HEARING

BEFORE THE

SUBCOMMITTEE ON ARMS CONTROL, OCEANS, AND INTERNATIONAL ENVIRONMENT

OF THE

COMMITTEE ON FOREIGN RELATIONS

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

U.S. POLICY WITH RESPECT TO THE EXPLOITATION OF ANTARCTIC RESOURCES

FEBRUARY 6, 1978

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EXPLOITATION OF ANTARCTIC RESOURCES

MONDAY, FEBRUARY 6, 1978

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL,
OCEANS, AND INTERNATIONAL ENVIRONMENT OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 11:05 a.m., in room 4221, Dirksen Senate Office Building, the Honorable Claiborne Pell (chairman of the subcommittee) presiding.

Present: Senator Pell.

OPENING STATEMENT

Senator PELL. The Subcommittee on Arms Control, Oceans, and International Environment will come to order to hear testimony from both Government and public witnesses concerning the U.S. policy with respect to the exploitation of Antarctic resources.

[Text of Antarctic Treaty follows:]

ANTARCTIC TREATY (COMPLETE TEXT)

"The Governments of Argentina, Australia, Belgium, Chile, the French Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.

Recognizing that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord;

Acknowledging the substantial contributions to scientific knowledge resulting from international cooperation in scientific investigation in Antarctica;

Convinced that the establishment of a firm foundation for the continuation and development of such cooperation on the basis of freedom of scientific investigation in Antarctica as applied during the International Geophysical Year accords with the interests of science and the progress of all mankind;

Convinced also that a treaty ensuring the use of Antarctica for peaceful purposes only and the continuance of international harmony in Antarctica will further the purposes and principles embodied in the Charter of the United Nations;

Have agreed as follows:

ARTICLE I

1. Antarctica shall be used for peaceful purposes only. There shall be prohibited, *inter alia*, any measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons.

2. The present Treaty shall not prevent the use of military personnel or equipment for scientific research or for any other peaceful purposes.

ARTICLE II

Freedom of scientific investigation in Antarctica and cooperation toward that end, as applied during the International Geophysical Year, shall continue, subject to the provisions of the present Treaty.

ARTICLE III

1. In order to promote international cooperation in scientific investigation in Antarctica, as provided for in Article II of the present Treaty, the Contracting Parties agree that, to the greatest extent feasible and practicable:

(a) information regarding plans for scientific programs in Antarctica shall be exchanged to permit maximum economy and efficiency of operations;

(b) scientific personnel shall be exchanged in Antarctica between expeditions and stations;

(c) scientific observations and results from Antarctica shall be exchanged and made freely available.

2. In implementing this Article, every encouragement shall be given to the establishment of cooperative working relations with those Specialized Agencies of the United Nations and other international organizations having a scientific or technical interest in Antarctica.

ARTICLE IV

1. Nothing contained in the present Treaty shall be interpreted as:

(a) a renunciation by any Contracting Party of previously asserted rights of or claims to territorial sovereignty in Antarctica;

(b) a renunciation or diminution by any Contracting Party of any basis of claim to territorial sovereignty in Antarctica which it may have whether as a result of its activities or those of its nationals in Antarctica, or otherwise;

(c) prejudicing the position of any Contracting Party as regards its recognition or non-recognition of any other State's right of or claim or basis of claim to territorial sovereignty in Antarctica.

2. No acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim, to territorial sovereignty shall be asserted while the present Treaty is in force.

ARTICLE V

1. Any nuclear explosions in Antarctica and the disposal there of radioactive waste material shall be prohibited.

2. In the event of the conclusion of international agreements concerning the use of nuclear energy, including nuclear explosions and the disposal of radioactive waste material, to which all of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX are parties, the rules established under such agreements shall apply in Antarctica.

ARTICLE VI

The provisions of the present Treaty shall apply to the area south of 60° South Latitude, including all ice shelves, but nothing in the present Treaty shall prejudice or in any way affect the rights or the exercise of the rights, of any State under international law wih regard to the high seas within that area.

ARTICLE VII

1. In order to promote the objectives and ensure the observance of the provisions of the present Treaty, each Contracting Party whose representatives are entitled to participate in the meetings referred to in Article IX of the Treaty shall have the right to designate observers to carry out any inspection provided for by the present Article. Observers shall be nationals of the Contracting Parties which designate them. The names of the observers shall be communicated to every other Contracting Party having the right to designate observers, and like notice shall be given of the termination of their appointment.

2. Each observer designated in accordance with the provisions of paragraph 1 of this Article shall have complete freedom of access at any time to any or all areas of Antarctica.

3. All areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspection by any observers designated in accordance with paragraph 1 of this Article.

4. Aerial observation may be carried out at any time over any or all areas of Antarctica by any of the Contracting Parties having the right to designate observers.

5. Each Contracting Party shall, at the time when the present Treaty enters into force for it, inform the other Contracting Parties, and thereafter shall give them notice in advance, of

(a) all expeditions to and within Antarctica, on the part of its ships or nationals, and all expeditions to Antarctica organized in or proceeding from its territory;

(b) all stations in Antarctica occupied by its nationals; and

(c) any military personnel or equipment intended to be introduced by it into Antarctica subject to the conditions prescribed in paragraph 2 of Article I of the present Treaty.

ARTICLE VIII

1. In order to facilitate the exercise of their functions, under the present Treaty, and without prejudice to the respective positions of the Contracting Parties relating to jurisdiction over all other persons in Antarctica, observers designated under paragraph 1 of Article VII and scientific personnel exchanged under subparagraph 1(b) of Article III of the Treaty, and members of the staffs accompanying any such persons, shall be subject only to the jurisdiction of the Contracting Party of which they are nationals in respect to all acts or omissions occurring while they are in Antarctica for the purpose of exercising their functions.

2. Without prejudice to the provisions of paragraph 1 of this Article, and pending the adoption of measures in pursuance of subparagraph 1(e) of Article IX, the Contracting Parties concerned in any case of dispute with regard to the exercise of jurisdiction in Antarctica shall immediately consult together with a view to reaching a mutually acceptable solution.

ARTICLE IX

1. Representatives of the Contracting Parties named in the preamble to the present Treaty shall meet at the City of Canberra within two months after date of entry into force of the Treaty, and thereafter at suitable intervals and places, for the purpose of exchanging information, consulting together on matters of common interest pertaining to Antarctica, and formulating and considering, and recommending to their Governments, measures in furtherance of the principles and objectives of the Treaty including measures regarding:

(a) use of Antarctica for peaceful purposes only;

(b) facilitation of scientific research in Antarctica;

(c) facilitation of international scientific cooperation in Antarctica;

(d) facilitation of the exercise of the rights of inspection provided for in Article VII of the Treaty;

(e) questions relating to the exercise of jurisdiction in Antarctica;

(f) preservation and conservation of living resources in Antarctica.

2. Each Contracting Party which has become a party to the present Treaty by accession under Article XIII shall be entitled to appoint representatives to participate in the meetings referred to in paragraph 1 of the present Article, during such time as that Contracting Party demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition.

3. Reports from the observers referred to in Article VII of the present Treaty shall be transmitted to the representatives of the Contracting Parties participating in the meetings referred to in paragraph 1 of the present Article.

4. The measures referred to in paragraph 1 of this Article shall become effective when approved by all the Contracting Parties whose representatives were entitled to participate in the meetings held to consider those measures.

5. Any or all of the rights established in the present Treaty may be exercised as from the date of entry into force of the Treaty whether or not any measures facilitating the exercise of such rights have been proposed, considered or approved as provided in this Article.

ARTICLE X

Each of the Contracting Parties undertakes to exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any acivity in Antarctica contrary to the principles or purposes of the present Treaty.

ARTICLE XI

1. If any dispute arises between two or more of the Contracting Parties concerning the interpretation or application of the present Treaty, those Contracting Parties shall consult among themselves with a view to having the dispute resolved by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means of their own choice.

2. Any dispute of this character not so resolved shall, with the consent, in each case, of all parties to the dispute, be referred to the International Court of Justice for settlement; but failure to reach agreement on reference to the International Court shall not absolve parties to the dispute from the responsibility of continuing to seek to resolve it by any of the various peaceful means referred to in paragraph 1 of this Article.

ARTICLE XII

1. (a) The present Treaty may be modified or amended at any time by unanimous agreement of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX. Any such modification or amendment shall enter into force when the depositary Government has received notice from all such Contracting Parties that they have ratified it.

(b) Such modification or amendment shall thereafter enter into force as to any other Contracting Party when notice of ratification by it has been received by the depositary Government. Any such Contracting Party from which no notice of ratification is received within a period of two years from the date of entry into force of the modification or amendment in accordance with the provisions of subparagraph 1(a) of this Article shall be deemed to have withdrawn from the present Treaty on the date of the expiration of such period.

2. (a) If after the expiration of thirty years from the date of entry into force of the present treaty, any of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX so requests by a communication addressed to the depositary Government, a Conference of all the Contracting Parties shall be held as soon as practicable to review the operation of the Treaty.

(b) Any modification or amendment to the present Treaty which is approved at such a Conference by a majority of the Contracting Parties there represented, including a majority of those whose representatives are entitled to participate in the meetings provided for under Article IX shall be communicated by the depositary Government to all the Contracting Parties immediately after the termination of the Conference and shall enter into force in accordance with the provisions of paragraph 1 of the present Article.

(c) If any such modification or amendment has not entered into force in accordance with the provisions of subparagraph 1(a) of this Article within a period of two years after the date of its communication to all the Contracting Parties, any Contracting Party may at any time atfer the expiration of that period give notice to the depositary Government of its withdrawal from its present Treaty; and such withdrawal shall take effect two years after the receipt of the notice by the depositary Government.

ARTICLE XIII

1. The present Treaty shall be subject to ratification by the signatory States. It shall be open for accession by any State which is a Member of the United Nations, or by any other State which may be invited to accede to the Treaty with the consent of all the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX of the Treaty.

2. Ratification of or accession to the present Treaty shall be effected by each State in accordance with its constitutional process.

3. Instruments of ratification and instruments of accession shall be deposited with the Government of the United States of America, hereby designated as the depositary Government.

4. The depositary Government shall inform all signatory and acceding States of the date of each deposit of an instrument of ratification or accession. and the date of entry into force of the Treaty and of any modification or amendment thereto.

5. Upon the deposit of instruments of ratification by all the signatory States, the present Treaty shall enter into force for those States and for States which have deposited instruments of accession. Thereafter the Treaty shall enter into force for any acceding State upon the deposit of its instrument of accession.

6. The present Treaty shall be registered by the depositary Government pursuant to Article 102 of the Charter of the United Nations.

ARTICLE XIV

The present Treaty, done in the English, French. Russian, and Spanish languages, each version being equally authentic, shall be deposited in the archives of the Government of the United States of America, which shall transmit duly certified copies thereof to the Governments of the signatory and acceding States.

In witness whereof, the undersigned Plenipotentiaries, duly authorized, have signed the present Treaty.

Done at Washington this first day of December, one thousand nine hundred and fifty-nine.

For Argentina : Adolfo Scilingo, F. Bello.

For Australia : Howard Beale.

For Belgium : Obert de Thieusies.

For Chile : Marcial Mora M, E. Gajardo V, Julio Escudero.

For the French Republic : Pierre Charpentier.

For Japan : Koichiro Asakai, T. Shimoda.

For New Zealand : G. D. L. White.

For Norway : Paul Koht.

For the Union of South Africa : Wentzel C. du Plessis.

For the Union of Soviet Socialist Republics : V. Kuznetsov (Romanization).

For the United Kingdom of Great Britain and Northern Ireland : Harold Caccia.

For the United States of America : Herman Phleger, Paul C. Daniels.

ADDITIONAL INFORMATION ON ANTARCTIC TREATY

Since the Antarctic Treaty became effective on June 23, 1961, eight consultative meetings have been held at which measures were recommended to further the principles and objectives of the original Articles. (A ninth meeting is scheduled for September 19–October 7, 1977, in London.) The measures include recommendations on conservation of flora and fauna, historic monuments, human impact on the environment, exchanges of information, and other matters. Detailed information on these recommendations may be obtained from the National Science Foundation's Public Information Branch or Polar Information Service.

Seven countries have signed the Antarctic Treaty since the 12 original nations signed the agreement on December 1, 1959. They are: Poland (June 8, 1961) ; Czechoslovakia (June 14, 1962) ; Denmark (May 20, 1965) ; The Netherlands (March 30, 1967) ; Romania (September 15, 1971) ; West Germany (November 19, 1974) ; and Brazil (May 16, 1975).

Antarctic Treaty Consultative Meetings: 1961, Canberra ; 1962, Buenos Aires ; 1964, Brussels ; 1966, Santiago ; 1968, Paris ; 1970, Tokyo ; 1972, Wellington ; 1975, Oslo ; and 1977, London.

As we all know, the Antarctic Treaty is a landmark of international cooperation. It bans the emplacement of weapons and military activities in the continent, and requires the free exchange of all scientific information concerning the treaty area. In effect, it has reserved Antarctic and its surrounding waters for the dual purposes of scientific research and environmental preservation since 1961.

Personally, I would not wish to see any U.S. Government policy which might alter or seriously undermine the pattern of cooperation which has existed in the Antarctic for the last 17 years. I am particularly concerned that the future viability of the Antarctic Treaty not be jeopardized in any way.

Any U.S. Antarctic policy should primarily emphasize the preservation of the treaty; the protection of the environment; and the continuation of the scientific cooperation that has taken place during the last two decades.

We have several witnesses, and will move as quickly as we can, as I have to leave a little before 1 p.m.

Our first witness is the Honorable Patsy Mink, Assistant Secretary for Oceans and International Environment and Scientific Affairs, Department of State, and an old friend and colleague.

STATEMENT OF HON. PATSY T. MINK, ASSISTANT SECRETARY OF STATE FOR OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS ACCOMPANIED BY AMBASSADOR ROBERT C. BREWSTER, DEPUTY ASSISTANT SECRETARY FOR OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS; THEODORE SELLIN, POLAR AFFAIRS OFFICER; AND R. TUCKER SCULLY, OCEANS POLICY OFFICER

Ms. MINK. Thank you, Mr. Chairman.

I want to express the Department's appreciation for this opportunity to discuss U.S. policy toward the Antarctic. I do so both as Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs (OES) and as Chairperson of the NSC (National Security Council) Antarctic Policy Group (APG).

It has been over 2½ years since our last testimony on Antarctic resources before this committee, and many important developments have occurred in the interim.

I have with me today several members of my staff. On my right is Ambassador Robert C. Brewster, the principal Deputy in my Bureau and Alternate Chairman of the APG; on his right is R. Tucker Scully, Oceans Policy Officer; on my left is Theodore Sellin, Polar Affairs Officer.

CONSULTATIVE MEETINGS OF ANTARCTIC TREATY COUNTRIES

Since you last held Antarctic hearings on May 15, 1975, the Antarctic Treaty countries have held two regular consultative meetings, the eighth and ninth in 1975 and 1977, and two extended preparatory meetings, one in 1976, dealing with mineral resources, and one in 1977, devoted to marine living resources of the Antarctic.

In addition, a special consultative meeting, the first of its kind, was held in 1977, at which the original treaty signatories, who are also consultative parties, welcomed Poland, the first acceding party to achieve consultative status and thus entry to the treaty forum. Poland, which had signed the treaty in 1961, became the thirteenth nation to join those entitled by the treaty to meet periodically to deal with questions involving Antarctica.

A second special Antarctic Treaty consultative meeting is scheduled to start on February 27 in Australia, and it will deal with marine living resources issues.

Before addressing specific resource issues, I would like to describe the main events of the past few years.

POTENTIAL SOURCE OF VALUABLE RESOURCES

The Antarctic, long the domain of scientists whose rights to unimpeded movement through the region are guaranteed by the treaty, has increasingly become the focus of attention as a potential source of valuable resources. This attention has manifested itself primarily in interest in aquatic resources, especially krill, because of the vast quantities believed to exist and the supposedly relative ease of its exploitation.

The flurry of public interest in mineral resources, especially petroleum, that stemmed from the period of the 1973 OPEC (Oil Producing Exporting Countries) oil embargo and the coincidental reports of possible oil reserves offshore of the continent, appears to have subsided somewhat.

Within the executive branch, however, and in the councils of the consultative parties, both the mineral and living resources issues have been kept under scrutiny. The year 1978 will be devoted largely to marine living resource questions, while 1979 will probably see fuller discussion of the mineral resource issues.

Senator PELL. Mrs. Mink, if you would excuse me for interrupting for a moment, I notice that you have a fairly long statement. Were you going to summarize it?

Ms. MINK. I could.

Senator PELL. I do think that would be helpful, especially in view of our time constraints; otherwise we will have no time for questions, which really bring out the meat of the matter.

U.S. HOSTING TENTH CONSULTATIVE MEETING

Ms. MINK. The United States will be hosting the 10th consultative meeting here in 1979, and this will be the 20th anniversary of signing of the treaty. This will give the U.S. Government not only a point of attention in terms of the progress of this treaty, but enormous responsibilities in helping to mold the agenda of the 1979 meeting.

CONSERVATION OF MARINE LIVING RESOURCES

It is important to remember that this February meeting in Australia with regard to the marine living resources is an initial meeting for the purposes of outlining the general approach toward this conservation regime. There is to be a decisive meeting again of the parties following this meeting in Australia. In other words, there will be a two-step approach toward the finalization of this activity.

I think that it is important to approach the marine resource question on the basis of what they hope to achieve at the meetings in Australia. The purpose, of course, is not to set down definitive allocation limits at the first outset, but to establish a mechanism for the develop-

ment of the information and the data base which all reports indicate is crucial for determining what kind of levels to establish in the first instance.

We know that the existing stocks of fish, squid, crabeater seals, penguins, and the baleen whales in the Antarctic waters all depend heavily upon krill. Therefore, while there have been enormous quantities of krill reported as estimates in existence, the balance of the ecosystem in the area is, of course, the critical concern which the Consultative Parties are now addressing at these meetings in Australia.

There have been fishings in the Antarctic waters by the Soviet Union and Japan, and more recently by the Federal Republic of Germany, and recently by Poland. South Korea is also planning a krill expedition in late 1978.

There are other indications that quite likely there will be other countries—perhaps even nonparty countries— interested in participating in harvesting in that area. So, the importance of these negotiations which will take place are evident and timely as well.

RECOMMENDATIONS OF NINTH MEETING

The recommendations of the ninth meeting in London can be made available to the committee, and if the chairman has no objections, they can be presented at this point in the record in order to define precisely what the agreements were that were arrived at in London.

Senator PELL. Without objection, they will be made a part of the record at this point.

[The information referred to follows:]

FINAL REPORT OF THE NINTH ANTARCTIC TREATY CONSULTATIVE MEETING

[Supplied by: Department of State]

1. In accordance with the provisions of Article IX of the Antarctic Treaty, representatives of the Consultative Parties (Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Poland, the Republic of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America) met in London from 19 September to 7 October 1977 to consult together and consider measures which might be taken to further the principles and purposes of the Treaty and, where appropriate, make recommendations to their Governments.

2. Mr. George Hall, Representative of the United Kingdom, acted as Temporary Chairman of the Meeting pending the election of a Chairman.

3. The Meeting was formally opened by Mr. Ted Rowlands, MP, Minister of State for Foreign and Commonwealth Affairs of the United Kingdom.

4. Mr. Hall was then elected Chairman, Mr. John Smallwood of the FCO was appointed Secretary-General and Mr. Ian Duncan of the FCO was appointed Assistant Secretary General.

5. The Opening Session was held in public. Opening statements were made by the Heads of Delegations (Annex 1).

6. The Meeting adopted the following Agenda:

1. Opening of meeting
2. Election of officers
3. Opening statements
4. Adoption of agenda
5. Antarctic resources—the question of mineral exploration and exploitation (Recommendation VIII–14, operative paragraph 4)
6. Antarctic marine living resources (Recommendation VIII–10, operative paragraph 5)
7. Improvement and telecommunications in Antarctic and of the collection and distribution of meteorological data

8. Effects of tourists and non governmental expeditions in the Antarctic Treaty Area. Completion of Annexes A and B to Recommendation VIII–9
9. Co-operation in transport (Recommendatin VIII–7)
10. Man's impact on the Antarctic environment
11. Activities in the Antarctic of states that are not Contracting Parties
12. Documents of the Consultative Meetings
13. Review of conservation measures and Sites of Special Scientific Interest
14. Date and place of next Consultative Meeting
15. Any other business
16. Adoption of Final Report
17. Closing of meeting

7. The Meeting considered in Plenary Session all the items on the Agenda and appointed four main Working Groups, as well as Working Committees, comprising members of all those Delegations wishing to participate, to assist it in reaching conclusions on certain items. A Working Group of Experts on Exploration and Exploitation of Antarctic Minerals was chaired by Dr. Martin Holdgate, Alternate Representative of the United Kingdom; a Working Group on Antarctic Marine Living Resources was chaired by HE Mr. John McArthur, Representative of New Zealand; a Working Group on Antarctic Telecommunications was chaired by HE Mr. Stephane Hessel, Representative of France; a Working Group on the Legal and Political Aspects of Mineral Resources, was chaired by HE Mr. Juan Carlos Beltramino, Representative of Argentina. HE Mr. Keith, Brennan, Representative of Australia, chaired a Working Committee on Marine Living Resources: Mr. Jorge Berguno, Deputy Representative of Chile, chaired a Working Committee on Tourism; and HE Mr. Stephane Hessel, Representative of France, chaired a Working Committee on the Legal and Political Aspects of Mineral Resources.

8. The Meeting adopted unanimously the following Recommendations, which are set forth in this Report:

IX–1. Antarctic mineral resources
IX–2. Antarctic marine living resources
IX–3. Improvement of telecommunications in the Antarctic
IX–4. Co-operation in transport
IX–5. Man's impact on the Antarctic environment
IX–6. Oil contamination of the Antarctic marine environment

9. *Mineral resources.*—The Working Group of Experts on Exploration and Exploitation of Antarctic Minerals met from 20 September until 29 September and had before it the report of the Scientific Committee on Antarctic Research (SCAR) Group of Specialists entitled A preliminary Assessment of the Environmental Impact of Mineral Exploration/Exploitation in Antarctica (EAMREA). Its Report was submitted to Plenary by Dr. Holdgate on 29 September. The Report was welcomed by Representatives who decided that it should be annexed to the Final Report of this meeting, together with a list of the experts who participated in the discussions (Annex 5).

The Working Group on the Legal and Political Aspects of Mineral Resources, and its Working Committee, met from 29 September–6 October. Its Report, which included a draft Recommendation, was submitted to Plenary on 7 October.

10. *Living resources.*—The Working Group on Marine Living Resources, and its Working Committee, met from 21 September–6 October. Its Report, which included a draft Recommendation, was submitted to Plenary on 7 October.

The Working Group agreed to include in its Report the understanding of the Group that the word "conservation" as used in the draft Recommendation includes rational use, in the sense that harvesting would not be prohibited, but the regime would exclude catch allocation and other economic regulation of harvesting. It was similarly the understanding of the Group that the word "resources" was not limited to commercially exploitable species.

In connection with the Special Consultative Meeting referred to in paragraph 2, Part III of Recommendation IX–2, the Representatives welcomed the invitation issued by the Government of Australia to hold the meeting in Canberra from 27 February to 16 March 1978.

11. *Telecommunications.*—The Working Group met on 30 September and 4 October. Its Report, which included a draft Recommendation, was submitted to Plenary on 6 October.

12. *Tourism.*—A draft statement of accepted practices and the relevant provisions of the Antarctic Treaty, together with a draft containing practical

guidance for visitors to the Antarctic, were considered for inclusion in Annex A of Recommendation VIII–9 but, owing to lack of time for full discussion, the matter was referred to the Tenth Consultative Meeting. The drafts are reproduced at Annex 6.

No action was taken to list or define areas of Special Tourist Interest for inclusion in Annex B of Recommendation VIII–9.

13. *Man's impact on the Antarctic environment.*—With the items on the agenda concerning Antarctic resources particularly in mind, the Representatives discussed the question of man's impact on the Antarctic environment. They recalled the numerous steps already taken by Consultative Parties designed to protect the Antarctic environment from unnecessary interference, including:

(i) The designation by the Consultative Parties of the Treaty Area as a Special Conservation Area and the adoption of the "Agreed Measures for the Conservation of the Antarctic Fauna and Flora".

(ii) The designation of "Specially Protected Areas" to preserve their unique ecological system and "Sites of Special Scientific Interest" to enable scientific investigations to be carried out at those sites without interference.

(iii) The negotiation of the Convention for the Conservation of Antarctic Seals (London 1972).

(iv) The adoption of measures to preserve and protect from damage historic monuments situated in the Antarctic Treaty Area.

(v) The adoption of a Code of Conduct to be observed at their stations and by their expeditions within the Antarctic Treaty Area.

