Fisheries Department in being able to pay its way and so to entail no cost to Government upon its working,

occupies an unique position in the world, a fact which the public should appreciate. In other countries where fisheries are properly cared for by Government, the conduct of piscicultural operations is not expected to contribute to the general revenue. It is considered sufficient return for the outlay, often heavy enough, if depopulation of inland waters be arrested and an increase in the food supply of the country be assured. Here we have been fortunate to have gone some distance to achieve these results, but without involving the state in any cost whatever.

76. The total receipts from tank rentals, etc., to the 30th June 1923 were Rs. 1,14,415-9-10 as against an expenditure, including full supervision and capital charges, of Rs. 93,964-12-5. This profit of Rs. 20,450-13-5 on the year's working is difficult to compare with the results of previous periods as a certain part of the expenditure was then debited to supervision and research under the instructions then in force; the profits then shown were to a considerable degree of the nature of gross profits, that of the present year is a net one. I strongly recommend that this system, which alone gives a true idea of the financial conduct and results of each section's work be continued in future. The principal item in these receipts is Rs. 1,11,615-9-10 obtained from the sale of the fishery rentals of the waters under the control of this department. This compares well with the amount received last year, viz., Rs. 87,333-1-8 from the same source. The amount paid as compensation, Rs. 56,134-14-0, was the same in both years. This satisfactory result is largely due to the energy, tact and foresight of the acting Assistant Director, Mr. Chakrapani Ayyangar, who was in charge throughout the whole year. He was most successful in combating the hostile efforts of non-co-operators and village plotters to prevent bidders giving adequate rates at the auction sales of fishing privileges, and I am glad to put on record my high appreciation of his administrative talent, and gift for organization.

Mr. Sundara Raj, the permanent incumbent of the post, continued his studies at Liverpool in Fishery Science under Prof. J. Johnstone throughout the year.

77. *Tank acquisition and stocking.*—No progress could be made in the extension of the department's control over irrigation waters in consequence of the virulence of the retrenchment malady now unhappily prevalent. Hence the promising scheme for the acquisition of a large number of tanks in Ganjam, was negatived by

Government in spite of the fact that the breeding and stocking operations there contemplated would have increased both the quantity and the quality of the inland fish supplies of this district. This is the more to be deplored as the department has not been able to do anything hitherto for any of the northern districts, the south and west being thereby unduly favoured. I trust that circumstances will shortly permit of this Ganjam scheme being accepted so that this inequality of treatment may be remedied, and this department given a chance to improve and regulate the tanks of that district. I am satisfied that, within five years, possibly even less, the beneficial effects of the scientific treatment of these waters would so increase the supplies that the revenue received would cover all expenditure and leave some net profit.

78. The stocking of the tanks under the department's control in other districts was done more efficiently and on a larger scale than in any previous year as our officers now understand the work much better than before; they are now thoroughly skilled in the details and have uniform success in the transport of fry and fingerlings, particularly of the Pearl-spot (*Etroplus suratensis*), Grey mullets of Catla (*Catla catla*) which are the indigenous fishes which we find most suitable for this purpose. A beginning was also made in the planting out of gourami in one of the sections of the Vellore Moat Farm.

79. *Fishery rentals.*—Our organization to combat local combination and the activity of political agitators designed to prevent our receiving adequate bids for the year's fishing rights in the waters controlled, is now perfected. An officer of the department attends all important auctions and refuses sanction to any sale where he considers the rate inadequate. In cases where opposition is determined and proves successful in intimidating bidders, the department now refuses to part with the rights and proceeds forthwith to fish the tank in question departmentally. Wherever this has been done, the value of the fish caught and sold has proved ample to cover all expenses and to give a satisfactory profit after paying the compensation charge. In other cases, the appearance of the department's fishermen has brought the villagers to their senses, who then become willing to offer reasonable bids plus payment of a day's wages and expenses to these outside fishermen. The lesson thus taught has proved salutary and should obviate similar trouble in future. It appears absolutely necessary

for a Fishery Officer to attend these sales if proper bids are to be ensured.

80. If income from fishery auctions is to be considered the chief index to the efficiency of our inland pisciculture—a view to which I do not subscribe—I invite attention to the fact that the total receipts from this source in 1922-23 rose to the handsome figure of Rs. 1,11,615-9-10 as against Rs. 87,333 in 1921-22. Out of 144 tanks under our control in Chingleput and Nellore, the fishing rights in 131 have been sold for Rs. 12,616 against a total compensation payable of Rs. 9,300. The remaining 22 have not yet been auctioned, so that the eventual returns will well exceed the figure given. In the previous year 143 of these tanks brought in only Rs. 10,235; so the increase is well over 25 per cent, which would certainly not have been given unless our stocking operations had increased the head of fish in these tanks satisfactorily.

The Cauvery-Coleroon fishery gave increased rentals also, and there is now every prospect of these being materially augmented as a result of the catla stocking operations. If this fish becomes permanently established in these rivers, the economic importance will be most important.

Two tanks in the Kundapur taluk of South Kanara came into our possession during the year—the historic Kodi and Kotakere tanks once stocked with the milk fish, *Chanos chanos*, by Tippu Sultan. These tanks had fallen into disrepair, the sluices constructed in the olden days having disappeared. This was set right recently, and will permit of the contemplated improvements being made.

81. *The Fish Farms.*—The three farms in existence, Sunkesula (Kurnool), Ippur (Nellore) and Perambur (Madras), together with the larvicidal farm at Præma (Kurnool), all worked satisfactorily. A new one, that of the Vellore Fort Moat, although not quite finished, was sufficiently well advanced to permit of partial stocking. The Chingleput Moat Farm, to our great disappointment, has not yet been satisfactorily completed by the Public Works Department, serious defects having been found in the construction of the sluices when our Department was asked to take over. This is the subject of discussion at present, as the arrangements are so faulty that it is impossible to segregate the different kinds of fish as contemplated. The Mopad scheme is also progressing very slowly in spite of my repeated representations.

82. The *Sunkesula Fish Farm* continues to labour under the same difficulties as were reported last year; the proposals to reduce expense by substituting a smaller engine was negatived—in consequence, no economy in working was found possible. Except for this, the farm was wholly satisfactory; gourami, pearl-spots and tench all continued to breed. The farm supplied stock for the Kurnool-Cuddapah canal and for the tanks in the Ceded districts. Kurnool market was supplied with fish to the approximate value of Rs. 500, an increase upon last year's value of about Rs. 450.

