

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

PROCEEDINGS
of the
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

Volume I, Number 1

1 August 1965
La Jolla, California

SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

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Volume I, Number 1

Preface

The Scientific Committee on Oceanic Research is an international group, organized by the International Council of Scientific Unions, and charged with furthering international scientific activity in all branches of oceanic research.

Since its first meeting in August, 1957, SCOR has been deeply involved in stimulating, organizing and, during its first years, coordinating the International Indian Ocean Expedition. Such cooperative investigations have made apparent the necessity for improved standardization and intercalibration of oceanographic methods. problems which are now being studied by several SCOR working groups. From its inception SCOR has been concerned with the most effective organization of international oceanography, and now serves as scientific adviser on oceanographic problems to UNESCO and to the Intergovernmental Oceanographic Commission. In attempting to satisfy the IOC request to prepare a general scientific framework for comprehensive study of the world ocean SCOR has been engaged in identifying major scientific problems whose solution would benefit from international cooperation. Discussions of such problems were an important feature of the First International Oceanographic Congress, and will be during the Second Congress; SCOR has been instrumental in the development of both Congresses.

Despite the large actual and potential influence of SCOR in the development of international aspects of oceanography, it

is apparent that these activities are not well known to the oceanographic community. The Executive Committee of ICSU, recognizing this problem, recommended that SCOR consider the possibility of publishing a bulletin. The SCOR Executive Committee accepted this proposal, and decided that the reports of Executive and General Meetings might serve as the basis for a publication to be known as "Proceedings of the Scientific Committee on Oceanic Research."

In the past, the results of SCOR activities have been published in a variety of places. Reports of meetings have been distributed in mimeographed form to National Committees. Working groups associated with UNESCO have had their findings published by UNESCO. Other reports have appeared in special publications of appropriate laboratories, or have been distributed informally. It is hoped that the new "Proceedings," by centralizing information on SCOR activities, will serve to strengthen the links between the Committee and the scientists and organizations it serves.

Warren S. Wooster, Secretary
La Jolla, 1 August 1965

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PROCEEDINGS
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SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

Report of the Executive Committee Meeting

Rome, 10 - 12 June 1965

The meeting of the SCOR Executive Committee was held in the Consiglio Nazionale delle Ricerche, Rome, 10 - 12 June 1965, with the President, Captain Luis Capurro in the Chair. On behalf of Professor V. Caglioti, President of the CNR, Professor G. Aliverti welcomed participants in the meeting.

A list of those who attended the meeting is given in Annex I. The agenda is given in Annex II.

1 Organization and Finance

Responsibility for managing SCOR funds has been transferred to the Secretary, in accordance with a recommendation of the ICSU Executive Committee. A portion of the funds will remain with ICSU to facilitate payments in certain currencies. The ICSU Accountant will continue to receive national contributions. In the future, contracts with UNESCO and other agencies can be made directly by SCOR. The SCOR Secretary will present audited accounts to ICSU each year.

A contribution had recently been received from Portugal, and it is anticipated that a Portuguese member of SCOR will be nominated in the near future. (Subsequently, Commander Manuel Antunes da Mota was nominated.)

The Executive Secretary of ICSU expressed the wish of ICSU to appoint a different representative to each SCOR meeting in order to reduce travel costs of its representatives. The Executive Committee agreed that ICSU could do this, but preferred to have a scientist nominated by ICSU who could serve for at least three years.

2. Working Groups

A list of active working groups, with their memberships and terms of reference is given as Annex III.

In a discussion of general problems relating to working groups it was decided that the tenure of all such groups would expire at the time of each General Meeting of SCOR. Upon consideration of the report of each group a decision would then be made about re-establishing the group, changing its membership, or revising its terms of reference. Where possible, it was desirable to bring the Chairmen of working groups to the General Meetings. Reports of working groups would normally be published in the UNESCO series of technical papers. Dr. Humphrey was asked to prepare a set of general instructions to working groups. These instructions, as revised by the Executive Committee, are given in Annex IV.

2.1 Activities of existing groups

WG 10 - Oceanic Tables and Standards:

This is a joint panel with UNESCO, ICES and IAPO. The last meeting was held at Copenhagen, 5 - 6 October 1964, and reported in UNESCO Technical Papers in Marine Science, No. 1. The next meeting will be held on 8 and 11 October in Rome in connection with the forthcoming ICES meeting.

WG 12 - Abstracts:

The last meeting was held at Plymouth, 9 - 11 December 1963, and a preliminary report was issued early in 1964. Subsequently, work has been carried on by correspondence. A meeting was planned for March, 1965, but has been postponed tentatively to the third quarter of 1965. An invitation to hold this meeting in Moscow has been extended by the Chairman of the Oceanographic Commission of the USSR Academy of Sciences, Professor Zenkevich. It was felt that an appropriate time for this meeting would be between the end of the ICES meeting (13 October) and the beginning of the Fourth Session of IOC (3 November 1965).

Mr. Holt reported that FAO had been doing much of the preliminary work recommended by the group. In particular, a study had been made of the practical problems involved in publishing a current contents list of some 50 "core" journals. It is proposed that the tables of contents of these journals, plus titles of papers presented at significant national and international symposia, be published periodically by FAO and/or UNESCO. There remain some details to be worked out, and the proposal should be carefully considered by the working group. A list of the journals is given in Annex V.

An opinion was expressed that the working group had devoted too much of its energies to consideration of the very complex problems of documentaion, and that it should proceed expeditiously with certain relatively simple but important matters such as the current contents list. It was recommended that a member of the Executive Committee attend the next meeting of the group.

WG 13 - Zooplankton Sampling Methods:

This is a joint group with UNESCO and ICES, each organization furnishing a third of the expenses. Several working parties for different size classes of zooplankton have been established and are working through correspondence; no meeting has yet been held.

Dr. Fraser, Chairman of the group, presented a report which had been prepared for WG 16 (see Annex VI). It was noted that Soviet scientists had not yet been nominated for several of the working parties; Professor Kort indicated that these nominations would be forwarded promptly. Mention was also made of the establishment by the Marine Section of IBP of a working group on methods, consisting of Cassie (New Zealand), Olaniyan (Nigeria) and Davies (South Africa). Participation of Dr. Davies, SCOR representative on SCIBP, should ensure close co-ordination between SCOR and SCIBP activities in this field.

It was felt that solution of problems being considered by WG 13 would require several years at least.

WG 14 - General Scientific Framework

The draft GSF has been widely distributed in several languages by the IOC Secretariat, which has also collected comments of interested individuals and organizations. The group met with a representative of ACMRR in Moscow 10 - 12 May 1965; a brief report of this meeting is attached (Annex VII).

Authors of proposed new sections will be recruited by Drs. Revelle, Deacon, Kort and Cushing, as appropriate. It was agreed that SCOR should provide financial support for such assistance as Dr. Revelle would need for his editorial work. When the new version is completed it is hoped that interested members of IOC will undertake translation into French, Russian and Spanish, and that UNESCO will arrange for publication.

