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REPORTS OF THE IOC ADVISORY BODIES TO THE TWELFTH SESSION OF THE ASSEMBLY

SC-82/CONF. 218/COL 12

REPORT ON THE ACTIVITIES

of the

FAO ADVISORY COMMITTEE OF EXPERTS ON MARINE RESOURCES RESEARCH (ACMRR)

WITH REGARD TO FISHERIES OCEANOGRAPHY

The following is a brief description of the main activities of ACMRR and its working parties since the last session of the IOC Assembly (November, 1979).

1. Tenth Session of ACMRR

The session was held in Rome, 2-6 November 1981, under the Chairmanship of Dr. A. Mena Millar. Fourteen members of the Committee (one of whom had been nominated by IOC) and observers from IOC/Unesco and SCOR were present. Among the main topics discussed were: promoting fishery research in developing countries, aspects of fishery management and the project on ocean sciences in relation to living resources.

Promotion of fishery research in developing countries

Regarding the promotion of fishery research in developing countries there was some discussion of what research was needed and, in the extreme, whether research was needed at all. It was pointed out that the provision of the draft Law of the Sea Convention placed responsibilities on coastal states on cooperating with neighbouring states on shared stocks, which required that all coastal countries had access to the results of research, even if they did not carry out research themselves. At the same time it would not be possible for more than a few of the larger countries to carry out all types of research. Countries need to collaborate with each other to transfer results and it was an important responsibility of FAO, under the new ocean regime, to assist them in this collaboration.

Research capacities are limited and training to improve these capacities to carry out research is very important. However, in many countries the existing resources of scientific skills are not fully utilized, in particular, research in universities and in fishery institutes often proceed independently. Much would be gained by better integration. There are problems: the two groups of scientists often have different status, and different objectives. Yet there can be mutual benefit from working together. For example, the university groups could be encouraged to tackle more theoretical studies which could provide backing for work of the fishery institutes. Close interaction would increase the relevance of university research and also increase the transfer of recent advances to fishery institutes. It was suggested that FAO should examine, jointly with IOC, ways of fostering this type of collaboration to which the regional subsidiary bodies and programmes of the two organizations could greatly contribute.

It is important that research is appropriate to national needs and to the local natural conditions. This is difficult to achieve because scientists must begin from existing models and techniques, which may have been developed elsewhere under different conditions. To increase the relevance of research as rapidly as possible, there must be continuous review and close feedback between the users and the scientists so that the latter adapt their methods and lines of study to local needs and local conditions. For example, many scientists are interested in predicting future fishery conditions (e.g. from early indications of year-class strength), but predictions are only valuable if the fishermen are in a position to take advantage of a forecast, say a couple of months in advance, that conditions will be unusually good or bad.

Training is one of the key elements in improving research capacities in developing countries. There is a need to keep the production of manuals and similar documents under regular review to take account of changing needs, especially in developing countries, and the growth of new concepts and techniques.

Recent developments in the legal regime of the sea offer to the coastal states substantial new opportunities and responsibilities for the management and utilization of fish resources. Many countries lack adequate skilled people to take advantage of these opportunities and filfill their responsibilities. Training of

fisheries managers and administrators to carry out these functions should be a matter of very high priority, not only among other training programmes but in any programme of fishery assistance.

The Committee found that the arrangements and facilities for the dissemination of information were relatively poor in most developing regions. Scientists in these countries had difficulty in becoming aware of publications relevant to their work and in obtaining copies of the papers or books concerned even if they became aware of their existence. Conversely, the results of work by scientists in these countries were often poorly disseminated.

Some of the problems were purely financial. Small institutes did not have the money to pay for the ever-increasing costs of books and journal subscriptions. If they published journals or reports they had problems in printing large numbers, or in having articles adequately translated from the national language into the common languages of scientific exchange. The Committee urged that this pressing need should be drawn to the attention of funding agencies.

Most developing regions lacked a regional fisheries journal, comparable to the Journal du Conseil of ICES in the North Atlantic, though the Committee noted with appreciation the interest of the American Fisheries Society to make its publications more useful to Mexico and Central America. A common problem in developing countries for both national and regional journals has been the lack of people able to carry out the referencing, reviewing and editing necessary to maintain a proper standard of papers.