A further consignment of 80 English carp and 50 tench were brought to the farm from Ootacamund lake, as I am anxious to try once more to acclimatize these carp, on the encouragement received through the successful though long delayed breeding of some of the old tench that have been here for several years.

83. The *Ippur Farm* once again was threatened with grave trouble through the Surveyepalli Reservoir running dry; no ill consequences actually occurred. The pearl-spots again bred prolifically and enabled the department to stock a larger number of tanks with fry and fingerlings than was possible in 1921-22. The number will be again increased next year.

A new departure was effected by setting apart one of the large ponds for the rearing of non-predaceous fish for the Nellore market; these will be reserved for the time when the supply of fish from other sources becomes scarce.

The gourami again bred, but not so prolifically as at Sunkesula and Perambur.

84. The *Perambur Farm* continues to breed gourami and pearl-spots in large numbers. Chingleput tanks were stocked with the latter from this farm, and a large number of larvicides were bred and supplied to a few private persons. Once again I have to deplore the apathy of municipalities in regard to this matter; here we have a source of supply that could furnish millions of these "millions" (for our local *Haplochilus* is as worthy of this name as the much advertised American fish); but, in spite of all circulars and advice by Government, no notice is taken, or, if a small order is placed, no care is taken to ensure that small boys shall not fish them out of the ponds where they are placed or that predaceous fishes are removed.

85. I regret to record that my scheme to utilize the extensive water pits and borrow holes at the old Madras brick fields, which would have given us a much better and more accessible farm than that at Perambur, was refused by the Public Works Department; the pity is the greater as I am satisfied that the scheme would have done much to reduce the mosquito nuisance in this neighbourhood, even if these mosquitoes be of non-malarious species.

86. The *Præma Larvicidal Farm* continued to supply large numbers of larvicides, but if the work is to go forward satisfactorily, an increase in the number of ponds is necessary. My proposal to do so was however negatived on the ground that this expenditure is not urgent.

87. In the Nallamalai forests, fifty-five water holes were stocked with 126,000 larvicides. On subsequent inspection of some of these holes or springs, a large number of haplochilus and black-spot were seen; the holes were however littered with dead leaves, giving shelter to mosquito larvæ. The Forest Officer was advised to keep the holes clear of rubbish if the maximum good result is to be attained.

88. *Vellore Moat Farm*.—The construction work is almost complete and work has been begun in stocking it with fish. All the four sections have been heavily stocked with larvicidal fishes in order to extirpate the mosquito larvæ that formerly crowded the moat water, and were the main source of endemic malaria. In the section reserved for angling 2,000 mullet fingerlings and some megalops and other fish that will take a hook were introduced. A thousand pearl-spots were put into another section and 38 gourami into a third. The fourth section, for tench, is not yet ready.

Rupees 1,080 were received during the year from the sale of fishes and lotus leaves. The Vellore moat is one of the few places where a chatty raft, formed of two inverted pots, is used to traverse the deep sections when collecting leaves; the man sits astride between the two pots.

89. *Chingleput Moat Farm*.—Work here is delayed because of the bad workmanship of the Public Works Department contractor. Till the defects be remedied there is little to be effected except to keep the weeds down and to stock the water with larvicides to abate, if possible, the malaria prevalent among the boys of the Reformatory situated within the fort. The difficulty is that even if

the moat be rendered harmless, there are thousands of breeding places in the paddy fields all round.

90. *Mopad Fish Farm*.—This is still under construction and there is no chance of it being handed over to us in the near future. The resident Assistant Inspector's quarters remain unfinished. Hence there is much difficulty in conducting fishing operation and only Rs 360 were realized. With the experience gained during the past season, it is hoped to increase the catches and sales very considerably during the coming year.

91. The *Kanigiri Duvur scheme*, ordered to remain in abeyance in 1922, has recently been revived. As soon as the buildings are completed, the work of organizing the fishery of this fine sheet of water will be taken in hand.

92. *Anti-malarial work*.—Besides the work being done in the Nallamalais, with Præma as a base, in Nellore from Ippur, around Madras from Perambur, and in the Vellore and Chingleput moats incidentally mentioned above, the Peddagadi pool in Cuddapah was stocked with 3,000 larvicides; this work will be continued yearly and it is hoped that as these fishes spread, the mosquito nuisance in Cuddapah town will abate considerably.

93. *Acclimatization*.—This goes on steadily on the lines described in the report for 1921-22. The breeding of the old tench brought to Sunkesula from Ootacamund lake in 1915, bred in 1921 for the first time. On 21st February 1922, the young ones, when transferred to a separate pond, measured from $4\frac{1}{2}$ to 8 inches in length; on 11th September, $6\frac{1}{2}$ months later, they had increased to 7 to $9\frac{1}{2}$ inches. Not only so, but these young ones, certainly not more than a year old, had themselves bred, as fry from 1 to $1\frac{1}{2}$ inch were abundant in the same pond. These latter were probably hatched in August. So we infer that these tench, when acclimatized in the low country, breed when one year old. Encouraged by this success, our efforts are now directed to acclimatize the English carp.

The stock of gourami on hand continues to increase satisfactorily. Thirty-eight have been placed in one of the Vellore moat ponds, and others will be sent to Chingleput and Mopad as soon as conditions there are satisfactory.

94. The pearl-spot promises to have an inland range co-extensive with our operations. It continues to exhibit marvellous powers of adapting itself to novel conditions and is beginning to be known

and appreciated by the farmers of the bigger tanks into which it has been introduced. It bred prolifically in all the fish farms. As a result of our stocking operations, fishes of this species have been fished in the Kamalapuram tank in Bellary, in the Barur and Penukondapuram tanks in Salem, the Markapur tank in Kurnool and the Chambarambakkam and Veliyar tanks in Chingleput. It was certainly fished in other tanks, but it is difficult to get reliable information and so I mention only those about which there is no question.

95. The project of introducing catla into the Cauvery was successfully accomplished. A first consignment of 475 large fingerlings was safely transported over 520 miles of rail and 40 of road and placed in the river below the Hoginkal falls. Another but smaller consignment, was put into deep pools in the river near Bhavani. The Forest Officers gave the scheme their hearty support and have kindly promised to ensure the safety of the fish by every means in their power; the stretch of river below Hoginkal falls, being strictly preserved, should form a splendid sanctuary for these fish till such time as they have established themselves securely and have spread to other pools down the river. If they thrive as we expect, their presence (for they are fine table fish and grow to a large size) should go far to augment the food supply obtainable from this river and incidentally to increase the rentals obtained from it.

