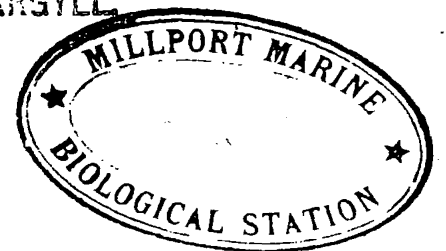




PART IV.—EDUCATION, SCIENCE, AND ART (G).

Administration Report of the Marine Biologist for the Year 1932.

SCOTTISH MARINE BIOL. STATION
DUNSTAFFNAGE MILLPORT MARINE BAY, ARGYLL
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(Dr. JOSEPH PEARSON.)



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1933.

MARINE BIOLOGY.

ADMINISTRATION REPORT (MARINE BIOLOGY) FOR 1932.

I.—INTRODUCTION.

THE work of the Department during the year has been greatly restricted owing to the lack of funds. A considerable saving under Sub-head 1 ("Personal Emoluments") was made possible by the retirement of Lieutenant-Commander E. L. Pawsey, R.N., on February 1, 1932, when it was decided not to fill the vacancy for the present. Lieutenant-Commander Pawsey joined the Department in 1926 and in the comparatively short period of six years was able to complete the fishery survey of Pedro Bank and to make a detailed chart of the bank which was published in 1932. In addition he was engaged in a new survey of the pearl banks as there is a considerable error in certain parts of existing charts. Unfortunately it was not possible to complete this work before Lieutenant-Commander Pawsey's departure. The unfinished survey has, however, been put on record and will be continued when better times return. In addition a survey of the Wadge Bank was being made, but for various reasons the completion of this work was postponed. I should like to place on record my appreciation of Lieutenant-Commander Pawsey's valuable work which was marked throughout by considerable care and accuracy supplemented by a keenness which was reflected in the work of the crew and seagoing staff. It is a piece of good fortune that this work has been taken over temporarily by Captain E. C. Stubbs, R.N., Master Attendant.

The survey of the pearl banks made in January–March of this year failed to reveal the presence of any oysters. Under the present system of inspections all the potential paar area has been surveyed at least once in three years. The system of surveying which is used has already been described.* The area to be inspected is divided up into rectangles 2 miles long and 1 mile broad. The positions of the four corner flags are very carefully calculated. Each rectangular area of 2 square miles is surveyed in one day. The survey is carried out by four pilot boats which work in parallel lines, the boats being in charge of experienced coxwains and the diving being done by experienced divers. The whole of the survey, which has been carried out with the utmost care, has been in the charge of the Marine Superintendent, Lieutenant-Commander Pawsey, who is a naval officer with special qualifications for marine surveying and navigation. The member for Mannar in the State Council, Mr. Anantham, has thrown doubt upon the accuracy of these surveys and has sought the permission of the State Council to have an independent survey. Mr. Anantham may have heard stories, which do not lose in the telling, of pearl oysters having been found by chank divers. It should be noted that chank divers are not permitted to dive on the pearl banks but it is not unlikely that these divers have come across stray oysters on the Venkalai and Arippu reefs. In the same way pearl oysters are occasionally found down the west coast of the Island and even in Colombo Harbour. A certain amount of local excitement was created some years ago, for instance, by the discovery of oysters on the reef at Dehiwala. But one swallow does not make a summer and an occasional oyster does not make a pearl fishery. I suggest that a lot of time might have been saved if Mr. Anantham had seen me before raising the questions in the State Council.

It will be noted in the present report that the lessee of the window-pane oyster fishery at Tamblegam was allowed a rebate of three-quarters of the rent for 1932. If a man obtains the lease of the Tamblegam pearl fishery by offering the highest price it might be thought that, like most other business dealings, his offer is a somewhat speculative one. But my experience of Tamblegam leases shows that there is no uncertainty in this form of investment. If the lessee makes a rich profit, well and good. If he makes a reasonable profit he assumes a mournful aspect and tries

* Pearson, J., Malpas, A. H., and Kerckham, J. C.—The Pearl Fishery of 1925.

to induce Government to offer him compensation for his "loss." If, however, he is unfortunate enough to make a loss he leaves no stone unturned to obtain a rebate on his last year's rent. This move was successful, as I anticipated, in the case of the present lease, and I have no doubt that the lessee is looking forward with considerable anticipation to having a further lease of the beds in the near future.