The Committee noted the activities carried out by FAO through ASFIS (Aquatic Sciences and Fisheries Information System), and in particular the moves to make ASFIS more responsive to the needs of developing countries. It welcomed the establishment of regional input centres in some developing countries. The output of ASFIS, and the opportunities of accession to the system also need to be decentralized to match regional needs and the Committee noted the trial efforts to produce bibliographic information tailored to the particular needs of fishery scientists in the IPFC region. These efforts needed to be strengthened to cover other developing regions.

Research aspects of fishery management

The FAO Fisheries Report No. 236 (Report of the ACMRR Working Party on the Scientific Basis of Determining Management Measures) pointed out that world fisheries are not being managed well and that the new regimes of extended economic zones provide both an opportunity and a responsibility of nations to manage rationally their living marine resources. It is critical that a coordinated system of management needs to be developed by the fishing nations now, so that coastal states can optimize social and economic benefits from fishery resources. Such a system is outlined and developed in the report and has the following components: setting of objectives, definition of boundaries, collection of data, transformation of data into information, formulation of action, execution of policies and evaluation of the system. The primary research needs are viewed as an examination and evaluation of this system.

This broad system for management is not intended to define objectives, define boundaries, etc., for the fishing nations, but rather to lay out a process by which a country could address these important items for itself. The role of planning in fishery management is essential and attention is called to the need for nations to define their objectives and evaluate the success or lack thereof in achieving their objectives. The interactive nature of the system from formulation of objectives to evaluation of the system to achieve them, was apparent to all, and could lead to an adaptive system of fishery research and management to achieve the objectives of a nation's fisheries.

Perhaps the most urgent need in biological research on marine resources is to develop and use approaches with inexpensive data acquisition and high information content. Interviews with fishermen continue to be an efficient first source of data on the distribution and biological features of living resources. Comparisons between similar systems to develop correlative indices of fish production is a second inexpensive approach. The morpho-edaphic index used to estimate fish production in lakes is an example and should be seriously tried in marine systems. A third general approach is to develop management regimes that have less demand for highly precise information. An example is to use decision-making theory applicable to situations with a high degree of uncertainty. A fourth approach is to survey the ecological or natural research management literature in fields other than marine fisheries with an eye to transfer creative or innovative ideas. An example might be the transfer of the equilibrium theory of island biogeography developed by MacArthur and Wilson for island bird communities to reef fisheries assessment. A fifth possibility related to the one above is to examine levels of biological organization between that of

the population and the ecosystem - namely at the community or species assemblage level. A sixth approach is to develop increased understanding of cause and effect relations between fish and their oceanic environment, with the aim of reducing future data needs and the development of indices. Regardless, much time and effort goes into our present systems of data acquisition and analysis and an investment in the development of alternatives is a high priority.

Ocean Sciences in Relation to Living Resources (OSLR)

At its First Session (Beaufort, U.S.A., June 1981) the Working Group recognized that the most logical approach to studying the interaction between ocean variability and fish stocks would be long-term studies in a few selected areas. However, an alternative approach of short-term studies on larger numbers of similar stocks would be more likely to attract support and had advantages in training and in involvement of more institutions in developing countries.

While not pursuing the scientific content of the draft report in depth, some concern was noted over the assumption that a comparative study in one year would be a meaningful substitute for a time series and that it would be able to test the matrix of hypotheses. Nevertheless a concerted scientific effort in this direction is timely in view of recent gains in the understanding of the relation between the ocean environment and recruitment mechanisms and of current and planned work in this field. A well conceived programme, related to existing activities, could substantilly boost overall progress and contribute to advances in regions which may not be adequately covered in national programmes. ACMRR also felt that a clearer statement of objectives with respect to fisheries management needs is required. This is even more important because of the proposed substitution of a comparative study for a time-series study. Advancement in scientific understanding of the effects of environmental variability on fish production is needed, but the interaction between that variability and long-term fisheries management should be identified in the report.

FAO/ACMRR has since participated in a meeting of WG.67 in April 1982 in Paris and in May 1982 had follow-up discussions in Paris.

Marine mammals

At its Ninth Session the Committee had formally terminated its Working Party on Marine Mammals. The direct output from the very active working party was expected to be concluded soon with the publication of the remaining volumes of Mammals in the Sea, containing the papers given at the Bergen Consultation. As follow-up to the activities of the Working Party, FAO had, with the support of UNEP, arranged for the preparation of a Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals. A draft of this Global Plan had, following two major revisions, been presented to the UNEP Governing Council and FAO's Committee on Fisheries in May 1981. ACMRR noted that this, and other activites, were important, and asked to be kept informed by the Secretariat.