96. The experiments in Hilsa hatching were intermitted as we have learned nearly all that is possible with the means at our disposal. Further development can only be made when means be found to conserve the hatched fry till they grow to a size when they can take some care of themselves. Our next requirement is to learn where and how the Hilsa fry live till they are big enough to go down the river to the sea. We have scarcely any data on this subject; till it be obtained, it is useless to spend more money on merely hatching out thousands of defenceless larvæ.

97. *Economic improvement of the fisher folk*.—The Co-operative Society of the Fishermen of Hampapuram, to whom Government in 1921 leased certain sections of the Cauvery, continued to work satisfactorily. The Society is regular in its payments and, in consequence, the lease is being continued in their favour.

The Fishermen's Co-operative Society formed at the Lower Anicut also appears to work satisfactorily.

An attempt is now being made to form a co-operative association among the fishermen of Nellore town. The main object is to give them an opportunity to work the fisheries of the local tanks now auctioned to the highest bidder on reasonable terms which will ensure them a better living than at present when so much of the profits is intercepted by speculators. Incidentally we should be able to exercise educative influence upon them and gradually to wean them from certain objectionable fishing practices now current.

V.—SOCIO-ECONOMIC SECTION.

98. *Education.*—The Fisheries Training Institute at Calicut continues to increase in usefulness. Forty pupils were under training in the year.

More practical work in fishing, net making, hemp spinning and twine making was done by the pupil teachers this year than in previous years. Two canoes were regularly used day and night with various kinds of nets whenever weather permitted the pupil teachers to go out for fishing. The total quantity of fish caught by them was 3,944 lb. and it was sold for Rs. 140-7-6. The students went on excursions for 20 days to Tanur Experimental Station, Chaliyam Cannery and to a number of fishing villages on the coast. The final year students spent ten days with the Assistant Director (Coast) in visiting important fishing centres on the South Kanara Coast as far as Malpe. During this tour they exhibited magic lantern pictures in out-of-the-way fishing hamlets; this was very much appreciated by the fisher folk.

Sixteen students who had completed their course and one student who failed last year appeared for the final examination and of these two passed in the first class, ten in the second class and five were declared to have failed. This year's candidates, in addition to other subjects, were also tested in their practical knowledge of rowing and handling of boats. The school co-operative society, which was organized two years ago to give practical knowledge in co-operation to the students, has worked actively and proved of much practical use. It has 53 members who have taken 167 shares, and a paid-up share capital of Rs. 743-7-0 against 43 members, 146 shares and Rs. 431 paid-up share capital of the previous year. The society utilized part of

the profits towards the upkeep of the school reading room and distributed Rs. 25-8-9 as dividend among the members. The society had also a fixed deposit of Rs. 200.

99. The school scout troop was inspected by the Territorial Commissioner and took an active part in the District Scout Rally held at Calicut. The lads underwent training to qualify as second-class scouts. Eleven of them also underwent the second year's training course in the Territorial Force at Cannanore.

100. *Staff.*—As experience showed that a carpenter who has a working knowledge of repairing fishing canoes and making wooden implements required for fishing is more useful in imparting a knowledge of practical carpentry as required in a fishing village, the school-trained carpentry instructor was replaced by one with more practical knowledge on a lower grade of pay. There was no change among the other members of the staff.

101. *Village Schools.*—The number of Elementary schools in 1921-22 was 27, including one Higher Elementary school at Kaipamangalam in Ponnani taluk. Of these, four night schools were closed during the year, one at Chalil in Tellicherry, two at Mangalore and one at Malpe in Udipi taluk (the last has been closed as a temporary measure). Three new schools were opened during the year, one at Kundazhiyur in Ponnani taluk, one at Kuriyadi in Kurumbranad taluk, and another at Kavvayi in Chirakkal taluk. At the end of the year, the number of schools was 26 (20 day and six night schools). The number of pupils receiving education in these schools rose from 1,533 (1,182 in day and 351 in night schools) in the previous year to 1,761 (1,541 in the day and 222 in the night schools) in this year, and of them 471 are girls as against 391 in the previous year. More than 90 per cent of the pupils belong to the backward class of fisher folk of various castes and creeds and the rest belong to non-fisher communities who are poor and depend on the fishing industry for their livelihood.

The number of teachers employed in these schools is 63 (53 in day and 10 in night schools) and 6 of them are fisheries trained men belonging to the first batch of teachers turned out by the Fisheries Training Institute, Calicut, after a three years course, and three are Kanarese men trained with fisheries stipends at Mangalore Training School.

102. The closing of four night schools in the year was due to the fact that the grown-up pupils resorting to these schools were very irregular in attendance owing to the favourable fishing season, especially in respect of drift net fishing carried on in the nights and of large sardine catches. Another reason is that most of the grown up pupils in the villages where these night schools were located have already picked up the three R's during the past few years. These night schools will be reopened in other localities where they can be more usefully utilized.

Of the 26 schools now existing, five are located in permanent masonry buildings belonging to the department, two in buildings attached to the village halls constructed by Mogears of South Kanara with a grant-in-aid from Government and seven others—in masonry buildings put up by the villagers and rented by the department. Out of the remaining 12 schools, three are held in temporary sheds put up by the department and nine others in private temporary sheds rented for the purpose. The holding of schools in temporary sheds is inconvenient both for pupils and teachers and these have therefore to be replaced in course of time by masonry buildings.

TEMPERANCE AND SOCIO-ECONOMIC WORK.

103. Intemperance has not increased and among the younger men there is a perceptible decrease; all the same, they are not economically benefited as the money which they now spend in tea shops is much more than what they used to spend on toddy, and the craving for tea becoming as great a vice as toddy drinking—another instance of the danger of pushing temperance reform at too rapid a rate.

One wing of the Temperance Hall and school building at Malpe, which was under construction in the previous year, was completed and half the grant-in-aid, amounting to Rs. 1,337, was paid. The remaining portion of the building, it is hoped, will be completed during the current year. The site for a similar building at Bollipu has not yet been given over to the fisher folk, though the Revenue authorities have promised it. There were also some petitions from the fisher folk in the Ponnani taluk and the Kurumbranad taluk for the grant of vacant sites on the river side and seashore for their communal purposes. These were submitted to the Revenue authorities, but no orders have been passed.

