REPORT OF THE FIRST MEETING OF THE SCIENTIFIC COMMITTEE FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES

(Hobart, Australia 7 – 11 June 1982)

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Commission for the Conservation of Antarctic
Marine Living Resources,
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HOBART, Tasmania. 7000 Australia

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SCIENTIFIC COMMITTEE
REPORT OF FIRST MEETING (7–11 JUNE 1982)

Opening of Meeting

1. The first meeting of the Scientific Committee was held in Parliament House, Hobart, from 7 to 11 June, 1982. Dr. R.G. Chittleborough acted as temporary Chairman.

2. Members of the Scientific Committee present are listed in Annex 1. Observers from FAO, IOC, IWC and IUCN attended.

3. Following a discussion on the conduct of the meeting, it was decided to meet in Plenary Session for the purpose of considering the Rules of Procedure.

4. It was also agreed to meet informally for the purpose of discussing various scientific matters related to the future work of the Scientific Committee.

Rules of Procedure

5. Temporary Rules of Procedure were discussed, and it was agreed to apply the temporary rules of procedure of the Commission (document CCAMLR-I/2 REV I) with one change. Rule 17 was replaced by the following wording:

> 'Decisions should be taken according to the Convention.'

6. In drawing up the permanent Rules of Procedure the broad lines of the Rules of Procedure of the Commission were followed. However, it was also taken into account that the Scientific Committee as a consultative body to the Commission has an identity of its own. Some problems relating to the interpretation of the terms of the Convention were referred to the Heads of Delegations for advice. This advice is now awaited.

Election of Officers

7. Understanding that the Heads of Delegation had included office bearers for the Scientific Committee in their discussions concerning office bearers for the Commission, the Scientific Committee confirmed by acclamation the following appointments:

Chairman: Prof. D. Sahrhage, FRG
Vice Chairmen: Dr. W. Ranke, GDR; Dr. D. Robertson, NZ

However, the Scientific Committee underlined the principle that the Scientific Committee should in future elect its office bearers according to agreed Rules of Procedure.

Program of Work for 1982 and 1983

8. Informal discussions were held on the future work of the Scientific Committee. The results of these discussions were reported to the Committee, and later to the Commission, by the then elected Chairman of the Scientific Committee. A copy of this report, as amended by the Scientific Committee, is attached in Annex 2.

Communications

9. To facilitate the inter-sessional work, it was agreed that in-respect of scientific and technical matters, the Secretariat should communicate directly with scientists and scientific institutions in member countries. For this purpose the Secretariat should, for the present, use the list of participants in the current meeting.

Closure of Meeting

10. In thanking all representatives for their active participation in a productive meeting and the Australian hosts for their assistance and hospitality, the Chairman closed the meeting.

ANNEX 1

LIST OF PARTICIPANTS

Argentina

Captain (RE) Oscar Alberto Casellas
Secretariat of Maritime Interests
Ministry of the Economy
Buenos Aires

Dr. Aldo Tomo
Chief, Biological Sciences Department
Argentine Antarctic Institute
Buenos Aires

Australia

Dr. R.G. Chittleborough
Head, Marine Studies Branch
Western Australian Department of Conservation and Environment
Perth

Mr. A.J. Harrison
Manager, Fisheries Development Authority
Government of Tasmania
Hobart

Dr. K. Kerry
Antarctic Division
Department of Science and Technology
Hobart

Chile

Mr. Alfonso Filippi
Ministry of Fisheries
Santiago de Chile

Mr. A. Mazzei
Chilean Antarctic Institute
Santiago de Chile

European Economic Community

Professor G. Hempel
Head, Alfred Wegener Research Institute
Bremerhaven

Mr Guy Duhamel
Museum d'Histoire Naturelle
Paris

Mr. Niels Daan
Netherlands Institute for Fishery Investigations

France

Mr. Jean-Claude Hureau
Assistant Director
Museum of Natural History

German Democratic Republic

Dr. Walter Ranke
Deputy Director for International Relations in Fisheries
Ministry of District Controlled Industry and Foodstuff Industries
Berlin

Federal Republic of Germany

Professor Dr. D. Sahrhage
Federal Research Institute for Fisheries

Japan

Mr. Shiro Yuge
Assistant Director, International Division
Fishery Agency
Ministry of Agriculture, Forestry and Fisheries
Tokyo