Living Resources of the Southern Ocean

The BIOMASS programme, and particularly FIBEX (First International BIOMASS Experiment) activities involving some 16 research vessels, had been among the largest activities in biological oceanography. They had been planned by the Group of Specialists on Living Resources of the Southern Ocean, of which ACMRR was a co-sponsor with SCAR, SCOR and IABO.

Until the Commission for the Conservation of the Antarctic Living Resources becomes operational, the Group of Specialists feels also responsible for cooperating with FAO in the acquisition of data needed for the assessment of exploited Antarctic resources. ACMRR agreed with the Group of Specialists in urging countries fishing in the region to provide data on catch and fish stocks. Data on krill catches, although still being small relative to present stock estimates, are also needed in order to provide a historical record of the development of the krill fishery in the various regions of the Southern Ocean.

It was recommended that FAO take the opportunity offered by the 1982 Bergen Symposium for a review of the need for a special ACMRR-sponsored group on acoustic research, and to provide the Committee, at its next session, with the results of this review, for its consideration and possible action.

2. Activities of ACMRR Working Parties, 1979-82

1.	ACMRR Working Party on the Promotion of Fishery Resources Research in Developing Countries	Flødro, Norway 1980 Rome, Italy 1980	Terminated (Referred to above)	FAO Fisheries Report No. 251
2.	ACMRR Working Party on the Scientific Basis of Determining Management Measures	Rome, Italy 1978 Hong Kong 1979	Terminated (Referred to above)	FAO Fisheries Report No. 236
3.	ACMRR Working Party on Marine Mammals FAO/UNEP Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals		Terminated (Referred to above) Pipeline project	 FAO/UNEP Project No. 0502-78/02 (1981)
4.	Working Party on Aquaculture	Planned Rome, Italy 1983	Reactivated	
	Ad hoc Consultation on Aquaculture Research	Rome, Italy 1980	Terminated (Referred to above)	FAO Fisheries Report No. 238
5.	Ad hoc Group of Experts on the Facilitation of Acoustic Research in Fisheries		To be reviewed	
6.	Working Party on the Principles for Fisheries Management in the New Ocean Regime	Planned Rome, Italy 1983	New	
7.	Working Party on the Management of Living Resources in Near-shore Tropical Waters	Planned Rome, Italy 1983	New	
8.	SCOR/ACMRR WG.67 on Oceanography, Marine Ecology and Living Resources	Beaufort, USA 1981 Paris, France 1982	Continuing (Referred to above)	See SCOR documents
9.	SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and Living Resources	Krakow, Poland 1979 Cambridge, U.K., 1980	Continuing (Referred to above)	See SCAR documents

ACRONYMS

ACMRR	Advisory Committee of Experts on Marine Resources Research
BIOMASS	Biological Investigations of Marine Antarctic Systems and Stocks
IABO	International Association of Biological Oceanography
IOC	Intergovernmental Oceanographic Commission
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research

ECOR REPORT TO IOC FOR THE YEARS 1979-1982

INTRODUCTION

ECOR was founded a decade ago as an international non-governmental, professional engineering body with the objective to provide an international focus for engineering interests in the marine field. One emphasis of this effort was intended to be on providing advice, from an engineering viewpoint, on policy, programme, and organisational matters to international and intergovernmental organisations concerned with marine affairs, one such organisation being IOC.

The purpose of this report is to convey a view as to what ECOR has achieved in the last three years in its effort towards attaining this objective.

ECOR's activities in general have ranged from the triennial technical sessions held in conjunction with the business sessions of the General Assemblies to workshops and working groups conducted by various combinations of adhering bodies, consultations with the Intergovernmental Oceanographic Commission, and individual tasks of international concern taken on by individual adhering bodies. In addition, a newsletter has been promulgated periodically to report on work of the adhering bodies and other events of possible interest to the membership.

FOURTH GENERAL ASSEMBLY

The Fourth ECOR General Assembly was held in London from 6-9 April 1981, organisation being the responsibility of the British Committee. The theme of the Assembly was "The Management of Oceanic Resources - The Way Ahead".

Two volumes subsequently made up the Proceedings of the event. Volume I is a report of the Business Sessions held on Monday 6th April. Volume II is a report of the Technical Sessions held from 7-9 April. During the course of the Conference, three workshop sessions ran concurrently, covering the following subjects:

Workshop One : Data Collection and Analysis
Workshop Two : Regulations, Codes of Practice and Guidance Notes - What are the benefits?
Workshop Three : Offshore Energy Resources Potential

The Proceedings contain the presentations made within the workshops plus reports from rapporteurs on the individual workshop sessions and on the general themes of (i) The Economical and Safe Development of Resources; (ii) The Development of Human Resources, Motivation, Training and Experience, and (iii) The Legal, Social and Environmental Implications of Developing Oceanic Resources.