WG 15 - Photosynthetic Radiant Energy:

This is a joint group with UNESCO and IAPO. The last meeting was held at Moscow, 5 - 9 October 1964, and reported in UNESCO Technical Papers in Marine Science,

No. 2 (copy received by Secretary on 10 March 1965). The next meeting is proposed for August, 1966, in connection with the Eleventh Pacific Science Congress in Tokyo. At this meeting it will be possible to report on work accomplished in accordance with earlier recommendations and to consider plans for future field trials. It was suggested that the August meeting should precede the Pacific Science Congress and that the possibility of meeting in Nagoya rather than Tokyo should be explored.

WG 16 - General Problems of Intercalibration and Standardization

The first meeting of this group took place in Rome on 9 - 11 June 1965; during the morning of 11 June the group met jointly with the Executive Committee. A preliminary report is attached (Annex VIII).

In a discussion of this report it was noted that where standard methods could not readily be adopted by all scientists, certain methods might be established to which the results of other methods could be referred. It was also suggested that the "Provisional Guide for Exchange of Oceanographic Data" provided a useful list of measurements for which standardization or intercalibration might be necessary. It was considered important that members of WG 16 receive copies of all reports on oceanographic methods prepared by other SCOR working groups or their members, or emanating from national committees or other appropriate sources.

Professor Kort urged the establishment of a working group on routine methods for chemical analysis; Professor Carritt preferred to await compilation of detailed information being requested from National Committees on chemical methods now being used or developed before such a group is established.

It was agreed that members of WG 16 could serve as an editorial board for the UNESCO publications on oceanographic methodology.

WG 17 - Determination of Photosynthetic Pigments:

This is a joint group with UNESCO. The last meeting was held at Paris, 4 - 6 June 1964; the report was issued by SCOR in November, 1964. It is planned that this report, plus several background and technical reports, will be issued as No. 2 of the UNESCO Monographs on Methodology. Professor Krey, Chairman of the WG, recommended continuation of the group, which must review experience with the proposed standard method for chlorophyll "a", consider methods for other pigments, sampling and storage problems, etc. A meeting may be desirable in 1966. It was recommended that Professor Banse be asked to represent this working group on WG 18.

WG 8 - Biological Data

This is a joint group with ACMRR. To date the work of this group has been carried out by correspondence; a meeting is proposed for September / October in Paris. A report on the WG activities (UNESCO document AVS / 9 / 7B of 25 February 1965) was submitted to the ACMRR meeting in March, 1965. It appears that main emphasis will be given to the establishment of an inventory of sources of biological data rather than to a world storehouse. Mr. F. Williams has been designated the ACMRR member of the group.

2.2 Proposed New Groups

WG 19 - Micropaleontology of Bottom Sediments:

At the Hamburg meeting it was decided to take steps to establish this WG. In February Professor Kort furnished proposed terms of reference and a working program together with a list of possible members. This information was forwarded to SCOR National Committees on 23 February with a request for proposals and recommendations for membership. Numerous responses to this request were received indicating strong interest amongst micropaleontologists.

It was decided to establish a small working group whose principal task would be to prepare a symposium on marine micropaleontology. In addition, the group should consider the various comments that had been submitted and should recommend further action in this field. Members of the working group were proposed as follows:

Seibold, Chairman (FRG); Zhuse (USSR), Riedel (USA), Kanaya (Japan), Funnell (UK), Deflandre (France).

WG 20 - Radiocarbon Estimation of Primary Production:

In a letter of 5 January Professor Steemann Nielsen reported his view that standardization was badly needed in the field of marine production measurements, and suggested the establishment by SCOR, UNESCO and ICES of an appropriate working group. After consideration of this proposal WG 16 suggested that a working group be established, that their consideration be restricted to the radiocarbon method, that their single term of reference be:

" to make a critical review of methods now being used and to recommend a single referee procedure, "

and that they be asked to supply a preliminary report within six months. It was also recommended that one member of the group be a radio-

chemist not involved in measurements of primary production.

It was decided that such a group should be established jointly with ICES and UNESCO, with the following proposed membership:

Steemann Nielsen (Denmark), Sorokin (USSR),
Broecker (USA), Strickland (USA), Ichimura
(Japan), Menzel (USA), Jitts (Australia).

It was hoped that ICES, at its forthcoming meeting in October, and UNESCO would look favorably on the establishment and membership of this group and would agree to joint financing of its activities.

Proposed WG on Air-Sea Interaction:

At the Hamburg meeting it was suggested that the existing IAPO - IAMAP joint committee on air - sea interaction might be somewhat enlarged and sponsored by SCOR and UNESCO. Thus, it was hoped that funds could be found to permit the Committee to meet. Mr. Charnock was asked to study the situation and advise SCOR on the most appropriate action.

Subsequently, the IUGG Committee on Atmospheric Sciences agreed to seek funds for a meeting of the Joint Committee. The WMO Commission for Maritime Meteorology has established a Working Group on Ocean - Atmosphere Interaction with terms of reference rather similar to those of the IAPO-IAMAP Joint Committee. Mr. McCleod, Chairman of the Commission for Maritime Meteorology, reported that the WMO Commission on Aerology also had a working group dealing with the scientific aspects of the air-ocean interface.

It was generally agreed that there were already too many working groups dealing with this problem, that membership and terms of reference of these groups appeared to overlap, and that SCOR's efforts might best be directed towards simplification of the organizational structure. It was felt that representatives of the interested groups should meet in the near future to resolve the organizational problems. The Secretary was instructed to communicate with WMO, UNESCO, IUGG, IAPO, IAMAP and other interested parties, and to attempt to have such a meeting convened, preferably by WMO.

Proposed WG on Organization of International Oceanography:

During the past five years there has been a continuing debate about the effectiveness of the organizational structure of international oceanography. Some say that there are too many international organizations in this field, and that coordination and funding of their activities is increasingly difficult. Others consider the present structure within the United Nations system

as satisfactory for the time being, but stress the eventual necessity for creating a separate agency whose principal concern is with oceanographic and marine fishery problems. In its role as adviser to both UNESCO and IOC, SCOR clearly has a responsibility to keep such organizational problems under continuing review. The Executive Committee recognized this responsibility, but considered that the problem should be discussed informally over a period of time before any formal action is taken.

3. Second International Oceanographic Congress

In accordance with decisions of SCOR and IOC, a Program Committee has been organized for the Congress. This Committee met in Moscow, 13 - 15 May 1965; a further meeting is planned in November. Dr. Stewart represented SCOR at this meeting, and SCOR also paid travel expenses for Dr. Revelle who represented IAPO. A report of the meeting is attached (Annex IX).

A list of lecturers to be invited to deliver morning lectures was also reported. Some concern was expressed over the geographical and disciplinary distribution of the proposed lecturers, some of whom were considered inappropriate for the assigned topics. The Secretary was instructed to bring the views of the Executive to the attention of the Program Committee.

Dr. Fedorov reported that UNESCO had set aside \$18,000 to cover travel of invited lecturers and young scientists. However, it appeared that all of this would be required for the lecturers. Funds held by the American Association for the Advancement of Science for the Congress amount to about \$20,000. The Executive Secretary of AAAS has indicated that upon receipt of an appropriate request from SCOR, this balance could be transferred to the SCOR account. It was decided that these funds could best be used to bring young scientists to the Congress, and that the amount should be divided more or less equally between the conveners of symposia who could then use them to pay the expenses of selected young scientists asked to present papers at the symposia. It was hoped that the Arrangements Committee would select symposium topics and conveners at an early date so that the scientists selected would have adequate time to prepare the papers.

