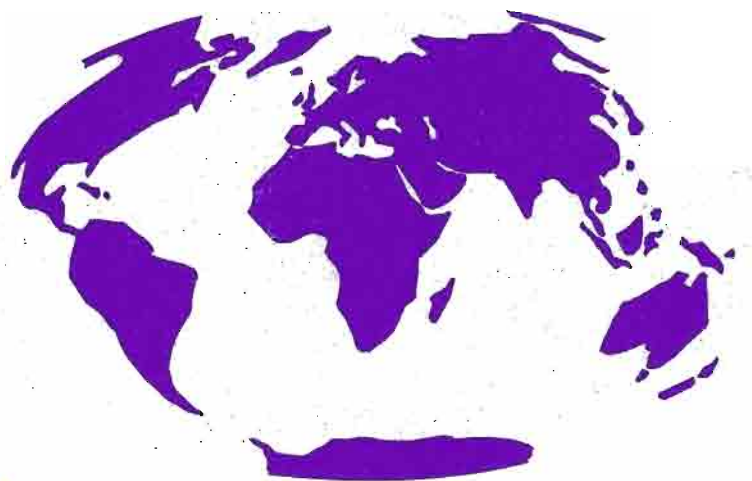


# Biology International

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## Editor's Note

The main activities of the International Union of Biological Sciences, when created more than sixty years ago, were the transmission of scientific information and the unification of Biology.

As biology evolved and developed, the needs for more biologists and the extension of biological sciences increased. The IUBS, which initially brought together most of the biologists active in international cooperation, began to spawn international Bio-Unions, the most recent of which is the I.U.M.S. created in September 1980.

After the second world war, the Union also became concerned with some of the major problems of Biology related to the crucial problems of mankind. A resolution relative to biological warfare was passed in 1947, and in 1964 the International Biological Programme was initiated.

Aware of its duties and of its responsibilities, the IUBS decided at its XIXth and XXth General Assemblies to tackle some of the great problems of humanity today. Based on these initiatives, ICSU created the InterUnion Commission on the Application of Science to Agriculture, Forestry and Aquaculture. In the same way, the International Bioscience Network has been initiated in cooperation with UNESCO and UNDP.

Convinced that biological sciences can help satisfy human needs, and willing to play an important role in resolving the world's problems, the XXth General Assembly, believing that the Union could do this better if its structures and functions were improved, resolved to appoint an Ad Hoc Committee of Review. One year later, this Committee prepared an Interim Report that has been submitted to the IUBS Executive Committee Meeting in 1980. *Biology International* publishes this Interim Report in order to obtain the reaction of scientific and national members before submitting it to the XXIst IUBS General Assembly in Ottawa 1982.

Any criticism and suggestions will be welcomed.

# ICSU/UNESCO/UNDP International Biosciences Network

by Prof. Richard D. KEYNES, Chairman IBN Steering Committee -  
Cambridge - UK

## *Introduction*

There are a number of fields where an effective application of recent advances in fundamental and applied biology is of vital importance to the developing countries. These include agriculture and plant breeding; fisheries and pisciculture; the treatment and prevention of tropical diseases; the nutrition of human populations and domesticated animals; the control of insect pests; studies of the ecology and taxonomy of indigenous plants; applied microbiology and biotechnology; and the application of new techniques for the exploitation of biological resources. Many of the problems in agriculture and tropical medicine are already being tackled in various parts of the world by intergovernmental organizations such as FAO and WHO, and by the institutes of the Consultative Group on International Agricultural Research (CGIAR), but it is not in their remit to cover the whole of biology, nor is their primary concern to expedite the growth of biological expertise in the countries in which they operate. There is therefore an urgent need to help the developing countries to organize their own research effort in those biological fields judged to be of greatest importance to their economies.

The main objectives of a programme aimed at supplying this kind of help are (1) the training of biologists skilled in appropriate specialities, (2) the education of administrators in the choice of priorities, (3) the setting up of conditions under which the biologists can conduct their research efficiently. As far as the training of the necessary biologists is concerned, useful contributions are already being made under the auspices of Unesco by the International Cell Research Organization (ICRO) and the International Brain Research Organization (IBRO) by ICSU's Committee on Science and Technology in Developing Countries (COSTED) and the Committee on Genetic Experimentation (COGENE), and by

the individual International Scientific Unions. However, the funds at their disposal are very modest, so that their coverage can be neither scientifically nor geographically comprehensive. Moreover, these bodies are not in a position to do much about steps (2) and (3). In order to attain the objectives set out above, the problem must be approached on a global or regional basis with very much greater financial resources.

## *Plan of action*

The question as to how the Unions of the ICSU family might help to do for biology what Unesco's International Centre for Theoretical Physics in Trieste has done for physics was first raised by the International Union of Biological Sciences (IUBS), and various discussions took place in 1978 and 1979 between representatives of Unesco and of ICSU. It was quickly agreed that because of the great diversity of the biological sciences, it would be better to set up some kind of international organization to link up a range of existing institutions covering the different areas of biology than to found a single institute. A Steering Committee was set up to produce detailed plans for such an organization, and it met in Paris on 28 March - 9 April 1980.

At this meeting, the Committee heard an account of the UNDP/Unesco Regional Program for Post-Graduate Training in Biological Sciences (UNDP/Unesco Projects RLA 75/047, RLA 76/006 and RLA 78/024), which has been in operation in South America since 1975, and decided that it would provide an excellent model for application elsewhere. The programme came into being through the cooperation of five Andean countries to form a network of research centres which, with funds supplied by UNDP, began to organize post-graduate training courses for biologists. Its success led quickly to the incorporation of five more South American

countries, and it is hoped that others from Central America will join in the near future. With a budget of the order of \$ 500,000 per annum, to which the participating countries add around twice as much from their own resources, the Latin American Network is not only running an extensive series of training courses within the region, but is also sponsoring joint biological research projects so that those laboratories who are scientifically strongest can help the weaker members to get research under way. This is an important ingredient in any scheme of this kind, since newly trained scientists cannot be expected to work well in relative isolation after they return home, and joint projects provide a means of achieving the critical mass that is always necessary for really successful research.

It has to be recognized that in every region there is a considerable spread in the state of scientific development of the individual countries. The first step in setting up a regional programme is therefore to identify the research centres best qualified to form a nucleus around which a network can be built up for organizing teaching courses and other forms of training in the various biological disciplines. Another initial objective is to establish scientific priorities, for the specific areas of biology where development will be most beneficial to the economy are likely to vary from country to country. A pattern of organization suitable for one region will not necessarily be optimal for another, and maximum flexibility must always be the aim. It must also not be forgotten that governments often need to be educated as well as scientists. In certain biological fields, there is an unassailable case for pursuing what an administrator might regard as fundamental research of little relevance to his country's economy, in order to tackle important applied problems. Furthermore, although there is no difficulty in importing experienced teachers to assist at training courses, or in sending people to be trained abroad, this will be of no avail if the scientists who are thus turned out are later denied the facilities that they must have in order to put what they have been taught into practice in their own laboratories. The creation of the complex environment that is essential for research to flourish must come from within, and cannot be supplied from outside. This too is a lesson that governments must learn.

It follows from what has been said that bioscience networks are best brought into being and operated autonomously on a regional basis. The role of the small central Steering Committee, once it has taken the initial steps to set up networks in those regions where they do not already exist, will be to ensure that each regional network benefits fully from the experience of the others, and that as much advantage as possible is taken of the input available from the ICSU

Unions and Committees, and from Unesco and the other IGO's.

### *Present status of the regional networks*

#### **(1) Latin America**

The network is in full operation, and is extending its membership into Central America. Negotiations for future funding by UNDP are in hand, probably with increasing emphasis on requests from member countries now that its establishment as a regional organization is accomplished. The IBN Steering Committee will wish to draw on the valuable experience gained in getting it going.

#### **(2) Africa**

Steps are in hand with the assistance of Professor Bekoe (President of ICSU) and Professor Ayensu (Secretary General of IUBS) to draw up a list of individuals and research centres in East and West Africa, both anglophone and francophone, who should be invited to participate in meeting to launch an African Biosciences Network. This meeting will be combined with a scientific symposium on biological topics of particular interest to Africa, and with a consideration of the IBN Steering Committee's long-term plans for the other regions. It is scheduled to take place at the University of Accra in April 1981, and will hopefully be supported by grants from Unesco and from UNDP's Interim Fund for Science and Technology for Development.

#### **(3) Asia**

An Asian Biosciences Network has been set up by COSTED with membership from 8 countries in the region, and headquarters in the Department of Biological Sciences at Madurai Kamaraj University, India. It has plans to hold 5 Training Courses on various biological subjects in 1981, and to organize joint research projects at designated centres of excellence in specialized fields such as marine biology. The IBN Steering Committee would hope to hold a meeting in Asia early in 1982, in conjunction with one of the activities planned by the Asian Network.

#### **(4) Arab States and North Africa**

It is proposed that Dr Younès, Executive Secretary of IUBS, will undertake a fact-finding mission to the Arab States towards the end of 1980, the results of which will be reported to the IBN Steering Committee at its next meeting. In the meantime, support will be given for Training Courses in the region already planned by the ICSU Bio-Unions and by ICRO.