WORKING GROUPS

Subsequent to the General Assembly progress was made in the establishment and continued operation of three ECOR Working Groups. These are on the subjects of:

(i) Drifting buoys;
(ii) Ocean Energy;
(iii) Marine Environment.

Activity of the groups is being co-ordinated by the US-ECOR, Japanese ECOR and British ECOR respectively. The status of each group is indicated in the Appendix to this document.

A further Working Group resulted directly from one of the General Assembly Workshop Sessions. Roger Venables of BC-ECOR and Horst Oebius of German ECOR undertook to prepare a report to IOC on Codes of Practice. This awaits finalisation.

During the past three years ECOR has continued to respond as an advisory body to various international bodies. This response has taken two forms. ECOR has designated specific representatives to a number of organisations; representation on IOC committees is as indicated in Table 1, the representatives attending meetings whenever possible. ECOR has also designated special representatives to specific meetings of international groups when an engineering input was in order. These meetings are indicated in Table 2. In addition to these activities, ECOR adhering bodies have generated information for the compilation of a report on international ocean engineering training authored by Professor Adrian Richards for UNESCO.

In October 1980, ECOR supported an international workshop on coastal engineering in Mexico City by helping to obtain speakers from the international engineering community. This workshop, held in conjunction with the First Pan American Congress on Ocean Engienering, was sponsored by COMIRO, the ECOR adhering body in Mexico.

In 1980 also, ECOR, through its Norwegian body, arranged for the one-year appointment of a petroleum data expert to ESCAP/CCOP.

Among the major reports prepared by ECOR and its adhering bodies over the past three years are those enumerated in Table 3. Another publication, containing abstracts of papers given at the international workshop on coastal engineering in Mexico City, October 1980, is in preparation.

In addition to major reports, ECOR publishes a newsletter on a quarterly basis and provides papers and articles on a periodic basis to other organisations.

More recent ECOR activities have included a workshop on Directional Wave Spectra, jointly sponsored by US ECOR and the ASCE, held in Berkeley, California in September 1981. Dr. Hogben of BC-ECOR presented a paper at this meeting and subsequently presented a report on the Conference to a further International Conference on Wind and Wave Directionality with Application to the Design of Structures, held in Paris later in 1981.

Also, ECOR was represented at a special UN meeting on Technology Transfer, held in Puerto Rico. A rationale was developed for transferring technology in developing countries and ECOR was recognised as a source of advice in the marine technology sector.

A further UN Conference, on New and Renewable Sources of Energy was held in Nairobi in August 1981 and attended by Ron Goodfellow, ECOR President. An outcome of the meeting was a set of recommendations for action by and through UN agencies for renewable energy developments, and for technology transfer, education and training.

ECOR has welcomed four new members since the third general assembly; Poland, represented by the Institute of Hydroengineering of the Polish Academy of Sciences, has joined as an adhering body; the Comité Colombiano de Ingenieria de Los Recursos Oceanicos has joined with observer status; Mr. Gerard de Froberville (Tahiti) and Dr. C.D. di Cenzo (Canada) have joined as associate members. Australia, unfortunately, has dropped out.

While the past, present, and future planned activities of ECOR are substantial, it must be said that, for whatever reason, ECOR has not yet succeeded in attracting an adequate number of developing countries to its ranks. This is perceived to be in part because these countries have not as yet reached a stage of development wherein a standing group of engineers exists and in part as a lack of recognition of the value of international communications among engineers on a nongovernmental level. There is also the fact that ECOR, as an institution, has not been able to convincingly demonstrate its potential value to the international engineering community. Operating with a limited number of members on a marginal budget, ECOR can only provide for limited support to the triennial ECOR technical assemblies, occasional travel assistance for experts to attend specific technical sessions of IOC and other international bodies, and publish a quarterly newsletter.

We believe that if ever ECOR is to attain its full potential, adhering bodies must take the initiative to establish ties with other adhering bodies and potential adhering members in order to forge communication links, establish engineering needs of the international community which might profitably be looked at by a nongovernmental body, and assist in the resolution of these needs thereby increasing our corporate knowledge and improving our capability to do useful work in the sea.