Professor Tatsuro Matsuda
National Institute of Polar Research
Tokyo

Dr. Keiji Nasu
Far Seas Fisheries Research Laboratory
Ministry of Agriculture, Forestry and Fisheries
Tokyo

New Zealand

Dr. D. Robertson
Fisheries Research Division
Department of Agriculture and Fisheries
Wellington

South Africa

Mr. G.H. Stander
Director, Sea Fisheries Institute
Department of Agriculture and Fisheries

Union of Soviet Socialist Republics

Dr. V. Shevchenko
Senior Scientific Officer
Ministry of Fisheries
Moscow

United Kingdom

Dr. R. Laws
British Antarctic Survey

Dr. J. Beddington
Director, Marine Affairs
International Institute for the Environment and Development
London

United States of America

Mr. Robert Hofman
Senior Scientific Adviser
Marine Mammal Commission
Washington

Mr. William Y. Brown
Environmental Defense Fund
Washington

Mr. Ken Sherman
Chief, Narragansett Laboratory
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

OBSERVERS FROM INTERNATIONAL ORGANISATIONS

Food and Agriculture Organisation (FAO)

Mr. John Gulland
Fisheries Department
Rome, Italy

International Oceanographic Commission (IOC)

Dr. Robin Barger
Marine Science Officer
UNESCO Regional Office for Science and Technology
Jakarta, Indonesia

International Union for The Conservation Of Nature And Natural Resources (IUCN)

Mr. Graeme Caughley
CSIRO Division of Wildlife Research
Canberra, Australia

International Whaling Commission (IWC)

Dr. J. Bannister
Chairman
IWC Scientific Committee

ANNEX 2

REPORT ON INFORMAL DISCUSSIONS OF THE SCIENTIFIC COMMITTEE

Following a decision by the Scientific Committee, informal meetings were held from 7–10 June 1982 under the chairmanship of Dr. Sahrhage to discuss the tasks of the Scientific Committee, arising from Article XV of the Convention, for 1982 and 1983.

Dr. Kerry introduced the background papers SC-CAMLR-I/3 and 1/4, and the group expressed their appreciation to their colleagues from Australia for preparing these documents with detailed proposals for the broad strategies and objectives of the work of the Scientific Committee.

The following extensive discussions centred around five major topics:

1. Inventory of Activities and Information

It was agreed that a thorough inventory of current and past activities in the fields of interest to the Convention was required as a matter of high priority. Such an inventory should also include information on institutions, oceanographic, biological, fisheries and other data.

The inventory should not only be based on submissions from all countries carrying out activities in the Southern Ocean but also include information from the SCAR/SCOR/ACMRR Group of Specialists on Southern Ocean Eco-systems and Their Living Resources on the ongoing BIOMASS programme. Furthermore, information was required from FAO and IWC concerning their related activities, particularly on data collection and retrieval.

Participants from Argentina, Australia, Chile, France, German Democratic Republic, Germany (Federal Republic of), Japan, New Zealand, South Africa, United Kingdom, United States of America, USSR and EEC gave detailed verbal reports on activities and programmes carried out in their countries. Frequently reference was made to the programmes of BIOMASS. Some information was also available for Poland and Norway not represented at the meeting.

From the verbal reports it became clear that in all countries substantial activities related to Antarctic marine living resources were going on, and that there was a considerable increase during the past ten years. Activities ranged from oceanographic and meteorological observations, biological and ecological investigations on primary productivity, plankton, benthos, krill, fishes, birds, seals and whales to commercial fishing on krill and fishes. It was stated that detailed data on catch and effort from commercial whaling and fishing for krill and fish and from various scientific fishing cruises were available. All participants indicated the willingness of their countries to submit their data and information to the Secretariat.