# IUBS Ad Hoc Committee of Review Interim Report - March 1980

## 1. INTRODUCTION

### 1.1. Establishment and meeting of the Committee of Review

The XX General Assembly of IUBS at Helsinki, August 1979, resolved *"To appoint an Ad Hoc Committee of Review to examine and report upon the functions, responsibilities and activities of the Union, its relations with international and national organizations affiliated with IUBS, and, in consultation with, and with the assistance of ICSU, on possible functional links with other biological Unions, and to consider and recommend appropriate changes in the structure and the activities of IUBS which may seem opportune as the result of these enquiries"*.

Subsequently an Ad Hoc Committee was appointed with the following membership: Sir Otto Frankel (Chairman), Professor N. Oker-Blom, Professor O.T. Solbrig, Dr. Satya N. Kakar, Dr. S.G. Vassetsky, Professor J. Guern, and Dr. M.G.P. Stoker.

After a preparatory meeting of a small group readily available in London (November 1-2, 1979) a full meeting was held at the Royal Society in London on March 10-11, 1980. All members of the Committee with the exception of Dr. Vassetsky attended, as did Professor E.S. Ayensu, Secretary-General and Dr. T. Younès, Executive Secretary, Dr. F.W.G. Baker, Executive Secretary of ICSU and Dr. C.A. Wright, former Secretary-General of IUBS, who had agreed to assist the Committee in its deliberations and in preparing the report. The Committee expressed its profound regret for the absence of Dr. Vassetsky whose participation would have been of great benefit to the Committee.

### 1.2. Nature and purpose of the Interim Report

This report was especially prepared on the use of officers and Executive Committee in connection with the forthcoming meeting of the General Committee of ICSU, and in particular with reference to the

proposed Union status for IAMS which is to come before this meeting. The Committee believes that a severance of IAMS from IUBS is a matter of such seriousness that it calls for a basic review of the structure and function of IUBS if restricted to those divisions which would remain within the Union, and of their relationship not only to the proposed new Union but to the other Bio-Unions which, with IUBS represent the biological sciences. Accordingly, this report leaves aside matters of vital importance, such as publications and finance, which require further detailed examination and discussion, and which are to be dealt with in future reports.

Due to the limitations of time the Committee at this stage has refrained from making firm recommendations on some of the most crucial issues referred to it, and in particular on the structure of the Union. Instead it has set out the options for the future of the Union it has recognized, although the preferences of members are indicated.

The Committee earnestly requests that the report in its present shape be not widely distributed but as far as possible be restricted to Officers and Executive Committee, until the Committee has had an opportunity to react to suggestions or criticisms by Officers. In its present form the report is unfinished and may prejudice national or scientific members against possible solutions which are suggested but not adequately developed.

### 1.3. Present structure and activities of IUBS

A background paper had been prepared by the Chairman, the first part of which contains an outline of, and comments on the current structure of IUBS and the functions and activities at various levels of the Union. In an edited form it is attached as Appendix A as a background and, in part in amplification of the main body of the report.

## 2. STRUCTURE AND FUNCTION OF IUBS

The Review Committee commented upon a number of aspects of the structure of IUBS, both as it exists at present and in the immediate future.

### 2.1. Sections and Commissions

#### 2.1.1. Conditions of membership and structure

The Sections and Commissions constitute the scientific membership which is the fundamental basis of the Union. There is a varied spectrum of size and activity of these units. Conditions of admission to membership of the Union require that an organization must have an international scientific basis with statutes or rules which are regarded as acceptable to the Union. This criterion of acceptability has been broadly interpreted in the past and there is a wide diversity of organization at the sectional level. This is inevitable in order to meet the varying requirements of different organizations. The Committee feels that in order to promote and maintain the vitality of the sections and commissions it is important that there should be a regular turnover of the officers of the relevant international organizations. The Committee realizes that the Executive Committee of the Union should not intervene in the internal affairs of the member sections. However, the Committee suggests that the Executive should urge those organizations whose statutes or rules do not at present provide for limited terms of service for members of their boards and officers to take steps to ensure an adequate turnover. The Committee also suggests that, where appropriate, sections and commissions should be encouraged to seek multiple divisional membership.

#### 2.1.2. Activity

The Committee experienced some difficulty in defining the term "scientific activity" in the context of the Sections. The organization of congresses, symposia etc. on a regular periodic basis is obviously an important function but it was felt that these are activities which, in most cases are carried out independently of the Union or with only a small financial subvention and they do not constitute a major activity of the Union itself. Meetings involving the interaction of two or more scientific sections can be seen as constituting an activity which owes something to the corporate membership of the Union as a whole. Initiatives for activities of this kind usually originate with individuals or small groups

of people. The Review Committee hopes that some of its suggestions for restructuring will encourage such initiatives to be developed and become part of the Union activity in the full sense.

At present, the only basis upon which the activity of a section or commission is judged is the submission of annual reports to the Executive Committee and triennial reports to the General Assembly. Some of these reports give little or no indication of the real scientific activity of the member organization. The Review Committee suggests that the Executive Committee should seek more detailed reports in the light of which the Union should carry out a stringent review of its membership and remove inactive or redundant organizations in accordance with the remit given by the XIX General Assembly in Bangalore.

### 2.2. Divisions

With the exception of the Division of Microbiology the review committee feels that the structure of the other Divisions leaves much to be desired. Article 9 of the Statutes of IUBS states "*The affairs of each Division are managed by a Board including at least one representative of each Section of that Division. Each Board elects its own Chairman and other Officers*". For various reasons compliance with this regulation has become little more than a formality and there is some evidence that the Article is not always applied. One of the problems in recent years is that it has not been possible for official representatives of every section to be present at General Assemblies. At the Assemblies inadequate time has been set aside for Divisional board meetings and the lack of defined terms of office for officers and members of the boards is responsible for a certain apathy which further contributes to poor attendance at the meetings.

The most important failure, however, is the lack of any defined function for the Divisional boards. They serve no administrative purpose because sections and commissions report directly to the Secretary General through the Executive Secretary and the Divisional representatives on the Executive Committee are simply nominated by the boards but do not necessarily have any specific relationship to their own board. Financial constraints usually do not permit meetings of Divisional boards other than at the triennial Assemblies and there is evidence that at least some do not work by correspondence. Given these circumstances it is

scarcely surprising that the main functions which the Divisional boards should perform, that of stimulating and coordinating both intra — and inter — Divisional scientific activity are rarely implemented. It is for these reasons that many of the Review Committee's suggestions for the future of IUBS are concerned with the structure and function of the Divisions.

## **2.3. National Members**

### **2.3.1. Status**

Article 5 of the IUBS Statutes and Articles 2, 3, and 4 of the by-Laws define the conditions under which countries shall adhere to the Union. Article 6 of the statutes makes it clear that the final administrative authority of the Union lies with the adhering countries.

### **2.3.2. National Committees**

The structure of different National Committees varies to suit the circumstances of the individual adhering countries. The Review Committee feels that some countries might welcome the provision of guidelines by IUBS on the structure and functions of National Committees, recognizing the wide spectrum of activities in the biological sciences.

The National Committees of some countries are concerned almost exclusively with international activities connected with IUBS. Some others have an active role in their own countries and the review committee feels that this kind of activity should be encouraged in that it provides a potentially important feedback to the Union.

### **2.3.3. Census of Biologists**

A recent attempt to obtain an estimate of the actual numbers of biologists who are represented by IUBS through the scientific membership has not produced full answers. It is probable that National Committees are in a position to provide more realistic figures and these are particularly important with respect to countries with small numbers of biologists. The Review Committee suggests that the Executive Committee should ask National Committees to cooperate in this matter. However, the statistics concerning the numbers involved in particular biological disciplines is still of great interest and further attempts should be made to obtain these data from the scientific membership.

## **3. OPTIONS FOR THE FUTURE**

The Review Committee considered four basic options for the future of IUBS. In the first two

(1a and 1b) the continued participation of Microbiology was envisaged. The other two (2a and 2b) assumed that Microbiology had succeeded in achieving separate Union status.

### **3.1. Outline and Options**

#### **Option 1a**

Maintenance of the **status quo** but with strengthening of Divisional organization and with provision for multiple Divisional membership by Sections as suggested under 2.1.1.

#### **Option 1b**

Restructuring of Divisions more in accord with contemporary scientific thought. The suggested new Divisions are :

1. Molecular & Functional Biology.
2. Systematic & Evolutionary Biology.
3. Environmental Biology.
4. Microbiology.

#### **Option 2a**

Separation of existing Divisions into Individual Unions.

#### **Option 2b**

Creation of three new Unions in addition to Microbiology on the basis of the restructured Divisions suggested in Option 1b.

### **3.2. Advantages and Disadvantages**

The Committee discussed some of the potential advantages and disadvantages of these options.

**1a** : The apparently inadequate structure of the existing Divisions did not promote confidence that any minor modifications would result in enhanced performance of the Union. In their present form the Divisions serve as little more than electoral colleges for the Executive Committee and the Union is in reality only a loose federation of its constituent scientific members.

There was little enthusiasm for this option but some possible improvements are set out in 2.1. and 2.2.

**1b** : Reorganization of the scientific sections and commissions into a smaller number of Divisions with aims more in keeping with contemporary scientific thought offers the opportunity to create a strengthened Divisional framework. It is envisaged that some sections such as Genetics or Human Biology would have flexibility of membership and not necessarily be

restricted to a single Division. Implicit in this option is the need for scientifically active Divisional boards, elected by the constituent scientific bodies, with defined terms of service for both officers and members of the boards. In order to promote scientific activity at the Divisional level some funds should be made available to the Divisional boards for "seeding" initiatives originating within the Divisions. The Chairmen or Secretaries of the Divisional boards would become members of the Executive Committee, thus providing direct liaison between the scientific components and the Executive. In this structure the emphasis upon the regional membership of the Executive Committee would be substantially reduced but any unbalance could be corrected by maintaining three additional places on the Committee for allocation on a regional basis.