104. Fisher folk are notorious for their thriftlessness, and, with a view to teach them the value of money and inculcate the habit of thrift, at least among the rising generation, small money-boxes made of empty cigarette tins were supplied to a few of the schools as an experimental measure; the pupils were encouraged to deposit in them a few pies whenever they could afford to do so. This experiment has succeeded well and the pupils evince keen rivalry as to who will fill up their tins first. These have not yet been opened except those of a few who required some money urgently. This idea will be further developed, but its success will necessarily depend on the honesty of the teachers concerned. The wage-earning young men who attend the night schools were encouraged to deposit money in the Post Office Savings Bank.

105. Representatives from the fishing community were nominated to all the maritime local boards and municipal councils in the West Coast, excepting the District Board of Malabar.

Magic lantern slides were exhibited in several hamlets and proved a great treat to the people who had never seen such pictures before. More frequent exhibitions with a larger variety of slides will be shown during the current year.

CO-OPERATION.

106. At the beginning of the year there were 60 fishermen co-operative societies on the West Coast, including three productive societies with a total membership of 3,581, of whom 453 were females. During the year three new credit societies were registered and started at Pallipuram, Chaliyam and Kavvayi in the Malabar district. Hence the number of societies at the end of the year was 63 with a membership of 3,327 of whom 359 were females. There are pending with the Assistant Registrars four applications to register societies organized in the previous year and two other applications for societies organized during last year.

107. The membership fell from 3,581 to 3,327, but the paid-up share capital rose from Rs. 81,702 to Rs. 85,916 and the amount of loans disbursed from Rs. 2,53,303 to Rs. 3,14,101. The loans granted for industrial use has increased from Rs. 99,634 to Rs. 1,20,033. The following table contains the important figures relating to the working of these societies showing the progress they are making:

Statement of figures relating to the Fishermen Co-operative Societies.

	East and West Coasts.			West Coast only.	
	1918-19.	1919-20.	1920-21.	1921-22	1922-23.
Number of members—					
Males	1,644	2,446	3,039	3,128	2,968
Females	256	381	445	453	359
Total number of members	1,900	2,827	3,544	3,581	3,327
Number of shares	2,438	3,852	4,875	4,978	4,723
Paid-up share capital RS.	25,388	49,232	66,585	81,702	85,916
Total of loans disbursed RS.	40,511	1,17,520	1,69,103	2,53,303	3,14,101
Total of loans for payment of prior debts	-8,736	17,866	26,318	44,615	60,296
Total of loans for industrial use	8,736	26,410	61,783	99,634	1,20,033
Total of loans received from Central Banks, etc.	4,714	27,994	18,253	21,608	6,533

N.B.—The figures for 1921 to 1922 and 1922 to 1923 exclude the 13 societies on the East Coast transferred to the Labour Department.

108. The societies worked satisfactorily with the exception of a few; the defective working was due mostly to mismanagement on the part of the office bearers. The villagers of Baikampady and Hosabettu reported that they are unable to work the societies successfully owing to the existence of caste panchayat funds, from which the local fishermen can borrow whenever they are in need of money. Hence it was agreed to wind up the business of these two societies. It was not possible to do more propaganda work for the organization of further societies owing to the insufficiency of budget provision for the travelling allowances of officers and also on account of the lack of sufficient literate men in the villages capable of being entrusted with the working of new societies.

109. The societies started for the benefit of the oil and guano factory owners in South Kanara did no business this year also, on account of the indifference of the members who were very irregular in repaying the loans taken from the Central Bank and also

because they were not able to secure orders in time for the disposal of their output of guano and oil which prevented them from undertaking any joint sale.

110. *Cost.*—The expenditure of the department in its educational and social activities for the past year may be particularized as follows:—

	RS.
Training institute	15,072
Village schools	14,927
Socio-economic work	10,282
Supervision; 40 per cent of the Assistant Director's (Coast) pay	2,920
	<u>43,201</u>

111. In previous reports the amount spent on this work was debited by Government instruction to "Supervision and Research." Under present conditions when the tendency is to judge the department's success by the financial results, it is only fair to separate the amount of this non-productive expenditure and show it under a distinct head. Otherwise the head "Supervision and Research" becomes unduly swollen and is apt to give critics the erroneous impression that the department is top-heavy.

JAMES HORNEILL,
Director of Fisheries.

21st July 1923.

Statement I.—Staff of the Fisheries Department, 1922-23.

Post.	Incumbent.	Period.
Director	James Hornell, Esq. ...	1st July 1922 to 30th June 1923.
Assistant Director (Marine).	Lieut J. H. Allan, O.B.E.	1st July 1922 to 23rd September 1922.
	M.R.Ry. Rao Sahib J. A. Fernandez Avargal.	26th September 1922 to 16th November 1922.
Assistant Director (Coast).	M.R.Ry. Rao Bahadur V. Govindan Avargal.	1st July 1922 to 30th June 1923.
Assistant Director (Inland). Acting.	M.R.Ry. C. G. Chakrapani Ayyangar Avargal.	1st July 1922 to 30th June 1923.
Superintendent of Pearl and Chank Fisheries.	M.R.Ry. Rao Sahib J. A. Fernandez Avargal.	17th November 1922 to 30th June 1923.

Statement II.—Summary of Expenditure and Revenue of the Fisheries Department for 1922-23.

Particulars.	Expenditure.	Revenue.	Difference.
	RS. A. P.	RS. A. P.	RS. A. P.
I. Supervision and Research.	45,925 6 6	146 5 5	-45,780 1 1
II. Education and allied subjects (Non-Commercial).	(a) 44,541 1 10	269 13 11	-44,271 3 11
III. Marine Fisheries	89,570 13 5	1,35,231 0 8	+45,660 3 3
IV. Inland Fisheries	(b) 93,954 12 5	1,14,415 9 10	+20,450 13 5
V. Factories—			
(a) Cannery	31,035 8 3	33,029 12 0	+ 1,994 3 9
(b) Tanur	22,446 5 9	28,228 6 2	+ 5,782 0 5
Less total capital expenditure incurred during the year, less depreciation and interest charged in Cannery and Tanur accounts.	3,27,485 0 2 12,130 12 8	3,11,321 0 0 ...	-16,164 0 2 12,130 12 8
	3,15,354 3 6	3,11,321 0 0	- 4,033 3 6

(a) Excludes Rs. 2,920 being 40 per cent of Assistant Director's (Coast) pay which equitably should be debited to the Salt Department.

