

ments designed for other purposes—and the sequence is of more than passing interest. It started with the yellow enzyme and a series of experiments designed to test the effect on growth of a series of synthetic analogues of the flavins.

Administration of 9-phenyl-5:6-benzo-*iso*-alloxazine to albino rats was accidentally, and most unexpectedly, found to produce an orange-yellow pigmentation of the hair (Haddow, Elson, Roe, Rudall and Timmis, 1945). Pursuing this curious observation, other coloured substances of a similar type were tested, and among them xanthopterin, the butterfly wing pigment, first isolated by Wieland and Schöpf in 1925. This did not colour the coat but produced a significant enlargement in the size of the rat kidney. It was an actual growth of the organ due to a great outburst of cell division in the kidney tubules.

In the course of still another research, that on the carcinogenicity of many styrylpyrimidines (Haddow and Kon), it was found that two substances of this group closely allied to xanthopterin in structure had the same effect in increasing the growth of the kidney. This cannot be mere coincidence and proves that the effect is a primary one of xanthopterin and the related pyrimidines on the cell. The phenomenon has been observed in the rat, mouse, *Peromyscus*, the rabbit, hamster and guinea pig.

Now xanthopterin is of natural occurrence in the kidney and it is possible that it is present as a growth regulator. Its structural relationship with folic acid will not be overlooked. Haddow and his associates feel that it is at least as important to study the means by which normal growth is so delicately adjusted as to inquire directly why the malignant cell is unregulated.

There are further experimental foundations for these ideas which lead Haddow and his collaborators to surmise that the co-ordinated growth of the normal tissues may depend upon the supply of essential substances from an external source and that, contrariwise, malignant cells may have acquired the power to synthesize these essential substances, or their equivalents, themselves. Such suggestions are fully consonant with all that we know of the subject as a whole and give a new prospect for the chemistry of growth and differentiation.

I am much obliged to Dr. Haddow for kindly acquainting me with results and ideas which are not yet published in full and for permission to mention them to-day.

I would not like to leave this subject without an incidental reference to Berenblum's significant discovery of sensitization of tissues to the action of carcinogenic agents. The constituents of croton oil, for example, directly or indirectly, prepare the ground for a carcinogenic hydrocarbon in a remarkable manner. The underlying biochemical processes may be hard to bring to light; but the effort to do so would doubtless be repaid with interest.

As a drama like that of the pyrimidine group unfolds we can look back on the steps of the pioneers and be thankful that they selected the paths which led into such rich territory. But it often appeared to contemporaries that they were wandering into a barren wilderness. Whatever makes Hopkins think that there can be any possible interest in the pigments of butterflies? Why does Windaus waste his time and talent on that impossible substance cholesterol? I have heard those actual questions asked in past years and would invite

consideration of the answers that can be given to them now.

Another thought arising from recent progress is that the world of biochemistry, though of vast extent and interest, is finite, and we are beginning to sense the existence of its boundaries. We seem to encounter the same thing more often than might be expected; coincidences are indeed of frequent occurrence.

An example has already been mentioned and another is the recent discovery that the photodynamic colouring matter of St. John's wort, hypericin (Brockmann *et al.*, 1939, 1942; Pace and McKinney, 1941; Dhéré, 1939, 1943) is closely allied to a pigment of the Aphididae, erythroaphin, studied by A. R. Todd and his collaborators at Cambridge (1948). Further, these substances are related to a mould pigment, oxypenicilliosin, isolated by Oxford and Raistrick (1940). The pigments are *bis*-anthracene derivatives of some kind and it is surprising to find these little investigated and highly characteristic substances so widely distributed in Nature.

A notable coincidence in my own field of work arose very recently from a theory of Woodward regarding the course of the synthesis of strychnine in the plant. He advanced what seemed at first the fantastic idea that a benzene nucleus, originally that of dihydroxyphenylalanine (or tyrosine), suffers fission so as to give two oxidized chains which enter into further transformations.

Transferring this mechanism piecemeal into an entirely different group of alkaloids, it was found to predict that constitution of emetine which can now be experimentally demonstrated to be correct. I am glad of this opportunity to say that I was unaware until quite recently of parallel, independent work by Dr. H. T. Openshaw on the constitution of emetine. This was submitted for publication some months ago and includes the establishment of one detail of the structure not fully proved by the work of Späth, of Pailer and of Karrer. A few months ago no connexion whatever could be discerned between strychnine and emetine, they seemed poles apart. Now at one stroke they are connected by recognition of a common and remarkable type of biogenesis.

## A PROPOSED INSTITUTE OF BIOLOGY

By DR. J. F. DANIELLI

INSTITUTES or analogous foundations have rendered great services to physicists, medical men, engineers, chemists, anthropologists and many other professional groups. No such foundation exists to serve the needs of biologists. Recently the Biological Council, consisting of representatives of nineteen different biological societies, was asked by a number of these societies to examine the possibility of forming an Institute of Biology. In a preliminary investigation the views of a number of representative biologists were obtained, and information was also available from the Institute of Biology recently established in the United States under the auspices of the National Research Council.