It should be noted that Microbiology has been named as one of the Divisions in this new structure. While not commenting on the claim of Microbiology for separate Union status, the Committee regards the inclusion of Microbiology as essential to the health of any organization of the biological sciences and views with dismay any proposal which might isolate it from other biological disciplines.

**2a and 2b :** If the Division of Microbiology succeeds in obtaining separate Union status the Committee feels that the remaining components of IUBS would no longer effectively represent the biological sciences. The most obvious solution to this problem would be for the remaining Divisions of IUBS jointly to apply for individual union status within ICSU, either in their existing condition (option 2a) or reconstituted in accordance with the suggestions under 1b (option 2b). As set out under 1a the present structure of the existing Divisions does not provide a promising basis for their viability as separate Unions.

### **Advantages and Disadvantages of 2b**

Option 2b has some potential advantages. The suggested reformed Divisions could constitute a sound foundation for scientifically effective inter-acting Unions. The smaller size of these entities would provide better opportunities for direct impact on and by individual workers by reducing the lines of communication. Perhaps the greatest advantage of option 2b is the possibility of these new Unions becoming more closely associated with other Bio-Unions within ICSU. A possible association of all Bio-Unions is discussed below.

The Review Committee is aware of some of the problems which might result from the creation of these new Unions. It is possible that not all National Members of the present IUBS would wish to adhere to all of the new Unions. Even if all present National Members accepted all of the new Unions it is unlikely that the National Committees would be prepared to make significant increases in their existing financial support. As a result the present barely adequate income of IUBS would be spread over four separate Unions and the new bodies would have to seek additional funds. The model of Microbiology (and some of the other constituent scientific bodies within IUBS) which raise a per capita levy on their corresponding national societies are seen as a possible solution. The Review Committee realizes that the effectiveness of this approach would not necessarily be the same for each of the new Unions.

For example, the proposed Union of Systematic and Evolutionary Biology might encounter difficulties if it became responsible, without additional funds, for the International Commission on Zoological Nomenclature. Further difficulties might come from other Unions because of the possible imbalance of voting rights in the ICSU general assembly. Despite these problems we see Option 2b as the basis of a healthy reorganization for the future.

### **3.3. Clustering**

The Review Committee sees the encouragement by ICSU of some kind of clustering at least of the Bio-Unions as an essential step in the promotion of international activity in the biological sciences. Such clustering would facilitate scientific interactions between the Unions as a normal function. As an example, it is probable that the existing separation of IUB and the IUBS Division of Cell and Developmental Biology has been detrimental to the activity of the IUBS Division if not to both organizations. Separations such as this have delayed and reduced the impact of Molecular Biology on IUBS. Arising from a clustering of Bio-Unions it is possible that the present informal caucus within ICSU might evolve into an International Committee of Biological Unions.

### **3.4. Short and long-term strategies**

3.4.1. The Committee believes that the changes in structure and function discussed in this report should be introduced as soon as possible if the Union is to fulfil a more positive role in the advancement of biological science. The Committee as a whole is convinced that this

is unlikely to be achieved within the existing structure, even with some modifications in function and procedures.

3.4.2. The Committee is unanimous in proposing a structure more in accord with contemporary scientific activities, and proposes option 1b for adoption by the General Assembly. This could be introduced without delay.

3.4.3. We believe, however, that option 2b has the advantage of creating a small number of Unions similar in size to biological Unions (other than IUBS) which has been notably active and successful. If the structure proposed under 1b proves more effective than the existing one in generating Union activities, one may expect such new energies to be enhanced by the responsibilities of Union status. This, after all, is the strongest argument in favour of independent status of Microbiology. Equally important would

be that a clustering of Bio-Unions — not necessarily all together — would become inevitable, which in our view is likely to enhance the effectiveness of all of them.

3.4.4. It is clearly not possible to contemplate an early introduction of a measure which would not only mean a drastic change to the structure of IUBS, but would affect a number of other Unions, and may have repercussions for ICSU as a whole. However, we commend this option as a longer-term objective, not only for consideration by IUBS, but for active prosecution in ICSU. Major social changes require time, but without advocates the evolutionary momentum may be infinitesimal. We recommend therefore that this option be kept under consideration, to be examined by IUBS over the next few years, and be brought before the ICSU forum on appropriate occasions.

# Appendix a : Structure and activities of IUBS

## 1. IUBS Sections and the international associations

The Scientific working organs of IUBS are its Sections, representing major areas within the biological sciences, and Commissions, representing more specific interests or activities. In the main both sections and commissions, are based on international associations totalling 70 at the time of the Helsinki General Assembly, 1979. The associations have individual or society membership, or both. They have their own statutes and elect their officers. Some publish journals, and some raise dues from member societies and/or from participants at international meetings. The president and secretary of the associations are also president and secretary of the corresponding sections of IUBS. IUBS supports some sections and commissions with a small annual grant (usually \$ 500) mainly for the administration of scientific activities. Most associations sponsor periodical congresses, and many sponsor and subsidize international conferences, workshops, etc. organized by national or specialist scientific societies. IUBS is notified of the dates of such meetings which are published in the IUBS newsletter. IUBS may support congresses by the granting of loans, and symposia or workshops by a subsidy. All these activities are regarded as occurring under the umbrella of IUBS, but are not subject to its authority or approval. The sections report annually on the use of the grants received from IUBS, but not necessarily on their other activities. Not all sections supply reports to the triennial IUBS Assemblies, in spite of sustained efforts by the Executive Secretary which, however, have resulted in a steady increase in the reports received. On its parts, IUBS does not appear to make an input into the scientific activities of the associations by way of suggestions or comments.

In short, as far as the sections of IUBS are concerned, the Union provides a framework in which the specialist associations operate, but it must be recognized that most of them functioned prior to joining IUBS, and others do so at the present time. IUBS thus emerges as a loose federation of self-governing associations with little interdisciplinary coherence or contact, except when established ad hoc between national or international organizations.

While this description generally applies, there are factors which, actually or potentially, provide for a degree of cohesion, and it is with these that this report is mainly concerned. These are the national participation in IUBS, the administrative superstructure of IUBS, the scientific initiatives of IUBS itself, and the participation of IUBS in ICSU.

## 2. National participation in IUBS

While the associations (or sections) must be regarded as the international working organs of the Union, the associations themselves are based on national societies and individual scientists in the adhering countries. Similarly, IUBS has at its general assembly national delegations who alone vote on

administrative matters. Participating national organizations have national committees responsible for the continuing liaison of IUBS. National participation is inter-sectional and thus can provide initiatives transcending sectional boundaries and preserves.

## 3. Administrative superstructure of IUBS

**3.1. The Divisions.** The sections and commissions are grouped in five divisions : Botany, Zoology, Microbiology, Cell and Developmental Sciences, and Environmental Biology. Each has a board including at least one representative of each section of that division; each board elects its chairman. The composition of divisions is discussed later. Here we are concerned with the role and effectiveness of divisional boards in managing the affairs of the divisions.

With the exception of the Division of Microbiology, divisional boards meet only in the course of general assemblies, and even these meetings may be brief and perfunctory. Hence the affairs of the Division are mainly in the hands of the president or secretary. In his report to the Bangalore Assembly, 1976, Dr. Donald Farner, as president of the Division of Zoology, recorded that "Historically, the Division of Zoology has not functioned as a cohesive unit". In a letter to David Ride, Dr. Farner said "Yet I do feel that there is both merit and necessity in furthering cohesion and communication among the fields represented by the sections and commissions". Otherwise, one may ask, why have divisions at all ?

This was clearly the view of a group, under the chairmanship of Dr. E. De Robertis, which in April, 1975, prepared a proposal for the reorganization of the former Division of Functional and Analytical Biology. The following is quoted from the proceedings of the Bangalore Assembly, 1976, page 113 :

*"In this proposal, the need for a strong and active divisional board to encourage cooperation with other unions and international organizations, as well as several activities of the Division were suggested. It was emphasized that the Division should stress all the studies related to Cell Biology in its physiological, molecular, developmental and genetic aspects. Among them, particular relevance was given to the organization of major interdisciplinary congresses, symposia and workshops, the support and encouragement of local societies in various parts of the world, the setting of panels for the standardization of techniques and terminology, the provision of fellowships to scientists in developing countries, training programmes, in appropriate disciplines, for scientists and technicians and the promotion of exchange communication on activities between sections by means of newsletter, etc. The question of training courses was considered in more detail and it was pointed out that in developing countries the need for training of technicians was particularly important".*

One wonders to what extent these admirable recommendations have been acted upon. At any rate, communications between the division and its

sections did not improve in the reconstituted division. On the credit side, a successful workshop on cell and tissue cultures resulted from a divisional initiative, as did the proposal to issue guidelines for bioassays.

The only division which has an active divisional structure is Microbiology, which is based on the International Association of Microbiological Societies (IAMS). In 1976 IAMS had 68 member societies comprising almost 59,000 individual members. It consists of three sections representing Bacteriology, Virology and Mycology, and 13 international committees. Its executive board meets frequently and plays an active role in the administration of the division.

In 1979 the three sections organized separate congresses, immediately preceding the inter-sectional Congress of Microbiology. The division is currently seeking Union status outside IUBS.