(b) Includes full pay of the Acting Assistant Director (Inland) and his staff.

Statement III.—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. Supervision and Research	(a) 20,430 5 8	(b) 15,731 12 0	5,107 15 0	...	4,656 5 10	45,926 6 6
II. Education and allied subjects (Non-Commercial)	(c) 2,920 0 0	21,644 3 9	4,453 4 0	14,742 0 4	781 9 9	44,541 1 10
III. Marine Fisheries	(d) 4,438 6 0	(d) 20,199 10 0	3,139 3 0	60,029 1 4	1,764 9 1	89,570 13 5
IV. Inland Fisheries	2,382 0 0	10,218 1 0	7,869 9 6	72,442 8 5	1,052 9 6	93,954 12 5
V. Factories—						
(a) Cannery	(e) 885 5 4	(f) 3,691 6 0	104 1 0	23,121 4 5	3,233 7 6	31,035 8 3
(b) Tanur	(g) 1,460 0 0	(h) 1,987 14 0	251 15 0	18,262 8 1	484 0 8	22,446 5 9
Total	32,516 1 0	73,472 14 9	20,925 15 6	1,88,597 6 7	11,972 10 4	3,27,485 0 2

Mr. Sundara Raj.

(a) Represents 95 per cent of the pay of the Director and the whole of the leave allowance of Mr. Sundara Raj.
 (b) Includes 55 per cent of the pay of the Zoological Assistant and his peon.
 (c) Represents 40 per cent of the pay of the Assistant Director (Coast).
 (d) Includes 45 per cent of the pay of the Zoological Assistant and his peon for supervision of the Marine Aquarium and Pulicat Oyster farm.
 (e) Represents 5 per cent of the Director's pay.
 (f) Represents the full pay of the staff.
 (g) Represents 20 per cent of the Assistant Director's (Coast) pay.
 (h) Represents the full pay of the staff.
 (i) The whole travelling allowance of the Zoological Assistant and peon has been debited to this head as representing the sum spent in connection with the supervision of the Oyster farm.

Statement IV.—Details of Supplies and Services.

	RS.	A.	P.	RS.	A.	P.
III. Education and allied subjects (Non-Commercial)—						
(1) Training Institute, Calicut	10,373	15	1			
(2) Day and Night schools	3,031	1	3			
(3) Part payment towards half grant for the construction of Temperance hall and School of Kodavur village, Udipi	1,337	0	0	14,742	0	4
IV. Marine Fisheries—						
A. Chank Fisheries—						
(1) Rannad Fisheries	14,253	7	5			
(2) Other Fisheries	21,187	6	6			
B. Pearl Fisheries—						
(1) Pamban Pearl Farm	60	6	0			
(2) Examination of Pearl Banks	3,761	2	7			
C. Vessels—						
(1) Lady Nicholson	4,313	0	9			
(2) Leverett	2,029	3	10			
(3) Sutherland	1,665	13	7			
(4) Pearl	820	13	3			
(5) Inshore Fishing experiments.	1,578	7	1			
D. Other works—						
(1) Marine Aquarium	5,022	12	10			
(2) Zoological specimen supply	1,822	10	7			
(3) Pulicat Oyster Farm	3,015	5	5			
(4) Beche-de-mer Fisheries	466	5	6			
(5) Sea-going launch	32	2	0	66,029	1	4
V. Inland Fisheries—						
A. Tank stocking—						
(1) Compensation to District Boards. (For details see last year's report).	56,134	14	0			
(2) Stocking of tanks	991	8	11			
(3) Chingleput and Nellore Tank stocking schemes.	1,881	13	4			
B. Other works—						
(1) Sunkesula fish farm	6,083	3	8			
(2) Ippur fish farm	1,720	0	3			
(3) Powder factory fish farm.	643	15	6			
(4) Chingleput Fort Moat Farm.	443	10	3			
(5) Vellore Fort Moat Farm.	582	12	0			
(6) Mopad fish farm	3,102	4	4			
(7) Larvicidal operations	41	4	0			
(8) House boat maintenance.	91	0	0			
(9) Motor boat expenses	413	0	0			
(10) Nallamalais scheme	313	2	2			
				72,442	8	5

Statement V.—Details of Receipts.

I. Supervision and Research.	II. Education and allied subjects (Non-commercial).	III. Marine fisheries.	IV. Inland fisheries.	V. Factories.
RS. A. P. 103 8 11	RS. A. P. 269 5 8	RS. A. P. 97,912 11 8	RS. A. P. 81,550 12 8	RS. A. P. 24,740 12 13
(1) Receipts from Biological section.	Fisheries Training Institute, Calcutt.	(1) Revenue from all chank fisheries including Beche-de-mer fishery as per statement VI.	(1) Rentals from Cauvery and Coleroon.	(1) By net sales of canned fish as per trading account.
42 12 6	0 8 3	11,102 2 7	16,102 1 10	262 9 6
(2) Miscellaneous receipts.	Day and Night schools.	(2) Revenue from Pearl Fishery section as per statement VII.	(2) Rentals from tanks in the Nellore and Chingleput districts.	354 9 3
		(3) Miscellaneous receipts.	(3) Receipts from other tanks and canals.	7,513 12 0
		(4) Revenue from Marine Aquarium.	(4) Receipts from fish farms by sale of fish, etc.	
			300 8 7	158 0 5
		(5) Revenue from Zoological supply section.	9,461 1 0	33,029 12 0
		(6) Revenue from Pulicat Oyster farm.	4,697 14 0	21,426 5 6
		7) Receipts from Inshore Fishing.	2,552 11 7	
		(8) Revenue from lease of right of fishery in salt factory channels.	600 15 3	4,627 13 9
			8,603 0 0	
146 5 5	269 13 11	1,35,231 0 8	1,14,415 9 10	28,228 6 2
				61,258 2 2

Statement VI.—Profit and Loss Account of the Chank and Beche-de-mer Fisheries for the season 1922-23.

