
Introductory Remarks

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Introductory remarks

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The first volume will shortly appear of the series of forty to be published by the Cambridge University Press and planned to summarize for each main field of investigation the scientific research carried out in fifty countries as contributions to the International Biological Programme. The introductory volume will describe the organization, administration and financing of I.B.P. at international and national levels and will also relate the very interesting story of the inception of the Programme. That being so I wish now only to remind you briefly of the background of this meeting.

Throughout the 1950s biologists all over the world were becoming increasingly concerned over the consequences of fast-increasing human populations and rapid technological advance. There were the basic problems of providing sufficient food and maintaining health, and the further problems of ensuring that life should not become intolerable through rising population-densities and environmental deterioration. Research was already being directed towards these problems but with too little sense of urgency and too little coordination of effort. When physical scientists made a striking success of their International Geophysical Year in 1957–8, biologists came to feel more strongly than ever that what was needed was a comparable enterprise of international scientific collaboration. In 1959 Sir Rudolph Peters, then President of I.C.S.U., made the definite proposal that there should be an International Biological Programme, and Professor Waddington and others whom I am glad to see here today played key parts in the initial deliberations.

After more than four years of discussions about suitable themes the formal initiation of the I.B.P. took place at the General Assembly of I.C.S.U. in Vienna in November 1963. It was proposed that the Programme should be entitled *The biological basis of productivity and human welfare* and should aim at the world-wide study of *organic production* on the land, in fresh water and in the seas, so that adequate estimates might be made of the potential yield of new as well as existing resources; and also *human adaptability* to changing conditions. It was thought essential that the Programme should be limited to *basic biological studies* that would *benefit from international cooperation* and were *urgent* because of the rapid changes taking place in environments throughout the world.

The proposal was accepted by the Assembly and this was the starting-point of I.B.P. It was envisaged, then, as a world-wide cooperative effort along two lines: basic research into how natural and man-made or man-modified ecosystems, of various kinds and in various places, make productive use of the solar energy incident upon them and how this may best be turned to man's advantage; and investigations of human adaptability, physiological and genetic, to different climates, altitudes, diets and other environmental variables. The two themes were related as aspects of *the biological basis of human welfare*.

There was initially only moderate enthusiasm for the preliminary proposals. They seemed too wide and diffuse and also outside the more exciting fields of advance in biological research.

Even ecologists did not immediately perceive that opportunities were being opened up amounting, as an American ecologist could say some years later, to 'lifting a minor subject to a position of major status'. Sir John Kendrew has recently gone so far as to say that 'ecology' was at the outset 'a word unknown to all but a select band of environmental specialists'. The substantial change of heart in many British biologists followed a more detailed formulation of the proposals, particularly at the first meeting in July 1964 of I.C.S.U.s Special Committee for I.B.P. (S.C.I.B.P.). Delegates from 35 countries, invited to meet at the same time, served on a number of *ad hoc* Working Groups based on those already established by the I.B.P. Planning Committee. Their function was to translate the general ideas of the Committee into detailed scientific programmes for each major area of investigation: they were the forerunners of the familiar seven sectional committees for Productivity of Terrestrial Communities (P.T.), Productivity of Freshwaters (P.F.), Human Adaptability (H.A.) and so on. The general acceptance of I.B.P. certainly owed much to these Groups, including as they did leading workers in the various parts of the I.B.P. field who were enthusiastic for the Programme and determined to make a reality of international cooperation.

At that Paris meeting Professor Jean Baer was made first President of the I.B.P.: it is sad to have to report that he died a few weeks ago. Another important appointment was that of Dr E. B. Worthington as Scientific Director, a post he held until S.C.I.B.P. came to an end last year. The U.K. Government later made it possible for the Royal Society to provide Dr Worthington with a Central Office in Marylebone Road, and it was from there that he undertook, with conspicuous success, the overall coordination of I.B.P. activities and gave assistance to the work of individual sections. It is a great pleasure to us that Dr Worthington has been able to attend this meeting. I know I speak for all in saying that I.B.P. owes an enormous amount to the dedicated administrative skill and scientific insight of Dr Worthington and his staff at the Central Office.