ECOR has had, during the past three years, a considerable amount of activity, a great deal of it providing specific responses to IOC in various areas, and several major reports produced by individual ahdering bodies as well as by ECOR itself. In addition, there has been permanent representation on a number of international working groups. Since one of the principal benefits of ECOR is the facilitating of communications among the nongovernmental ocean engineering federation, the individual adhering bodies share a large part of the responsibility in encouraging this communication. The principal mechanisms we do that through are publications such as the newsletter which is only as good as the information provided to the secretary for incorporation. We believe that the flow of information has been improved over the last several years, and it could be improved even more. There are several adhering bodies that have been very faithful in providing information, and there are a number of them who unfortunately have not. We think there is a great opportunity in the Latin American countries for increased participation. Professor Lara has done a great deal in this area. Mexico, up until this year, has been a member, and we hope that we will be able to renew that association in the near future. Canada has recently joined but only at the level of an observer. We think that is temporary, and in fact eventually there will be strong participation from that country. In this part of the world, we think that France should be a strong member of ECOR, but we have not been able to find the key to encourage French participation. We think that can be one of the projects of the nearby existing adhering bodies. It is a difficult task because unless the fraternity of nongovernmental engineers perceives an advantage in becoming a member of ECOR it will be difficult to recruit them. We might say that one of the real plusses in the last several years has been to look at the Norwegians and how active they have been in building up Norwegian ECOR. It has been a very effective adhering body, and we hope to see more of them.

In April 1982 the ECOR Secretariat was transferred from the Institute for Marine and Coastal Studies, USA to The Society for Underwater Technology, London UK. Miss Monica Bradley subsequently became Secretary to the Committee.

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Table 1

ECOR REPRESENTATION

ON

IOC Working Committee for GIPME	J.G. Th. Linssen
IOC/CCOP-SOPAC	Herman Sheets
IOC Working Committee for TEMA	Adrian Richards
IOC Working Committee for IODE	Kenji Okamura
IOC Interface	President/Past President of ECOR

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Table 2

MEETINGS ATTENDED BY ECOR REPRESENTATIVES

May, 1978	Third General Assembly - Washington D.C.
May - June 1978	Third Session Scientific Advisory Board - IOC Paris; Goodfellow, Heyning
June, 1978	IOC Executive Council Meeting (IOC/EC X) Rome; Goodfellow, Heyning
September, 1978	SCOR Working Group 57 - Hamburg, Tollin; Ferguson
October, 1978	Consultation Meeting of Advisory Bodies of IOC Paris; Heyning, Linssen
October 1978	Joint SCOR/ACMRR/ECOR Meeting on the Future Role and Functions of IOC - Paris, Heyning, Gaskell
November, 1978	XIV General Meeting of SCOR - Brest; Heyning, Gaskell
December, 1978	IOC Meeting - Paris; Goodfellow
February - March, 1979	IOC Executive Council Meeting (IOC/EC XI) - Mexico City; Wheaton
August - September, 1979	XIV Pacific Science Congress - Khabarovsk; Sheets
October, 1979	67th Statutory Meeting of the International Council for the Exploration of the Sea - Warsaw; Wilde
October, 1979	IOC Executive Council Meeting (IOC/EC XII) - Goodfellow
January, 1980	22nd Meeting, SCOR Executive Committee - Kiel; Gaskell, Heyning
April, 1980	IOC/TEMA Meeting - Buenos Aires; Richards
June, 1980	IOC Executive Council Meeting (IOC/EC XIII) - Paris; Linssen
September, 1980	15th General Meeting of SCOR - Woods Hole Oceanographic Institution; Keil
October, 1980	Second Session Joint IOC/WMO Working Committee for IGOSS - Geneva; Engelsen
February, 1981	IOC Scientific Review Board - Paris; Linssen, Goodfellow

