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Co-ordination of the results of scientific research

RECOMMENDATIONS OF THE SURVEY ON THE MAIN TRENDS OF RESEARCH  
IN THE NATURAL SCIENCES, THE DISSEMINATION OF SCIENTIFIC  
KNOWLEDGE AND THE APPLICATION OF SUCH KNOWLEDGE TO PEACEFUL ENDS

Addendum

Comments of the Director General of Unesco

The survey on the Main Trends of Research in the Natural Sciences proposes 11 General Recommendations and 31 Special Recommendations.

The General Recommendations may be grouped under the following headings:

- a) International co-operation in scientific research (excluding the exchange of scientific information) : General Recommendations 1, 8, 9, 10 and 11.
- b) International networks for the exchange of scientific information : General Recommendations 4, 5, 6, 7 and 10.
- c) International co-operation in science training : General Recommendations 2 and 3.
- d) International co-operation in the development of technology for countries in process of industrialization : General Recommendation 2.

The General Recommendations falling into classes (a) and (b) are not the sole concern of Unesco ; other intergovernmental agencies are also involved with international co-operation in scientific research and with networks of exchange of scientific information.

However, although not exclusive to Unesco, these two general domains do represent the general and traditional fields of action of Unesco in the Natural Sciences.

It is therefore not surprising that, as indicated in the comments made below on each of the General Recommendations, most of the recommended suggestions are already being implemented in the programme of Unesco, partially or completely.

## I - GENERAL RECOMMENDATIONS

### Recommendation 1 - Scientific Policy of States

It is recommended that the organizations of the United Nations system assist Member States in the organization of their national science structure so as to ensure harmonious operation of the reciprocal action between the stimulation of scientific research and economic and social progress.

The awareness of the relationship between the stimulation of scientific research and economic and social progress has been and continues to be the basic principle under which Unesco operates a programme of aid to Member States, particularly to those with developing economic systems. Further to assist Member States in the organization of the national research structure for the above purpose, the Director-General proposes to initiate in 1961 a documentation center for national research organizations which will gather, analyze and make available to Member States information on pertinent experiences in this field.

### 2. International Aspects of technology

The Recommendation suggests collective responsibility for bridging the gap between scientific research and technology in order to solve the problem of industrialization of the least developed regions.

Unesco accepts responsibility for assisting Member States in their industrialization by helping them in setting up technical schools, technological institutions and universities, industrial research laboratories and facilities to train personnel for surveys of natural research.

In addition, Unesco is helping Member States to determine their future needs for trained engineers and scientists in the light of their planned industrial growth.

The Director-General is of the opinion that no new specialized agency for Technology is needed to meet the needs of Member States in this field, since problems concerned with research, education and training of technologists are being handled by Unesco, and other related problems concerning economic and social development are dealt with by the United Nations and other competent organizations of the United Nations system.

### 3. Regional scientific and technical training institutes

The recommendation suggests the formation of regional educational and technical training institutions to meet the growing needs of Member States for trained research workers, especially where facilities are too costly or specialized for a single nation to operate them.

Unesco now supports such a regional institution in Mathematics in Latin America and is considering the possibility of establishing similar institutions in other fields, like, for example, oceanography.

Although the idea of regional training institutions is very good in principle and may, in certain cases, be very useful, its successful operation presents, in practice, numerous difficulties ; careful consideration should be given by interested States before final decisions are taken for the establishment of such institutions.

#### 4. Scientific documentation

The recommendation suggests standardization of titles of published articles and the holding of an international conference on principles to be adopted in the field of classification and indexing. It also suggests new methods of publication, and publication of subjects in rapid growth.

Unesco has long considered the problem of documentation a major one requiring international action and this recommendation is therefore welcomed.

As continuation of past activities in this field, the Director-General of Unesco is studying the problems listed in the report as well as the translation of scientific articles, the abbreviation of titles of periodicals, the improvement of scientific abstracting services including the elimination of duplication, utilization of mechanical aids, etc. If during the next few years, with the collaboration of interested international non-governmental organizations, a reasonable number of solutions are found to all these problems, the Director-General of Unesco is planning to convene an international conference to present these solutions and the ways of carrying them out by concerned institutions and Governments. The question of primary publications may be included in the agenda since it is very doubtful that the "individual articles" suggested in the recommendation represent a solution for this problem.

#### 5. International study and liaison service for the organization of scientific research in Member States of the United Nations system

The recommendation suggests the establishment of an international service able to advise governments in their efforts to organize and improve their national scientific structure.

As stated under General Recommendation 1, the Director-General plans to initiate in 1961 a Documentation Center on national research organization which initially will study and compare the national research structure in various

countries. When considerable documentation has been compiled and careful analysis made, Unesco will be in a position to set up a service with a view to giving advice to Member States, who so request, on their research structure.

6. Information service on current research work

The recommendation suggests initiation of an information service on current research in progress and on the exact programme of research workers, laboratories and institutions.