It is to be regretted that the offer of a grant of Rs. 50,000 from the Colonial Development Fund has not been accepted. The proposal aroused a certain amount of opposition mainly because the objects of the scheme were not understood. The general impression appears to have been that it was proposed to introduce a Rs. 50,000 motor boat with the object of establishing a fleet of large and expensive motor fishing boats. On the contrary it was the intention, after making the requisite experiments, to introduce decked motor boats about 28 feet long and provided with a hold for storing fish at a cost of about Rs. 3,000.

Our scheme was based upon two considerations :—

- (1) the local fishing methods are out of date and ineffective.
- (2) there is a movement throughout the world to substitute fast and inexpensive motor boats for the old-fashioned sailing boats.

The chief opposition to the scheme appears to have arisen owing to the fear that the fishing industry of Ceylon would pass into the hands of capitalists. But it should be noted that the fishing industry of Ceylon, primitive and inadequate as it is, is already in the control of capitalists to a great extent. The opposition appears to be based upon the hypothesis that capitalism is inherently bad. No industry can be modernized and placed upon a progressive basis without the aid of the capitalist and the introduction of capitalized and organized industry in other countries has not reacted unfavourably upon the fishermen. On the other hand the most prosperous fishing countries are those in which modern methods have replaced the old, and so far as can be ascertained the fishermen have benefited by the change.

The Moratu Seveka Samithiya took an active part in the opposition to the scheme. Their opposition, which was based upon ignorance of the proposals, will do the fishermen a great disservice. This Association stultified itself by proposing that Government should give it a grant of Rs. 9,500 per annum for five years "for the purpose of developing the local fishing industry by helping the local fishermen to pursue their calling, using up-to-date vessels, tackle, and methods."

II.—PEARL FISHERY (GULF OF MANNAR).

The usual annual divers inspection of the pearl banks in February and March was carried out this year by the Master Attendant, who, in addition to his own duties, was deputed to carry out the essential duties of the post of Marine Superintendent rendered vacant by the retirement of Lieutenant-Commander E. L. Pawsey on February 1. All arrangements for this inspection were completed before the Marine Superintendent retired, and, as the Master Attendant had no previous experience of inspection work, a preliminary trip was made in the "Nautilus" to the pearl banks (from January 19–26) by the Marine Superintendent and Master Attendant, when the former initiated the latter into the practical technique and routine of inspection methods, at the same time pointing out to him the more important navigation marks and their relation to the various paars.

Schooner "Mansha Muni Wafee," which did good work during the inspections of 1930 and 1931, was again chartered for two months from January 15 to house the inspection crew of boatmen, divers, manducks, &c. The schooner arrived in Colombo Harbour on the due date and was then placed in the Harbour Engineer's hands for temporary fittings and adjustments to be made to accommodate the inspection crew and inspection gear. She was finally ready for sea on January 28 and at 9 p.m. on February 1 the "Nautilus" with the schooner and anchor boat in tow left Colombo for the pearl banks, arriving at the True Venkalai paar on the evening of February 2. Inspection areas were laid the following day and the divers commenced work on February 4 terminating on March 5.

During this period a total area of 50 square miles was inspected by divers, namely:—

| | | | |
|---------------------|----|----------------------------|-------------------|
| (a) Northern paars— | | | |
| February 4-5 | .. | Periya paar karai | .. 4 square miles |
| Do. 6-10 & 13 | .. | True Vankalai paar | .. 10 do. |
| Do. 11-29 | .. | Twynam's paar | .. 32 do. |
| (b) Southern paars— | | | |
| March 3-4 | .. | Donnan's Muttuvarattu paar | 4 do. |

The results of this inspection were very disappointing. No oysters were found over the whole area but the inspection added 10 miles of new ground to the chart of the pearl banks now in preparation.

