Contents (N° 12, 1985)

1. Editor’s Note

FEATURE ARTICLES
2. «Unity of Biology»
by F.B. Straub
5. «The Decade of the Tropics: Some Remarks on the Initial Programme Design»
by H.A. Mooney
7. «The Programme TROPENBOS for Tropical Forest Research Stimulation»
by R.A.A. Oldeman
11. «Peculiarities of Fish Reproduction in Reservoirs of Different Latitudes»
by B.V. Koshelev

IUBS NEWS
12. Resolutions and Ad Hoc Committees Reports Adopted by the IUBS XXIIInd General Assembly
17. IIIrd International Congress of Systematic and Evolutionary Biology
18. Report of the Ad Hoc Committee on Biological Nomenclature
20. International Commission on Zoological Nomenclature
21. Global Connections in Ecological Theory and Practice
22. Publications Review
24. Call for Proposals to House the World Data Centre for Collections of Microorganisms of the World Federation for Culture Collections
25. Calendar of Meetings
EDITOR’S NOTE

The 22nd General Assembly of the International Union of Biological Sciences was concluded on 7 September, 1985, in Budapest, Hungary, and at this time we would like to convey the general impression of which the participants of this Assembly were left; a mixture of a deep appreciation of the work already accomplished by the Union since the last General Assembly in Ottawa, with an anxious optimism for the future tasks which shall present enormous challenges to the IUBS.

At the Assembly, models of complex behaviour were presented, tropical biology and the pressing needs of those regions were given special attention by delegates, as was the topic of how to best use biological material to monitor the pollution and environmental change. Other topics considered by the Assembly were biological education, research on fertility, taxonomy, and study of the inorganic constitution of the biosphere.

The IUBS main duties, as was felt by the Assembly, are twofold:

— first, towards its scientific membership, to reflect the unity of biology in promoting the collaboration between the various biological disciplines, and the development of intersectional and interdisciplinary cooperative scientific programmes;

— and second, to cooperate with national and international development agencies and organisations, in providing innovative approaches and intellectual insights which can help in putting biological sciences at the service of humankind well being.

In presenting in this issue of Biology International the resolutions of the Budapest General Assembly together with some of the major topics dealt with at this meeting, we would like to share with the world biologists the concerns and hopes expressed by the IUBS, and we look forward to the contribution of the Union’s Members in this endeavour.
Unity of Biology

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Fifty years ago, as a medical student I started to do research work in biochemistry and used to go to the weekly scientific meetings of the medical faculty. Clinicians and physiologists gave seminars about their current research, morphologists have presented their results on microscopic histology, we, as biochemists described our work on the mechanism of tissue respiration. Whether good or bad, the new results described in these seminars may have been interesting in themselves, but they did not mean very much for others working in different disciplines in the sense that no connections were recognized between the results of morphologists, physiologists or biochemists. As biochemists we were not aware whether the structure of the muscle cell has any relevance to our findings. At that time, indeed, the situation could be well illustrated by the story, when a couple of men stand around an elephant in the dark, each touching with his fingers a restricted area of the animal, the trunk, the tail or the ear, describing those different parts, not even realizing whether they are standing around the same animal.

It was indeed a time, when morphology, darwinism, Mendel's laws, physiology, biochemistry, pharmacology, nutrition and pathology were separate disciplines yet people did believe that one day it will turn out that they are studying the different facets of the same problem. Perhaps it was the reflection of this belief that at the international forum there was only a single international union of physiology which embraced not only, physiology, but biochemistry, nutrition, immunology, pharmacology and pathology as well. This situation started to change by the end of the 1930-s when in a number of cases the relation between structure and function became evident. The rapid development of methods, the new concepts of molecular biology, the advance of medical biology and genetics have given rise to many interconnections between the formerly unconnected disciplines. Indeed, it is hard to find nowadays a problem in experimental biology, which does not involve advanced knowledge of ultrastructure, of cell structure, of genetics and physiology. On the other hand, I believe it is just as difficult to find a problem in ecology, which does not involve knowledge of physiology, genetics, soil composition and climate, food chain etc. Curiously enough, at the same time international scientific organisation underwent a splintering of international biological unions. However, I am not talking now about science organization at the national or international level.

Rather, I am wondering, where this growing interdisciplinary nature of biological research is leading, whether biology will become a unified science like physics and chemistry or not. I believe that the answer to this question may be very important in deciding about the aims of future research projects. At present there are many biologists who lean towards the view that biology is reducible to the laws of physics and chemistry laws, some people even talk about electronbiology, and there are on the other side many who believe that reductionism is neither practical nor possible, as the essential theories of biology, yet to be discovered, are such laws of nature which are rather independent of the undoubtedly underlying physical and chemical laws of the matter.

Before going on, let me first address myself to a charge brought up against biologists, the charge that explanations of biologists are often tainted with teleology and therefore cannot be accepted as scientific statements. I believe no biologist can be found who would hold the view of Dr Pangloss that the human nose and the earlobes have grown to the present form and size in order to hold our spectacles. It is true, many times biologists are using teleological terminology. For instance the discovery of the introns within DNA in eukaryotes and the absence of introns in prokaryotes has led to the explanation that the introns were lost during evolution from prokaryotes in order to allow them a much faster growth and a shorter reproduction time. I am convinced that such and similar statements are only a kind of shorthand description of facts, that evolution has arrived at this difference between eukaryotes and prokaryotes for some — maybe for a series of different — unknown adaptive advantage, according to their different way of life. Such and similar teleological formulations therefore do not imply goal orientedness of biological objects, they are rather anthropomorph guesses, referring to probable facts of evolution. For this reason I would not accept as a valid basis for or against the assumption of a difference between the laws of physics and biology the fact
that biology contains many such apparently teleological statements.

Turning now to the reductionist view, this holds that all phenomena of biology starting from metabolism, motility, genetic variability right up to the interpretation of the feeling of boredom of an audience during a lecture on some philosophical aspects of a science, these all can or have to be explained by the physical and chemical laws of matter by the molecular and macromolecular structure, catalysis, ion-flux etc. Admittedly, very great advances have been achieved in understanding how the molecular and macromolecular structure gives us adequate ground to be able to describe a number of different functions, like the transmission of genetic properties and its variability, transmission of nerve impulse, its inhibition and facilitation. With the advance of wonderful new methods it became possible to describe primary, secondary and tertiary structure of enzymes and relate these data with enzyme function even the intramolecular dynamic properties of an enzyme can be described nowadays during its binding of a substrate and the splitting of the substrate. The structure-function relation has achieved much recognition, because of its predictive success. Indeed the structural research has gone so far that many structural information are now looking for a proper function, which is yet unknown. This is just the reverse of the earlier situation, when functions were known, but the underlying structure unknown. Now we can rightly hope for example that the study of chromatin structure will soon explain for us the mode of regulation in gene expression.

However it is not at all sure that such results of the reductionist approach can be applied to higher levels of organisation; for example the research on Aplysia, in which the short term memory and the long term memory can be associated with some phosphorylation reactions in which cyclic AMP is involved. In our laboratory we are doing similar research using as a method the comparison of the wild strain Drosophila with a derived mutant strain of dumb Drosophila. One can find that the addition of caffeine makes the wild type Drosophila protein phosphorylation become similar to the dumb one. This should not discourage us from using the coffee-break as a stimulant. The point I want to make is that the same biological phenomenon, a function may come about based on several different molecular mechanism. As another example I may mention a research done by one of my Hungarian Colleagues. He finds that frost resistance of plants can be changed by spraying the plants with some lipid metabolites, which change the transition temperature of the membrane lipids. However, different species of plants have different lipid composition and different genetic make up of being able to change their lipid content according to ambient temperature. Again no simple generalization can be made.

So, I think reductionism has to face the fact that a biological phenomenon, no matter how much it appears to be a well defined one, may rest on different structural and genetic basis, therefore one suspects that we do not have a simple straightforward connection between a given phenomenon and the underlying structure and metabolism. Philosophers talk about a concept, supervenience. A property, a biological function is supervenient on the structure on which it is based. As an example, one can cite a concept, like a power station, producing electricity. A wind mill, a hydroelectric plant, an atomic power-plant or a biogas plant have different structures, different modes of operation, different environmental costs, yet the supervenient concept, that of being a device producing electricity is common to all of them. In the same way, the functioning of the wings of a butterfly, a bird or a bat is supervenient, a biological property which has no common structure in the real sense, no similarity in evolution.