4. International Biological Program

SCOR was represented at the February SCIBP meetings by Dr. David Davies (South Africa) who also participated in a meeting of the Productivity Marine Sectional Committee. The question of SCOR membership was finally resolved, the report of the meeting stating, "It was agreed that the representatives of SCAR and SCOR should be included as members of SCIBP, but that the costs for their attendance at SCIBP meetings would not be borne by SCIBP. The draft constitution of SCIBP was modified accordingly."

The PM Sectional Committee recognized the important work of SCOR in

the field of oceanographic methodology, but felt that a more vigorous approach was required. Possibly an international center for the development and inter-comparison of methods could be established. A working group on methods was established, with Davies as a member. This group would work closely with appropriate SCOR Working Groups. SCOR was asked to evaluate its efforts in the field with a view to improving and accelerating the work.

During the discussion of this matter Dr. Davies and Mr. Baker (SCIBP) were present. As noted above (under WG 13), collaboration between SCOR and SCIBP in the field of methodology appears to be well established. The proposed international center was discussed by WG 16 which felt that the difficulties of staffing such a center made such action undesirable at the present time. Dr. Davies was asked to draft a statement to SCIBP indicating the areas in which cooperation between the two Committees appeared most appropriate. This could then be disseminated in International Marine Science.

5 Relations with ACMRR

SCOR was represented by Dr. Tham Ah Kow at the ACMRR meeting in March. The representative of ACMRR, Dr. Cushing, attended discussions on the General Scientific Framework and the Second International Oceanographic Congress in Moscow. A new section of the GSF on fishery oceanography is to be prepared by Drs. Cushing, Chapman and Mitra.

FAO is taking action to develop a world meeting on marine pollution and its effects on fisheries resources. It was agreed that this subject was of great interest to SCOR, but that no action was appropriate until more information was available.

6 Relations with UNESCO/IOC

6.1 Indian Ocean Biological Center

It was noted that the role of SCOR is to advise UNESCO, operation of the Center being a responsibility of UNESCO and the Indian Government. The Executive Committee approved the terms of reference of the IOBC Consultative Committee adopted at the International Indian Ocean Expedition Coordination Meeting (Paris, 7 - 9 June 1965), and recommended that the Chairman of this Committee serve for two years; its members should normally serve for three years, but not more than six years. It was also recommended that Professor J. Krey be appointed as the sixth member of the Committee.

International Indian Ocean Expedition

At the IIOE Coordination Meeting referred to above, it was

considered that the SCOR disciplinary experts provided an extremely valuable service, and that the importance of such work will further increase, despite the termination of IIOE field operations at the end of 1965. It was recommended that these scientists formulate suggestions for action by IOC, UNESCO, SCOR, WMO and other interested international organizations, to ensure that the best use is made of data obtained through the cooperative efforts of countries which participated in the IIOE. The SCOR experts were also asked to serve as members of an editorial board for the IIOE Collected Reprints being published by UNESCO.

A proposal had been made that SCOR participate in the publication of IIOE data reports in order to obviate certain technical difficulties if UNESCO alone were to be the publisher. However, it was decided that the World Data Centers for Oceanography would be more appropriate co-publishers.

6.3 UNESCO Monographs on Oceanographic Methodology

Publication of the first of this series, a new edition of Strickland and Parsons' manual of chemical oceanographic methods, has been delayed due to some misunderstandings between UNESCO and the Queen's Printer in Ottawa. A second volume will be devoted to various reports resulting from activities of WG 17 on determination of photosynthetic pigments. A suggestion was made that the work of WG 10 would lead to the production of new oceanographic tables, and that a volume could usefully be devoted to such tables plus a comprehensive text on the research leading to these new tables.

6.4 Other Matters

The ICITA Atlas Committee has recommended the plotting of ICITA station curves by computer at NODC. UNESCO is prepared to pay for this work, and has suggested that SCOR serve as the contracting agency. The ICSU Treasurer has approved such a contract, and the Secretary was instructed to take the necessary action to complete arrangements with UNESCO and NODC.

The IOC Secretariat and UNESCO Office of Oceanography submitted a statement of other matters which SCOR might consider (ANNEX X). The problem of financial statements for SCOR / UNESCO contracts can be solved administratively. Some recommendations concerning the UNESCO program in oceanography are contained elsewhere in this report.

With regard to the question of the most effective ways for UNESCO to contribute to the development of oceanography in Latin

America and Africa, it was recognized that this is closely related to the IOC consideration of the development of national programs. Although no specific advice could be given to UNESCO on this complex problem, the Executive Committee agreed to keep the matter under review. The responsibility of SCOR to consider from a non-governmental point of view the ways whereby oceanographic programs can be developed was accepted.

In a discussion of the proposed international underwater scientific laboratory, it was concluded that SCOR action would be premature at the present time.

Other questions in Annex X are treated elsewhere in this report.

7 Other Business

7.1 Pacific Science Congress

Mr. Tyler, Chairman of WG 15, reported the plan of this group to meet in Japan prior to the Congress, and indicated that it was too early to schedule any intercalibration tests, as had at one time been proposed. Professor Suguwara reported on arrangements and program for the Congress, to be held in Tokyo from 22 August to 10 September 1966.

7.2 SCOR Bulletin

In a letter of 13 April, Professor Blaskovic, Secretary-General of ICSU, transmitted the suggestion of the ICSU Executive Committee that SCOR should consider publicizing its activities by printing bulletins similar to those of SCAR and COSPAR. There was general agreement that such a publication would serve to keep members, national committees, ICSU and other interested parties better informed on SCOR activities. It was decided that the six-monthly reports of the SCOR Executive and General Meetings could be somewhat expanded and published as "Proceedings of the Scientific Committee on Oceanic Research." The Secretary was instructed to prepare the first number, based on the report of the present meeting.

7.3 International Association of Biological Oceanography

At its Fifteenth General Assembly in Prague (18 - 22 July 1964), IUBS approved the establishment of a Section of Biological Oceanography. The Executive Committee agreed to invite Professor Steemann Nielsen to serve as the first President and to organize the Section. He has invited Dr. Currie to act as Secretary and Dr. Parin, IUBS representative

on SCOR, to serve as one of the members of the Executive Committee. The first General Assembly is planned during the Second International Oceanographic Congress.

7.4 Upper Mantle Project

Sir Edward Bullard, SCOR representative on the Upper Mantle Committee, has submitted a report on this project, which is given in ANNEX XI.

7.5 Next Meeting

The Fourth Session of IOC is scheduled for 3 - 12 November 1965 in Paris. On 2 November the IOC Working Group on Variability in the Ocean will meet. It was decided to hold the next Executive meeting on 28 - 30 October, with further ad hoc discussions during the session as required. The Secretary was instructed to investigate the possibilities of holding the meeting in Marseilles or Monaco.

The Eighth Meeting of SCOR is scheduled to be held in Italy just before the Second International Oceanographic Congress (now scheduled for April or June, 1966). When the Congress dates have been established, negotiations with appropriate Italian authorities should proceed.