Is the divisional organization of IAMS as an association of societies a pointer to other divisions, whether in their present or some other context? In a recent letter Dr. Donald Farner mentions this as a possibility for Zoology.

What are the reasons for what must be regarded as the very limited effectiveness of the divisions (other than Microbiology)? Several come to mind. The complete absence of funds to facilitate board meetings or to initiate interdisciplinary or inter-sectional activities — which should surely be the principal concern of divisions — are the primary obstacles of their relations with the sections. But there is an equally effective block in their relations with the Executive Committee. It is not the president or secretary of the division who represents the division on the Union's governing body as the link with the sections which constitute the division. On the contrary, it is a person selected by the nominations committee to fit into the national checkerboard of Executive Committee members. Thus the division is effectively isolated from both, sections and Executive Committee, in a sort of no-man's land separating rather than linking the working organs and the Executive.

Attention must also be given to the way Divisional Committees are nominated, and to the length of service which at present appears to be unlimited. A maximum of 6 years of uninterrupted service might fully be adequate. The following procedure for nominations of Divisional Officers was recommended at the Helsinki Assembly, 1979, by the Ad Hoc Committee on the Organization of IUBS:

*Nominations for Officers of the Divisions should be solicited by the Executive Secretary directly from appropriate International Societies and indirectly through National Committees from National Scientific Societies. From the names received a slate of candidates shall be selected by the Nominating Committee taking into consideration the nationality of the candidates and the field they represent to ensure the widest possible national and disciplinary representation.*

*To ensure adequate time for national and international societies to respond, nominations should be solicited at least a year before the IUBS General Assembly.*

One cannot but agree that it is the divisional structure which holds most of the keys to a drastic

activation of the Union as a whole. This was admirably expressed by the Ad Hoc Committee quoted above.

*"As to IUBS functions and responsibilities the committee feels that the IUBS Executive Committee and the Executive Secretariat should perform basically a coordinating and administrative function, while the Divisions should be primarily concerned with scientific matters. The formation of ad-hoc interdisciplinary working groups should be fostered for the purpose of developing and coordinating scientific programs, meetings and courses. These ad-hoc groups should not be part of the permanent structure of IUBS and should be reviewed by the Executive and the Assembly at intervals to see whether their objectives are being met. Inactive groups and those that have fulfilled their objectives should be disbanded".*

**3.2. The Executive Committee.** The Executive Committee (EC) has an important role to perform since (a) it is charged with carrying out the decisions of the General Assembly (GA); (b) it meets annually hence has a better opportunity for continuing consultation than have most other organs of the Union; and (c) it is the main link with the ICSU family.

In the preceding section it was argued that without a close link between divisions and executive the latter is isolated not only from divisions but from the sections. Such a direct link would be established through divisional presidents (or secretaries) being *eo ipso* the first divisional representatives on the executive. This matter has been suggested on several past occasions and was the subject of a resolution at Helsinki.

A few comments may assist discussion. It appears to be an unwritten rule that no country shall have more than one representative on the EC so as to avoid the committee being swamped by any one country, and to spread the geographical representation as widely as possible. Yet the European countries between them have at present 11 out of the 20 members whereas Asia has two the URSS one, and the USA shares one with Ghana.

**3.3. The General Assembly (GA).** The (triennial) General Assembly provides a forum for national and scientific members and the Executive Committee to present and receive reports, to consider changes to membership or amendments of Statutes and By-Laws, the scientific programme, and any other matters relating to the responsibilities and functions of the Union. It provides an opportunity for most Divisions the only one — for meeting of Divisional Boards. For some years the programme has included lectures or symposia of interest to a broad spectrum of biologists.

**3.4. Executive Secretary.** Experience in the years since the approval of a full-time appointment has justified this decision, as again confirmed by the Helsinki (GA). The Executive Secretary will have an important role in moves to activate the Union, but it is clear that this contributions are largely restricted to initiatives coming from representative bodies of the Union.

**3.5. IUBS and the ICSU family.** IUBS provides the only formal link between ICSU and its affiliated scientific Unions and all organizations and individual

scientists under the IUBS umbrella. Potentially this could be seen as one of the most important of the Union's contributions to the prosecution and organization of biological science. While there are joint activities with other unions, these are limited in scope compared with the needs of, and opportunities for interdisciplinary cooperation in our vastly changing science. Yet it should be recalled that it was IUBS which stimulated IBP, though it contributed little to its work. Nor did it take a major part in its successor, SCOPE.

#### 4. Scientific activities of IUBS

There hardly is a need to emphasize that it is the scientific activities of the Union that are its most important objects and aims, as stated in Article of its Statutes and restated on many occasions. Accordingly, it is by the scientific activities of the Union that the effectiveness of its structure and policies must be primarily assessed. While not overlooking activities undertaken or sponsored by the sections of IUBS, i.e. the international associations affiliated with it, in the light of the discussion in 1.1. above, it would commend itself to give special attention to those activities which were genuinely generated by IUBS and would not have been undertaken but from the initiative from the Union.

This is in line with the emphasis given in recent years to intersectional (French National Committee report, 1976, GA) and interdisciplinary activities (Committee of Scientific Activities, Helsinki GA, 1979) and further with the emphasis since 1976, on agricultural science, itself and integration of various biological and physical sciences.

Examination is needed whether the Union's current research activities and policies are restricted by organization, policy, finance, or any other factors, and how such restraints might overcome or mitigated. Whatever the causes, the current activities,

including those recommended by the 1979 GA, are inadequate in both number and diversity. The high quality of the projects brought to IUBS, together with their being confined to a small number of areas indicate the wide scope for IUBS participation if such initiatives were broadly spread throughout the diversity of the Union. Indeed, the interest and usefulness of recent and current projects which have been or are in progress is unquestioned. The IUBS symposium on plant cell and tissue culture, Pavia 1979, covered a topic of direct concern to many fields of pure and applied Plant Biology, as will the workshop on models of nitrogen in soil, Wageningen, 1980.

Another proposal brought to the Helsinki GA, the application of Molecular Biology in evolutionary research, interesting and promising as it is, opens up wider perspectives and opportunities which IUBS might have grasped much earlier. Until now the Union has failed to recognize and promote "the conceptual and practical link which is already in front of us in the form of the extraordinary achievements made by Cell and Molecular Biology and Genetics in recent years". (From the Preface to IUBS **Newsletter No. 16**, December 1979, by the President, Professor De Robertis). Indeed, as the President points out, we now recognize not only a conceptual, but a very practical link between the diversity of fields comprising the biological sciences. Clearly, the advancement and encouragement of the application of molecular biology in a great diversity of biological fields would be a task wholly germane to the largest and most diverse of the biological unions.

It is often claimed that IUBS, by comparison with most other Unions, is hampered by its enormous diversity of subjects. Whether the latter is correct or not, diversity causes problems, but also offers opportunities for inter-actions. Indeed, in view of the sectionalization of its adhering bodies, the integration of its diverse components can be seen as the principal *raison d'être* of the Union.

### The Interim Report at the IUBS Executive Committee Meeting

The IUBS Executive Committee Meeting 27-29 October 1980 discussed the interim report presented by Professor N. Oker-Blom.

The Executives were in favor of the option 1b according to which the IUBS sections, commissions and committees should be reorganized into three new divisions :

1. Molecular and Functional Biology.
2. Systematic and Evolutionary Biology.
3. Environmental Biology.

The division of Microbiology proposed in this option does not exist any more due to the separation of the International Union of Microbiological Societies IUMS.

The Executive Committee indicated that the interim report should be completed by a plan of reorganization of the IUBS sections, commissions and committees into the new proposed divisions before submitting it to the 21st IUBS General Assembly, 1982. It was decided to have at the next officer's meeting (May 1981) a preliminary proposal of reorganization of new divisions.

Concerning the reorganization, it was suggested to ask Professor J. Guern (France) to prepare the reorganization for the Division of Molecular and Functional Biology, Professor O. Solbrig (USA) for the Division of Systematic and Evolutionary Biology and Professor G.A. Knox (New Zealand) for the Division of Environmental Biology. It was agreed that multiple membership of sections and commissions may occur.

# The International Commission on Zoological Nomenclature Its role in the modern world

by Prof. R.V. MELVILLE, Secretary ICZN, British Museum - London (UK)

## Introduction

The Commission's aim is to promote a stable and uniform Nomenclature in Zoology. It works towards this in two ways : first, it develops and improves the International Code of Zoological Nomenclature to provide a set of rules and recommendations for the guidance of zoologists; secondly, it gives rulings on individual nomenclatural problems submitted to it.

The Commission consists of a minimum of 18 (at present, 26) eminent zoologists from a variable number of countries (at present, 18). The number of

its members must be kept relatively small if the Commission is to work efficiently. Efforts are being made to develop relations with zoologists in China, India and Africa.

The Commission's Secretariat is housed in the British Museum (Natural History), by kind permission of the Trustees. Here it has access to the finest library of its kind in the world, as well as to taxonomic advice from the scientific staff of the Museum. These advantages are of great value.

## The Commission's work

It may be helpful to explain the background to the Commission's work. Zoologists (including palaeontologists) recognize about a million species of animals, and are describing new ones at the rate of about 15,000 a year, with about 2,000 new genera. Given numbers of such magnitude, it is inevitable that problems should arise. The commonest problems are of three kinds :

- (a) where a - species or genus has been given two or more names independently (some species have been given as many as ten different names) ;
- (b) where a - generic or specific name has been used to denote different genera or species ;
- (c) where a - name has been wrongly used in a sense different from that intended by its author.