Hardboiled reductionists may think that whatever we can not explain by reducing the phenomena to the physical and chemical make up of the biological objects, is only due to a temporary lack of our knowledge. Not being yet able to explain them is — accordingly — only due to the complexity of even the simplest biological object. I suspect, however, that complexity is not the real answer. Undoubtedly, during the past several decades, our knowledge has grown in an admirable way, but to me this fact suggests that we are still at the beginning of biological sciences, however proud we are of our achievements. Nevertheless, reductionism may never be able to overcome the problem of supervenience. This is a word of caution, not to generalize from simple structure-function relations and conclude that the same biological phenomenon is always reducible to the same physical and chemical structure. How does all this relate to the unity of biological sciences?

Let us see first the other side. For the last twenty years biologists are answering a new challenge. Whereas molecular biology appears to me to be an answer for the demand of our contemporaries, how to devise new psychotropic drugs, how to understand and control cancer, circulatory diseases and others, how to improve food production and so on, the new challenge of understanding how modern man is destroying his environments, is rather a concern of our grandchildren and coming generations. At a time, when fossil fuels are burned a thousand times faster than they have accumulated, when air, soil, water, forests and
genes are fast polluted and destroyed, it is for biology to answer, how this can be prevented. The answer would be if we would know the laws of ecology. At this level of biological sciences we haven’t any other generalized law, but the Darwinian theory of natural selection combined with Mendelian genetics. It appears, that in a number of biological subdisciplines, such as ecology, embryology, behavioral biology there is no hope of obtaining other laws that have the required universality, generality and exceptionlessness. According to a modern philosophical treatise by the philosopher Alexander Rosenberg, each of these disciplines has to be regarded as case-study oriented research programmes. The reason lies in the subject matter itself, the phenomena which are studied at the supra individual level are spatio-temporally unique cases, the interacting species have each their separate local evolutionary history, determined by different environmental conditions and these conditions too have their own history.

If there cannot be general laws about species or about groups of species, then why pursue the case studies of them? There is a very good reason to do so; to obtain implementable knowledge about this biosphere that can have a pay off in the short-term control of the environment. This need will only be met by the case studies to which biology now devotes its attention.

The foregoing argument of the philosopher may correctly describe the present situation, the present practice. I am, however convinced that case studies will bring about first empirical relations and then the basis of this relation can be found. I had one experience in the past few years, when scientific advice was sought how to deal with the increasing eutrophication of our famous health resort, lake Balaton. This is a shallow lake of an average depth of 10 feet and a surface of about 700 square kilometers. Our senior hydrobiologist Olga Sebestyén has shown already fifty years ago the beginning of eutrophication. Not much was done about it until 15 years ago when with intensified agriculture, intensified tourism the situation started to become critical. Decisions needed diagnosis, hydrologists and hydrobiologists offering conflicting views. With some outside help, the hydrobiologists won the case and based on knowledge gained abroad measures were taken to reduce the load of phosphorus. We hope we shall be able to contain eutrophication and in this way a costly case study can be added to the experience obtained elsewhere. The individual case of Balaton adds hitherto missing experience of a shallow lake.

While eutrophy was previously a qualitative statement, it can now be expressed in quantitative terms. Moreover, if such case-studies are compared, the changes on the food chain can in future be correlated with the process and the control of eutrophication. I mention this case study to indicate that I believe case studies may and should be connected with studying the underlying hierarchical level. In this case eutrophication is supervenient on the dynamics of the food chain. As in the case of molecular biology we can relate the lipid content of the membrane with the ability of the membrane to adapt to ambient temperature, so also in ecology, behavioral physiology, embryology and other disciplines of biology the biological phenomena can be studied in relation to the underlying hierarchical level of organisation. A simple reduction will not be possible, but case studies will provide an insight and later a formulation of the laws both at the higher and the lower levels of the hierarchy. Ultimately I wanted to express my belief that biology cannot be split in two, that case studies are only an intermediate step in the development of the biological sciences.
If there was ever a time to mount a major research effort for the study of the tropics it is now. Over the past years there has been a remarkable amount of interest and attention focused on the problems associated with the "development" of tropical landscapes. The issues which have received the most attention are the losses of diversity, the losses of productive capacity, and the possible large-scale alterations of climate through a series of complex interactions involving alterations of radiative, water, and CO₂ balances.

Thus the timing of a global programme for the study of tropical systems from a biological perspective could not be better. This International Union of Biological Sciences programme on the Decade of the Tropics has enormous potential because the needs are urgent and the timing is correct.

I have been asked to be one of a number of reviewers of the programme. The time allotted for this is limited so my remarks will not deal with the specific details of any particular subproject but rather will give an overview.

The 1983 document on the Decade of the Tropics by O.T. Solbrig and F. B. Golley is an excellent statement of the need for the programme as well as a listing of programme research priorities. Few would argue on the value of the objectives given. In viewing later documents it can be seen that many of the themes listed have been developed into actual programmes whereas others evidently have not and, I assume, will not be pursued (e.g. weed control in tropical agriculture).

There is no indication in the 1983 document exactly how the programme will be co-ordinated except to note that the secretariat will oversee the network. How the various subprojects would be co-ordinated or inter-related is not specified nor is information given regarding the desirability and function of a co-ordinating committee. I will return to this later.

The DOT as currently configured is certainly addressing two of the three major tropical research themes mentioned above head on: losses in productivity and losses in diversity.

I. Soil programme

The Soil Biological Processes and Tropical Soil Fertility programme as described is in my estimation a model for doing international research on any topic as well as being directed right to the heart of a central problem in tropical landscapes — the potential loss of productive capacity. The programme has many features which appeal to me.

1) The leadership is strong and has a clear vision of the research priorities and of the ways to accomplish them. A first rate co-ordinating committee with considerable experience in international science as well as the research area has been appointed. An equally strong scientific advisory committee has been appointed and they have clearly defined responsibilities.

2) Preparation for the initiation of the programme has been excellent. Wide circulation of a preliminary project report with an invitation for programme participation evidently prompted considerable enthusiasm and has provided the beginnings of a research network. Thus the relevant research community has been informed. The larger science community has not however learned too much about this programme or of DOT in general... more on this later.

3) The objectives of the programme are important and are clearly defined: developing techniques to enhance fertility of tropical soils through biological manipulations.

4) The programme to achieve these objectives is cleverly designed to achieve new basic as well as applied information. It compares processes in natural as well as agriculture systems and thus it has a control for determining the impact of agriculture on natural soil productivity. A programme of this type should attract basic as well as applied scientists and ecologists, soil scientists as well as agriculturists.

5) Although the programme is designed to provide answers to the question posed above it also has a strong training component, both for students as well as managers.

6) The actual research programme would test three central principles relating to soil fertility.
Tests for these hypotheses are elegantly simple although the specific research plan is not yet developed.

7) A world network, which would include programme centers, is beginning to take form which would interact with centralized analytical services. Uniform analytical techniques as well as experimental designs would be accomplished through a handbook developed for the programme.

8) Small seed grants to the network facilities is envisioned to bring the project to reality.

9) The project is seeking from the start to interact with other world organizations dealing with soils and tropical agriculture. In my view this programme cannot help but succeed if the plans already in place are achieved and if the same level of organizational intensity is maintained.

II. Diversity programme

As noted earlier one of the issues receiving considerable attention in the general press is the loss of biotic diversity in general and of the tropics specifically. A central question related to the loss of diversity is what does the loss mean to biosphere functioning and human welfare. The latest workshop report from this programme gives excellent lists of the “benefits” of diversity. Many of these benefits however have not been rigorously demonstrated and are subject to some doubt by many scientists. A challenge then to this programme is to provide such evidence in a convincing manner.

However the main thrust of most of the programme statement is related to understanding the causes of diversity rather than on its biospheric significance. Granted the two are related however surely the emphasis should shift to the latter since this will provide the necessary information on the significance of diversity to human welfare. This information is needed and needed quickly because of the rapid rate of species losses.

This criticism is a fundamental one and needs further discussion. This is not to say that there is no discussion of the significance of diversity in the programme document but rather this area is secondary to the discussion of the causes of diversity, an area which is very difficult to resolve and which is not of great practical importance even if it were approachable.

The actual research plan is not given but then maybe this was not intended at this time. All that is mentioned are vague statements regarding information systems and data management.

This area is certainly a vital component of the Decade of the Tropics programme and certainly requires more detailed discussion among scientists working on these problems worldwide.

III. Tropical Mountain programme

The central themes identified in this programme are very broad and encompass land use, culture, geographic patterns, productivity, and evolutionary processes. Sites have been identified where work is presently in progress or where it has gone on in the past. Ten such sites have been identified worldwide. Yearly conferences, rotating among these sites is planned. No structure other than this is planned. In essence then progress will be implemented by mutual support of groups identified within the programme. This model has worked with other international working groups (e.g. mediterranean ecologists).