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SCOR EXECUTIVE COMMITTEE MEETING

Rome, 10 - 12 June 1965

LIST OF PARTICIPANTS*

Present

Captain Luis R. A. Capurro, President
Dr. George F. Humphrey, Retiring President
Professor Vladimir G. Kort, Vice President
Professor Trygve Braarud, Vice President
Professor Warren S. Wooster, Secretary

In Attendance

R. L. Fisher, IIOE
K. N. Fedorov, UNESCO/IOC
R. P. von Herzen, UNESCO/IOC
S. J. Holt, FAO
R. Jackson, FAO
K. T. McLeod, WMO
N. K. Pannikar, IOC
M. Ruivo, FAO/ACMRR
K. Sugawara, IOC
S. Szymborski, SCOR
K. Terada, FAO
M. Uda, IIOE/CSK

*Working Group 16 met concurrently with the Executive Committee, and some of the following members participated in discussions of Working Group activities:

D. E. Carritt (Chairman of WG 16)
D. H. Davies
J. H. Fraser (Chairman of WG 13)
J. Joseph
J. Krey (Chairman of WG 17)
J. E. Nafe
J. P. Riley
J. E. Tyler (Chairman of WG 15)

SCOR EXECUTIVE MEETING

10 - 12 June 1965 Rome, Italy

AGENDA

1. Organization and Finance
2. Working Groups
 - Activities of Existing Groups
 - Proposed New Groups
3. Second International Oceanographic Congress
4. International Biological Program
5. Relations with ACMRR
6. Relations with UNESCO/IOC
 - 6.1 Indian Ocean Biological Center
 - International Indian Ocean Expedition
 - 6.3 UNESCO Monograph Series
 - 6.4 Other Matters
7. Other Business
 - Pacific Science Congress
 - 7.2 SCOR Bulletin
 - 7.3 IABO
 - Next Meeting

on

OCEANOGRAPHIC TABLES AND STANDARDS

Jointly Sponsored by ICES - SCOR - IAPO - UNESCO

Terms of reference

To review present knowledge of the equations of state of seawater, in particular of the properties of chlorinity, salinity, density, conductivity and refraction index, and the relationships among these properties, (2) to consider whether re-definition of any of these properties is necessary, and (3) to advise on such further investigations as may be required.

Chairman Professor Dr. G. Dietrich
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SCOR WORKING GROUP NO. 12
on
ABSTRACTS AND BIBLIOGRAPHIES

Terms of Reference

To state (1) the present position regarding marine abstracts and bibliographies, (2) what improvements marine scientists would like, and (3) how these improvements can be brought into practice.

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SCOR WORKING GROUP NO. 13

on

STANDARDIZATION OF ZOOPLANKTON METHODS

A Joint Sub-Committee of ICES, SCOR and UNESCO

Terms of Reference

To set up small working parties from experts in their particular fields of work, who will examine and consider the methods used at sea and in the laboratory in sampling zooplankton of various categories, and make recommendations concerning the methods they consider the most satisfactory for general adoption. Where they consider present methods inadequate new methods should be recommended, based if necessary on new hydrodynamic or other research. Where it is possible to do so the working parties should compile a series of intercalibration factors between the methods most frequently in current use, and should consider the inclusion of factors for past methods especially where much data have been published.

Chairman: Dr. James H. Fraser
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Another Member To Be Named From
USSR

Working Party IV (Large and Fast Swimming Zooplankton)

Convener: Mr. Peter Foxton
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Dr. William I. Aron
Defense Research Laboratory
General Motors Corporation
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Mr. Michel Legand
O. R. S. T. O. M.
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Dr. Takahisa Nemota
Whale Research Institute
Minato-ku
Tokyo, Japan

Another Member to be Named

SCOR WORKING GROUP NO. 14
on
THE GENERAL SCIENTIFIC FRAMEWORK
for the
COMPREHENSIVE STUDY OF THE WORLD OCEAN

Terms of Reference:

(1) To report on the General Scientific Framework Symposium (Halifax, 6 and 8 April 1963), (2) To have further contact with National Committees and scientists, (3) To report on the value of a General Scientific Framework, and (4) To prepare a statement for transmission to the Intergovernmental Oceanographic Commission.

Chairman: Dr. Roger Revelle
Harvard School of Public Health
55 Shattuck
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List of Members:

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Professor Dr. Vladimir G. Kort
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Moscow J-387, USSR

SCOR WORKING GROUP NO. 15
on
PHOTOSYNTHETIC RADIANT ENERGY
Jointly Sponsored by UNESCO - SCOR - IAPO

Terms of Reference:

(1) To identify exactly what measurement of irradiance is required by biological oceanographers. (2) To recommend apparatus and procedure for measuring the variable defined above.

Chairman: Mr. John E. Tyler
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Dr. E. Steemann Nielsen
Botanical Department
Royal Danish School of Pharmacy
Copenhagen, Denmark

SCOR WORKING GROUP NO. 16
on
GENERAL PROBLEMS OF INTERCALIBRATION AND STANDARDIZATION

Terms of Reference:

(1) To work out a general and comprehensive plan establishing priorities in intercalibration and standardization, (2) To evaluate the results of studies already made, (3) To propose new working groups to study other techniques, (4) To organize exchange of experience gained when applying new methods and instruments, (5) To arrange for tests in the laboratory and at sea, and (6) To establish tentative and recommended procedures.

Chairman Dr. Dayton E. Carritt
Department of Geology and Geophysics
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

List of Members

Dr. David H. Davies Oceanographic Research Institute 2 West Street Durban, Natal South Africa	Professor Dr. J. Krey Institute für Meereskunde Universität Kiel Hohenbergstrasse 2 Kiel, West Germany
Professor Dr. G. Dietrich Institut für Meereskunde Hohenbergstrasse 2 Kiel, West Germany	Dr. John E. Nafe Lamont Geological Observatory Columbia University Palisades, New York
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Dr. Joachim Joseph International Laboratory of Marine Radioactivity Musée Océanographique Monaco	Mr. John E. Tyler Scripps Institution of Oceanography Post Office Box 109 La Jolla, California 92038

SCOR WORKING GROUP NO. 17
on
DETERMINATION OF PHOTOSYNTHETIC PIGMENTS
Jointly Sponsored by UNESCO and SCOR

Terms of Reference:

To consider experimental results relevant
to the following points:

- (i) Type of filter for removing phytoplankton from sea water
- (ii) Suction pressure to be applied to filter
- (iii) Necessity for grinding or sonification
- (iv) Extraction solvent
- (v) Addition of basic material, e.g. $MgCO_3$ or dimethylaniline during extraction
- (vi) Desiccation of filters before extraction
- (vii) Steam treatment of filters
- (viii) Storage of filters
- (ix) Duration of extraction
- (x) Removal of extracted residue by centrifugation or filtration
- (xi) Precision of chlorophyll a determination at 1.0, 0.1 and 0.02 $\mu g.$ levels under laboratory conditions

Chairman: Professor Dr. J. Krey
 Institut für Meereskunde
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Bunkyo-ku, Tokyo, Japan

Dr. S. W. Jeffrey
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New South Wales, Australia

Dr. Leo Preston Vernon
Charles F. Kettering Laboratory
Yellow Springs, Ohio

SCOR WORKING GROUP NO. 18

on
BIOLOGICAL DATA

Jointly Sponsored by SCOR and ACMRR

Terms of Reference:

1. To list the kinds of biological data which might be considered for inventory and/or storage in regional, specialized, or world, data centres:
2. To make proposals for action required to reach agreement among scientists as to the forms of transmission and storage of types of biological data in the categories.
 - 2.1 variables for which there is general agreement on the usefulness of transmission to data centres and for which a guide could readily be prepared.
 - 2.2 variables for which general agreement could probably be obtained after discussion among scientists and data centres.
 - 2.3 variables for which there is at present little prospect of agreement.
3. To consider the desirability and practical implications of storing biological and other related data in the same or different centres.
4. To consider and advise on appropriate action concerning the compilation and indexing of source lists of publications containing biological data.
5. To consider and advise on the question whether data centres should process biological data.

