PART IV—ADMINISTRATION

1. ORGANIZATION OF THE DEPARTMENT OF FISHERIES

THE importance of administration to the fishing industry has never been adequately recognized in Ceylon. Fishing is the Cinderella among Ceylon's industries and its workers remain the poorest section of the community, living in slums and shanties, using out-moded and primitive craft and gear, pursuing a most rigorous and dangerous occupation with little or no safeguards against the unpredictable nature of both their daily work and their daily wages. It has only recently been accepted that the function of Administration is to provide services such as research, development, welfare and legislation, through which the industry can overcome its various defects and develop into a thriving and progressive activity comparable to any other major industry in the Island.

From 1907 up to about 1920, so little attention was paid to fisheries administration that fisheries matters were the part-time duties of the Director of the Colombo Museum. The chief duty of this officer, when he functioned as the Marine Biologist, appears to have been to serve as scientific adviser to the Government on matters connected with the exploitation of the Pearl Banks. In 1920, the Marine Biologist was directed to carry out a biological survey of the coastal waters and the first faint beginnings of the department can be found in the provision made in the 1920–21 Estimates for work under the head " Department of Fisheries ".

The " Department " consisting of a full-time staff of one or two scientific officers continued to work within the framework of the Museum Administration until 1941. Their work was chiefly connected with the Pearl Banks and included a limited amount of biological research. In 1941, an independent Department of Fisheries was set up, a Director appointed and the department moved into offices which were located temporarily at Mount Lavinia a few miles south of Colombo. The Fisheries Research Station building at Galle Face, which was completed in 1940, was commandeered by the Services and it was not until 1946 that the department was able to move into this building. Unfortunately World War II and the consequent shortage of food made it necessary for the department to limit its attention to fish marketing and the grant of loans to fishermen with the object of making fish available to the consumer at reasonable prices. In 1950 it was possible to reorganise the department into its present form with an enlarged staff responsible for a wide variety of functions.

The department at present is headed by a Director assisted by 30 other staff officers including 12 for research and development, a clerical staff of 112, a field staff of 101, trawler and boat staff of 114, Mutwal Factory staff of 100, transport, stores and preventive (anti-dynamiting) staff of 56 and a further 82 minor employees making a total of 597.

2. RESEARCH

Research is the only satisfactory means of obtaining answers to many of the questions which arise from a desire to improve the fishing industry. Answers cannot always be found through work done in other countries and contained in the books found in a library ; more often it involves patient, critical and impartial investigation of local resources and prevailing practices to obtain accurate facts on which sound and realistic programmes of future development can be based.

The fisherman can look to biological research to give him more precise information as to when and where shoals of fish are to be found and to improve the gear he uses to catch them. He has to rely on technological research for methods to mechanize his boats, to preserve without undue spoilage the fish he catches and to convert his waste and unusable fish into saleable products. Fisheries research is thus closely linked with the economic advancement of the fishermen and hence the industry.

The Fisheries Research Station, Colombo

The early administrators were scientific officers and they did a considerable amount of research into mollusc fisheries (which were at that time of great economic importance), marine fisheries (such as exploring the Wadge and Pedro Banks and identifying the various fish found in Ceylon waters) and even freshwater and brackish water fisheries. The Department of Fisheries was separated from the Museum Administration in 1941, mainly with the object of concentrating its activities on fisheries development and research. However the task of purchasing and marketing of fish for public consumption was so onerous that research was drastically curtailed until a research division was established in 1950. Since then the research section has advanced rapidly and it now has trained officers in almost every branch of fisheries research.

A short account of the research work that has been done appears below. This may serve as an introduction to the appendix which gives a comprehensive bibliography of papers on subjects connected with the fisheries of Ceylon.

