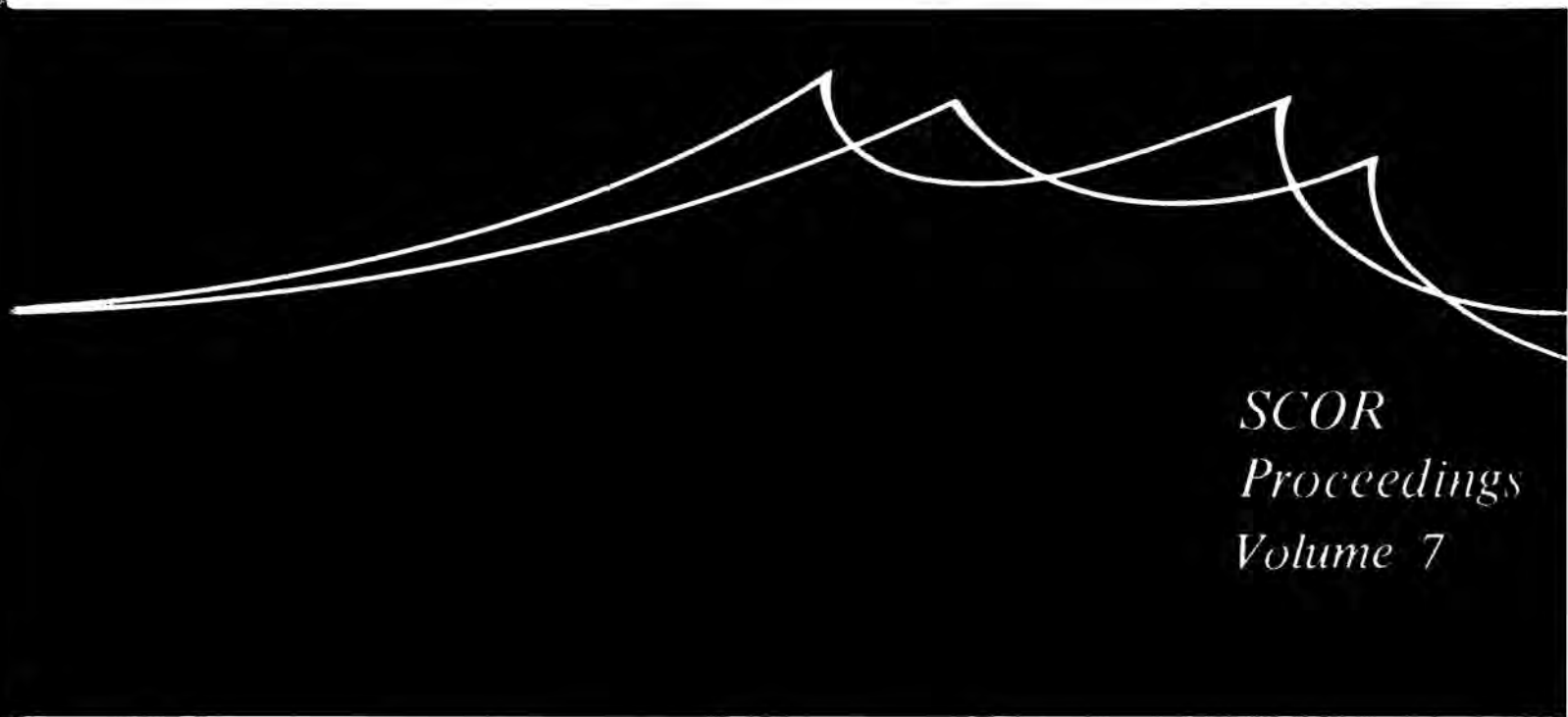


SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH



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Proceedings
Volume 7*

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

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INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

**PROCEEDINGS
OF THE
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH**

Volume 7

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PROCEEDINGS
of the
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

Report of the 15th Executive Committee Meeting
Madrid, 17 - 19 May 1971

The 15th Executive Committee Meeting was held at the Consejo Superior de Investigaciones Científicas, Madrid, 17 - 19 May 1971, with the President, Professor Wooster, in the chair. Participants were greeted by the Subsecretario de la Marina Mercante, Almirante Leopoldo Boado, and the Director of the Instituto Español de Oceanografía, Sr. Damaso Berenguer. Local arrangements were made by Professor Nicobar Menendez.

A list of those who attended the meeting is given in Appendix I. The President of the meeting gave an outline for the report which follows.

1. ORGANIZATION AND FINANCE

1.1 MEMBERSHIP

Notification was received from the Consejo Superior de Investigaciones Científicas, Madrid, of affiliation with SCOR; the Instituto Español de Oceanografía serving as the Spanish National Committee.

National Committees have been asked to designate their Nominated Members in accordance with the new SCOR Constitution; a list of members of the Executive Committee is given in Annex II.

The new category of Invited Member was discussed. It had been agreed at the 14th General Meeting that only one such member would normally be invited per country. The purposes of this category of membership include to make SCOR more broadly representative of the marine science community, to add competent scientists who could make personal contributions to the activities of SCOR, to improve communications with marine scientists in developing countries, and to stimulate the development of national committees that would subsequently affiliate with SCOR. Such members should preferably come from centers of scientific activity, and should be appointed for the limited period of two years. It was unanimously agreed to invite Dr. Augustin Ayala-Castañeres, Director of the Instituto de Biología, Universidad Nacional Autónoma de México, as the first member in this category. A list of countries was developed where significant activity in marine science was occurring and where the Executive Committee should attempt to identify other suitable candidates.

A proposal had been received that the Mediterranean Association for Marine Biology and Oceanography (MAMBO) be designated as an Affiliated Organization of SCOR. In accordance with Article 7 of the SCOR Constitution. The important activities of MAMBO were described by several of the participants. It was noted, however, that these activities were regional in character whereas the category of Affiliated Organizations had been created to accommodate world-wide organizations with specialized interests. Thus, while recognizing the need for a mechanism to interrelate the activities of regional groups, the Executive Committee did not feel that SCOR was ready to assume that responsibility.

1.2 PUBLICATIONS

In order to simplify the distribution of Proceedings, the following procedure has been approved. Individual copies will be sent airmail to all members of whatever category. Normally, as many as three copies will be sent airmail to National Committees; this number can be increased if feasible. Other copies to be distributed within a country will be sent by surface in bulk to the

appropriate National Committee. Thus the National Committee will distribute copies to a list furnished from La Jolla (including members of SCOR working groups and others associated with SCOR activities) in addition to their own distribution list.

Papers of the Symposium on the Biology of the Indian Ocean with particular reference to the International Indian Ocean Expedition (Kiel, 31 March - 6 April 1971) will be edited by Dr. Zeitschel and published by Springer. Arrangements have been made through SCOR for publication by Gordon and Breach of the reports from the FAO Seminar on Methods of Detection, Measurement and Monitoring of Pollutants in the Marine Environment (Rome, 4 - 10 December 1970); the volume will be edited by Dr. Goldberg.

Papers presented at the SCOR Symposium on Micropaleontology of Marine Sediments, held at Cambridge in September 1967, have recently been published by Cambridge University Press in a volume entitled "The Micropaleontology of Oceans" edited by B.M. Funnell and W.R. Riedel. Fifty two papers are included in this volume of 828 pages which sells for £ 20 net.

Papers presented at the SCOR WG 31 Symposium held in Cambridge in March 1970 are being published by the Institute of Geological Sciences and can be obtained from Her Majesty's Stationary Office in London. All four volumes are now available:

Delany, F.M.(Ed.) 1971. "The Geology of the East Atlantic Continental Margins." 1. General and economic papers (Rep. 70/13), cost 90p. 2. Europe (Rep. 70/14), cost 90p. 3. Europe (Rep. 70/15), cost 60p. 4. Africa (Rep. 70/16), cost £ 1.

The Royal Society of London has published the following volume resulting from a conference sponsored by several organizations including SCOR:

A discussion on the petrology of igneous and metamorphic rocks from the ocean floor. In Philosophical Transactions of the Royal Society of London, Ser. A, Vol. 268, Part No. 1192. 365 pages, frontispiece and 10 plates. Price £ 10 (U.S. \$26.00).

The Permanent Service for Mean Sea Level has just issued the following publication:

Bibliography on Mean Sea Level 1959 - 1969. Bibliography on Tides 1955 - 1969. IAPSO Publication Scientifique No. 29. IUGG Monograph No. 32.

Copies of this publication can be obtained for £ 1.50 plus postage from the Permanent Service for Mean Sea Level, The Observatory, Bidston, Birkenhead L43 7RA, England.

1.2 BUDGET AND FINANCE

After approval by the 10th General Meeting of the new scale of national contributions, National Committees were asked to indicate their selected category. Most committees will remain in their previous category but will pay the higher amount; a few committees have selected the next higher category. UNESCO has increased its contract support from \$12,500 in 1970 to \$20,000 in 1971. An additional contract for \$10,000 has been written to cover the costs of travel and shipment of equipment for UNESCO nominees to joint working groups, such costs were previously paid by UNESCO directly. ICSU has provided a subvention of \$5,000 in 1971. Estimates of SCOR finances for 1970 and the first half of 1971 are given in Annex III.

2.0 WORKING GROUPS

2.1 ACTIVITIES RELATED TO PREVIOUS WORKING GROUPS

At its 58th Statutory Meeting in October 1970, the International Council for the Exploration of the Sea decided that the results of the ICES/SCOR intercalibration experiment on methods of nutrient salt analysis should be ready for review within a year. The nutrient standards (prepared

for CSK at the Sagami Research Center, Japan) used in the experiment were adopted as the primary standards for all future ICES international and multi-ship expeditions. It was also agreed to ask SCOR to provide funds estimated at \$1,650 to allow the compilation work to be completed. The Executive Committee agreed to this expenditure and further proposed that the results of this experiment be jointly published by ICES and SCOR in a suitable ICES publication. A co-editor from each organization was considered appropriate; Professor Joris Gieskes would serve in this capacity on behalf of SCOR.

2.2 REPORT ON EXISTING GROUPS

A list of active and new working groups, together with their terms of reference and membership, is given in Annex IV.

WG 10 Oceanographic Tables and Standards (with ICES, IAPSO and UNESCO): Additional tables, for oxygen saturation, chlorosity and sigma-t, have been or are being submitted to UNESCO for publication. The group does not expect to meet in 1971.

WG 15 Photosynthetic Radiant Energy (with IAPSO and UNESCO): Since successful completion of the experiment aboard DISCOVERER in 1970, the resulting data have been prepared and circulated among participants. Some results of the experiment will be reported at the IAPSO Symposium on Optics of the Sea to be held in Copenhagen in June 1972. In view of the international character of the working group's activity and the substantial expenditures by SCOR, as well as by national sources, the Executive Committee considered it essential that a comprehensive report on the experiment and on the interpretation of its results be published and made widely available. This report should include a general description of the experiment, together with individual papers by the various participants. Publication should be arranged for and expedited by SCOR. It was agreed to support a meeting of the group prior to the IAPSO Symposium, should this be necessary to coordinate preparation of the final report.