It was originally intended to inspect 54 square miles of the Northern paar area but an area of 8 square miles adjacent to the N. W. Twynam's station buoy in $9\frac{1}{2}$ –11 fathoms had to be abandoned as the water was so opaque with suspended matter that the divers were unable to see the bottom.

This area is 5 miles due south of Adam's bridge and the opacity of the water was undoubtedly due to sand and mud, carried in fine suspension from the Palk Strait and Adam's Bridge, stirred up by exceptional rains a few days earlier.

This phenomenon is of regular occurrence during January and results from the heavy rains and seas of the north-east monsoon but this is the first occasion it has been observed so late in February (February 28).

In addition to the divers inspection, the "Nautilus" dredged west and south-west of Twynam's paar to the 100 fathom overfall which was fixed over a frontage of 10 miles. These dredgings covered an area of 20 square miles of new ground which had been added to the chart. No oysters were taken in these dredgings. The "Nautilus" also took a line of dredgings across the West Cheval and the North-east and East Cheval paars. Isolated patches of young oysters were found on these paars but no considerable spatfall warranting the expectation of fisheries in the near future was discovered.

During the course of the inspection opportunity was taken to scrape and tar the Arippu and Venkalai reef beacons and the new shore beacon on Karativu Island, which had collapsed earlier in the year owing to denudation, was re-erected and its position accurately charted.

III.—WINDOW-PANE OYSTER FISHERY (LAKE TAMBLEGAM).

This fishery was leased to a local resident for a period of three years commencing June, 1930, at an inclusive rental of Rs. 25,000 the lease carrying the option of renewal for a further period of three years at the same rental. The lessee held successful fisheries in 1930 and 1931, and was expected to hold a small fishery during the year under review. Early in January, however, he petitioned Government for a considerable rebate ($\frac{3}{4}$) of his third and final year's rent on the grounds that, owing to a slump in the pearl markets of Bombay due to the general trade depression and possibly aided by the political situation, he had not been able to find a satisfactory market for the pearls obtained from his fishery in 1931 and was left with a considerable supply on hand.

After due inquiry and consideration Government granted the petitioner's request on condition that he surrendered his lease by March 30, and held no fishery this year.

The lessee agreed to these terms and duly surrendered his lease as required, and no fishery was held this year.

An inspection made from September 5 to 9 showed the following beds of oysters distributed in the lake:—(1) a bed of three and four-year old oysters of about $\frac{3}{4}$ square mile in area in the Kapalthurai region; (2) a bed of three-year old oysters of about $\frac{1}{2}$ square mile in area in the centre part of the lake which should be fishable in 1936; (3) a small bed of two-year old oysters of about $\frac{1}{2}$ square mile in area near the south side of the lake between Kodipota and Kakamunai, which should be fishable in 1937; and (4) a small bed of one-year oysters midway between Kakamunai and Peyaddaimunai unlikely to survive the heavy rains of the next north-east monsoon.

Fisheries in the near future are therefore distinctly promising and should materialize provided no abnormally heavy rains occur during the intervening north-east monsoons. Further, with so many brood oysters present in the lake the chances of the existing oysters being supplemented by new spatfalls are very hopeful.

IV.—CHANK FISHERIES.

As provided under rule dated November 30, 1929, made under the Chanks Ordinance of 1880 and amending Ordinance of 1928, the inshore area of the pearl banks between Mannar and Moderagam Point and Venkalai reef was again opened for chank fishing from January 31 to April 30. No details of this fishery could be ascertained as the "Nautilus", during the inspection of the pearl banks, was working many miles from the area and no motor launch was available to visit the fishing ground.