Mollusc fisheries. Early biological research into aquatic organisms of economic importance was directed to a study of three molluscs, the pearl oyster, the window-pane oyster and the chank. A series of scientific papers on the rates of growth, reproduction, distribution and the formation of

pearls were published(1). Since then no scientific study except occasional surveys for tracing the presence of fishable stocks, has been made. The success of the pearl oyster fishery in the early part of 1958 has rekindled interest in the mollusc fauna of the Gulf of Mannar.

Marine fisheries (Demersal species). Exploratory trawling of the Wadge Bank and Pedro Bank to determine their productivity was begun in 1907. The surveys(2) showed the suitability of the Banks for trawling and the presence of large quantities of fish, mainly snappers and breams. The early attempts to fish on a commercial scale failed on account of the poor marketing arrangements ashore. Since World War II, the Ceylon Government has operated three trawlers on the Wadge Bank and their fishing records have been analysed(3) and it was concluded (*a*) that further increased trawling would not adversely affect the fish stocks, and (*b*) that migrant species (especially horse mackerel) enter the fishery during the south-west monsoon season when highest catches are obtained. The narrow continental shelf around Ceylon was found to be unsatisfactory for trawling(4). During these surveys a dredge was used for sampling the sea bottom and the invertebrate fauna present in the sediments has been listed(5). The fauna of the Pearl Oyster Banks in the Gulf of Mannar, and the stomach contents of fish caught during inspections of these Banks have been recorded(6). A recommendation was made to develop a fishery for sponges(7), following which the shallow water fauna of Trincomalee Harbour was investigated and a report was made on the species composition of the sponges and the sea cucumbers observed there(8).

Marine fisheries (Pelagic species). Although pelagic species of fish are much sought after by local consumers, the study of this group has not progressed beyond the level of identification of species such as the mackerels(9) and the herrings(10). Statistics based on the quantities of fish received in the Colombo Markets showed seasonal variations in the supply of sier, tuna, herrings, etc.(11). The Marine Biologists have repeatedly emphasized the importance of investigating the biology of these species for introducing better fishing techniques and thereby increasing the catches. The beach seine fishery is dependent on several small-sized pelagic species, and the low efficiency of this gear on our coasts was reported recently(12).

Freshwater fisheries. The great value to the village economy of fish resources in streams and irrigation reservoirs, made it necessary to investigate the habits of fresh water food fishes(13). This interest led to the gourami being introduced to Ceylon from Java in 1909 and the later successful establishment of this species in the lower reaches of the Mahaveli river has been reported(14). The import of exotic species for establishing new or larger fisheries was begun earlier by the Nuwara Eliya Fishing Club who obtained trout to stock mountain streams. This club maintained a fish hatchery, with well-defined culturing practices(15). The indigenous freshwater fish fauna has been reported on extensively(16) and the establishment of nursery ponds by the Government was advised(17). With the need for a rapid increase in local food supplies after World War II, the Department of Fisheries decided to supplement its stocking programme with researches on fish culture and the productivity of inland waters. Scientific data on these aspects of study are being collected.

Brackish water fisheries. The necessity for investigating the productivity of lagoons and estuaries was almost forced on the Marine Biologists through their being called upon for advice in settling frequent disputes among fishermen over the use of different types of gear in these waters, and over supplies of bait, particularly of crustacea found here. Fishermen using hand-lines were limited in their seagoing by the amount of bait available to them, and practical methods were sought to regulate the fishing(18). Overfishing of some estuaries was established and the close-set fish traps ("kraals") extending across the entire width of estuaries were found to be chiefly responsible for depleting the fish fauna. Adoption of fish culturing methods for stocking these waters has been recommended(19). It is hoped that the recent proposal to establish a field research station at

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(1) Herdman (1903–06), Hornell (1905–16), Malpas (1933) and Pearson (1913 (*a*) and (*b*), 1923*a*, 1925, 1933*a*).
(2) Malpas (1926).
(3) Sivalingam and Medcof (1957).
(4) Pearson (1923, 1927).
(5) Pearson (1914, 1921).
(6) Southwell (1914).
(7) Herdman (1906).
(8) Pearson (1912*a*).
(9) Deraniyagala (1933*b*, 1951).
(10) Henry (1912).
(11) Pearson (1930).
(12) Canagaratnam and Medcof (1956).
(13) Willey (1903, 1909–10).
(14) Pearson (1911).
(15) Fowke (1938).
(16) Deraniyagala (1929, 1929*c*, 1932, 1932*a*).
(17) Malpas (1936–37).
(18) Willey (1910), Pearson (1933), Malpas (1939).
(19) Pearson (1933), Schuster (1951).