WG 21 Continuous Current Velocity Measurements (with IAPSO and UNESCO): It was agreed to support a meeting of the group during the IUGG General Assembly in Moscow, in August 1971. At the meeting, the group should consider how to complete and publish the results of the 1970 inter-comparison experiment and should examine the need for further intercomparison of the Alexeev and Geodyne meters. The views of the group were also desired on the problem of undertaking inter-comparisons of current meters in shallow water, of evaluating new types of current meters as they became available, and of interrelating WG 21 activities with those of WG 34 on the Oceanographic Basis of Ocean Monitoring and Prediction Systems.

WG 23 Zooplankton Laboratory Methods (with UNESCO): After reviewing an informal report from the WG Chairman, it was agreed to retain the present membership of the group, adding such consultants as may be required for completion of the work. A final report should be made available for publication by UNESCO; preliminary results should be published in SCOR Proceedings and made available to National Coordinators of IOC cooperative investigations such as CICAR and CINECA and to FAO for use in its field projects. SCOR should continue to support, as necessary, Dr. Steedman's travel to the Smithsonian Institution where much of the experimental work is being conducted. The proposal to hold a final workshop/symposium in July 1972 at The University, Bath, UK, was endorsed, and comments on the program were prepared for consideration by the WG Chairman.

WG 24 Estimation of Primary Production under Special Conditions (with IBP/PM): The group met in Nanaimo on 9-12 November 1970. A final report, entitled "A guide to the measurement of marine primary production under some special conditions", has been received, and arrangements are being explored for publication by UNESCO.

WG 27 Deep-Sea Tides (with IAPSO and UNESCO): The group is scheduled to meet in Venice, 18-19 October 1971.

WG 28 Air-Sea Interaction (with IAMAP and IAPSO): The group is scheduled to meet in Moscow, 1 and 7 August 1971.

WG 29 Monitoring in Biological Oceanography (with ACMRR, UNESCO and IBP/PM): The interim report (Proceedings 6 (2), Annex VII) summarizes the problems related to monitoring in biological oceanography. After further work has been carried out by various members of the WG, another meeting should be held in early 1972, in order to discuss sampling frequency (both in space and time) and to prepare a final report which should include:

- (a) statements on the need for, and use of, monitoring of biological parameters (revision of interim report),
- (b) data (or reference to data) regarding biological parameters of use to designers of ocean monitoring systems.

WG 32 Biological Data Inventories (with ACMRR): The urgent need was recognized of incorporating information on studies and data in biological oceanography and pollution research in the inventories of data centers. It was therefore agreed that Dr. Colebrook, in cooperation with national oceanographic data centers, should produce a final draft of amendments of the ROSCOP form incorporating biology and pollution indices. The draft should be approved in correspondence with members of WG 32, and should then be submitted to IOC for consideration by the working group on international data exchange and final approval by IOC. ACMRR had recommended that the scientific advisory bodies should be represented at future meetings of the IOC WG on data exchange; arrangements are being made for Dr. Colebrook to attend on behalf of SCOR. Whether the remaining tasks of WG 32 require another meeting, or whether work can be finished by correspondence, should be decided by the presidents of SCOR and ACMRR in consultation with the chairman of the WG.

WG 33 Phytoplankton Methods (with IBP/PM): An interim report of the first meeting of the group (1-3 December 1970 in Kingston, Rhode Island) was available. Experimental work on counting phytoplankton is in progress, and there is no immediate need for another meeting. Plans are being made for a manual on quantitative phytoplankton methods. It was suggested that the editor and at least part of the authors of the manual should be selected from members of the WG and that a further meeting of the WG and other authors should be held when needed to develop final plans for the manual.

The proposed reprinting of key papers on phytoplankton methodology was welcomed. Translation of certain papers into English may be desirable. Although taxonomic papers should not be reprinted, lists of the more important ones should be included in this volume as well as in the manual. A commercial publisher should be sought; organizations such as UNESCO and FAO may wish to obtain copies for their field projects.

Relevant fixation problems should be considered by WG 23, while questions of computer programs and storage of plankton raw data at national data centers should be discussed by WG 32. A proposed course in phytoplankton methods should be taken up by UNESCO and ICES.

WG 34 Oceanographic Basis of Ocean Monitoring and Prediction Systems: Informal discussions have continued, and the theoretical panel is scheduled to meet in Moscow on 6-7 August 1971. The Executive Committee asked that participants in that meeting examine the broad terms of reference and advise how these could be implemented by completing organization and membership of the parent group. In collaboration with other WG's meeting in Moscow, the group should also advise on the IOC request concerning oceanographic participation in the GARP Atlantic Tropical Experiment (see item 3.1).

2.3 CONSIDERATION OF NEW WORKING GROUPS

Conditions for Oceanic Research: As a consequence of decisions at the 10th General Meeting (Proceedings 6 (2), 57) a circular was sent to Members and National Committees, as well as to a number of other scientists, requesting their views on the necessary conditions for effective scientific research in the oceans. A copy of the circular and the formal replies of National Committees

In Australia, France, Germany (FRG), India, United Kingdom, USSR and USA are given in Annex V.

With regard to this inquiry, ACMRR at its 6th Session agreed that objective studies of this nature would serve a useful purpose and recommended that FAO, in preparing contributions for the Law of the Sea Conference, should keep the needs of scientific research in mind.

The Executive Committee agreed that additional views should be obtained and requested the President to formulate an appropriate statement for further consideration. It was noted that the support of other components of ICSU, and ICSU itself, would be helpful in getting adequate attention to the problem in the discussions leading to the 1973 Law of the Sea Conference.

WG 35 Methods in Quantitative Ecology of Coral Reefs: Upon the suggestion of IABO, it was decided to establish this group with the following terms of reference:

To identify the major scientific problems in the quantitative ecology of coral reefs; to evaluate and test existing methods for the quantitative description of abundance, composition and distribution of benthic invertebrate communities on reefs; to recommend standard field techniques suitable for the problems identified under 1 above; to consider the need for a future symposium on the quantitative ecology and productivity of coral reefs.

Dr. D.R. Stoddart, University of Cambridge, was nominated as Chairman, and a list of other members was prepared. It was proposed that members of the group present in Canberra during the Pacific Science Congress might meet informally. The group might initially produce through correspondence an interim report on the present status of methods for sampling hard bottom invertebrate fauna. A meeting may be required in 1972.

WG 37 Marine Plankton and Sediments: The proposal of the National Committee of the Federal Republic of Germany was accepted to establish this group with the following terms of reference:

To discuss the principles of systematics, stratigraphy and environmental interpretation of planktonic remains in marine sediments, including biological remains in varved sediments as indicators of recent ocean conditions; to compare submarine stratigraphy with that on land; to prepare a symposium on these topics.

Professor Dr. E. Seibold, University of Kiel, was nominated as Chairman. A list of other members was prepared, and it was suggested that the group should work closely with both CMG and IABO.

It was agreed to establish three other working groups as a consequence of requests made by the Bureau and Consultative Council of IOC (see item 3.1).

WG 36 Coastal Upwelling Processes (with ACMRR and ACOMR): At its 6th Session, after considering the GELTSPAP proposals, ACMRR had recommended that SCOR take the lead in organizing a workshop on the design of investigations of coastal upwelling, and that ACMRR and ACOMR should participate in organization and support of this workshop. The matter is closely related to another proposal, for a comprehensive study of the ecosystem of an upwelling region off north-west Africa (CINECA), and ACMRR suggested that the workshop might be focussed on CINECA; ICES and other appropriate organizations should be invited to participate.

After considering the ACMRR proposal, the Executive Committee decided to establish a working group with the following terms of reference:

To review present knowledge of the physical, chemical and biological processes involved in coastal upwelling; to evaluate strategies for the investigation of these processes and recommend appropriate investigations; to examine the application of these recommendations in the upwelling region off north-west Africa.

It was agreed that the group should have a single chairman, and should include two panels, on the physical and biological aspects respectively. ACMRR and ACOMR should be invited to co-sponsor the group and to participate in the selection of its members. The last term of reference should be considered in consultation with ICES and the CINECA coordination group.

WG 38 Special Studies on Circumpolar Waters South of 40° S (with SCAR): The IOC International Coordination Group on the Southern Ocean (Brussels, 23-26 November 1970) had suggested that SCOR, with the assistance of SCAR, establish a working group on circumpolar waters south of 40°S. This was endorsed by the IOC Bureau in its Recommendation 12.7 (see item 3.1). Discussion of this recommendation revealed that it was primarily concerned with the use of resupply vessels and other ships of limited oceanographic capability rather than with oceanographic research vessels. What was required was a feasibility study to specify problems, largely physical, that could be studied by relatively simple observations from non-specialized vessels. Geological and geophysical problems should be included, and there should be a preliminary look at relevant biological problems.

Accordingly, it was agreed to establish a group with the following terms of reference:

To examine the feasibility of conducting oceanographic studies in Antarctic circumpolar waters by relatively simple observation programs from resupply vessels and other ships of limited oceanographic capability, and to recommend methods and strategies whereby such programs could be developed and carried out.

The working group should be organized with the assistance of SCAR; Sir George Deacon agreed to serve as its chairman. The Executive Secretary of SCAR reported that information on supply and relief ships expected to be on regular passages between 40°S and the Antarctic continent during 1971-1976 was being obtained from SCAR National Committees and would be made available to the group.

WG 39 Scientific Investigation of Pollution in the Marine Environment (with GESAMP, ACMRR and ACOMR): IOC Bureau Recommendation 12.5 requests the scientific advisory bodies, together with GESAMP, to cooperate in developing the program elements of a Global Investigation of Pollution in the Marine Environment (GIPME) and, in cooperation with the appropriate bodies, to arrange for the preparation of specific proposals on the organization and work program of GIPME for consideration by the IOC VII Session, and for the integration of a number of relevant documents into a single working paper. This recommendation was considered by ACMRR in its Sixth Session; ACMRR proposed establishment of a joint working group and suggested terms of reference and ways of establishing membership. The ACMRR proposal had been discussed informally with the Chairman of GESAMP who accepted it in principle.

The Executive Committee decided to proceed along the lines of the ACMRR proposal, in establishing a working group with the following terms of reference:

To review relevant documents concerning programs of scientific investigation of pollution in the marine environment; to identify the lines of research that appear to be the most effective in such investigations; to develop an outline for GIPME, including estimates of priorities and timing and of the facilities and manpower required, and to suggest institutional arrangements for the planning and coordination of the work and the allocation of responsibility for parts of the program among the various interested organizations; to note the regional approach to the development of GIPME suggested by GESAMP and to (a) consider areas, additional to those named by GESAMP, in which investigations might be commenced at an early date, (b) bear in mind the need to enable the developing nations to take an active part in GIPME.

This working group should be jointly sponsored by SCOR, GESAMP, ACMRR and ACOMR. Each of these organizations should designate an officer and two or three other scientists to participate in the work. SCOPE, the UN organizations participating in ICSPRO (UNESCO, FAO, WMO, UN, IMCO), and the IOC Secretary should be invited to send representatives. SCOR should take

the initiative in organizing the group. It was tentatively agreed to hold a meeting of the group near Rome during the week of 11 October, with the ACMRR Secretariat making the local arrangements. A report should be prepared for consideration by the IOC VII Session in late October. With regard to the proposed integration of relevant documents, this appeared to be an appropriate task for a consultant, to be arranged by one of the participating organizations; action has since been taken by SCOR.