The programme structure which now exists is flexible since in essence it is reviewed yearly, but at the cost of being somewhat diffuse. This programme vagueness (every group doing its own thing within broad guidelines) may make it difficult to generate international support (versus local support) and further it may not attract new and outside talent to the programme. Further discussion should be made on the desirability of a more focused and co-ordinated programme now that the programme is initiated.

Overall Assessment

This is a timely and important programme which is still in its developmental stages. Some parts are near the operational point and are clearly focussed and well organized. Others are obviously still struggling. The co-ordination among programmes appears minimal, maybe to the point of the detriment of the programme as a whole. The total programme has not benefitted greatly from outside support and council because it is not well known within the world biological community as a whole.

The programme deserves the strong support of all of us. It is asking the right questions at the right time. A failure to realize fully the programme objectives may truly be an opportunity lost forever as well as reflecting poorly on the capacity of biologists to accomplish integrated, international science. Further, it has preempted other efforts in tropical biology during this crucial period, thus it must succeed.
The Programme “TROPENBOS” for Tropical Forest Research Stimulation
by Roelof A. A. Oldeman
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A Minister of Scientific Research in Ivory Coast once defined the results expected from research, as a basis for national policy. The results should bring new knowledge and insights. They should also be in a form to be taught. Finally, they should be applicable in some useful field of human endeavour. Formulated in the 1960’s, these requirements were visionary. In the 1980’s, flooded by ever-increasing streams of new information, they have become nearly self-evident as directives for keeping science healthy and balanced.

Deforestation in the humid Tropics and the complex field of problems linked to it have been brought to the attention of the world in many national and international fora and in the media. During the last ten years, more and more tropical biologists have manifested their wish to contribute to the solution of these problems with their knowledge and their scientific activities. The book by Jacobs (1981, now being rewritten into English) and the last 40 pages of the proceedings of the Leeds Symposium (Sutton et al., 1983) are examples of this trend. At first, this has lead to controversies between biologists and foresters, the latter ones considering themselves responsible for the design and implementation of tropical forest management. More recently, however, there are positive signs of the two groups closing ranks and tackling problems together. A united group of cooperating biologists and foresters has the potential to organize research according to the criteria mentioned above : new knowledge, communication by teaching, and application in the diagnosis, design and implementation of forest management systems.

In 1981, such an interdisciplinary group of biologists, sociologists and foresters met with numerous representatives of private enterprise, public servants and politicians in Utrecht (the Netherlands). As one result of this symposium, the Director General for Scientific Research of the Ministry of Education and Science in the Hague took the initiative to reconnoiter the possibilities of stimulating research relevant to tropical rainforests, their conservation and their sustained use. Later, a “preparation group” was asked to prepare a plan for such a stimulation programme and in April 1986 this plan was presented to the Director General. Cofinancing by several Dutch ministries is now being negotiated. The plan has been brought to the attention of the media and has been extensively covered in the national press and T.V. Public awareness is rising, and by no means in the Netherlands alone, of the urgency to improve the world’s forest situation and that of the humid tropics in particular. There also seems to be wide acceptance of the idea that research should shape the base for efficient action and that feedback between research and management is the cornerstone for improvement.

The birth of TROPENBOS has been described in some detail, because it illustrates some facts which are of considerable importance for the “Decade of the Tropics”. Next to it being evident that the times are ripe for tropical rain forest research because many people do not only accept but welcome it, it also is clear that the days of the narrow specialism are gone. Biological research now has to be part of a scientific web. The threads that sustain it lead to endeavours such as agriculture and forestry, soil and water science, economics and social sciences. Moreover, given the interdependence of forest problems, no study can remain geographically isolated any more, and this leads to the conclusion that networks, spread through many countries, are desirable to enhance the value of science.

Interdisciplinary and network studies are becoming fashionable nowadays. It therefore may seem that it is no innovation any longer to build a programme on this basis. Together with the ideas on communication of results (teaching) and blending basic and applied research, however, a programme with new features can emerge. It is a good deal more difficult to build interdisciplinary teams with lifelong specialists, and networks with large prestigious laboratories, than it is to design and implement a small network with young researchers and small research stations. If large organisations and experienced researchers indeed are serious in their wish to establish interdisciplinary research and geographical networks, they will support a small new enterprise. This is what happened in the Netherlands with TROPENBOS : 36 scientific institutions and University departments stand at its cradle, representing about 150 researchers, technicians and students. They
have been consulted frequently, and most of their ideas have been woven into the design, next to the ideas of the many persons that were consulted in the tropics.

Outline of the programme

TROPENBOS concerns interaction between humans and tropical forests. The interdisciplinary studies included in the programme hence should lead to the correct diagnosis of a forest and its land resource, as a basis for the design of systems for sustained conservation and use of forest and forest land. Land use planning and land use systems represent two different integration levels, i.e. the landscape and its elements, which are basic for this approach. They are the first steps in a sequence of research project clusters:

1 - Resource mapping of a forested region of approximately 1 to 2 millions of hectares.

This system, as studied, is mainly determined by geomorphological, hydrological and soil factors. It can most often be divided in subsystems, such as drainage basins, which in their turn are composed of smaller subsystems, e.g. catenas. On steeply divided terrain, very fragmented site units may exist. Hypotheses to be tested may be of the following kind:

- Vegetation patterns on remote sensing images are symptoms for the diagnosis of equiproductive landscape units.
- Vegetation patterns on remote sensing images are symptoms for the diagnosis of classes of species richness or diversity.

Of course, the verification of such hypotheses depends on "ground truth", which is to be assessed more precisely in stage 3 of the sequence. In the meantime, there is much existing knowledge which will lead to stage 2. Pattern recognition and analysis is the main methodological aspect of step 1.

2 - First delimitation of potential land use units, areas of some 10 000 to 100 000 ha.

This step of the research sequence has to rest heavily on existing knowledge, but it is indispensable for the selection of priority zones in stage 3. Such zones as can be attributed, with a probability approaching certitude, to more or less intensive agriculture or plantations will not be studied in detail in stage 3. They concern research institutions involved with non-forest land use. An exception to this rule may be made if such zones contain a particular and valuable rainforest type, which would disappear if the entire zone were given over to intensive land use forms. In this case, particular attention should be given to the possibilities to establish forest reserves - and this anticipates of course on stage 4 of the sequence.

The hypotheses to be evaluated globally in stage 2 would be of the following type:

- In zone x, prevalent land use should be agriculture.
- Zone y would be eminently suited for a forest reserve with a support zone.

Again, the verification of these hypotheses by the explanation of patterns, processes and species compositions, is only to be expected from combination of stages 3 and 4. It has to be mentioned that stage 2 implies a socio-economic hypothesis, to wit "stable land use patterns can be established". In this stage, national policies on land use in the studied region will be provisionally taken as proof of this hypothesis.

3 - Diagnosis of structure, processes and species composition on sites being representative for potential land use units, and covering 1 to 100 ha each.

Systems of this size are the living systems called "forest". At this scale, pattern and process of forest regeneration and succession will be closely studied, selecting key structures and processes for priority rating. Selection criteria will have to be developed; roughly they concern those patterns, processes and species (groups) that constitute vital links holding together the ecosystems. Anticipating on stage 4, usefulnes of forest plants and animals will be taken into consideration. Hypotheses to be tested are exemplified by the following ones:

- Succession from pioneers to late pioneers depends more on microflora than on trees.
- The presence of species z, useful for resin production, is proportional to the number of canopy gaps with diameter p in forest with a height q.
- For the complete ecosystem to be preserved, the surface of the territory of animal NM has to be contained y times in one forest reserve.
- If the mean size of regeneration units on site Q attains value c, both nutrient turnover and biomass production become maximal.
- The low species diversity on site g is due to fast forest dynamics caused by frequent violent winds.

As may be seen, an ongoing effort in plant and animal taxonomy, also on the subspecific level, will be indispensable as a support for this research stage. This stage is indeed interdisciplinary, if one realises that every "site" mentioned represents hydrological, meteorological and soil conditions to be studied. The aim again is diagnostic: if one hypothesis is proven, easy symptoms should be found to determine the state of structures, processes or species as indicators for ecosystem state. Proven statements are sought, such as "if all big trees show dead branches in between one
third and two thirds of the total height, the forest is losing vitality”.

4 - Socio-economic testing of the economic and social environment on the location.

In stage 2, land use policy of the country owning the site is used to pinpoint land use zones on the resource maps. Without changing this policy, which is not the task of researchers, the real systems of land use are considered in stage 4 because this is of the utmost importance to achieve harmony with the local inhabitants. Without this harmony, no land use system can be sustained, because people do not maintain what they do not accept. Fortunately, most principles of land use such as agroforestry, agriculture or forestry, can be conceived in thousands of different systems. Examples of hypotheses to be tested might be:

- The inhabitants of village cluster w are ready to change 50 % of their traditional crops against new crops.
- Clearcutting practices will lead to permanent disappearance of the forest on the surfaces concerned and incorporation of these surfaces in pasture land belonging to ethnic group Z.