Negombo may result in greatly extending our knowledge of the bionomics of edible forms of brackish water fish. Studies are in progress on species of crustacea, their reproduction and the extent of their migration to and from the sea.

Aquatic mammals and reptiles. The aquatic reptiles of Ceylon have been studied (20) and the instituting of closed seasons was advised to prevent overfishing in the green turtle fishery which had existed for a long period in the northern province. Protection for the dugong was another measure recommended (21). Whales have been stranded on our coasts from time to time and these have been identified (22) while the prospects for the commercial utilization of porpoises found in our seas have been examined (23).

Fish fauna. Two valuable compilations on Ceylon's fish fauna have been published recently (24). A total of 846 species have been recorded from our waters and the illustrations of a majority of these fish are available to assist their easy identification (25).

Oceanography. Behaviour of currents in the Gulf of Mannar was studied with the object of correlating water movements with the successful settling and growth of pearl oyster larvae. The methods applied were based on the use of the Ekman Current Meter, the liberation of Drift Bottles and the collection of sea water samples at regular stations for ascertaining changes of salinity (26).

Fish processing. Better methods for the curing of fish, based on chemical and bacteriological studies have been suggested in an attempt to improve the quality of locally produced dried fish (27). Methods have also been devised for converting fish wastes into liquid meal, and for utilizing fish liver residues. A long-term project to determine the chemical composition of food fishes was begun recently and a report presenting results from 30 species has been published (28).

3. DEVELOPMENT

An important function of administration in its efforts to assist the local fisherman is to introduce better types of fishing boats, more effective fishing methods, use of new types of nets and gear and to acquaint him with any new knowledge, derived through research, which will be of practical use to him.

Although the need for this type of service was realized and advocated as far back as 1925, very little was done till a development division was set up within the Fisheries Department in 1950. This division worked on the mechanization of the local fishing industry and the trying out of different kinds of gear used successfully by other countries. This work received considerable assistance from F. A. O. and Colombo-Plan countries. In 1955, training courses for fishermen were added to the curriculum of Co-operative Training Centres while the opportunity was taken to set up propaganda stalls at exhibitions and fairs arranged by Government departments, schools and private organizations.

Mechanization of local craft. Local fishing craft have changed very little during the past century. On the west and south coasts, the fishermen use the outrigger sailing canoe ("oru"). These go out to distances not exceeding 25 miles from shore and when the winds fail and the craft have to be rowed, about 10 hours are spent in travelling and only one or two hours in actual fishing on the grounds. The outrigger canoe is normally too narrow to take an engine inside the boat. In an attempt to put a small inboard engine (a 4 h.p. Arcadia) into a standard type outrigger canoe the engine had to be fitted high up on the top edge of the side of the boat. This experiment showed that engines can work in this type of craft in spite of the presence of an outrigger but the installation has not been successfully used in any commercial operations. In 1956 a local boat builder constructed one with a hull wide enough to accommodate an engine and this boat has worked very successfully

(20) Deraniyagala (1930*a*, 1933*c*, 1936*c*, 1939).
(21) Deraniyagala (1940).
(22) Fernando (1912), Deraniyagala (1938).
(23) Lantz and Gunasekera (1955).
(24) Mendis (1954), Munro (1955).
(25) Munro (1955).
(26) Pearson (1913), Malpas (1930).
(27) Gunasekera, de Silva and Lantz (1955).
(28) Lantz and Gunasekera (1957).