The usual chank fishery was also carried on in the Palk Strait. Details of this fishery are also not available. The comparative prosperity of the chank fishing industry is, however, reflected in the particulars of the export of chanks from Ceylon as extracted from Customs returns and given below :—

| Annual average under old royalty from— | Chanks exported. | Royalty collected. | | Average Royalty per 1,000 Shells. |
|---|---------------------|-----------------------|----|--------------------------------------|
| | | Rs. | c. | |
| 1919 to 1928 .. | 2,305,664 .. | 10,770 2 | .. | 4·67 |
| 1930 .. | 2,193,967 .. | 28,667 14 | .. | 13·06 |
| 1931 .. | 1,240,440 .. | 16,690 35 | .. | 13·45 |
| 1932 .. | 1,326,846 .. | 14,684 33 | .. | 11·06 |

V.—THE LOCAL FISHERY INDUSTRIES.

Fishery Statistics.—As a measure of retrenchment the collection of fishery statistics relating to weight of fish transported by rail from the various fishing centres, average daily landings at Mutwal fishery harbour, and average daily supplies at the principal fish markets of Colombo, was discontinued.

The imports of fish goods into the Island as extracted from Customs returns show a total of 530,779 cwt. valued at Rs. 10,288,880, as against 548,350, cwt. valued at Rs. 12,465,706 for the preceding year. Of these imports cured fish from Southern India and Maldivian fish from the Maldivian Islands accounted for 403,127 cwt. valued at Rs. 9,521,993, as against 391,116 cwt. valued at Rs. 11,403,516 in the preceding year.

Development of the Industry.—In my report of last year reference was made to an application to the Commissioners for the Colonial Development Fund for a grant of Rs. 50,000 for the purpose of building a modern fishing vessel and equipping it with the latest appliances with which to make detailed investigations and research necessary to determine the best means to be adopted to promote the development of the industry on modern lines. An outline of the proposed scheme of investigation was given and it was stated that the grant had been approved on condition that the annual recurrent charges of the investigations would be provided from Ceylon funds.

The scheme was referred to the Minister of Local Administration and early in the year was considered in detail by the Executive Committee which decided to recommend the acceptance of the grant to the State Council; but before the matter could be discussed by the State Council, it was withdrawn by the Minister for the further consideration of the Executive Committee in the light of considerable opposition to the scheme contained in petitions submitted to the State Council and to the Minister.

Opposition to the scheme was principally from the standpoint that, as the local fishermen were not in a position to purchase expensive boats and gear, it could only result in the capitalization of the industry and in the inevitable ruin of thousands of fishermen who would thus be deprived of their only means of subsistence.

It was nevertheless, generally admitted that the industry is conducted on very primitive lines and that an improvement in the conditions was long overdue, the essential requirements being (a) a better type of boat economical in construction and upkeep and affording greater speed and safety and (b) improved fishing gear which would ensure greater catches.

The suggestion was also made that, instead of accepting the offer of Rs. 50,000 for a research vessel, the recurrent expenditure of the investigations, *i.e.*, Rs. 9,500 for five years, should be voted to the fishermen to enable them to pursue their calling

using up-to-date vessels and gear. Apart from other considerations, it was apparently overlooked when the above suggestion was made, that, as the fish fauna of Ceylon differ entirely from that of European waters and the general fishing conditions are also very different, it is most unlikely that boats and fishing gear successful in European waters would be suitable for Ceylon waters, without considerable modification necessary to adapt them to local conditions, and, since no experiments have ever been made with intensive methods of fishing by small craft, either in Ceylon or Indian waters, there is no information available of local value which can assist the fishermen in the choice of either vessel or gear. It was precisely for the purpose of obtaining information for the guidance of the fishermen on these points that our scheme was devised.

As this scheme seems to be generally misunderstood, it may not be out of place to consider it in some detail in this report.