As far as such studies do not exist at all at a given site, it may be necessary to include them in an earlier research stage, for instance to guide the choice of parameters and variables to be studied in stage 3.

5 - Design of land use systems, particularly for conservation, forestry and agroforestry.

The earlier stages will have to provide the answer to the question: who is the designer, who is the client? For rapid introduction of new or improved land use systems, participation of the rural population in the designing activities would be an advantage, but this certainly differs from system to system and from region to region. The design stage should rest on the integration of proven knowledge obtained during the former research stages. No examples of hypotheses are given here, because the more hypotheses remain at this stage, the weaker the design will be. The other way round, the more solid the basic knowledge acquired earlier, the better will be the designed land use system. In fact, stage 5 will be the proof of the pudding. One of the TROPENBOS aims is to blend basic and applied studies and the success of the ultimate design is indicative for the scientific success. However, a first design never is perfect, and monitoring systems hence should be built into the design itself so as to obtain feedback between ongoing research and continuing system improvement.

Organisation and implementation

Given the fact that tropical rainforests are very different from continent to continent, and that the whole research sequence will be very different in locations with human population pressure being higher or lower, the minimum size of the network covers six locations:

**Tropical Africa**:
- Tai, Ivory Coast (high population pressure)
- Makokou, Gabon (lower population pressure)

**Tropical Asia**:
- Kerinci, Sumatra, Indonesia (lower population pressure)
- East Kalimantan, Indonesia (higher population pressure)

**Tropical America**:
- Araracuara, Colombia (low population pressure)
- Tapajos/Belterra, Brazil (planned high population pressure)

Four years of stimulation funding by TROPENBOS should contribute to the development of fully fledged national institutions at those sites, with independent financing obtained during the TROPENBOS-period. Whether this aim is fulfilled or not will largely depend on the results obtained during this stage. In agreement with the principles outlined in the introduction, these results should be the following ones:

a) A methodology to gather and process vital information. TROPENBOS aims at a blending of “basic” and “applied” research, because this distinction often has proved to be unproductive or counterproductive. Vital information is all information that human beings need in order to live a life which is worthy of humans and hence surpasses biological needs. In the case of TROPENBOS this is all information which is indispensable to understand, conserve and use tropical forests in an optimal way. A general framework of basic information for all locations (stages 1 and 2) should ensure that TROPENBOS remains able to communicate and compare results among different locations with their national programmes.

b) Fast work is important, because in many parts of the world deforestation is accelerating. There is no more time to keep forests under observation during decades, unless there are possibilities for a fast diagnosis and an efficient design for management and site conservation in the first place. With the research sequence described above, executed in sequence or in parallel, symptoms, explanations and diagnosis should be rapidly forthcoming.

c) Results should have a form which is easily communicated to a large public. Therefore, priorities have been shifted in the policy of
publications. Of course, all of these have to be scientifically solid. But they have to lead to a loose-leaved tropical forest encyclopedia, each researcher contributing one page per month, to poster papers, to handbooks. The usual articles and books in abstract terms will be required, but as a communication tool between scientists only.

d) The improvement of human capability to deal with tropical forest research and tropical forest problems also is one of the results to be coveted. The researchers belonging to the initial teams will be briefed through a reading programme and technical courses, aiming at increased interdisciplinary and practical abilities. Researchers should understand all issues, not only their special subject. Moreover, an active policy will be pursued for the funding of fellowships and exchanges between sites and universities for all implied scientific personnel and students of the cooperating countries.

e) Concrete results, in the form of reforested pilot areas, experimental forest management units, established agroforestry systems or National Parks and other visible endeavours are aimed at, wherever the situation and the research are ready for it. Because the first two research stages are oriented according to national tropical land-use policies in the countries owning the forest location, such concrete results are to give visible form to these policies. Hence they can differ considerably from one TROPENBOS-site to another.

f) New research technology is a result urgently needed. Too many objects of research are difficult and expensive to reach for the observer. Examples are the forest canopy, the rhizosphere and the genetic patterns. Still, in such compartments essential regulation mechanisms of forest life are hidden. The design and implementation of new, cheap and easy instruments for information gathering and processing therefore is included in the aims having priority.

The objectives mentioned above may seem ambitious for a small network, sponsored by a small country. It is thought that the secret of success is to consider these aims not as ambitions, but just as a sign that TROPENBOS knows what it wants to contribute to. Starting small, and seeking cooperation with other, larger and smaller institutions elsewhere in and outside the tropics, it is hoped that a set of meaningful activities may be stimulated and added to everything that is already being done in this field of study. TROPENBOS, if all goes well, will start around the end of 1985. Communication is deemed essential: all comments are welcome.
Peculiarities of Fish Reproduction in Reservoirs of Different Latitudes

by B. V. KOSHELEV

Institute of Evolutionary Animal Morphology and Ecology, Academy of Sciences of the USSR (Moscow)

During a long period of time the specific communications between the organisms and conditions of their existence within historically formed areas were being set up in nature. At present the considerable reconstruction of reservoirs and fish communities is being carried out, as the anthropogenic influence on the biology of the fresh-water and marine fish species becomes stronger. Due to this fact, some considerable changes in the reproduction of species and in the structure of fish communities are observed. Great attention is also paid to the problems of fish culture and aquaculture. However, to breed precious fish species, to get maximal fish production of high quality from the controlled and sometimes absolutely new aquatic ecosystems it is necessary to know the biology of these species.

The strategy and tactics of the fishing in fresh and marine waters are greatly changing now. We should take into consideration the succession changes in fish communities and kinetics of the population and onthogenetic modifications.

The maturation rate in fish species is different due to the climate. For example, in carp of the Northern reservoirs sexual maturation occurs at the age of 5-8 years, in that of Cuba — at the first year of its life; sexual maturation of a bream from Karelian lakes occurs at the age of 8-9 years, but in the southern reservoirs — at the age of 2-3 years. The type of development of sexual cells is rather original — from synchronous one in the north to the extreme degree of asynchronism in the south, with spawning frequency 0.25 - 1 per year in the North; 1 - 3 times a year in reservoirs of the moderate latitudes, up to 5 - 365 times a year in Tropics. The quantity of developing spawn is also different. — in the North GSI (gonadal somatic index) reaches 25-30 (50 %), in reservoirs of the Moderate latitudes it is 20-25 %, in Tropics 4-6 %.

The process of intensive storage of nutritive substances in oocytes of the tropical fish species occurs in various seasons and this period is rather short, in northern species it is timed to the certain seasons and extended. The duration of spawning also differs: in the North spawning lasts for 0.5-7 months; in temperate zones: 1-3 months and in the Tropics 2-12 months. In southern species post-spawning processes occur rapidly, and after spawning the ovaries of fish pass not only to the stage 2, but to the 3 rd and 4 th stages. Within a year at high and relatively constant temperatures fish species of the tropical reservoirs change the type of a seasonal course of the intensive storage of nutritive substances in the oocytes, and the individuals can spawn considerable quantities of the spawn during a year, or on the contrary, grow without spawning.

The detailed analysis of the peculiarities of fish reproduction in the Tropics is required not only for understanding of the specifics of tropical species ecology, but for the optimization of biotechnology in fish culture as well, especially in aquaculture of tropical species cultivated in thermal waters of the energy objects (AES, TES, etc.)

Our comparative ecologico-histological studies on fish culture in reservoirs of different latitudes demonstrated that the peculiarities of development and functioning of the sexual glands in fish can serve as a reliable index of not only the originality of their environment in different regions, but also of the seasonal changes of the conditions in separate years as well as the influence of various anthropogenic factors on fish communities in the reconstructed reservoirs or subjected to the strong human influence.
Resolutions Adopted by the IUBS
XXIIInd General Assembly
1-7 September, 1985
Budapest, Hungary

RESOLUTION 1:
Responsibility to Work for Peaceful Use of Resources

Considering that biologists have a part in promoting the peaceful use of scientific knowledge in all countries and in particular in developing the use of natural resources for the betterment of humankind and the environment,

Viewing with concern the rapid deterioration of ecosystems and the widespread occurrence of famine in the world today,

Emphasizing that the objectives of IUBS can only be achieved in a peaceful and stable world,

Expressing concern at increasing escalation of the arms race and its huge consumption of resources,

Urges biological scientists everywhere, and adhering organizations of IUBS in particular, to assist responsible decision-makers to work towards the elimination of the arms race, the achievement of world peace, and the devotion of resources to peaceful purposes.