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Table 3

ECOR REPORTS

1978	Proceedings of the ECOR Third General Assembly (ECOR)
1978	Proceedings of the International Workshop on Ocean Instrumentation (ECOR) Workshop; published as October 1978 issue of IEEE Journal of Oceanic Engineering, volume OE-3, no.4
1978	Engineering for Deep Sea Drilling for Scientific Purposes (interim report) (US ECOR)
1978	Specifications Relating to Design, Construction, and Installation of Offshore Structures (US ECOR)
1978	Marine Technology in the Federal Republic of Germany: A Comprehensive Presentation of Prerequisites and Activities (German ECOR)
1978	Marine Mining Technology (Norwegian ECOR)
1979	Strategy for Developing Fossil Fuel Extraction Drilling Technology (US ECOR)
1979	Implementing Best Available and Safest Technologies for Offshore Oil and Gas (US ECOR)
1979	Responding to Casualties of Ships Bearing Hazardous Cargos (US ECOR)
1979	Engineering at the Ends of the Earth - Polar Ocean Technology for the 80s (US ECOR)
1979	Inspection of Offshore Oil and Gas Platforms and Risers (US ECOR)
1979	Construction of Artificial Islands (German ECOR)
1979	Sea Floor Development: Moving into Deep Water (British ECOR)
1980	Engineering for Deep Sea Drilling for Scientific Purposes (final report) (US ECOR)
1980	Outer Continental Shelf Frontier Technology - Proceedings of a Symposium (US ECOR)
1980	Environmental Exposure and Design Criteria for Offshore Oil and Gas Structures (US ECOR)
1981	Safety Considerations for Ocean Margins Drilling (US ECOR)
1981	Safety in Offshore Oil (Volume with background material also available) (US ECOR)
1981	Proceedings: Research Needs of Sea Ice Mechanics Ocean Instrumentation to Serve Science and Engineering: Water Sampling While Underway.

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APPENDIX

STATUS OF ECOR WORKING GROUPS

(i) Drifting Buoys Working Group

The proposed working group on drifting buoys would have boundary conditions as follows:

1. Scope of Effort - The proposed working group to advise IOC, through ECOR, on the engineering applications of drifting buoys will function primarily by correspondence among members and consultants. A chairman and rapporteur will assemble and disseminate information, perform liaison with parallel efforts, and report results to parent bodies. At least one meeting of the working group is planned, to be held in concert with the upcoming Joint Oceanographic Assembly in Halifax, Nova Scotia. The initial effort will provide a report addressing the items in the terms of reference for use by the Marine Board and, ultimately by ECOR. After appropriate review, the report will be provided, on behalf of ECOR, to the IOC Secretariat.

2. Tentative Schedule

January/February 1982	Appoint membership and organise study plans; inform ECOR
April 1982	Report status to IOC General Assembly
August 1982	Working session (Halifax); Assemble individual inputs
December 1982	Draft report to the Working Group; simultaneously to the Marine Board staff
February 1983	Final draft available to Marine Board
Spring 1983	Report to IOC General Assembly

3. Estimated Expenses - $6,000 - $8,000 ($3,000 presently allocated by ECOR

4. Terms of Reference

Identify selected ocean engineering areas that could benefit significantly from application of drifting buoy technology.

Summarise observational needs (for these applications) in terms of parameters, sampling density and duration, and geographical emphasis.

Identify logistical opportunities and constraints associated with these applications.

Identify technical deficiencies likely to be encountered in applying today's technology to new (engineering) applications.

Advise IOC on the probable extent of engineering programmes employing drifters during the next decade.

Establish liaison with SCOR WG.66 (oceanographic applications of drifting buoys) and the appropriate WMO advisory group; identify potential areas of mutual concern.

The Drifting Buoy Programme is the prime example of collaboration between ECOR and SCOR in the context of IOC interests.

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(ii) Ocean Energy Working Group

Boundary conditions for the ocean energy working group are as follows:

1. The basic objective of the working group is to determine the potential of ocean energy (less fossil fuels) for developing countries by the end of the 20th century.

2. Among the energy potentials to be considered are:

   a) ocean thermal energy conversion
   b) salinity gradient
   c) salt ponds
   d) geothermal
   e) waves
   f) tides
   g) currents

3. Since the objective is to determine the potential for developing countries, it is as important to determine which energy alternatives are not feasible as it is to determine which are feasible.

4. The geographic scope should include offshore waters to a distance of 200 miles from the coast.

5. The time frame for this working group is 24 months, with the preliminary report due one year prior to the ECOR Fifth General Assembly. This report will be used as a basis for the technical sessions of the Fifth General Assembly. The theme of this Assembly will be "The Potential of Ocean Energy for Developing Countries".

Since ECOR is principally an engineering body, the principal thrust of the working group will be to determine the type of measurements required to determine the energy potential, the kind of instruments required to make the measurements and to briefly review the state of the art with respect to technology required to harness the energy.

