VISITORS' TABLES AT COLONIAL FISHERIES RESEARCH STATIONS

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THE Colonial Office is establishing a number of fisheries research stations at suitable points in the British Colonial Empire. These stations are particularly concerned with the application and adaptation of existing knowledge, methods and techniques of fishery and of marine and freshwater biological research to Colonial problems, and this work involves, in addition to general studies of the ecological background, detailed studies of the life-histories of the fauna and of the factors which influence their growth, distribution and migration. The whole of the initial capital expenditure for these stations is being met from central research funds made available under the Colonial Development and Welfare Acts. The same source usually provides for one-half of the recurrent costs for an initial period of five years, the remaining half being divided between the territories in the region served by the research station.

The work of these stations is reviewed by the Colonial Fisheries Advisory Committee, which advises the Secretary of State for the Colonies. Apart from Colonial Office members, this Committee consists of the following: Mr. J. Croft Baker, chairman, British Trawlers' Federation, Ltd.; Dr. G. E. R. Deacon, director, National Institute of Oceanography; Mr. T. S. Leach, chief inspector of fisheries, Ministry of Agriculture and Fisheries; Dr. C. F. A. Pantin, Department of Zoology, University of Cambridge; Dr. G. Reay, superintendent, Torry Research Station (Department of Scientific and Industrial Research); Mr. F. S. Russell, director, Plymouth Laboratory; Dr. Ethelwyn Trewavas, British Museum (Natural History); Mr. R. S. Wimpenny, Fisheries Laboratory, Lowestoft (Ministry of Agriculture and Fisheries); and Prof. C. M. Yonge, Department of Zoology, University of Glasgow. Brief reports on the work of the stations are included in the annual series of reports entitled "Colonial Research" (for example, for 1951-52: Cmd. 8665; H.M.S.O.; 6s. 6d.).

Each station is locally administered by the Government in whose territory the station is situated, except that, in East Africa, administration is in the hands of the East Africa High Commission. Local committees, on which the interested and contributing territories are represented, discuss research policy with the directors. These research stations have accommodation for visiting scientists; and for hydrologists and biologists who may be interested in taking advantage of these facilities, the following brief account of the research stations is offered.

The earliest research station to be established is at Jinja, on Lake Victoria. Mr. R. S. A. Beauchamp is director, and there is a staff of four research officers. A study is being made of the distribution and life-histories of the fishes of Lake Victoria and of the other East African lakes, with special reference to species of *Tilapia*. Speciation problems in the *Haplochromis* group of Cichlid fishes are being investigated. A study has been made of the Chironomid and Chaoborid 'lake flies', and the life-history of these insects has been related to that of the elephant snouted fish (*Mormyrus*), which feeds principally on their larvæ. Recently, the spawning grounds of

Mormyrus have been located with the aid of the echo-sounder; these fish spawn in deep water over rocks emerging from the mud. Ripe fish have been caught, and the eggs artificially fertilized.

The hydrology and chemistry of lake waters, with special reference to the production of plankton, form an important part of the research programme.

Work on aquatic molluscs is increasing our knowledge of the snail-borne helminth diseases of man, domestic animals and fish. A number of new snail vectors of *Schistosoma* have been recorded, and infection experiments carried out on them. As part of these investigations, a very complete type-collection of East African freshwater aquatic snails has been made, and is housed at Jinja.

The Station has two motor launches and a mobile laboratory for field-work.

Air passages and accommodation can be provided for visiting scientists who wish to work at this laboratory. Very valuable work has already been done by such visitors, which benefits and supplements that of the research station staff. Visitors include Dr. Margaret Brown, Dr. H. B. Cott, Mr. R. Ross, Mr. J. T. Saunders, Dr. G. S. Carter, Mr. D. E. Moorhouse and Dr. W. Holmes.

At Zanzibar there is a newly established Marine Fisheries Research Station. The laboratory was officially opened by H.H. the Sultan of Zanzibar in April 1953. The director is Dr. J. F. G. Wheeler, and two of the four scientific officers on the establishment are at work. Research, so far, has been mainly on the big surface fishes, such as the Carangids, Scombrids and Tunas, which are caught by multiple trolling, using a wide variety of experimental lures. At a later stage, when the full scientific staff is at work, hydrography, plankton and the biochemistry of mangrove muds and fish products will be included in the programme. The station has the use of a number of brackish-water fish-ponds, in which the chemical and biological changes undergone by seawater when impounded over mud can be studied.

Full research facilities are provided. The Station has a 70-ft. diesel research drifter, and a 'landrover' for local transport. Zanzibar is situated in an area of coral reefs and mangrove swamps, and very deep water comes to within a few miles of the island.

The British West African territories are served by the West African Fisheries Research Institute at Kissy Dockyard, near Freetown in Sierra Leone. The Institute is placed on low cliffs overlooking the Freetown estuary, and backed by the Sierra Leone hills. This is one of the few points in West Africa where the coastal lands are high and where the foreshore is rocky. Seaward of Freetown there is a 60-mile wide continental shelf, which descends steeply from a depth of about 70 fathoms.

The director of the Institute is Mr. Angus Taylor, and the full establishment of scientific officers is six, of whom four are now at work. The station has three research vessels, namely, a 110-ft. steel motor trawler, and two 31-ft. motor launches. The station buildings are adapted from the headquarters, stores, workshops and living quarters of the former naval

base. A freshwater research substation is now being established at Birnin Kebbi in Northern Nigeria.