Problems under (a) and (b) can, in principle, be easily solved by applying a simple Law of Priority : the oldest name given to a species or genus is the only one to be used ; and a name must only be used for the genus or species to which it was first given. This simple rule works well enough for species and genera that are known only to a few academic specialists ; but when animals of economic importance are involved (see the following section of this paper), matters become less simple. The names in general use may be heavy with meaning to many workers to whom taxonomic procedures and the

rules of nomenclature are mysterious and remote. To change such names for merely legalistic reasons could cause widespread confusion, if the Commission had not powers to prevent such changes. Problems under (c) may be complex and entail difficult choices : is the original author's intention to be upheld, or should the name be used in its accustomed way ? If the latter, how is the new meaning of the name to be fixed unmistakably for the future ? Where any of these sorts of problems arise there must be an international system of regulation and a machinery for working it that applies without discrimination to zoologists and palaeontologists in all countries and all disciplines.

The Commission accordingly examines problems submitted to it. When a case has been thoroughly prepared and agreed with the applicant, it is published in the *Bulletin of Zoological Nomenclature* and any comments by zoologists that affect the issue are also published there. In due course the Commission votes by postal ballot and the result, embodying the ruling of the Commission, is published in the *Bulletin* as an Opinion.

The Commission has issued over 1,150 rulings giving rulings on some 10,000 names. The demand for its services increases, and the Secretariat holds files on problems of great complexity.

## Relevance to human needs

Man and the rest of the Animal Kingdom interact in a number of ways. The plants and animals that are useful to us as food or as raw materials themselves depend on other species for their survival, as food or as commensals or in other ways

(as with insect-pollinated plants). They are attacked by other species as predators, or pests, or vectors of disease. In exploiting the resources of the earth's crust, especially groundwater and fossil fuels, fossils are an indispensable research tool. Communication

between scientists working in these fields depends in large measure on a common system of nomenclature that all can understand.

The Commission cannot control the ways in which scientific names are used. That is a matter of correct taxonomic practice, which is itself a product of training, experience and judgement. The misuse of a name, however, can have very serious consequences. It can vitiate effective communication and may result in inappropriate steps being taken, for instance in pest control, with consequent waste of financial and human resources and increased pollution of the environment. The Commission has given rulings in many cases in which there has

been serious confusion over the use of names, or disagreement among zoologists as to the correct names to be used. Examples include the three main species of human malarial parasites and the generic name of their mosquito vector; the names of such notorious pests of cereals as the cereal-root eelworm, the grain weevil and the corn root weevil; the sugar-cane borer moth; the bee chiefly responsible for pollinating alfalfa (lucerne), which is the world's most important fodder crop; the tick vector of Rocky Mountain Spotted Fever and many other diseases; and a major cutworm pest of cotton, maize and legumes in Africa, Asia and Australia. Many other cases of similar importance are awaiting decision or presentation.

## Value in international communication

The future of the human race — and in particular the problems of north-south communication and the progress of the developing countries — must depend in part on mutual understanding within agreed frameworks of communication. The development of the countries of the Third World must in turn depend on their making the best use of their renewable and non-renewable natural resources. For this it is apparent that they need access to the expertise and accumulated knowledge of the developed countries.

The few examples cited in this paper give an

indication of the essential part played by the Commission in the provision of the general framework in which such communications and transfers of knowledge can take place.

The Commission is especially grateful for the generous financial help given by the Union in consequence of a decision by the 1979 (Helsinki) General Assembly. However, this (together with a grant from the U.K. Government) ensures stability only until the end of 1982. The Commission looks forward to working with the Union in building a realistic financial basis for the long-term future.

## Appendix

The system of scientific nomenclature used in zoology today was founded in 1758, with the publication of the 10th edition of Linnaeus's *Systema naturae*. There was then no set code of rules; the principles that Linnaeus had earlier laid down for botanical nomenclature provided an informal framework that sufficed for the small numbers of zoologists working on the comparatively small number of species known in those days.

Within less than a century, however, some 400,000 names had been given to genera and species of animals. Much confusion arose because many species had been given several different names, while identical names had been used for different species. The number of investigators and the output of their publications had also greatly increased. The need for some system of regulation was admitted. The first attempt to meet it was made by the British Association for the Advancement of Science in 1842, and their code was succeeded by a number of others produced either by national zoological societies or by workers in particular animal groups.

The existence of these codes, each differing in some respects from the others, and none having a claim to overall authority, was one of the main motives for the establishment of the International Congress of Zoology in 1889. The International Commission on Zoological Nomenclature was set up for the express purpose of producing a single international code, applicable over the whole field of

zoology and palaeontology. The first *Règles internationales de nomenclature zoologique* were published in 1905.

The publication of the *Règles*, however, proved but a first step towards a satisfactory system. The rigid application of its basic principle, the Law of Priority, caused much ill feeling because it led to many long-familiar names being rejected in favour of overlooked names that had been published earlier. In 1913, therefore, the Commission was given plenary powers to suspend the rules when it was satisfied that their strict application would produce more confusion than uniformity.

The Commission continued to be an instrument of the Congress until 1972, when that organization, at its final session in Monaco, invited IUBS to accept the continuing sponsorship of the Commission. While informal relations between the Commission and the Union had existed previously, these were formalized at the 1973 (Ustaoset) General Assembly with the setting-up of the Section of Zoological Nomenclature of the Division of Zoology. It is a pleasure to record the friendly atmosphere that has grown up between the two organizations.

The *Règles*, thus modified, survived with little change until 1948. Since then they have been under nearly continuous reform. In 1961 they were succeeded by the present International Code of Zoological Nomenclature, of which the third edition is to appear in 1981.

# Information Note on the Conference Exhibit

## ECOLOGY IN PRACTICE

Paris 22-29 Sept. 1981

The plans for an International Conference and exhibit announced in *Biology International* no. 1, 1980 have changed somewhat due to circumstances outside the control of the Conference Steering Committee.

The Scientific Conference will focus on the general topic of "Ecology in practice : establishing a scientific basis for land management". The Conference will be based on invited contributions, organized around seven main themes. 100 to 150 scientists will participate in the Conference as invited contributors or members of national delegations.

The Exhibit will attempt to present some of the results obtained within MAB during the last ten years in an experimental and innovative way and it will be high technical quality, and it will draw on different communication media, inclu-

ding graphics, audiovisual presentations, games, etc. At least one hundred copies of the Exhibit will be produced so that countries will be able to mount national exhibits using the materials sent from Paris as a core. Thus, contrary to the original exhibit plan, national contributions are no longer being solicited, but should continue to be prepared for use within national activities.

The dates of the Conference Exhibit and associated seventh session of the International Coordinating Council of MAB have been changed. The new dates are as follows :

International Conference Exhibit 22-29 September 1981.

International Co-ordinating Council,  
Seventh session 30 September - 2 October 1981.

### The main headlines of the tentative programme are the following :

- *Tuesday, 22 September*  
Opening session and theme 1  
The search for sustained production systems in the humid and sub-humid tropics.
- *Wednesday, 23 September*  
Theme 2  
Scientific basis for the management of grazing and marginal lands.
- *Thursday, 24 September*  
Theme 3  
Providing a basis for ecosystem conservation.
- *Friday, 25 September*  
Theme 4  
Ecological approaches for improving urban planning.
- *Saturday 26 September (morning only)*  
Theme 5  
Use of scientific information for environmental education purposes.
- *Monday 28 September*  
Theme 6  
Providing the types of information needed for decision-making on land management.
- *Tuesday, 29 September*  
Theme 7  
Emerging issues and priority problems for the 1980's.

# New Project :

## Ecological Problems in the Humid Tropics

To comply with recent Congressional mandates<sup>(1)</sup> the U.S. Agency for International Development (AID) is attempting to incorporate ecological principles into its bilateral assistance programs. Its mechanism for achieving this goal is a large project, managed by the U.S. National Park Service's Office of International Park Affairs, consisting of the organization and translation of information on the environment and natural resources for AID missions and bureaus through a series of review papers on different topics and for different geographic regions, case studies, and project design aids (called environmental guidelines).

The U.S. National Research Council's Division of Biological Sciences, because of its recent experience in recommending priority research needs in the tropics through its report *Research Priorities in Tropical Biology* (National Academy of Sciences, Washington, D.C. 1980 — Available for \$ 8.25 from NAS Office of Publications) was considered to be an appropriate source for one of these review papers : "Humid Tropics : A Review of Selected Ecological Problems." To accomplish this, a committee was established in May 1980 and Dr. Jay M. Savage, University of Southern California, was appointed Chairman. During its first meeting on June 20-21, 1980, the committee formulated its plan of attack.

As its primary objective the committee, through its report, hopes to assist AID's Development Support Bureau in its efforts to improve the capabilities of developing countries to conserve and manage their environment and natural resources by incorporating ecological principles into development projects. It intends to accomplish this objective by including in its report discussions of selected ecological problems in the humid tropics, such as watershed protection, reforestation, agroforestry, forest preserves, perennial crop production, regional environmental impacts,

and germplasm resources, as well as natural resource surveys and baseline studies. Furthermore, it will develop a series of conceptual and operational recommendations to assist AID in developing an ecological perspective for specific projects and programs in the humid tropics. This report is expected to be released in the Fall of 1981;

In addition to Dr. Savage, committee members include Drs. Charles R. Goldman, Division of Environmental Sciences, University of California-Davis; David P. Janos, Dept. of Biology, University of Miami; Ariel E. Lugo, Institute of Tropical Forestry, Rio Piedras, Puerto Rico; Peter H. Raven, Missouri Botanical Garden, St. Louis; Pedro A. Sanchez, North Carolina State University, Raleigh; and H. Garrison Wilkes, University of Massachusetts, Boston.