There are two aspects of an Institute which are of general interest: on one hand there is the daily life

of an Institute; and on the other hand, there is the long-term influence of an Institute on policy.

The setting up of an Institute would immediately give to biologists a central address and general office service, and should ultimately provide a club and meeting rooms. An Institute would produce a bulletin to carry news and notices, maintain a watch on legislation and international matters of interest to biologists, maintain an employment bureau, and protect the standards of employment of its members, if need be by providing legal aid. A public relations service would be maintained, members would be advised in their dealings with the Press and with publishing firms. Special income-tax problems would be considered and the establishment of special relationships with trading firms and with insurance offices would be sought. Such day-to-day activities constitute a group of sound reasons for forming an Institute.

Of equal importance are the arguments based on consideration of policy. These include:

(a) The lack of a representative body of biologists. This causes two difficulties. It is difficult for those who are not biologists to obtain a measure of the balance of biological opinion on matters which may, for example, come within their province of administration. It is also difficult for biologists to place proposals before Government and other bodies, since at present such proposals cannot receive the backing of a representative body.

(b) Biology is becoming of increasing importance in industry and for the economic and physical well-being of the country. But at present the authority of biologists in these fields is restricted, and often in consequence insufficiently serious consideration is given to the purely biological aspects of a problem. The modification of this position is hampered by lack of professional organisation, by the general ignorance of biological factors and by the prevailing dominance of the strong professional organisations of chemists, physicists, veterinarians and medical men.

(c) Many biologists are now going into industry and their numbers are likely to increase. In the absence of any recognized Institute of Biology there is a tendency for membership of academic societies to be quoted as a qualification. This is an undesirable practice which may reach serious proportions. It did so, for example, in the cases of the Chemical Society and the Psychological Society. The formation of a recognized Institute with established qualifications for admission would put an end to this practice.

(d) Biologists are still badly paid in comparison with other professional groups. It is felt that this is at least in part the result of there being no professional body to look after the interests of biologists.

(e) The channels whereby biologists may be recruited are sometimes inadequate, and appointments too often depend mainly on chance. This situation would be improved by formation of an Institute with an appointments register. It is of interest that, in one recent year, out of the ten thousand members of the Institute of Chemistry, no fewer than one thousand made use of the appointments register.

(f) The formation of an Institute of Biology, embracing both academic and applied biologists, would be of national service, since it could assist in securing better financial support for biological research. It would also perform a most valuable service in surveying the position of biological science

in general education, and the more specialized training of professional biologists.

With these considerations in mind, the Biological Council has decided to conduct a postal ballot of biologists, the distribution of ballot papers being made by the affiliated societies. In this ballot biologists are asked to state whether they would support an Institute, and to give the Council their opinions on the formation of an Institute.

An Institute can be formed only if a sufficiently large number of biologists are prepared to support it. If this support is forthcoming, the Biological Council will call a central meeting of biologists, at which officers and a provisional council can be elected. For the first year of its foundation the Institute could be run on a largely voluntary basis, during which time a constitution would be evolved, office premises found, etc.

The Biological Council envisages the Institute being open to all who are engaged in biology as a profession. Those joining would probably fall into two categories of membership, namely, associate members, holding an honours degree in biology or its equivalent, and full members, holding a degree of D.Sc. or its equivalent. In addition, provision should be made for scientific societies to become affiliated to the Institute. The Council of the Institute we envisage as elected in two ways—some of the members being elected by the individual members of the Institute, and others nominated as representatives of the affiliated societies. But the final decision on these details would, of course, be taken when a constitution is agreed upon.

It is not intended to exclude people who have no degrees, or to limit full membership to those with D.Sc. degrees. There is no reason why a biologist should not be either an associate or full member while having no degree, provided he has a training, or has achieved a status, which can be regarded as equivalent to that indicated by a degree. However, it may well be that the foundation members will prefer to have only one category of membership. All decisions on such matters, including the constitution, will, of course, rest with those biologists who indicate, by voting in the Biological Council's ballot, a desire to participate in the formation of an Institute of Biology.

Biologists who are members of a society affiliated to the Biological Council will receive a ballot paper from their society. Those who are not members of an affiliated society may obtain a ballot paper from one of the joint secretaries of the Biological Council, namely, Dr. J. F. Danielli, The Chester Beatty Research Institute, Royal Cancer Hospital, Fulham Road, London, S.W.3, or Dr. W. P. K. Findlay, Forest Products Research Laboratory, Princes Risborough, Bucks, or Prof. J. Z. Young, Department of Anatomy, University College, Gower Street, London, W.C.1.

The societies affiliated to the Biological Council are: Anatomical Society, Genetical Society, British Mycological Society, Linnean Society, Nutrition Society, Society for General Microbiology, Pathological Society, Biochemical Society, Pharmacological Society, Physiological Society, Society for Experimental Biology, British Ecological Society, Royal Entomological Society, Marine Biological Association, Association of Applied Biologists, Royal Horticultural Society, Eugenics Society, Association for the Study of Systematics in Relation to General Biology, and Society of Applied Bacteriology.