The development of the U.K. national contribution

As far as this country was concerned the Royal Society, as the national adhering body for I.C.S.U., became responsible for the U.K. contribution to I.B.P. The preliminary proposals were considered formally by the Society's Council as early as May 1963, and it was decided to support a continuation of planning. Early in 1964 the Council set up a British National Committee for I.B.P., with the Biological Secretary as Chairman, to coordinate the U.K. scientific contribution and to maintain contact with the international organization. Subcommittees were appointed corresponding with the international sectional committees. The Society was granted funds from the Government enabling it to maintain a small office staff for I.B.P. under the Deputy Executive Secretary, Dr Ronald Keay. All concerned with I.B.P. in this country are immensely grateful to the Society and to Dr Keay and his successive I.B.P. assistants – Mike Powell, Sue Kirby and Ratti Bulsara – for organizing functions so helpfully assumed and so efficiently carried out. To Mrs Bulsara has fallen the arduous task of organizing this large meeting. She has undertaken it with her customary cheerfulness, and we congratulate her on her good work.

In March 1964 the Society gave wide circulation to the international proposals, and the resulting comments provided valuable guide-lines for drawing up a provisional U.K. programme. This has been subject to continual review but has retained the main lines of the original draft.

Within each section there have been *main programmes*, continued over some years; *supporting*

programmes, likely to contribute to the general objectives of I.B.P., and *training programmes*, mainly for workers from developing countries. Main programmes could be categorized as: *methodological studies*, many of them aimed at finding the best methods for securing inter-comparable results in observations and experiments; *replicated studies*, undertaken here as well as in other countries and using internationally agreed methods so as to provide data for synoptic surveys; *research on new topics*, or new developments of current research, relevant to the aims of the I.B.P.; *expeditions*, mainly to tropical areas and high mountains, and *long-term investigations overseas*, mainly in the tropics but also in polar regions. The non-governmental cooperation fostered by I.B.P. favoured scientific studies of tropical ecosystems and populations, and it will be seen that these became important aspects of the U.K. contribution, often in collaboration with scientists of the countries involved.

The financing of the I.B.P.

The total cost of the I.B.P. was that of the international coordination of the Programme together with the cost of the research itself and of its organization within participating countries. I am indebted to Dr Keay, who became Chairman of the Finance Committee of the I.B.P., for information used below.

It was estimated at an early stage that a *minimum* of between a quarter and a half million dollars would be required annually for the international coordination of the Programme – for central direction, organizing meetings, issuing publications and the like. In the event the sums spent for these purposes probably averaged about \$400 000 a year. Some \$200 000 of this went directly to S.C.I.B.P. as central income, rather less than half of it as national dues and special contributions, these being supplemented by grants from I.C.S.U. and loans through I.C.S.U. from the Ford and Nuffield Foundations; by contracts with U.N.E.S.C.O., chiefly for organizing meetings of joint interest; from sales of publications and in particular of the highly successful series of methodological Handbooks, and by grants from some other bodies including the Commonwealth Foundation and the World Health Organization. The remaining \$200 000 or so came as more or less ‘hidden’ items from some of the participating countries. The United Kingdom, for instance, provided accommodation for the Central Office and also, through the Nature Conservancy, an office for the Conservation of Terrestrial Communities section (C.T.) and an international data-centre. There has also been U.K. help in the preparation of synthesis volumes.

From the first the financing of each national contribution to I.B.P. was envisaged as the responsibility of the participating nation. It was not expected that participation would lead to an appreciable increase in the total volume of research in a developed country. Some research in progress would be found relevant to the I.B.P., and some workers would be stimulated to undertake research within the I.B.P. field rather than outside it. For both categories existing research funds could be supposed adequate. Certain methodological and data-collecting projects would remain, and some overseas investigations, for which there was no recognized source of funds. And the Royal Society would require finance to cover expenses of coordinating the national contribution, including costs of meetings in this country and of travel for British scientists attending meetings in this country or elsewhere. Estimates were therefore submitted to the Council for Scientific Policy and the Society was granted sums totalling about £688 000 over the ten years 1964–74. During the five most active years, 1968–73, sums ranging from £75 000 to £104 000 annually were made available for scientific projects, the total over the

whole 10-year period being £611 000. The remaining £77 000 provided rent for the I.B.P. Central Office and the costs of administration, including Dr Keay's small office, which at £52 000 over ten years amounted to a surprisingly small fraction of the whole. The national dues to S.C.I.B.P. and costs of travel to I.B.P. meetings are not included in the above figures. Latterly, the operational phase of the I.B.P. being over, the Society has been able to support meetings, like this one, concerned with the preparation of final reviews of the U.K. contribution and also to contribute towards the costs of the international syntheses.