They also recall that in close co-operation with the Scientific Committee on Antarctic Research (SCAR) of the International Council of Scientific Unions, and through SCAR with other appropriate international organizations concerned, they have developed plans for the comprehensive study of the Antarctic marine ecosystem considered as an integral part of the Antarctic environment and have sought to: (*a*) identify the types and assess the extent of human interfrence which has occurred in the Treaty area as a result of man's activities; and (*b*) assess the possible impact on the environment of the Treaty Area and other dependent ecosystems if mineral exploration and/or exploitation were to occur there.

The Representatives, while considering the next steps to be taken with regard to questions concerning Antarctic resources, decided to recommend that their Governments should reaffirm their commitment to environmental protection. Accordingly the Representatives drew up the statement contained in Recommendation IX–5.

14. *Activities in the Antarctic of other states.*—This question was widely discussed.

In connection with possible substantial or continuing activities in the Antarctic Treaty Area by States that are not Contracting Parties of the Treaty, the Representatives recalled their agreed view expressed in the Final Report of the Seventh Antarctic Treaty Consultative Meeting that it would be advisable for Governments to consult together as provided for by the Treaty and be ready to urge or invite as appropriate the State or States concerned to accede to the Treaty, pointing out the rights and benefits they would receive and also the responsibilities and obligations of Contracting Parties.

15. *Information and documents of Consultative Meetings.*—The question of availability of information and documents to the public was discussed and it was generally agreed that there should be increased efforts to make both more available to the public.

16. *Review of Conservation Measures and Sites of Special Scientific Interest.*—The attention of Representatives was drawn to two errors in Recommendations VIII–1 and VIII–4 respectively. The Representatives decided to correct the latitude shown on the map attached to Recommendation VIII–1 so as to read 66°16′ S. The Representatives decided to remove the discrepancy between the Management Plan for Site of Special Scientific Interest No. 6 (attached to Recommendation VIII–4) and the attached map by substituting the word "three" for the word "four" in section (i) of the Management Plan.

The Meeting considered the question of the designation Marine Sites of Special Scientific Interest and the opinion was expressed that SCAR should be invited to examine this matter. In this connection, Representatives noted that the Government of Chile intended to propose to SCAR, following agreed procedures, two Marine Sites of Special Scientific Interest.

The United States Delegation submitted the following information on its experience in Sites of Special Scientific Interest: Management plans for seven Sites of Special Scientific Interest (SSSI) were accepted as interim guidelines by Recommendation VIII–4 in 1975. The 1976–77 austral summer provided the first opportunity to incorporate these guidelines into Antarctic operating procedures.

The existing seven SSSI expire June 30, 1981, which date is likely to occur before the eleventh Consultative Meeting.

The US Antarctic Program controls visits to SSSI by a permit system and has found this to be an effective means of reducing harmful interference at SSSI 1, 2, 3 and 4 during the 1976–77 operating season. The posting of information signs around SSSI has been a deterrent to unintended interference by tourists. During this initial year of operations, the U.S. issued one permit for access to SSSI. One request for access to SSSI 3 was denied on grounds that the proposed purpose was in conflict with the Management Plan as set forth in Recommendation VIII–4.

17. *Tenth Consultative Meeting.*—Representatives accepted with pleasure the invitation of the Representative of the United States to hold the Tenth Consultative Meeting in Washington, D.C. in 1979.

18. *Other business.*—The United States Delegation submitted documents showing the status of approvals by Governments of Recommendations adopted at Consultative Meetings, as received and recorded by the United States Government as depositary Government for the Antarctic Treaty, up to and including 13 September 1977. The documents are reproduced at Annex 3.

During the course of the Ninth Consultative Meeting it was unanimously agreed that the greetings of all Representatives be conveyed to the Antarctic Stations of the Consultative Parties. The text is at Annex 4.

The Consultative Parties were agreed that in view of the number of important matters requiring continuing consideration it was desirable to meet on a more frequent basis than in the past. It was noted that the holding of Special Consultative Meetings for ad hoc purposes would be a response to this need; and it was agreed that the question of periodicity and nature of meetings within the Treaty framework should be included as an item on the agenda of the Tenth Consultative Meeting.

Recommendations Adopted at the Ninth Antarctic Treaty Consultative Meeting

IX–1. Antarctic Mineral Resources

The Representatives,

Recalling the provisions of the Antarctic Treaty, which establishes a regime for international cooperation in Antarctica, with the objective of ensuring that Antarctica should continue forever to be used exclusively for peaceful purposes and should not become the scene or object of international discord;

Bearing in mind the provisions of Article IV of the Treaty;

Convinced that the framework established by the Antarctic Treaty has proved effective in promoting international harmony in furtherance of the purposes and principles of the United Nations Charter, in ensuring the protection of the Antarctic environment, and on promoting freedom of scientific research in Antarctica;

Noting with thanks the Report of the Scientific Committee on Antarctic Research (SCAR) Group of Specialists entitled Preliminary Assessment of the Environmental Impact of Mineral Exploration/Exploitation in Antarctica (EAMREA);

Recognizing nevertheless that adequate scientific data concerning the harmful environmental effects of activities related to the exploration and exploitation of Antarctic mineral resources, should they occur, are not yet available;

Concerned that unregulated activities related to exploration and exploitation of mineral resources could adversely affect the unique environment of the Antarctic and other ecosystems dependent on the Antarctic environment;

Conscious that the Consultative Parties to the Antarctic Treaty in carrying out scientific research in the area have accumulated valuable experience and can substantially contribute to the protection of the environment and the rational use of Antarctic mineral resources, should exploration or exploitation thereof occur;

Aware of the special responsibilities of Consultative Parties to ensure that any activities in Antarctica, including commercial exploration and exploitation in the future, should they occur, should not become the cause of international discord, of danger to the unique Antarctic environment, of disruption to scientific investigation, or be otherwise contrary to the principles or purposes of the Antarctic Treaty;

Recommend to their Governments that:

1. They reaffirm the basic principles set forth in Recommendation VIII–14 of the Eighth Antarctic Treaty Consultative Meeting;

2. They take note with appreciation of the Report of the Group of Experts on Mineral Exploration and Exploitation annexed to the Report of the Ninth Consultative Meeting and make the best possible use of its conclusions and guidelines;

3. They continue to study the environmental implications of mineral resource activities in the Antarctic Treaty Area and hold at a time and place to be arranged through diplomatic channels a meeting of ecological, technological and other related experts, in accordance with Recommendation IV–24, with a view to developing scientific programs aimed at: (i) improving predictions of the impact of possible technologies for mineral exploration and exploitation in the Antarctic, as outlined in Section IIB of the Report of the Group of Experts, and in Section 5 of the SCAR EAMREA Group Report; (ii) developing measures for the prevention of damage to the environment or for its rehabilitation, in accordance with Section IIC of the Report of the Group of Experts;

4. They endorse the following principles elaborated at the Special Preparatory Meeting held in Paris from 28 June to 10 July 1976:—

(i) The Consultative Parties will continue to play an active and responsible role in dealing with the question of the mineral resources of Antarctica;

(ii) the Antarctic Treaty must be maintained in its entirety;

(iii) protection of the unique Antarctic environment and of its dependent ecosystems should be a basic consideration.

(iv) the Consultative Parties, in dealing with the question of mineral resources in Antarctica, should not prejudice the interests of all mankind in Antarctica;

5. They note that the provisions of Article IV of the Antarctic Treaty shall not be affected by the regime. It should ensure that the principles embodied in Article IV of the Antarctic Treaty are safeguarded in application to the area covered by the Antarctic Treaty;

6. They study the content of a future regime based on the principles contained in paragraphs 4 and 5 and on such further principles, rules and arrangements as may be agreed, taking full account of all proposals submitted to the IXth Consultative Meetings;

7. The subject "Antarctic Resources—The Question of Mineral Exploration and Exploitation" be the subject of intensified consultation among them and they urge the host Government of the Tenth Consultative Meeting to convene a meeting to consider legal and political aspects of mineral resources issues; this meeting to report to the Tenth Consultative Meeting on the results of its work;

8. They urge their nationals and other states to refrain from all exploration and exploitation of Antarctic mineral resources while making progress towards the timely adoption of an agreed regime concerning Antarctic mineral resources activities. They will thus endeavor to ensure that, pending the timely adoption of agreed solutions pertaining to exploration and exploitation of mineral resources, no activity shall be conducted to explore or exploit such resources. They will keep these matters under continuing examination;

9. The subject "Antarctic Resources—The Question of Mineral Exploration and Exploitation" be placed on the Agenda of the Tenth Antarctic Treaty Consultative Meeting.

IX–2. ANTARCTIC MARINE LIVING RESOURCES

The Representatives,

Recalling the special responsibilities conferred upon the Consultative parties in respect of the preservation and conservation of living resources in the Antarctic by virtue of Article IX paragraph 1(f) of the Antarctic Treaty;

Recalling further the history of action taken by Consultative Parties concerning conservation and protection of the Antarctic ecosystem including, in particular, Recommendations III–VIII, VIII–10, VIII–13 and IX–5;

Noting that concentrations of marine living resources are found in the Antarctic Treaty area and adjacent waters;

Aware of the need to compile more information with a view to developing a good scientific foundation for appropriate conservation measures and rational management policies for all Antarctic marine living resources;

Recognising the urgency of ensuring that these resources are protected by the establishment of sound conservation measures which will prevent overfishing and protect the integrity of the Antarctic ecosystem;

Concerned that interim guidelines for the protection and conservation of Antarctic marine living resources are desirable until such time as a definitive regime enters into force:

Convinced that provision for effective measures to conserve Antarctic marine living resouces as well as for collecton and analyis of the data necessary to develop such measures will require the early conclusion of a definitive conservation regime;

Recommend to their Governments that:

I. Scientific research

1. To the greatest extent feasible, they cooperate broadly and comprehensively in scientific investigation, and in the exchange of information thereon, relating to the Antarctic marine environment and that they intensify as far as possible scientific research related to Antarctic marine living sources;

2. In planning their marine activities in the Antarctic, they have regard to the advantages that will accrue from coordination by them of their scientific investigations contributing to the BIOMASS programme;

3. They give sympathetic consideration to the provision of practical measures (such as ships, ship time, personnel and finance) in support of the implementation of the BIOMASS programme or other similar programmes;

4. They examine the possibility of integrating, in so far as is practicable, research vessel programmes with the activities of other vessels, and make available on vessels operating in the Antarctic, other than research vessels contributing directly to the BIOMASS programme, time and facilities for routine observations aimed at extending the data base for the programme.

II. Interim guidelines for the conservation of Antarctic marine living resources

1. They observe the following interim guidelines pending entry into force of the definitive regime for Antarctic Marine Living Resources:

(*a*) they cooperate as broadly and comprehensively as possible in the mutual exchange of statistics relating to catch of Antarctic Marine Living Resources;

(*b*) they should show the greatest possible concern and care in the harvesting of Antarctic Marine Living Resources so that it does not result in the depletion of stocks of Antarctic marine species or jeopardizing the Antarctic marine ecosystem as a whole;

(*c*) they urge those Governments which are not parties to the Antarctic Treaty and which engage in activities involving the use of the marine living resources of Antarctica to take account of these guidelines;

2. They review these interim guidelines as and when necessary and in any event following the conclusion of the definitive regime with a view to their future elaboration in the light of the provisions of the definitive regime.

III. Establishment of a definitive conservation regime

1. A definitive regime for the Conservation of Antarctic Marine Living Resources should be concluded before the end of 1978.

2. A Special Consultative Meeting be convened in order to elaborate a draft definitive regime, and in particular:

(*a*) to determine the form of the definitive regime, including the question as to whether an international instrument such as a convention is necessary;

(*b*) to prepare, if necessary, draft rules of procedure for a subsequent decisive meeting for the establishment of the definitive regime;

(*c*) to decide on participation in such a meeting by States other than Consultative Parties which are actively engaged in research and exploitation of Antarctic Marine Living Resources and the participation, on an observer basis, of appropriate international organizations;

(*d*) to finalize the date and place of the decisive meeting;

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(*e*) to take any other steps in order to facilitate the work of the decisive meeting referred to above.

3. The Special Consultative Meeting shall base its work on this recommendation and take account of the discussions at the Ninth Consultative Meeting, its report and the documents presented to it, and, in the elaboration of a draft definitive regime, shall take into account *inter alia* the following elements:

(*a*) the regime should explicitly recognize the prime responsibilities of the Consultative Parties in relation to the protection and conservation of the environment in the Antarctic Treaty area and the importance of the measures recommended by the Consultative Parties to this end;

(*b*) the provisions of Article 4 of the Antarctic Treaty shall not be affected by the regime. It should ensure that the principles embodied in Article 4 are safeguarded in application to the marine areas south of 60° south latitude;

(*c*) the regime should provide for the effective conservation of the marine living resources of the Antarctic ecosystem as a whole;

(*d*) the regime should cover the area of specific competence of the Antarctic Treaty;

(*e*) the regime should, however, extend north of 60° South latitude where that is necessary for the effective conservation of species of the Antarctic ecosystem, without prejudice to coastal state jurisdiction in that area;

(*f*) the regime should not apply to species already regulated pursuant to existing international agreements but should take into account the relationship of such species to those species covered by the regime.

IX–3. IMPROVEMENT OF TELECOMMUNICATIONS IN THE ANTARCTIC

The Representatives,

Considering that requirements in the field of telecommunications as regards collection and dessemination of meteorological data and the need for, scientific, administrative and operational traffic have developed substantially since the second telecommunications meetings of experts of the Consultative Parties held in Buenos Aires in 1969;

Considering that the implementation of Recommendation VI. 1 and VII. 7, and participation of the programs of the World Meteorological Organization, particularly the World Weather Watch, require a thorough review and improvement of the network operating in the Antarctic;

Recommend to their Governments that they:

1. Compile comprehensive data, each for its own part, on the types of traffic, modes of transmission, timing, frequencies of their telecommunications schedules and current equipment of their telecommunications programs in the Antarctic, as well as on projects in the process of implementation and proposed improvements, in particular by designating, where appropriate, stations capable of replacing others in the event of breakdown.

2. Forward all such data to each of the other Consultative Parties via diplomatic channels on the one hand and on the other by direct dispatch to the departments concerned.

3. Arrange for a meeting of telecommunications experts to be held, on the initiative of the Government of the host country, before the Tenth Consultative Meeting, to analyze the data thus compiled, suggest desirable measures of harmonization and put forward recommendations on improvements to be made in the operation of the telecommunications network in the Antarctic.

4. Request SCAR through their National Antarctic Committees to undertake, at the earliest opportunity, a study of the most recent applications of science and technology to the specific problems of the Antarctic in the field of propagation of radio waves, and to pass on its conclusions to the Consultative Parties prior to their Tenth Meeting or if necessary to the next Consultative Meetings.

IX–4. CO-OPERATION IN TRANSPORT

The Representatives,

Recalling the appropriate provisions of the Treaty as well as Recommendation VIII–7;

Acknowledging the comprehensive report on transport resources and potential requirements delivered to the Fourteenth Meeting of the Scientific Committee on Antarctic Research (SCAR);

Concurring that the most effective use of aviation assets will be in coordinated air support projects (as circumstances permit) without major additional construction or investment;

Noting that new types of aircraft, equipment, and facilities are either being developed or likely to be introduced, and the continuing need for standardization of facilities and procedures to ensure effective coordination;

Recommend to their Governments that:

1. They request SCAR, through their National Antarctic Committees, to continue the work of the Sub-Committee on Cooperative Air Transport System for Antarctica (CATSA) of the Working Group on Logistics.

2. They request their offices responsible for the administration of Antarctic expeditions to adopt, to the extent practicable, such measures for improved compatibility of facilities and procedures as SCAR might be able to suggest.

IX–5. MAN'S IMPACT ON THE ANTARCTIC ENVIRONMENT

The Representatives,

Recommend to their Governments that they approve the following declaration on the Protection of the Antarctic Enrivonment,

The Governments participating in the Ninth Antarctic Treaty Consultative Meeting,

Deeply aware that the Antarctic environment is unique and vulnerable to contamination and disturbance,

Determined to protect the Antarctic environment from harmful interference,

Having particular regard to the conservation principles developed by the Scientific Committee on Antarctic Research (SCAR) of the International Council of Scientific Unions,

Recalling their obligation to exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in Antarctica contrary to the principles or purposes of the Antarctic Treaty,

Declare as follows:

1. The Consultative Parties recognise their prime responsibility for the protection of the Antarctic environment from all forms of harmful human interference.

2. They will ensure in planning future activities that the question of environmental effects and of the possible impact of such activities on the relevant ecosystems are duly considered.

3. They will refrain from activities having an inherent tendency to modify the Antarctic environment unless appropriate steps have been taken to foresee the probable modifications and to exercise appropriate controls with respect to harmful environmental effects.

4. They will continue to monitor the Antarctic environment and to exercise their responsibility for informing the world community of any significant changes in the Antarctic Treaty Area caused by man's activities.

OIL CONTAMINATION OF THE ANTARCTIC MARINE ENVIRONMENT

The Representatives,

Recommend to their Governments that:

1. They consider the possibility of preparing reports concerning the pathways by which oil may reach the Antarctic marine environment as a result of man's maritime activities in the Antarctic;

2. They include in these reports proposals relating to practicable means, if any, by which such oil contamination might be reduced;

3. They consider the possibility of instituting, in association with appropriate organisations, a programme for the determination of baseline levels of contamination of the Antarctic marine environment by oil;

4. They provide such reports as they may have prepared to, and further consider this matter at, the Meeting of Experts recommended in paragraph 3 of Recommendation IX–1, with a view to making proposals concerning these matters for consideration at the next Consultative Meeting.

PARAMETERS OF DISCUSSION

Ms. MINK. In my statement I have a list of the important recommendations which we believe will be the parameters of discussion at

the Australian meeting. I might outline the significance of at least three of them. First is an effective system for conservation; second is that it should cover the entire range of marine living resources—in other words the full Antarctic marine ecosystem; and third is that it should be embodied in an international convention and that should the Antarctic Treaty consultative parties make provision for participation in the final negotiations by non-consultative parties with fishing interests in the area. Other countries should also be permitted to join the agreement through accession.

There should be an opportunity for the appropriate international organizations also to participate in the final negotiations as observers.

STATE DEPARTMENT HEARINGS

The Department held public hearings in December in which individuals and representatives of nongovernmental organizations were given an opportunity to present their views. There will be again a later meeting on February 10 of this week in which other comments will be taken, this time on the draft EIS (Environmental Impact Statement), which has been completed and published and distributed late last week. A copy has been made available to the committee.*

We have made every effort within the Department to enlarge the scope of public attention within the United States to these issues.

As you know, I had sought early-on to establish an advisory committee in order that the public sector of the United States, and particularly the nongovernmental organizations, could have a direct say in the formulation of U.S. policies. The recommendation to organize such a committee came at the time the President decided to cut back on some 2,000 advisory committees that were in existence. So, my proposal was left in abeyance.

Recently, about a month ago, the Department provided me with approval to establish such an advisory committee under an existing OES committee, and so this process is underway and names of individuals are being received now by the Bureau for inclusion in this committee. But, because of the security requirements and other details that need to be attended to, the finalization of this advisory committee will not take place until after the February meeting in Australia.

As I said before, the mineral resource issue will be an issue which will monopolize our attention in 1979, and the outlines of such a regime have not yet been formulated. I assume that the views and the recommendations of the advisory committee will be especially helpful in that direction.

Mr. Chairman, I think that that summarizes basically the marine resource issue. I would like to also make comment about the Convention for the Conservation of Antarctic Seals.

CONVENTION FOR THE CONSERVATION OF ANTARCTIC SEALS

We were the fifth country to ratify this convention. Seven ratifications are necessary. We believe that Belgium and the Soviet Union are at the point of submitting their instruments of ratification and that this convention will become effective 30 days after such deposit.

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*See Appendix.

PENDING LEGISLATION

We also would like to note that there is legislation pending before the Congress—S. 1691 and H. 7749—which will make it possible for the United States to approve the agreed measures for the conservation of Antarctic flora and fauna. We are hopeful that action can be taken on this matter by this Congress as we view this convention as a very important step forward.

We also have the criminal legislation pending before the Congress. This we consider to be another item which is important to the orderly management and handling of our domestic affairs on that continent. We view the extension of juridical jurisdiction to that area as vital to the internal management of our personnel on that continent, and we would hope that the Congress would authorize and enact that legislation.

Mr. Chairman, that roughly summarizes what I wanted to say this morning.

Thank you very much.

[Ms. Mink's prepared statement follows:]

PREPARED STATEMENT OF PATSY T. MINK

Mr. Chairman, I thank you for the opportunity to meet with the Committee to discuss U.S. policy toward the Antarctic. I do so both as Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs and as Chairperson of the NSC Antarctic Policy Group (APG).

It has been over two-and-one-half years since our last testimony on Antarctic resources before this Committee, and there have been important developments in the interim.

I have with me today several members of my staff. They are Ambassador Robert C. Brewster, the principal Deputy Assistant Secretary of my Bureau and alternate Chairman of the APG: Theodore Sellin, Polar Affairs Officer; and R. Tucker Scully, Oceans Policy Officer.

Since you last held Antarctic hearings on May 15, 1975, the Antarctic Treaty countries have held two regular Consultative Meetings, the Eighth and Ninth in 1975 and 1977, and two extended preparatory meetings, one in 1976, dealing with mineral resources and one in 1977 devoted to marine living resources of the Antarctic. In addition, a Special Consultative Meeting, the first of its kind, was held in 1977, at which the original Treaty signatories, who are also Consultative Parties, welcomed Poland, the first acceding Party to achieve Consultative status and thus entry to the Treaty forum. Poland, which had signed the Treaty in 1961, became the thirteenth nation to join those entitled by the Treaty to meet periodically to deal with questions involving Antarctica. A second Special Antarctic Treaty Consultative Meeting is scheduled to start on February 27 in Australia. It will deal with Antarctic marine living resources issues.

Before addressing specific resource issues I would like to describe the main events of the past few years.

The Antarctic, long the domain of scientists whose rights to unimpeded movement through the region are guaranteed by the Antarctic Treaty, has increasingly become the focus of attention as a potential source of valuable resources. This attention has manifested itself primarily in interest in aquatic resources, especially krill, because of the vast quantities believed to exist and the supposedly relative ease of its exploitation. The flurry of public interest in mineral resources, especially petroleum, that stemmed from the period of the 1973 OPEC oil embargo and the coincidental reports of possible oil reserves offshore of the Antarctic Continent, appears to have subsided somewhat.

Within the executive branch, however, and in the councils of other Antarctic Treaty Consultative Parties, both the mineral and living resources issues have been kept under scrutiny. 1978 will be devoted largely to marine living resource questions while 1979 will probably see fuller discussion of mineral resource issues.

The U.S. will act as host to the Tenth Antarctic Treaty Consultative Meeting in 1979, the twentieth anniversary of the signing of the Treaty in Washingon.

Beween now and then it is also likely that there will be as many as six or seven multilateral meetings on Antarctic matters dealing with things ranging from improvement of telecommunications to the "decisive meeting" to negotiate a living marine resource conservation regime.

In all, I can say that the international discourse in the Antarctic in the past few years has been fruitful. U.S. policy objectives have in the main been achieved. The general public and the private sector in the U.S. have also made their views known to the Department. Indeed, in the past year consultations with conservation groups in particular has been beneficial in the policy formulation process and their advisor role on U.S. delegations dealing with Antarctic matters have been solicited and accepted. This is a departure from the practice of exclusion of public members prevalent as late as 1976 and still exercised by almost all other Consultative Parties.

Turning now to resource issues, U.S. policy is governed by two primary considerations. First, protection of the environment and preservation of the ecosystem from undue harm is essential. Second, resources, if ever exploited, must be used wisely and taken only under appropriate environmental safeguards. The thrust of this policy can be seen in the Recommendations on mineral resources adopted at the Eighth and Ninth Antarctic Treaty Consultative Meetings. These call for continued efforts to achieve a timely international regime to regulate resource exploitation if it should occur and for nations to exercise and urge restraint on commercial exploitation in the meantime.

It may be of interest to the Committee to learn that the widespread support among Consultative Parties in the first half of the 1970's for some kind of moratorium on mineral resource activities has largely evaported. Most Consultative Parties now believe that a moratorium would simply halt all constructive thinking about a minerals regime without effectively halting an oil rush if a find were made. Therefore, a U.S. offer at the Ninth Consultative Meeting to work toward an acceptable moratorium if a consensus for one developed fell on virtually deaf ears. A feeling of varying degrees of urgency to achieve a regime prevails, one which we welcome because without it the relatively slow pace with which the consultative mechanism moves may not necessarily produce results in a timely fashion.

The question of marine living resources is, in fact, more immediate. The Ninth Meeting of Antarctic Treaty Consultative Parties held last fall, and the preparatory meetings held prior to it, witnessed the emergence of Antarctic marine living resource issues as a primary concern to the Consultative Parties.

The emphasis upon Antarctic marine living resources derived from the coincidence of two factors: first, the prospect that large-scale fishing would be initiated in Antarctic waters, and, second, recognition of the potential vulnerability of the Antarctic marine ecosystem to unregulated harvesting.