Expenditure.	Amount.	Revenue.	Amount.
	RS. A. P.		RS. A. P.
Chank fisheries—		Value of chanks fished—	
Tinnevely	28,395 10 9	Tinnevely	66,269 3 2
Rāmnād	15,556 13 1	Rāmnād	26,613 15 8
Sivaganga	305 12 7	Sivaganga	269 8 10
Beche-de-mer Fishery ..	466 5 6	Beche-de-mer	300 0 0
Tenth year's proportion of the total consideration paid in 1913-14 for a 15 year's lease of the Rāmnād Fishery ..	4,000 0 0	Chank rentals realized—	
Supervision charges, viz.—		Tanjore district ..	2,750 0 0
50 per cent of pay and travelling allowance of Assistant Director (Marine) and Superintendent, Pearl and Chank Fisheries ..	2,521 1 0	South Arcot district ..	900 0 0
Balance of profit ..	46,367 0 9	Chingleput and Nellore districts	750 0 0
Total ..	97,912 11 8	Total ..	97,912 11 8

Statement VII.—Profit and Loss Account of the Pearl Fishery section for the season 1922-23.

Expenditure.	Amount.	Revenue.	Amount.
	RS. A. P.		RS. A. P.
Pearl Fisheries—		Receipts from Krusadai Island ..	151 8 0
Examination of Pearl Banks	3,761 2 7	Sale-proceeds of two iron tanks of "Lady Nicholson" ..	400 0 0
Pamban Pearl Farm ..	60 6 0	Sale of kerosene oil and stores to Royal Indian Marine officers ..	434 4 11
Contingencies	1,041 5 3	Hire and repair charges due from the Revenue Department ..	9,801 6 10
Running expenses of "Lady Nicholson" ..	4,313 0 9	Rent of Fisheries Bungalow at Tuticorin ..	113 0 0
Contingencies	100 0 0	Miscellaneous receipts ..	191 14 10
Pay and travelling allowance of crew of "Lady Nicholson" ..	3,938 2 0	Loss ..	8,349 13 0
Pay and travelling allowance of Pearl Fishery establishment.	3,416 14 0		
Supervision charges, viz.—			
50 per cent of pay and travelling allowance of Assistant Director (Marine) and Superintendent, Pearl and Chank Fisheries ..	2,821 1 0		
Total ..	19,451 15 7	Total ..	19,451 15 7

Statement VIII.—Government Fisheries Cannery, Chaliyam—Production Account for the year ending 30th June 1923.

	Amount.	Amount.	Amount.	Amount.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
To opening stock—		By sales (Recoveries)—		
Raw materials ..	9,063 9 10	Cured fish ..	5 12 0	
Empty cans ..	1,532 14 9	Fish guano ..	40 14 3	
Guano ..	..	Tin scrap and empty tins ..	95 8 3	
Fish oil ..	..	Fish oil ..	110 7 0	262 9 6
Prawn shells ..	..			
Pit manure ..	241 8 0	Value of canned fish produced during the year ..	..	21,259 3 9
To purchases—		Closing stock—		
Fish for curing ..	2,887 6 6	Raw materials ..	8,664 2 0	
Raw materials ..	11,046 12 4	Empty cans ..	1,728 13 3	
Empty cans ..	557 5 7	Guano ..	125 0 0	
Wages of mechanic ..	806 3 0	Fish oil ..	25 0 0	
"canning overseer ..	414 3 0	Prawn shells ..	..	
Half pay of store clerk ..	210 0 0	Pit manure ..	20 0 0	
Share of sub-assistant's pay (one-third).	285 1 0			
Manufacturing wages ..	1,715 7 0			
Depreciation on buildings—				
5 per cent on Rs. 2,920 ..	146 0 0			
2½ per cent on Rs. 15,207 ..	380 0 0			
Plant and machinery ..	869 0 0			
	1,395 0 0			10,568 15 3
	32,090 12 6			32,090 12 6

Statement IX.—Government Fisheries Cannery, Chaliyam—Trading Account for the year ending 30th June 1923.

	Amount, RS. A. P.	Amount, RS. A. P.	Amount, RS. A. P.
To opening stock of canned fish at Chaliyam.	25,067 5 5		
At Madras with McDowell & Co.	11,013 2 8		
Railway freight thereon	723 7 0	36,803 15 1	
To opening balance packing materials.			
New season canned fish as per production account.		259 4 1	
Packing materials purchased		21,259 3 9	
Railway freight, petty cooly and cartage.		599 11 11	
Postage		281 9 9	
Miscellaneous		3,233 7 6	
Advertising		136 15 8	
Rent of Bangalore stall (six months)		1,122 11 6	
Half pay of store clerk		15 0 0	
Pay of sales clerk and acting sales clerk.	210 0 0		
Share of sub-assistant's pay (one-third).	477 13 0		
	285 1 0	972 14 0	
To gross profits carried to Profit and Loss Account.		4,790 15 2	
Total	69,475 12 5		
		Total	69,475 12 5

* The other half debited in production account.

Statement X.—Government Fisheries Cannery, Chaliyam—Profit and Loss Account for the year ending 30th June 1923.

	RS. A. P.	RS. A. P.	RS. A. P.
To establishment—			
Share of Sub-assistant's pay (one-third).	285 1 0		
Senior clerk's pay	445 0 0		
Pay of accountant	105 0 0		
Pay of peon	168 0 0		
Travelling and other allowances	104 1 0		
	1,107 2 0		
Share of direction expenses—5 per cent.	885 5 4		
Bad debts written off	19 7 1		
Discount to travelling agent	21 8 3		
Interest on capital 3·325 per cent on Rs. 33,622.	1,117 14 0		
Net profit	1,994 3 9		
Total	5,145 8 5		
		By gross profit transferred from Trading Account.	
		Miscellaneous receipts	354 9 3
		Total	5,145 8 5

Statement XI.—Trading Account of the Experimental Station, Tanur, for the year ending 30th June 1923.