Firstly as regards the type of boat selected for the investigations. This, as already stated, is a 45-foot Scotch type fitted with heavy oil engine and equipped with the necessary gear to work Danish seine-net, drift-net, and long-lines; these being the most important of the modern fishing gear suitable for small craft. This type was selected by the late Marine Superintendent after obtaining the advice of the technical officers of the Ministry of Fisheries in England of the Fishery Board for Scotland and of master fishermen, and after a careful examination of all types now in favour in home waters. It is a type that is actually engaged in more varied kinds of fishing than any other, has met with greater success, lends itself to greater modification and is most likely to fulfil the following requirements for experimental work in these waters, namely:—

- (1) It is able to stand up to all reasonable conditions of weather and to work in any part of the Ceylon waters at any time of the year and hence to have the greatest possible working range..
- (2) It is suitable for testing the more important type of intensive fishing gear designed for small craft.
- (3) It is large enough to afford sleeping accommodation for the crew and to permit experiments being made in the artificial preservation of fish if found desirable.
- (4) It is of reasonably shallow draft and capable of being beached, or in the alternative, of lying ashore without the necessity for shore equipment.
- (5) It is a type which is most capable of modification. If modifications are required to meet local conditions and it has the further advantage that it can be built in all sizes to suit all pockets without undue departure from type.

Plans and specifications of the boat made to type, but including all additional fittings necessary for the investigations, have been prepared by a well-known Scottish fishing boat-builder.

It should be understood that this boat, as designed, is essentially a small research vessel capable of carrying out prolonged investigations and trials with modern fishing gear and that it was not intended that such an elaborate vessel should be adopted by the local fishing industry. It is, however, a type which, if found suitable for these waters, can be reduced to such dimensions as would be within the means of the local fishermen to purchase, work, and maintain.

In addition to her investigation work, it is proposed to use this vessel for inspection and other work in connection with the pearl fisheries to replace M. L. "Lion" recently condemned, and for this purpose it was deemed inadvisable to cut her length below 45 feet.

The perfection of the paraffin engine, and diesel and the semi-diesel oil engines has considerably reduced not only initial costs, but running and maintenance costs, and has resulted in a great advance in the utilization of motor power for fishing craft, particularly, for the smaller inshore types. Vessels fitted with these engines are reported to be reliable and efficient and to be rapidly replacing sail. It is even predicted that in the near future large trawlers and drifters will be converted to heavy oil engines to reduce running costs to a minimum.

Standard types of the small boat class are now being built for work in English and Scottish waters at a cost varying from £150 to £1,500 according to size and gear used, and it is expected that the proposed investigations will lead to the evolution of small vessels of low cost to replace the outrigger canoe in Ceylon waters. Whether such vessels will be purely sail, or sail with auxillary power, or purely motor, will depend on the methods of fishing found to be most profitable.

Recent statistics of the world's fisheries compiled by the Deputy Commissioner of Fisheries, United States Bureau of Fisheries, show that Japan has the greatest output valued at approximately £35,000,000, while England, Scotland, and Wales and the United States of America are bracketed second with an output valued at approximately £22,000,000. Ceylon, India, Asiatic Turkey, Arabia, and Burma have a combined output valued at only £4,000,000.

It is significant that Japan employs more motor fishing boats of the small class than any other country ; America being next on the list.

The Japanese vessels are of three types (1) a purely local design, (2) an imported design, and (3) a combination of the two. Boats engines and gear are all made in Japan.

It is within the bounds of possibility that, given a well-designed model of proved success in these waters, the local boat-builders could reproduce such a model without any loss in its efficiency, and Mr. Mason of the Harbour Engineer's Department, an expert boat-builder, agrees that this should be possible. The preparation of fishing gear should present little difficulty as the fishermen already make that now in use.

In regard to the above paragraph, it may be of interest to record the views of Mr. L. L. Hunter, Assistant Government Agent, Kalutara, regarding the fishing industry in his district : his being the only constructive proposals we have yet received.

After stating that no boats in present use can safely put to sea during the south-west monsoon from May to October (on the east coast the period is from October to March during the north-east monsoon), and that the fishermen, who before the depression were able to eke out a living in casual employment during this period, now suffer acute distress, Mr. Hunter refers to the disabilities of the outrigger canoe, namely, that it cannot be launched from the beach in heavy surf and is too small to be sea-worthy in big seas, and stresses the immediate need of the fishermen for :—

- (1) Larger and safer boats of moderate draught capable of working improved gear.
- (2) Suitable harbours for the safe anchorage of such boats.