The staff office for the project (see below) is attempting to compile lists of specialists with experience in any of the above mentioned areas for the following countries : Bangladesh, Bolivia, Cameroon, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Kenya, Liberia, Nicaragua, Nigeria, Panama, Peru, Philippines, Sierra Leone, Sri Lanka, Thailand, Togo and Zaire. The purpose of this exercise is to alert AID to local persons capable of advising them on ecological matters. Anyone with information on persons from such countries, including correct mailing address and area of expertise, please forward it to the address listed below.

Dr. James J. Talbot.  
Division of Biological Sciences.  
National Academy of Sciences.  
National Research Council.  
2101 Constitution avenue,  
Washington, D. C. 20418 USA.

(1) - 1973 "New Directions" Amendment to the Foreign Assistance Act.  
1977 Section 102 of Foreign Assistance Act "Environment and Natural Resources" (22 U.S.C. Sec. 2151-1)  
Section 118 - Section 118 (22 U.S.C. Sec. 2151 p)  
1978 Section 103 (b) (22 U.S.C. Sec. 2151 a)

# JUNGLES :

## Tropical Forests and their Importance \*

by Prof. Edward S. Ayensu, Director, Office of Biological Conservation  
Smithsonian Institution and Secretary-General of IUBS

As space travel and genetic manipulation open new vistas to mankind, tropical forests still present an intriguing diversity of species that defy comprehension. Our lack of knowledge of this luxuriant vegetation type is a telling commentary on our sense of priority. For the tropics and its relation to economic development represent one of the most frightful problems facing mankind in the next few decades.

Every week a tropical forest area the size of Delaware goes into development. Annually an area equivalent to Oregon is transformed to farmland or inadvertently destroyed. The elimination of some 27 million acres of such forest per year is depriving the world of many options for solving current and future problems.

Diesel fuel is being *grown* experimentally in Okinawa. It is being tapped from an imported Brazilian tree, *Copaifera langsdorfii*, and works even when poured directly into the fuel tank.

West African plant species of *Zanthoxylum* (*Fagara*), are showing promise in problems related to sickle-cell anaemia. Elsewhere, the subtropical Indian neem tree (*Azadirachta indica*) is being tested as an insecticide for crop plants. The extract is harmless to humans but so repellent that insects absolutely will not touch treated plants. One of corn's closet relatives *Zea diploperennis*, grows as a perennial instead of dying back after grain is produced. It could be used to breed perennial corn. Only last year, scientists found what remains of this species' natural habitat — three acres on a Mexican hillside.

Such are the potential of tropical forests but they — with their 3 million different kinds of organisms, compared to 1 1/2 million in the temperate zones — are disappearing. Modern medicine has improved child care and extended the human life span around the world, but the resulting increase in population is causing enormous pressure on jungle ecosystems, as people increasingly search for living space and a productive life. Add to this the normal concomitants: massive hydro-electric schemes, road construction, timbering and land clearance for large-scale, one-crop moderne agriculture.

Add also the insatiable market for endangered plants and animals and their products, such as reptile leather, ivory, fur of large spotted cats, and exotic birds. More than 100,000 parrots were imported into this country last year; may be half as many again were smuggled in. Some were being sold for \$ 5,000 each. Even smugglers should be worried that parrot habitat is fast vanishing. Concern over endangered species has been formalized in an international trade treaty in 1973, but careful monitoring and regulation remains a problem. And, of course, few species can survive if their habitat is eliminated.

The loss of the gene pool of any species is regrettable, regardless of the "value" of the species at the present time. Around the world, some 20,000 flowering plant species are endangered or threatened with extinction. That is 10 % of all the world's flora. Most of the endangered ones are from the tropics, the home of our most familiar house plants, such as philodendrons, bromeliads and orchids.

Annually the United States imports tropical hardwood and hardwood products valued at about half a billion dollars. On a world scale 4.7 billion dollars of tropical forest woods are removed yearly. Even more serious than deforestation is the fact that woods are being consumed much faster than they are being regenerated.

Surging among all of the above pressures is the increasing demand for firewood, upon which millions of people in tropical, developing countries depend for cooking fuel and heat. The situation is so desperate that scaffolding has been poached from construction sites in Africa and openly sold in local markets.

Jungle soils are actually less fertile than temperate zone soils, being continually subjected to rains which leach out many nutrients, leaving reddish and yellowish oxides of iron and aluminium. The jungle stores its nutrients in the forest trees, not the soil, and when the trees are cut, the soil is left poor and of little use. Rain forest requires an enormous amount of time to regenerate into a semblance of its original condition; the results of rapidly cutting jungles are

\* This text appeared in New York Times in 9 July 1980.

The author is Editor of the book JUNGLES published by Jonathan Cape, London and Crown Publishers, New York.

erosion over denuded surfaces, siltation of nearby waterways and, often the laterization of soils.

Worse, it is thought that massive forest removal, if continued at its current pace, may affect the world's climate in the future by altering global temperatures. The widespread burning of forests could well increase the build-up of carbon dioxide in the

atmosphere, leading to higher temperatures. It is also worth noting that from these same tropical forests the Earth receives much of its oxygen supply.

International disputes over responsibility for a changing climate and lowered crop yields in temperate zone countries due to tropical deforestation is a scenario that cannot be comfortably discounted for our future.

## Microbial Ecology

Although few would doubt the importance of micro-organisms in the natural environment, the subject of microbial ecology has been slow to achieve coherence and recognition. The simple approach of qualitative description of communities which is open to the plant or animal ecologist is usually difficult for the microbial ecologist and ideas about the activities of micro-organisms in ecosystems are mostly extrapolations from observations on laboratory cultures by workers who would describe themselves as physiologists or biochemists. With such diverse habitats to deal with as the open ocean, soil, hot springs, dead fish, the rumen and the human body, there has been little contact even between those who would call themselves microbial ecologists. Meetings of microbial ecologists are thus very necessary if common problems are to be solved and general principles formulated but run the risk that potential participants may see little of direct interest in the programme and those who do attend may find little common ground. These hazards seem to have been successfully overcome at the Second International Symposium on Microbial Ecology held under the auspices of the International Commission on Microbial Ecology at the University of Warwick from 7 to 12 September 1980, which was attended by some 800 delegates representing 38 countries. The programme had been organized by a committee representing the principal microbiological and ecological interests in the U.K. Of the two plenary lectures, one, by Sir Hans Kornberg on "The nature and regulation of carbohydrate transport in micro-organisms" reflected the biochemical origins of microbial ecology and the other, by Professor W.D.P. Stewart, on "Dinitrogen fixation — genes, dreams and realities" explored the economic possibilities of one of the most active

fields of investigation at present. The main proceedings were based on twenty symposia with invited speakers dealing with processes or relations common to micro-organisms in general, as for example, selection and evolution, interactions between microorganisms and with plants and animals, the challenge of reductant molecules and water activity and microbial ecology. The keynote contributions in each of these are available in a volume \* published on the first day of the meeting. These symposia brought together workers concerned with microbes in the widest sense — algae, protozoa and microfungi as well as bacteria and viruses. They also found grounds of common interest in round-table discussions on topics such as microbial diversity, ecology of surfaces, polar and tundra microbiology, and determination of biomass. Contributed papers were grouped in sessions many of which were concerned with particular habitats, e.g. the sea, freshwater, the rhizosphere, litter or food, while others dealt with more specialized topics such as distribution and development of pathogens, virus epidemiology, nitrogen transformations, and plasmids. Some 150 poster contributions ranged over a similar variety of subject. All this cannot be summarized briefly but two clear impressions are left: one is that in spite of the fact that many contributors began with the words "I'm not a microbial ecologist but — " the same people spoke enthusiastically of the symposium in promoting the exchange of ideas: the other is that many microbial ecologists now carry out experiments in the field. Add the facts that a substantial proportion of the delegates were young and very competent and that so much of microbial ecology is of direct practical importance and one can have confidence in predicting a bright future for this branch of science.

\* **Contemporary Microbial Ecology**, edited by D.C. Ellwood, J.N. Hedger, M.J. Latham, J.W. Lynch and J.H. Slater. Academic Press, London, 1980.

# Benefits for scientists in developing countries based on calories

Two resolutions were passed at the XXI Congress of the International Association of Limnology held in Kyoto, Japan, August 24-31, 1980, benefitting scientists in developing countries. The Association committed itself to solicit and coordinate support for predoctoral students in limnology in developing countries; and, for a three-year trial period, to reduce dues by twenty-five percent for scientists in developing countries, recognizing the high proportion of net income that may pertain under such circumstances. These actions are of international interest in their own right; but perhaps even more in terms of the criteria used for eligibility.

Eligibility for these benefits pertains to scientists who are citizens and residents of nations in which the ratio of technological

energy consumption (as coal, petroleum, natural gas, hydroelectric and nuclear power) to physiological energy consumption (as food) is less than half the global average. This ratio, known as the demophoric-index or D-index, is readily obtainable from data in United Nations Statistical Yearbooks (Vallentyne 1972, 1978). The simplest way to calculate the pertinent value is to divide the national *per capita* technological energy consumption by the global average as listed in the most recent United Nations Statistical Yearbook. If this value is less than half of the global average, the scientist in that nation qualifies for the above benefits.