Briefly, then, a few special projects were funded from the Society's Grant-in-Aid earmarked for the I.B.P., but the majority of I.B.P. investigations undertaken in Government and Research Council institutions and in universities were financed through the usual channels and for the most part without any earmarked funds. For grant applications in all categories the British National Committee was prepared to certify relevance to the U.K. contribution to the I.B.P., but success or failure depended on the independent assessment of their scientific merit. Thanks are due to the Research Councils, and especially to the Agricultural, Medical and Natural Environment Research Councils, for their cooperation in the financing of I.B.P. projects. It should be added that the Nuffield Foundation has financed fellowships and technical assistance for the work of the Production Processes (P.P.) section.

Methodology

From the formal start of I.B.P. in mid-1964 until the end of 1966 there was an initial Preparatory Phase concerned primarily with drawing up detailed research programmes and with methodology and training. The methodological enquiries were designed to arrive at international agreement on observational and experimental techniques to be *recommended* in each field of study, in view of the importance of intercomparability of results in any programme involving international cooperation. In order to make these agreed techniques readily available they were published in the volumes of a series of I.B.P. Handbooks, some of which were general guides to sectional activities but most were primarily methodological. There have been 24 of the Handbooks, and U.K. scientists have played a large part in their preparation. They have proved very valuable, not only for those engaged in I.B.P. research but for scientists all over the world, and many have become standard textbooks. Their success has made it possible for S.C.I.B.P. to repay its loans from I.C.S.U.

Assessment and outlook

It is eleven and a half years since the I.B.P. was launched, and a very large number of papers embodying results of investigations bearing the I.B.P. label have appeared in the scientific literature. The scientific outcome of the I.B.P. has undoubtedly been very substantial, though the final assessment must await the publication of those forty volumes of international synthesis and the hundreds more that are to review national efforts. The questions I should like our speakers at this meeting to attempt to answer, first for individual sections or subsections and then for the U.K. contribution as a whole, go beyond a straightforward assessment of the scientific return for the effort expended, important though it will be to make that judgement. I hope we shall also hear how far it is thought that the original aims have been fulfilled. Have we increased to a significant extent – and because of the I.B.P. – our knowledge and understanding of organic production and human adaptability, and will it be likely to lead to solutions of those urgent problems that so much concerned the founding fathers? Or has I.B.P.

served at least as an essential preliminary to more 'mission-oriented' successor-programmes such as M.A.B. and S.C.O.P.E.? And if the I.B.P. has achieved substantial scientific success, how far has this derived from its being international and non-governmental and from its having an organization at national and international levels designed to make cooperation effective at both levels? Was there in fact more effective cooperation than there would have been without the I.B.P.?

The productivity studies in the I.B.P. were basically studies of the functioning of whole communities, of complex biological systems, an increased understanding of which had been recognized as essential for the rational management of our natural resources in the interest of human welfare. It has been claimed for the United States I.B.P. programme that these studies stimulated the formation of large multidisciplinary teams of a kind previously unknown among biologists and that this led to something of a revolution in biological research methods through the use of systems analysis and computer-assisted modelling and data-handling procedures. Can we feel that this has also been true of at least some parts of our U.K. programme, and has been a valuable outcome?

Two further points upon which views would be of interest are, first, the adequacy of the financing and financing procedures for the I.B.P.; and, secondly, the question of whether or not there was sufficiently detailed preliminary planning of the research programmes. On this last there have been differing views. Some have felt strongly that the initial planning was inadequate, others that the Programme benefited from the gradual evolution of plans through continued discussion in the light of incoming results. It would surprise me if we came readily to an agreed conclusion on this matter, but I am sure that planners of successor-programmes will find it valuable to have your comments on this as on other points.