With regard to (1) Mr. Hunter suggests a boat of approved design and shallow draught provided with sail and auxillary motor, which could be built at a cost of about Rs. 3,000 exclusive of motor, and urges that, as a source of additional employment for the fishermen during the slack fishing season, such boats should be built locally and of local timber. He is of the opinion that small groups of fishermen would take up such vessels aided, if necessary, by loans from Government funds. Although we are not yet in a position to recommend a suitable boat, we agree that the cost should be the lowest minimum possible and that local encouragement should be given for its building.

With regard to (2) Mr. Hunter suggests that the Panadure lagoon, the Kalutara lagoon, and the Alutgama lagoon (failing Beruwala Bay) be converted to harbours by deepening the Panadure, Kalutara, and Alutgama river mouths. He points out that the latter are liable to some movement during the north-east monsoon owing to the formation of sand-bars and suggests that this movement might be checked by the construction of permanent river mouths.

While we agree that some lagoons might be adapted to afford safe anchorage for small craft, we fear that in many cases the cost of conversion would be prohibitive. It is clear, however, that, as beach boats cannot be launched during the greater part of the south-west monsoon, some harbour provision will be necessary to enable the industry to be carried on throughout the year ; and it was with this provision in mind that we included, as an essential part of our scheme, the survey of the more important

fishing bases round the coast now in use by local fishermen, such as Barberyn, Weligama, Tangalla, Hambantota, &c., to determine their suitability to all-weather fishing harbours. Such surveys can be carried out most conveniently by a small boat of the type selected.

This may look somewhat ahead, but in our view it is desirable that the investigations should be carried to their logical conclusion rather than tackled in a piece-meal manner.

With regard to the inclusion in our scheme of a general investigation of the fish resources of the inshore waters, with particular reference to the seasons and frequencies of the more important pelagic food fishes, to which exception has been taken on the ground that the fishermen are already conversant with these matters and stand to gain little or nothing from such investigations, some misconception appears to exist as to the significance of the term "inshore-waters."

This term, in the sense used above, denotes such waters as are within the daily working range of small craft operating from a port as opposed to deep-sea fishing which is carried on by large vessels and involves some days absence from port. Thus, the inshore-waters of Ceylon include, not only the area in the 100 fathom line with an average width of 15 miles, but also the belt of deep sea beyond within the range of the outrigger canoe. This belt would naturally be extended with an increased speed and working range of the craft employed.

At the present time nets are worked from the shore and from catamarans and small outrigger canoes to a radius of about 3 miles. Outside this radius, fishing is restricted to hand lines worked from outrigger canoes.

Thus, while it may be true that the catches obtained by hand-line fishing may give the fishermen sufficient information, as to the movements and frequencies of the fishes they normally catch; to enable them to carry on their present methods of fishing in localities known to them, such information is entirely inadequate to determine by what methods and to what extent the industry can be modernized and developed.

The chief factors which influence seasonal movements and frequencies of migratory fishes are (1) food distribution, (2) breeding requirements.

Food distribution depends primarily on the seasonal concentration of the minute free-swimming organisms in the sea known collectively as plankton, which is largely governed by the direction and velocity of oceanic currents.

Little is known regarding the seasonal concentration of these organisms in Ceylon waters and hence of the seasonal concentration of such small fishes as depend on them for their food supplies, and, as it is the habit of larger fishes to feed on smaller fishes, little is therefore known of the seasonal swarming habits of the larger mid-water and surface fishes whether for the purpose of feeding or of breeding.

It is conceivable that some species of migratory fishes swarm at certain seasons in greater concentration in the outer limits of the inshore waters and in such abundance that drift-net fishing may be more profitable at this particular season than closer inshore. On the other hand another species may swarm nearer inshore at a different time of the year; and it is the object of the proposed investigations to examine systematically and in detail the whole of the inshore waters of Ceylon in order that all information essential to the development of the industry may be obtained.

Finally with regard to the demonstration of the vessel and the working of her fishing gear to representatives of the fishing industry and instructing them in the technique of the methods of fishing found to be most successful.