Using the D-index for this purpose offers the advantages of quantifiability, absence of stigma and a foundation that is annually updated by the United Nations system.

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# The Growth of the History of Arabic Science

Among the most significant modern developments in the field of the history and philosophy of science, reported verbally at the ICSU General Assembly in Amsterdam on 10 September 1980 by Professor Eric G. Forbes, Secretary-General of the IUHPS, is the recent upsurge of interest and activity in Arabic science. This is reflected by the success of the *Journal for the History of Arabic Science* issued biennially from the Institute for the History of Arabic Science in Aleppo, Syria and more recently by the establishment in Pakistan of the new biennial periodical and a new association for the promotion of Philosophy of Science, both named appropriately after the famous Muslim philosopher-scientist *Al-Kindi*. It is also apparent in the interest shown in the Second International Symposium for the History of Arabic Science held in Aleppo in April 1979, where 111 papers were presented covering the whole range of science, medicine, and technology; and in the International Congress of the History and Philosophy of Science in Islamabad last December. Thanks primarily to the initiative of Dr. Hakim Mohammed Said of the Hamdard Foundation, an International Congress on Science thru' XIV Centuries of Islam, with wide-ranging objectives, is being planned for 1983.

The Technical University of Istanbul has also recently established an Institute for the History of Science and Technology. Its aims are to prosecute research in the history of Turkish-Islamic science and technology, to establish archives and a museum, and to train students in this field. The Institute's first tasks will be to collect documents and publish them; and prepare an inventory of those contained in various libraries and museums in Turkey and elsewhere, with a view to assimilating a bibliography. Such work will complement that being undertaken by the recently-inaugurated Center for Research in

Islamic History, Arts, and Culture in Istanbul. The Centre for Libyan Studies in Tripoli, opened about two years ago, and the Centre for the Revival of the Arabic Scientific Heritage at Baghdad University, Iraq, both have parallel aims. A programme of higher studies has also been introduced at the Aleppo Institute under the auspices of departments for the history of the basic sciences, medical sciences, and applied science respectively. Diplomas of Higher Studies, Masters' and Doctors' degrees will be awarded by Aleppo University to students who successfully complete these courses.

A Committee of History of Arab Science has been formed in Paris, whose prime task is to co-ordinate the research being carried out at the above-mentioned institutes and to encourage co-operation among them through exchange visits of scholars and lecturers as well as the joint edition of manuscripts. The most recent innovation, however, is the creation of an Iraqi Chair of Arabic and Islamic Studies at Edinburgh University through a generous donation of £ 250,000 from the University of Baghdad. The terms of reference cover Arabic language and culture, Islamic history and religion, and the history of Arabic science and philosophy; but it is still hoped that, in due course, separate funding will become available to establish a specialist lecturing post in the last-mentioned field. These and other developments are reported in the Institute for the History of Arabic Science Newsletter and in the IUHPS/DHS Newsletter, both of which are printed and distributed on a quarterly basis in March, June, September, and December of each year. Anyone interested in receiving a copy of either of these publications should write to : The Director, Institute for the History of Arabic Science, University of Aleppo, Aleppo, Syria.

# Nitrogen Cycling in Ecosystems in Latin America and the Caribbean

The SCOPE/UNEP International Nitrogen Unit, in cooperation with MAB and the Centro Internacional de Agricultura Tropical (CIAT), is sponsoring the *Workshop on Nitrogen Cycling in Ecosystems in Latin America and the Caribbean*, to be held 16-21 March, 1981, at CIAT, Cali, Colombia. The objectives of the workshop are :

- 1) to increase awareness of the importance of the nitrogen cycle in ecosystems within the region,
- 2) to allow scientists working on nitrogen cycling in the region present papers describing on going research,
- 3) to compile available data for nitrogen budgets of the region's main ecosystems,

- 4) to identify gaps in our knowledge of the nitrogen cycles in these systems, and
- 5) to discuss research priorities.

This is the third and final regional workshop organized by the SCOPE/UNEP International Nitrogen Unit. The first, held in Nigeria in December, 1978, dealt with nitrogen cycling in West African Ecosystems, and the second, held in Thailand in November, 1979, considered nitrogen in wet monsoonal ecosystems of Southeast Asia.

For further information, contact Thomas Rosswall

SCOPE/UNEP International Nitrogen Unit,  
The Royal Swedish Academy of Sciences,  
S-104 05 Stockholm, Sweden.

## Zoological Record

To be published jointly by the  
Zoological Society of London and BIOSIS

The Zoological Society of London and BioSciences Information Service (BIOSIS) of Philadelphia U.S.A., have entered into an Agreement concerning the publication of the *Zoological Record*. The Society will continue to be responsible for editorial control and to appoint the Editor, while BIOSIS will take over management and finance with effect from Volume 115.

Published annually, the *Zoological Record* gives a detailed index to the zoological publications which have appeared world wide in the preceding year. At present, the 27 separate Sections which comprise each volume, index some 60,000 papers from 6,000 journals and a range of books.

The *Record* was founded by a group of zoologists associated with the Zoological Society of London and the British Museum, and the first volume covered the literature for 1864. The Zoological Society assumed complete responsibility for the *Record* in 1886, and has supported and published it ever since.

BioSciences Information Service publishes *Biological Abstracts*, *Biological Abstracts/RRM*

and a number of other special publications in the life sciences, which are distributed in print, microform and magnetic tape formats. It was founded, as *Biological Abstracts*, in 1926 by the United States National Academy of Sciences, the American Association for the Advancement of Science and the American Institute of Biological Sciences (UABS). Dedicated to advances in the collection and dissemination of biological information, it operates an advanced computer-based production system.

For several years the Zoological Society of London and BIOSIS have worked together on various projects for the *Record*. The new partnership will enable this co-operation to be extended to the benefit of the *Zoological Record* and those whom it is intended to serve.

Subscribers will be informed in due course of future arrangements regarding sales and distribution. Meantime, for further information please write to the Editor, *Zoological Record*, Zoological Society of London, Regent's Park, London. N.W.1. or the User Services Dept., BioSciences Information Service, 2100 Arch Street, Philadelphia, Pennsylvania, U.S.A.

# IUBS Executive Committee Meeting 27-19 october 1980.

The Executive Committee of the IUBS held its Annual Meeting at the Secretariat, 51 Boulevard de Montmorency, 75016 Paris, France on the 27th to 29th October 1980 and approved the budget and subventions for 1981.

It was decided to review the budget at the Officer's Meeting 27-28 April, 1981.

On the other hand, in order to facilitate the participation of the IUBS Executives in the UNESCO/MAB conference on "Ecology in Practice" that will take place on 22-29th September 1981, it was decided to convene the next IUBS Executive Committee Meeting from 29 September to 1 October 1980.

## IUBS BUDGET For 1981\* (In US \$)

### 1. INCOME

|                                    |         |         |
|------------------------------------|---------|---------|
| 1.1. National Member contributions | 150 000 |         |
| 1.2. ICSU/UNESCO Basic Allocation  | 9 600   |         |
| 1.3. Unesco Contracts              | **      |         |
| 1.4. Reimbursement of loans        | 6 000   |         |
| 1.5. Interests and Dividends       | 6 000   |         |
| 1.6. Income                        | 1 000   |         |
|                                    | <hr/>   |         |
|                                    |         | 172 600 |

### 2. EXPENDITURES

#### 2.1. Administration of the Union

|                                        |         |         |
|----------------------------------------|---------|---------|
| 2.1.1. Office of the President         | 1 000   |         |
| 2.1.2. Office of the Secretary General | 1 000   |         |
| 2.1.3. The Secretariat                 | 100 000 |         |
| 2.1.4. Audit Fees                      | 2 500   |         |
| 2.1.5. Bank charges                    | 700     |         |
|                                        | <hr/>   |         |
|                                        |         | 105 200 |

#### 2.2. Scientific Activities

|                                                                |        |        |
|----------------------------------------------------------------|--------|--------|
| 2.2.1. Travel expenses, officers                               | 8 000  |        |
| 2.2.2. Executive Committee Meeting                             | 16 000 |        |
| 2.2.3. Dues to other organizations                             | 6 000  |        |
| 2.2.4. Representation to other organizations                   | 10 000 |        |
| 2.2.5. Publications                                            | 9 000  |        |
| 2.2.6. Zoological Nomenclature                                 | 10 000 |        |
| 2.2.7. Scientific Activities for scientific members            | 7 000  |        |
| 2.2.8. Support to scientific meetings (either grants or loans) | 12 500 |        |
| 2.2.9. Special scientific projects                             | ***    |        |
|                                                                | <hr/>  |        |
|                                                                |        | 78 500 |

\* This budget will be reviewed at the IUBS officers meeting in 1981

\*\* UNESCO contracts to be negotiated for special projects.

\*\*\* To be decided later on according to UNESCO contracts.