The proforma for a review of existing data and programmes to be supplied by member countries was discussed and further elaborated through the assistance of an ad hoc working group (Convenor: Dr. Kerry). It was recommended that such a Questionnaire (Appendix 1) should be sent as soon as possible to all member countries by the Secretariat, and that countries should be requested to reply as soon as possible and not later than the end of 1982. Data relating to the harvest of living resources on an experimental, or commercial basis since the year harvesting began should be reported. The inventory of scientific research should be reported for the past twelve years only. However countries should be invited to also provide information from earlier times. The provision of information and data inventories for commercial fishing operations was most essential, reaching back to the early stages of the establishment of such fisheries. Countries should also be encouraged to supply the Secretariat with summary reports on Antarctic expeditions and any other documents which they consider of special interest to the Convention. It was felt, however, that it was not required at this stage to obtain extensive lists of bibliographic references which had been elaborated already in several member countries. Reference was made to the annual national reports to SCAR which contained lists of current bibliographic references, and to the BIOMASS bibliography in preparation.

Discussion showed that at least six member countries are already using different forms of log books on board ships for obtaining detailed information on commercial fishing operations in the Southern Ocean. It was recommended that the Commission should take urgent steps to introduce a log book system for all commercial fishing operations on krill and fish with adequate guidelines to member governments. However, it was also realised that it would be difficult to introduce major changes in already existing national log books. It was therefore proposed to produce a uniform specification for the information required, rather than a uniform log book. For reporting of catch and effort from krill fisheries there may, however, be a possibility to develop a standardised format with the detailed information required to define the actual fishing effort. An ad hoc working group (Convenor: Dr. Hureau) compared existing log books and identified a list of information that should be

included in log books for fish and for krill (Appendix 2). It was recommended that this list should be circulated to all countries, especially those with existing log books, with a view to a more definitive discussion at next year's session. The ad hoc working group was also requested to continue its work by correspondence during the intersessional period.

It was realised that a large amount of information and data of special interest to the Convention was readily available from other international organisations, if cooperative working relationships would be established with them in accordance with Article XXIII of the Convention.

FAO has an established system for the reporting of catch and effort data from the Antarctic areas on STATLANT forms 08A and 08B. These forms are already being sent to all countries known to be fishing in the Antarctic, who are returning them to FAO. It was agreed that the Secretariat should consult with FAO so that the STATLANT forms should be circulated on behalf of both organisations. Countries would then complete them in duplicate, one copy being sent to FAO and one to the Commission. The blank forms, and requests for information should be circulated towards the end of each fishing season, with a view to having the completed forms returned as soon as possible after the end of the season.

The boundaries of the statistical region used in the Antarctic Sector (Appendix 3) had been adjusted as from the beginning of 1982 to coincide with the boundaries of the Commission. No other changes in boundaries were proposed, but it was noted that some changes had been proposed by the BIOMASS Working Party on Fish Biology. It was felt that the Commission should aim at receiving data on the basis of small areas (perhaps 5° or 10° grids of latitude and longitude) which could then be grouped in various ways to coincide with various scientific needs, eg, to match the whaling areas of IWC.

The IWC possesses a large set of statistical and biological data on whales and whaling which could be made available to the CAMLR Secretariat upon request, providing also access to computer records. The use of whaling data in the operation of the Scientific Committee was described in document SC-CAMLR-I/7. It was realised that there is an urgent need for biological data, especially age and sexual maturity of the females, pregnancy rates, stomach contents and various condition factors, of whales caught by the pelagic fleets of Japan and the USSR. Participants from these countries were asked to look into this matter.

In view of the great importance of the BIOMASS programme under the auspices of the SCAR/SCOR/ACMRR Group of Specialists on Southern Ocean Ecosystems and Their Living Resources for the work under the Convention, more detailed descriptions of this

programme and its FIBEX and SIBEX phases were given by Drs. Hempel and Laws. Summaries of their descriptions are in Appendices 4 and 5.

Participants stressed the need for the Commission and the Scientific Committee to establish cooperative working relationships with SCAR and its Group of Specialists on Southern Ocean Ecosystems and Their Living Resources as soon as possible. It was felt strongly that maximum use should be made of the results of BIOMASS activities, ensuring that programmes under the Convention and under BIOMASS, will supplement each other so as to avoid any duplications.

The Group of Specialists should be asked as soon as possible to provide the Secretariat with copies of all BIOMASS publications of interest to the Scientific Committee, with a view to distribution to all members of the Committee.