Although some of the fishermen are accustomed to work small nets of the drift-net type, such knowledge is insufficient to enable them to work modern drift-nets so as to obtain maximum catches. Proficiency in the use of these nets is largely a matter of practice; but practice without a knowledge of the correct method of use will not result in efficiency; it is therefore very necessary that the fishermen should be taught by practical demonstration the uses of this net and the correct procedure to be followed in the setting, laying, and hauling. Similarly, with the long-line and the Danish seine-net. The former unlike the hand-line in present use, carries a very large number of hooks which require to be baited, laid, and hauled in a particular manner in order that it should work at its greatest efficiency. It would be distinctly

unfair to the fisherman, however intelligent, to expect him to work this gear and to obtain good results without first giving him detailed instructions in its proper use. Similarly, the fisherman cannot be expected to take up new methods of fishing with a new type of boat unless he is convinced by demonstration of the great superiority of such a boat to that in present use.

Furthermore, he should be supplied with complete data relating to initial and the working costs and comparative efficiencies of the different types of gear and of the type of vessel recommended for his use.

It is now proposed to enlist the services of a master fisherman, skilled in small boat fishing with modern gear, for the purpose of making the initial investigations and to train a local crew in the proper use of the boat and gear instead of appointing a new Marine Superintendent would not be so skilled in this type of work. It is also proposed to purchase with an anticipated saving from the grant of Rs. 50,000 a small boat, suitable for the use of the fishermen, to serve as a model for adoption. The purchase of this boat will, however, not be possible until the investigations have been carried far enough to indicate the type most suitable.

VI.—MISCELLANEOUS.

Whaling Ordinance, No. 30 of 1930.—Mr. K. Berntzen who under this Ordinance holds a 5-year licence dating from January, 1930, has not yet started whaling operations in Ceylon waters.

International Convention for the Regulation of Whaling.—In September, 1931, the League of Nations adopted a convention for the regulation of whale fishing designed to prevent the uneconomic exploitation of whales. This convention, which is applicable to the high seas and territorial and national waters, applies only to baleen or whale bone whales; toothed whales including sperm whales and members of the *Celacea* family other than baleen whales, are not effected.

It prohibits the taking of right whales (*Balaena* spp.) which are now so reduced as to be threatened with total extinction. It legislates for the international control of all baleen whale fishing and places the onus for the observance of the articles of the convention on the signatory governments who are required to licence all whale fishing vessels flying their respective flags. (This latter provision does not prejudice the co-operation of Ceylon Whaling Ordinance, No. 30 of 1928).

It further prohibits the taking of calves and sucking whales and requires that the fullest possible use shall be made of carcasses. It also requires that returns shall be rendered of numbers, species, sexes, dimensions, &c., of all whales taken. These provisions are already provided for in the Ceylon Whaling Ordinance, No. 30 of 1928.

The State Council agreed to accede to this Convention but only on condition that effect is given to the terms of the Convention by legislation to be made by the State Council and not by legislation by an Order-in-Council.

Whale Stranded at Trincomalee.—In June a fin whale (*Balaenoptera musculus*) about 60 feet long was stranded in shoal water in Kodyar Bay, Trincomalee. It was in such a position that it could not be towed off into deep water and despite numerous gun shot wounds inflicted in an effort to kill the animal it survived in this position for some days. Portions of it were subsequently secured for the Museum.

Prior to its death an application to purchase the whale was received from Mr. O. D. Harder, proprietor of U. S. Shows then exhibiting in Price Park, Colombo. He proposed to embalm it after death and to bring it to Colombo by rail for exhibition at his show, a practice which I understand is frequently observed in America.

The proposal was examined but found impracticable owing chiefly to the impossibility of obtaining sufficient embalming fluid in Colombo.