Chairman Dr. G. Hempel
 Office of Oceanography
 UNESCO, Place de Fontenoy
 Paris 7^e, France

List of Members:

Professor Vernon E. Brock	M. R. M. Cassie
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Honolulu, Hawaii 96822	Auckland, New Zealand
Dr. M. J. Dunbar	Dr. Frank Williams, Director
Marine Sciences Department	Guinean Trawling Survey
Mc Gill University	P.M.B. 2359
Montreal, Quebec, Canada	Lagos, Nigeria, Africa

There are two more members to be named from WG-17 and the USSR

SCOR WORKING GROUP NO. 19
on
MICROPALAEONTOLOGY OF BOTTOM SEDIMENTS

Terms of Reference:

(1) To prepare a symposium on marine micropaleontology, (2) To consider comments submitted on activities of the working group, and (3) To recommend further action in this field.

Membership is being established.

SCOR WORKING GROUP NO. 20
on
RADIOCARBON ESTIMATION OF PRIMARY PRODUCTION

Jointly Sponsored by SCOR - ICES - UNESCO

Terms of Reference

(1) To make a critical review of radiocarbon methods of primary production now being used, and (2) To recommend a single referee procedure.

Membership is being established.

GENERAL INSTRUCTIONS TO SCOR WORKING GROUPS

1. The creation of Working Groups is usually determined at General Meetings; in some cases, where the necessity for establishing a group is clear, action can be taken at Executive Meetings. Sometimes membership is decided at these meetings; sometimes National Committees are consulted first. In all cases, National Committees and relevant international and inter-governmental bodies are asked to nominate observers to participate freely in correspondence and meetings, and to receive documents. The observers are financed by their nominating bodies; SCOR pays fares, per diem and administrative expenses of their nominees.
2. Some Working Groups are in cooperation with bodies such as UNESCO, FAO, IAPO, ICES, etc. In such cases SCOR nominates some of the WG members and finances only them. Decisions on membership are made in close consultation with all the nominating bodies.
3. All Working Groups have terms of reference decided by SCOR (alone or in consultation with other nominating bodies). The Chairman of a Working Group may suggest to SCOR additional terms of reference but may not change those already given.
4. The tenure of Working Groups automatically expires at each SCOR General Meeting. Usually the Chairman of each Working Group is asked to present a written report and to help SCOR decide whether the Working Group should be reformed with or without changes in membership and terms of reference. Working Groups reports may be published by SCOR, UNESCO or other sponsoring bodies, as appropriate. Such publication does not imply SCOR approval or that SCOR agrees to act on any recommendations. SCOR may summarize or adapt the WG report for its own purposes. With joint Working Groups, disbanding, reforming and reporting will be made in consultation with the other nominating bodies.
5. SCOR action after receiving a Working Group report includes.
 - 5.1 Making recommendations to relevant bodies
 - 5.2 Forming further Working Groups.
 - 5.3 Requesting or arranging (but not financing) laboratory and field studies.

CORE JOURNALS

Title of Periodical	Periodicity
Advances in Marine Biology. New York, London.	Annual
Archiv für Fischereiwissenschaft. Hamburg.	Irregular
Archivio di Oceanografia e Limnologia. Venezia.	Irregular
Australian Journal of Marine and Freshwater Research. Melbourne.	Irregular
Beiträge zur Meereskunde. (Deutsche Akademie der Wissenschaften zu Berlin).	Irregular
Bericht der Deutschen Wissenschaftlichen Kommission für Meeresforschung. Hamburg.	Irregular
Biological Bulletin. Marine Biological Laboratory. Woods Hole.	Bi-monthly
Bollettino di Pesca, di Piscicoltura e di Idrobiologia. Roma.	Semi-annual
Botanica Marina. International Review for Seaweed Research and Utilization. Hamburg.	Quarterly
Bulletin of the Bingham Oceanographic Collection, Yale University. New Haven.	Irregular
Bulletin of the Marine Science of the Bulf and Caribbean Coral Gables.	Irregular
Cahiers de Biologie Marine. Paris.	Quarterly
Cahiers Océanographiques. Paris.	Monthly
Deep-Sea Research. Oxford.	Bi-monthly
Deutsche Hydrographische Zeitschrift. Hamburg.	Bi-monthly
Geochimica et Cosmochimica Acta. London.	Monthly
Helgoländer Wissenschaftliche Meeresuntersuchungen. Stuttgart.	Irregular
Indian Journal of Fisheries. New Delhi.	Semi-annual
International Hydrographic Review, Monte Carlo.	Semi-annual
Investigación Pesquera. Consejo Superior de Investigaciones Científicas. Barcelona.	Irregular
Journal du Conseil. (Conseil Permanent International pour l'Exploration de la Mer.) Copenhague.	Irregular
Journal of the Fisheries Research Board of Canada. Ottawa.	Bi-monthly
Journal of Geophysical Research. Richmond, Virginia.	Monthly

Title of Periodical	Periodicity
Journal of the Marine Biological Association of India. Mandapam Camp.	Semi-annual
Journal of the Marine Biological Association of the United Kingdom. London.	3 times a year
Journal of Marine Research. New Haven, Conn.	3 times a year
Journal of the Oceanographical Society of Japan. Tokyo.	Monthly
Kieler Meeresforschungen. Kiel.	Semi-annual
Limnology and Oceanography. Lawrence, Kansas.	Quarterly
Marine Geology. Amsterdam.	Quarterly
Marine Science Instrumentation.	Irregular
Meddelelser fra Danmarks Fiskeri- og Havundersøgelser. Charlottenlund.	Irregular- Once a Year
Netherlands Journal of Marine Research.	Irregular
Oceanography and Meteorology. Nagasaki.	Bi-monthly
Okeanologiia. Moscow.	Annual
Progress in Oceanography. Oxford.	Irregular
Pubblicazioni della Stazione Zoologica di Napoli. Napoli.	Irregular
Publications of the Institute of Marine Science. University of Texas. Port Arkansas.	Irregular
Rapport et Procès-verbaux des Réunions. Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée. Paris.	Irregular
Records of Oceanographic Works in Japan. Tokyo.	Irregular
Revue Algologique. Paris.	Irregular
Sarsia. (Universitetet i Bergen.) Oslo.	Irregular
Sedimentology (International Association of Sedimentology). Amsterdam.	Quarterly
Tellus. Svenska Geofysiska Föreningen. Stockholm.	Quarterly
Travaux Centre Océanographique de Pointe Noire	Irregular
Trudy Instituta Okeanologii, Akademiia Nauk SSSR. Moskva.	Irregular
Trudy Vsesoiuznogo Nauchno-issledovatel'skogo Instituta Morskogo Rybnogo Khoziaistva i Okeanografii. (Trans.)	Irregular
Veröffentlichungen des Instituts für Meeresforschung in Bremerhaven.	Irregular
Zeitschrift für Fischerei und deren Hilfswissenschaften. Berlin.	Irregular- 2-4 times a year

Report of Working Group 13
on
ZOOPLANKTON SAMPLING METHODS

A joint sub-committee of ICES, SCOR and UNESCO was set up to consider the advisability of standardization of methods in zooplankton sampling, and the first meeting took place at UNESCO in Paris in January, 1964, with Drs. Humphrey (SCOR), Parsons (UNESCO), Krey and Fraser (ICES). Following the discussions at this meeting, a letter was sent out by SCOR in the following terms to each nation group interested in plankton work.

