NEMATOLOGY AT THE IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY, LONDON

ON October 23, at Silwood Park, Sunninghill, the new Shell Parasitology Building was formally handed over to the Imperial College of Science and Technology. A plaque inside the door explains that "These laboratories were erected with the aid of a generous benefaction from Shell International Chemical Co., Ltd., in support of research into parasitology".

The new building consists of two floors, each of 2,400 sq. ft., and a small basement of 400 sq. ft. On the ground-floor are a lecture room and well-equipped teaching laboratory for the one-year postgraduate course in nematology, a preparation room for extracting nematodes from soils or from plant materials, and a radio-tracer room. On the first floor are three staff laboratories, a large laboratory for higher-degree students, a small teaching laboratory for undergraduates specializing in parasitology, and a photographic dark room. In the basement are three constant-temperature rooms separately controllable within the range 5°–30° C.

Fig. 1. Front view of the Shell Parasitology Building, Imperial College of Science and Technology

While research projects extend over the field of general parasitology (recent work has dealt with protozoal parasites of insects, and the bionomics of sheep trichostrongyle larvæ, for example), major prominence is given to nematology. The most pressing requirement was to house the postgraduate nematology course: it will now be possible to accommodate with comfort eight students, and at need up to twelve, instead of only four as hitherto.

This one-year course aims at giving a grounding in: (1) general nematology with an emphasis on plant-parasitic and soil-inhabiting species; (2) the principles of control by chemical and other means; (3) the art of experimentation. The course, the first of its kind in Great Britain, has a strong bias towards practical techniques and research methods. Of a total of fifteen students to date, ten have come from seven overseas countries, and it is hoped to maintain this overseas appeal, if only because plant eelworms are of great economic importance in tropical and subtropical lands.

The new laboratories are well equipped with such standard items as microscopes and calculating machines, and radiotracer equipment includes a versatile scaler with scintillation head, and monitor. Work is in progress with labelled chemical fumigants.

B. G. PETERS

THE HUMBER LABORATORY

THE Humber Laboratory of the Department of Scientific and Industrial Research at Hull held two open days during November 9–10. This establishment is a branch laboratory of the Torry Research Station, Aberdeen, and like its parent Station is concerned with research on the handling and processing of fish from the time of catching to retail sale. Since the Humber Laboratory was opened in 1952 it has dealt with an ever-increasing volume of work, particularly in applied research and in giving scientific information to the fish trade. The buildings have been extended twice during the short life of the station, and the recent open days marked the putting into service of a new block containing laboratories, library, and a lecture theatre.

The exhibits at the open days were not limited to the activities of the Humber Laboratory itself, but also covered the much wider range of subjects dealt with at the Torry Research Station. Prominent among these is the matter of freezing fish at sea. Poorer catches from present fishing grounds and the loss of some traditional grounds by the extension of territorial limits are encouraging longer voyages by British distant-water trawlers. This in turn means that the use of ice is no longer an adequate method of preserving all the catch in an edible condition. Freezing and cold storage is one obvious answer to the problem of preservation, but the successful application of this technique has required the co-operation of scientists and engineers trained in widely different disciplines. This was illustrated by exhibits which range from techniques of showing the damage to muscle cells during freezing, and of estimating the extent of denaturation of proteins in cold store, to a model of freezing plant designed to work on small ships in rough weather. The work of the Torry

Research Station has been particularly concentrated on the design of trawlers which will freeze part of the catch rather than on factory ships to freeze and process all of it at sea, and a model of one of the first vessels of this type to operate commercially was exhibited.

When frozen fish is used on any large scale the problem of thawing for further processing becomes a matter of very considerable importance. The thermal diffusivity of wet fish is very much less than that of frozen fish, and hence the thawing of a block of frozen fish in warm air is a self-retarding process. Also the temperature gradient permissible in such a process is limited by the need to minimize the spoilage of the fish already thawed. This has led to examination of dielectric heating as a means of thawing, and a practicable technique has been worked out. A pilot plant of 6-kW. output operating at 36 Mc./s. was on show. In this, frozen fish was carried on a conveyor belt between the plates of a condenser and 2-st. blocks were thawed in about 15 min. Equipment of this type developed by the Torry Research Station has recently been put into commercial operation.