2. Review of the State of the Ecosystem and Modelling of Antarctic Ecosystems

It was agreed that an appraisal of the state of the Antarctic marine ecosystem as it stands today was required as a baseline in planning future activities of the Scientific Committee. Realising that the group of Specialists on Southern Ocean Ecosystems and Their Living Resources had made a published review of the state of this ecosystem at the commencement of the BIOMASS programme, it was recommended that through SCAR the Group of Specialists should be asked to prepare a review with up-dated information to summarise the present knowledge in this field. This review should focus at problems of special interest to the Convention, such as estimates of krill standing stock(s) in the various parts of the Southern Ocean, status of fish stocks and other aspects under the framework of the Convention. It should contribute to identify more urgent needs in the Convention area and allow for the identification of some priorities.

It would be required that the Group of Specialists provide the Secretariat with this review in due time prior to the second meeting of the Scientific Committee, preferably around the end of 1982.

A sum of $20–22,000 would be required to cover the costs of travel and subsistence for 6–8 specialists who would need to meet for about one week to prepare the review. This amount should be provided to the Convenor of the Group of Specialists, asking him to take care of all the arrangements.

There was agreement that the Scientific Committee will have to consider the existence or development of suitable models for the ecosystems in the Convention area. It was noted that the Group of Specialists had already established a Working Group on Modelling under the BIOMASS Programme. This was welcomed and it was proposed that the Scientific Committee should co-sponsor this Working Group to include one or two specialists in the membership of that Working Group. In reviewing the terms of reference, it was felt that the Working Group should consider the problem of unit stocks within the different elements of the Antarctic marine ecosystem. It was also underlined that priority should be given to the development of models describing the inter-actions between certain elements of the ecosystem, e.g. krill/whales and krill/fishes, rather than to try to establish one model for the entire Antarctic ecosystem. The report of the Working Group on Modelling should be made available to the Scientific Committee so that during the second meeting of this Committee it can be used as the basis for further discussion on the appropriate procedures to start modelling studies with particular emphasis on management problems.

Since considerable information on existing ecosystem models for the Southern Ocean and other parts of the world oceans might be available in various countries, it was agreed that the Questionnaire (Appendix 1) should contain a request to provide such information to the Secretariat.

3. Identification of Research Needs and Gaps

A first attempt was made to identify major research needs and gaps in present knowledge.

Taking into account that the needs for research on krill and related problems are already covered extensively in the reports from the Group of Specialists and its working parties within BIOMASS, discussions concentrated on other groups of living resources.

It was found that knowledge on squid resources in the Southern Ocean is still poor and that research activities and data are needed. The problems are mainly related to the development of techniques for catching squid. Since a Working Group on Squid Ecology had already been established by the Group of Specialists for BIOMASS, it was considered sufficient at this stage to express interest in the work of the group and to await the results from the Working Group.

Further detailed data on catch and effort for commercial fisheries and on scientific fishing on Antarctic fish stocks, and related biological data, are most urgently required for the assessment of the state of these stocks under fisheries exploitation. Preliminary assessments for some major fish species carried out by the Fish Ecology Working Party of BIOMASS provided evidence to indicate that due to the limited size of these resources and the biological characteristics of the fish species these stocks are heavily exploited and there is a risk of recruitment overfishing. It was agreed that more attention should be given to this question during the second meeting of the Scientific Committee.

For the whales it was stated that large sets of suitable data could be obtained from IWC upon request but that also the collection of further biological data and information by member countries should be encouraged. A special problem is the monitoring of the stock size of protected baleen whales.

Work on seals should give special attention to the study of Crabeater seal populations, specifically an extension of ongoing research around the Antarctic Peninsula to other areas of the Southern Ocean. It was proposed to approach the SCAR Group of Specialists on Seals for obtaining their views concerning needs for seal research and related groups.

It was noted that, under guidance from the BIOMASS Working Party on Bird Ecology, a programme for an International Survey of Antarctic Sea Birds (ISAS) will continue to produce data as a baseline and for monitoring of sea bird populations. Special attention is being given to the study of rookeries of Adelie and Chinstrap penguins and their locations in relation to krill concentrations. Of particular importance is research on the rates of consumption of krill by its predators and on indices of the health of the bird populations, such as breeding success and other criteria.