RESOLUTION 2:
Free Circulation of Scientists

Emphasizing the fact that the circulation of persons as well as ideas has become easy and frequent throughout much of the world, and

Emphasizing further the fact that this rapid communication has been of the utmost benefit to scientific discoveries and their application for a better way of living of mankind,

Observe however, with regret, that even today after several decades of efforts by a number of international organizations, scientists are sometimes prevented from travelling freely, attending scientific meetings and visiting scientific institutions in other countries,

Stresses the fact that such an attitude is damaging to the scientific community and therefore, to mankind,

Recalls the basic policy of ICSU of non-discrimination which affirms «the rights of scientists throughout the world to adhere to or to associate with international scientific activity without regards to race, religion, political philosophy, ethnic origin, citizenship, language, or sex», as provided by the ICSU booklet «Advice to Organizers of International Scientific Meetings», published by the ICSU Standing Committee on the Free Circulation of Scientists,

Recommends with utmost insistence that the adhering bodies of IUBS and the responsible authorities in all countries respect the rights of scientists to adhere to, and associate with, international scientific activities, to assist international scientific meetings, and adopt policies towards scientists with comprehension, tolerance and generosity for the benefit of our rapidly changing world.

RESOLUTION 3:
Scientific Programme

Receiving with satisfaction reports of reviews of the IUBS Scientific Programme committed at the XXIst General Assembly at Ottawa in 1982,

Recognizing a need for a still more extensive programme within the limits of resources available to IUBS and participating bodies and scientists,

Noting that the Scientific Programme Committee had studied and discussed the outlines of the Proposed Programme for an «International Programme for the Study of Global Change (IGBP)».

Resolves to:
1) support the concept of a new international Programme for the Study of Global Change and urges its adoption,
2) suggest that biological interactions with the atmosphere and geosphere serve as the central focus of the programme,
3) stand ready and wishes to collaborate with the IGBP in the formulation of the programme and its operation, and

Receives and Adopts the Scientific Programme presented to the General Assembly at the XXIIInd General Assembly, Budapest.
REPORT OF THE SCIENTIFIC PROGRAMME COMMITTEE

The Scientific Committee met on three occasions to consider the Scientific Programme of the Union.

The Committee voted unanimously to recommend the continuation of the Programmes on Bioindicators, Vegetation Map of Europe; Decade of the Tropics, the Scientific Aspects of Biological Education, and Medicinal Plants. It was recognized that there is a need for added funding for these projects and that every effort should be made to aid these projects financially.

Based on the fruitful cooperation between the IUBS Section of Biological Oceanography (IABO) and the UNESCO Division of Marine Sciences and ICSU Scientific Committee on Oceanic Research (SCOR), the General Assembly recommends that this cooperation be continued mainly in the following areas:

1) Biological Diversity in Marine Ecosystems;  
2) Traditional Knowledge and Management of Coastal and Island Systems;  
3) Characteristics and Functioning of Fresh Water and Coastal Marine Ecosystems;  
4) Marine Biotechnology.

The General Assembly also recommends that the IUBS Section of Oceanography develop these activities in close coordination with the other Scientific Sections of IUBS and with those activities included in the Global Change Programme (IGBP) and the Biotechnology Committee.

The Ad Hoc Committee considered a series of new proposals and suggests that:

1) The International Union of Biological Sciences appoint a committee to study the feasibility of establishing a programme on «Element Concentration Cadasters in Ecosystems (ECCE)» growing under different climatic and edaphic conditions. This committee is to report to the Executive Committee by 1 July, 1986, with the results of their analysis.

The objective of the planned project is to obtain a detailed assessment of the distribution and concentration of chemical elements in different ecosystem components (soil, water, plants, animals, etc.). Such information will provide a needed baseline for studies on nutrient fluxes, effects of nutrients on productivity, etc.

2) The International Union of Biological Sciences help to organize two of three workshops on the question of biological diversity (including species diversity as well as genetic diversity of wild and cultivated organisms, in both terrestrial and marine ecosystems). One or two of these workshops would address themselves to the issue of change in diversity over time addressing specifically rates of extinction and speciation in time, and space and rates of immigration and emigration and including possible causes. The remaining workshops would address the issue of the extent and possible reasons for diversity in various groups and ecosystems.

Biological diversity and its change in time is a very important issue given the significant landscape transformations, including species invasions that are taking place all over the world. To understand the significance of the human impact, however, it is necessary to have a clear picture of the rates of natural extinction and speciation and of the biological significance of diversity.

The Union is requested to appoint an ad hoc committee to report to the Executive Committee no later than 1 July, 1986, with a detailed plan for consideration by the Executive Committee.

3) The International Union of Biological Sciences is urged to appoint an ad hoc committee on taxonomy to consider the apparent shortage of trained taxonomists, especially in the Third World countries, and possible measures to alleviate the problem. This committee is charged to:
   a) obtain data on the amount of basic taxonomic work needed in regard to the fast modification of many ecosystems and associated current biological research;
   b) obtain a quantitative estimate on the number of positions available and required for taxonomists, and estimate how many of these have been lost during the last two decades;
   c) investigate the type of training that is required to best fill the need, and ways to obtain this training.

The committee is requested to make a first report to the IUBS Executive Committee by 1 July, 1986.

4) At the suggestion of the section on Zoological Nomenclature, it is proposed that a feasibility study be carried out on the registration of new scientific names of organisms, and to include in this project as a pilot project, the desirability of re-publication of the official lists of «Names of Zoology and Works in Zoological Nomenclature» as well as the official «Indexes of Rejected and Invalid Names and Works in Zoology». Special attention should be paid to the financial implication to the Union of the proposed Registry.

5) The «control of fertility or reproduction» has as its goal the regulation of fecundity in humans, other animals, and plants. Many countries have created programmes and organizations concerned with this subject, using a variety of multidisciplinary approaches with facets pertaining in some cases to fertility increments and others to fertility decrease.

It is felt that there is a need for better coordination and communication between these organizations and groups to compare experiences in different countries, stimulate research and identify new goals.
It is recommended that a small committee be appointed to investigate this matter and a possible role of IUBS, and to report its findings to the Executive Committee by 1 July, 1986.

6) It is proposed that in considering new scientific programmes, special concern be given to the dissemination of information about the programme and its broader educational implications; and to assist with this the Executive Committee should establish a small group in consultation with the Commission for Biological Education to establish guidelines for future development.

The Committee also considered two further issues that involve the relations of IUBS with the scientific programmes of ICSU. The first of these issues is that of Biotechnology. Following a panel discussion, the Committee discussed the desirability of IUBS participating in a proposed ICSU Committee on Biotechnology. Questions were raised regarding overlap of the functions of the proposed Committee with another ICSU committee, COGENE. Our representative to ICSU is asked to bring this concern to the attention of ICSU. It was further pointed out that the Commission on Biological Education is already addressing the "Educational Implications of Biotechnology" and the "Diffusion of Biotechnological Information Especially in Developing Countries".

With these provisos the Committee endorsed the suggestion of an ICSU Committee on Biotechnology and approved its draft constitution with some modification.

The last item in this report refers to the proposed International Geosphere-Biosphere Programme of ICSU (IGBP), commonly known as Global Change. A detailed presentation of the programme was presented by Professor Francesco di Castri, which was followed by an informative and thorough discussion. The Committee approved the following resolution.

The International Union of Biological Sciences, having studied and discussed the outlines of the Proposed Programme for an "International Programme for the Study of Global Change (IGBP)"

RESOLUTION:
Support for Systems of Nomenclature
Recalling the decisions and conclusions of previous General Assemblies on the fundamental and applied importance of taxonomy, including nomenclature and the need for international support for systems of nomenclature that will secure their continued function.

Appreciating the generous support provided in recent years to Zoological Nomenclature by members of IUBS and, in particular, by the Royal Society (including the British Research Councils), the Australian Academy of Science, the Royal Danish Academy of Sciences and Letters, the South African Council for Scientific and Industrial Research, and the Royal Swedish Academy of Sciences.

Noting with pleasure the donation made by the USSR Academy of Sciences announced at the General Assembly.

Commends to all member bodies the importance of developing and providing ongoing support for all systems of biological nomenclature which provides a fundamental base for communication in biological science.