# IUBS SUBVENTIONS For 1981 - 1982 (In US \$)

|                                                                                                                                                                                                                                                                                       |                          |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------|
| <b>1. Subventions to Scientific Activities of the IUBS Divisions, Sections and Commissions.</b>                                                                                                                                                                                       |                          |               |
| <b>1.1. Division of Botany and Mycology</b>                                                                                                                                                                                                                                           |                          |               |
| 1.1.1. Section of Paleobotany (IOP) M.C. Boulter                                                                                                                                                                                                                                      | 1 000                    |               |
| 1.1.2. Section of Plant Pathology (ISPP) - K. Verhoeff                                                                                                                                                                                                                                | 500                      |               |
| 1.1.3. Commission of Palynology (ICP) R. Jan de Chene                                                                                                                                                                                                                                 | 1 000                    |               |
| <b>1.2. Division of Cell and Developmental Biology</b>                                                                                                                                                                                                                                |                          |               |
| 1.2.1. Section of Developmental Biology (ISDB) A. Moscona                                                                                                                                                                                                                             | 1 500                    |               |
| 1.2.2. Section of Genetics (IGF) Sir O. Frankel                                                                                                                                                                                                                                       | 500                      |               |
| 1.2.3. Commission on Photobiology (AIP) L.O. Björn                                                                                                                                                                                                                                    | 1 000                    |               |
| <b>1.3. Division of Environmental Biology</b>                                                                                                                                                                                                                                         |                          |               |
| 1.3.1. Section of Human Biology (IAHB) D.F. Roberts                                                                                                                                                                                                                                   | 500                      |               |
| 1.3.2. Section of Oceanography (IABO) T.R. Parsons                                                                                                                                                                                                                                    | 1 000                    |               |
|                                                                                                                                                                                                                                                                                       | Subtotal \$              | 7 000         |
| <b>2. Subventions to Scientific Meetings</b>                                                                                                                                                                                                                                          |                          |               |
| <b>2.1. World Federation for Culture Collections (WFCC)</b><br>International Conference on Culture Collections, 1981                                                                                                                                                                  | 2 000                    |               |
| <b>2.2. Commission on Seed Technology (ISTA)</b><br>17th International Colloquium on Seed Pathology, 1981                                                                                                                                                                             | 2 000                    |               |
| <b>2.3. Plants and Daylight Spectrum</b>                                                                                                                                                                                                                                              | 1 000                    |               |
| <b>2.4. Light Mediated Plant Development</b>                                                                                                                                                                                                                                          | 1 000                    |               |
| <b>2.5. Course-Workshop - Developmental and Comparative Immunology</b><br>Mexico 1981.                                                                                                                                                                                                | 2 000                    |               |
| <b>2.6. VI International Congress of Protozoology</b> Warsaw, 1981                                                                                                                                                                                                                    | 2 000                    |               |
| <b>2.7. IVth Symposium on Photophysical photochemical processes in Biological systems,</b> Calcutta 1981.                                                                                                                                                                             | 2 500                    |               |
|                                                                                                                                                                                                                                                                                       | Subtotal \$              | 12 500        |
| <b>3. Special Scientific Projects*</b>                                                                                                                                                                                                                                                |                          |               |
| <b>3.1. Commission for Biological Education (UNESCO)</b>                                                                                                                                                                                                                              | 7 500                    |               |
| <b>3.2. Section of Developmental Biology</b><br>Teaching and Research in Developmental Biology in Afro Asian Countries (UNESCO/COSTED)                                                                                                                                                | 10 000                   |               |
| <b>3.3. Symposium on Human Biology in Natural Development</b><br>India 1981 (WHO/CIOMS)                                                                                                                                                                                               | 4 000                    |               |
| <b>3.4. IUBS participation to MAB International Conference (UNESCO)</b>                                                                                                                                                                                                               | 20 000                   |               |
| <b>3.5. Workshop on the Use of Modern Techniques of Molecular Biology (UNESCO)</b>                                                                                                                                                                                                    | 5 000                    |               |
| <b>3.6. IUBS projects on Medicinal Plants (UNESCO/WHO/FAO)</b>                                                                                                                                                                                                                        | 5 000                    |               |
| <b>3.7. Biology International (UNESCO)</b>                                                                                                                                                                                                                                            | 8 000                    |               |
| <b>3.8. Young Scientists (IFS)</b>                                                                                                                                                                                                                                                    | 5 000                    |               |
|                                                                                                                                                                                                                                                                                       | Subtotal \$              | 64 500        |
| <b>4. Sponsorship of Scientific Meetings</b>                                                                                                                                                                                                                                          |                          |               |
| <b>4.1. International Conference on Chemistry and World Food Supplies, 1982.</b><br>Cosponsor with CHEMRAWN (Prof. Rossiter)                                                                                                                                                          |                          |               |
| <b>4.2. IUBS Symposium on Toxins and Lectins</b><br>South Africa 26-28 July 1982, Pretoria (Mrs. Du Plessis)                                                                                                                                                                          |                          |               |
| <b>4.3. 8th Congress of the International Society for Human and Animal Mycology,</b><br>February 1982.<br>A.W.F. Thynne. Ex. Off. Royal Society of New Zealand<br>Dr. M. Baxter Dept. of Veterinary Pathology and Public<br>Health, Massey University, Palmerston North, New Zealand. |                          |               |
| <b>4.4. Symposium on Arctic Charr - Canada</b>                                                                                                                                                                                                                                        |                          |               |
| <b>5. XXI General Assembly IUBS Canada 1982</b>                                                                                                                                                                                                                                       |                          | 5 000         |
|                                                                                                                                                                                                                                                                                       | <b>Grand Total US \$</b> | <b>89 000</b> |

\* These projects have priority as concerns the additional funds IUBS will negotiate with the intergovernmental organizations mentioned.

# PUBLICATIONS REVIEW

## **MICROBIAL ECOLOGY OF FOODS, FACTORS AFFECTING LIFE AND DEATH OF MICROORGANISMS (Vol. 1).**

Academic Press 1980 (332 pages).

*Microbial Ecology of Foods* prepared by the International Commission on Microbiological Specifications for Foods is meant to be a source of information for those who must interpret the results of microbiological analyses conducted on foods.

This volume, dealing with factors effecting the growth and death of microorganisms, encompasses the environmental factors that affect microorganisms in foods. Special chapters treat the effects of cell injury on survival and recovery of microorganisms in food and the metabolic aspects of mixed populations. The treatment accorded to each of these factors includes methods of measurement, control measures and interrelationships with other factors.

## **INTEGRATED CONTROL IN GLASSHOUSES**

West Palearctic regional section bulletin of the IUBS section of Biological control (257 pages).

This bulletin contains the papers presented at the 4th Meeting of the Working group "Integrated control in glasshouses" 12-15 June 1979 at Vantaa (Finland).

Most of the papers mainly relate to biological control in glasshouses with a special attention to factors that limit the application of biological control.

## **CLASSIFICATION OF NOMENCLATURE OF VIRUSES**

The 3rd report of the International Committee on Taxonomy of Viruses ICTV edited by R.E.F. Mathews, Auckland, published by S. Karger, 1979 (160 pages).

The main section of this report summarizes the state of approved virus nomenclature and taxonomy as it was following the plenary meeting of the ICTV at the Hague in September 1978. There are now fifty approved families or groups of viruses. In addition three proposed families are included: The data on the viruses, the list of member viruses and the literature references have been updated.

## **PLANTS FOR MEDICINAL USES WITH SPECIAL REFERENCE TO ARID ZONES**

July 1979 (pages 118 to 178) Prepared by E.S. Ayensu.

It is part of the Arid land plant resources, the Proceedings of the international Arid Land Conference on Plant Resources, Texas Tech University.

This paper offers suggestions for the discovery of new medicinal plants that could be of help in the international efforts to supply better medical care for the world's population by the year 2000.

A list of (about 400) arid zone species for medicinal uses is given with indications on the area life forms, chemical constituents and uses.

## **TROPICAL FOREST ECOSYSTEMS**

Published by UNESCO/UNEP/FAO 1978 (683 pages).

Prepared by UNESCO in cooperation with UNEP and FAO. This state-of-knowledge report on tropical forest ecosystem aims to provide better guidance to research what is vital for the satisfactory management of tropical subtropical ecosystems, and to contribute to the training of specialists in the various scientific fields involved. The report attempts to summarize the results of research undertaken over the past two decades, to point out gaps in knowledge and to sketch out the lines of future research.

## **METHODOLOGICAL STUDIES IN ENVIRONMENTAL EDUCATION**

Edited by M. Numata.

Chiba University, Japan, 1980 (54 pages).

This volume deals with environmental problems in the 1960s and with environmental education in primary schools and at the University level in Japan.

## **REGULATION OF DEVELOPMENTAL PROCESSES IN PLANTS**

Edited by H.R. Schutte and D. Gross 1978, VEB Gustav Fischer Verlag, Jena.

The proceedings of the international conference on Regulation of Developmental processes in plants held in Halle (DDR) 4-9 July, 1977; Contains four main parts devoted to the protein pattern and regulation of differentiation, to the regulation of organelle biogenesis, to the regulation of differentiation in cell and tissue cultures and to the regulation of development by interactions of plant hormones or other growth substances.

## **DATA HANDLING FOR SCIENCE AND TECHNOLOGY: AN OVERVIEW AND SOURCEBOOK**

1980 (184 pages) North Holland Publishing company, Amsterdam, New York, Oxford) edited by D.G. Watson and S.A. Rossmassler.

Data generation, treatment of data in the Biosciences, Treatment of observational data in the geosciences: estimation and approximation of data, analysis and interpretation of data, presentation of data in the primary literature, compilation and evaluation of data, standards and guidelines for data, use of computers in handling of laboratory data, National and international data programs, the Unesco general Information Programme, UNISIST programme activities and CODATA and CODATA conferences. This book will prove an invaluable tool to anyone interested in scientific data.