The establishment of such a service, even in a limited field, on a world-wide basis constitutes an extremely difficult and large task. At the present time, the Director-General of Unesco has no plans to establish such a service, but will continue to work closely with national research councils and other institutions concerned with the reporting of research in progress. Should the evolution of the situation make it possible for such a service to be established, Unesco could initiate the appropriate steps to do so.

7. International scientific conferences

The recommendation suggests the holding of international conferences outside the framework of the regular congresses of the various non-governmental scientific unions and associations, where such conferences, of an interdisciplinary nature, answer a real need of the scientific community.

Through its International Advisory Committee on Research in the Natural Sciences, made up of leading scientific representatives throughout the world, the Secretariat of Unesco is in constant touch with the growing and changing needs of the scientific community, and when it is believed that an international conference on an inter-disciplinary subject would be of benefit, Unesco will hold such a conference. As an example, the Director-General is exploring the possibility of holding conferences on the geophysics of seismic areas, molecular biology, properties of the solid state, and properties of the ionosphere.

8. Measurements, units and methods

The recommendation suggests the holding of an international scientific conference to appraise the present situation in the use of units in the basic sciences and in the methods of measurements of such units.

Having seriously considered this suggestion, the Director-General of Unesco is now studying the possibility of holding such a conference and proposes, in his draft programme for 1961-62, to co-operate with the International Bureau of Weights and Measures to determine the actual need for such a conference and the scope which it might cover.

9. The organization of international co-operation in scientific research

The recommendation suggests a complete survey of the existing state of affairs with respect to the organization of international co-operation in scientific research for the purpose of suggesting improvements in such co-operation.

The Organization is actively engaged in the improvement of multilateral intergovernmental co-operation by a number of means. These means include the holding of intergovernmental meetings to agree on forms of new co-operation such as in oceanographic surveys, the gathering together of governmental representatives of national research councils on a regional basis, and the introduction of co-ordinated research programmes such as in the Arid Zones.

Furthermore Unesco and the International Council of Scientific Unions are setting up a joint co-ordinating Committee for the purpose of improving the co-operation between the non-governmental professional unions and the intergovernmental programmes of Unesco.

It is hoped that by this twofold approach Unesco will find practical ways to improve further international co-operation in scientific research. The need for another survey of the kind suggested does not appear to be very clear.

10. Agreements and conventions concerning international scientific co-operation

The recommendation suggests a central registry of all bi-lateral or multi-lateral agreements concerning international scientific co-operation between Member States now in force, and a study center responsible for keeping this central registry and for giving advice to Member States wishing to join such agreements or to prepare new ones.

Unesco shares the belief that the study of bilateral and multilateral arrangements is important for the planning of international aid. It accordingly plans to initiate in 1961-1962, the above-mentioned central registry of such agreements.

11. Exploration and preservation of natural media

(a) Exploration and inventory of the Earth

The recommendation suggests that it is a national interest of all Member States to undertake studies of the physical, chemical and biological properties of the land in order that this knowledge be used by the nation itself for the rational exploitation of its natural resources, and also in order that the total knowledge of our globe be made as complete as possible so that scientists everywhere may benefit from this total knowledge. It is also suggested that the Member States unable to carry out such work be given necessary assistance by the United Nations family.

The need for international action in this field has long been recognised by Unesco, and the Organization has been engaged, in co-operation with FAO and other specialized agencies, in general programmes concerned with Arid Zones, Humid Tropics and Oceanography, as well as more specific tasks like the bibliography of surveys in natural resources in Africa, undertaken at the request of the United Nations Economic Commission for Africa.

The Director-General is also proposing in his Draft Programme for 1961-1962 to help Member States to survey their natural resources by sending experts under the Expanded Programme of Technical Assistance, by holding training courses devoted to such studies and by aiding in the organization of various co-operative and co-ordinated measurements concerned with the earth's crust, such as the sending of teams of experts to the seismic belts of the Mediterranean and Latin America for the purpose of setting up networks of seismic measurement stations.

(b) Preservation and improvement of natural media

The recommendation suggests that each country has a national duty with regard to its own territory, and an international duty in respect of media common to several and sometimes all nations, to safeguard and improve these media against destruction and contamination. It is further suggested that methods for safeguarding these media should be studied and agreed upon between nations.

Unesco has been and is regularly engaged in the preservation and the improvement of natural media in a number of ways. This includes aid and improvement of soil within the framework of its Arid Zones and Humid Tropics programmes, study of the ocean system, support of the Darwin Research Station on the Galapagos Islands and annual grants to the International Union for Conservation of Nature and Natural Resources.

II - SPECIAL RECOMMENDATIONS

The following Special Recommendations are of particular concern to Unesco.

A. Fundamental sciences

(a) Physical and chemical sciences

1. High energy physics

The recommendation suggests that Member States in various parts of the world may wish to group together to establish common centers of high energy physics similar to the European Organization for Nuclear Research (CERN).