3.0 RELATION WITH INTERGOVERNMENTAL ORGANIZATIONS

3.1 ADVISORY MATTERS CONCERNING UNESCO AND IOC

The IOC Bureau, during its 12th Meeting with the Consultative Council (Bordeaux, 1-6 March 1971), adopted a number of recommendations involving action by SCOR. The following were discussed by the Executive Committee:

12.2 Joint Oceanographic Assemblies: After reviewing the experience of the Joint Oceanographic Assembly in Tokyo, the Bureau decided to "recommend to the Seventh Session that it encourage the scientific organizations concerned to consider the possibility of organizing the next Joint Oceanographic Assembly in 1976, and to develop plans for that meeting in time to permit governments, intergovernmental agencies and other sponsors to make adequate budgetary provisions".

The SCOR Executive Committee accepted this proposal in principle. A steering committee for the 1976 assembly should be established, to consist initially of the presidents and secretaries of SCOR, IAPSO, IABO and CMG. UNESCO and other UN bodies should be informed that financial support would be required for the meeting. The cooperation and participation of ACMRR and ACOMR should be sought, together with the support of their parent organizations, FAO and WMO. The general format of the Tokyo assembly was considered acceptable; SCOR members and national committees should be asked for suggestions on design of the meeting and on themes to be emphasized. A suitable location for the assembly must be found.

12.4 Long-term and Expanded Program of Oceanic Exploration and Research: The Bureau requested the scientific advisory bodies to examine a number of proposals in the report of the IOC Group of Experts on Long-Term Scientific Policy and Planning (GELTSPAP), in some cases to take appropriate steps as indicated therein and in other cases to prepare more detailed plans for consideration by the Commission. The Executive Committee took the following action on those proposals where SCOR appeared to have some immediate responsibility (numbers refer to paragraphs of the GELTSPAP report):

- 23.1 Coastal upwelling - WG 36 was established (see item 2.3).
- 39 Biological remains in sediments - WG 37 was asked to look into this (see item 2.3).
- 24 International Advanced Institute for Physical Oceanography - this proposal has been submitted for comment to members of WG's 21, 27, 28 and 34, and comments are being compiled for consideration by the IOC.
- 98 Storm surges - SCOR will offer to cooperate with ACOMR (see item 3.3).
- 32 South Atlantic studies - this proposal was considered appropriate for development by the International Coordination Group on the Southern Ocean in cooperation with FAO.
- 34 Polar oceanography - the symposium proposed for 1973 (see item 5.0) should contribute to elaboration of this proposal.

63 - 73 Marine geoscience exercises - in order to evaluate these proposals, the Executive Committee agreed to organize an International Workshop on Marine Geosciences, in cooperation with CMG and the Inter-Union Commission on Geodynamics (ICG). The purposes of the workshop are as follows:

To exchange information on present knowledge and activities relating to the geoscience exercises proposed by GELTSPAP and the marine aspects of the Geodynamics Project; to prepare specific proposals for implementation of further cooperative investigations, for consideration by the IOC and by National Committees of ICG.

Subsequently, the State of Hawaii made funds available for the meeting which is scheduled for 20-25 September 1971 at the University of Hawaii. Dr. Tom Gaskell will serve as chairman and Dr. George Sutton is responsible for local arrangements. About 25 participants have been invited, after consultations with CMG and ICG.

12.5 LEPOR - Pollution: Establishment of WG 39 (see item 2.3) is in response to this recommendation. Other actions with respect to marine pollution are reported under items 3.4 and 4.0.

12.7 Cooperative Investigations: Establishment of WG 38 (see item 2.3) is in response to this recommendation.

12.10 Oceanographic Participation in the GARP Atlantic Tropical Experiment: The Bureau requested SCOR to identify the oceanographic processes that could be studied in conjunction with the GARP Atlantic Tropical Experiment (GATE) and to prepare for consideration by the Seventh Session of the Commission, if practicable, a plan and program for oceanographic participation in that experiment, and also to maintain liaison with the planning body for CINECA to determine the possibility of interrelating future CINECA investigations with the oceanographic participation in GATE. The Executive Committee decided first to seek from WMO/GARP a precise description of the meteorological experiment and of the ships to be employed therein, and to ask WG's 21 and 34 to examine the question during their meetings in August.

12.13 Integrated Global Ocean Station System: The Bureau invited the active participation and collaboration of the scientific advisory bodies in the development of IGOSS. SCOR has been participating largely through the activities of its working groups 21, 27, 28, 29 and 34; the last named group has been asked to reexamine its terms of reference and advise on how they might be more fully implemented.

12.16 Education, Training and Mutual Assistance: The scientific advisory bodies were called upon to cooperate with the IOC Secretary in preparation of a list of existing manuals, basic reference books, text books and review periodicals in marine science, and to join GESAMP in preparing a list of types of courses necessary to "fight, watch and investigate" pollution as well as plans of studies for these courses. The Executive Committee agreed to correspond at the appropriate time with SCOR National Committees on these matters.

During the SCOR Symposium on Biology of the Indian Ocean (Kiel, 31 March - 6 April 1971), it was proposed that a small editorial advisory group be established to assist in completion of the IIOE Atlas on Chemical Biology being prepared under the direction of Professor Krey. This group would review the present status of preparation and would suggest amendments and format of presentation in the light of present knowledge. Professor Postma agreed to chair the group which would meet with Professor Krey during the autumn of 1971.

3.2 RELATION WITH FAO/ACMRR

The President had participated in the 5th Session of ACMRR (Rome, 10-17 March 1971) where attention was paid to IOC requests for action on various proposals of GELTSPAP. These have already been discussed above in section 3.1. Several other matters of interest to SCOR were discussed.

During the SCOR 9th General Meeting (La Jolla, June 1968), FAO and ACMRR were requested to consider a proposal of the Soviet National Committee for establishment of a group of experts on transplantation and reconstruction of marine fauna and flora. FAO had commissioned the following review papers which were now available:

L.A. Walford and R. Wicklund "Introduction of exotic marine, euryhaline and anadromous organisms"

A.R. Karpevich "Acclimatization of marine organisms in the USSR"

ACMRR recommended that these reports be published in an appropriate FAO series, and agreed to establish, together with IABO and other appropriate bodies, a working party on aquaculture; FAO should consider the convening in 1974 or 1975 of a Technical Conference on Aquaculture.

"International Directory of Marine Scientists" had been published by FAO and was being distributed to those listed therein. ACMRR recommended that this publication be maintained effectively and up-dated periodically with the advice of an ad hoc group of nominees from ACMRR, SCOR, FAO and UNESCO. However, the Executive Committee felt that continued publication of the Directory is now a joint responsibility of FAO and UNESCO, and that SCOR's role for the time being should be restricted to corresponding with these organizations to see what help they desired from SCOR in improving the Directory.

ACMRR also proposed that SCOR assist in reviewing the coverage of "Marine Science Contents Tables". The Executive Committee agreed to do this in correspondence with appropriate members.

3.3 RELATION WITH WMO/ACOMR

As noted previously (item 3.1: 12.4), the GELTSPAP report (para 98) contained reference to the possible contribution of LEPOR to international efforts to improve forecasting of storm surges associated with tropical cyclones. The Executive Committee, in discussing this proposal, noted the need for more complete documentation of relevant past events in the Bay of Bengal, and hoped that WMO would be able to facilitate obtaining such information. Should ACOMR decide to take specific action with respect to the GELTSPAP proposal, SCOR is prepared to propose the names of appropriate oceanographic specialists and to cooperate in other ways.

The first meeting of the WMO Advisory Committee on Oceanic Meteorological Research (ACOMR) is scheduled for 6 - 10 September 1971; SCOR representation is anticipated.

3.4 RELATIONS WITH ICES

As a consequence of recommendations of the FAO Technical Conference on Marine Pollution, the GESAMP III meeting, and the recent meeting of the IOC Bureau and Consultative Council, ICES had decided to organize a baseline survey of pollution in the North Sea. Representatives of ICES countries on the North Sea met in Lowestoft in late March and recommended that the Council's governing bodies sponsor an International Study of Pollution of the North Sea and its Effects on Living Resources and their Exploitation; this study should start with a baseline survey. Before such a study could be started, information such as the following would be needed:

Updated knowledge of the sources and rates of input of pollutants to the North Sea; survey of the methods used by different laboratories concerned with pollution analyses and advice on need for intercalibration; information on present capabilities of laboratories engaged in such work and on what would be needed to expand present national investigations into an international survey of the entire North Sea.

The General Secretary of ICES outlined the steps taken by the ICES Bureau at its meeting on 2 May in order to obtain information on these matters for consideration by the Council during its meeting in Helsinki, 27 September to 6 October 1971. On behalf of the ICES Bureau, he invited

SCOR to join ICES in taking similar steps for the Baltic. A joint meeting could be arranged just before the ICES meeting, when the results of actions concerning the North Sea would be known.

The Executive Committee accepted this invitation and agreed to ask its National Committees in countries bordering the Baltic to nominate members to a joint ICES/SCOR group to meet in Helsinki on 24-25 September 1971. ICES would also invite participants through its national contacts. The meeting should review the status of the North Sea work, examine the situation in the Baltic, advise ICES and SCOR on further steps necessary to develop a joint investigation of pollution in the Baltic, and consider the needs for further discussions. In this latter connection, it might be useful to arrange at some convenient date during the summer of 1972 a broader scientific meeting on pollution of the Baltic, possibly in Stockholm or Lund.

4.0 RELATION WITH NONGOVERNMENTAL ORGANIZATIONS

4.1 RELATION WITH ICSU

The ICSU Secretary General, in a circular of 5 March 1971, had requested the views of ICSU bodies on the role and structure of the Council and their relation thereto. In a discussion of this question, the following points were accepted:

ICSU structure is essentially vertical, with the disciplinary Unions being the only scientific members of the Council. Horizontal (interdisciplinary) linkages are provided by inter-union commissions and by the special and scientific committees. The revised SCOR Constitution is an experiment in improving the association of the vertical and horizontal structures. The commissions and committees have been notably successful in promoting and facilitating cooperative work on interdisciplinary problems and thus have filled a significant need of ICSU. Yet the committees have no role in the management of ICSU affairs. In the view of SCOR, the permanent bodies, the Scientific Committees, should be represented on the Executive Committee of ICSU. If that Committee is to be reduced in number, or if a sub-group is to be established to expedite the Executive Committee's business, representation of several Scientific Committees (for example, SCOR and SCAR) might be pooled.

The President was asked to bring these views to the attention of the ICSU Secretary General. This was done on 24 May, and the SCOR proposals were considered by the Committee on Role and Structure of ICSU.

4.2 RELATION WITH SCIBP AND SCOPE

An IBP/PM Working Conference will be held in Rome, 4-8 October 1971, and will deal with topics such as primary and secondary production, modelling, marine environmental damage, aquaculture, and higher trophic levels (fish and mammals). SCOR representation will be ensured through participation of one or more members of the Executive Committee. In addition, a limited amount of financial support can be provided.