It has long been known that Antarctic waters are highly productive and rich in marine life. Uncontrolled harvesting has in the past led to serious depletion of Antarctic whale and seal stocks. In the 1960's the attention of scientists and fisheries experts turned to Antarctic krill—small shrimp-like crustaceans (euphausiids) which are the primary food for the great whales and which are found in Antarctic waters in very large quantities. One species of krill, Euphausia superba, forms dense swarms at or near the surface. This combined with its high protein content has made krill a leading candidate for commercial harvesting either for direct human consumption or for fish meal. In addition, certain fish species and squid are considered to offer potential for sustained catches.

Exploratory fishing in Antarctic waters was first undertaken by the Soviet Union and Japan. More recently other nations have joined in such activities, notably the Federal Republic of Germany, a non-treaty Party, and Poland. South Korea is also planning a krill expedition in late 1978. The large estimates of potential yield of krill—from tens of millions to over one hundred million metric tons annually—combined with excess distant water fishing capacity because of restrictions in Coastal State 200-mile fishery zones—make commercial harvesting a probability—and sooner rather than later.

At the same time there is little experience in large scale harvesting of resources such as krill, which occupy so low and central a role in the marine ecosystem. The Antarctic marine ecosystem represents a finely balanced adaptation to the extreme environmental condition of the southernmost ocean. Uncontrolled harvesting of krill, or other components of the ecosystem, could have unforeseen and perhaps irreversible impacts.

In recognition of these factors, the view emerged at the preparatory meetings for the Ninth Consultative Meeting that adequate conservation of Antarctic marine living resources was an objective of considerable urgency. The United States took the lead in proposing consideration of a conservation regime—a complete system, with machinery for identifying conservation needs and developing necessary conservation measures.

In preparing for the Ninth Consultative Meeting, the United States determined that its environmental and other interests would be best served by negotiation of an international convention to establish a conservation regime for Antarctic marine living resources. We believe that the initiative for the creation of such a convention should come from within the Antarctic Treaty system, consistent with the principles and purposes of the Treaty. We hold that the convention, however, should be concluded by a separate international conference with additional participation by non-Treaty Parties and international organizations with direct interests in the resources concerned.

The representatives to the Ninth Meeting of Antarctic Treaty Consultative Parties held in London, September 19–October 17, 1977, adopted Recommendation IX–2, on Antarctic marine living resources. The Recommendation provides that a "definitive regime" for the conservation of Antarctic marine living resources should be concluded in 1978. The recommendation suggests a two-step process: the first, a special meeting of Consultative Parties (to be convened in Canberra February 27–March 16); and the second, a "decisive meeting", the dates for which have not yet been fixed. The recommendation anticipates that the "decisive meeting" will be a diplomatic conference, and that states other than Consultative Parties with direct interests in Antarctic marine living resources will participate in it, as well as appropriate international organizations on an observer basis. The recommendation also elaborates several principles to be taken into account in developing the regime. Among these is the principle that a regime should apply to the entire Antarctic marine ecosystem.

The United States Delegation to the Ninth Consultative Meeting supported Recommendation IX–2. It satisfactorily reflects initial U.S. views on a possible regime to conserve Antarctic marine living resources, specifically, that:

First, an effective system for the conservation of Antarctic marine living resources, including krill, should be in place prior to large scale harvesting of such resources.

Second, a conservation regime should cover the entire range of Antarctic marine living resources—that is, cover the full Antarctic marine ecosystem.

Third, the conservation regime should be embodied in an international convention and there should be provision for participation in the negotiations by Consultative Parties, other countries with direct interest in the resources concerned, and by appropriate international organizations.

Since the Ninth Consultative Meeting, we have directed our attention to the development of our specific policy on a conservation regime for the Special Consultative Meeting which opens in Canberra three weeks from today.

This process of policy development involves not only coordination among the interested federal agencies, such as with our colleagues here present from NOAA and NSF, but also incorporation of the views of the interested public and the Congress and the preparation of an Environmental Impact Statement (EIS).

The Department held a public meeting on December 20, 1977, at which both individuals and representatives of non-governmental organizations presented their views on a possible conservation regime for Antarctic marine living resources. Another will be held on February 10, 1978.

We believe, however, that a more structured means of obtaining public input is required. Therefore, we have amended the charter of the Department's Oceans Affairs Advisory Committee to include Antarctic matters, and we are setting up an Antarctic Affairs Section of this Committee to advise us on Antarctic matters, including Antarctic resources and environmental issues. Our present thinking is that the Section will consist of 15 to 20 members drawn from various public sectors.

A draft Environmental Impact Statement has been prepared and circulated to interested Federal agencies and non-governmental organizations. A copy of the draft EIS, which includes a number of Appendices, is provided for the record. The Department has scheduled a public meeting on February 10 to receive oral comments on the draft EIS. Formal comments of both the public and federal

agencies and organizations are not, of course, due until 45 days after the publication of the Statement.

However, we want to have the benefit of the preliminary comments of members of the public and non-governmental organizations on February 10 so that we may take these views into account in the formulation of our position for the Canberra Special Consultative Meeting which begins on February 27.

The proposed Federal action—the negotiation of a conservation regime—set forth in the draft EIS, also summarizes our current thinking on the elements of a conservation regime. With your permission, Mr. Chairman, let me review these elements:

The regime, which would be included in a treaty, would set forth the objectives of the regime and provide the obligations, functions and machinery necessary to fulfill them.

The proposed conservation regime would apply to all the species which comprise the Antarctic marine ecosystem, except that it would not provide for direct regulation of species already covered by existing international agreements specifically, the International Whaling Convention and the Convention for the Conservation of Antarctic Seals.

The purpose of the regime would be to ensure that any harvesting of Antarctic marine living resources takes place in accordance with sound conservation principles and practices. Specifically: to prevent overexploitation of any Antarctic marine living resource; to ensure that harvesting of any species does not adversely affect populations of dependent or related species; and to ensure that any harvesting of Antarctic marine living resources is conducted in such fashion as to maintain the health of the Antarctic marine ecosystem.

In order to accomplish these purposes, the conservation regime would need to provide for: acquisition of basic scientific data on the nature, interrelationships and dynamics of the Antarctic marine ecosystem; acquisition of quantitative data on the standing stocks of Antarctic marine living resources and detailed data on the levels of any harvesting of such stocks; assessment of the status of the stocks of Antarctic marine living resources; identification of stocks to which conservation measures should be applied; and development, implementation and effective enforcement of specific conservation measures, including catch limitations, to achieve the purposes of the regime.

The functions to be performed by the conservation regime would be of a regular and continuing nature. Their performance would require establishment of an effective organizaitonal structure. This structure would include a plenary body or commission, in which representatives of the contracting parties to the regime would decide upon conservation measures and take other actions provided for in the international agreement. This organizational structure would also require standing bodies to: collect, collate and distribute necessary basic scientific data; collect, collate and distribute quantitative data on standing stocks and catch data; assess and review the status of stocks of Antarctic marine living resources; prepare for the periodic meetings of the plenary body or commission; monitor the effectiveness of conservation measures; coordinate the activities of the conservation agreement with the activities of the International Whaling Commission and with activities pursuant to the Convention for the Conservation of Antarctic Seals; establish cooperative relationships with other international bodies which deal with Antarctic marine living resources.

On the basis of the comments and suggestions we are receiving in our discussions with the public, with the Congress, and among the Federal agencies, we will be defining detailed positions for the Canberra meeting. Commitment to an ecosystem approach and the establishment of a workable system for effective conservation lies at the heart of our approach to the issue. The negotiations in Canberra will be complex and difficult, but the shared emphasis demonstrated at the London Consultative Meeting upon maintenance of the Antarctic marine ecosystem and the need to conclude a conservation regime give rise to cautious optimism.

An important issue with regard to satisfactory resolution of the resource issues, both living as well as non-living, is accommodating the juridical positions of claimants and non-claimants. A general accommodation of the issue of national sovereignty is reflected in the Antarctic Treaty. The U.S. position under the Treaty is that we do not assert or recognize claims to territorial sovereignty in Antarctica. Since the Treaty does not address resource issues, the prospect of resource activity raises this question again in direct fashion. We believe solu-

tions are possible. They will require hard work and imaginative thinking on the part of all participants.

With respect to other Antarctic developments, the United States in December of 1976 ratified the Convention for the Conservation of Antarctic Seals. We were the fifth country to do so. Seven ratifications are necessary to bring the Convention into force. We made several diplomatic approaches last year to the other signatories urging their ratification of the Convention. I am pleased to say that Belgium and the Soviet Union have both just recently ratified the Convention and are expected to deposit their instruments of ratification shortly. The Convention will become effective 30 days from the deposit of the seventh ratification.

The Department has presented legislation to both houses of Congress, S. 1691 and H. 7749, to enable the U.S. Government to approve the measures, agreed upon by the Antarctic Treaty Consultative Parties in 1964, for the conservation of Antarctic fauna and flora. Hearings were held before the appropriate committees of the House last fall, and the bill is expected to be reported out shortly. No action, however, has yet been taken in the Senate, although we understand the Commerce Committee intends to hold hearings. I want to urge the passage of this legislation by the current session of Congress in order that the U.S. can approve the "agreed measures" before the Tenth Consultative Meeting in Washington in 1979.

Our early approval would permit us to suggest to Japan and Australia, who together with us are the last Consultative Parties yet to take action, that they make every effort to do so. We should seek to make the "agreed measures" effective before the Tenth Meeting.

Another matter before the Congress is that of criminal legislation for Antarctica. Since few of our criminal laws extend beyond the geographical limits of the United States, a draft bill to extend U.S. jurisdiction to certain criminal cases arising in the Antarctic has been submitted by the Department of each of the last three Congresses. The current submission coincided with a similar Congressional bill, which the Department supports. Hearings on that bill, H. 6148, were held in the House last fall. No action has been taken by the Senate. Rapid passage of appropriate legislation is, in our view, essential.

Mr. Chairman, although this hearing is largely devoted to the question of resources and my statement is therefore primarily addressed to those questions, I would not wish to leave the impression with you or this Committee that resource concerns predominate in our consideration of Antarctic policy. An overriding continuing objective of our Antarctic policy is to ensure maintenance of the Antarctic Treaty system and the preservation of the Antarctic environment and ecosystem. Our concern, and that of our Antarctic Treaty Consultative Partners, manifests itself in the study of questions such as the establishment of sites of special scientific interest, examination of the environmental problems which may be caused by increasing tourism, and problems relating to possible consequences of mineral resource exploration and exploitation. Meanwhile the scientists of a number of the Treaty nations are continuing their year-round work in Antarctica in a spirit of cooperation that has always been the hallmark of the Antarctic Treaty.

Senator PELL. Thank you very much, Mrs. Mink.

RELATIONSHIPS OF SEPARATE CONVENTIONS TO OVERALL ANTARCTIC TREATY

To educate me a little bit, what is the relationship of the separate conventions to the overall Antarctic Treaty? I am trying to get through my mind why we are moving a few nations when the Antarctic Treaty is supposed to be open to signature by all the nations of the world, and why these things aren't being done under the Antarctic Treaty itself, under its umbrella?

Ms. MINK. With respect to the marine living resource issue in particular?

Senator PELL. To any issue.

Ms. MINK. I believe that the consultative parties wanted to design the regime and then, after agreeing on the draft regime, invite other

countries to a conference to consider that document. This is why there is a two-step plan in the development of this convention.

Senator PELL. What I don't understand is this.

We are going to a meeting for purposes of a treaty in Canberra, Australia; correct?

Ms. MINK. Yes.

Senator PELL. How does that relate to the Antarctic Treaty? Is it under its umbrella or separate?

Ms. MINK. The Antarctic Treaty did not provide for the details in which to manage the resources in the area. The entire ecosystem is involved. In order to make it possible for the conservation and management regime to affect the range of the species in the area, it was felt that a separate treaty was necessary. In particular, the conservation, study, and understanding of the importance of krill as the basis of the entire ecosystem should be noted, because so many of the animal species depend upon it. It seems that it was the only effective way to regulate this.

In addition, our view is very strongly held that all of the countries ought to be given an opportunity to sign on because unless all of them do, we would have no way in which to regulate and effectively manage the system.

Senator PELL. But, as I understand it, from a layman's viewpoint, there are two basic problems on which we really should focus, that is, the Congress and the people. One is the question of the krill and the other is the question of possible mineral resources. Both of those should be examined, I would think, under the umbrella of the Antarctic Treaty. Yet, aren't we moving down other paths, setting up other groups of nations separate from the original signatories to the Antarctic Treaty?

Ms. MINK. I really don't know how to respond to that question except to say that perhaps it would be the preference of the consultative parties if they could keep the matter within themselves and within their exclusive management. But the realities are that the rest of the nations of the world and many international organizations are insistent upon having a say, having a role, having a part in not only the development of the concept, but in making sure that the purposes of the initial treaty are also lived up to—that is, safeguard of the environment, use of the area for peaceful purposes, the nature of the scientific explorations, and many other items on the agenda.

I might ask Ambassador Brewster if he would like to expand on that response.

Ambassador BREWSTER. There are two comments that I would make, Mr. Chairman.

One is that the treaty applies only to the area south of 60 degrees South latitude, whereas the Antarctic ecosystem extends north of that latitude. Therefore, in order to deal effectively with the questions of marine living resources, the area which is formally covered by the treaty has to be expanded. The only suitable way of doing that is by a separate convention.

Second, the path that we are discussing, which is the preparation of a convention, is consistent with the treaty and would be supportive of it. But it would be open, as Assistant Secretary Mink said, to acces-

sion by those countries whose interests in Antarctica were limited solely to the living resources.

KRILL SUPPLY

Senator PELL. How acute is the problem of krill? What percentage of the total krill supply of the world comes out of the Antarctic area?

Mr. SCULLY. If I might answer that, Mr. Chairman. Krill is a generic name, I believe a Norwegian word, meaning whale food. It refers to a whole group of small crustaceans.

Antarctic krill, or the krill in Antarctic waters, have been identified as having a very large biomass. There has been a limited exploitation of krill generally. There is some exploitation of krill in northern polar waters and in the Pacific. But there has been almost no exploitation of krill which appears to have a very large biomass in southern oceans. One species in particular, which has the habit of swarming and forming dense swarms at or near the surface, seems to be a particular target for potential commercial exploitation.

To date, to our knowledge, there has been only a limited research and perhaps only limited exploratory fishing; a very tiny fraction of any possible potential of that Antarctic resource has been exploited to date. Our best estimate would be that perhaps 20,000 metric tons has been the maximum take of krill in any given year.

Senator PELL. The question is what percentage of the krill of the world comes out of the Antarctic area or exists there?

Mr. SCULLY. I am not sure that we have sufficient evidence to make a quantitative guess. However, a very large percentage of krill is found in southern waters.

Senator PELL. More than half?

Mr. SCULLY. It's hard to say. In terms of that which might ever be exploited, it would probably be more than half. Whether it would be half of the total biomass of the species in the world, I would not venture to guess.

KRILL FOOD SUPPLY

Senator PELL. As the supply of whales, alas, diminishes, what other forms of marine life depend upon the krill for their food?

Mr. SCULLY. If I may continue, directly or indirectly all higher forms of life in the Antarctic area's ecosystem depend upon krill. The greatest direct consumers, other than the great whales, would be the Antarctic avian population, that is, birds, particularly various forms of penguin, and the Antarctic seal population, particularly the crabeater seal. In addition, there are numerous, more completely marine, species that depend upon krill.

It is assumed, or it is thought at least, that large populations of squid depend upon krill as the primary source of food, along with various species of fish.

Senator PELL. So basically krill is a little higher up in the scale or chain from plankton, is that correct?

Mr. SCULLY. Correct. Krill are a part of the plankton, but they are the zooplankton, the animal plankton. Though their feeding habits are not completely understood, it is thought that they feed directly on the plant, plankton, the phytoplankton.

NEGOTIATING OUTSIDE ANTARCTIC TREATY PROCESS

Senator PELL. I will again come back to this question, which I don't quite understand: that is, why is it necessary to negotiate the treaty outside of the Antarctic Treaty process?

Ambassador BREWSTER. The treaty, in the first instance, is going to be negotiated at a special consultative meeting of the treaty parties convening in Canberra. That meeting will prepare a draft, which will be the subject of a subsequent decisive meeting or conference at which or to which other states, depending upon the decision of the Antarctic parties, will be invited to participate.

It is our view that international organizations, specifically FAO—Food and Agriculture Organization—should be also invited to participate on observer status.

Senator PELL. Shouldn't the environmental organization in Nairobi be invited, too? Wouldn't it be equally important?

Ambassador BREWSTER. That is certainly a possibility.

FAO IMPORTANCE

Senator PELL. I am curious. Why would you think FAO is more important than the other group?

Ambassador BREWSTER. Because it has a series of programs and interests in the southern oceans and has done a considerable amount of scientific research with respect to it.

Senator PELL. So, eventually it will be a treaty that is done through the treaty process.

CANBERRA MEETING AGENDA

Will you be examining only the question of krill at this meeting, or will you also be going into the question of mineral resources?

Ambassador BREWSTER. Only of marine living resources.

Senator PELL. Only living resources?

Ambassador BREWSTER. Yes.

CATCH ALLOCATIONS, OTHER ECONOMIC HALTS TO HARVESTING

Senator PELL. There is a certain feeling in the environmental community that the treaty may be a weak one with limited teeth. One wonders why catch allocations and the other economic halts to harvesting will be excluded from the treaty?

Ambassador BREWSTER. It is not our expectation that they will be excluded.

Senator PELL. Good.

Ambassador BREWSTER. In fact, we specifically desire that they be included.

I would only note with respect to specific catch allocations for separate states that that is a subject which we feel should be addressed later.

ANTARCTIC REGIME CONCEPT

Senator PELL. Do you feel that this treaty, if it is concluded, will strengthen or weaken the overall concept of the Antarctic regime?

Ambassador BREWSTER. I think that if the Antarctic Treaty parties and other interested states are able to agree on an effective conservation convention for the Antarctic Oceans, they will succeed in strengthening the treaty and demonstrating its ability to deal with the new problems which we have in that area.

U.S. MINERAL RESOURCES POLICY

Senator PELL. What is U.S. policy with regard to exploitation of mineral resources?

Ambassador BREWSTER. To date, our policy has been one of urging the timely creation of an international solution to the mineral resource problem through the Antarctic Treaty.

The administration is currently engaged in a review of its policy. I would expect that under Mrs. Mink's leadership of the Antarctic policy group a policy will be developed in the next months prior to our participation in the further deliberations with respect to mineral resources.

What we will be doing, as I see it, is identifying the options that we have and choosing them with respect to the nature of such a regime and how to achieve them.

Senator PELL. What is the view of the State Department in this regard?

Let's say that there is a large supply of a needed mineral in Antarctica. Should that be exploited or should it be held in reserve?

Ambassador BREWSTER. The Department has not formulated its view on that, to my knowledge, Mr. Chairman.

Senator PELL. Does any branch of the Government have a view in this matter?

Ambassador BREWSTER. I'm certain they do. But a coordinated view as to whether resources should be exploited and at what time has not yet, to my knowledge, been decided upon.

The one thing the Government has been insistent upon, if exploitation takes place, is that it take place under proper and secure safeguards to the environment.

MINERAL RESOURCE POLICIES OF OTHER COUNTRIES

Senator PELL. What is the view of other nations in this regard, such as the Soviet Union, Germany, and Great Britain, for example?

Ambassador BREWSTER. The Soviet Union has taken the view that the environment of Antarctica must be safeguarded. I don't know specifically their view toward the exploitation beyond that. They have been in favor of a moratorium on exploration.

ENVIRONMENTAL DESTRUCTION

Senator PELL. But is it considered a sine qua non that if you mine a mineral resource, that is automatically destructive of the environment? Are the two necessarily consonant?

Ambassador BREWSTER. Certainly not in my view.

Senator PELL. I think it is a question of trying to make sure we know what there is there and what the future holds, and maybe keep-

ing it in reserve, but at least having some concept of what the world's stockpiles are.

Do we have any knowledge of what the mineral resources are there?

Ambassador BREWSTER. Not specifically.

Senator PELL. Surely all of the great scientific expeditions that have gone on must have been boring little holes down there and trying to find out, haven't they?

Ambassador BREWSTER. They have identified the existence of various minerals, but not, to my knowledge, their extent.

Senator PELL. So, there is no real estimate?

Ambassador BREWSTER. None that I am aware of, Mr. Chairman.

MORATORIUM ON EXPLOITATION OF MINERAL RESOURCES

Senator PELL. What would be the American view to a serious proposal to have a moratorium for a period of years, to any exploitation of mineral resources in that part of the world?

Ambassador BREWSTER. The United States stated at the last consultative meeting that it would be agreeable to a moratorium if the consensus for one developed. The consultative parties agreed upon the phraseology that is reflected in recommendtation IX–1, which calls for restraint.

With regard more specifically to your question concerning the U.S. Government view on a moratorium for, say, up to 20 years, it would not be in favor of it. It would not be in favor of it principally because that, in our view, would impede progress toward a regime to control and govern the exploitation of mineral resources, if and when it were to occur.

ACCESS TO ACG MEETINGS DOCUMENTS

Senator PELL. I understand that some of the public interest international groups have had trouble getting access to documents put out by the Antarctic consultative group meetings.

Are you aware of this problem, and if so, what is being done to remedy the situation?

Ambassador BREWSTER. I am aware of the problem. I have explained, both in the public meeting and in private meetings, and in correspondence that has come to me and to the Bureau raising this question what we are able to do about it.

The Antarctic Treaty, with the exception of the reports of consultative meetings and such documents as may be attached to them, considers that the documents used at its meetings are confidential.

The United States is therefore bound to accord that——

Senator PELL. Excuse me, but who considers it confidential?

Ambassador BREWSTER. The treaty parties have agreed on that. The United States has proposed, most recently last October, that a system be developed which would allow certain documents to be declassified and made available to the public. That was not acted upon.

As you know, the treaty parties operate by unanimity. So, we are therefore faced with the practical fact that we must accord confidential handling to these documents.

We have made available those documents which the United States has submitted to the meeting.

Senator PELL. But if they operate by unanimity, then the United States must have been party to agreeing that they should be confidential.

Ambassador BREWSTER. That has always been the practice. In previous years I assume that the United States concurred in that.

Senator PELL. What is the reason for that confidentiality?

Ambassador BREWSTER. The basic reason, I believe, Mr. Chairman, is that we are able, within the consultative forum, to discuss some things which frankly could not be publicly discussed in certain other countries.

Senator PELL. Could you give me an example?

Ambassador BREWSTER. I refer specifically to questions which impact on the claimant status of seven members of the treaty.

Senator PELL. What do you mean by "claimant status?"

Ambassador BREWSTER. There are seven members of the Antarctic Treaty which have territorial claims in the Antarctic, which, are in abeyance, to use a shorthand word, because of article IV of the treaty.

Senator PELL. As you know, several of these—I think three—overlap. But I don't quite see why, because of that, the documents should not be public, as they are in the Security Council or in ECOSOC, (Economic and Social Council), or UNESCO (United Nations Educational, Scientific and Cultural Organization) or in many organizations.

Ambassador BREWSTER. I don't think there is a precise parallel between the Antarctic Treaty forum, certainly not in the way it is operated, and international organizations such as those to which you have referred.

I don't think, for instance, that it is a practice to publish all documents, for instance, in NATO (North Atlantic Treaty Organization) or in certain other organizations.

Senator PELL. In what?

Ambassador BREWSTER. In NATO or other organizations.

Senator PELL. Right. But there is a world of difference between NATO and this.

Ambassador BREWSTER. Yes.

Senator PELL. Or so I would hope.

Ambassador BREWSTER. Indeed.

The problem is that the majority of the other states feel that the proposals which are submitted for discussion should remain confidential.

Senator PELL. I will come back to my original point. If everything is done by unanimity, surely the United States could object to the proposal of limited distribution of this information and not give its approval for that.

Ambassador BREWSTER. We are trying to change the practice, and our proposals to do so are not receiving the assent of the other countries.

ORIGIN OF AGREEMENT CONCERNING DOCUMENT ACCESS

Senator PELL. Let us take this to its logical point of origin. How did the original practice start? Is it in the minutes of a meeting? Certainly it is not in the treaty, as I read it.

Ambassador BREWSTER. It is not in the treaty. I don't know how it began, Mr. Chairman.

Senator PELL. Why don't you find out? Let's see if we can go back to the origin. Maybe there was never unanimous agreement at that time. If the United States concurred, then we would be perfectly justified in opening up any documents that we have—or so I would think.

Ambassador BREWSTER. I will look into that for you, Mr. Chairman.

Senator PELL. Thank you.

[The information referred to follows:]

ASSISTANT SECRETARY OF STATE,
OCEANS AND INTERNATIONAL ENVIRONMENTAL
AND SCIENTIFIC AFFAIRS,
Washington, D.C., April 5, 1978.