	RS.	A.	P.	RS.	A.	P.
To stock on hand on 1st July 1922—						
Cured fish ..	4	2	0			
Fish oil and foots ..	312	14	0			
Prawn shells and pit manure ..	40	10	0			
Fish guano ..	93	0	11			
Expendible stores ..	837	15	11			
				1,288	10	10
To charges from 1st July 1922 to 30th June 1923—						
Establishment wages of temporary staff, Rs. 1,553-2 5.	3,987	9	5			
Wages of coolies on muster-roll and overtime bills, Rs. 2,434-7-0.						
To cost of fish for curing ..	4,842	6	1			
To cost of fish oil, guano and fish meal ..	1,802	1	6			
To cost of fuel ..	335	9	0			
To cost of packing materials ..	1,628	0	3			
To railway freight on cured fish ..	1,262	1	0			
To railway freight on other goods, Rs. 401-14-2.						
To petty cooly and carriage, Rs. 159-6-7.	561	4	9			
To cost of sundry stores ..	188	4	8			
To salt and preservatives ..	180	4	0			
To miscellaneous (including oil purchased).	2,876	9	11			
To exhibition charges ..	34	6	6			
				17,698	9	1
To gross profit ..				9,901	10	11
Total ..				28,888	14	10
By sale-proceeds of cured fish remitted into treasury from 1st July 1922 to 30th June 1923.						
By sale-proceeds of fish oil and foots remitted into treasury from 1st July 1922 to 30th June 1923.						
By sale-proceeds of guano remitted into treasury from 1st July 1922 to 30th June 1923.						
By sale-proceeds of prawn shells and pit manure remitted into treasury from 1st July 1922 to 30th June 1923.						
By sale-proceeds of fish meal remitted into treasury from 1st July 1922 to 30th June 1923.						
Book adjustments of sale-proceeds ..	8,959	1	9			
	20,798	3	4			
	2,053	14	6			
Deduct outstandings shown in 1921-22 accounts.				18,744	4	10
By value of stock on hand—						
Cured fish, salted ..	237	11	4			
Do. Colombo cured ..	96	10	4			
Fish meal ..	370	0	0			
Prawn shells ..	5	9	8			
Fish guano ..	46	9	8			
Fish oil and foots ..	910	3	3			
Expendible stores ..	1,796	1	6			
				3,462	13	9
By value of goods sold but not realized ..				6,681	12	3
Total ..				28,888	14	10

Statement XII.—Profit and Loss Account of the Experimental Station, Tanur, for 1922-23.

Expenditure.	Amount.		Revenue.	Amount.	
	RS.	A. P.		RS.	A. P.
To rent of Bangalore stall ...	...	...	By rent of Cannanore yard	...	...
To rent of Cannanore yard ...	30	0 0	By sale of coconuts	...	...
Postage charges ...	...	...	Other miscellaneous receipts	...	...
Coconut plantation maintenance	320	0 0	By gross profits transferred from trading account	...	...
Pay and travelling allowance of permanent establishment.	74	0 8		9,901	10 11
Supervision charges—20 per cent of the pay of the Assistant Director (Coast).	1,460	0 0			
Depreciation on plant and machinery—10 per cent on Rs. 4,633-11-4 plus 1,005-11-2.	563	15 0			
To net profit ...	...	...			
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Order—No. 1590, Development, dated 2nd November 1923.

Recorded.

2. The Government consider that Mr. Hornell who, since the close of the year under review, has retired after rendering fifteen years' valuable service to Government, first as Superintendent of the Pearl and Chank Fisheries and subsequently as Director of the Department, is much to be congratulated on the account he has been able to give of the last year of his control of the Department. Whilst it must again be emphasized that the Fisheries Department as such is not intended primarily for the production of revenue, it cannot be gainsaid that the financial results obtained are a valuable test as to whether the Department is working successfully or not. These results for the year under review must, therefore, have been very gratifying to the retiring Director; for they show that the important revenue earning sections realized a profit of Rs. 76,569 against a loss of Rs. 4,694 in 1921-22 and that the total expenditure of the Department in which is included Rs. 43,210 spent on the education of fisher-children and on socio-economic work amongst the fisherfolk exceeded the receipts by Rs. 16,164 only against Rs. 1,18,448 in 1921-22. It should be mentioned that the figures of revenue include an item of a sum of Rs. 9,450, hire charges for the *Lady Nicholson* for the period for which she was lent to the Revenue Department which is still under discussion whilst from those for expenditure have been excluded Rs. 2,920, a proportion of the pay of the Assistant Director (Coast) which the Director considers should be debited to the Salt Department. The Director's debit of Rs. 12,131 to capital expenditure is also open to criticism, but these are comparatively small matters which do not detract to any appreciable extent from the favourable aspect presented by the balance sheet of the Department as compared with that of the previous year.

3. The Fish Cannery at Chaliyam is reported to have worked at a profit of Rs. 1,994. There was a satisfactory increase both in output and sales but the gap between them is still far too wide and until it has been greatly reduced the Government consider that it would be premature to consider the question of erecting a larger cannery at a more central locality. The Director's suggestion that the Canning industry which already receives fifteen per cent protection should be still further protected requires careful examination in the light of the figures of production and consumption

in India as a whole. The Government are not satisfied that all that is possible is being done to tap important retail markets in the Presidency and the question what steps can be taken to improve matters in this respect is engaging their consideration. They are glad to note that the Director is exploring the possibilities presented by overseas markets.

4. For the first time in its history, the Tanur Experimental Station showed a substantial net profit. Perhaps the most important feature of its operations was the greatly extended scale on which fish meal, a product of considerable value to owners of farms and piggeries, poultry breeders and the Government cattle farms, was prepared, thus rendering possible its sale at the very low rate of 2 annas per lb. Orders have recently issued directing that the station should no longer act as an intermediary between Government departments and the private manufacturers for purchases of fish oil.

5. The loss of Rs. 491 on the Oyster farm at Pulicat is attributed to the destruction of the main bed by the contractor holding the lease of a shell pit adjacent to it. The Director should consider the advisability of avoiding any risk of loss in future by slightly increasing the price of oysters sold from the farm.

6. The unfavourable fishing season greatly handicapped the working of the fish-curing yards, but a further improvement in the conditions under which work is carried on in these yards is reported. The transformation of the dark, badly ventilated and most insanitary cadjan sheds into substantial permanent buildings with tiled roofs, cemented floors and masonry salting troughs is proceeding apace. The question of transferring the remaining fish-curing yards in the Presidency to the control of the Fisheries Department is under consideration and the Government trust that when the transfer is effected it will be possible to extend to them the improved methods and conditions which are now common to the yards under the control of the Department on the west coast.

7. The number of private oil and guano factories in Malabar and South Kanara increased from 542 to 647. Most of these may be said to owe their existence to the Fisheries Department, for, it is the demonstration by that department of improved methods of extracting fish oil which has rendered their successful working possible. The Director estimates the total value of the 32,000 tons of guano and 12,000 tons of oil they produced during the year at

Rs. 36 lakhs. An industry with an output of this value represents an addition to the economic resources of the country which is by no means negligible.