(iii) Marine Environment Working Group

British ECOR is discussing with IMO (the International Maritime Organisation - formerly IMCO, the International Maritime Consultative Organisation) and IOC (the International Oceanographic Commission) the scope of the Working Group on the Marine Environment and is particularly concerned not to duplicate the existing activities covering the subject which are presently established in many countries. Rather it will seek to draw on existing knowledge, and proceed from that base.

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. is usual for ECOR Council to establish the boundary conditions for its Working Groups. In this case British ECOR has been entrusted with the task of preparing the terms of refe rence and presenting them for endorsement by ECOR Council. The general scope of the work is directed towards the use of the oceans for the disposal of industrial wastes. It is recognised that nuclear waste disposal is a special case, and one which is likely to receive only passing reference in this study. This situation reflects the extensive effort already directed towards that topic, but the general disposal of underwater wastes to close inshore areas, or even rivers in some cases, is seen to be reaching the point where other options must be seriously explored. It is not going to happen overnight, but it is imoportant to decide in the time available just what are the opportunities for the disposal of these wastes (not always chemically inactive by any means) in other ways. Use of the deep oceans is one possibility being considered.

The disposal of wastes can become a major industry in its own right, so in commercial terms there are points in favour as well as points against. In terms of the marine environment itself, disposal in the deep ocean could cause contamination. Engineering the process to provide a level of safety for disposal techniques which is acceptable means first defining the term 'acceptable' for this application.

In preparing the terms of reference for this Working Group, British ECOR is of course seeking input from its own member bodies.

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SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH
REPORT TO IOC 12th ASSEMBLY

This report will present information on the activities of SCOR, particularly in its role as an IOC advisory body, since the 11th Session of the IOC Assembly in 1979.

SCOR was represented at the 11th Session of the IOC by its President and Executive Secretary. Several SCOR members were present as members of national delegations. Some of the Assembly Resolutions referred to SCOR and these were considered at the next opportunity, the 22nd meeting of the SCOR Executive Committee, in January, 1980.

Resolution XI.2 requested SCOR to propose action on the evaluation and presentation of data from the FGGE Oceanographic Programme. This was referred to WG 47.

Resolution XI.3 stated the agreement of the IOC to cosponsor CCCO.

Resolution XI.8 invited CCCO to include El Niño in its scope. The SCOR Executive Committee endorsed this proposal and it has been carried out by CCCO.

Resolution XI.9 requested SCOR and ACMRR to advise on the composition of a technical advisory group to CINCWIO. This was done, as noted in a subsequent Resolution (EC-XIII-5).

Resolution XI.14 asked SCOR for information on the support required for FIBEX.

Resolution XI.17 requested SCOR to assist in the development of a comprehensive plan and project proposals aimed at understanding the marine ecosystem complementary to, and in support of, fisheries research. The Executive Committee recognized this to be an extremely important project and nominated Professor W. Wooster to liaise with the IOC on the matter. At its General Meeting in September, 1980, SCOR established WG 67 on "Oceanography Ecology and Living Resources". WG 67 has been active since late 1980 and will present a report on "Ocean Sciences in Relation to Living Resources" to the IOC at its 12th Assembly. WG 67 was cosponsored by ACMRR who named three members to the group.

Resolution XI.28 invited SCOR's comments on an IOC document (IOC/EC-XII/7) on the major directions of its future programme. These were transmitted to the IOC.

Resolution XI.29 established the Scientific Review Board and invited SCOR to designate a member. Dr. H. Postma has represented SCOR on the SRB since 1980.

Resolutions of the 13th Session of the IOC Executive Council were also considered by SCOR. Some of these related to matters discussed above. In particular, SCOR responded to Resolution EC-XIII.10 by establishing a working group on "Oceanographic Applications of Drifting Buoys". The Chairman of WG 66 participates in joint IOC/SCOR/ECOR consultative meetings on drifting buoys.

The 14th Session of the Executive Council was attended by the SCOR President, Professor Simpson, and by Dr. H. Postma. The input of SCOR to the UNESCO Medium Term Plan was noted in Resolution EC-XIV.1.

On the recommendation of the SRB, Resolution EC-XIV.4 called on the Advisory Bodies to assist with a study of expected major trends in ocean sciences up to the year 2000. This developed into a significant effort for SCOR in 1981 and 1982 and will result in the presentation of the FORE report at the 12th Assembly. SCOR was especially active in the selection of subject leaders and associates in each area of oceanography, the selection of participants and some arrangements for the Villefranche workshop, and a major discussion of the scientific chapters of the FORE report at the JOA.