"The methods used in plankton sampling are so varied, and the difficulties in comparing one set of data with another are so great, that it would be a real step forward if some standardization could be introduced wherever it was reasonably practical to do so. The problems involved are world wide, and the Plankton Committee of the International Council for the Exploration of the Sea at their 1963 meeting in Madrid decided to seek the co-operation of other organizations with a view to setting up working parties of experts to consider specific fields.

"I am acting, on behalf of I. C. E. S., as chairman of the sub-committee to organize working parties on zooplankton for which I propose the following terms of reference.

Terms of reference

"To set up small working parties from experts in their particular fields of work, who will examine and consider the methods used at sea and in the laboratory in sampling zooplankton of various categories, and to make recommendations concerning the methods they consider the most satisfactory for general adoption. Where they consider present methods inadequate, new methods should be recommended based, if necessary, on new hydrodynamic or other research. Where it is possible to do so, the working parties should compile a series of intercalibration factors between the methods most frequently in current use, and to consider the inclusion of factors for past methods, especially where much data have been published.

"I envisage four such working parties in zooplankton (including fish eggs and larvae) to deal with:

- (1) The microzooplankton, at present sampled by water bottle, very fine meshed nets and pump filters.
- (2) The zooplankton now sampled by a great range of techniques, but largely dependent on filtration through a No. 3 mesh (about 60 meshes per inch).
- (3) The larger zooplankton, often sampled by stramin or other coarse meshed nets.
- (4) The faster moving macroplankton, such as the larger euphausiids and small fish.

"The working parties should be of a practical size and I suggest five members to each party, to be chosen from suitably experienced experts and representing, as far as reasonably practical, a world wide coverage of interests.

"My sub-committee is faced with the problem of arranging for the best coverage in making their selection of personnel to invite, and I would be most grateful for your co-operation. Would you please let me have a note of the names of experts in your organization working in each or any of these four fields of zooplankton work, and whom you consider qualified to undertake the work, and who would be willing if selected to participate? The names should be sent to me at Aberdeen as soon as you conveniently can, and not later than June first.

"To keep expenses within reasonable bounds I would expect the working parties to do much of their work by correspondence, but funds are likely to be available for at least one meeting. This can be dealt with more fully when the membership and needs of the working parties are known."

Based on the replies received, a further meeting was held at UNESCO in June, 1964, at which the members we wished to invite to form the four working parties were selected. After some changes, because of other commitments, etc., the following were chosen:

Working party 1 -- R. I. Currie (England), Convener; with Krey (Germany), Banse (Seattle), Vagn Hansen (Denmark), and McLaren (Canada).

Working Party 2 -- Allan W. H. Bé (USA), Convener; with Kimor Komarovskiy (Israel), Boudillon (France), de Decker (South Africa), Della

Croce (Italy), Bogorov (USSR), and
Aurich (Germany).

Working Party 3 --D. J. Tranter (Australia), Convener;
with Gehringer (USA), Marta Vannucci
(Brazil), Anraku (Japan), and a repre-
sentative from USSR.

Working Party 4 --P. Foxtan (England), Convener; with
Aron (USA), Nemoto (Japan), Legand
(New Caledonia), and another.

Meetings of these four working parties are to be financed on an equal
basis by SCOR, UNESCO and ICES. Progress to date is:

Working Party 1 -- (Microzooplankton)

This working party has been working by correspondence and it
may be possible for them to complete their work without meeting,
but this will be decided later. The convener expects a draft
statement to be ready by August, 1965.

Working Party 2 -- (Smaller Zooplankton)

After having worked by correspondence, it is hoped to arrange
a meeting in the relatively near future. This is likely to be in
southern Europe. A second meeting has been under discussion,
but this will depend on progress at the first meeting.

Working Party 3 -- (Larger Zooplankton)

Although still awaiting the name of the representative from
USSR (which I now understand is to be sent shortly), this working
party is now actively engaged in work by correspondence after a
delayed start. A questionnaire has been sent out but no meeting
has so far been proposed.

Working Party 4 -- (Large and Fast Swimming Zooplankton)

Their work is still at the exploratory stage by correspondence,
but the convener hopes to have his draft statement ready by August.

It is hoped that each of the four working parties will be able to produce
a draft statement by the end of August, 1965, which can then be given (in
draft form only) to the IBP in time for the meeting of their working group in
September, and that UNESCO will duplicate and circulate the drafts for con-
sideration by a wide field of interested marine biologists who would be asked
to comment by a given date. Final revised reports could then be produced at
meetings of the working parties based on the comments received.

J. H. Fraser
2 June 1965

Report of Working Group 14
on the
GENERAL SCIENTIFIC FRAMEWORK FOR WORLD OCEAN STUDY

Following the Resolution of the Third Session of the Intergovernmental Oceanographic Commission, the SCOR Working Group on the GSF, together with representatives of other interested organizations met from 10 - 12 May 1965 in Moscow to discuss comments received from individual scientists and scientific institutions on the Draft of a General Scientific Framework for World Ocean Study as published and distributed by the Commission. The Working Group consisted of Dr. Revelle (Chairman), Dr. Deacon, Professor Kort, and of scientists appointed by international organizations: Dr. Cushing (ACMRR / FAO), Academician E. K. Fedorov (WMO), Drs. Lal and K. N. Fedorov (IOC / UNESCO), and Dr. Stewart (SCOR).

The number of comments received by 10 May was considerably greater than the group could meaningfully digest in three days. The comments fall into three categories:

- (a) Those requiring editorial changes;
- (b) Those requiring changes in substance;
- (c) Those requiring preparation of new paragraphs, sections and chapters.

Most of the editorial comments and substantial changes were introduced into the text of the Draft during the meeting, although sometimes in a provisional form which implies that considerable editorial work will have to be done later. At the meeting authors were identified for some, but not all, of the suggested new parts of the GSF.

The Working Group suggested appointing Dr. Revelle Chief Editor of the GSF. SCOR should be asked to support financially a young scientist who would work in close association with Dr. Revelle on editing the final version of the GSF. No deadline was suggested for preparation and publishing the final version, the Committee having felt that further work on the GSF should be done with no hurry. The Committee considered that the publishing of the first draft of the GSF and its wide distribution had already played a remarkable role in stimulating scientific discussion in oceanographic circles.