RESOLUTION 5:
Response of Systems of Nomenclature to Developments in Science and Information Technology.
Noting the report made to the General Assembly by its Ad Hoc Committee on Biological Nomenclature.
Noting in particular that the report proposes involvement by the Union in encouraging a harmonious and common approach by the various systems of nomenclature in facilitating the development of protistan taxonomy and nomenclature, in promoting increased communication between those bodies administering the systems and biologists in general through the International Congresses in Systematic and Evolutionary Biology (ICSEB), and in seeking solutions to difficulties being experienced in botany and zoology as a result of growth of scientific literature and in information technology.
Commending the recommendations of the Report to the Executive Committee of IUBS.
Requests the Executive Committee to establish a standing committee to report to it at each meeting of the Executive Committee in
furtherance of the continuing aim of IUBS to achieve maximum harmony between the different systems of nomenclature.

RESOLUTION 6:
Importance of Biological Taxonomy.

Reiterating its view that proper development of the knowledge of the kinds and distribution of organisms throughout the world is basic to development of biological science.

Noting that taxonomic collections are inadequate and poorly supported in many countries, especially in the developing countries.

Recalling the Resolution of the XXlst General Assembly in which it noted its pleasure that the Egyptian Academy of Scientific Research and Technology had approved the establishment of a Natural History Museum in Egypt.

Requests the Executive Committee to seek information on projected developments in taxonomy, and

Urges relevant international and national bodies to support development of taxonomy and biological collections.

RESOLUTION 7:
Finances of the Union.

Receiving the report of the Ad Hoc Committee on Finance.

Noting the conclusion of the Committee that an increase in funds is required to meet inflationary demands.

Resolves to adopt the recommendations of the Ad Hoc Committee on Finance.

REPORT OF THE AD HOC COMMITTEE ON FINANCE

1. The Ad Hoc Committee on Finance considered in detail the Treasurer's Report for 1983-85. It wished formally to thank Professor Lévi and Dr. Younès for a well presented and clear document. The Committee concluded that the document indicated careful management of the Union's resources and recommends that the report be approved.

2. In view of the increasing utilization of the successful loans system, it would be desirable for future reports to append a formal statement of the loan fund as a separate annex, distinct from the statement of income and expenditure.

3. Although the financial situation to date appears healthy and has allowed the Union to meet and encourage expansion of activity, it is not one of unqualified optimism. To maintain its scientific programmes, to ensure support for scientific activities which are of central concern to the Union's aims and purposes and which cannot be otherwise funded and to safeguard against reliance on a limited number of outside sources, the Committee could see no alternative other than to recommend an increase in National dues. It realizes that for some National Members, dues were increased in 1982, and acknowledges that others have voluntarily increased their subscriptions. It recommends that for those countries whose dues have not increased since 1976 an increase of 20% be implemented; for all others voluntary increases are encouraged.

4. Other measures to improve the financial situation are:
   a) by royalties from sales of publications and especially the books that will emanate from the researches to which IUBS has contributed funding;
   b) by subventions from further international agencies.

5. The problems were discussed of remittance of fees from subscribers experiencing difficulties in international currency transfer to individual Scientific Members of the Union. The Committee proposed that the IUBS and national adhering bodies provide assistance in any appropriate way.

RESOLUTION 8:
Admissions.

Receiving the report of the Ad Hoc Committee on Admissions.

Noting with pleasure the proposal to admit the Chinese Association of Science and Technology as an Ordinary Member, and the proposal to admit a further two Sections and three Commissions.

Resolves to adopt the report and commends to the Executive Committee the proposal to review the categories Section and Commission of the IUBS structure.
IUBS New Members

Concerning the membership of the Union, the 22nd General Assembly of the IUBS adopted the following new Members:

- The Chinese Association for Science and Technology (People’s Republic of China), as an **Ordinary Member**.
- The World Congress of Herpetology, as the IUBS **Section of Herpetology**.
- The Commission on Systematic and Evolutionary Biology to become the **Section of Systematic and Evolutionary Biology**.
- The International Society of Mediterranean Ecologists (ISOMED), as the IUBS **Commission for Mediterranean Ecology**.
- The International Polychaetology Association, as the IUBS **Commission of Polychaetology**.

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The IUBS Executive Committee

for the period 1985-1988

**Members:**

President : O.T. Solbrig (U.S.A.)
Vice President : J. Salánki (Hungary)
Vice President : W.D.L. Ride (Australia)
Secretary General : F. Di Castri (France)
Treasurer : D.F. Roberts (U.K.)

**Voting Members:**

A. Badran (Jordan)
W. Greuter (F.R.G.)
N. Khrushchov (U.S.S.R.)
J. McNeil (Canada)
H.S. Salama (Egypt)
J. Silva (Venezuela)
I. Wanatabe (Japan)

**Alternate Members:**

F.B. Golley (U.S.A.)
E. Gomez (Philippines)
A.N. Khalaf (Iraq)
J. Kavanagh (Ireland)
G. Maury-Lechon (France)
O. Pavan (Brazil)
A. Urbanek (Poland)
The Third International Congress of Systematic and Evolutionary Biology
Brighton, England, 4-10 July, 1985
by Beryl B. Simpson and Geoffrey G. Scudder

After holding its first two Congresses in North America, ICSEB met for the third Congress in Europe. The University of Sussex in Brighton, England hosted the meeting in early July, 1985. The Congress was officially opened at a reception given on the evening of the 4 July by the mayor of Brighton in the Corn Exchange. Attendance at the Congress was high with 600 scientists registered for the week and about 150 registered as day participants. As in the past, ICSEB members came from diverse fields — paleobiology, molecular biology, ecology, cell biology, systematics, genetics, and evolutionary biology. The matrix that help together these scientists was a common interest in the processes of evolution and the ordering of life into a meaningful systematic framework. Toward this end, the Local Organizing Committee chaired by Dr Barry Cox of King's College London, working with Dr William Chaloner (Bedford Colleges) as the head of the Programme Committee, arranged 12 Congress Symposia (Co-evolution and Systematics, Evolution of Genomes and Chromosomes, Biogeographic Evolution of the Malay Archipelago, Measurement of the Rates of Evolution, Evolutionary/Physiological/Ecological Biology, Molecules vs. Morphology, Symbiosis in Evolution, Angiosperm Origins and their Biological Consequences, Random and Directed Events in Evolution, Conservation of Tropical Ecosystems, and Co-evolution in Ecosystems and the Red Queen Hypothesis).

Individual members of ICSEB also arranged 21 Special Interest Symposia that were very well attended. In order to accommodate all of the volunteered papers, John Taylor (British Museum of Natural History) skillfully ground them into 15 Contributed Paper Sessions. The combination of the many offerings of the Symposia and Sessions made the five days during which talks were presented very full indeed.

In order to allow Congress members to see Darwin's Down House, samples of local vegetation, or simply the countryside of southeastern England, Wednesday was a free day. Down House was opened by the trustees especially for the Congress, and as might be expected, this particular excursion was the most popular of the wide array offered. Other social events included a "Sussex" evening that allowed members to sample local wines, Sussex ciders, see some English folk dancing, and to feast on traditional Sussex foods. There were also Botany and Zoology buffets that allowed small groups to meet and chat over informal meals. An elegant all-Congress banquet on the evening of 9 July was attended by most of the participants.

At the Closing Plenary session of 10 July, the results of the votes of the International Committee on the new officers, council members, and International Committee Members was announced. These were:
- Co-President: Barry Cox (UK), James Reveal (USA);
- Secretary General/Treasurer: Nils Stenseth (Norway).
1. Meeting

The Committee met in Brighton, England, in July 1985 concurrently with the 3rd International Congress on Systematic and Evolutionary Biology.

As well as meeting in closed session, the Committee attended symposia on «The Protists: Evolution, Taxonomy and Nomenclature» (convened by Dr. J.O. Corliss) and on «Codes of Nomenclature» (convened by Mr. R.V. Melville). For one session of the latter Symposium the members of the ad hoc Committee, Dr. W.D.L. Ride (Chairman), Dr. Rita R. Colwell, and Dr. W. Greuter constituted a panel and conducted a free workshop to discuss the future development of various codes of nomenclature.

2. The Committee reports:

(a) Taxonomy and Nomenclature of Protists.

Considering views expressed in formal presentations at the symposium «The Protists: Evolution, Taxonomy and Nomenclature», and the discussions on those presentations, the Committee has concluded that the major issues leading to the present instability in the nomenclature of protists are taxonomic. Protistan taxonomy is currently in a healthy state of active scientific questioning as a result of much new information arising from the application of developing methodologies. The consequence has been the development of fundamentally different classifications at all classificatory levels by different authorities. The Committee CONSIDERS that IUBS should continue to encourage protistologists to meet and exchange information on protistan taxonomy with the aim of reaching common approaches and, if possible, reaching agreement on the composition of major groups.