SCOR relations with SCOPE were reviewed with the SCOPE representative, Professor Grasshoff and with Mr. Hemmen who represented SCOR at the SCOPE meeting in January. It was agreed that SCOR should be represented at the SCOPE General Assembly to be held in Canberra in September 1971. It was generally felt that SCOPE should look to SCOR for assistance on problems concerning the marine environment rather than trying to handle these itself. This is not so much a matter of finding the most suitable marine scientists for a given problem as it is of using the mechanisms and institutions already established for communicating with the oceanographic community. The Secretary General of the 1972 United Nations Conference on the Human Environment had requested SCOPE views on the future role of the nongovernmental scientific community in environmental affairs. It was considered appropriate that a SCOR reply be sent directly to the Secretary General, in view of the importance of the ocean in most environmental considerations.

The representative of SCOPE reported on the draft "Outline for the design of an integrated marine pollution monitoring system" being prepared for consideration by SCOPE and submission to the 1972 UN Conference on the Human Environment. Comments on the draft by marine scientists would be desirable and should be submitted by early August. It was agreed to circulate copies when available to members of WG 39 and other appropriate scientists and to compile their comments for transmission to SCOPE.

4.3 RELATION WITH ECOR

It was noted that an international Engineering Committee on Oceanic Resources (ECOR) had been established and that its First General Assembly would be held in London at the time "Oceanology International 72" is held in Brighton (19-24 March 1972). The IOC had already shown its interest in the possibility of ECOR serving as an advisory body on ocean engineering aspects of IOC programs. For this and other reasons, it was agreed to maintain contact with ECOR and to ensure representation at the 1972 assembly.

5.0 FUTURE MEETINGS

The 11th General Meeting will be held in Oban, Scotland, in September 1972 following the Second International Congress on the History of Oceanography and the Challenger Expedition Centenary Celebrations to be held in Edinburgh, 12-20 September 1972. During the 10th General Meeting, it had been proposed to organize a pack-ice symposium as the scientific portion of the next meeting. However, it now appears that with the substantial scientific content of the Edinburgh meetings, it would not be advisable to hold an additional SCOR symposium. Therefore, a few days would be assigned just after the Edinburgh meetings during which the business sessions of the 11th SCOR General Meeting would be held in Oban.

The 16th Executive Meeting will be held in January 1972. The President was requested to seek arrangements for appropriate dates and location.

As noted above (see item 3.1:12.2), it is likely that the Second Joint Oceanographic Assembly will be held in 1976; this would be the occasion for the 13th SCOR General Meeting.

There still appeared to be a need for a symposium on polar oceanography, particularly in view of several recommendations in the GELTSPAP report. An appropriate theme for such a symposium would be the relation between the special physical conditions, both past and present, in the polar oceans and their consequences for life. The symposium should be held in 1973, and should be organized in cooperation with SCAR, with the other scientific advisory bodies of IOC, with IOC subsidiary bodies such as the group on the Southern Ocean, and with ICES or other organizations as seem appropriate.

Further information has become available on the International Symposium on the Oceanography of the South Pacific, being organized by the New Zealand National Commission for UNESCO. This symposium, to be held at Victoria University of Wellington on 9-15 February 1972, will be concerned with problems centering on the Pacific Ocean south of the equator from Australia to South America, including the Coral and Tasman Seas; the Antarctic region will not be included. General topics include ocean circulation; structure, sedimentation and geologic history; and fauna and flora of the South Pacific. Additional information can be obtained from the Secretary, National Commission for UNESCO, Department of Education, Government Buildings, Wellington, New Zealand.

A list of future meetings of SCOR and associated organizations is given in Annex VI.

6.0 OTHER MATTERS

As suggested at the last Executive Meeting, the Secretary presented a report on the status of the studies resulting from the International Baltic Year. The data have not yet been fully exchanged, and various studies are in progress. The Secretary was asked to keep the matter under review and to advise if SCOR action was required to facilitate publication.

* * * * *

ANNEX I

15th SCOR EXECUTIVE MEETING Madrid, 17-19 May 1971

List of Participants

MEMBERS OF THE EXECUTIVE COMMITTEE

Professor Warren S. Wooster	(U.S.A.)	President
Captain Luis R.A. Capurro	(Argentina)	Past President
Professor Dr. H. Postma	(Netherlands)	Vice-President
Dr. Klaus Voigt	(GDR)	Secretary
Dr. T.F. Gaskell	(IUGS/CMG)	Ex Officio
Professor Dr. G. Hempel	(IUBS/IABO)	Ex Officio
Professor H. Lacombe	(IUGG/IABO)	Ex Officio

OTHER PARTICIPANTS

Cmdr. J.E. de Ataide (SCOR member from Portugal)	Professor N. Nasu (Japan)
Professor E. Dahl (SCOR member from Sweden)	Dr. X. Le Pichon (ICG) *
Sir George Deacon (SCOR member from UK)	Dr. M. Ruivo (FAO/ACMRR) *
Dr. K.O. Emery (U.S.A.)	Professor J.E.G. Rayment (SCOR member from UK)
Dr. P.M. Fye (U.S.A.)	Mr. H. Tambs-Lyche (ICES)
Professor Dr. K. Grasshoff (SCOPE) *	Dr. O.G. Tandberg (SCOR member from Sweden)
Mr. G.E. Hemmen (SCAR/UK)	Professor E.S.W. Simpson (SCOR member from South Africa)
Dr. S.J. Holt (UNESCO/IOC)	Dr. O.A. van der Westhuysen (South Africa)
Dr. A.S. Laughton (SCOR member from UK)	
Dr. C.E. Lucas (FAO/ACMRR, UK)	
Dr. N.L. Veranneman (WMO/ACOMR)	

Observers from Instituto Español de Oceanografía

Srs. D. Berenguer, D.F. Fernandes, N. Menendez, J. Gomez, F. Fernandez,
J. Garcia, G. Parrilla

* 18th and 19th May only

MEMBERS OF SCOR
as of 1 August 1971

ANNEX II

- ATAIDE, Cmdr. J.E. de, Oceanographic Department, Rua das Trinas 49, Lisbon-2, Portugal (1).
- AYALA-CASTANARES, Dr. A., Director, Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, México 20, D.F., México (3).
- BANSE, Prof. K., Department of Oceanography, University of Washington, Seattle, Washington, U.S.A. (2 - WG 33).
- BATTAGLIA, Prof. B., Institute di Zoologia e Anatomia Comparata, Università di Padova, via Loredan 10, 35100 Padova, Italy (1).
- BERTELSEN, Dr. E., Director, Danmarks Fiskeri-og Havundersøgelser, Charlottenlund Slot, 2920 Charlottenlund, Denmark (1).
- BRAARUD, Prof. T., Institute of Marine Biology B, P.O. Box Blindern 1069, Oslo 3, Norway (1).
- BREKHOVSKIKH, Academician L.M., USSR Academy of Sciences, Head: Department of Oceanology, Physics of Atmosphere & Geography, Leninsky Prospekt 14, Moscow, V-71, USSR (2-ICSU).
- BRODIE, Mr. J.W., Oceanographic Institute, P.O. Box 8009, GPO, Wellington, New Zealand (1).
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- BURDON-JONES, Prof. C., School of Biological Sciences, James Cook University, P.O. Box 999, Townsville, Queensland, 4810, Australia (1).
- CAPURRO, Capt. L.R.A., Office of Oceanography, UNESCO, Place de Fontenoy, Paris 7e, France (1).
- CHARNOCK, Prof. H., Director, National Institute of Oceanography, Wormley, Godalming, Surrey, UK (2 - WG 28).
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- CHU, Prof. T.Y., Director, Institute of Oceanography, National Taiwan University, Taipei, Taiwan, China (1).
- COLEBROOK, Dr. J.M., Oceanographic Laboratory, 78 Craighall Road, Edinburgh, 6, Scotland (2 - WG 32).
- COMSTI, Asst. Director F.A., Bureau of Mines, Chairman of the NCMS, Herran, Manila, Philippines (1).
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- DRAKE, Prof. C., Dartmouth College, Department of Geology, Hanover, N.H., U.S.A. (1).
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- FEDOROV, Dr. K.N., Institute of Oceanology, USSR Academy of Sciences, I, Letnyaya, Ljublino, Moscow, J-387, USSR (1).
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Received after 1 August 1971

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ESTIMATE OF SCOR FINANCES
(1 January thru 31 December 1970)

BALANCE AS OF 1 January 1970

In Rome	\$ 5,633.63 *
In La Jolla	12,840.08
	<hr/>
	\$ 18,473.71
* 2,133.63 in Indian Rupees	

INCOME

National Contributions	17,632.42	
ICSU - "Ocean World"	2,500.00	
UNESCO Contract	12,500.00	
Interest on Savings	<u>435.58</u>	<u>33,068.00</u>
		\$ 51,541.71

EXPENSES

Office		3,356.84
Publications		2,087.03
Working Groups		
WG 15	11,326.32	
WG 21	750.10	
WG 23	503.15	
WG 24	1,600.46	
WG 25	757.00	
WG 29	1,329.65	
WG 31	1,512.00	
WG 32	1,333.00	
WG 33	<u>2,058.42</u>	<u>21,170.10</u>
Executive Expenses		3,261.45
Rep. Other Meetings		1,400.66
"Ocean World"		8,530.37
FAO Seminar		<u>1,809.00</u>
TOTAL EXPENSES		\$ 41,615.45

BALANCE AS OF 31 December 1970

In Rome	2,219.23 *
In La Jolla	<u>7,707.03</u>
	<hr/>
	\$ 9,926.26
* 219.23 in Indian Rupees	

ESTIMATE OF SCOR FINANCES
(1 January thru 30 June 1971)

BALANCE AS OF 1 January 1971

In Rome	\$ 2,219.23 *
In La Jolla	<u>7,707.03</u>
	\$ 9,926.26

* \$219.23 in Indian Rupees

INCOME

IBP Support for Kiel Symposium	2,500.00	
ICSU Subvention	5,000.00	
National Contributions	14,951.56	
UNESCO Contract	4,012.85	
Refunds, 1970	141.80	
Interest on Savings	<u>111.07</u>	<u>26,717.28</u>
		\$ 36,643.54

EXPENSES

Office		1,537.03
Publications		661.50
Working Groups:		
WG 21	300.00	
WG 23	1,106.50	
WG 25	830.00	
WG 33	<u>739.60</u>	<u>2,976.10</u>
Rep. Other Meetings		884.50
Kiel Symposium		7,080.84
"Ocean World" - 1970		641.00
Executive Expenses		<u>3,622.13</u>
TOTAL EXPENSES		\$ 17,403.10

BALANCE AS OF 30 June 1971

In Rome	6,689.91 *
In La Jolla	<u>12,550.53</u>
	<u>\$ 19,240.44</u>

* 219.23 in Indian Rupees

SCOR WORKING GROUPS
MEMBERSHIP AND TERMS OF REFERENCEWG 10. Oceanographic Tables and Standards (with ICES, IAPSO and UNESCO).

Terms of Reference: To carry out all the necessary preparatory work for publishing new oceanographic tables; to advise on the certification of the standard sea water; to advise on such further investigations as may be desirable.