Hon. CLAIBORNE PELL,
Chairman, Subcommittee on Arms Control, Oceans and International Environment, Senate Foreign Relations Committee, U.S. Senate, Washington, D.C.

DEAR CLAI: I appreciated the opportunity to brief your Subcommittee on February 6 with respect to the ongoing negotiations regarding Antarctica. During the course of my presentation, you requested that I supply some historical information for the record on two points. They were:

1. The reason why the U.S. has acceded to the practice of classifying documents of Antarctic Treaty meetings and;
2. The reason why the Administration submitted draft enabling legislation for the conservation of Antarctic fauna and flora thirteen years after the adoption of Agreed Measures for this purpose by the Antarctic Treaty Consultative Parties.

I enclose two memorandums prepared by my staff that provide the information requested.

Very truly yours,

PATSY T. MINK, *Assistant Secretary.*

Enclosures.

DEPARTMENT OF STATE,
BUREAU OF OCEANS AND INTERNATIONAL
ENVIRONMENTAL AND SCIENTIFIC AFFAIRS,
Washington, D.C., April 5, 1978.

MEMORANDUM

Subject: Classification of Documents of Antarctic Treaty meetings.

The treatment of documents submitted to Antarctic Treaty Consultative Meetings is an outgrowth of the practice that developed during preparations for the Antarctic Treaty Conference of 1959. Those proceedings, being preliminary in nature and subject to later endorsement and possibly change by Governments, were closed. The latter Conference itself was also closed and documents were given the designation "Conference/Confidential" or "Conference/Unclassified", as the case might be. Rules of procedure for the Conference, like those later adopted for Consultative Meetings, stipulated that meetings would be closed except for the opening session. The Rules of Procedure apparently were adopted by concensus. With the exception of one rule relating to the adoption of recommendations by all representatives present and which requires unanimity to change, the rules can be amended by a two-thirds vote. The practice has become for all documents to be considered classified unless it was specifically decided otherwise. The United States cannot now alter or change this procedure simply by dissenting from the agreed practice.

We do, however, believe that the system is too inflexible and are seeking to open it up to the greatest extent possible. We tried at the Ninth Consultative Meeting to obtain agreement on a system whereby documents would be regarded as "declassified" unless a submitting government specified otherwise, instead of the reverse, which is now the practice. (A copy of the U.S. document on the subject is enclosed.) There was limited approval of this general idea but widespread opposition to the specific proposal. We will continue to press for some means to improve the dissemination to the public of more conference papers.

However, we are required to afford confidential treatment to all documents submitted by other governments who expect such treatment.

Enclosure: as stated.

Prepared by: OES Staff 4/4/78.

ANTARCTIC TREATY

NINTH CONSULTATIVE MEETING

Agenda Item 12

London, September 26, 1977.

AVAILABILITY TO THE PUBLIC OF CONFERENCE DOCUMENTS

(Working Paper Submitted by the U.S. Delegation)

Public interest in Antarctica is growing, fueled by concern for the environment and questions relating to possible resource activity. Governments outside the Treaty regime are evidencing increasing interest in the activities of Treaty parties, particularly within the Consultative forum. There is relatively little information publicly available, and in its absence suspicion and misinterpretation may occur.

If the Consultative Parties are to maintain their leadership in Antarctic matters, they must be more forthcoming than heretofore. Evidence of their deliberations at Consultative Meetings, up to now largely out of reach of the public, should be made more readily available. To this end, it is proposed that the Ninth Consultative Meeting and future meetings determine at the end of the meetings which conference documents should be considered privileged and afforded confidentiality. All documents not so designated would be considered releasable to the public.

One way to accomplish this would be to propose that the Ninth Consultative Meeting amend the Rules of Procedure with the addition of a new Section, numbered 25 and entitled "Documents of the Meetings", as follows:

"Any Delegation submitting a document to a Consultative or preparatory meeting may request such document be afforded confidential treatment and the other Consultative Parties shall accord said document such treatment.

Any other document of the meeting will be available to the public at the conclusion of the Meeting unless there is consensus to the contrary."

TIMING ON SUBMISSION OF IMPLEMENTING LEGISLATION

Senator PELL. The Congress can be very laggard in the way it handles problems; but why did it take the executive branch 13 years to submit the implementing legislation, S. 1691?

Ambassador BREWSTER. Mr. Chairman, I don't know the answer. I certainly share the criticism of the time element.

Senator PELL. It is really not a criticism. I am just curious as to the reason.

Ambassador BREWSTER. I'm sorry, but I just don't know.

Senator PELL. Would you give us a report on that for the record? Certainly I would personally like to know. I am curious as to the reason.

[The information referred to follows:]

DEPARTMENT OF STATE,
BUREAU OF OCEANS AND INTERNATIONAL
ENVIRONMENTAL AND SCIENTIFIC AFFAIRS,
Washington, D.C., April 5, 1978.

Subject: Implementation of agreed measures for the conservation of Antarctic fauna and flora.

The "Agreed Measures" were adopted unanimously at the Third Antarctic Treaty Consultative Meeting in 1964 (Recommendation III–VIII). The Depart-

ment of State subsequently determined that approval of Recommendation III–VIII by the United States Government was contingent on the passage of enabling legislation. There was some discussion of interim implementation procedures in the interagency context in 1964 and 1965.

The Antarctic Policy Group (APG), established in April 1965, and then consisting of the Secretaries of State and Defense and the Director of the National Science Foundation or their designees, became the focal point for this discussion. On February 14, 1966, the APG issued a policy statement (APG–66–1) declaring: "It is the policy of the United States to observe the practices for the conservation of Antarctic fauna and flora set forth in [the] Agreed Measures without waiting for them to be formally approved." The statement also outlined the management responsibilities for observance of the stipulations of the "Agreed Measures".

In 1968, the second and last APG policy statement on the subject was issued (APG–68–2) in connection with the adoption, as interim guidelines, of certain Recommendations of the Fourth Antarctic Treaty Consultative Meeting pertaining to the "Agreed Measures". APG–66–1 and APG–68–2, the latter with an explanatory cover note, are attached.

In the following years, as the interim procedures were in effect and apparently working satisfactorily (See the attached U.S. document, ANT/14, submitted to the Seventh Antarctic Treaty Consultative Meeting in October 1972), the Department's Legal Adviser worked intermittently on draft enabling legislation. In 1972 all concerned agencies of the U.S. Government except the Department of the Interior approved a draft bill and early in 1973 the bill was submitted to the Office of the Solicitor of the Department of the Interior for his clearance, which was not immediately forthcoming. Since a number of other Consultative Parties had not yet formally approved the "Agreed Measures", there seemed to be no particular urgency. Various personnel shifts at the involved agencies also resulted in lapses of attention to the subject.

In 1975 the Department, National Science Foundation (NSF), and the Council on Environmental Quality (CEQ), resurrected the legislation and began the interagency discussion and drafting process again. The bill currently before the Congress, which was submitted by the Department on May 23, 1977, is the result of that effort.

The "Agreed Measures" have now been approved by all of the governments of the Consultative Parties except those of Australia, Japan and the United States. The Australian Government, as the U.S., is seeking enabling legislation. Japan has indicated it has some constitutional difficulties in enforcing the provisions of the "Agreed Measures" on persons other than its civil servants. It has expressed a desire to find a solution that will permit approval of "Agreed Measures". After the Australian and the United States Governments have approved, Japan alone presumably would not wish to prevent the coming into force of the "Agreed Measures".

Prepared by: OES Staff, 4/4/78.

Enclosures: As stated.

February 14, 1966.

ANTARCTIC POLICY GROUP

UNITED STATES POLICY FOR THE CONSERVATION OF ANTARCTIC FAUNA AND FLORA

Recommendation III–VIII of the Third Consultative Meeting under the Antarctic Treaty which met in Brussels in June 1964 adopted the attached "Agreed Measures for the Conservation of Antarctic Fauna and Flora." It is the policy of the United States to observe the practices for the conservation of Antarctic Fauna and Flora set forth in these agreed measures without waiting for them to be formally approved.

In accordance with Article IV of the Agreed Measures, Governments are required to prepare and circulate to members of expeditions and stations information to ensure understanding and observance of the provisions of the Agreed Measures, setting forth in particular prohibited activities, and providing lists of specially protected species and specially protected areas. Federal Agencies concerned are taking the necessary steps to implement this provision.

The Agreed Measures prohibit, within the Treaty Area, the killing, wounding, capturing or molesting of any native mammal or native bird, or an attempt at any

such act, except in accordance with a permit issued for scientific purposes or other limited reasons under the provision of Article VI of the Agreed Measures. The following officials have been given authority to issue such permits: The Special Assistant for Antarctic Affairs of the National Science Foundation and the United States Antarctic Research Program representatives at McMurdo Station and on the Antarctic Peninsula. Copies of these permits will be forwarded to the Commander, Naval Support Force, Antarctica, and the Smithsonian Institution. The Smithsonian Institution has agreed to maintain and retain appropriate records concerning permits issued and collection made under such permits.

June 26, 1968.

ANTARCTIC POLICY GROUP

CONSERVATION OF ANTARCTIC FAUNA AND FLORA (II)

At the Fourth Consultative Meeting of Antarctic Treaty Representatives fifteen (15) Specially Protected Areas and two (2) Specially Protected Species were recommended to Governments for approval in accordance with Article IX(4) of the Antarctic Treaty and subject to Recommendation III–VIII, *Agreed Measures for the Conservation of Antarctic Fauna and Flora*. Further, the Representatives of Governments recommended two additional measures subject to Recommendation III–VIII; one implementing cooperation between expenditions operating in the same area in coordinating activities prescribed under Recommendation III–VIII, and the other providing for uniform reporting procedures for activities carried out under permit in accordance with Article XII(1) (d) of Recommendation III–VIII. In February 1966 the Antarctic Policy Group approved as United States policy, pending passage of legislation to give legal effect to Recommendation III–VIII, the provisional application of Recommendation III–VIII for all U.S. personnel in Antarctica. In view of U.S. approval of Recommendation IV (20), the United States has agreed that until such time as the *Agreed Measures for the Conservation of Antarctic Fauna and Flora* become effective in accordance with Article IX of the Antarctic Treaty, Recommendations IV(1) through IV(19) shall serve as interim guidelines. The Antarctic Policy Group approves the Statement of U.S. Policy regarding conservation of Antarctic Fauna and Flora (II) APG–68–2.

ANTARCTIC POLICY GROUP

POLICY STATEMENT FOR CONSERVATION OF ANTARCTIC FAUNA AND FLORA (II)

Recommendations IV–1 through IV–19 of the Fourth Consultative Meeting under the Antarctic Treaty which met in Santiago in November 1966 adopted the attached Recommendations on Specially Protected Areas and Specially Protected Species, and further measures to implement the *Agreed Measures for the Conservation of Antarctic Fauna and Flora*. It is the policy of the United States to observe the practices for the conservation of Antarctic fauna and flora set forth in these Recommendations without waiting for them to be formally approved under terms of Article IX Paragraph 4 of the Treaty. Responsible Federal agencies will take appropriate steps to ensure that U.S. personnel accompanying U.S. expeditions to Antarctica will be made familiar with these conservation measures.

The Agreed Measures provide that the collection of Specially Protected Species and the collection of native plants in Specially Protected Areas shall be prohibited except as authorized by a permit. Permits may be issued only for compelling scientific reasons and then only when collections do not jeopardize the existing natural ecological system or the survival of the species. The Special Assistant for Antarctic Affairs and the senior U.S. Representative in Antarctica are designated as the issuing authorities for permits, with delegation of authority to such U.S. Antarctic Research Program Representatives in Antarctica as may be required. Copies of these permits will be available to the Commander, U.S. Naval Support Force, Antarctica, for information. The Smithsonian Institution has agreed to act as the central repository concerning permits issued and all collections made under such permits. Copies of all permits and reports of activities conducted under permit will be forwarded to the Smithsonian Institution by the National Science Foundation.

WELLINGTON

SEVENTH ANTARCTIC TREATY CONSULTATIVE MEETING
(OCTOBER 10, 1972)

CONSERVATION OF FAUNA AND FLORA.—REVIEW OF LEGISLATIVE AND/OR ADMINISTRATIVE ACTION BY CONSULTATIVE PARTIES

(Paper Submitted by U.S.A.)

ADMINISTRATIVE ACTION FOR IMPLEMENTATION OF THE AGREED MEASURES

The United States has taken the following measures to implement the agreed measures for the conservation of Antarctic fauna and flora and related recommendations under the treaty.

1. The agreed measures have been adopted by the Antarctic Policy Group as United States policy for the activities of its nationals in the Antarctic.

2. Any request to the National Science Foundation for support of scientific research in the Antarctic involving the killing, wounding, capturing, or molesting of a bird or mammal must be accompanied by a request for a permit listing the area of work, species, and number of specimens.

The request is given a critical review by the Office of Polar Programs of the National Science Foundation. If it is consistent with the provisions and spirit of the agreed measures, a permit is issued by the National Science Foundation. This permit specifies the type of activity, species, quantity, and area, and its period of application is limited. Performance carried out under such permits is monitored in the field by the National Science Foundation and may be revoked or modified as necessary in the field.

3. The provisions of the agreed measures are part of the "understandings" which accompany all grants and contracts for scientific research issued by the National Science Foundation.

4. All individuals proceeding to the Antarctic are briefed on the necessity to minimise harmful interference, as described under Article VII. Regulations prohibiting acts of harmful interference are a part of the operational orders of the military support forces.

5. Tourists and other visitors are thoroughly briefed on the necessity to abide by the agreed measures. Prior written agreement to conform to the agreed measures is required of tourist companies before U.S. facilities will be made available. Access to specially-protected areas is strictly controlled insofar as visitors and tourists are concerned.

6. In the McMurdo area, when tourists or other visitors are taken to areas where birds or mammals are located, it has been U.S. practice to have a representative from the United States or New Zealand accompany the group.

7. The specially-protected area at Hallett Station is field marked, and a large map with the area identified on it is mounted in a prominent place in the dining area of the station.

8. No species of animal or plant not indigenous to Antarctica may be introduced into Antarctica unless under controlled conditions. Those that have been were destroyed or removed upon completion of the experiments in which they were utilised.

9. The 1971 report of U.S. observers on inspection of Antarctic stations to parties signatory to the Antarctic Treaty stated that personnel encountered in Antarctica were conscientious about observing sound procedures for the conservation of living resources.

10. Specially-protected areas are designated on published maps.

HEARING PROCEDURE

Senator PELL. We have some other questions that we would like to submit to Ms. Mink and to Ambassador Brewster to be answered for the record.

[The information referred to follows:]

STATE DEPARTMENT RESPONSES TO ADDITIONAL QUESTIONS SUBMITTED BY SENATOR PELL

Question 1. To what extent do other countries fish in Antarctic waters? What are the actual catch statistics? What types of fish, other than krill, are caught?

Answer. The Soviet Union and Japan have for a number of years engaged in exploratory fishing in Antarctic waters. Chile has undertaken limited exploratory fishing, as well as Norway and the German Democratic Republic on still more modest a scale. Within the past several years, Poland and the Federal Republic of Germany have initiated significant programs of research and exploratory fishing on Antarctic marine living resources. A Taiwanese fisheries vessel has been reported in Antarctic waters and the Republic of Korea has indicated plans to dispatch fisheries vessels to the area in the near future.

There are no reliable statistics on fish catches in Antarctic waters. According to one estimate, as much as 40,000 metric tons of krill was taken in Antarctic waters during the 1974–75 austral summer. Other estimates have placed annual krill harvests of no more than 20,000 metric tons in recent years.

According to FAO material, there are a number of species of cephalopods and fish, other than krill, which may be of possible exploitation interest in Antarctic waters. Cephalopod species include cuttlefish, squids and octopus. There is very little data on either the distribution or abundance of cephalopods in Antarctic waters. That these species offer some potential is inferred from stomach analyses of higher order predators in Antarctic waters.

Fish species of potential commercial importance in Antarctic waters have been identified as follows (also from FAO sources):

TABLE 8.1.—FISH SPECIES OF POTENTIAL COMMERCIAL IMPORTANCE IN THE SOUTHERN OCEAN

Group	Species	Common name
Rajidae	Raja georgiana	
	R. murravi	
	R. eatonii	
Gadidae	Micromesistius australis	Southern Blue Whiting or Southern Poutassou.
Merluciidae	Merluccius hubbsii	Patagonian Hake.
Nototheniidae	Notothenia gibberifrons	
	N. corriipces	
	N. neglecta	
	N. rossii rossii	
	N. rossii marmorata	Marbled Notothenia.
	N. magellanica	
	Dissotichus mawsoni	Antarctic Tooth Fish.
	D. eleginoides	Patagonian Tooth Fish.
	Pleuragramma antarcticum	
Channichthyidae	Champsocephalus gunnari	
	Channichthys rhinoceratus	
	Pseudochaenichthys georgianus	
	Chaenocephalus sp	
	Chionodraco sp	

Note: Although there are several species of hake in the Southern Hemisphere, Merlucciug hubbsii is the only species to have been reported from Antarctic water (Mikneyev 1967). In this single instance fish were assumed to have migrated into the Antarctic to feed on krill. This migration is not consistent with the shoreward summer migration pattern in Patagonia described by Hart (1946), a movement confirmed by the observations of Ciechomski and Weiss (1974) who found that M. hubbsii spawned in shallow water during the summer.

The respective ranges of Southern Poutassou and Patagonian hake are thought to lie primarily to the north of Antarctic waters. Limited numbers of these species, however, appear to exist in Antarctic waters at least on a seasonal basis.

There has been significant fishing by the Soviet Union for demersal species in the vicinity of South Georgia and Kerguelen Island. It has been estimated that as much as 100,000–200,000 metric tons—primarily Nototheniidae—were taken by the U.S.S.R. from these areas on an annual basis in the early 1970's.

Question 2. What is the urgency of the problem? How real is the prospect of large scale fishing? Why do we need a treaty which authorizes the commercial exploitation of Antarctic fishery resources? Is it possible to negotiate a flat prohibition of commercial exploitation?

Answer. In our view there is considerable urgency in developing a regime to conserve Antarctic marine living resources. This view rests on the conclusion that large-scale fishing could well develop very soon and very rapidly and on what we know about the Antarctic marine ecosystem.

The prospect of large-scale fishing in the near future derives from the fact that Antarctic waters appear to have marine living resources in large and potentially commercially attractive quantity and that there exists considerable distant water fishing capacity that could be applied to harvesting in these waters. Progressive extensions of jurisdiction over fisheries to 200 miles is resulting in significant displacement of distant water capacity for which in turn new fishing grounds are being sought. Techniques exist for harvesting and processing many of the cephalopod and fish species of potential interest and advances are being made in solving problems involved in handling and processing of krill.

At the same time, the Antarctic marine ecosystem displays a number of characteristics which may make it particularly vulnerable to uncontrolled harvesting. These include:

Short, simple food chains;

The dependence of many high trophic level species on a single species—krill—as a food source;

The relatively slow growth rates of many high trophic level species, particularly fish.

In our view, there are persuasive reasons for devising and setting in place an effective conservation regime before large-scale fishing and concomitant vested economic interests emerge. An additional reason for moving now is the fact that a conservation regime, once concluded, will likely take several years to enter into force and then become fully operational.

Fishing in Antarctic waters is, in the United State's view, a permitted use of these waters in accordance with existing international law. Therefore, a treaty is not necessary to authorize such fishing. A treaty, however, is required to ensure that fishing takes place in accordance with sound conservation measures. A flat prohibition of commercial exploitation is, in our opinion, not negotiable.

Question 3. Is there an adequate basis of scientific knowledge concerning Antarctic fisheries which would permit effective management and conservation?

Answer. An adequate data and information base for detailed management of Antarctic marine living resources, with the possible exception of whales and seals, does not as yet exist. There are wide gaps in data and knowledge on the Antarctic marine ecosystem and the species which are parts of that system. One of the basic functions of the conservation regime which the U.S. seeks is the implementation of obligations and mechanisms for developing the required data and information base. Further, it is generally agreed that much of the data necessary for effective management and conservation can be obtained only from properly controlled harvesting. An important task of the conservation regime would be to provided a scientific and statistical data base adequate to assess the effects of possible harvesting as the possibilities of harvesting evolve.

Question 4. Could you elaborate with some detail the type of treaty the United States will be seeking the Canberra meeting?

Answer. The type of treaty that the United States seeks is set forth in detail in a draft convention that the United States tabled at the outset of the Canberra session of the Special Consultative Meeting on Antarctic Marine Living Resources. A copy of that draft convention is attached.

Question 5. There is a growing feeling in the environmental community that this treaty or regime is going to be weak. Will there be any enforcement mechanisms in this treaty? Will "catch allocations" and "other economic regulation of harvesting" be excluded from this treaty?

Answer. We seek conclusion of the most effective conservation regime possible. We have consulted with the environmental community on a continuing basis in the development of our policy on a conservation regime and will continue to do so. It is our hope that a convention will be concluded which permits the full support of the environment community as well as all concerned interests.

With regard to enforcement, we believe that a convention to conserve Antarctic marine living resources should impose obligations upon Contracting Parties to ensure that their nationals and vessels observe the conservation standards set forth in the convention and conservation measures adopted pursuant to the convention. In addition, we support provision for an international system of observation and inspection of vessels engaged in fishing for Antarctic marine living resources to assist in ensuring their compliance with conservation standards and conservation measures.

We are prepared to consider a convention which does not explicity provide for allocation of total catch limits among fishing states or for licensing of fishing activities. At the same time, the convention should not exclude or preclude development or evolution of means for providing for catch allocations which levels of fishing make them desirable.

Question 6. Will this regime have catch limits, gear restrictions, effort restrictions, closed seasons and other management techniques? How can it be an effective conservation regime without these techniques?

Answer. In our view, an effective conservation regime must have the competence to apply a full range of conservation techniques, including, but not limited to, total catch limits, gear restrictions, effort restrictions and closed seasons.

Question 7. How do you propose to finesse the claims issue?

Answer. There is no prospect that a convention to conserve Antarctic marine living resources can resolve the issue of territorial claims in the sense of endorsing either the position of those states which claim territorial sovereignty in Antarctic or that of states which neither assert nor recognize such claims. We believe, however, that it is possible to develop a jurisdictional formula which reserves the legal positions of claimant and non-claimant alike and under which each Contracting Party to the convention would limit the jurisdictional prerogatives which it asserts sufficiently to authorize a commission to develop and adopt effective conservation measures.

Question 8. The U.S. is anxious to conclude an agreement this year. What are the essential irreductible points a conservation and management regime *must* contain to satisfy the U.S. view?

Answer. In our view, a conservation regime must provide a responsive and effective system for ensuring that any harvesting of Antarctic marine living resources takes place in accordance with sound conservation principles and practices. There is no pre-existing or automatic formula outlining the necessary components to achieve this objective. Much will always depend upon the commitment of the participants in the conservation regime to making the regime work. A number of the elements we believe a conservation regime should include are set forth in the draft environmental impact statement prepared by the Department of State, and can be paraphrased as follow:

A conservation standard which requires that harvesting accord with maintenance of the health of populations of individual species (target, dependent and associated) but also of the Antarctic marine ecosystem as a whole;

Obligations and mechanisms for developing the necessary information base, including scientific data and catch and effort statistics on Antarctic marine living resources;

Establishment of a commission of the Contracting Parties to develop, adopt and revise conservation measures and to take other actions necessary for the effective functioning of the regime;

Establishment of a scientific body composed of qualified experts to provide the best and most objective scientific advice and recommendations to the Commission;

Obligations upon the Contracting Parties to ensure compliance with conservation measures and standards and establishment of an international system of observation and inspection;

A non-preiudicial formation of issues relating to maritime jurisdiction which will protect U.S. juridical views and permit all Contracting Parties to cooperate in the conservation regime;

Provision for cooperation and coordination with other appropriate international inter-governmental and non-governmental organizations;

Provisions which will encourage all states with harvesting or research activities to participate in the regime.

Question 9. Do you intend to allow conclusion of substantive agreements, even in draft form, to be reached in Canberra?

How will this affect participation by other nations at later stages of negotiations?

Answer. It has been our position that negotiation of a regime to conserve Antarctic marine living resources should include participation by countries, in addition to Antarctic Treaty Consultative Parties, engaged in harvesting of or research on Antarctic marine living resources, and should include participation by appropriate international organizations, on an observer basis. The idea of a two-step negotiating process—a Special Consultative Meeting followed by a formal, decisive meeting—represented a compromise between those sharing the U.S. view and those preferring that the negotiation take place solely among the Consultative Parties. We believe that the Special Consultative Meeting which opened in Canberra has as its primary task preparation of a draft which will serve as the working document at the decisive meeting. The U.S. will obviously seek to see that such a working document reflects U.S. positions to the extent possible and would also hope that it represents as much agreement as possible among participants in the Special Consultative Meeting. At the same time, such a working document should not prejudge all substantive decisions at the decisive meeting. If this were the case, there would be a disincentive for additional participants to join in the decisive meeting.