Research is being done on the hydrology and biology of the Freetown estuary, with special reference to the fisheries, and a routine trawling survey from the motor launches is in progress. There is a very varied fauna of fish and invertebrates on bottoms of sand, shells, gravel and fine mud. Studies of bottom soils include estuarine muds and mangrove swamps, and a start has been made on the physical, chemical and biological changes which follow the empoldering and draining of such swamps.

With the large research vessel, a trawling and hydrographical survey of the seas lying off the British West African territories has begun, but has been interrupted by mechanical defects in the research trawler. Trawling was carried out to depths greater than 100 fathoms, where little or no fishing has hitherto been done. When the research trawler returns to service, these long-range surveys will be done throughout the year.

A little work has been done on the freshwaters of Sierra Leone; these are of an acid character and the territory as a whole is deficient in lime.

The Northern Rhodesia-Nyasaland Joint Fisheries Research Scheme has to cover waters separated as widely as Lake Tanganyika in the north, Lake Nyasa in the east, the Zambesi and Kafue Rivers in the south, and Lakes Bangweolo and Mweru, with their swamps, and the Luapula River, in the south and west. Consequently, though its headquarters will be on Lake Bangweolo, at Samfya, where a laboratory and houses are being built on a bluff overlooking the lake, the research unit must be mobile. This autumn it is starting a two-year survey of Lake Nyasa. Buildings are being prepared, and a research launch acquired. The scientific officer in charge is Mr. P. B. N. Jackson, and there is an establishment of three research officers.

At an earlier stage of development are the Marine Research Stations at Singapore and Hong Kong. Dr. F. D. Ommanney is director of the Singapore station, and Mr. J. A. Tubb is director of the Hong Kong station. The building of a laboratory and houses at Singapore has been delayed; a research vessel is being sought. Two of the establishment of three research officers are in training; one has recently undertaken a short mission to Barbados to study the fishing for flying-fish. The Research Station at Hong Kong is in association with the Department of Zoology of the University of Hong Kong, and will be staffed by graduates of that Department. A small research vessel has been laid down. Finally, provision has been made for a station for fundamental research into fish farming. A suitable site has yet to be found.

The Research Stations at Jinja (freshwater) and Zanzibar and Freetown (marine and brackish water) are now in operation, and provide research facilities for visiting workers, who will be welcomed. In certain cases, a part of the expenses (except salary) of a visiting scientist can be defrayed from funds available to the Research Stations. These Stations, being situated where seasonal changes are slight by comparison with temperate climates, and where there is a very wide range of ecological conditions, offer unusually good research opportunities. Applications and requests for information should be addressed, either to the Directors, or to the Fisheries Adviser, Colonial Office, Sanctuary Buildings, Great Smith Street, London, S.W.1.

INTERNATIONAL CONFERENCE ON THEORETICAL PHYSICS MEETING IN JAPAN

I BELIEVE that the proposal to hold a conference in Japan under the auspices of the International Union of Physics was first made at the General Assembly of the Union in Copenhagen during 1951; certainly the proposal had the strong support of the late president of the Union, Prof. H. A. Kramers. Suggestions were originally made for a conference of rather limited scope, on statistical mechanics or on field theory; but it seemed to everyone concerned that this, the first important conference on physics ever to be held in Japan and the first real opportunity for Japanese physicists to meet those of other countries, should cover a much wider field. It was decided in the end to arrange a conference to include most branches of theoretical physics on which work is being done in Japan, including field theories, meson theories, molecular structure and the physics of the solid state, and also to hold the annual executive committee meeting of the Union in Tokyo on the same occasion.

The conference was organized by the Science Council of Japan, with the collaboration of Kyoto University where the main sessions were held, and by the Physical Society of Japan. About sixty physicists from outside Japan attended, including thirty from the United States, six each from France and Great Britain, and others from Australia, Belgium, Denmark, Germany, India, Italy, Korea, Mexico, Netherlands, Sweden and Switzerland. About ten times as many Japanese physicists took part. Much of the heavy cost of bringing the foreign scientists to Japan was defrayed by special grants from Unesco and from the Rockefeller Foundation, while arrangements were made by the United States Government Agencies for bringing most of the scientific workers from that country. Within Japan, the cost of living and of travelling from place to place was borne by the organizers of the conference, money being contributed by the Japanese Government, by industry and commercial organizations, by newspapers and by many private individuals.

The main conference opened in Tokyo with a formal session, the delegates then travelling to Kyoto for the scientific meetings. These were held in three sections in parallel, the first on nuclear physics and field theory, and the other two covering various aspects of molecular physics, statistical mechanics and the physics of the solid and liquid states. In addition, more limited symposia were held in Kyoto and other centres, and in hotels in holiday resorts, on nuclear resonance phenomena, polymers, dislocations, latent image theory and on liquid helium, to mention only some of them.

The discussions on field theory and nuclear physics were attended by the largest numbers, both of Japanese physicists and of the visitors from other countries. (I am indebted to Prof. R. E. Peierls for a description of the work in this section.) For the visitors the most important result of the conference was that they learned to understand the ideas behind some outstanding Japanese papers that they had seen in print but had not adequately compared with their own methods. Probably the experience was mutual. It is, of course, a difficult time for field theory, since we are in doubt about the basic equations and are also without sufficiently powerful methods of solving