Members: nominated by SCOR: K. Grasshoff, FRG (Chairman), F. Fisher, USA. nominated by ICES: F. Herman, Denmark; O. Saelen, Norway. nominated by UNESCO: G.N. Ivanoff-Frantzkevich, USSR; M. Menache, France. nominated by IAPSO: N.P. Fofonoff, USA; W. Kroebe, FRG.

WG 15. Photosynthetic Radiant Energy (with UNESCO and IAPSO).

Terms of Reference: To identify exactly what measurement of irradiance is required by biological oceanographers; to recommend apparatus and procedures for measuring the variable defined above.

Members: nominated by IAPSO: J. Tyler, USA (Chairman); N. Jerlov, Denmark. nominated by UNESCO: A.A. Ivanoff, France; Y.E. Ochakovsky, USSR; I.E. Baird, UK. nominated by SCOR: H.R. Jitts, Australia; Y. Saijo, Japan; E. Steemann Nielsen, Denmark. ex-officio: T.R. Parsons, Canada (Chairman, WG 24).

WG 21. Continuous Current Velocity Measurement (with IAPSO and UNESCO).

Terms of Reference: To design, and propose means of carrying out an intercomparison at sea of the principal current measuring systems now employed for the continuous recording of current velocity on moored stations.

Members: nominated by SCOR: J.C. Swallow, UK (Chairman); K.A. Chekotillo, USSR; F. Webster, USA. nominated by IAPSO: T. Kvinge, Norway; G. Siedler, FRG. nominated by UNESCO: N.P. Fofonoff, USA; B. Shekhvatov, USSR.

WG 23. Zooplankton Laboratory Methods (with UNESCO).

Terms of Reference: To suggest methods for preserving zooplankton samples for taxonomic study and for biomass determination.

Members: nominated by SCOR: V. Hansen, Denmark (Chairman); J. Beers, USA; H. Flugel, FRG; E. Paasche, Norway (Consultant); H.F. Steedman, UK. nominated by UNESCO: B. Kimor, Israel; T. Tokioka, Japan; M. Vinogradov, USSR.

WG 24. Estimation of Primary Production under Special Conditions (with IBP/PM).

Terms of Reference: To review and suggest the best methods for estimating primary production under special conditions, such as those found beneath the polar ice, and the turbid conditions found in estuaries, heavily polluted waters and exceptionally eutrophic or oligotrophic waters.

Members: nominated by SCOR: T.R. Parsons, Canada (Chairman); S. Ichimura, Japan; O. Koblentz-Mishke, USSR. nominated by IBP/PM: S.Z. Qasim, India; P.D.V. Savage, UK.

WG 27. Deep-Sea Tides (with IAPSO and UNESCO).

Terms of Reference: To encourage and assist with the design of instruments for measuring tides on the continental shelf and in the deep sea; to establish criteria concerning precision, sampling times and related considerations; to coordinate the observational programs and ultimately to bring about some uniform analyses of the deep sea data.

Members: nominated by IAPSO: W.H. Munk, USA (Chairman); L.R.A. Capurro, Argentina; G.C. Dohler, Canada. nominated by SCOR: D. Cartwright, UK; J.R. Radok, Australia; T. Teramoto, Japan. nominated by UNESCO: W. Hansen, FRG; M. Eyries, France, S.S. Voit, USSR; W. Horn, FRG.

WG 28. Air-Sea Interaction (with IAMAP and IAPSO).

Terms of Reference: To review the requirements and foster research within the field of atmosphere-ocean interaction; to provide advice on this subject, on request, to individuals as well as to national and international organizations; to consider the need for an international symposium on atmosphere-ocean interaction to be held at or before the next General Assembly, and to organize such a symposium; to ensure coordination with governmental organizations (WMO and IOC) and with non-governmental organizations outside of IUGG on subjects related to the work of the Joint Committee, and in particular to solicit their participation or co-sponsorship of any future symposium (organized under preceding term) for which such participation appears advantageous.

At the 10th SCOR General Meeting, the following recommendation was made to WG 28 on Air-Sea Interaction:

It was recommended that the working group give special attention to the question of direct eddy flux measurements of the water vapor transport. The adequacy and intercomparability of existing instrumentation should be evaluated, as should the distribution of measurements needed to establish reliable estimates of evaporation for any place on the surface of the world ocean.

Members: H. Charnock, UK (Chairman); J. Namias, USA; E.L. Deacon, Australia; A.S. Monin, USSR; R.W. Stewart, Canada; P. Welander, Sweden. Co-opted: K. Bryan, USA; S.S. Zilitinkevich, USSR.

WG 29. Monitoring in Biological Oceanography (with ACMRR, UNESCO and IBP/PM).

Terms of Reference: Using the outcome of various relevant working groups of SCOR and other organizations, to review critically the present status of devices for (a) continuous observation of parameters such as pigments, particles, transparency, submarine irradiance, primary production, nutrients, and (b) continuous or intermittent sampling of organisms, and to list suitable techniques and instruments for such measurements. The WG would work, where relevant, with the Chairman or Rapporteurs of other SCOR WG's.

Members: nominated by ACMRR: A. Longhurst, USA (Chairman); K. Grasshoff, FRG. nominated by SCOR: R.J. LeBrasseur, Canada; S. Nishizawa, Japan; G.L. Clarke, USA. nominated by UNESCO: C.J. Lorenzen, USA; C.W. Beklemishev, USSR. nominated by IBP/PM: J.M. Colebrook, UK.

WG 32. Biological Data Inventories (with ACMRR).

Terms of Reference: To review the present status of biological data inventories and information retrieval in national, regional and world data centers; to propose standard forms and procedures for inventory of marine biological and related biochemical data (exclusive of commercial fishery statistics).

Members: nominated by SCOR: J.M. Colebrook, UK (Chairman); G. Hempel, FRG. nominated by ACMRR: B. Zeitzschel, FRG; S.B. Saila, USA. ex-officio members: A.R. Picciolo, USA; R. Serene, Singapore.

WG 33. Phytoplankton Methods (with IBP/PM).

Terms of Reference: To review the methods now used for quantitative phytoplankton studies (exclusive of pigment and other chemical methods); to select the most satisfactory methods for various purposes, such as the description of species composition of communities, studies for special components, and biomass estimation; for the selected methods, to recommend detailed procedures for sample collection, preservation and laboratory examination; to prepare a report that might serve as a basis for a manual, including references to literature on taxonomy of the main groups and on methods for using quantitative phytoplankton data in ecological studies.

Members: nominated by SCOR: K. Banse, USA (Chairman); M. Bernhard, Italy; R.W. Epply, USA; G.R. Hasle, Norway; R. Marumo, Japan; G.I. Semina, USSR; T.J. Smayda, USA. nominated by IBP/PM: G.A. Robinson, UK.

WG 34. Oceanographic Basis of Ocean Monitoring and Prediction Systems.

Terms of Reference: To identify the scientific problems related to the design and use of systems for the monitoring and prediction of oceanic conditions, including problems of sampling, general circulation and the development of predictive models, and to indicate relevant investigations in progress or being planned; to consider the desirability and possible design of a mid-ocean dynamics experiment to determine whether the dynamics of the general circulation of the ocean is similar to, or very different from, that of the atmosphere.

Members: H. Stommel, USA (Chairman)
Theoretical Panel: A. Robinson, USA (Chairman); A. Gill, UK; K. Hasselmann, FRG; P. Welander, Sweden; L.M. Fomin, USSR; N.A. Phillips, USA.

WG 35. Methods in Quantitative Ecology of Coral Reefs

Terms of Reference: To identify the major scientific problems in the quantitative ecology of coral reefs; to evaluate and test existing methods for the quantitative description of abundance, composition and distribution of benthic invertebrate communities on reefs; to recommend standard field techniques suitable for the problems identified under the first term; to consider the need for a future symposium on the quantitative ecology and productivity of coral reefs.

Members: D.R. Stoddart, UK (Chairman); F.H. Talbot, Australia; M. Pichon, France; R.E. Johannes, USA; G. Scheer, FRG; Y. Loya, Israel; K. Konishi, Japan.

WG 36. Coastal Upwelling Processes (with ACMRR and ACOMR).

Terms of Reference: To review present knowledge of the physical, chemical and biological processes involved in coastal upwelling; to evaluate strategies for the investigation of these processes and recommend appropriate investigations; to examine the application of these recommendations in the upwelling region off north-west Africa.

Members: Being determined.

WG 37. Marine Plankton and Sediments

Terms of Reference: To discuss the principles of systematics, stratigraphy and environmental interpretation of planktonic remains in marine sediments, including biological remains in varved sediments as indicators of recent ocean conditions; to compare submarine stratigraphy with that on land; to prepare a symposium on these topics.

Members: E. Seibold, FRG (Chairman); H. Bolli, Switzerland; B.M. Funnell, UK; W. Riedel, USA; Y. Takanayagi, Japan; A.P. Jouse, USSR; A. Be, USA.

WG 38. Special Studies on Circumpolar Waters south of 40°S (with SCAR).

Terms of Reference: To examine the feasibility of conducting oceanographic studies in Antarctic circumpolar waters by relatively simple observation programs from resupply vessels and other ships of limited oceanographic capability, and to recommend methods and strategies whereby such programs could be developed and carried out.

Members: Sir George Deacon, UK (Chairman); other members being determined.

WG 39. Special Investigation of Pollution in the Marine Environment (with ACMRR, ACOMR and GESAMP).

Terms of Reference: To review relevant documents concerning programs of scientific investigation of pollution in the marine environment; to identify the lines of research that appear to be the most effective in such investigations; to develop an outline for GIPME, including estimates of priorities and timing and of the facilities and manpower required, and to suggest institutional arrangements for the planning and coordination of the work and the allocation of responsibility for parts of the program among the various interested organizations; to note the regional approach to the development of GIPME suggested by GESAMP and to (a) consider areas, additional to those named by GESAMP, in which investigations might be commenced at an early date, (b) bear in mind the need to enable the developing nations to take an active part in GIPME.

Members: nominated by SCOR: A.J. Lee, UK (Chairman); H. Seki, Japan. nominated by ACMRR: G. Berge, Norway; P.A. Butler, USA; J.H. Steele, UK. nominated by GESAMP: A.I. Simonov, USSR; S. Keckes, Yugoslavia. nominated by ACOMR: E. Eriksson, Sweden; K.O. Münnich, FRG.

INQUIRY ON CONDITIONS FOR OCEAN RESEARCH

Circular Letter to Members and National Committees,28 December 1970

During the 10th General Meeting (Tokyo, 13-25 September 1970), a proposal was received to establish a working group to evaluate the need for freedom of scientific research in the ocean and the obligations implied by that freedom and to examine the consequences for scientific research of the various alternative ocean regimes.

In a discussion of this proposal, SCOR Members accepted the importance of the problem but differed on methods by which it could be most effectively handled. On the one hand, SCOR had a responsibility to marine scientists to represent their interests in intergovernmental discussions of such matters, and thus needed to be fully informed of their views. On the other hand, by becoming involved in such a controversial problem, SCOR could weaken its credibility as a scientific body. It was ultimately agreed that the Executive Committee should solicit the views of its Members and National Committees, as well as of a number of other scientists, on the necessary conditions for effective scientific research in the oceans. These views should be compiled by the Executive Committee in a document which would be made widely available for use by National Committees and other scientists.