Question 10. Is the U.S. going to push for establishment of a maximum overall annual catch during the interim period?

Answer. We feel that there should be arrangements to prevent overharvesting and to begin building the necessary data base during the interim period between the conclusion of a conservation regime and the commencement of its effective functioning. We are currently studying what sorts of provisions should be included in these interim arrangements, including possible catch limitations on certain species.

Question 11. Assuming some sort of total permissible catch is established, how can that be implemented without national allocations? What happens if the allowed maximum is exceeded?

Answer. In our view, total permissible catches can be implemented with or without national allocations. There are a variety of conservation techniques to ensure that total catch levels are observed. One such technique consists in national allocations. Others include effort limitation, gear regulation, closed areas and closed seasons. All of these techniques require effective reporting and enforcement systems to ensure that fishing does not exceed total catch levels. The conservation regime should not exclude or preclude development or evolution of national allocation systems.

If total permissible catches, or any other measures adopted pursuant to the conservation regime, were exceeded or otherwise violated, we believe that the Contracting Party or Parties of the nationals or vessels involved should be obligated to apply sanctions sufficient to remedy such non-compliance. We also support inclusion in the regime of an international system of observation and inspection and a system of direct reporting by any Contracting Party of evidence of non-compliance with conservation measures.

Question 12. Should a Convention explicitly spell out all the conservation measures which the Commission would be empowered to apply?

Answer. It would be desirable for a convention to set forth an illustrative list of conservation measures which the Commission would be empowered to apply. Such list, however, should not be exhaustive, as the Commission may well develop other measures necessary or desirable for the successful discharge of its functions.

Question 13. What will the U.S. do to ensure that scientific advice is given a sufficiently important place in catch or management decisions? What arrangements are needed to assure that any Commission which is established will have access to first-rate, impartial scientific advice which cannot be ignored in the decision-making process?

Answer. Decisions on conservation measures should be taken on the basis of the best and most objective scientific analyses and findings available. We support creation—directly by the Convention itself—of a scientific advisory body composed of qualified experts to analyze data on Antarctic marine living resources, to assess the status and trends of populations of Antarctic marine living resources and of the marine ecosystem as a whole, to identify conservation and research needs, and to recommend conservation measures and research programs. The scientific advisory body should base its work upon biological and ecological considerations and should be able to invite other scientific experts to participate in its work.

We believe that the Commission should rely upon the work and recommendations of the scientific advisory body in developing, adopting and revising conservation measures. In addition, we support an obligation that the findings and recommendations of the scientific advisory body be published so that both its and the Commission's activities be open to review by the scientific community and the public at large. Such a provision could help guarantee that scientific advice given to the Commission could not be ignored.

Question 14. What is the point of establishing a close relationship between the regime and the U.N. Food and Agriculture Organization? How will this benefit the U.S.?

Answer. The U.N. Food and Agriculture Organization, as the global organization most directly concerned with fisheries matters, has experience and technical competence in the fisheries field which could benefit any organization or regime aimed at conservation of living resources. Two examples are FAO's lead role in development of concepts and techniques for reporting and analysis of fisheries statistics and its work in the field of product development of marine living resources. A regime to conserve Antarctic marine living resources should establish cooperative relationships with FAO in areas such as these. We believe that the U.S. has an interest in such relationships which would be of benefit both to the regime and to FAO.

Question 15. Am I correct that the U.S. and other Treaty Powers were opposed to a joint FAO/UNDP proposal to assist in the exploration, exploitation and utilization of krill for the world as a whole? If so, on what grounds?

Answer. A proposed FAO/UNDP regional project related to the resources of the Southern Ocean was under active consideration within FAO for several years. A first phase of a program—essentially a feasibility study and resource survey—was funded by FAO. Proposals for the operational phase of such a program have neither been completed or endorsed by FAO, or by UNDP.

At the meeting of FAO's Committee on Fisheries (COFI) in 1977, a tentative proposal was put forward for creation of a sub-committee to oversee an FAO/UNDP regional project on the Southern Ocean. There was a widespread view within COFI that it was premature to consider creation of such a sub-committee prior to development and approval of the project itself. The U.S. and other Antarctic Treaty Consultative Parties present took this position. The report of the 1977 COFI meeting identified the following five areas of possible FAO attention and activity with regard to the Southern Ocean:

1. collection, compilation and dissemination of information;
2. assessment of the biological and nutritional potential of the resources;
3. promotion of necessary scientific and technological investigation and experiments;
4. encouragement of cooperation in the technology of harvesting and processing of these living resources and assessment of their potential for economic development; and
5. promotion of the development of products suitable for consumption especially to bring benefit to developing countries.

MINERAL RESOURCES

Question 16. What are the long-term prospects (political, economic, and technical) for mineral exploitation in the Antarctic?

Answer. The Department cannot predict if or when exploitation of Antarctic mineral resources will take place or become feasible. If exploitation of any resource is to occur the following inter-related preconditions will have to be met:

(*a*) Location of suitable deposits of the resource;

(*b*) The existence of suitable technology to extract the resource and transport it to market, including technology for protection and clean up of the Antarctic environment;

(*c*) The existence of conditions in the world market for the resource which would render economic the high costs, including opportunity costs, of operating under Antarctic conditions; and

(*d*) The existence of a politically viable system to govern mineral activities.

None of these preconditions has been fulfilled.

Present knowledge on the first two preconditions is summarized in "Antarctic Mineral Resources," a document presented by the United States delegation to the Paris Special Preparatory Meeting of Antarctic Treaty Consultative Parties, June 28–July 10, 1976; and in the Report of the Groups of Experts on Mineral

Exploration and Exploitation included in the Report of the Ninth Consultative Meeting held in London, September 19–October 7, 1977. Copies of the two reports are attached.

Politically, adequate regulation of exploitation activities would require that means be developed to deal with basic differences in view between those states which claim territorial sovereignty in Antarctica and states, such as the United States, which neither assert nor recognize sovereignty there. Uncertainty concerning political and legal differences relating to such exploitation activities is clearly a deterrent to such activities. Ultimately, however, the question of whether exploitation of Antarctic mineral resources ever occurs may depend on whether cost advantages in Antarctic development emerge in relation to alternative sources of substitutes for the resource or resources involved.

On the basis of very preliminary examination of the technical (as opposed to political-legal) factors involved, offshore hydrocarbon development on the Antarctic continental shelf seems the most likely candidate for exploration and exploitation activity in the foreseeable future. Onshore mineral development in Antarctica is a more remote possibility.

Question 17. Are there any legal impediments (treaties, etc.) to the future exploitation of Antarctic resources?

Answer. In the view of the United States, mineral resource activity is a peaceful use of the Antarctic Treaty area within the meaning of the Antarctic Treaty. Any such activity involving U.S. nationals and vessels would be subject to the obligations assumed by the U.S. under international treaties, which it has ratified or otherwise implemented, such as IMCO marine pollution conventions or the Ocean Dumping Convention.

Question 18. What are the political problems of negotiating a minerals regime?

Answer. There are two basic political problems in negotiating a mineral regime: first, finding a means of handling the divergent positions on the existence of territorial sovereignty in Antarctica in such fashion as to permit operation of an equitable and environmentally sound resource management system; and second, elaboration of a regime which can gain necessary acceptance internationally.

It should be noted that there are technical resource management questions of great importance which must be resolved in devising a regime. Any or all of these questions could assume political significance in the course of negotiation.

Question 19. Has the subject of mineral exploitation in Antarctica been raised within any other international forums?

Answer. There are, to our knowledge, two instances in which the question of Antarctic mineral resources has been raised in international forums other than the Antarctic Treaty Consultative Meetings.

First, then Sri Lanka Permanent Representative to the United Nations, H. S. Amerasinghe included a general reference to the possible need for equitable sharing of Antarctic resources in an address to the U.N. General Assembly in 1975.

In addition, there was some discussion of Antarctic resource issues at the 1976 Non-Aligned Conference in Colombo, though no resolution on the subject was adopted.

Question 20. Is mineral exploration and exploitation permissible under the Antarctic Treaty? Is your view shared by all the parties to the Treaty?

Answer. It is our view that exploration for an exploitation of mineral resources is permitted under the Antarctic Treaty. This view is not shared by all Parties to the Treaty. It has been argued by certain other Parties that resource activity is not permitted in the area of the Antarctic Treaty, since the treaty is silent on resource issues. The more frequently made argument is that of territorial claimants who argue that they have exclusive competence to govern exploration and exploitation activities in their claimed areas.

Question 21. Could you provide the subcommittee with current information concerning the known mineral resources of the Antarctic?

Answer. There is attached a copy of the report "Antarctic Mineral Resources", a document presented by the United States delegation to the Paris Special Preparatory Meeting of Antarctic Treaty Consultative Parties, June 28–July 10, 1976. This report summarizes the information available to us on Antarctic mineral resources.

S. 1691

Question 22. Are you aware of any opposition to the implementing legislation (S. 1691) for the agreed measures on the conservation of Antarctic flora and fauna?

Answer. No.

Senator PELL. I would also ask if you would be kind enough to stay here while the other witnesses give their statements before the committee so that if any questions arise, we could get the State Department reaction to them.

Ms. MINK. We would be happy to remain, Mr. Chairman.

Senator PELL. Thank you very much.

In any case, I look forward very much to seeing you on Thursday with hopefully an agreed-upon view as to the international environmental assessment—we don't call it an impact statement any more—of the treaty, which, as you know, means a great deal to this subcommittee, and also I believe to the world.

Thank you.

Ms. MINK. Thank you, Mr. Chairman.

WITNESS

Senator PELL. Our next witness this morning is Paul L. Leventhal, Assistant Administrator of the Office of Policy and Planning, National Oceanic and Atmospheric Administration, Department of Commerce.

Mr. Leventhal, we welcome you here today.

STATEMENT OF HON. PAUL L. LEVENTHAL, ASSISTANT ADMINISTRATOR, OFFICE OF POLICY AND PLANNING, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE; ACCOMPANIED BY JOHN A. MIRABITO, POLAR PROGRAM ANALYSIS, NOAA; MS. REBECCA A. DONNELLAN, OFFICE OF POLICY AND PLANNING, NOAA; AND ALAN F. RYAN, INTERNATIONAL AFFAIRS SPECIALIST, OFFICE OF INTERNATIONAL FISHERIES, NOAA

Mr. LEVENTHAL. Thank you, Mr. Chairman.

I have brought a few specialists along with me whom I will introduce in a few moments.

Mr. Chairman, I appreciate this opportunity to appear before your subcommittee to discuss the interests and concerns of the National Oceanic and Atmospheric Administration in the upcoming negotiations on living resources in Antarctica.

I am Paul Leventhal, Assistant Administrator for Policy and Planning. I have been designated by Richard A. Frank, the NOAA Administrator, to Chair——

Senator PELL. Excuse me. You are the Assistant Administrator for Policy and Planning.

Mr. LEVENTHAL. That's correct.

Senator PELL. Does that concern the allocation of resources around the country?

Mr. LEVENTHAL. That's correct.

I was about to say that we have formed an NOAA task force for the specific purpose of——

Senator PELL. I would like to change the subject for the moment.

BLOCK ISLAND WEATHERMAN REMOVAL

I want to express my very real concern and upset at a much more local problem that you have in planning—that is, the removal of our weatherman in Block Island, which is off Rhode Island. The total cost for that is less than $30,000 a year, which is peanuts to the Government, and I am using the phrase advisedly. I wish you would relay to Mr. Frank the very real concern of this subcommittee at what seems to be a needless action on this particular matter. It has caused great upset in that part of the country. People are dependent upon this one man, which is all that is involved. It just seems needlessly exacerbating to my own community.

Mr. LEVENTHAL. I can assure you, Mr. Chairman, that the Administrator is well aware of your concerns and is giving this question his personal attention.

Senator PELL. I realize that you have to make some economies, but I would think you could find bigger slices in other ways than that particular one.

Mr. LEVENTHAL. We appreciate your concern.

Senator PELL. Thank you.

NOAA TASK FORCE ON ANTARCTICA

Mr. LEVENTHAL. In introducing myself, let me say that I have been designated by the Administrator, Richard Frank, to Chair an NOAA Task Force on Antarctica.

We are using this task force to build a program that will apply NOAA's mission as the lead agency for conservation and management of marine living resources to the important task of developing an Antarctic living resource regime.

INTRODUCTION OF INDIVIDUALS ACCOMPANYING WITNESS

Let me just briefly introduce, if I may, the individuals who are here with me.

To my left, and your right, is John Mirabito, who is the Polar Program Analyst for the Research and Development Office of NOAA. To my right is Rebecca Donnellan from the Office of Policy and Planning, who is coordinating the work of the task force. To her right is Alan Ryan, the International Affairs Specialist of the Office of International Fisheries, who is focusing on Antarctic questions.

In the process of developing a program we are working and we will continue to work in close coordination with the Department of State and the National Science Foundation.

CONVENTION FOR THE CONSERVATION OF ANTARCTIC LIVING RESOURCES

As you know, at the Ninth Consultative Meeting of the Antarctic Treaty last fall, the parties were in agreement that a convention should be negotiated to provide for the conservation of living resources of Antarctica. The negotiations are important because they may create the institutional mechanism to insure conservation of Antarctic living resources before, rather than after, extensive damage is done to the ecosystem.

Today there is little harvesting of krill or fish in the Antarctic and many technical problems remain to be solved.

This gives us a very important headstart needed to collect information, to study and learn to understand the ecosystem, and then to regulate activities before a crisis develops.

KRILL RESOURCES

The rich ecosystem found in Antarctic waters has been under increasing pressures of late from countries that may wish to exploit its potential. At the center of this food web lies krill, the basic food for most Antarctic whales, penguins, seals, and many of the birds and fish.

Recent estimates of the potential sustainable harvest of krill range from 50 to 250 million metric tons per year. I would add here that the broad range represented by these estimates gives us a very clear indication of the degree of uncertainty as to the size of this resource and encourages us to take as conservative an approach as possible to the question of developing a conservation and management regime.

By comparison to the krill resource of 50 to 250 million metric tons a year——

Senator PELL. I have never seen a krill. Would you please explain how long a krill is.

Mr. LEVENTHAL. The krill, Mr. Chairman—I will confess that I haven't seen one either—is, as I understand, slightly smaller than a shrimp. It is in the shrimp family. It is about three inches long as I understand it.

Senator PELL. It swims, doesn't it?

Mr. LEVENTHAL. It does swim and it swarms near the surface, which makes the potential harvesting of krill technologically feasible if there is a sufficient desire to go down there to get it.

Senator PELL. If it is part of the shrimp family, is it also high in cholesterol, as in shrimp?

Mr. LEVENTHAL. I assume that it is. The principal interest in it, of course, is in the protein which it contains, which is considered equivalent to the protein contained in the equivalent weight of beefsteak.

Senator PELL. Thank you very much.

Mr. LEVENTHAL. Given the world food situation and given the fact that many of the waters which have been traditionally fished by the large fishing nations are being subjected to heavy harvesting and to national restrictions, it is no surprise that attention has turned to this new and potentially rich food supply. There are obstacles yet to be

overcome before the krill resource can be utilized effectively; harvesting, processing, and marketing problems all must still be dealt with. They are being dealt with by some nations more than others, particularly by the Japanese and the Soviet Union at this time.

Krill spoils easily, and it is found in inhospitable waters. Yet the potentially vast source of the high protein that krill represents may soon provide the incentive to overcome the obstacles to its harvesting.

The Antarctic also contains a large sustainable harvest of fish, which has been exploited by other nations and which may be exploited by the U.S fishing industry in the future.

U.S. INTERESTS IN ANTARCTIC EVOLUTION

What are the U.S. interests in Antarctica and how have they evolved?

First, the United States has a longstanding commitment to insuring that Antarctica does not become the scene of international rivalry and conflict. The Antarctic Treaty, which reserves Antarctica for peaceful purposes and demilitarizes and denuclearizes the continent, reflects this objective. Its importance to the United States remains undiminished, even though the potential strategic significance of Antarctica has decreased.

Second, Antarctica has presented a unique opportunity for international cooperation rather than national competition in carrying out scientific and other activities. The United States has chosen not to assert or to recognize claims to sovereignty in Antarctica. Instead, the United States has been an active supporter and participant in the Antarctic experiment in international cooperation.

Third, the Antarctic has presented the United States with an incomparable opportunity for scientific research. We at NOAA believe that much of the long-term global climate pattern is influenced by processes which take place in the Antarctic. The ice sheets provide a continuous record of Earth history and climate history which can be read back tens of thousands of years. Atmospheric patterns in the Antarctic can teach us about large scale flow processes in the lower atmosphere and atmospheric electrical and magnetic characteristics.

The Antarctic oceans present us with an opportunity to study the biological processes of a highly interrelated ecosystem with relatively few species in an environment that is uniquely rich and uniquely stressed.

Because of its pristine condition, it represents an unusual laboratory for assessing the impacts of man's activities on marine and terrestrial ecosystems.

Finally, the living marine resources of the Antarctic may make an important contribution toward solving the world food supply problems. Further, the Antarctic krill provide an essential link in the marine mammal ecosystem. For these reasons, NOAA's interest in Antarctica has been shifting from one traditionally oriented toward pure science—and I would add atmospheric science—to one of applied science, oriented toward resource assessment, conservation, and management.

U.S. INVOLVEMENT IN ANTARCTICA

NOAA and its antecedents have been involved continuously in Antarctica since the International Geophysical Year of 1957, which provided the impetus for the Antarctic Treaty. In fact, our roots in Antarctica go back to the 1920's, when scientists from the old U.S. Weather Bureau accompanied Admiral Byrd on his first expedition to the Antarctic. NOAA has regularly had scientific personnel wintering over in Antarctica.

At present, NOAA's scientific effort includes programs in upper atmospheric physics and chemistry, meteorology, and climate monitoring. As part of its global network to monitor climate changes, NOAA collects environmental benchmark measurements at the South Pole in the "clean air" which can be used to measure the impact of possible future environmental alterations.

Our Environmental Satellite Service operates weather satellites which provide information both locally in the Antarctic and to national and international users, which is essential to long-term weather monitoring and prediction.

Our Environmental Data Services disseminates and archives environmental data for the Antarctic Continent and the adjacent circumpolar sea.

As to krill, NOAA scientists participated in the survey work of the mid-1960's, which has been the major U.S. work on krill assessment to date. NOAA scientists have worked on estimation of krill for the FAO [Food and Agriculture Organization] and the Scientific Committee on Antarctic Research, known as SCAR.

In all of these projects, NOAA has acted in close cooperation with the National Science Foundation, which as been the lead agency for coordination of the Antarctic scientific research program. We also depend on the U.S. Navy, the principal provided of logistical support in the Antarctic.

NEW FOCUS TO U.S. ANTARCTIC CONCERNS

The negotiation of the living resources convention and the ongoing discussions of mineral resources bring a new focus to U.S. Antarctic concerns, a focus where the capabilities and competence of NOAA play an important role. The international community now places increased emphasis on resource assessment, resource management, and assessment of environmental consequences of resource utilization.

NOAA has special competence and capabilities in these areas. We are involved in the administration of a wide range of fisheries management regimes, both domestic and international. We have responsibility for the protection of certain species of marine mammals and marine endangered species. We have the scientific capability to assess environmental consequences for a variety of resource utilization strategies, involving both living and mineral resources. An important example in NOAA's work with the Department of the Interior in the Outer Continental Shelf environmental assessment program in the Arctic. This work can be of particular assistance in developing such assessment capabilities in the Antarctic.

Resoure management will require a new emphasis in scientific effort in the Antarctic, one that can be applied to resource management development.

In addition to "pure science" concerns, we will need to collect information that can be applied to assessing the consequences of different activities on the ecosystem. We need to develop techniques, data bases, and research capabilities in the Antarctic that we have not needed in the past.

This will probably involve an expanded commitment by all of the nations who are cooperating in the development of an environmental and resource management program for Antarctica. The ongoing U.S. commitment and mission in the Antarctic will probably change substantially in scope and nature. NOAA stands ready to help to the extent possible.

I appreciate this opportunity to appear before this subcommittee, which has shown such a longstanding and important interest in Antarctic matters. I will be pleased to answer your questions.

Senator PELL. Thank you.

U.S. POLICY REGARDING KRILL

Mr. Leventhal, your testimony is an interesting résumé of your interests and roles, but I am not sure that it is responsive to the question before us, which is what sort of treaty should we seek? What are the specific goals? What should be our policy?

I would like to ask you directly, what should be our policy with regard, for example, to krill? Should we have national allocations or shouldn't we? How should it be divided up?

Mr. LEVENTHAL. I would like to respond to that, Mr. Chairman, by first stating that we are working closely with the Department of State in the development of a U.S. position.

Senator PELL. So, then we don't have a position?

Mr. LEVENTHAL. We are developing a position, and as I understand it, a position will be articulated clearly prior to the Canberra meeting. But I think certain guidelines, certain concepts can be discussed at this point.

As far as NOAA is concerned—and I think this prevails in the formulation of the U.S. position—there is a commitment to moderation as to the type of conservation and management regime that should be established. By that I mean that we should err on the side of conservatism.

There is not an adequate data base established yet on the population dynamics of krill. The estimates on the size of the entire biomass range widely. The draft environmental impact statement, which I believe you have seen, indicates that the best estimate now is somewhere between 200 million and 600 million tons, although the Russians have gone as far as 930 million tons to 1.95 billion tons in estimating the total biomass.

There are rough estimates on the total predatory activity on krill, totaling about 330 million tons. It is estimated in this environmental impact statement that a harvest of 150 million tons would displace half of the existing predators on the krill population.

Senator PELL. Let me cut through this interesting statement of statistics and facts—or nonfacts, what kind of treaty should emerge? Or, do we not have a view in that regard? And, if we don't have a view, what is the purpose of having a treaty conference?

Mr. LEVENTHAL. I think we do have a view, and the view has been reflected in recommendation IX–2 of the last consultative meeting. I would add simply that one of our specialists in this area, James Storer, participated in the negotiation of those recommendations. It deals very importantly with such questions as the need for having the conservation regime deal with the ecosystem as a whole, including the dependent species on krill; that it ought to cover the full range occupied by these species, even if it goes above the limit of the present Antarctic Treaty, which is, as you know, 60° south.

It should apply to protection of whales and seals, but not to regulate the take because there are existing treaties and conventions covering those considerations.

I think it is very important that at this point the position of NOAA and the interagency position deal on the basis of caution and conservatism in approaching how we ought to go about developing a living resource regime that would impact specifically on krill.

I think we do support an interagency position that there could be some moderate exploitation pending establishment of the regime. I would be wary of setting an estimate of what that would be until we have further knowledge as to the resource itself. But I believe current fishing for krill is in the order of 10,000 to 20,000 metric tons a year. I don't think we ought to go much beyond that.

REASONING BEHIND LIVING RESOURCES TREATY NEGOTIATIONS

Senator PELL. But if there is no real scientific basis for a conservation regime—and really, what you have been saying is that we don't know the facts of what we are doing—then why are we negotiating a treaty to exploit the living resources?

Mr. LEVENTHAL. I think we are trying to develop a regime before the resource itself is exploited. It is, to some extent, a race against time. Only recently has the attention of the world focused on this particular resource and on Antarctica as a source of major resources that might be in strong demand throughout the world. It is quite important that we use this opportunity to avoid a situation in which we are forced to play a catchup ballgame. We are in a position here to be one step ahead of possible exploitation, to anticipate and prevent a problem before the problem itself occurs.

PRINCIPLES, OBJECTIVES OF CANBERRA MEETING

Senator PELL. As you know, I have always believed in being one step ahead. That is why I pushed through legislation regarding no weapons of mass destruction on the seabed floor and no environmental modification means of warfare, both of which were ahead of their time. In each case we were moving on a draft treaty.

Do you have a draft treaty or a draft set of principles that you wish to see achieved at Canberra?

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Mr. LEVENTHAL. We at NOAA do not. We are participating with the State Department in the preparations for the meeting. As I understand it, there will be at least some guidelines laid out, if not an actual text.

MORATORIUM ON EXPLOITATION

Senator PELL. Why wouldn't we do better simply to have a moratorium until we know what the effects of exploitation would be?

Mr. LEVENTHAL. I'm sorry, Mr. Chairman?

Senator PELL. Why not have a moratorium until we know what the effects of exploitation would be, and make that our policy?

Mr. LEVENTHAL. We perhaps could. I think it might be very difficult to reach agreement on that, given the extent of interest that already is indicated down there, at least by two or three nations.

Senator PELL. Why shouldn't that be our position? We don't always have to have the same position as other nations. We can adjust afterward.

Mr. LEVENTHAL. I am not prepared to take a firm position on that question at this point. I think that surely is one of the things we will be looking at in anticipation of the meeting.

SPECIFIC GOALS, PRINCIPLES TO BE ACHIEVED

Senator PELL. Mrs. Mink, are there any specific goals or a set of principles of draft treaty that you have in mind?

Ms. MINK. Yes.

