

these studies will play an important role in increasing pond productivity.

FISH PHYSIOLOGY, ECOLOGY AND ANATOMY

One of the key problems in freshwater pisciculture is to get fish fry. Up to now pond fish fry are procured from the rivers at a particular season of the year and then transported to other places for cultivation. There are many shortcomings in such a method: it is difficult to select and transport fry, it demands too much labour, the time for collection is too limited, etc. With the rapid development of pisciculture, the supply of fry will become to some extent a limiting factor. Inducing pond fishes to spawn in the stagnant waters of lakes or ponds is therefore of no little significance both theoretically and practically. Studies are being made to attack the problem from many sides (physiologically, biochemically and histologically). Some preliminary results regarding factors governing spawning have already been obtained.

The ecological survey of fish in the Liangtze Lake (458.5 square kilo metres), in Hupeh Province, has just been finished.

Detailed morphological studies of the carp are being made by Prof. Chi Ping (now of the Zoological Institute of the Academy).

Researches on planktonic, algæ, zooplankton, fish and fish parasites are being carried out and some results have been published. The plan is to continue these studies and to publish serial monographs.

The problem clearly set before the hydrobio-

logists is the difficult one of raising the total fish yield. At the heart of the problem is the productivity of water bodies, whose resources, reserves and productive capabilities must first be investigated. Therefore, surveys of various types of lakes throughout the country will be continued and at the same time permanent stations will be established. In order to raise the productivity of the medium and small-sized lakes, research will be conducted under the following headings: the growth of fish in relation to their natural food; the effect of artificial fertilization on water bodies; the chemistry of freshwater; the relationship between aquatic micro-organisms and productivity of water bodies; the prevention and treatment of fish diseases, etc.

The multi-purpose utilisation of rivers is being developed rapidly in this country; hydro-technical construction will deeply affect fishery in the basins. How to ensure that hydrobiological research is suited to the changing hydrological aspects daily assumes greater significance. The ecological survey of fish in the Yangtze and the Heilunkiang (Amur) rivers has already begun. Investigation into the productivity of large water reservoirs will begin soon. The question of water pollution by the many newly-built factories will be given due attention.

All this work is being carried out in accordance with the needs of China's economic construction and at the same time these are also problems of importance to hydrobiology.

CELL AS AN OBJECT OF EXPERIMENTAL STUDY

UNDER the auspices of the Department of Zoology, Presidency College, Calcutta, a symposium was held on the 3rd May 1959 on the "Cell as an Object of Experimental Study". The purpose of this meeting was to try and bring about a synthesis of the various aspects of study of the Cell. Considering that this was the first attempt made in this direction in India the results were quite encouraging.

The fifteen papers presented at the symposium were rather diverse but stimulating.

A typical example, of the possibilities of Biological experimentation, was offered by B. R. Seshachar's studies on *Spirostomum*. He reported that the macronucleus of this ciliate could be extended to as much as fifteen times the original length. More recent experiments have shown that, under high speed centrifuga-

tion, it presented the appearance of a system of parallel fibres, quite unlike its characteristic particulate appearance, in the vegetative state. The interest in this work lies in the fact that it fits into the present concept of the structure of DNA which makes up much of the ciliate macronucleus.

The behaviour of the cell, under different conditions, gives us an idea of the substances that are essential for the synthesis of the ultimate cell products, and those that are detrimental to it. C. De and M. Mukherjee presented an analysis of the function of plasmalogen in different tissues like liver, kidney tubules, adrenals and testis. A number of experimental conditions, which alter hormonal activity in the last two organs, have been observed to affect the plasmalogen content also.

The importance of cell constituents like the microsomes was well brought out in the studies of liver and kidney by I. B. Chatterjee and his colleagues. These cytoplasmic inclusions contain all the enzyme systems for the conversion of either D-glucuronolactone or *l*-gulonolactone to *l*-ascorbic acid. The absence of *l*-gulonolactone in guinea-pig is thought to be due to a gene controlled enzyme disfunction.

In his work on reticulo-endothelial cells in tissue culture, J. Chatterjee showed that the antibody formation, initiated and continued by these cells, could be enhanced by certain vitamins or depressed by low temperatures.

It becomes more and more clear that for a complete investigation of any given material it is necessary to use not only the method of biology but of biochemistry and biophysics too. An example is found in the investigation of Sen and Biswas on auxin-induced growth in plants using P^{32} . Auxins, through increased activity of nucleotides, stimulate the synthesis of both DNA and RNA. Here both C^{14} and P^{32} were used as tracers.

A. Guha presented what he thought was evidence for the presence of a chromosomal organization in bacteriophage. S. P. Ray-Chaudhuri described his findings of radiation induced dicentric bridges. He showed that in grasshoppers kept in an atmosphere of more oxygen, radiation induced the production of

more bridges than those in an atmosphere of less oxygen.

Dr. Nandi's paper on Ultraviolet Radiation on *Aspergillus niger* showed that visible light is able to counteract damages, done to cells, by exposure to UV irradiation, the photoreactivation effect being maximum with sunlight.

P. De's contribution dealt with an analysis of growth and functionation in normal and malignant cells, while A. K. Sharma discussed the role of plant pigments in the production of breaks and other changes in chromosomes. S. Mookerjee showed how in Hydra, the interstitial cells could be stimulated to gonad differentiation by treatment with DNA.

Cytochemical studies on Protozoan parasites undertaken in the Calcutta School of Tropical Medicine were described by Dr. H. N. Ray. These studies have brought out the importance of the nucleic acids as well as cell enzymes in the metabolism of these animals. Asoke Ghosh dealt with the probable role of progesterone in the metabolism of the pigeons adrenal cortex. P. N. Bhaduri's contribution dealt with recent refinements in the methods of culturing excised paddy embryos and their bearing on experimental induction of polyploidy.

The symposium highlighted the importance of close collaboration among Biology, Biochemistry and Biophysics.

DISCOVERY OF A NEW ATOMIC PARTICLE: NEUTRAL- χ_i

THE discovery of a new kind of atomic particle was announced from the radiation laboratory of the University of California. Called the "Neutral- χ_i " particle, it is one of the unstable heavy mesons, several of which have been discovered in the last twelve years.

The discovery had been accomplished by shooting a beam of "K mesons" from the bevatron in Berkeley into a hydrogen bubble chamber. The latter is a tank of liquid hydrogen arranged in such a way that atomic particles passing through it leave behind a trail of minute bubbles which can afterwards be photographed.

Prof. Alvarez said that the particle which has been observed was produced by a collision between a negatively charged K meson and a proton in the bubble chamber. In the photograph this would have been represented by a sudden cessation in the track of the K meson, for the products of the nuclear reaction are electrically neutral and so leave behind no visible track of bubbles.

The proof of the formation of the χ_i -meson rested on the observation of the "neutral lambda" meson formed in its natural radioactive decay (which appears to take about a ten-millionth of a second). This is a remarkable technical feat, for the "neutral lambda" is itself electrically neutral and therefore not represented by a track in the bubble chamber. In fact it was only recognised by the observation of its own radioactive decay products.

From these experiments, Prof. Alvarez said, it had been concluded that the mass of the new particle (which is greater than that of a proton) was roughly 2,590 times that of a single electron. Within the accuracy of the experiment this is identical with the mass of the negatively charged χ_i -meson—one of the first of the heavy mesons discovered by a research group from Manchester University in 1947.

Prof. Alvarez also said that the new particle appeared to decay spontaneously (as it should) into a neutral lambda meson and a neutral π -meson.—*Science Newsletter*, 4718.