Despite the attention given to frozen fish, work on wet fish has been by no means neglected. A number of exhibits were concerned with the effect of temperature on spoilage by reference to the chemical and bacteriological changes involved. The Humber Laboratory has been particularly concerned with the temperature of fish throughout the chain of distribution and has conducted temperature surveys at all stages from dock side to retail shop. This work has entailed the development of a number of special instruments, notable among which is a spear-type resistance thermometer in which the resistance element is contained within a hypodermic needle. For making temperature measurements by thermocouple on board moving vehicles, the conventional electronic self-balancing potentiometer is not a very suitable instrument. It is too large and its power consumption is too great. The Humber Laboratory has developed a small, battery-operated potentiometer in which balance is indicated by a 'magic eye', and this has been used successfully for many measurements on lorries. Another simple and effective instrument is the 'temperature indicator' which shows a sharp change in colour when it exceeds a given temperature. This device consists of a tube of 1 ml. capacity containing two aqueous solutions separated by a frozen non-aqueous layer.

The Torry Research Station has long been concerned with the smoking of fish, and when the Humber Laboratory was opened most of the applied work on this subject was transferred to Hull. The 'Torry kiln' has made considerable strides towards becoming the conventional piece of apparatus for smoking fish. Examples of the wide range of smoked products that can be made in a Torry kiln were on show together with sectioned models of both Torry and traditional kilns. The Humber Laboratory has devoted considerable effort to the question of the more efficient production of wood smoke, and has developed a continuous, automatically controlled smoke producer which uses a fluidized bed of sawdust. Tests have also been carried out to evaluate the performance of various commercial smoke producers, and a number of these machines was on show.

The work on smoking has also led to the development of various new instruments. A simple robust smoke density meter operating on the usual lamp and photocell principle was exhibited together with a modification of it, the 'smoke density integrator', which indicates directly smoke density multiplied by time—a quantity of great importance in smoke curing. Although more recent background work has shown that the invisible vapours in wood smoke are of more importance than the visible particles in giving smoked products their characteristic odour and flavour, smoke density meters are still of very considerable value. A technique for measuring the concentration of vapours was also exhibited.

Much of the work of the Humber Laboratory which has been of the most direct value to the fish industry has depended less on the discovery of new facts than on the practical application of well-established knowledge. For example, very considerable assistance has been given in setting up quality-control schemes which are based on taste panel techniques developed at the Torry Research Station in past years. Similarly, much-needed advice on the best methods of packing fish in ice for inland transport is merely the application to fish of the well-known laws governing the transient state conduction of heat. Work of this nature is extremely necessary in a station of the Department of Scientific and Industrial Research which serves the needs of an industry which as a whole is technically backward, and in which scientific staff are found only in the largest and most progressive companies.

D. L. Nicol

FOOD AND AGRICULTURE IN DEVELOPING COUNTRIES

On October 13 the Nutrition Society held a symposium, at the National Institute for Research in Dairying, Shinfield, Reading, under the chairmanship of the director, Prof. R. G. Baskett, on agricultural problems in developing countries. The latest Food and Agriculture Organization review of food and agriculture* shows that the developed areas still have an abundance, even a surplus of agricultural products, while malnutrition and hunger are the order of the day in many less-developed countries. The past decade has seen a very considerable expansion in the world output of food. For example, the average annual combined output of wheat, rice and maize (including the Food and Agriculture Organization estimates for the U.S.S.R. and mainland China) rose from about 470 million long tons in 1948–52, to about 720 million long tons in 1959. This remarkable technical achievement rests far more on increased efficiency of production than on increases in crop area. The overall food output per head has risen, but this covers dangerous decreases in Latin America and Oceania, and little change in Africa, as well as considerable increases in Europe (where population growth has been slower than elsewhere), North America and the Near East. In the Far East, where food production per head fell sharply during the War years, the pre-war standard, low as it was,

* Food and Agriculture Organization of the United Nations, Rome. *The State of Food and Agriculture*, 1961. Pp. viii + 177. (Rome: Food and Agriculture Organization of the United Nations; London: H.M.S.O., 1961.) 10*s*.; 2 dollars.