They are listed in the EIS (environmental impact statement) in terms of our proposed Federal action. We outlined them in the very first page, as the important principles to be achieved, which are preventing the overexploitation, insuring that the harvest doesn't affect the population of the dependent species, insuring that the harvest is conducted in a fashion which maintains the health of the ecosystem, and then acquiring the scientific data which is essential, and analysing the data in order to determine the status of the stocks in the ecosystem, identifying the ones that need special attention for conservation, and otherwise taking the steps necessary to implement these objectives.

These are the basis for the documents.

Senator PELL. So this then would hopefully provide the basis for a draft treaty which would emerge later on?

Ms. MINK. Yes, it does.

Senator PELL. Thank you.

I have another question to address to NOAA.

LEAD AGENCY FOR SCIENTIFIC RESEARCH

Who has the real responsibility in Antarctica for scientific research there? Is it NOAA or the National Science Foundation (NSF)?

Mr. LEVENTHAL. For the overall scientific program it is the National Science Foundation. In fact, NOAA has been participating with the National Science Foundation in certain programs related to climate and weather.

We anticipate, as interest continues to develop on resources, that NOAA will play an increasing role. How it will all finally come out, we have no clear reading on now, although there are no difficulties at all, as far as NOAA is concerned with the present role of the NSF as the lead agency for scientific research.

I would simply note that as the focus shifts more and more from one of pure basic science to one of applied science relating to resources, we anticipate NOAA playing a more active role than it has to date.

NOAA BUDGET ALLOCATIONS FOR ANTARCTIC PROGRAM

Senator PELL. What percentage of your budget is allocated for Antarctic programs?

Mr. LEVENTHAL. As I mentioned before, our Antarctic programs are right now confined to questions relating to climate and weather. There is no separate line item for Antarctic programs.

Senator PELL. Approximately what percentage of funds will be used in Antarctic-related programs?

Mr. LEVENTHAL. We can identify about $200,000, and the present NOAA budget is approaching $1 billion. So it is a very small percentage at this time.

Senator PELL. Is that only 0.2 percent?

Mr. LEVENTHAL. I think that is correct. It is $200,000 out of a budget which for fiscal 1979 will approach $1 billion.

Senator PELL. So all you are now spending is about $200,000?

Mr. LEVENTHAL. Yes; that's right. It is confined at this point to weather and climate-related programs. I would just hasten to add that until quite recently, U.S. policy has not focused primarily on resource assessment, particularly living resource assessment, in Antarctic. It is clear now that policy is shifting in that direction rather rapidly and I think rather effectively. We anticipate playing a major support role in the State Department efforts to negotiate this convention and possibly the treaty.

Senator PELL. Good.

Thank you very much, indeed.

Mr. LEVENTHAL. Thank you, Mr. Chairman.

Senator PELL. Our next witness is Dr. John Slaughter, Assistant Director for Astronomical, Atmospheric, Earth, and Ocean Sciences of the National Science Foundation.

This is quite a mouthful, Dr. Slaughter.

Dr. SLAUGHTER. Good morning, Senator.

Senator PELL. You have a fairly long statement. We would appreciate it if you would summarize. Your statement will be printed in full in the record of this hearing.

Also, please try not to forget that what I am after here is not so much a background of what you do or what your agency does, but what your view is with regard to this treaty and whether we should include in it specific safeguards with regard to krill, whether or not we ought to move into the mineral resources.

These are the reasons for the hearing.

STATEMENT OF DR. JOHN B. SLAUGHTER, ASSISTANT DIRECTOR FOR ASTRONOMICAL, ATMOSPHERIC, EARTH AND OCEAN SCIENCES, NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.; ACCOMPANIED BY AL FOWLER, ACTING HEAD, DIVISION OF POLAR PROGRAMS, NSF

Dr. SLAUGHTER. Yes, Mr. Chairman. I understand that fully well. However, let me say at the outset that our interests in both the marine-related resources and the mineral resources are driven by the scientific programs which the Foundation supports. I would like to say just enough about that to give you some perspective. I will try to focus on your specific interest in the relationship of our science programs to the treaty.

I have asked Mr. Al Fowler to join me. He is Acting Head of the Division of Polar Programs within the Foundation, replacing Dr. Edward P. Todd, the Division Director, who is on a much-deserved vacation at the moment.

I am pleased to have the opportunity to talk with you this morning about the Foundation's role in the issue that you are discussing. I will give a brief overview of the nature of our activities in the Antarctic region so that you will be aware in some depth of how it relates to this matter.

Senator PELL. Sir, I will have an opportunity to read your statement and we do have more witnesses to hear from this morning. So, please try to be responsive to the wishes of the Senate committee, which is to get the information not about the agency, but your views with regard to the treaty.

Dr. SLAUGHTER. I will. The aspects that we are most interested in, of course, are the marine resources and the mineral resources. Our scientific programs are to a large extent addressed to those specific issues.

In the marine-related area, which is the one of greater interest at the moment; we are concerned, as has been discussed here, with the question of the exploitation of euphausia superba, or krill.

The marine resources, of course, are the most important since 98 percent of the continent is covered with ice, thereby making it a difficult situation for anyone who might want to take advantage of the mineral resources that exist in the continent.

In the marine area, in addition to studies in physical oceanography, chemical oceanography, and marine biology, we are specifically concerned with the issue of understanding the feeding habits and migratory patterns of euphausia superba.

SCIENTIFIC KNOWLEDGE OF KRILL HABITS

Krill certainly represents an item of potentially great interest to people throughout the world. We are concerned that in considering the possibility of a treaty not enough is yet known scientifically about krill habits. We feel that the science that is underway and the science that is planned in understanding these habits is absolutely mandatory prior to the development of any policies and procedures that may be imposed. Many scientific questions must be answered before we can

understand what would happen to the ecosystem if, in fact, unlimited fishing were to occur.

It is our firm belief that the marine biology aspects of our program in the Antarctic will continue to increase in importance. We have been impressed by what has happened since the International Geophysical Year in terms of the strengthening of the scientific program in marine biology. We now have much more information and much more confidence in the scientific knowledge of the habits and ways to protect the krill resource.

ANTARCTIC REPRESENTS VERY FRAGILE ECOSYSTEM

An important thing to realize, of course, is that the Antarctic represents a fragile ecosystem. It is bountiful in terms of many of the resources so important to life, but the delicate balance is quite important to maintain. I think that is why we are so concerned about what would happen if unlimited krill fishing were to take place.

We are aware that so many important fisheries throughout the world have been essentially destroyed because unlimited fishing occurred long before anyone thought to consider the possibility of a treaty or some sort of constraint on the activities of the nations that may want to draw on those resources. That is why it is important, we believe, to be examining this question at this time and to take into consideration the interests of a large number of nations, not only those that are participants in the consultative treaty.

We think that unregulated harvesting of krill, for example, could have a serious effect upon all life in the Antarctic.

FUTURE ROLE FOR CONTINUED SCIENTIFIC PRESENCE

We see in the future a strong role for a continued scientific presence in the Antarctic. We see that it will be essential to continue this activity in order to provide the kind of evidence and knowledge and understanding that will be required by all of the countries that may participate in the treaty. We think that this activity must continue. The Foundation is committed to developing and extending a strong scientific program and answering, or attempting to answer, the key questions that will occur as a result of the deliberations on the treaty.

We think that any guidelines that would not consider the importance of scientific investigations would certainly diminish the ability to produce a reasonable and wise solution to the questions of interest.

I would respond to any questions, Senator Pell, that you may have.

Senator PELL. Thank you very much, Dr. Slaughter. Your statement will be printed in full in the record.

[Dr. Slaughter's prepared statement follows:]

PREPARED STATEMENT OF JOHN B. SLAUGHTER

I appreciate the opportunity to appear before this subcommittee and to present a statement on behalf of the National Science Foundation. As the agency responsible for the management of all U.S. activities in Antarctica, the Foundation hopes to provide an overview of the past, present, and probable future nature of these activities.

The one feature that best characterizes man's activities in Antarctica for the past two decades is international cooperation. This austral summer, which is now

drawing to a close, has been continued U.S. cooperation with virtually all countries actively engaged in scientific investigation in the Antarctic. For example, the U.S. and Norway are jointly pursuing oceanographic studies in the Weddell Sea. U.S. geologists are working with field parties from the Soviet Union while Soviet scientists have participated in the research utilizing the hole we drilled through the Ross Ice Shelf. U.S. and Japanese scientists are engaged in a cooperative effort to collect scientifically important meteorites.

Joint marine biology investigations are being pursued with French scientists. With the U.K. we are engaged in a survey of the continent beneath the ice sheet using radio-echo sounding techniques—approximately one-third of the continent has been surveyed. We recently entered into a cooperative air transport program with Australia; this compliments the existing arrangement with New Zealand. Cooperative efforts, including the exchange of scientists, are or have been undertaken with Argentina, Chile, the Federal Republic of Germany, South Africa, and Switzerland among others. As you know, this cooperation developed during the International Geophysical Year, or IGY, and created the basis for the successful negotiation of the Antarctic Treaty which became effective in 1961. Science necessarily has been and continue to be the principal expression of U.S. interest throughout the Treaty area; that is, everywhere south of 60 degrees south latitude.

Over the years, the Foundation's funding and management responsibilities have increased so that NSF now has total planning, funding and management responsibility for all U.S. Government activities in Antarctica. NSF provides funds for scientists both from academic institutions in the United States and also from agencies of the Federal Government. We currently are funding scientific programs conducted in Antarctica by the National Oceanic and Atmospheric Administration, the U.S. Geological Survey and the National Aeronautics and Space Administration, in addition to projects of about 300 individual academic scientists. Logistic support for the scientific effort is purchased from the Departments of Defense and Transportation and from a private commercial contractor who operates three of the four permanent stations in Antarctica and one research ship. The Foundation funds procurement of all aircraft, equipment, and supplies required to support the program.

The U.S. maintains two coastal and two interior stations (including that at South Pole) on a year-round basis; the winter population is about 120 persons. With the return of the sun in October, about 900 personnel are flown in to prepare buildings and equipment for use, to replenish supplies of food and fuel, to maintain and operate the five LC–130 Hercules aircraft and the six UH–1N helicopters, and to establish and support field camps over a wide area of the continent. In late October we bring in about 300 research personnel who then have roughly until February to complete their scientific tasks before the winter close down process begins. By March, the U.S. population in Antarctica drops from a summer peak of about 1,200 to its winter minimum of about 120.

The hub of all this activity is McMurdo Station on the Ross Sea. An icebreaker is required once a year, usually in January, to open a channel in the sea ice for the resupply of fuel and cargo by ships chartered from the Military Sealift Command. The shortness of the operating season, the magnitude of the task, and unpredictable extreme weather all result in a high tempo of operations.

Ski-equipped, long-range aircraft have given the U.S. a unique capability in Antarctica by providing access to virtually any location on the continent. This capability is essential to the support of the inland stations, Siple and South Pole. Although the primary function of the LC–130's is logistic support, one has been equipped to perform secondary mission of collecting scientific data.

I should mention here that Palmer Station in the Antarctic Peninsula is not supported from McMurdo. Palmer Station depends upon the research ship Hero for logistic support and personnel transport. Bulk fuel is delivered to Palmer by the British ship Bransfield under a cooperative arrangement with the British Antarctic Survey.

The U.S. Antarctic Research Program seeks to provide a reasonably balanced appraisal of Antarctica with active programs in earth, ocean and atmospheric sciences, and in biology and glaciology. The program is designed to seek not only a broader understanding of the continent itself, but also to explain the role this region plays in the global ocean and atmosphere environment. Our research efforts embrace the continent, the atmosphere above it, and the ocean surrounding it.

Turning to possible exploitation of Antarctic resources, it is generally believed that this will first occur in ocean areas. Since about 98 percent of the Antarctic continent is buried under a moving ice sheet up to 2½ miles thick, mineral exploitation on land is believed unlikely in the foreseeable future. The immediate focus of attention with respect to mineral resources is the possible existence of offshore petroleum deposits, even though there is no hard evidence that recoverable deposits exists. The only living resources in Antarctica are marine, and as you know, their exploitation has begun primarily in the form of exploratory harvesting for krill.

Given the marine nature of possible exploitable Antarctic resources, I think it would be useful for me to highlight the oceanographic aspects of the U.S. Antarctic Program.

In oceanographic research, 400,000 miles of a circumantarctic survey were conducted aboard the ice-strengthened research ship *Eltanin* until her deactivation in 1972. The final 25 percent of this survey will be completed by 1979 through a cooperative agreement with Argentina which has been operating *Eltanin* as *Islas Orcadas* since 1973. This effort includes a comprehensive program of research in physical, chemical and geophysical oceanography, in marine biology, and in meteorology. Substantial marine ecosystem studies are also conducted in fully equipped laboratories at the two coastal stations, Palmer and McMurdo. The national pool of scientists expert in Antarctic marine biology has grown from only four at the conclusion of the IGY to several hundred at the present time. Additional oceanographic research is supported by R/V *Hero*, an ice-strengthened, wooden, ship one-half the size of *Eltanin*, when support operations permit. A significant additional research effort is made possible by use of the Coast Guard icebreakers when they have completed their channel-breaking and supply-ship escort duties each year. The Foundation thus has available a substantial body of knowledge, a pool of scientific talent, and productive international cooperation to maintain and expand oceanographic research efforts within the U.S. Antarctic Program.

The Consultative Parties, drawing in part upon recommendations and reports from the Scientific Committee on Antarctic Research—a nongovernmental committee of the International Council of Scientific Union, have addressed resource exploitation in the form of several recommendations. These recommendations of the Consultative Parties and the Scientific Committee on Antarctic Research identify deficiencies in our knowledge of the possible effects of Antarctic resource exploitation. These deficiencies will be further addressed in the oceanographic portion of the Antarctic program.

Turning to minerals, a major deficiency recognized in the recommendation adopted at the Eighth Consulative Meeting in the area of fundamental scientific data on the geologic structure of the Antarctic. While a great deal of information about Antarctic geology has already been obtained much more remains to be learned, particularly in ice-covered offshore areas of possible interest. A crucial prerequisite for Antarctic mineral resource exploitation is a sufficient understanding of the Antarctic environment to provide for adequate protection, prevention and corrective measures. Antarctica contains a bountiful, but fragile ecosystem and has a major influence upon the global ocean and atmosphere. The Foundation is participating fully in the development and implementation of scientific programs to obtain this essential information.

With respect to living resources, the possible annual harvest of Euphausia superba—commonly called krill—has been estimated to be in the range of 50 to 200 million tons. While this broad range indicates how much more we need to know about krill, even the lower estimate approximates the total annual catch of all species over the rest of the globe: about 65 million tons. There are two significant facts about krill that argue for exploitation on the one hand and against exploitation on the other. On the positive side, krill is very high in protein content and has a broad range of potential use approximating that of the soybean. The potential benefits to a resource hungry world are significant. On the negative side, krill is the primary food source for all higher Antarctic life forms (whales, seals and penguins) and may be an important food source for other harvestable species such as crabs, squid, and cod. Unregulated harvesting of the krill population could have serious adverse impact upon essentially all Antarctic life forms.

The Treaty nations have endorsed a recommendation by the Scientific Committeé for Antarctic Research that a major biological investigation of marine

Antarctic species and stocks be undertaken so that the Antarctic ecosystem interrelations can be reliably defined. Execution of this proposal would require an intensive effort by all Treaty nations for at least ten years. While the U.S. Antarctic Program alone cannot hope to accomplish a task of such magnitude, we have begun to address the fundamental scientific questions upon which the long term task is ultimately dependent. Among these questions are included: the breeding habits of krill—how and where and when do they reproduce; what is the life expectancy of krill; does a krill swarm include a cross section of all age groups or only a single age group at the same stage of development; and what other species feed upon krill and to what degree of exclusivity? We are also interested in the related information about migratory range, life cycle, and behavioral aspects of krill and krill predators, as well as the lower forms upon which the krill depend.

The Foundation foresees a full program of such fundamental scientific research. The NSF and the U.S. Antarctic Program plan a continuing role in international cooperative efforts to address these fundamental questions over the coming decade. To this end we anticipate substantial growth in the oceanographic research effort within the overall program.

National policy on Antarctic matters is developed through the National Security Council and promulgated by Presidential directive. The Foundation receives policy guidance from the Antarctic Policy Group, chaired by the Department of State. Current policy guidance for the U.S. Antarctic Program is to strengthen and maintain international cooperative research in several major scientific disciplines. NSF, through the U.S. Antarctic Program, will continue addressing these resources issues in harmony with and in reinforcement of the principles and purposes of the Antarctic Treaty.

Mr. Chairman, I thank you for this opportunity to appear before your committee and present this statement on behalf of the National Science Foundation.

Senator PELL. I have a profound regard for the National Science Foundation, having worked with you for years on a variety of projects and having been on this subcommittee.

NSF CURRENT LEVEL OF FUNDING, PERCENTAGE OF OVERALL BUDGET

What is the current level of funding for your Antarctic-related programs and what percentage is it of your total budget?

Dr. SLAUGHTER. The current funding for the Antarctic program is about $50 million. For fiscal year 1978 we are down a couple of million from that level. The total budget of the Foundation is about $900 million. So we are are devoting about 5 percent of our total funds to the Antarctic.

Of course, this funding supports the totality of the activities in the Antarctic—the Department of Transportation, DOD—Department of Defense—and others, of course, are supported by the $50 million.

Senator PELL. So, from the viewpoint of your relationship with NOAA, you are spending about 250 times more money than they are in that part of the world.

Dr. SLAUGHTER. That is true, except that we have the total responsibility for the budgeting. We provide support for NOAA, NASA—National Aeronautics and Space Administration—DOD, USGS—U.S. Geological Survey—Department of Transportation, and others, for their activities in the Antarctic, including the academic research scientists.

ROLE OF SCIENTIFIC ADVICE AT CANBERRA

Senator PELL. What, in your view, would be the role of scientific advice when we move into the negotiating stage at Canberra? You

have seen how, unfortunately, scientific research does not seem to be doing well at the Law of the Sea Conference. What can be done to make sure that the scientific viewpoint influences the proper level of decisionmaking at this Conference?

Dr. SLAUGHTER. It is critical, as I stated earlier, that a strong input from the scientific community be brought to this Conference. The consultative treaty nations have a committee, the Scientific Committee on Antarctic Research with a representative from each of the nations, that provides advice to us about the programs that we carry forth.

We think it is imperative that these inputs be well recognized at the treaty discussion because of the obvious questions and the obvious uncertainty in the testimony that I and others have given about the nature of the resources in the Antarctic. Obviously there are a number of scientific questions which must be answered.

NSF REPRESENTATION AT CANBERRA

Senator PELL. Will you have representatives at Canberra?

Dr. SLAUGHTER. Yes; we will.

Senator PELL. Will there be a delegate, an adviser, or what?

Dr. SLAUGHTER. There will be a member of our staff who will serve as an adviser to the U.S. delegation.

Senator PELL. Let me address the next question to Mrs. Mink, if I could.

CANBERRA DELEGATION CHAIRMAN, REPRESENTATIVES

Who will be the Chairman of our delegation at Canberra?

Ms. MINK. Ambassador Brewster will head the delegation at Canberra?

Senator PELL. Will he have delegates or advisers? How will the NSF be fitted in?

Ms. MINK. We will have representatives from the National Science Foundation, from NOAA, from the nongovernmental organizations (NGO's) as well, and from the Marine Mammal Commission.

Senator PELL. Will the NGO's be permitted to be part of the negotiating process?

Ms. MINK. They will be fully participating as will the agencies I have listed. We hope to have three NGO's on our delegation.

Senator PELL. Thank you very much, Mrs. Mink.

Thank you very much, Dr. Slaughter. We very much appreciate your appearance here today. We will all benefit from your testimony.

WITNESSES, HEARING PROCEDURE

Our final witnesses compose a panel of environmental groups. We have Mr. Robert Stein, representing the International Institute for Environment and Development (IIED). He is the Director of the Washington Office. We also have Mr. Leonard Meeker, Director of International Project, Center for Law and Social Policy. Mr. Meeker has a long background as Legal Adviser to the State Department, so he knows how to wear both hats.

Gentlemen, we welcome you here today and are pleased to receive your testimony.

Mr. Stein, you have what appears to be a fairly long statement. Perhaps we could have that inserted in the record in full.

The subcommittee would appreciate both witnesses addressing themselves to the same questions that I asked of our previous witnesses. What do you think our policies should be at Canberra?

Should they be more specific in goals?

Should they touch mineral resources or should they be limited to living resources?

Mr. Stein, after you have given your answers to those questions I would be very interested in hearing Mr. Meeker's response. Then I would hope to have a dialog to get the benefit of your views and of the Government's reactions as well.

STATEMENT OF ROBERT STEIN, DIRECTOR, NORTH AMERICAN OFFICE, INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, WASHINGTON, D.C.; ACCOMPANIED BY BARBARA MITCHELL, RESEARCH ASSOCIATE, INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

Mr. STEIN. Thank you, Mr. Chairman.

I have had a very busy red pencil during the past hour and a half and I will try to keep to the questions you have asked. I have been cutting down my statement.

This morning, Mr. Chairman, I am accompanied by Barbara Mitchell, who is a research associate at the institute, and has been primarily responsible for our Antarctic work over the past 2 years.

Senator PELL. Is this the same institute that Russell Train has been very active in?

Mr. STEIN. That's correct. He is a senior fellow.

Senator PELL. Lady Jackson is on your board, isn't she?

Mr. STEIN. She is our president, that is correct.

IIED BACKGROUND INFORMATION

Senator PELL. How are you financed?

Mr. STEIN. We have three different basic sources of funding. We have general support and specific project support from a number of foundations, including the Ford, Rockefeller, and Clark Foundations. We have received project support from a number of United Nations organizations—the United Nations environmental program, the World Bank, parts of U.N. Secretariats for particular activities—and also from governmental agencies, such as the Canadian Urban Affairs Ministry for our Habitat Followup, and money from the Canadian International Development Agency, and others as well.

Senator PELL. How much is your total budget?

Mr. STEIN. The total budget of the Institute is about $750,000 a year.

Senator PELL. Is that worldwide?

Mr. STEIN. With our two offices in the United States and the United Kingdom.

Senator PELL. How does that divide between London and Washington?

Mr. STEIN. That is rather hard. The Washington Office probably expends about $200,000 or $250,000 of that. Part of London's money, I should say, Mr. Chairman, is in a particular project called Earthscan, which is funded by the United Nations environment program, which is about $150,000.

Senator PELL. Are you an NGO, too?

Mr. STEIN. We are an NGO and we have been actively participating in the discussions here within the United States and participating in a number of international meetings.

Senator PELL. Have you registered as a lobbying organization, too?

Mr. STEIN. No, we have not.

Senator PELL. I don't know whether you wish to or not, but I would think you would want to influence legislation.

Mr. STEIN. Given the small staff that we have and our limited resources, thus far we have not. But we have been coordinating our work with the Center for Law and Social Policy on a number of occasions and we do work with other environmental groups which have taken that step.

Senator PELL. I think if the environmental groups want to have more of an effect than they have had in the past, they should not be worried about the political processes, not hesitate about registering, not hesitate to help their friends, not hesitate to work against their enemies right across the country and in other countries, too. I am sure that Barbara Ward is a very political person and that she is not adverse to those thoughts—at least in the British branch.

I guess basically you really are Barbara Ward's baby, wouldn't that be a good way to put it?

Mr. STEIN. That's right. We now have a number of independent projects in a variety of areas, Mr. Chairman.

Senator PELL. Good. Thank you for that background. Now would you please answer the questions which I posed.

Mr. STEIN. Yes, Mr. Chairman.

APPROACHES IN CONSERVATION REGIME FOR CANBERRA

I think that the point you raised earlier is a crucial one; that is, that the approaches to the regime in Canberra are very important, because this may be one of the first opportunities in which we have the potential to draw up a sound management framework for a resource in advance of full-scale exploitation.

We would submit, Mr. Chairman, that the recommendation on Antarctic living resources together with the report of the working group which was discussed earlier do not point in the direction of a strong and equitable regime. Let me just mention a few specific cases.

The guidelines laid down for the content of the regime are vague.

Senator PELL. Excuse me for interrupting, but we first have to reach an agreement. Do we want a strong regime or not? My understanding from the State Department testimony was that we did not want a strong regime. I would be inclined to agree with you. I think that you can't press them to do something that they don't wish.

Let me put that question directly to Mrs. Mink.

Do we want a strong regime?

Ms. MINK. It depends on how you define the word "strong." Obviously that is our intent if by strong you mean the instance of its establishment, to provide for specific limitations of catch. Our response to that is we do not have a scientific basis for deciding what these allocation limitations ought to be. So we would like to start conservatively at a point that provides in the regime for the establishment of such limitations when we find that necessary.

ENFORCEMENT ARRANGEMENTS

Senator PELL. What sort of enforcement arrangements—sanctions—would we have?

Ms. MINK. We would establish a commission which would be required to implement the decisions of this treaty.

Senator PELL. With the power to fine?