8. There was no branch of the work of the Department during the year the results of which reflect greater credit on Mr. Hornell and his staff than that of the Pearl and Chank Fisheries section. The re-organization of this section effected during the year converted a loss of Rs. 18,771 into a profit of Rs. 38,286, notwithstanding the debit to it of the cost of an extensive pearl bank inspection which, in the opinion of the Director, revealed the most promising prospects of a very successful pearl fishery in 1926 or 1927. In view of this and of the fact that the *Lady Nicholson* has been found by the Revenue Department to be very suitable for the inspection of the Laccadive Islands, the proposal to dispose of the vessel has been re-considered and she will now be retained for the joint use of the Fisheries and the Revenue Departments.

9. About equally satisfactory results were obtained from the inland piscicultural operations the net revenue from which is reported by the Director to be Rs. 20,451 as compared with the loss, on the methods of calculation adopted by him for the purposes of this report, of Rs. 10,127 in 1921-22. The attendance of an officer of the Fisheries Department at the sales of important tanks appears to have been largely instrumental in securing increased rentals from them. Valuable work was done in stocking the inland waters under the control of the Department with pearl spot, grey mullets and catla. The attention of the Public Works Department will be drawn to the remarks in paragraph 81 of the Director's report regarding the defects in the construction of the sluices at the Chingleput moat farm.

10. The inshore fishing experiments on the Coromandel coast with Malabar canoes were closed down during the year and the Government now await with interest the results of the experiments in fishing with the Danish seine net which will be initiated on the arrival of the motor fishing launch now on its way to India. A master fisherman has been engaged for this purpose and the Government trust that the Director's advocacy of trials of the Danish seine will prove to be justified.

11. In paragraph 72 of the report, the Director suggests that the Government of India should be requested to subsidize to the extent of Rs. 3,000 the work which is being done by the Department in

supplying biological specimens to educational institutions throughout India. Whilst the Government do not consider that there are sufficient grounds for such a request they are of opinion that further efforts should be made to make this work self-supporting. The Director is requested to examine the matter again.

12. Temperance and socio-economic work continued to occupy a large share of the attention of the Department on the west coast, and if the Department were regarded purely as a commercial department, the expenditure of Rs. 43,210 incurred on this branch of its activities would be transferred from its budget to that of the Labour and Education Departments. The Fisheries Training Institute and elementary schools continued to do useful work. The number of fishermen's co-operative societies on the west coast increased from 60 to 63 though the number of members fell from 3,581 to 3,327; the paid-up share capital, however, increased from Rs. 81,702 to Rs. 85,916 and the amount of loans disbursed from Rs. 2,53,303 to Rs. 3,14,101 of which loans to the total amount of Rs. 1,20,033 were disbursed for industrial purposes.

13. In the statement of accounts attached to the reports on the administration of the department in previous years, the practice has been to debit only a percentage of the pay and allowances of the staff to the various semi-commercial undertakings, the remainder being debited to the head "Supervision and Research" on the ground that a large proportion of the time of the staff is devoted to research and experimental work. The Director considers that this procedure can no longer be justified and, in the statements attached to the report under review, has debited the whole expenditure to the various sections. The Government agree that the statements as now prepared give a more accurate presentation of the financial position of each section than in previous reports but, before finally approving of the new procedure, would be glad to have a report from the Director showing exactly how he proposes to distribute the whole expenditure of the Department among the five main headings in statements II and III annexed to his report. It would appear that, in arriving at the capital expenditure of the department, the Director has included expenditure on such items as furniture and the accessories for transporting fish which would more properly have been debited to revenue, as only expenditure on works of a permanent or semi-permanent character should be shown as capital expenditure.

14. Almost simultaneously with the submission of the Director's report, the recommendations of the Retrenchment Committee regarding the Fisheries Department have reached Government. These recommendations demand and will receive the most careful consideration from the Government, but the report under review would *prima facie* hardly appear to justify either the abolition of the Fisheries Department as a separate entity or any drastic curtailment of its activities.

(By order of the Government, Ministry of Development)

F. NOYCE,
Acting Secretary to Government.

To the Director of Fisheries,
 „ all Collectors.
 „ the Board of Revenue, Land Revenue and Settlement.
 „ „ Separate Revenue.
 „ Law (Education) Department.
 „ Local Self-Government Department.
 „ Public Works Department.
 „ Registrar (Co operative Societies).
 „ Finance (Separate Revenue) Department.
 „ Public Department.
 „ Accountant-General.
 „ Director-General of Commercial Intelligence (with C.I.).
 „ Government of India, Commerce Department (with C.I.).
 Editors' Table.



THE MADRAS CIVIL LIST.

4	5	6	7
NAMES.	Commence- ment of Service.	Date of Arrival.	Non-Residence, and if now on leave, date of expiry of leave.
Walter Miller Thorburn, B.A., Dalhousie Coll., Halifax.	26 July 75	26 Nov. 75	16 Apl. to 13 Aug. 76, Med. Cert. 26 Oct. 83 to 19 July 85, Med. Cert. 24 Aug. 89 to 1 July 90, Furlo. 2 July to 26th Dec. 90, Med. Cert. 21 Mar. to 16th Sep. 93, Spl. leave.
Arthur Henry Temple Martin date.	27 July 75	10 Nov. 75	14 June 78 to 11 Mar. 79, Med. Cert. 13 Oct. to 29 Dec. 79, Spl. Leave. 23 Oct. 85 to 28 Oct. 86, Furlo. 4 April 91 to 10 Jan. 92, Furlo.
Russ. Int. Horace Har- O'Farrell	21 July 75	23 Nov. 75	3 to 28 Feb. 76, Med. Cert. 25 Sep. 81, Abs. 14 Nov. 83 to 8 May 84, Spl. Leave. 7 Nov. 85 to 30 Oct. 87, Furlo. 4 Nov. 93 to 28 Feb. 95, Furlo.
Guy Francis Thos. Powell College, Oxford.	13 Aug. 75	23 Nov. 75	10 Dec. 86 to 17 Dec. 87, Furlo. 26 June 91 to 25 June 92, Furlo. 26 June to 18 Dec. 92, Med. Cert.