To provide a clearer focus on the problem, I have prepared the attached list of issues that seem to be involved. It would facilitate compilation of responses if you were to relate your comments to these issues. However, your views on the matter, in whatever form, will be appreciated.

In order for a draft paper to be ready for consideration by the Executive Committee at its May meeting, your comments should reach me not later than 29 March 1971.

/s/ Warren S. Wooster

Necessary Conditions for the Effective Conduct
of Ocean Research, Issues Involved

Ocean investigations, whether called exploration or research, are conducted for both fundamental and applied reasons. The increased knowledge of ocean phenomena and processes resulting from fundamental research has made possible important uses of the ocean and its resources. Enhancement of these uses continues to depend on such research, not only in the case of extractive resources, but particularly in the cases of ocean forecasting and the control of ocean pollution.

Important ocean phenomena do not, in general, correspond in location with delimitations drawn on political grounds. The control of ocean research, however, is affected by such limits. Coastal states control research in ocean regions under their jurisdiction. These regions have expanded through international agreement and are being further extended by unilateral action. Beyond the limits of national jurisdiction, ocean research is at present restricted only by other uses of the ocean. However, this region is the subject of continuing international discussions; any regime established for its governance may include conditions for the conduct of research.

Restrictions on ocean research are justified principally on the grounds that such research will give special advantages in the exploitation of resources. National security and protection of the environment are also invoked. Although controls are first directed to applied research on selected problems (such as fisheries) or regions (such as the sea bed), they tend toward coverage of all ocean research, presumably because of the potential application of such research to practical problems.

Consideration of the conditions for conduct of ocean research should include (1) evaluation of the justifications for control, (2) examination of alternative ways to meet problems implied by

the justifications, and (3) estimation of the cost of various restrictions, including their effect on the rate of acquiring scientific knowledge. With reference to (2), special consideration should be given to ways of assisting developing countries to make effective use of the results of ocean research.

Reply from Australian National Committee for Oceanic Research

3 March 1971

I have collected opinions from ANCOR members on your letter concerning the "Necessary conditions for the effective conduct of ocean research", and although there is some variation in detail we have a predominant reaction that SCOR should not seek involvement in controversial questions which are political rather than scientific. The question of freedom of research is inevitably linked with international jurisdiction and control of the world oceans, and if SCOR were obviously to seek involvement in these issues in the public forum it might suffer loss of scientific credibility.

This is in no way to say that either SCOR or we as individuals should accept arbitrarily imposed restrictions, but perhaps the proper attitude for SCOR is that there should be freedom of research and that SCOR should use its many contacts with governmental and other bodies to oppose restrictions as they become evident and can be seen to interfere with scientific programmes.

It will be helpful for SCOR to circulate a digest of views which will then be available to support individual members in discussions within their own countries.

/s/ Bruce Morton

Reply from French National Committee for Oceanic Research

19 March 1971

Le Bureau du Comité National Français de Recherche Océanique s'est réuni récemment pour préparer une réponse à votre lettre citée en référence. Vous trouverez cette réponse ci-jointe.

En ce qui concerne les "issues" intervenant dans les conditions nécessaires pour la conduite efficace de la Recherche dans l'océan, les trois premiers paragraphes reposent, selon le CNFRO, sur des conceptions très saines.

Par contre, pour le quatrième paragraphe, il ne semble pas que l'étude des trois points cités relève du SCOR (voir document joint).

/s/ H. Lacombe

1. - Les scientifiques, les organismes scientifiques non gouvernementaux et le SCOR lui-même ne peuvent que déplorer toute limitation à la liberté de recherches conduites de bonne foi à des fins purement scientifiques ou appliquées; ils doivent lutter pour préserver cette liberté: la recherche ne connaît pas de frontières. Ceci est particulièrement vrai pour un milieu un et continu comme l'océan, à un moment où notre connaissance des mécanismes qui s'y déroulent est encore très incomplète. C'est surtout le cas pour les régions de faible profondeur, qui seront les premières à être soumises à juridiction, et où la petitesse relative des échelles d'espace et de temps des phénomènes exigerait au contraire une plus grande concentration de mesures.

Il est bien probable que la propagande souvent outrancière faite depuis une dizaine d'années sur l'intérêt financier de l'exploitation des ressources océaniques et sur l'imminence d'un rendement à court terme ait contribué à hâter la décision de certains Etats d'étendre unilatéralement la zone sur laquelle s'exerce leur droit de regard, sinon leur souveraineté.

2. - Il semble au bureau du CNFRO que, s'agissant de problèmes où les limitations éventuelles résultent au premier chef de l'attitude trop souvent unilatérale des gouvernements, il est de beaucoup préférable que ce soit aux organisations intergouvernementales qu'il appartienne de traiter des effets d'éventuelles juridictions nationales sur la conduite efficace de la recherche marine et d'en atténuer l'incidence sur son rendement.

3. - Le SCOR, sorte de "Conseil des Sages" de l'océanographie scientifique et conseil scientifique de diverses organisations intergouvernementales, comme la COI, doit demeurer sur le plan strictement scientifique. Sa voix aura d'autant plus de poids qu'il demeurera plus indépendant de toutes les discussions et tractations que l'extension en mer des juridictions nationales va nécessairement amener devant les instances océanographiques intergouvernementales.

Le SCOR demeurera ainsi dans l'esprit et les limites de son mandat, et sa qualité de "Conseil" auprès d'instances telles que la COI lui permet de défendre la liberté de la recherche auprès de ces organismes qui ont à connaître des juridictions nationales. Les membres élus du Comité exécutif du SCOR, éclairés par les membres ex-officio sont les personnalités les plus qualifiées pour faire entendre la voix du SCOR.

4. - La mise au point d'éventuelles conventions ou textes concernant la sauvegarde de la liberté de la recherche relève, selon le Bureau du CNFRO, des organisations intergouvernementales d'océanographie affiliées aux Nations Unies.

Reply from SCOR National Committee of the Federal Republic of Germany
23 March 1971

You asked the SCOR National Committee of the Federal Republic of Germany for comments about "Necessary Conditions for the Effective Conduct of Ocean Research". The enclosure will give you some ideas of our group for further discussions.

/s/ E. Seibold

1) SCOR should distinguish between basic research and economically oriented research. It is realized that the boundaries here are often transitional. In addition, basic research in many cases may lead rapidly or some years later to economic applications, and "one man's basic research is another man's applied". A differentiation can, however, serve to quiet the distrust of some countries, particularly the developing nations, and thereby save at least part of the freedom to carry out basic oceanographic research.

2) A scientific programme would be classed as basic research when:

- a) rapid publication of the entire results is assured,
- b) participation of foreign scientists, particularly those from the country whose coast borders the project area, is allowed and when invitations have been issued. Classification of a programme as basic research would be facilitated if it is carried out within the framework of an international scientific organization, for example LEPOR-IOC, or as a "declared national programme".

Economically oriented research (for example for mineral exploration, fishery, coastal engineering) as well as projects relating to defense, do not need to meet these conditions. Therefore, they must be willing to accept greater restrictions.

3) Qualitative differentiation should be made between:

- a) Research which involves no, or only insignificant contact with the sea floor; i.e., no installation which would remain for a long time (more than 1 lunar monthly tidal period) on the sea floor and which would have no sustained effect on the structure and content of the bottom, and
- b) Research which involves longterm installation or longterm anchoring of equipment on the sea floor or research which could lead to significant damage of the environment.

- 4) Areal differentiation should be made between:
- a) Coastal waters (boundary unfortunately still open; a uniform distance of 12 miles from the coast would be desirable);
 - b) Continental shelf and slope;
 - c) High sea beyond 4b).
- 5) a) Basic research outside coastal waters should be unrestricted. Permission would be required in case of 3b) for continental shelf and slope areas under territorial control. Notification would be required for all work in these areas.
- b) Basic research within coastal waters would remain contingent upon obtaining permission from the government in question.
- 6) a) Economically oriented research in coastal waters and in continental shelf and slope areas under territorial control could be carried out only with permission.
- b) Economically oriented research in high sea areas should be unrestricted. When it effects the sea floor outside of 6a-areas, permission must be obtained from an international institution charged with the responsibility of these problems as soon as such an institution is formed.

Reply from British National Committee on Oceanic Research
17 April 1971

The British National Committee on Oceanic Research has discussed your circular letter no. 529D of 28 December 1970 and is of the opinion that urgent action is required by SCOR on the second part of the proposal "to examine the consequences for scientific research of the various alternative ocean regimes" but that no attempts should be made to establish rights to freedom of scientific research as was implied by the first part of the proposal.

The British National Committee is of the opinion that future treaties and conventions related to the resources and use of the ocean areas outside national jurisdiction will be determined by political or commercial criteria and that scientists would be unwise to attempt to establish for themselves any special consideration because this would be fraught with legal difficulties and could be detrimental.

It is fully appreciated that the 1958 Convention on the Continental shelf has demonstrated that the requirements of such conventions do constitute a hinderance to scientific research and that difficulties have been aggravated by the ambiguous wording of some parts of the Convention. Further problems have been experienced recently following unilateral decisions by some nations to extend their territorial seas to 200 miles which indicate that the adverse effects on scientific research of extensions of such claims could be substantial.

It is vital therefore that the views of scientists be expressed at an early stage to those responsible for drafting new treaties and that the advice of scientists be sought in order to avoid the kind of anomalies which exist in the wording of the Convention on the Continental Shelf. This kind of activity is best undertaken at national level and SCOR might encourage its National Committees to seek representation at State Department or Foreign Office meetings which might be called for briefing delegates to U.N. meetings concerned with drafting new conventions.

SCOR should attempt, perhaps through IOC, to ensure that scientists are represented at such U.N. meetings but SCOR is not fully competent to evaluate the justification for such controls as may be proposed and we do not consider it advisable at this stage for SCOR to attempt to advocate alternative ways of meeting the problems implied by military, political and commercial requirements.

The British National Committee does, however, consider that SCOR should take prompt action on the third point you proposed, namely to attempt to estimate the cost of various forms of international legislation now under consideration including the likely effect on the rate of acquiring

scientific knowledge. It is proposed that SCOR establishes a small competent group of specialists to undertake such an objective study as soon as possible. ACMRR might be invited to work with such a group, having already expressed its concern about these matters to FAO. IOC should be asked to represent the scientists viewpoint to the appropriate U.N. authorities.

In preparing its statement, the British National Committee suggests that the SCOR group might give particular attention to:

a) demonstrating that those nations now pressing for extension of restrictions on exploitation could lose more than they might gain by applying such restrictions to fundamental scientific research.

b) demonstrating that the extension of restrictions may stifle much fundamental research, which often depends upon ability to adapt programmes to changing conditions at short notice, to the detriment of both developed and developing nations.

c) emphasising that coastal states should assume definite responsibilities for observing, documenting and publishing data about the sea areas over which they claim responsibility in the same way that they are considered responsible for producing data about the atmosphere over their territory.

Amplification of these comments is contained in the attached papers which were considered, and agreed with, at the meeting of the British National Committee on Oceanic Research.