Recognising that environmental surveillance by satellite is becoming an effective means of monitoring ice cover, cloud cover, surface temperature and ocean colour, it was agreed to set up a small Working Group on Remote Sensing, consisting of Dr. Sherman (Convenor), Dr. Hureau and Dr. Kerry. This group should, during the intersessional period, work by correspondence to review the subject in the light of existing reports and publications as well as contacts to specialists, and to report on the results to the Scientific Committee during its second meeting.

4. Management Goals

Noting that this was an important and very wide field which could not be discussed adequately during this first meeting due to the lack of time, it was agreed that this matter should be included in the agenda of the Scientific Committee for its second meeting. Participants from all countries should be encouraged to prepare their views, preferably in writing, in advance of the next session. Depending on the outcome of further discussions in the Scientific Committee, preparations could be made for a Seminar on principles for conservation and management of the Southern Ocean to be held during the third meeting of the Scientific Committee, with participation of both the administrators and scientists.

5. CAMLR Data Base

Participants were informed of data collection and analysis aspects within the BIOMASS programme, and of the plans to establish a BIOMASS Data Centre.

It was concluded that for its special needs in relation to resources evaluation and assessment for the management of the living marine resources and the Antarctic ecosystem the Convention would require the early establishment of its own Data Base. For taking initial steps in this direction, it was recommended that the Scientific Committee should set up a Data Base Working Group to consist of about six selected experts and to undertake the tasks specified in the terms of reference as they appear on page three of document SC-CAMLR-I/4. The Working Group should be formed preferably at a time when the Secretariat's Data Manager has been recruited, and this Data Manager should be a member of the Working Group. The working Group should hold a meeting at Hobart for about one week as soon as possible after the Data Manager has been appointed, and a sum of $30,000 would be required for this meeting in early 1983. The decision on membership of this Working Group will be left to the Chairman of the Scientific Committee who will consult the Executive Secretary concerning the organisational and financial implications.

APPENDIX 1

INVENTORY OF EXISTING DATA AND PROGRAMS

Pro forma for information to be supplied by member countries.

1. Introduction

It is agreed there is an urgent need to prepare an inventory of knowledge of the Antarctic marine ecosystem. To this end members have agreed to provide the information listed below to the Scientific Committee as soon as possible but in any event before 31 December, 1982.

Data relating to the harvest of living resources on an experimental or commercial basis since the year harvesting began should be reported. The inventory of scientific research should be reported for the past twelve years only.

Information relating to whaling provided to the IWC, information provided under the exchange of information within the Antarctic Treaty and information provided to SCAR need not be included. However, a cross reference to it would be useful.

NOTE: The Committee seeks to determine what kind of information is available, how much of it there is and where it is stored. Detailed scientific data are not required at this stage.

2. Ships

2.1 Characteristics

A table or brief summary of the name and operational characteristics (e.g. length, displacement, horsepower, basic design, fish hold capacity, gear specifications, processing capability, acoustic equipment, etc.) of each vessel used for supply, research, experimental or commercial fishing.

2.2 Operations

A summary of the types (supply, research or commercial) of vessel referred to in paragraph 2.1 and areas of operations, deployment schedules, etc. within the Convention area. Projected operations during 1982 and 1983.

3. Fisheries Data

3.1 Availability of Data

Members should report on what types of data are being collected from their fishing vessels, with notes on the seasons for which the data are available, the extent of coverage (all the fleet, or just some vessels), and where relevant, the kinds of samples collected each season. This information should cover inter alia:

Catches: To the greatest degree of detail available in respect of time (month, week, etc.), location (FAO sub-areas, or 5° grid, etc.), and type and size of vessel.

Effort: The types of effort data (days fishing, hours tracking, searching time, etc.), which are collected together with comments on their suitability for estimating relative abundance. Information on fish and krill should be separated.

Biological Data: Types of data (length, maturity, etc.) collected, and definitions of classifications used.

3.2 Reporting of Data

FAO should send copies of STATLANT forms received for all years up to the 1979/80 season to the Secretariat. Countries should send data for the 1980/81 and 1981/82 seasons directly to the Secretariat, using the STATLANT A and B forms. The collaboration of FAO in doing this would be welcome. Countries should also send to the Secretariat any STATLANT-type data for earlier years – especially effort data – which has not already been sent to FAO.