Resolution EC-XIV.II approved the adoption of the new Practical Salinity Scale, 1978 and of the new International Equation of State of Seawater, 1980 and recommended their use from January 1, 1982. These new standards were developed by the SCOR/ICES/UNESCO Joint Panel on Oceanographic Tables and Standards and will lead to greater precision in research related to the physical properties of seawater. The IOC WC on IODE is investigating the necessity for relevant changes in data formats and in data centre procedures.

The President and Executive Secretary of SCOR attended the 15th Session of the Executive Council in March, 1982.

Resolution EC-XV.1 asked SCOR and CMG to develop a scientific programme plan and project proposals to provide a scientific basis for the management of marine non-living resources. The SCOR President has undertaken this responsibility and will present a programme on "Ocean Science and Non-Living Resources" at the 12th Assembly of IOC.

In addition to the representation at IOC meetings discussed above, SCOR has particpated in IODE and GESAMP meetings during the last two years. The SCOR activities outlined above have been undertaken specifically as a result of IOC Resolutions since November, 1979. Other activities have continued in the meantime. Nineteen SCOR working groups have been active in the period since 1979 as well as CCCO, JPOTS, the Antarctic Review Group and two editorial panels. Detailed records of their achievements

may be found in SCOR Proceedings, volumes 16, 17 (1) and 17 (2). Five of these groups will have discharged their terms of reference by September, 1982 and four new ones are beginning their work. Many publications arising directly from working group activities have appeared. "River Inputs to Ocean Systems" (WG 46), Progress in Equatorial Oceanography (WG 47), "Mathematical Models in Biological Oceanography" (WG 59), and "Coastal Upwelling" (WG 57), amongst others, are major contributions to the oceanographic literature. Many other reports have been published in the various UNESCO, and IOC series. Partial support for the activities of working groups of special interest to the IOC (ten in 1982) has been provided through contracts between the IOC and SCOR.

Finally, SCOR has, of course, been extremely active in the planning for the Joint Oceanographic Assembly to be held in Halifax in August, 1982. The Scientific Programme Committee for the JOA has been chaired by Dr. W. Hay, a member of the SCOR Executive Committee. The Executive Secretary is a member of the National Steering Committee. The ICSPRO/UNEP Logistics Committee has provided funds to assist with the travel expenses of some convenors and speakers and of scientists from developing countries.

In summary, relations between SCOR and the IOC have been extremely productive during the three years since the 11th Assembly. Plans for the near future include an Executive Committee Meeting (July 1982, Halifax) and a General Meeting (August 1982, Halifax). The 25th Executive Committee Meeting will be held in late 1983 (location undetermined) and the 17th General Meeting will take place in the autumn of 1984. Details of the plans for meetings of SCOR subsidiary bodies will be available after the 16th General Meeting.

Financial problems continue to be a major concern of the SCOR Executive Committee. SCOR income derives from two sources: national contributions and grants and contracts from ICSU, UNESCO and IOC. An attempt has been made to offset the effects of inflation by instituting regular increases in the levels of national contributions. Contracts, however, have not been similarly increased and continue at much the same level in spite of the fact that SCOR has assumed certain tasks specifically at the request of the IOC or UNESCO. For example, the basic contract between the IOC and SCOR in 1981 was for $20,000.00, while the activities it was supposed to cover cost about $54,000.00. The rapidly escalating costs of meetings will result in a reduction in the pace of SCOR's scientific programmes unless income can be increased somewhat.

In particular, the financial support for CCCO is a serious problem. CCCO has been clearly identified by both the IOC and SCOR as a major scientific effort. In the years since 1979, SCOR has made commitments of funds to CCCO as large as resources will permit; no other subsidiary body has received such levels of support from SCOR. Each year SCOR seeks a grant from ICSU and the funds so obtained have been entirely allocated to CCCO in addition to $10,000.00 annually from other SCOR income. In

spite of these efforts, and those undertaken by the IOC and the Chairman of CCCO, it appears likely that CCCO will experience a budgetary shortfall in 1982 and that some of its scheduled scientific activities will have to be curtailed. SCOR urges the IOC to continue its efforts to ensure adequate funding for CCCO activities in 1983 and subsequent years.

It has not been possible for this report to address specific agenda items of the 12th Session of the IOC Assembly since the Provisional Agenda was not available at the time of writing. If commentary from SCOR on certain agenda items seems appropriate it will be submitted at a later date.

E. Tidmarsh.

July 14, 1982.