There is currently consensus that protistan taxonomists will continue to use both the Botanical and Zoological Codes but, since there is no agreement on the composition of major groups, it is not possible to recommend the allocation of different taxonomic categories to particular codes. It is generally agreed that taxonomists will apply the codes of their choice and, in particular, those that are customarily used in determining names in the group concerned. When the use of different codes results in the use of different names for the same taxon, the problem will be solved by the case-by-case approach exemplified by Silva (1980, Taxon, vol. 29, pp 121-143).

In order to facilitate the use of the two codes, and to expedite the solution of problems arising from the case-by-case approach, the Committee RECOMMENDS:

(i) that the IUBS Commission on the Nomenclature of Plants (General Committee on Botanical Nomenclature) and the Section on Zoological Nomenclature (International Commission on Zoological Nomenclature) be requested to commence a study of the Codes with the aim of harmonizing them as far as possible, both in essential terminology and in such features as would lead to different names for to the same taxon. In particular, the bodies responsible for the codes are asked to review the appropriateness of introducing:

- provisions to expedite the use of the plenary power of the Commission (zoology) and the procedure for nomina conservanda and nomina rejicienda (botany) in cases where it is necessary to use such provisions to achieve harmony in the case-by-case approach.
- provisions for the admission of living types and multiple types.
- provisions enabling protistologists to treat protists under one or other of the two codes without being required to define them as either plants or animals.

(ii) that in course of the studies referred to in (i) above, the bodies responsible for the Codes be encouraged to consult whenever appropriate with the following international organizations:

- International Commission for the Nomenclature of Bacteria.
- International Mycological Association.
- International Society for Evolutionary Protistology.
- International Society of Phycologists.
- International Paleontological Association.
- Society of Protozoologists.

(iii) that a body active in protistan taxonomy (possibly the International Society for Evolutionary Protistology) be encouraged to publish lists of generic names validly published (botany) or available (zoology) for protists.

(b) Consequences to Nomenclature

Systems of developments in Information Technology.
As a consequence of discussions at the Symposium on the Codes of Nomenclature, the ICSEB III Congress resolved to request the bodies responsible for Botanical and Zoological Nomenclature to establish registers of new names and to make registration a necessary condition for the establishment of a new name in zoology or botany.

The Committee notes that such a procedure is already established in Bacteriological Nomenclature and, because of the increasing inapplicability of requiring conventional publication as a condition of establishing new names, and because of increasing difficulties in learning of newly described and named taxa published in obscure works, RECOMMENDS the endorsement of IUBS sought in the ICSEB Resolution.

(c) Interdisciplinary approach to problems of nomenclature

Considering the success of the two ICSEB symposia in fields of nomenclature in creating a better understanding between biologists working in fields of the taxonomy and nomenclature of viruses, bacteria, plants and animals, the Committee endorses the recommendation of ICSEB III to the Organizing Committee of ICSEB IV to provide a forum at that Congress for continuing the multidisciplinary approach.

(d) Possible function of ICSEB Congresses to provide a venue for official meetings of the IUBS Section of Zoological Nomenclature.

Noting that the functions of the Section of Zoological Nomenclature are to enable zoologists generally to participate with Commissioners of the International Commission on Zoological Nomenclature in electing Commissioners, and in considering proposed amendments to the International Code on Zoological Nomenclature (and recommending on proposed amendments to IUBS), and moreover considering that the attendance of systematic and evolutionary biologists at ICSEB Congresses provides such a forum, the Committee RECOMMENDS that the International Commission on Zoological Nomenclature be requested.

(i) to consider whether such an arrangement would be appropriate and in the interests of zoological nomenclature.

(ii) and, if such an agreement is favoured, to propose for adoption such changes to the Constitution and By-Laws of the Commission and to the Statutes of the Section of Zoological Nomenclature as would be required to enable the arrangement to be implemented.

The attention of the Section on Nomenclature should be drawn to Resolution 1 on the ICSEB III Congress that gives effect to the IUBS Resolution 4 of the XX1st General Assembly that a Group of Systematic and Evolutionary Biology (including the Section of Zoological Nomenclature) be formed within IUBS.

(e) Formation of Advisory Committee to IUBS Executive on interdisciplinary matters in biological nomenclature.

The Committee considers that it would be in the interests of biology for the Executive of IUBS to be informed of developments in different disciplines of biological nomenclature to ensure that the need to achieve maximum harmony is recognised as a continuing aim of IUBS.

Accordingly, the Committee RECOMMENDS that a Standing Committee be established for that purpose to report to the Executive Committee of IUBS.
International Commission on Zoological Nomenclature

Retirement of M. R. V. Melville as Secretary

Mr Richard V. Melville retired from the Secretaryship of the International Commission on Zoological Nomenclature at the conclusion of the XXII General Assembly of I. U. B. S. at Budapest on 7 September 1985. Mr Melville, who had been successively Chief Palaeontologist and Assistant Director to the Institute of Geological Sciences (now the British Geological Survey), was Secretary of the Commission for more than 17 years.

His association with the Commission began more than 30 years ago. He played a prominent part in the 1963 Copenhagen Colloquium and the International Congress of Zoology Section on Nomenclature, assisting Secretary Hemming to prepare the daily summaries of the proceedings. In addition, he verified and saw through to publication the “Copenhagen Decisions” – described by Secretary Hemming as “that indispensable work of reference to all systematists”.

In May 1958, Mr Melville was seconded from the Geological Survey and Museum for 18 months as Assistant Secretary of the Commission in order to be Secretary of the London Colloquium and Congress Section on Nomenclature and of the Editorial Board of the 1st Edition of the International Code of Zoological Nomenclature.

In 1968, Mr Melville was elected a member of the Commission and appointed its Secretary. Outstanding amongst his many achievements as Secretary and Editor of the Bulletin of Zoological Nomenclature have been the preparation of some 500 Opinions, the handling of the Appeal for Funds to ensure the Commission’s survival, and his secretariatship of the Editorial Committee culminating in the publication, earlier this year, of the 3rd Edition of the Code.

The Zoological community as a whole owes a great debt to Richard Melville for his dedication to zoological nomenclature and the wisdom and skill which he has shown in administering the Commission’s affairs. His experience and scholarship will be greatly missed within the Secretariat and by the Council but will continue to be available within the Commission through his continuing membership as a Commissioner.

Richard Melville’s many friends in zoology will wish him health in a long and well-earned retirement.

As a result of changing requirements in the management of the Commission’s affairs, and with the agreement of the Management Committee of the International Trust for Zoological Nomenclature, the duties of the Secretary of the Commission and of the Scientific Controller of the International Trust are being rearranged.

Dr Philip Kingsley Tubbs, MA, PhD (Cambridge), has been appointed Executive Secretary of the Commission and will be responsible for the management of its affairs. An Honorary Secretary of the Commission will be appointed from the Commission to fulfil statutory requirements.

Dr Tubbs is a Fellow of Corpus Christi College, Cambridge, and a former University Lecturer in Biochemistry in the University of Cambridge. Dr Tubbs brings to the Secretariat the experience of long association with the Commission of Enzyme Nomenclature of the International Union of Biochemistry and membership of the Editorial Board of the Biochemical Journal and of the Biochemical Society’s Publications Advisory Committee. He has a long-standing interest in Lepidoptera.

W.D.L. RIDE
President
International Commission on Zoological Nomenclature
Global Connections in Ecological Theory and Practice

The VI International Congress of Ecology, 10-16 August, 1986, Syracuse, USA, is organized by the International Association for Ecology (INTECOL), which represents the Ecology Section of the IUBS. It is sponsored by the Ecological Society of America, the State University of New York (SUNY) College of Environmental Science and Forestry, and Syracuse University.

The theme of the Congress is «Global Connections in Ecological Theory and Practice». The Programme includes plenary lectures, workshops, and contributed papers (oral presentations and poster sessions).