Draft Report of Working Group 16
on
GENERAL PROBLEMS OF INTERCALIBRATION AND STANDARDIZATION

The primary work of the group during three half day sessions was to interpret the terms of reference given to us by SCOR in a manner that will permit the efficient and productive operation of the working group in the future.

The terms of reference given to us are:

- (i) to work out a general and comprehensive plan, establishing priorities in intercalibration and standardization,
- (ii) to evaluate the results of studies already made,
- (iii) to propose new working groups to study other techniques,
- (iv) to organize exchange of experience gained when applying new methods and instruments,
- (v) to arrange for tests in the laboratory and at sea,
- (vi) to establish tentative and recommended procedures.

Reference (ii) appears to us to be outside the competence of the working group. Indeed, if by "evaluate" is meant to make critical value judgements concerning the adequacy of studies that deal with specialized kinds of measurements, we are of the opinion that this can be done only by experts in the particular speciality involved.

The remaining reference items do form an adequate and workable framework within which we can and will operate. We propose the following as a suitable set of operations for the immediate future.

All of our considerations are concerned with the results of the measurements of chemical, physical dynamical, biological and geological properties of the ocean. Of primary concern are those measurements that are being

made by several laboratories, especially when the laboratories are in different countries. One of our immediate tasks then, is to assemble from laboratories and individuals throughout the world, by means of a questionnaire, a list of the kinds of measurements being made, together with standards being used and the results of intercalibration studies that have been, or are being performed. This information will be a part of that required for action under items (i), (iii), (iv), (v) and (vi) of our terms of reference.

In addition to the sources of information noted above, it appears from our discussions with the Chairmen of other SCOR working groups, that WG 16 will receive questions and requests from the other working groups on problems that fall outside of the competence of a particular group, but which are related to their problems. For example, WG 13, under the Chairmanship of Dr. Fraser, on Standardization of Zooplankton Methods, is concerned with plankton net design and testing, but has no member who can provide the necessary hydrodynamic expertise. WG 16 may be able to act as an intermediary in such an effort.

At the present time we see no intercalibration efforts directed towards the methods of chemical analysis for nutrients, with the exception of dissolved oxygen and phosphate, for geological measurement in general, and for some physical measurements, for example, intercalibration of current meters. Professor Kort and Dr. Joseph have supplied detailed information on some of these problems. However, we will reserve recommendations until more information has been accumulated.

The first effort of WG 16 then, will be to discover and emphasize the areas in which measurements are being made but which lack a common basis for standardization and have not been involved in intercalibration studies.

Having then pointed out the kind of measurements that lack the stabilization brought by standardization or intercalibration, we see our second line of action to be in promoting further action by SCOR to remove the deficiencies noted.

We see a third line of action to be that of co-ordinating efforts in all areas of standardization and intercalibration of oceanographic measurements. This can be by providing to all interested parties the results of studies in any field of speciality, particularly studies that are in progress or have been completed, but not published.

A comment offered several times during the meeting of WG 16 was that several intercalibration studies already planned are now foundering on the rocks of inadequate funding. WG 16 may act to stimulate additional funding

from appropriate sources. The funds required are likely to be considerable.

WG 16 heard a preliminary report by Dr. Davies on some of the activities of IBP-PM. We discussed in particular the proposal that would establish an International Calibration Centre. The group feels that the difficulties of staffing such a centre make such an action undesirable at the present time. We agree with the alternative suggestion made by IBP that the same results might be obtained initially by supporting individual scientists who desire to do intercalibration work and by providing financial support for any laboratory that will encourage such work. Because the funds required will be considerable, funding from all possible sources is desirable, for example from FAO and other international groups, as well as from national organizations.

The working group discussed the proposal dated 27 January 1965 from Captain da Silva, to establish within the Brazilian Institute of Naval Research a service for supplying South American oceanographers with prepared solutions or pre-weighed solids in ampules for chemical analyses to be performed at sea. We find no fundamental reason for discouraging such an effort, but we have no knowledge of the shelf life of such solutions. We suggest that if immediate action is contemplated, the preparation of pre-weighed solids be undertaken and that the preparation of solutions be postponed until the results of the study proposed by UNESCO (UNESCO / IOC / INF-68, p. 12, item 4(3), paragraph 1, 3 sub 4), are available. We suggest that independent checks on the suitability of the prepackaged chemicals can be made by several of the major oceanographic laboratories.

Finally, the working group is of the opinion that there may be general points concerning the experimental design of all intercalibration experiments, that should provide the broad guide line for actions and recommendations by the group. We defer conclusions about this until further study can be made.

Report of the Program Committee
for the
SECOND INTERNATIONAL OCEANOGRAPHIC CONGRESS
First Meeting, 13 - 14 1965, Moscow

In attendance

Chairman - Academician E. K. Fedorov, USSR Academy of Sciences
Professor V. G. Bogorov, USSR Academy of Sciences
Dr. D. Cushing, ACMRR/FAO
Dr. G. Deacon, SCOR
Dr. K. N. Fedorov, IOC/UNESCO
Professor V. G. Kort, USSR Academy of Sciences
Dr. D. Lal, IOC/UNESCO
Dr. R. Revelle, IAPO
Dr. R. Stewart, SCOR
Academician A. P. Vinogradov, USSR Academy of Sciences

Second International Oceanographic Congress
11 - 20 April 1965, Moscow, USSR

PROGRAM

"Ocean Research for the benefit of Mankind"

Ocean and atmosphere - total of six lectures at plenary sessions.

Interaction between ocean and atmosphere - (energy exchanges) between oceans and atmosphere; long-term weather forecasting and variations of climate (two lectures).

The general circulation of the oceans - (dynamics) of general ocean circulation. Meridional heat transfer. Exchange between subsurface and deeper waters (three lectures).

The sea surface - studies of surface waves and wave prediction; the study of ship motion in relation to waves (one lecture).

2. Ocean and Life - total of six lectures at plenary sessions.
- Productivity and Fertility of the Ocean - factors which make some parts of the ocean more fertile than others and which lead to concentration of plankton and fish (two lectures).
- Distribution of Marine Animals - factors which promote concentration of particular species or sub-species in different parts of the ocean; the effect of different factors on development and survival of larval or adult marine animals; the limits of species number (two lectures).
- Biochemistry of the Oceans - distribution of nutrients, nutrient cycles, fractionation of isotopes, the distribution and role of deuterium in the sea (two lectures).
- 3 Marine Geology and Mineral resources of the Ocean - total of six lectures at plenary sessions.
- The rocks below the ocean - acoustic, seismic, magnetic and gravity measurements. Significance of the work on the International Upper Mantle project (two lectures).
- Topography of the Ocean Floor - studies of abyssal plains, seamounts, mid-ocean ridges, ocean channels and rift valleys (one lecture)
- Ocean sediments - distribution and stratification; laws of sedimentation; biogeochemistry of ocean floor deposits; distribution of mineral resources and the possibility of their use (two lectures).
- Nearshore processes - changes in waves as they approach a beach; on and off-shore movements; problems of beach enforcement; sedimentation in the coastal and shelf zones (one lecture).
4. Oceanography of the Indian Ocean and the Antarctic - total of four lectures at plenary sessions.
- Recent advances in the study of the Indian Ocean in connection with the International Indian Ocean Expedition (IIOE) (two lectures).
- Antarctic oceanography (two lectures).
- Total of twenty-two (22) lectures at morning plenary sessions.