Ms. MINK. To assess the data and determine whether enforcement measures are needed.

Senator PELL. Will it have the power to fine, though? How would breaking the treaty be punished?

Ms. MINK. I will have to yield to the staff because those details have not yet been fully worked out.

Mr. SCULLY. Mr. Chairman——

Senator PELL. Please talk a little louder so that I can hear you.

Mr. SCULLY. I would start with the caveat that these views are preliminary. We believe there should be a commission with strong powers, to be able to develop, recommend, and adopt effective conservation measures which would be binding upon all parties and that there should be effective enforcement measures written into the convention with obligations on all contracting parties to enforce those measures. We would also like to see an international observer scheme to insure compliance with the measures adopted.

We would also seek for this commission a continuing role in the monitoring of the effectiveness of the conservation measures, both from a scientific and technical point of view, as well as from an acceptance and enforcement point of view.

Senator PELL. Maybe we would go toward my idea of an International Sea Guard which would enforce these arrangements, because there is going to have to be some kind of enforcement capability, I would think.

Mr. SCULLY. We would perhaps hope that this international scheme could evolve into something that might be the equivalent of that.

Senator PELL. I look forward to going off a week from Wednesday with the Coast Guard to inspect our own enforcement arrangements of the 200-mile limit. We have the advantage of having the Coast Guard here. I don't quite see who would be responsible for enforcing, or even observing, any limitations down there.

What would be your thinking on that?

Mr. SCULLY. At this stage of the game, from our point of view we would rely upon flag-state enforcement, in other words, enforcement by the flag. There are a number of ways in which an international ob-

server kind of scheme could work. One of the models, for instance, might be the kinds of things that the International Whaling Commission has been trying to do, in which there would be specific observers on board fishing vessels, whose allegiance would be, in fact, to the international body, the commission itself, to oversee and report on the observance of regulations.

This system would have the added advantage of permitting, in a number of instances, important scientific work to be done. We could take advantage of the actual fishing activities of vessels in areas of concern to scientists and fulfill not only an enforcement function but also a scientific research function through the presence of observers in place on board such vessels.

Senator PELL. I think that would be a great idea.

Mr. Stein, I'm sorry. I didn't mean to get diverted. I do have to get to both you and Mr. Meeker and ask my questions.

Please proceed.

Mr. STEIN. I am glad we had this intervention because I think it does point to the importance of a very strong regime. I am glad that the State Department does feel that it is important.

However, if one permanently or at the present time excludes catch allocations, I fear that what Ambassador Brewster has given us as teeth are really just the gums. What we really need are not only total catch limitations but some way of at least making sure that the commission, when the data is available, will be fully empowered to adopt specific catch allocations on a country-by-country basis. This is important for a number of reasons because otherwise it would be hard to prevent development of overcapacity in the fishery. Even though there is just a small amount which is being taken now, the impact statement does reveal that a number of fishery biologists believe that within a short period of time there is a potential danger of some of the krill being overfished.

CONSERVATION APPROACHES FOR CANBERRA MEETING

There are a few other things about the impact statement which I think are important.

In it there is an indication that the government's intention is to seek an agreement which would just set forth the objectives of the regime and provide the obligations, functions, and machinery necessary to fulfill them. Some of these objectives were read to us by Mrs. Mink.

I think that another approach, which would involve the actual hard negotiation in Canberra in the international agreement itself of specific conservation measures for some or all of the Antarctic marine living resources is important.

The draft statement does recognize that this latter approach would pose fewer risks to the Antarctic marine ecosystem than the proposed governmental action. However, it suggests that there is insufficient data upon which to base specific conservation measures and that an attempt to introduce such measures ab initio would significantly decrease the incentives for nations with harvesting interests to participate in the regime.

DANGERS OF GRADUALIST APPROACH

I think that there is a danger, Mr. Chairman, that the proposed Federal action could result in a regime which would be more like the no-action-now approach which was rejected than the governmental position actually intends. I don't think we have to look any further afield than the Antarctic Treaty itself for evidence of the dangers of a gradualist approach. Notwithstanding the agreement signed in 1959 to open the continent up for purposes of scientific research, claimants and nonclaimants appear to be no nearer agreement on ownership today than they were then. Further, had the provisions of the treaty relating to freedom of scientific investigation and demilitarization of the continent been left to a later negotiation, I am not sure that they would have been ever concluded.

Again, the environmental impact statement itself time and again describes the drawbacks of a gradualist approach. It refers to extensive evidence from efforts to conserve marine resources in other areas of the world that after the fact regulation is not effective. It states that initiation of effective regulation is likely to be more difficult once substantial economic stakes in uncontrolled methods of harvesting are created.

So, I think it is important that some of these things be worked out now.

In my statement, Mr. Chairman, I do describe some of the specific aspects of a sound and equitable regime, which would include the immediate introduction of some form of regulation and, if specific numbers cannot be set at this moment, restraints on increases, something which is recommended in the impact statement.

TERMS OF REFERENCE TO COMMISSION

The terms of reference of the commission, which I am pleased the United States favors, should include the power to implement controls in the following areas, all of which I think should explicitly be mentioned in the eventual agreement: catch limits for each species, according to age or size, class, geographic area, and the season in which they can be taken; total catch limits for each species; allowable gear; total effort or time spent in harvesting; national catch and effort allocations; and annual increases in national effort and catch.

I think the decisionmaking, as you suggested, Mr. Chairman, should be open to all and information on which the decisions are based made available to the public.

I would say that there should be no veto rights in the commission and its rules should be binding.

I would say that institutional arrangements and the division of responsibilities within the regime should be agreed upon before the convention is signed.

I believe provisions should be made for effective enforcement and policing of arrangements; that flexible settlement of dispute provisions should be included; that a commitment should be made by all parties to the convention to concentrate efforts on the acquisition of basic information on the nature, interrelationships and dynamics of

the Antarctic marine ecosystem; and finally, that steps should be taken to protect the interests of the broader international community in the resources.

A positive attitude to this last question would be very much in keeping with the U.S. commitment to aid developing countries and to work toward the elimination of world hunger. It would also enhance the credibility of U.S. development policy at a time when we are really searching for more effective ways to assist the world's poor, but unfortunately we are seen by many to be withdrawing from a range of international activities.

Furthermore, I think it is something that the United States could afford, since the impact statement notes our country at the present time has no solid commercial interest in krill exploitation.

RECOMMENDATIONS

Finally, I would just add that these concerns should be reflected in three ways:

First, the convention should include a general provision recognizing the interests of the international community in the living resources of the sea;

Second, that a strong institutional relationship between the FAO and the future living resource regime should be written into the convention; and

Third, that delegates from international organizations, including FAO and the United Nations environment program, should be invited to participate in the session after Canberra, which is the one that is going to, supposedly, reach a final agreement.

Finally, no final agreements or commitments should be entered into at Canberra because Antarctic Treaty parties should not provide outsiders with any sort of fait accompli.

Thank you, Mr. Chairman.

[Mr. Stein's prepared statement follows:]

PREPARED STATEMENT OF ROBERT E. STEIN, DIRECTOR, NORTH AMERICA OFFICE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

I am Robert E. Stein, Director of the North American office of the International Institute for Environment and Development. Thank you for giving me the opportunity to testify on a most important subject.

At the outset, Mr. Chairman, I would like to commend you for holding this hearing in such a timely manner. It permits a broad review of the U.S. position on the utilization of the living resources of Antarctic, before the important meeting scheduled for late February in Canberra, Australia. This hearing is indicative of your long and deep interest in the uses of the resources of our planet and their management by the members of the international community.

My statement this morning, Mr. Chairman, is based on the work that the IIED has been carrying out over the past 2 years. I am pleased to be accompanied by Barbara Mitchell, an IIED Research Associate, who has been chiefly responsible for our Antarctic and Southern Ocean activities.

We share your concern over the uses of the global commons and the Southern Ocean. Antarctica and its surrounding ocean contain one of the earth's last great reserves of undeveloped natural resources. This morning we are focusing on the living marine resources of the area, and the articulation of a U.S. policy which will properly address the crucial issues of their management. The Canberra meeting takes on added importance, and provides us with considerable

cause for hope, because governments have rarely attempted to agree on an issue of this type before damage has been done.

Now, for once we have an opportunity to negotiate an international agreement that will not be too little, too late.

The U.S. should approach this meeting with a clear understanding of its objectives. Before discussing what is necessary for an effective management regime, I would like to provide background on several of the crucial issues.

THE NATURE OF THE LIVING RESOURCES

Interest in the living resources of the Southern Ocean is not a new phenomenon: whales and seals have been hunted in the area. However, it is only recently that attention has been directed to a whole range of alternative stocks—squid, crab, fish and most important of all, krill. Krill is a generic term that is used to describe the particularly large pelagic component of the zooplankton. Figures given for the standing stock and potential yield of the most abundant member, *Euphausia superba*, vary enormously but are very high indeed in comparison with those for conventional marine fisheries.

From the resource and technological points of view, krill may well have the potential to become the world's major fishery product.[1] From 20 to 40 thousand tons are already being taken annually. The USSR, Chile, Japan, Poland, the Federal Republic of Germany (FRG), S. Korea, Taiwan, and Norway have all undertaken exploratory fishing, and the first three of these are now at the stage of marketing krill-based products. A further expansion of krill harvesting over the next few years is very likely.

Fisheries have a tendency to develop with alarming rapidity once a market has been identified for a particular resource. Practically unknown until the 1950's, by 1967 the annual catch of anchoveta came to 10 million tons. In the case of krill, the pressure will be particularly intense. The recent spread all over the world of exclusive economic zones is eroding the traditional grounds of distant water fishing fleets, while world catches of the more familiar species of fish, are fast approaching the limits of their potential. Given large capital investments in long distance fishing, and the need for more protein, Antarctic krill is the probable next target.

The Southern Ocean also contains considerable stocks of Antarctic cod and other fish. In the early seventies, Soviet and Japanese boats were reported to have harvested about 340,000 tons from the Antarctic section of the South Atlantic over a six-month period. Today, the FRG and Poland are also actively investigating the possibility of harvesting Antarctic fish.

IMPLICATIONS OF LIVING RESOURCE EXPLOITATION

Krill exploitation has important implications, the most pressing of which are environmental. In certain areas there are signs that Antarctic fish have already been overexploited. The harvesting of krill may have more serious ecological effects. First, our knowledge of its biology is incomplete: for example, we do not know whether there is a single breeding stock or several discrete stocks. Second, krill has been identified as the principal link in the complex food chain of the Antarctic waters. As herbivores, the crustacea occupy the second tropic level and their predators include the Blue, Fin, Humpback, Sei, Right and Minke Whales, Crabeater Seals, the Adelie Ringed and Gentoo Penguins, several other birds including the Albatross, Petrel and Tern and as many as 31 different species of Antarctic, Sub-Antarctic and even migratory subtropical fish.

It is unusual for so many predators to depend on one prey group. When man harvests krill he enters into direct competition with them. Thus, uncontrolled fishing of krill would not simply affect the future yield of the resource itself, it could have extremely complicated effects on the higher tropic levels of the Antarctic ecosystem. This might include, for example, increased stress on the recuperation of whale stocks, and the reduction of the population of other living resources of potential value to man.

It is widely claimed that from 50 to 150 million metric tons of krill could be safely taken annually. (The total world marine match from conventional sources in 1974 was 59.9 million metric tons.) On the other hand, krill's central place in the Antarctic marine ecosystem, combined with the imperfect state of our

[1] Grantham, FAO, 1977

knowledge have led a biological consultant working for the UN Food and Agriculture Organization (FAO), to comment on the uncertainty which exists about the effects of an annual take as low as several million tons. "Although on present estimates, a fishery of this size might have a negligible effect on the stocks the fact must be faced that the effect might be major consequence both to the resource and in the ecosystem in general." [2] In view of the growing interest in krill noted earlier, a total annual catch approaching or even exceeding this potentially dangerous range must be considered a distinct possibility in the near future.

The implications for developing countries of krill recovery are also of great concern. Krill has the same protein composition by weight as beef steak and has a potentially important part to play in relieving the hunger of the vast number of undernourished individuals of this world. Largely outside the recognized jurisdiction of any particular group of nations, krill represents an important "new" source of food for the planet as a whole. Will it be treated as such?

In cooperation with a number of experts, IIED hopes to be examining the relative advantage and drawbacks of a range of approaches to the accommodation of international community interests in krill. Among the avenues we may explore are:

(*a*) establishment of joint ventures;

(*b*) financial or technical assistance from existing national and multilateral aid sources for the establishment of suitable fishing fleets;

(*c*) product development with a view to identifying products which would provide the greatest nutritional benefit to the greatest number of human beings;

(*d*) establishment of processing facilities in developing countries;

(*e*) organization of technical training programs;

(*f*) channeling of krill or a krill-derived product to developing countries; and

(*g*) access for developing countries to a percentage of the revenue to be derived from krill exploitation.

A REGIME EMERGES

In the absence of any management framework for these resources, and in the face of dramatically increasing exploitation of krill, the group of countries signed the Antarctic Treaty in 1959 has taken the initiative to elaborate a conservation regime. At the Ninth Consultative Meeting of this forum held in London in fall of 1977, representatives of the thirteen countries which are full Parties to this Treaty recommended to their governments that an Antarctic marine living resource conservation agreement be concluded the end of 1978, and that a special meeting be held in Canberra from 27 February to 17 March, with a view to elaborating a "draft definitive regime".[3] Decisions made in the very near future will thus determine for many years to come whether these resources will be wisely used.

This could become man's first successful attempt to draw up a sound management framework for a resource in which there is considerable commercial interest in advance of full-scale exploitation. So far, we would not say that this opportunity seized by the Antarctic Treaty Powers to construct a sound environmental regime has been entirely wasted. The recommendation on Antarctic Marine Living Resources drawn up in London calls for a regime which in certain significant respects breaks with tradition. Unlike its forerunner, the 1972 Convention for the Conservation of Antarctic Seals (not yet in force), it will adopt an ecosystemic approach. It is to "provide for the effective conservation of the marine living resources of the Antarctic ecosystem as a whole." Although it will not apply to species already regulated under international agreements, it will "take into account the relationship of such species to those species covered by the regime". Again, unlike the Sealing Convention, it will extend north of 60 degrees south latitude (the northern limit of the Antarctic Treaty's jurisdiction) "where that is necessary for the effective conservation of species of the Antarcic ecosystem, without prejudice to coastal state jurisdiction in that area."

Beyond this, the recommendation on Antarctic Marine Living Resources, together with the report of the Working Group on this subject [4] do not point in the

[2] Everson, FAO, 1977.
[3] Rec. IX–2 Ninth Antarctic Treaty Consultative Meeting.
[4] Report of the Ninth Antarctic Treaty Consultative Meeting ANT/IX/83. (Rev. 2)

direction of a strong and equitable regime. A discussion of some particular weaknesses should make this clear.

In general, the guidelines laid down for the content of the regime are dangerously vague. In one case, however, they are dangerously specific. It was the understanding of the Working Group that "the regime would exclude catch allocation and other economic regulations of harvesting". A broad interpretation of this clause could exclude any measure which affects the economics of harvesting. The regime would thereby not be able to set any limitations on harvesting at all, whether in the form of catch limits, closed areas, closed seasons, prohibited species or otherwise. This interpretation must at all costs be ruled out. Even a narrow interpretation of this clause, which may be likely, would certainly prohibit allocation of the total catch of a given species among those nations engaged in fishing. It is our impression that it might also prohibit the issuing of licenses.

The exclusion of national catch allocation may be dictated by a negotiation process which involves many issues not touched on today. The Antarctic Treaty Parties are anxious to avoid upsetting the delicate balance established in 1959 between claimants and non-claimants. A claimant country feels that it will lose some of the credibility of its territorial claim and of any ensuing "rights" if it submits to arbitration over the ownership of living resources within the 200-mile boundary off the coast of its claim.

However, Antarctic Treaty Powers may have to recognize that the shelving of political differences is one of the prices to be paid for the privilege of retaining control in this field. The permanent exclusion of catch allocations would constitute a grave restriction on conservation. It is hard to see how a total catch limitation could be effectively observed without any form of national allocation. In particular, how would one prevent the development of overcapacity in the fishery to the point where it would become extremely difficult to apply any substantial cuts in catch that might turn out to be necessary in the future? Furthermore, in international fisheries everywhere, the lack of national catch quotas is responsible for competition among fleets, leading to economically inefficient operations and excessive investment in vessels and equipment. In the world as a whole the total level of investment in fishing already far exceeds what is needed to take the maximum catch. Enormous amounts of natural resources such as fuel are wasted in this way. We should make the most of this chance to run at least one fishery in a more sensible manner.

The guidelines for the regime are weak in another area. They make no mention at all of the interests of the international community. This is in stark contrast to the position taken over mineral resources. In London, the Thirteen recommended to their governments that "the Consultative Parties, in dealing with the question of mineral resources in Antarctica, should not prejudice the interests of all mankind in Antarctica."[5] On present indications, the living resource regime will provide for freedom of access to krill and the other living resources of the area to anyone capable of recovering them. It is clear that without deliberate assistance on the part of the wealthier nations, most developing countries will fail to benefit from this resource.

What is the U.S. doing to remedy these ills? In its draft environmental impact statement, the State Department indicates the intention of the Government to seek an international agreement which would "set forth the objectives of the regime and provide the obligations, functions and machinery necessary to fulfill them."[6] The statement contrasts this with another approach, which would involve negotiation in the international agreement of specific conservation measures for some or all Antarctica marine living resources.

The draft statement recognizes that the later alternative would pose fewer risks to the Antarctic marine ecosystem than the proposed governmental action. However, it suggests that there is insufficient data upon which to base specific conservation measures and that an attempt to introduce such measures ab initio could significantly decrease incentives for nations with harvesting interests to participate in the conservation regime.

There is, in effect, a danger that the proposed federal action will result in a regime, more like the rejected "no-action-now" approach than the U.S. Government position actually intends. We do not need to look farther afield than the Antarctic Treaty for evidence of the dangers of gradualism. Notwithstanding the

[5] Rec. IX–1. Ninth Antarctic Treaty Consultative Meeting.
[6] Draft Environmental Impact Statement for a possible Regime for Conservation of Antarctic Living Marine Resources. U.S. Dept. of State, February 1978.

agreement signed in 1959 to open the continent up for the purposes of scientific research, claimants and non-claimants appear to be no nearer agreement on the ownership of the continent and surrounding waters today than they were then, witness the difficulties currently experienced in establishing a resource regime. Further, had the provisions of the Treaty relating to the freedom of scientific investigation and the demilitarization of the continent been left to later negotiation, would they ever have been concluded?

Time and again, the EIS itself describes the drawbacks of a gradualist approach. It refers (P. 4) to "extensive evidence" from efforts to conserve marine resources in other areas of the world, that "after-the-fact" regulation is not effective." Initiation of effective regulations is likely to be "more difficult once substantial economic stakes in uncontrolled methods of harvesting are created." It notes too, that if the development of the conservation machinery requires more years than is presently anticipated, there would be a risk of overexploitation occurring in the meantime. These arguments can apply as well to elements of the preferred approach. Therefore, Mr. Chairman, the fullest possible regime should be worked out now.

PROPOSALS FOR CANBERRA

In view of our uncertainty about the effects of krill harvesting, we support the U.S. proposal for the establishment of a strong Commission to undertake and implement appropriate conservation measures when the necessary information has been acquired. However, we do not suggest that definitive, longterm catch limits be set now. In order to combat the dangers associated with gradulasim and to ensure the creation of a sound and equitable regime, we would advocate the following:

1. The immediate introduction of some form of regulation is essential. If specific numbers cannot be set at this moment, restraints on increases in fishing effort are essential. In the detailed analysis of proposed Federal action provided on page 6 of the draft EIS, it is suggested that very conservative catch limitations, at least for krill, with provisions for phased expansion of that limit by fixed annual percentage increases over a fixed and limited period of years, would be a desirable supplement to the international agreement, at least during an interim period after entry into force of the regime. We agree with the draft EIS on page 6 that this course is preferable to the possibility of relying on "technological and other limitations" to keep the harvest below the possibility of impact for the immediate future.

2. The terms of reference of the Commission should include the powers to implement controls in the following areas, all of which should be explicitly mentioned: Catch limits for each species, according to: age or size class; geographic area; and season.

Total catch limits for each species, allowable gear, total effort or time spent in harvesting, national catch and effort allocations, and annual increases in national effort and catch.

3. Decision-making should be open and all information on which decisions are based, made available to the public. (The present practice followed by the Antarctic Treaty powers of holding meetings behind closed doors and of restricting circulation of documents often leads to mistrust of their claim to be acting on behalf of all mankind.)

4. There should be no veto rights in the Commission and its rules should be binding.

5. Institutional arrangements and the division of responsibilities within the regime should be agreed upon before the convention is signed. In particular, care should be taken to protect the role of scientific advice; economic and other considerations must not be allowed to override it in decision-making. The means by which the operations and activities of the regime are to be financed should also be made clear. It is especially important that all research work including the monitoring of non-target species which might be affected by harvesting be adequately financed on a long term basis.

6. Provisions should be made for effective enforcement and policing of any arrangements. The appointment of independent observers and their right to carry out inspections of all fishing operations should be written into the convention. Flexible settlement of dispute provisions should also be included.

7. A commitment should be made by all parties to the convention to concentrate efforts on the acquisition of basic information on the nature, interrelationships and dynamics of the Antarctic marine ecosystem.

8. Steps should be taken to protect the interests of the broader international community in the resources.

We recognize that what is being established is a conservation regime. But national expectations and investments in krill are growing daily. Postponements of this issue may make any proposal to ensure that this source of protein is used to maximum benefit politically impossible to negotiate. Facing the issue now would mean that at a later date, if and when it is found that sufficient quantities of krill can be safely recovered every year, parties to the convention would be able to take the appropriate action to enable developing countries to benefit from the resource.

A positive attitude to this question would be very much in keeping with the U.S. commitment to aid developing countries and to work towards the elimination of world hunger. It would also enhance the credibility of U.S. development policy at a time when this country is searching for more effective ways to assist the world's poor, but is unfortunately seen by many developing nations to be withdrawing from a range of international activities in a narrower protection of national interests. Furthermore, it is something the U.S. could afford; our country has no solid commercial interests in krill exploitation at present.

The concerns should be reflected in three different ways:

(*a*) The convention should include a general provision recognizing the interests of the international community in the living resources of the area, as in the recommendation on mineral resources quoted earlier.

(*b*) A strong institutional relationship between FAO and the future living resource regime should be written into the convention. In the past FAO has shown interetst in a joint program with the UN Development Program to assist in the exploration, exploitation and utilization of krill for the world as a whole.

(*c*) Delegates from international organizations such as FAO as well as all krill fishing nations should be invited to participate in the next session after Canberra. To make this participation meaningful, no final agreements or commitments should be entered into in Canberra; Treaty Parties should not provide outsiders with a fait accompli.

In short, Mr. Chairman, we are proposing that the U.S. Government do its utmost to introduce a sound and equitable arrangement for the future exploitation of the living resources of the Southern Ocean. We have no objection to a degree of gradualism in approaching this task, as long as it is backed up by the strongest textual guarantees. Some of these will be difficult to negotiate, but it should be born in mind that decisions made here will be of the greatest and most lasting importance for the future of what may become the world's major fishery.

One last, but important procedural point, Mr. Chairman; the U.S. Government should be commended for including a public member in its London delegation and three for the Canberra meeting. Would that other governments were as willing to receive assistance from and participation by outside experts. The problem remaining, however, as mentioned above, is that so much of the information and data produced by the Consultative Parties is tightly held, not available for review outside the parties themselves. This makes it difficult to adequately prepare for events such as the Canberra meeting. A U.S. proposal to open up the process met with resistance at the London meeting. But we feel that the U.S. Government should strongly urge the parties to reconsider their attitudes on withholding information, to the end of permitting wider understanding of the Treaty process and its initiatives in establishing regimes.

Thank you, Mr. Chairman.

64 Excerpt from New Scientist 13 January 1977

Antarctica: a special case?

While no country actually enjoys uncontested sovereignty over any part of Antarctica, the 12 consultative parties to the Antarctic Treaty demonstrate something of a proprietary air towards it. Its "pristine" scientific character is now threatened by the impending desires of the world to exploit Antactica's minerals and marine resources

M. Bell Courtesy of NERC British Antarctic Survey

Barbara Mitchell is a research associate at the International Institute for Environment and Development

Two important meetings were held last summer to discuss Antarctica's resources. In Paris at the beginning of July consultative parties to the Antarctic Treaty met to consider the question of mineral resource exploitation; in August in Woods Hole, Massachusetts, members of the Scientific Committee on Antarctic Research (SCAR) examined a draft proposal to study the living resources of the Southern Ocean. What is significant about these two meetings is that they involved participants from only 12 countries—Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union, the United Kingdom, and the United States. Why is it that, while the deep sea bed and outer space are considered the trust of the international community, the southern continent and its surrounding waters and continental shelf, over which no-one has clear jurisdiction, are held to be the responsibility of a privileged few?