I trust these views will be helpful to the SCOR Executive when it discusses these problems at its meeting in May.

/s/ G.E. Hemmen

There is a serious danger that attempts by SCOR or other bodies to establish any specific rights for scientific research will only tend to tie the legal knots tighter. Scientists may do better to live with the restrictions that they find, and demonstrate by experience that restrictions do not necessarily operate to the advantage of those who impose them, rather than attempt to establish a firm legal framework for scientific research on the oceans.

In the long run, SCOR's activities in changing the general climate of opinion is likely to be more important than any attempt it makes to specify requirements for research. What is required is a shift from discussion of 'rights' in respect of territorial and national waters towards a consideration of responsibilities. Just as nations accept a responsibility for observing, documenting and publishing data about the atmosphere over their territories so should they be encouraged to accept the same responsibilities for their oceanic areas on the grounds that at least the fluid part and the fishes will not remain there and must be of concern to all ocean users. Against such a climate of opinion the visiting research ship would then be seen as assisting the sovereign country in carrying out its responsibilities, and not as collecting information for private use. Such a point of view would however impose a responsibility on research workers to publish results and data, and be seen to be doing so.

The second paragraph of the SCOR letter seems to imply that SCOR wants to prepare a paper that National Committees can use, while avoiding direct commitments itself, but if well reasoned arguments can be put forward SCOR might 'weaken its credibility as a scientific body' by holding back.

Coastal states may try to justify restrictions on ocean research on the grounds that it gives special advantages in exploitation of resources ('issues involved', para 3), but the real reason is probably their determination to put the highest possible fence round the extended sovereignty and sole rights to fish and minerals that they can hope to claim, and they will tend to increase such controls while they can gain any revenue or prestige.

The main economic justification for ocean science is not discovery of new uses of the oceans and their resources. Such discoveries, whether for gas under the North Sea, oil off the coast of California, or tin and other minerals in the offshore sands of Thailand, are generally direct continuations of industrial developments on land, and new fisheries are generally found by fishermen. But science makes a great difference between exploitation and profitable management, and the chief economic justification for research at sea is to help industries that already spend enormous sums of money on work at sea.

Instruments designed for academic study of the sea floor, understanding its character and its destructive phenomena such as turbidity currents, have led to the safer routing of submarine cables. New information about sediment movements and sand waves can assist pipe laying and other underwater operations. The same knowledge and technical experience may eventually allow profitable recovery of minerals from the deep ocean, but this is a long way off, and the potential has been much exaggerated.

Biological research has already done much to preserve marine resources. Even the whaling industry would have been £600 million worse off without very clear scientific justification for control. All coastal states, however rich their marine resources, must take care, and their management can improve as more is known about the fishes and their migrations.

Science at sea has done quite a lot for navigation and coastal engineering, and it has many further possibilities. With the growing size of ships, the need to reduce delays and damage by rough water, and the problems that arise as fuller use must be made of harbour approaches, offshore moorings and improved sea defences, the potential benefits, though at first sight marginal in character, promise very large savings. The varying currents which influence long-term weather as well as navigation, climate and dispersion of pollutants are also worth studying.

Governments and industry will find it difficult to advance marine science and make effective use of the new knowledge and techniques unless they have enthusiastic groups of scientists in close personal touch with their most active counterparts in other countries. It will be difficult to convince national authorities that frustrating regulations won't pay, and that they may lose by keeping science, scientists, and research ships at arm's length, but it is possible. It can be argued that some of the new rules are reasonable, but sea-going scientists, who must be opportunist and able to take immediate advantage of changing conditions to get something done, will find demands for early, fixed schedules of movements, and detailed lists of personnel and equipment both distracting and restrictive. What seems reasonable in an office, and to lawyers, may well stifle devoted, well-meaning, research at sea, and leave the initiative to exploiters and limited interests, and the future to unsatisfactory trial and error.

On the contrary the problem may not be as serious as we might think. Although studies must be made in regions where the current changes with the wind, in others where mixing and upwelling seem predictable, and so on, alternative sites can sometimes be chosen to solve the problems, and the balance and benefits of new advances will move to the more co-operative parts of the world. Perhaps the United Nations has talked too much about exploiting the deep oceans, and talked itself into bonanzas and disasters that are remote if they exist at all. Perhaps it may be sufficient for scientists to hint that countries that impose severe restrictions will get left behind, and while taking all possible advantage of bilateral and regional agreements, try to avoid the worst restrictions.

Reply from National Committee of Soviet Oceanographers,
1 March 1971

The National Committee of Soviet Oceanographers is in full agreement with the decision of SCOR's Executive Committee to limit its activities in such complex legal areas as that of the concept of freedom of scientific research in the ocean by simply soliciting views of its members and National Committees on the matter. We agree that more active steps by SCOR in this field would weaken its credibility as a scientific body.

The National Committee of Soviet Oceanographers believes that an exchange of views on some relevant issues related to the freedom of scientific research in the ocean may prove to be very useful. Its usefulness would be further enhanced by publishing views and opinions of SCOR members and making them widely known. This would enable members and participants of SCOR's work to get adequately acquainted with the jurisdictional problems faced by those who are responsible for arranging and conducting oceanic research.

The National Committee of Soviet Oceanographers shares the view that the right for freedom of scientific exploration or research, conducted for both fundamental and applied purposes carried out by scientists of various countries in different areas of the World Ocean for the benefit of man's knowledge and general progress should not be restricted or delimited; on the contrary, it should be regarded as a cornerstone in the evaluation of the jurisdictional aspects of oceanic research providing the countries participating in exploration works observe the principle of mutual exchange of collected data, coordination and cooperation of scientific efforts on equal world-wide basis.

The National Committee of Soviet Oceanographers regrets that the issues outlined in the Appendix of your letter had been chosen and formulated rather haphazardly. Some of their aspects run beyond the competence of scientific interests represented by SCOR and its National Committees. Even the IOC Working Group on Legal Aspects Related to Scientific Research in the Ocean had chosen a much more careful approach in tackling the same problem. For this very reason the National Committee of Soviet Oceanographers, which acts as the National Committee for SCOR is hereby submitting its brief comments on the presented issues (see Appendix to this letter).

/s/ A.D. Dobrovolsky

1. The question of evaluating the justifications for the control of scientific research in the ocean may be discussed only by those who propose to control or restrict scientific research in the ocean. It is difficult to imagine a single body acting as a National Committee attached to SCOR which would deliberately speak in favour of such a control or restriction. The true question is whether or not the future international ocean regime is going to be worked out with the participation of scientists and with a due account of the interest of science?
2. It is hardly SCOR's task to try to satisfy through some alternative solutions those who insist on controlling science in the ocean. Would it not be more appropriate for SCOR members and National Committees to think of some positive arguments in favour of preserving and upholding the concept of freedom of scientific research? These arguments should have at least the same weight in the eyes of humanity as those in favour of restrictions and control.
3. It is difficult to estimate quantitatively the economic effect of various restrictions. One thing is evident: this effect will be clearly negative for both developed and developing countries. The latter for quite a long time to come will have to rely upon the developed countries for obtaining for their own use results of the expensive and costly oceanographic research.

Reply from U.S. National Committee for SCOR
12 May 1971 *

As Chairman of the U.S. National Committee for SCOR I wish to provide you with a discussion on the necessary conditions for effective conduct of ocean research prepared by the International Marine Science Affairs Policy Committee of the National Academy of Sciences Ocean Affairs Board. This discussion has been endorsed by the Ocean Affairs Board in its capacity as the U.S. National Committee for SCOR.

/s/ John C. Calhoun, Jr.

This paper is in response to the SCOR Circular Letter of 28 December 1970 that identified the problem of (1) evaluating the need for freedom of scientific research in the ocean and the obligations implied by that freedom and (2) examining the consequences for that freedom of various

alternative ocean regimes.

Before responding directly to the statements in the letter about this problem, the U.S. National Committee has some preliminary observations. First, the Committee does not concur in the opinion expressed by some SCOR members that SCOR's credibility as a scientific body will be weakened by becoming involved with this problem. To the contrary, the Committee believes that SCOR has an obligation to be concerned with the problem and to involve itself in some degree in its resolution. SCOR is the principal international non-governmental body for marine science, and as such it is entirely appropriate for SCOR to take the lead in demonstrating the need for freedom as the major condition for effective conduct of ocean research. If SCOR did not take this initiative, members might properly raise questions about SCOR's central role in facilitating ocean science at the international level.

Second, the U.S. National Committee would prefer a far more vigorous approach to this problem than adopted at the 10th General Meeting. A mere compilation of views is not likely to have much effect. The following views are submitted for such effective use as the Executive Committee can devise, in accordance with the decision of the 10th General Meeting.

In formulating its views, the U.S. National Committee adopts the basic premise that effective conduct of ocean research depends upon freedom of access to and movement on all parts of the ocean. To emphasize this fundamental condition not only conforms with the real needs of research operations but also with the applicable legal framework. According to existing law as perceived by nearly every state in the world as evidenced by their practice, scientific research at sea is one of the freedoms of the sea and, therefore, protected by international law.

It is not enough now, if it ever was, for marine scientists to repeat the exhortation that ocean research is protected by the concept of the freedom of the seas. This is not enough because some states either do not believe this is the existing legal status of ocean research, or they assert that, even if it is, the existing freedom should be diminished substantially by the imposition of restrictive conditions or controls. In light of these opinions, the need is to establish the case for freedom of research by elaborating upon the factors that justify such a status. This is a major task for SCOR and for scientists generally at this stage in time.

The question is, how is this case to be established. No doubt there are several approaches to this objective, but here we suggest only two. A first task is that of demonstrating that for good scientific reasons investigations must be carried out in all parts of the oceans if they are to be satisfactory. Conversely stated, to exclude investigation from or into some parts of the sea, because of proximity to shore or to some ocean feature, would probably result in insufficiently comprehensive inquiry and markedly reduce the validity or usefulness of research results. This approach might be implemented by spelling out the requirements for widespread, ocean investigation arising from the various fields of ocean science such as geology, geophysics, chemistry and biology. For example, it might be useful to examine from this perspective, the scientific projects identified in the Comprehensive Outline for LEPOR and to show their applicability to all parts of the ocean. Other formulations of projects could also be used, such as the Ponza Report, another document produced by an international body of scientists.

A second necessary task is to show that what is required for effective scientific research at sea, i.e., freedom of research, also serves the needs of states in making productive use of the ocean. One way of discharging this task is to clarify the close relationship between ocean research and various forms of using the ocean, such as fisheries, transportation, communications, extraction of non-living resources, and the various means of modifying the marine environment. Virtually every state in the world seeks to make use of the ocean in one or several of these ways and, therefore, is a beneficiary of marine science research.

Another aspect of this problem is not how states generally benefit from marine research but the need to assure that states have the capability to realize such benefits and to engage in research themselves. If freedom of scientific research is to serve the interests of many states directly and immediately, they must be put in the position either of being able to engage in such

research with their own resources or of being capable of using research results produced by others. To make freedom fully meaningful, therefore, there must be increased efforts to assist the developing states in marine and fisheries sciences education and in marine resource development. The U.S. National Committee believes these efforts deserve urgent priority attention.