So far three topics for symposia were approved by the Program Committee. These are:

- (1) New oceanographic instruments, tools and carriers,
- (2) Biological uses of underwater sound,
- (3) Biology of upwelling areas on examples provided by the Indian Ocean.

Further symposia may be suggested later and organized concurrently.

Procedure of the Congress

The opening plenary session will be held on Monday, April 11, 1966.

The Program of the Congress includes plenary sessions, sectional meetings and symposia.

Plenary sessions will be held in the morning from 1000 to 1300. There will be only six days with morning plenary sessions. At each plenary session three to four lectures will be delivered, taking approximately forty to forty-five minutes for each lecture.

Sectional meetings will be generally held in the afternoons from 1500 to 1800 and, in addition, during one morning from 1000 to 1200. Two other mornings (including Saturday) are reserved for symposia on specific topics.

There will be three major sections on the following topics:

- (1) ocean and atmosphere
- (2) ocean and life
- (3) marine geology and mineral resources of the ocean

They will have their meetings simultaneously.

The sectional meeting on "Oceanography of the Indian Ocean and the Antarctic" will be held separately during one morning and one afternoon so as to allow scientists of various profiles to attend. It was also understood that, although several symposia might be held concurrently, there will be no section meetings during the time reserved for symposia.

Part of the time of sectional meetings will be spent on questions to invited lecturers and discussion of morning lectures.

Another part of the time of section meetings will be devoted to the presentation of papers. Each of the three major sections will have a total time available of twenty-one hours (seven afternoons of three hours each). If discussion of each lecture (six for each section) occupies one and one-half hours (answering questions included) it will leave twelve hours for presentation of papers which would permit the hearing of about seventy ten-minute papers in each of the three sections. The fourth section on the "oceanography of the

Indian Ocean and the Antarctic" will have only three hours for discussing four lectures and three hours for the presentation of about 15 - 18 papers. Thus, the total number of papers will amount to approximately 125. An additional number of papers will be presented during symposia.

The language practice was only briefly touched on by the Program Committee. It was decided that the morning plenary sessions should be served by simultaneous interpretation in four languages (E, F, S, R), while arrangements for the sectional meetings and symposia should be made on a pragmatic basis, i. e. making the best use of funds and people available.

The next meeting of the Program Committee will take place on 1 November in Moscow where only two of the non-Russian members (Drs. Lal and Revelle) would be able to attend. There might be a need to send there a UNESCO staff member (perhaps from the Conference Service) if any logistics problems should require additional clarification.

PROBLEMS WHICH UNESCO AND IOC WISH CONSIDERED BY SCOR

- 1 Financial statements for the contracts with UNESCO of previous years. These are sometimes unduly delayed. Thus, we still do not have the financial statement on utilization by SCOR of money under the 1964 contract. This caused considerable difficulties in UNESCO when concluding a contract for 1965.
- 2 The UNESCO program in oceanography for 1967 - 68 is now being prepared. SCOR's advice is needed on the content of the part relating to the exchange of information and the promotion of the work on modern oceanographic methodology. SCOR's advice might contain:
 - i. Titles of meetings and symposia to support;
 - ii. Topics to be treated in a series of monographs on oceanographic methodology;
 - iii. Intercalibration and standardization tests;
 - iv. Joint panels of experts to support
3. SCOR advice is also sought for the most effective ways for UNESCO to contribute to the development of oceanography in South American and African regions. With limited resources, should UNESCO concentrate on one or a limited number of rather permanent projects in each region, for which international support can be obtained (such as IOBC, for example), or attempt to spread its efforts over the maximum region, with projects of limited duration (with fellowships and training courses, for example), or both? This problem is closely related to the development of national oceanographic programs, a major subject for discussion at the last IOC Session and to which SCOR has already given advice. The Office of Oceanography in UNESCO has often only limited information on the present state of development and specific needs of such regions, and SCOR might comment if travel missions of the staff or of experts to such regions would be advisable.
4. The Intergovernmental Oceanographic Commission is likely to be approached by ICSEM, or one of the member countries, with a request for support to the idea (currently developed by Commandant Cousteau) of establishing eventually an international underwater scientific laboratory. SCOR's advice on the desirability of IOC's undertaking to support this idea is needed.

- 5 In the light of the results of the recent meeting of the GSF Working Group, it is desirable to know SCOR's ideas as regards the future course of action to be undertaken by the IOC as regards the GSF.
- 6 The procedure for publication of the series of IIOE data and cruise reports should be finalized after its having been discussed at the IIOE Co-ordination Group Meeting in Paris and the role of SCOR in this enterprise should be determined.
- 7 All the procedures as regards the IOBC and its Consultative Committee should be straightened out. It is presently not clear who (SCOR or UNESCO) makes nominations on the Consultative Committee, how its terms of reference are being approved and how the proposed Constitution of the International Collection should be finally established.

Paris, 28 May 1965.

OCEANOGRAPHIC ASPECTS OF THE UPPER MANTLE PROJECT

The Upper Mantle Project is an international program in which the attention of geophysicists is directed to the outer 1000 km of the earth's mantle; this part of the mantle may be supposed to be the part of the earth's interior where processes most influence the crust.

The project was first suggested at the meeting of the IUGG in 1960 in Helsinki and was formally set up at the meeting in 1963 at Berkeley. The project is co-ordinated by the Upper Mantle Committee (Secretary: Dr. L. Knopoff of the Physics Department of the University of California at Los Angeles). The IUGS, IAU, IUPAC, IUPAP and IUTAM have also expressed a wish to participate. Most countries have national committees for the project and many have published programs.

The Upper Mantle Committee has set up ten working groups whose membership and functions can be found in the publications of the Committee.^{1,2} The titles of these are:

1. Seismology
2. Physics and Chemistry of the Upper Mantle
3. Earth's Gravity, Geodesy, Tides and Recent
Movements of the Crust
4. Magnetism
5. Theory and Computers
6. Deep Drilling
7. Petrology and Volcanism
8. Tectonics
9. Submarine Geology
10. Isotope and Silicate Geochemistry

In principle, all these subjects can have a marine aspect but a study of the resolutions of the Upper Mantle Committee and its working groups and of the national programs,^{1,2} suggests that the principal marine investigations connected with the project will be:

1. Deep drilling at sea to obtain samples of the mantle
2. The study of continental margins and island arcs
3. The study of the mid-ocean ridges, particularly of their
central valleys as part of the world rift system
4. The study of oceanic volcanic rocks
5. The study of the upper mantle by seismic, gravity and
heatflow survey

The various parts of the projects are carried out by national agencies and with national funds (as for the IGY and the Indian Ocean Expedition.) The Upper Mantle Committee and its working groups provide a forum for discussion and co-ordination and arrange conferences; they do not in any large way finance the work of measurement and observation.

E. C. Bullard
May, 1965

¹ International Upper Mantle Project, Programs and International Recommendations. ICSU. 1964.

² International Upper Mantle Project, Report No. 1. ICSU. 1964.