Fishing Disputes, Kalutara.—In March this year the fishermen of Kalutara petitioned Government alleging encroachment and general interference with their fishing by Indian kattamaram fishermen who regularly migrate to Kalutara in their kattamarams ostensibly to purchase lunumidella timber, establish fish camps north of the Kalu-ganga river and engage in fishing from about September to April of each year. On investigation it transpired that this was an old dispute dating back 30 to 40 years which had been periodically revived and amicably settled by mutual

agreement between the parties concerned. On this occasion the Assistant Government Agent, Kalutara, conducted an inquiry at Kalutara which was attended by the Assistant Marine Biologist, Second Assistant Marine Biologist, and representatives of the disputing parties. The latter re-affirmed the following terms of settlement agreed to at an earlier inquiry :—

- (a) The kattamaram fishermen not to fish south of a line drawn due west from the northern end of the Kalutara Railway Station platform (whatever the position of the mouth of the Kalu ganga). The ruins of the wreck of a boat, viz., a wrecked iron wheel lying in the sea, was the point of identification of the boundary in the sea.
- (b) The kattamaram fishermen were at liberty to fish in the sea south of the line in (a) but west of the line of the outer reef called the Koramuruwappare.
- (c) The local fishermen similarly agreed not to fish north of the line at (a) as far north as Poltuduwa, the sea between these two boundaries being the area in which kattamaram fishermen should fish.

Panadure Lagoon.—There has been a conflict of interests between the kraal owners and the net fishermen. Certain nets, though prohibited have been used from time immemorial.

I have suggested that use of drag nets and kraals are harmful in an enclosed lagoon unless their use is strictly regulated. For the protection of young fish it is desirable that neither nets nor kraals should have too close a mesh and that, further, a close season for nets should be established.

Hikkaduwa.—Certain fishermen were charged at the Galle Police Court under the Sanitary Board Rules of the Galle District with having fished from unregistered boats. The case was dismissed on the grounds that the open sea is outside the boundaries of the Sanitary Board.

New rules were drafted and proclaimed under the Game Protection Ordinance, No. 1 of 1909. These regulations differed from the Sanitary Board Rules mainly as follows :—

- (1) The territorial waters were included.
- (2) Boats were not to be registered, only nets.
- (3) Barû-del and yoths were to be registered as well as ma-del.

There has been difficulty since the new regulations came into force as the barû-del fishermen object to the registration of their nets.

The matter is still under consideration.

Visit to the Maldives.—Mr. P. E. P. Deraniyagala, Second Assistant Marine Biologist, paid a visit to the Maldives in December, and was absent from Colombo for eleven days. Through the kind offices of the Maldivian Ambassador, Mr. E. A. H. Didi, the trip was made at the expense of the Maldivian Government. My department is greatly indebted to the Maldivian Government for this kindness and for the courtesy shown to Mr. Deraniyagala during his stay in the Islands. Unfortunately, the time at his disposal was too short to be of much material value.

This group of atolls has attracted the attention of several naturalists in the past, particularly those who were interested in the divergent views regarding the origin of coral reefs, and it is to be desired that my department should send a fully equipped expedition, preferably in the "Nautilus," to supplement the work which has already been done. I have had this in view for some years but more pressing work in our own waters has made it impossible to release the "Nautilus," but it is to be hoped that when the financial situation improves, facilities will be offered my department to carry out this work.

Fish Transplanting.—Along many estuarine fishing villages large numbers of fish fry are taken with the larger fishes and discarded. These fry often belong to large food fishes such as "Modha" *Lates calcarifer* and "Dalla" *Lutianus argenti-maculatus*. An attempt was made by Mr. Deraniyagala to transplant fry from Negombo to Gampaha and two cans full were transported to the latter place on

July 28. These were placed in a large trench with flowing water and protected by wire mesh. With a few exceptions the fishes survived the transplantation and when examined six weeks later were healthy. With the first showers, however, they all died probably from the effects of decayed organic matter and road tar which was washed into the trench.

Fish Curing.—Experiments were conducted by Mr. Deraniyagala in preparing Umbalakada from the Balaya on October 11. The fish was half boiled in sea water then smoked. The product appears to require about two months to mature and change from the pinkish grey to the hard, dark red product sold in the market.

Colomb Museum,
February 27 1933.

JOSEPH PEARSON,
Marine Biologist.