4. Basic Scientific Data

4.1 Type and Quantity

4.1.1 An indication of the type and quantity of data (biological, physical oceanography, ice conditions, meteorology) obtained (or sought) in each year.

4.1.2 A catalogue giving, where appropriate, a summary of the amount of information available on size, age, sex, and reproductive condition of each harvested species, including whales and seals, taken each year by the identified ships from various locations in the Convention area for research or commercial purposes.

4.1.3 A catalogue of studies by year of the biology, demography, dynamics and ecology of harvested species and research in these fields on dependent and related populations of Antarctic marine living resources.

4.2 On-going and Planned Research and Monitoring Programs

Article XV(2) (f) of the Convention directs the Scientific Committee to 'formulate proposals for the conduct of international and national programs of research into Antarctic marine living resources'. To facilitate consideration of this directive, it would be helpful if the Contracting Parties, pursuant to the aforementioned agreement, prepared and distributed papers describing relevant research which:

(a) was conducted during the 1981/82 austral summer; and
(b) is being planned for the 1982/83 austral summer.

4.3 Modelling

A brief description of models developed or being developed which are considered to be of relevance to the study of Antarctic Marine Ecosystems.

5. Bibliographies and Other Information

5.1 Each member country to prepare an annotated bibliography of papers of limited circulation relevant to the Southern Ocean ecosystem or to Antarctic marine living resources.

5.2 Location: A list of the institutions at which the relevant scientific and commercial data are being or will be held; a general description of the types of data; an indication of the system(s) used to store and retrieve data.

APPENDIX 2

INVENTORY OF EXISTING LOGBOOKS AND PROPOSALS FOR A COMMON FORMAT

1. Introduction

The informal group had on the table models of logbooks in use in the Southern Ocean by Australia, Chile, France, Japan, Poland, USA and the suggested form of fishing log for trawlers engaged in exploratory fishing for Antarctic krill (FAO document GLO/50/77/2), and also the STATLANT 06A and 08B of FAO.

It was proposed to study separately the logbooks for fish statistics records and those for krill statistics records.

It is recommended that a member of the Secretariat could provide a special format for computer recording so each country could send to the Secretariat either data sheets suitable for coding in a computer form, or directly tapes with data.

Initially it is proposed to produce a uniform specification for the information required, rather than a uniform logbook. Such information should be extracted from the existing logbooks and sent to the Secretariat. If this information cannot be found in the existing logbooks, these logbooks should be modified.

2. Logbooks for fish statistics

The information required is as follows:

a. Description of vessel

- name of ship
- registration number and port of registration
- gross register tonnage
- length overall (m)
- maximum shaft power (kW at … rev/min) or horse power

b. Description of gear

- trawl type (according to FAO nomenclature)
- code number for trawl type
- mouth opening or length of bottom rope and length of upper rope(m)
- effective area of mouth (m^2)
- mesh size at mouth (mm stretched)
- mesh size at codend (mm stretched)

c. Tow information

- date
- position at start of fishing (in degrees and minutes)
- trawl code number
- time of shooting (in hour and minutes GMT; if local time, indicate the variation from GMT), in hour and minutes
- time of hauling
- depth (m)
- fishing depth (NB: only if midwater trawl)
- direction of trawling (NB: if the track changed during trawling, give the direction of the longest part of the track)
- towing speed

d. Environment

- speed of wind (knots) or wind force (Beaufort scale)
- surface temperature
- bottom temperature

e. Catch records

- estimated total catch (kg)
- weight for each species (kg) amount and composition of discards
- number of boxes of each size of fish per species
- quantity and type of processing per species

f. General information

- explain why the ship was not fishing (searching, adverse weather conditions, steaming to/from port, inability to process catch, etc.)