The U.S. National Committee recognizes that there are occasionally apprehensions on the part of coastal states that the free conduct of marine science research unduly impinges on coastal interests. There is a need to devise ways of satisfying these apprehensions without sacrificing the advantages of freedom of science. One such way is illustrated in the document attached to this letter, embodying the approach to this problem that the U.S. National Committee has recommended to its own government and that is being studied by that government for possible adoption. The U.S. National Committee believes the assurances outlined in this document offer adequate safeguards to legitimate coastal concerns.

Having reviewed the position paper on Freedom of Scientific Research and Exploration of the Sea and Seabed prepared by the International Marine Science Affairs Panel of the Committee on Oceanography, the Council of the National Academy of Sciences:

1. Reaffirms the importance of insuring freedom of scientific research and exploration of the sea and seabed;
2. Expresses concern that restrictions placed by various nations are seriously jeopardizing ocean research;
3. Urges the federal government to explore vigorously ways and means of encouraging all nations to ease their restrictions on marine research done in their territorial waters.

As an approach to achieving a global easing of restrictions, we recommend that the federal government seriously study the possibility that the U.S., on its own initiative take the lead and declare its intent to permit scientific research, without a permit, but with appropriate and adequate safeguards, in areas subject to its jurisdiction outside internal waters.

The Council requests the President to forward this resolution, together with the position paper, to appropriate federal agencies, stressing that the actions recommended therein, modified according to security requirements, might represent a reasonable basis for action.

The Committee on Oceanography and its International Marine Science Affairs Panel have been concerned with the problem of maintaining freedom of scientific research and exploration of the sea and the seabed. The Committee and the Panel have actively cooperated with federal agencies in pursuing certain limited international actions which might facilitate such research and exploration. The Committee and the Panel believe that other governmental measures must be initiated for this purpose and propose that the United States Government announce that henceforth it will freely permit scientific research in areas subject to U.S. jurisdiction and that no permit will be required except for investigations in internal waters. In order to be satisfied, however, that research vessels in these areas do properly conduct bona fide scientific activities and that the results of their work are available to the U.S., the following assurances should be observed so that the United States shall:

1. Be given reasonable advance notice, a period of 60 days probably being adequate.
2. Have the opportunity to participate in the research and exploration and have access to all equipment, compartments and instruments aboard the vessel.
3. Have the right to receive copies of all data on request, and the right of access, for study, to all samples not feasible to duplicate.
4. Be assured that significant research and exploratory results will be published in the open scientific literature.
5. Be assured that the scientific exploratory activities will present no hazard to the resources or uses of the sea or seabed (e.g., seismic explorations that could damage fish stocks, or exploratory drilling that could result in petroleum pollution).

The Committee and the Panel believe that bold unilateral action substantially similar but not necessarily identical to this recommendation could well be effective in demonstrating the advantages to all states of encouraging free and open scientific research and exploration. We hope that appropriate officials in our government will consider this recommendation and explore the possibilities of such an initiative by the U.S. Government.

Reply from Indian National Committee on Oceanic Research
22 June 1971

The Indian National Science Academy and the Indian National Committee on Oceanic Research have carefully considered the note sent by the SCOR sectt. It has agreed that the National Committees and academies have a responsibility to marine scientists to protect all justifiable interests in the conduct of scientific research pertaining to the oceans without being unduly hampered by restrictions imposed by the coastal states. The Academy supports any steps which will create a better understanding amongst countries which will enable such work to be carried out for the common good of mankind.

2. So far as the ocean waters are concerned, there is apparently no restriction now imposed for studies outside the territorial waters. A problem has, however, arisen because of the unilateral extension of the territorial waters on the one hand and the increasing interest in the study of the seabed and the ocean floor on the other, where the present international conventions make it obligatory that the consent of the coastal state to be taken for the pursuit of such investigations on the continental shelf.

3. In the opinion of the Academy, SCOR would do well to enumerate and specify the types of investigations which, in the opinion of SCOR, should be brought within the ambit of unfettered scientific research outside the territorial waters. Similarly, it would be useful to list separately the types of investigations which are necessary but which need be carried out only with the permission of the coastal states.

4. The attitude of many countries not allowing others to carry out observations in their coastal waters is partly based on ignorance of the types of observations made and partly due to their apprehension that the more advanced countries possess the technology and competence for obtaining information relating to coastal and subsoil features which may be of defense value and may be used against these countries. It is also a matter of common knowledge that even in the advanced countries the extent to which the scientific community that proclaims the need for freedom in scientific research could influence a military regime is extremely limited when it comes to the application, by their own military regimes, of the scientific knowledge thus acquired.

5. What is there to prevent the defense establishments of these countries from fully utilizing the information gathered by their scientists, if it is relevant to a military operation? It is precisely this kind of thinking which prevents many countries not having the requisite technology and competence to give blank cheque for free research without the knowledge of the coastal states.

6. The second situation pertains to what may be called the actual commercial operation in the guise of exploration and research; for example, a factory ship working for two months a hundred miles outside the coast of a country collecting fish and processing them at sea, might still be called an exploratory operation.

7. It is true that these are two extreme instances and the Academy feels that the best solution is to spell out, in the light of modern technology, the types of investigations or observations which will be taken on hand and for which there should be no restriction. The subject is extremely complex and we are aware that proposals for a draft convention or treaty relating to this is being discussed but the point mentioned in the SCOR letter that as a scientific body it should not get unduly involved in controversial problems which might erode its authority in scientific circles is a desirable caution necessitating a careful approach.

FUTURE MEETINGS OF SCOR AND ASSOCIATED ORGANIZATIONS

1971

30 July - 14 August	Moscow	IUGG, 15th Gen. Meet. (Includes IAPSO)
1, 7 August	Moscow	SCOR WG 28 Air-Sea Interaction
4, 7-8 August	Moscow	SCOR WG 21 Continuous Current Velocity Measurements
6-7 August	Moscow	SCOR WG 34 Oceanographic Basis of Ocean Monitoring and Predic- tion Systems
16 - 20 August	Geneva	UN Conf. Human Environ., IWG on Monitoring or Surveillance
18 August - 3 September	Canberra	Pacific Science Congr., 12th Session
30 August - 4 September	Canberra	SCOPE, 1st Gen. Assem. and associated meetings
6 - 10 September	Geneva	ACOMR, 1st Meet.
13 - 24 September	New York	UN Conf. Human Environ., 3rd Session Prep. Comm.
20 - 24 September	Honolulu	SCOR/CMG/ICG Workshop on Marine Geoscience
20 - 25 September	Rome	IOC WG Oceanogr. Data Exchange, 6th Session
24 - 25 September	Helsinki	ICES/SCOR Meet. on Baltic Pollution
27 September - 6 October	Helsinki	ICES, 59th Statutory Meet.
29 - 30 September	Ottawa	ICSU Exec. Comm., 12th Meet.
4 - 8 October	Rome	IBP/PM Working Conf.
11 - 18 October	Rome	SCOR WG 39 Scientific Investi- gation of Pollution in the Marine Environ. (with GESAMP, ACMRR and ACOMR)
18 - 19 October	Venice	SCOR WG 27 Deep-Sea Tides
25 October	Paris	IOC Bureau with Consult. Council, 13th Meet.
26 October - 5 November	Paris	IOC 7th Session

6 November	Paris	IOC Assem., 1st Extraordinary Session
8 - 12 November	Ottawa	UN Conf. Human Environ., IWG on Marine Pollution
? November	Singapore	UNESCO, Adv. Panel on UNESCO Sponsored Marine Biological Centers
1972		
? January	?	SCOR, 16th Exec. Meet.
9 - 15 February	Wellington	New Zealand Nat. Comm. for UNESCO, Internat. Symp. Oceanography of the South Pacific
? February	Buenos Aires	IOC Internat. Coord. Group on Southern Ocean
6 - 11 March	Geneva	GESAMP, 4th Session
? March	London	ECOR, 1st Gen. Assem.
? April	Paris	IOC, Group of Experts on Oceanogr. Res. related to IGOSS, 1st Meet.
5 - 16 June	Stockholm	UN Conf. Human Environ.
19 - 23 June	Copenhagen	IAPSO Symp. Optics of the Sea
13 - 18 July	Bath	SCOR WG 23, Workshop Zooplankton Lab. Methods
8 - 17 August	Montreal	IGU, 22nd Internat. Geographical Congr.
21 - 30 August	Montreal	IUGS, 24th Internat. Geological Congr.
12 - 20 September	Edinburgh	Second Internat. Congr. History of Oceanography, Challenger Expedition Centenary Celebration
21 - 23 September	Oban	SCOR, 11th Gen. Meet.

ABBREVIATIONS

ACMRR	Advisory Committee on Marine Resources Research (of FAO)
ACOMR	Advisory Committee on Oceanic Meteorological Research (of WMO)
CICAR	Cooperative Investigations of the Caribbean and Adjacent Regions
CINECA	Cooperative Investigations of the Northern Part of the Eastern Central Atlantic
CMG	Commission on Marine Geology (of IUGS)
CNFRO	Comite National Français de Recherche Océanique
COI	Commission Oceanographique Intergouvernementale (IOC)
CSIR	Council for Scientific and Industrial Research (South Africa)
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
CSK	Cooperative Study of the Kuroshio and Adjacent Regions
ECOR	Engineering Committee on Oceanic Resources
FAO	Food and Agriculture Organization (of the UN)
GARP	Global Atmospheric Research Program (of WMO/ICSU)
GATE	GARP Atlantic Tropical Experiment
GELTSPAP	Group of Experts on Long Term Scientific Policy and Planning
GESAMP	Group of Experts on Scientific Aspects of Marine Pollution
GIPME	Global Investigation of Pollution in the Marine Environment
IABO	International Association for Biological Oceanography (of IUBS)
IAMAP	International Association of Meteorology & Atmospheric Physics (of IUGG)
IAPSO	International Association for the Physical Sciences of the Ocean (of IUGG)
IBP/PM	International Biological Programme/Productivity Marine
ICES	International Council for the Exploration of the Sea
ICG	Inter-Union Commission on Geodynamics (of IUGG/IUGS)
ICSPRO	Inter-Secretarial Committee on Scientific Programs Relating to Oceanography
ICSU	International Council of Scientific Unions
IGOSS	Integrated Global Ocean Station System
IGU	International Geographical Union
IIOE	International Indian Ocean Expedition
IMCO	Intergovernmental Maritime Consultative Organization
IOC	Intergovernmental Oceanographic Commission
IUB	International Union of Biochemistry
IUBS	International Union of Biological Sciences
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUPAP	International Union of Pure and Applied Physics
IUPS	International Union of Physiological Sciences
IWG	International Working Group
LEPOR	Long Term and Expanded Program of Oceanic Research
MAMBO	Mediterranean Association for Marine Biology and Oceanography
NAS	National Academy of Sciences (USA)
NCMS	National Council of Marine Sciences (Philippines)
SCAR	Scientific Committee on Antarctic Research
SCIBP	Special Committee for the International Biological Programme
SCOPE	Special Committee on Problems of the Environment
SCOR	Scientific Committee on Oceanic Research
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WG	Working Group
WMO	World Meteorological Organization