Congress symposia will include:
- Reduction vs. Holism in Ecology
- Landscape Ecology in Transdisciplinary Science
- Comparison of Coral Reefs and Rain Forests
- Modeling and Remote Sensing in Biogeochemical Processes
- Management of Fragile Tropical Forests
- Physiological Ecology in Arid Lands
- Forest Tree Dynamics and Demography
- Ecological Basis of Sustainable Agriculture
- Modeling Complex Systems
- Microevolutionary Changes in Populations
- Ecological Management of Coastal Zone Processes
- Long and Short Term Roles in Evolutionary Constraints
- Coevolution in Herbivory
- Role of Fire in Ecological Systems
- Role of Soil Biological Processes in Soil Fertility
- Linking Satellite Imagery with Ground Observations
- Comparative Pine Forest Ecosystems
- Ecological Impacts of Acid Deposition
- Mutualism as an Ecological Process
- Nutrient and Carbon Conservation
- Foraging Ecology: Theory and Application
- Interpreting the Present from the Past
- Movement and Storage of Toxic Materials in the Environment

- Ecological Engineering — Application for Environmental Management
- Contributions of Models to Ecological Theory
- Large Lake Models
- Statistical Paradigms and Ecological Modeling

Plenary lectures will address:
- Microbial Ecology
- Behavioral Ecology
- Biogeography and Ecology
- Landscape Ecology
- Industrial Stress on Ecosystems
- Coevolution and Coadaptation
- Community Structure
- Statistical Ecology

Workshops will include:
- Ecological Management of Common Property Resources
- Use of Personal Computers in Ecological Modeling
- Ecosystem Education
- Environmental Decision-Making
- Evaluation of Large Scale Aquatic Surveys
- Role of Ecologists in the Global Change Study
- Interactions of Energy Flow, Matter Cycling and Yield in an Agroecosystem
- Endangered Species
- Introduction to Theory and Application of Modeling for Ecologists

The IUBS Executive Committee Meeting has been jointly organized with the Congress, and will take place on August 8-9, 1986, in Syracuse, USA.
CONSERVATION, SCIENCE AND SOCIETY
Published by UNESCO-UNEP, 1984 (245 pages).
This issue (XXI) of the natural resources research series published by Unesco is devoted to the contributions to the First International Biosphere Reserve Congress, Minsk, Byelorussia/USSR 26 September-2 October 1983. It includes 3 parts dealing, the first with the biogeo graphical coverage and the establishment and management of biosphere reserves, and their relations to other protected areas; the second with biosphere reserves and science: research, monitoring, forecasting and management; and the third focusing on the society dimension in the biosphere reserves, conservation, local participation and environmental education.

FRUITS OF THE GUIANAN FLORA
by Marc G.M. van Roosmalen.
Published by the Institute of Systematic Botany, Utrecht University, the Nederlands, 1985 (483 pages).
This book on the fruits of Guiana Rain Forest is as complete as anyone can make it today; its key, descriptions, and illustrations make it easily accessible also to the non-taxonomist.
Fruits occupy a place at one of the main biological cross-roads of the forest; and the significance of «Fruits of the Guianan Flora» is not exclusively a taxonomic one. The text reflects a blend of fundamental and applied sciences.

GLOBAL CHANGE
Edited by T.F. Malone and J.G. Roederer.
Published on behalf of the ICSU Press by Cambridge University Press. 1985 (512 pages).
This volume represents the Proceedings of a Symposium sponsored by the International Council of Scientific Unions (ICSU) during its XXth General Assembly in Ottawa, Canada, 25 September 1984, addressing the possibility of an interdisciplinary approach to understanding our planet’s subtle and often synergistic, physical, chemical and biological processes. «Global Change» comprehensively explores the interaction between the physical and living world by examining the Earth, its environs and life in the biosphere as a single system.

INTEGRATED CONTROL OF CEREAL PESTS
West Palaeartic Regional Section Bulletin of the IUBS Section for Biological Control, 1985 (141 pages).
This issue represents a summary of the last 10 years of research by the group of «Integrated Control in Cereals», specially aphids, at the meeting held on 1-2 March 1984 at Wageningen (NL). The main topics are : (1) aphid degradation on small grain; (2) role of the main natural enemies of cereal aphids; (3) and the relationships of cereal aphids with their host plants.
The practical use of these studies will allow to establish a complete system of integrated protection of cereals, limiting the insecticide spray to its minimum requirement for the benefit of agriculture.

INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE - Third Edition
Published by the International Trust for Zoological Nomenclature in association with the British Museum (Natural History) London and the University of California Press Berkeley and Los Angeles. 1985 (339 pages).
The International Commission on Zoological Nomenclature presents in this third edition of the International Code of Zoological Nomenclature a thoroughly revised Code that nevertheless retains the same format and sequence — with minor exceptions — as the first two editions (1961-1964).
An Editorial Committee charged with drafting the new edition was appointed in 1973, including W.D.L. Ride (Chairman 1973-77, 1983-84), C.B. Sabrosky (Chairman, 1977-1983), G. Bernardi and R.V. Melville (Secretary).
The Code like its preceding editions, has one fundamental aim, which is to provide the maximum universality and continuity in the scientific names of animals compatible with the freedom of scientists to classify animals according to taxonomic judgments. It consists of provisions and recommendations designed to enable zoologists to arrive at names for taxa that are correct under particular taxonomic circumstances.
INTERNATIONAL NOMENCLATURE OF DISEASES
Volume II: Infectious Diseases.
Part 1: Bacterial Diseases.

Published by the Council for International Organisations of Medical Sciences (CIOMS), 1985 (158 pages).

This volume represents a part of a joint project of CIOMS and the World Health Organisation (WHO). The present nomenclature, like all parts of volume II of the International Nomenclature of Diseases, takes a primarily etiologic approach.

THE LITERATURE OF THE LIFE SCIENCES: Reading, Writing, Research.
By D.A. Kronick.
Published by ISI Press, 1985 (219 pages).

This book is a practical guide that explains how to evaluate and use major print and online information sources by comparing their scope, coverage, currency, format, authority, subject access points, and other means of access such as author and title. Intended for graduate students, researchers, and practitioners in the life sciences, and for library students and librarians, the book explores the history, evolution, and the organisation of that body of literature.

THE TRADITIONAL KNOWLEDGE AND MANAGEMENT OF COASTAL SYSTEMS IN ASIA AND THE PACIFIC
Edited by K. Ruddle and R.E. Johannes.
Published by the Unesco Regional Office for Science and Technology for Southeast Asia, Jakarta, Indonesia, 1985 (313 pages).

This volume includes the papers presented at a Unesco Regional Seminar 5-9 December 1983, Jakarta, Indonesia, to deal with the traditional knowledge and management practices of coastal and marine systems in Asia and Oceania.

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NEW

Journal of Tropical Ecology
Published for INTECOL and the ICSU Press
Editor: Adrian G. Marshall Institute of South-East Asian Biology University of Aberdeen

If your work involves research into the ecology of tropical regions, then you will be interested in this new quarterly journal, which acts as a valuable forum for both established scientists and young ecologists in tropical nations. The Journal’s editorial board is comprised of specialists from North and South America, West and East Africa, South and South-East Asia, Australasia and Europe.

Papers in the first issue include:
D. H. Janzen: Mangroves: Where’s the understory?
G. W. Cox and C. G. Gakahu: Mima mound microtopography and vegetation pattern in Kenyan savannas
P. K. S. Lam and D. Dudgeon: Seasonal effects on litterfall in a Hong Kong mixed forest
D. L. Pearson and R. L. Dressler: Two year study of male orchid bee attraction to chemical baits in lowland South-Eastern Peru
P. Becker, M. Leighton and J. B. Payne: Why tropical squirrels carry seeds out of source crowns

Subscription Information – Volume 1 (1985)
$4.50, $8.00 for members of the International Association for Ecology (INTECOL), $9.00 for individuals in developing countries, Single copies $12.00; Air mail $11.00 extra

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23
Call for Proposals to House the World Data Centre for Collections of Microorganisms of the World Federation for Culture Collections

Because of the impending retirement of the Director, the World Data Centre (WDC) must be relocated and offers are sought from institutions willing to house and develop this important information centre. The WDC is part of the World Federation for Culture Collections (WFCC) and is responsible for the collection, storage and distribution of information about culture collections internationally. It forms an essential resource for the support and development of microbiology in research, education and industry.

Detailed information on requirements is available in the Request for Proposals document available from the WFCC’s Steering Committee for the WDC. Applicants are required to provide a detailed specification of mechanisms for implementation of the databank, qualifications, resources and policy. This, or a letter of intent, must be sent to the President of WFCC. Applicants will be assessed by the Steering Committee and recommendations made to the Executive Board of WFCC, which will make the final decision. Relocation must be completed by July 1986 and every assistance will be given to the successful applicant to complete a smooth transition of this important centre.

Steering Committee contacts: Dr M. Krachevsky, Microbial Systematics Section, National Institute of Dental Research, National Institute of Health, Building 10, Trailer A, Bethesda, Maryland 20205, USA; Dr L. R. Hill, National Collection of Type Cultures, Central Public Health Laboratory, 61 Colindale Avenue, London NW9 5HT; Dr R. E. Stevenson, American Type Culture Collection (ATCC), 12301 Parklawn Drive, Rockville, Maryland 20852, USA and Dr H. Sugawara, Kenkyuu-Jouhoushitu, Riken, 2-1 Hirosawa, Wako-Shi, Saitama 351, Japan.

President WFCC: Mrs Kirsop, National Collection of Yeast Cultures, AFRC Food Research Institute, Colney Lane, Norwich NR4 7UA, U.K.