3. Logbooks for krill statistics

The information required is as follows:

a. Description of vessel

Same information as under section 2a

b. Description of gear

Same information as under section 2b; in addition:

- underwater acoustic equipment
  echosounders (types and frequencies)
  sonar (types and frequencies)
  netsonde (yes/no)

c. Tow information

Same information as under section 2c; in addition:

- acoustic targets: apparent/not apparent
  at one level/more than one level
  moving up/moving down/stationary

d. Environment

Same information as under 2d; in addition:

- sea state
- presence or not of ice in water
- cloud coverage or type of weather

e. Catch

- estimated total weight (kg)
- approximate species composition (percent of total)
- weight (kg) of: krill
  other edible species (specify)
  inedible (specify)
- average size of krill (run) or commercial size categories

f. General information

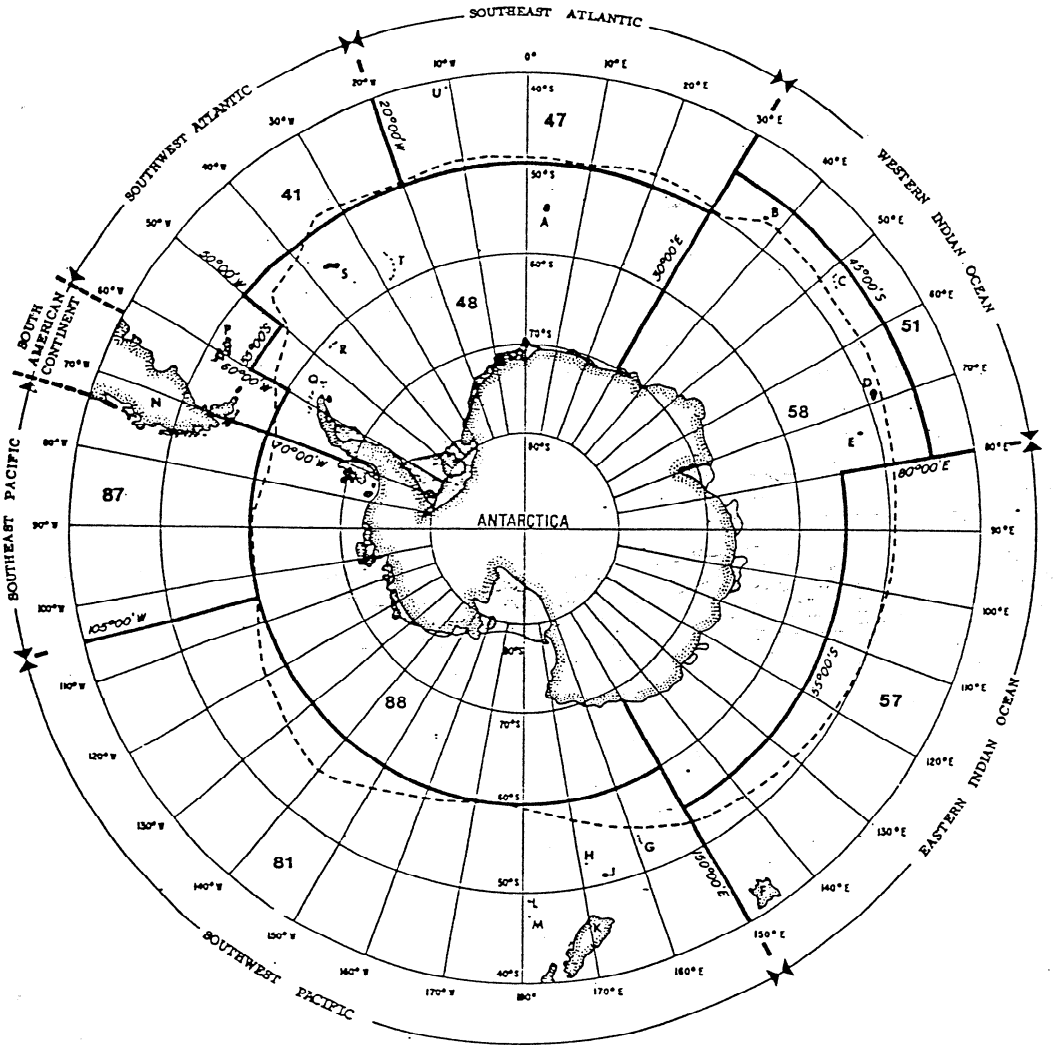
- number of ships searching or fishing together
- approximate distance between swarms (nautical miles)
- activity of ship: for each hour (01 to 24) of each day give the following information: fishing/searching/adverse weather conditions/steaming/processing limitations/ other
- utilisation of catch: amount and type product

NB: A. The informal group expressed the opinion that the presence of scientists or technicians on board is required to record accurate biological data on fish and krill.