Unesco, as in the case of CERN, would aid such member states in forming such regional organizations and will bring its experience to bear in order that the

regional organizations might operate successfully. However, Unesco would wait for the need to become apparent to Member States and for their initiative in suggesting such action.

## 2. Plasma physics

The recommendation suggests that an international conference be organized and that plans be made for an international research organization of the type of CERN for the field of plasma physics.

Unesco is working in close co-operation with the International Atomic Energy Agency for the possible organization of an international conference on aspects of plasma physics closely related to controlled thermo-nuclear energy production.

In addition, the Director-General is considering, with the co-operation of the International Union in Pure and Applied Physics, the possible organization of an international conference devoted to the basic theoretical and experimental aspects of plasma physics as part of a more general domain of physics, called the physics of dispersive media. Unesco believes the time is premature to consider the formation of an international laboratory devoted to plasma physics.

## 3. Solids

The recommendation suggests that an inter-disciplinary conference be held on the properties of solids.

The Director-General is considering the possibility of holding such a conference, as stated under General Resolution 7.

### (b) Biological sciences

#### 1. Molecular biology

The recommendation suggests that an international programme of co-ordinated research in the field of molecular biology be strongly supported financially.

Within the modest financial resources available, the Director-General is planning, under the Cellular Biology Programme and in consultation with WHO and IAEA, to support advanced symposia on the following subjects :

- The Amplification Techniques in Cellular Biology
- Information Theory and Cellular Biology
- Latest advances in Cellular Biology
- Biological Organization : Cellular and Supra-Cellular

Although cellular biology is a broader field than molecular biology, the above-mentioned symposia will all be principally concerned with the molecular biology aspects of cell biology.

2. Neurophysiology and brain research

The recommendation suggests that the setting up of a co-ordinated and assisted programme of brain research in collaboration with interested non-governmental organizations would be very useful.

It is proposed, under its 1961-1962 programme, that Unesco will initiate an inter-disciplinary brain research programme which will involve symposia and the establishment of a documentation center concerning research laboratories and programmes in all countries dealing with brain research. This programme will be planned and implemented in close co-operation with WHO. It may be executed with the assistance of an international non-governmental brain research organization, the creation of which is under consideration.

5. Radiobiology

The recommendation suggests that radiobiological research is closely linked to basic phenomena in biophysics and molecular biology, and that extensive studies of the effects of small doses of radiation and low intensity irradiation would be extremely useful, especially in the case of animals with reactions similar to man.

As mentioned under the Special Resolution on molecular biology, the Director-General is proposing a programme in this field and, in particular, plans to hold a symposium on Radiobiology in relation to Cell Theory and Ageing.

6. Preservation of species and varieties, living fossils

The recommendation suggests that an international programme be set up to preserve rare species of living animals and plants.

Unesco, through its support of the International Union for Conservation of Nature, is attempting to do this.

(c) Earth and space sciences

3. Exploration of the oceans

The recommendation suggests that exploration of the oceans necessitates co-ordination on the international level.

Unesco plans to launch a large-scale programme in the field of oceanography. This programme includes the setting up of land-based research stations, the training of oceanographers on land and on sea, the planned acquisition of an international training and research vessel to explore parts of the ocean which are not intensively investigated at the present time, and the creation, within Unesco's framework, of an intergovernmental oceanographic commission to help Member States planning to carry out surveys of the oceans and to co-ordinate their national



programmes among themselves. Work in this field would be carried out in very close co-operation with other interested international organization such as UN, FAO, WHO, IAEA.

7. Space research

The recommendation suggests that intergovernmental collaboration, similar to CERN, would be extremely valuable in the field of space research.

The Director-General intends to co-operate closely with the United Nations in the preparation of the proposed International Conference on Outer Space Research and is also planning in 1961-1962 to start a modest programme to further international co-operation in this field by supporting the programme of two of the leading international organizations concerned with space research, namely the International Astronautical Federation and the Committee on Space Research of the International Council of Scientific Unions (COSPAR).

Support will be given to these organizations to help them disseminate to the general public the results of space research, prepare a multilingual handbook of terms in space research and offer travel grants to young scientists in this field.

Symposia would be supported on highly specialized subjects such as Precision tracking, Ultra-violet Astronautical Observations and Effects of High Temperature on Small Biological Organisms.

B. The Applied sciences

(b) Agricultural sciences

1. Use of arable land

The recommendation suggests that the problem of fertility of soils be attacked on an inter-disciplinary scientific basis and that appropriate international co-ordination of the work be undertaken.

The Director-General proposes to consider in 1961-1962, in close consultation with FAO, basic aspects (particularly the role of biology) of the problem of fertility of soil by gathering together a small working group to determine its future action in this field if necessary.

In addition, Unesco carries out a large programme of scientific research devoted to the use of arid zone land and a modest programme concerned with the soils of humid tropical areas.

(c) Power

2. Solar energy

The recommendation suggests that research on solar energy deserve international support.

Unesco through its Arid Zone programme carries out a small programme devoted to preliminary measurements of solar energy which are required before practical applications can be made.

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