B. A minimum of one krill sample (about 1 kg) should be taken per day fishing. If there are no scientists on board to process the samples, the samples labelled with ship, data and position should be kept deep frozen and taken back to the laboratory in the home country for further processing.

APPENDIX 3

BOUNDARIES OF THE MAIN STATISTICAL REGIONS IN THE SOUTHERN OCEAN



Code	Name of Islands and Continents	Lat.	Long.	Code	Name of Islands and Continents	Lat.	Long.
A	Bouvet	54 S	5 E	L	Antipodes	49 S	179 E
B	Prince Edward and Marion	46 S	38 E	M	Bounty	47 S	179 E
C	Crozet	46 S	51 E	N	South America		
D	Kerguelen	49 S	70 E	P	Falklands (Malvinas)	51 S	59 W
E	Mc Donald and Heard	53 S	73 E	Q	South Shetland	62 S	58 W
F	Tasmania (Australia)			R	South Orkney	81 S	45 W
G	Macquarie	54 S	159 E	S	South Georgia	54 S	37 W
H	Campbell	52 S	169 E	T	South Sandwich	57 S	26 W
J	Auckland	50 S	166 E	U	Gough	39 S	11 W
K	South Island (New Zealand)						

APPENDIX 4

BRIEF ACCOUNT ON THE FIRST INTERNATIONAL BIOMASS EXPERIMENT (FIBEX)

Submitted by G. Hempel

Since its first meeting in 1974, the SCAR/SCOR Group of Specialists on the Living Resources of the Southern Ocean had planned co-operative studies on particular aspects of the Antarctic ecosystem. The general programme was drafted in 1976, and in subsequent years a Technical Group on programme implementation and co-ordination, assisted by specialised working Groups and ad hoc consultations developed the detailed plans for a joint venture in 1980/81. The main objective of FIBEX, the first co-operative experiment of the Biological Investigation of Marine Antarctic Systems and Stocks (BIOMASS) was to gain quantitative estimates of the total biomass of krill in some major areas of the Southern Ocean and to determine the variance in spatial abundance related to the patchy distribution of krill and krill swarms.

The key instruments were high frequency echosounders with signal integrators installed on all vessels. Those instruments were run for 22 days at about 150 nautical miles per day on meridional transects chosen by random in the West Atlantic Sector. After a broad scale first survey a second phase concentrated on subareas with high krill abundance, and a third phase was a patch study of large krill swarms. The survey strategy was somewhat different in the Indian Ocean and on two transects in the Pacific Ocean.

Catch data were needed for the interpretation of the echo-signals and environmental data on physical and chemical oceanography and phyto- and zoo-plankton were taken in order to relate krill abundance to the physical and biological environment both on the large scale ocean-wide studies and in aggregations of krill.

The sea-going experiment in January to early March 1981, involved twelve vessels of ten countries. They produced in a highly co-ordinated and standardised manner the largest amount of data ever collected during an international co-operation in biological oceanography.

The major objective for studies of krill predators is to describe and quantify the impact of fish , bird, seal and whale (and if possible cephalopod) predation on krill and conversely

the effect of variations in krill abundance, in time and space, on the populations of predators. Indices of krill abundance, such as growth rates, pregnancy rates or breeding success, and age at maturity will be explored and quantified for birds, seals and whales. At the same time opportunity will be taken to map the distribution and abundance of krill, at least in the SIBEX study areas, by means of acoustic surveys.

Fish studies will include work on biological parameters for stock assessment and other factors like spawning areas and spawning periods, stomach contents, distribution of fish and young life stages in relation to krill swarms and ichthyoplankton. There will also be surveys of fish resources; pelagic surveys could he combined with zooplankton surveys, but bottom trawl surveys would require different design and extra ships' time.

As a synthesising objective it is intended to formulate models of parts of the Antarctic ecosystem. These detailed studies of processes, turnover rates, and in particular the relation of annual production to standing stocks, will provide a sound basis for the broader synoptic work expected to be developed by the Commission and will enable management-oriented surveys and monitoring to be designed and carried out with efficiency and economy.