The question is of more than academic importance. In the first place the resources at stake are significant. There are indications that Antarctica's continental shelf may contain oil and gas and the waters of the Southern Ocean are rich in krill, a small crustacean, of which it is estimated that at least 50 million metric tonnes could be safely harvested annually. (The 1974 total world marine fish catch from conventional sources was only 59·9 million metric tonnes.) A number of nations are already fishing krill on an experimental basis; growing population and declining supplies of food will make it increasingly difficult for others to overlook what appears to be the world's largest single source of animal protein. Finally, Antarctica's icebergs represent a potential source of fresh water; the Saudi Arabians have recently shown interest in exploiting them.

Unfortunately, the environmental hazards attached to the recovery of these resources may be serious. Exploitation of oil and gas would involve a number of specific dangers. A series of physical obstacles, for example, increase the likelihood of spills occurring. No attempt has previously been made to exploit hydrocarbons in areas where heavy sea ice and icebergs, with their different relative movements, are found in combination. Large icebergs which project 250 metres below the surface may damage submarine well heads, while navigational hazards increase the probability of oil spills from tankers.

Once a spill had occurred the ice would prevent it from spreading and dissipating, and limit the use of conventional anti-pollution devices such as booms to contain it, and dispersants and mechanical systems for skimming oil from the surface. Secondly, cold temperatures have a severe effect on the biological decomposition of oil; this slows markedly at lower temperatures, with many components of the process stopping altogether in freezing water. Low temperatures also reduce the rate of evaporation of the more toxic and soluble aromatic fractions of oil, thus allowing more of them to form solutions in sea water.

The ice masses and atmospheric currents in the antipodes play an important role in the world's weather and climate. It is postulated that ice cover on the ocean reduces heat exchange between the atmosphere and the ocean. Seasonal and long-term variations in the extent of sea ice are thought to have a marked influence on atmospheric circulation and a massive patch of polluted ice could prove to be significant to the process.

Exploitation of krill itself is not without serious ecological implications. It has been identified as a principal link in the complex food chain of the Antarctic waters and has been found in the stomachs of as many as 31 different Antarctic, sub-Antarctic, and even migratory, sub-tropical fish species. Next to nothing is known of the factors controlling its abundance. It would be unwise to assume that the reduction in the whale populations that grazed on krill has left a gap in the ecosystem that man can fill.

More direct and immediate yet than the danger to the environment is the threat to scientific research of resource exploitation—the recovery of minerals in particular. Traditionally, Antarctica has been left to the scientists and there can be no doubt that Antarctica's contribution to science has been considerable. To give two more spectacular examples, it has recently provided important insight into the theory of continental drift and—through work carried out in the Dry Valleys—indications of the

possibility of life in extreme conditions such as those on Mars.

A large part of Antarctica's scientific value lies in its presently undisturbed state. It provides a unique scientific laboratory, a place from which to monitor critical environmental variables such as changes in atmospheric conditions and the accumulation of long-lasting toxic substances. Resource recovery, with all it entails, would interfere with these experiments. It is clear, too, that the restrictions on physical access which accompany exploitation will reduce the current freedom enjoyed by scientists. Companies granted licences to explore given areas for a certain length of time are hardly likely to welcome scientific research on their doorstep, particularly if conducted by scientists from a rival state. One might also expect the secrecy that is part and parcel of commercial exploration to introduce serious limitations on the hitherto free exchange of information about the continent.

Dogs in the manger?

The stakes are high—who are the players? It should be stressed that the Antarctic Treaty powers are not asserting a straightforward claim to ownership of Antarctica. This was not the purpose of the original agreement and is not the intention of these signatories today. Both the Antarctic Treaty and SCAR, the non-governmental coordinating body for scientific research, are offshoots of the International Geophysical Year (IGY) in which Antarctica was selected for special attention. In 1959 the 12 countries that were carrying out research there signed a treaty designed to preserve the area exclusively for peaceful purposes and to promote international cooperation in the conduct of scientific research. The 12 meet biennially and have passed a number of procedural and environmental recommendations. While seven of these countries have territorial claims in the area, the remaining five (Belgium, Japan, the United States, the Soviet Union, and South Africa) do not possess and have not recognised any claims.

Although the 12 have not established joint sovereignty in Antarctica, there have always been elements of exclusivity about the "club". The discussions preceding the signing of the Treaty in 1959 were already marked by this trait; at least one nation, Poland, requested and was refused permission to attend. The Treaty itself perpetuates this exclusivity. For, while it is open to accession by any country that is a member of the United Nations, or has been invited to join by all consultative parties, full consultative membership can only be attained by an acceding party "during such time as . . . (it) . . . demonstrates its interest in Antarctica by conducting substantial scientific activity there," to date no acceding party has been admitted to consultative membership although applications have been made. However, the original 12 signatories remain consultative members whether or not they carry out scientific research in Antarctica. The conditions for membership of SCAR are slightly different; this is open only to nations "actively engaged in Antarctic research".

Reactions on the part of consultative parties to any outside initiative to raise the issue of Antarctica's future demonstrate that they consider themselves the sole protectors of the area. Thus in 1975, Antarctic Treaty consultative parties on UNEP's governing council had the issue of Antarctica removed from the agenda on the grounds that it formed a special case outside the bounds of the cited General Assembly resolution. Similarly, most of the parties have opposed an FAO/UNDP project to assist in the development of the Southern Ocean fisheries.

But some of the 12 seem to have more in mind than benign protection. There are signs of a reluctance to share the benefits of any eventual resource exploitation. As might be expected, the seven territorial claimants claim ownership of the land and different breadths of the adjacent seas, within "their" sectors (see map). Claimants further maintain that rights to the resources of the continental shelf flow automatically from ownership of the adjoining land. Officially, non-claimants recognise no ownership of land, sea or resources. The US, for example, has explicitly declared that there should be freedom of access to the resources for all nations. In practice, however, there are signs that claimants and non-claimants alike consider themselves to have special rights to the resources, and particularly the minerals. It is generally agreed by them, for example, that management of, as opposed to access to, mineral resources, with all the discretion this implies, should remain in the hands of the 12. Similarly, the US could not but be aware that freedom of access under "uniform and non-preferential rules applicable to all countries" entitles very few indeed to benefit from the area. Clearly, recovery of oil and gas, and to a lesser extent krill, from these ice-encumbered seas requires special technology which few countries are in a position to develop. Some consultative parties are more anxious than others to allow the international community to benefit from the area, but there is certainly no conviction that, like the deep sea bed, the area is the "common heritage of mankind".

It would be misleading to portray the "outsiders" as united in clamouring for a share of Antarctica. For the vast majority of the international community Antarctica has never been a subject of great interest. After all, 15 per cent of the territory remains unclaimed. However, there are signs of growing discontent with this state of affairs.

In 1975 Sri Lanka raised the subject at the UN Economic and Social Council as well as at the General Assembly. Last May, at the FAO, the representative from Guinea, making an extended statement on the developing countries' need for protein and training for their scientists, insisted that control over the FAO/UNDP southern fisheries programme mentioned above should be shared equally by developed and developing countries. In this connection he called for a new Antarctic Treaty.

The first indication of a coordinated approach by "outsiders" to the problem emerged at the board meeting of the non-aligned nations in Algiers last May. (Due to lack of time a final statement on the interests of the non-aligned nations in this area was omitted from the economic declaration produced by the August summit meeting in Colum-

Territorial claims in Antarctica exclude oceanic areas

bo.) More recently, several Arab nations have begun attempts to expand the jurisdiction of the proposed Seabed Authority to include Antarctica. Not only are these countries firm believers in the "new international economic order", but they are anxious to ensure that as little oil as possible escapes their control. However, caution is needed in interpreting all these moves. It is always difficult in international politics to judge when a mere idea becomes an issue. As yet this has not happened.

Obviously with only two developing countries in the "club", it is very largely a North-South debate. There is an understandable Third World reaction against the permanent management of the area by a small band of countries—including one international outcast, South Africa—which had been participating in the work of the IGY in 1957/58. Some of the 12 are carrying out very little scientific work in Antarctica today. In the words of this year's President of the UN General Assembly, Mr H. Shirley Amerasinghe of Sri Lanka:

> . . . there can be no doubt that there are vast possibilities for a new initiative that would redound to the benefit of all mankind. Antarctica is an area where the now widely accepted ideas and concepts relating to international economic cooperation, with their special stress on the principle of equitable sharing of the world's resources, can find ample scope for application . . .

On the other hand, is it right to prevent the nations which had the foresight and initiative to explore Antarctica to profit from the natural wealth their efforts made available? Should not they be expected to receive a return from their investment? For some of the 12, too, their proximity entitles them to a form of preferential status.

Are the 12 likely to produce a sounder system of management than the international community? The present arrangements which were admirable for the purposes of scientific research would be ambiguous, and indeed unworkable, in the context of resource exploitation.

The thorny path ahead

The most likely alternative is scarcely more promising; freedom of access favoured by the US, and already practised by the Soviet Union in the exploitation of krill, could be environmentally hazardous and lead to conflict. Both petroleum deposits and krill, by their very nature, demand a cooperative development by nations rather than an expansionary approach.

In view of the clash between claimants and non-claimants it is highly questionable whether parties to the Treaty will be able to reach any agreement at all. The alternative to agreement is not encouraging. In 1975 a US spokesman said:

> In the absence of a shared understanding, those countries who do not recognise claims to sovereignty would surely have to assert the right to commence mineral resource activities at their will, subject only to applicable provisions of the Antarctic Treaty.

If one believes that Antarctica's oil and gas should be exploited with great caution, if at all, there are good reasons for widening the debate. The prospects of such an approach being adopted may well be better within the larger forum, although not necessarily for environmental reasons. As most non-Treaty nations would be unable to begin mineral exploitation themselves, they would be more likely to favour a moratorium, system of quotas, or production control, either to protect their own positions elsewhere or to gain time to catch up technologically. Some Arab nations may be as interested in preventing production of oil in Antarctica as in exploiting it. Similarly, developing nations, relying to a greater extent on outside assistance in the fishing of krill, might well advocate a system of international management for this resource.

Finally, the participation of the international community may be indispensable if the regime is to receive the recognition and respect necessary for it to be effective.

R. White Courtesy of NERC/British Antarctic Survey

The British Antarctic Survey's biological station at Signy Island in the South Orkneys

Opening the debate is not without serious risks. Perhaps foremost among these is the threat to the Antarctic Treaty itself, the result of long-drawn-out, laborious and delicate negotiations. It would be dangerous, both immediately and symbolically, to pull the rug from under the unparallelled cooperation the Treaty has established and undermine the status of the world's first non-militarised, nuclear-free zone. As a vehicle for negotiation the Treaty forum presents certain undeniable advantages. It has functioned exceptionally smoothly during its 15 years' existence and its meetings are quiet and efficient, in marked contrast to those of the Law of the Sea negotiations. Furthermore, the Antarctic Treaty arrangement has the unusual strength of a close working relationship with a non-governmental body, SCAR.

There can be no doubt that the 12 have the best knowledge and experience of this critical and unique area. Conservation and environmental protection have always been a central feature of Antarctic Treaty meetings, and the current talks are no exception. Until recently most of the 12 were in favour of a moratorium on commercial mineral resource activities, while environmental impact studies on the effects of mineral exploitation are now being prepared by SCAR and the US.

Antarctica is not the deep sea bed, but the pressures, means and case for opening the debate to a wider community are there. If the 12 wish to retain any control over the discussions, they may have to show greater interest in the concerns of the international community. They may have to accept an international system of management within which there is some form of recognition of their special relationship to the continent. There are many examples to draw on both in the procedure for debate and the single negotiating texts produced at the Law of the Sea discussions. It would be possible to adopt the "arena" approach and let Treaty states negotiate and "outside" states attend as observers. Alternatively, one could accord SCAR a special role in an otherwise international debate. In seeking a final settlement which would recognise the legitimate interests of both sides, the negotiators might make use of the formulae for mixed jurisdiction and participation which are contained in the Law of the Sea draft treaty articles dealing with the rights of geographically disadvantaged states, and procedures for revenue-sharing both from the deep sea bed and the continental margin beyond 200 miles. The proposals on the political composition of the decision-making organs might also be studied. It is not too late to start thinking along these lines. □

714 Excerpt from New Scientist 22 September 1977

Comment

Attention on Antarctica

At a closed meeting in London, delegates from the 13 countries which are consultative parties to the 1959 Antarctic Treaty are now examining the question of resource exploitation in and around the Southern polar continent. Immediate interest is focused on krill (a small high-protein crustacean, of which the annual sustainable yield is estimated by some to exceed the current world marine catch) and on offshore oil and gas.

Three main problems are involved. First, resource recovery may have both local and global environmental implications. Krill constitutes a crucial link in Antarctic foodchains and harvesting it could affect the stocks of many other creatures such as whales. Frequent and long lasting oil spills would have severe local impact and might conceivably disturb world-wide processes of atmospheric and oceanic circulation. Whatever else happens, Antarctica's role as a scientific laboratory will certainly suffer. Secondly, Antarctic resource recovery will reopen old wounds of territorial dispute. Of the 13 Antarctic Treaty consultative powers, seven have territorial claims; six do not and indeed have not recognised the assertions of claimant signatories. Thirdly, following calls for a new international economic order and the proclamation of the deep seabed as the "common heritage of mankind", Antarctica is attracting the covetous glances of the wider international community —a move resisted by Antarctic Treaty powers.

Opening the session on Monday, Mr Ted Rowlands, Minister of State at the Foreign and Commonwealth Office, set an encouraging tone for the debate. Without going as far as other national spokesmen who have proposed a moratorium on mineral resource exploitation, Mr Rowlands placed every emphasis on the need to foresee and guard against the harmful effects of resource exploitation in the Antarctic. On the territorial issue, he called for mutual respect for the positions of both claimants and non-claimants, and a recognition that neither was likely to provide the sole basis for an agreement. Mr Rowlands also stressed the need to reach decisions, acceptable to the world community, that would be seen "to be serving the long term interests of the Antarctic and the world community rather than short term illusions of national advantage". Perhaps most significant of all, he stressed the urgency of getting across the real issues in Antarctica to the general public.

The cynic would say that this readiness to reach agreement is simply a reflection of a desire to keep the international community out. Nevertheless, sentiments such as those expressed by the Minister should be acted upon. As a first step let us hope that all the Antarctic Treaty powers will raise the veil of secrecy which has traditionally shrouded their negotiations and prove that they are really acting in the best interests of mankind.

Barbara Mitchell

130 Excerpt from New Scientist 20 October 1977

Comment

Antarctic enlightenment?

Curiously inconsistent conclusions about the fate of Antarctica's resources emerged from the recent meeting in London of the 13 Antarctic Treaty Consultative Powers. On the positive side, a moratorium or ban on mineral exploration and exploitation was agreed until a framework for these activities had been established. The considerable environmental hazards attached to mineral recovery in this vulnerable area, combined with the aversion of certain powers to such restrictions, make this a particularly important achievement.

Turning to a more immediate prospect for exploitation—the living resources of the Southern Ocean surrounding the continent—the recommendations are distinctly less encouraging. There are good environmental grounds for introducing firm controls on Antarctic krill fishing. Although krill exists in large quantities, it constitutes the main food of many Antarctic marine creatures and our knowledge of its population dynamics is rudimentary. There is ample evidence of the speed with which commercial fisheries build up under normal conditions and today, with coastal state jurisdiction encroaching on traditional fishing grounds world wide, this process can only be accelerated. Yet, in part because they did not wish to invoke questions of sovereignty, the Antarctic Treaty Powers have ruled out any economic regulation of the krill fishery. Equally serious, no mention was made of the interest of the wider international community in this protein-rich resource, an interest which the UN Food and Agriculture Organisation is helping to articulate. What the Antarctic Treaty powers are in the process of farming is no more than a permissive regime in which benefit is monopolised by those with the capital and technology to harvest, process and market the krill.

Decisions to postpone Antarctic mineral exploration and exploitation and to respect the interests of the international community in these non-living resources are significant steps forward. Can we hope that some of this spirit will percolate thinking on Antarctic living resources before next Spring when Treaty Parties start drafting their definitive regime? Or must we conclude that such enlightenment is possible only when a resource has been written off technologically and economically for at least 15 years, and possibly indefinitely? *Barbara Mitchell*

Excerpt from Forum August 1977

Antarctic riches—for whom?

In September the Antarctic Treaty powers meet in London. They will have to deal with the question of how that continent's natural resources of food, energy and minerals should be shared

by Barbara Mitchell

A recent United States Government report pinpoints five areas of Antarctica's deep continental shelf from which it is believed that 'tens of billions' of barrels of oil could be recovered, while analogies drawn with Lake Maracaibo in Venezuela indicate that the Weddell Sea alone may yield more than 15,000 million barrels. These are significant figures when compared with similar estimates for the Atlantic of 10,000/20,000 million barrels and for all offshore Alaska of 30,000/60,000 million barrels. The Soviet Union is predicting that Antarctica's offshore potential will surpass that of Alaska. However, it should be stressed that commercial quantities of oil and gas have yet to be discovered.

Considerable interest has also been shown in the living resources of the Southern Ocean. These include crabs, lobsters, fish and, most important of all, krill. Until the early 1960s this small crustacean was simply known as the staple diet of the whale. The possibility of commercial exploitation then became apparent. Marine biologists suggest that from 50 to 150 million tonnes could be taken annually without depleting the stocks. (The total world marine fish catch from conventional sources in 1974 was 59.9 million tonnes.)

On land small amounts of a number of minerals including copper, molybdenum, gold, silver, platinum and chromium have been noted. There is evidence of larger quantities of coal and Soviet explorers report the discovery of what has been described as a 'mountain of iron ore' in the Prince Charles Mountains facing the Indian Ocean. However, inaccessibility and poor quality combine to make exploitation of these coal and iron-ore deposits extremely unlikely.

The southern treasure trove

For some time the developing countries have been putting forward demands for a new international economic order of shared wealth. Coming across an unsuspected treasure

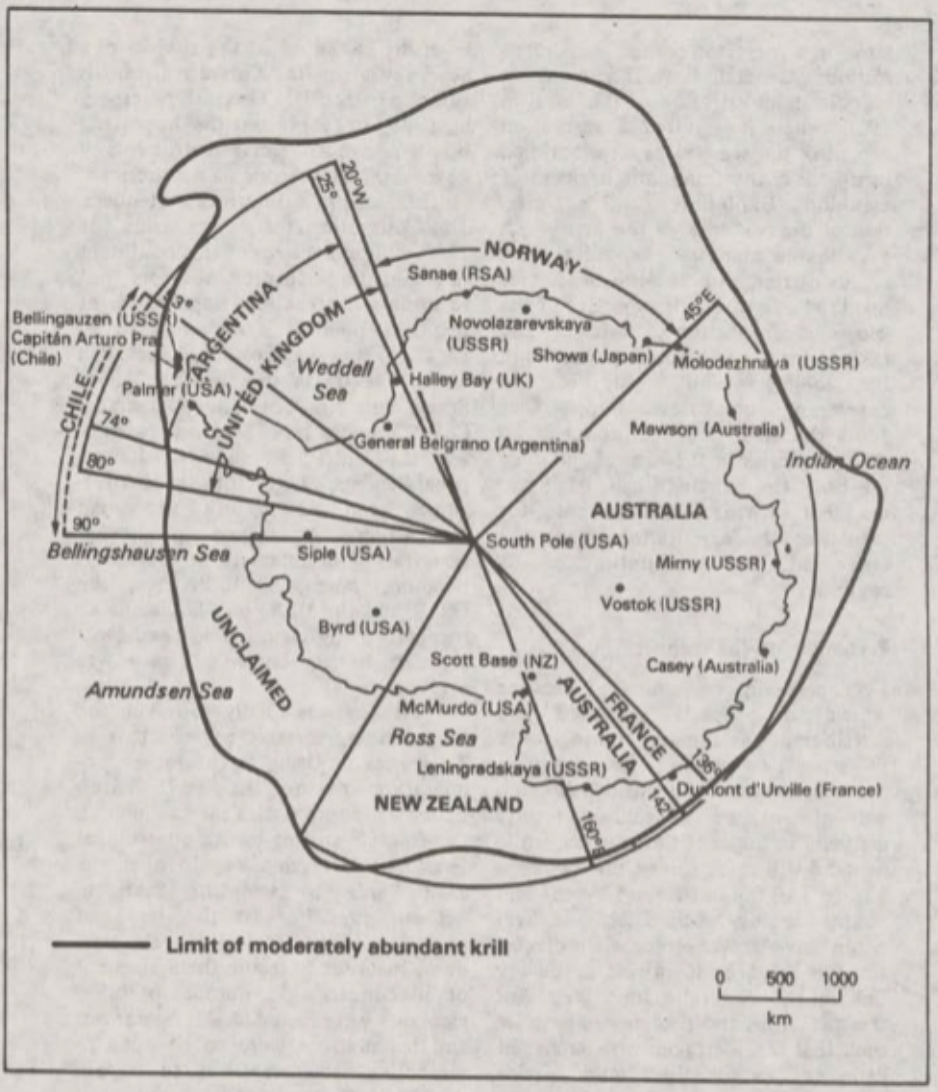
trove in a neglected corner, the United Nations General Assembly made a specific demonstration of this ideal in 1970 when it adopted a resolution declaring the sea bed beyond national jurisdiction the 'common heritage of mankind'. Exploration and exploitation of the resources of this area—such as valuable manganese nodules—were to be carried out 'for the benefit of mankind as a whole, irrespective of the geographical location of states . . . and taking into particular consideration the interests and needs of the developing countries'. Should we apply the same rules to Antarctica, an area where, as in the case of the deep sea bed, 'the existing legal regime . . . does not provide substantive rules for regulating the exploration of the . . . area and the exploitation of its resources'?

Pretenders to the throne

Krill certainly represents a resource which, if properly harvested and distributed, a hungry world could ill afford to ignore. According to present estimates the world fish catch will not exceed 90 million tonnes annually in the next thirty years, while demand will reach somewhere between 130 to 150 million tonnes by the end of the century. The fishing of krill could have grave ecological repercussions; it has been identified as the key link in the Antarctic food web. But the quantities and protein content are such that if undertaken with sufficient care, krill exploitation could provide substantial amounts of food for the world while relieving the pressure on other overfished stocks.

When Hamilton S. Amerasinghe from Sri Lanka raised the subject of a new initiative in Antarctica in his address to the UN General Assembly in 1975, he expressed the hope that this would not cause a flutter in any dovecots. If the throne of Antarctica is vacant, it is not without its pretenders. The Antarctic Treaty sets aside the 1500 million hectares of this continent as a gigantic scientific laboratory, but to understand the full significance of this settlement it is necessary to go back to the situation that prevailed before the treaty was signed in 1959. Seven countries—Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom—had territorial claims. Three of these overlapped and no claim had broad recognition. A second group of countries with interests in the area—Belgium, Japan, South Africa, the USSR and the USA—had not made or recognized any claims. The need for a solution to the territorial issue was evident.

A key was finally found in the long-standing interest of scientists in Antarctica. Using Antarctic cooperation during the 1975 International Geophysical Year as a model, the treaty's answer to the question of territorial ownership was to open the entire area to scientific research, *without prejudice* to the issue of existing claims, and banning any new ones. In order to secure the agreement of all concerned, a number of other elements were included. All operations and installations were to be open to inspection, the area was to remain demilitarized and the disposal of nuclear waste was banned. Full, consultative membership was limited to the twelve countries originally



Antarctica: claims and selected stations

Resources of the Antarctic

Resource	Krill (*Euphausia superba*)	Antarctic fish	Lobster (*Jasus paulensis* and *J. tristani*)	Crab	Seals (Weddell, Ross, Crab-eater, Leopard, Southern Elephant, Southern Fur seal)
Location	Mostly S. of Antarctic Convergence, but some concentrations N. of this. Greatest population in Atlantic sector, secondary concentrations in Indian Ocean and Ross Sea sectors	Nototheniids found in shelves of subantarctic archipelagoes and near slopes of Antarctic continent	Around islands of St Paul, Amsterdam and Tristan da Cunha	Crozet Islands shelf	Fast ice, sea and pack ice around Antarctic continent
Current jurisdiction	High seas, much within Antarctic Treaty purview and 200-mile zones declared by Argentina and Chile off their Antarctic claims. Could also be covered by any future economic zones drawn around Antarctic continent, and rocks and islands in vicinity	As for krill	Outside Treaty purview. High seas or any future economic zones drawn around relevant islands	As for lobster	As for krill; 1972 Convention for the Conservation of Antarctic Seals (to be ratified) prohibits taking of Ross, Southern Elephant and Southern Fur seals. Yield levels set for others. Future activities to be carried out under international inspection and populations monitored
Amount	Sustainable yield calculated at 50 to 150 million tonnes p.a. Standing stocks up to 5 billion tonnes		Exploitation began 1959. After peak in 1970 of 1,000 tonnes, total catch and catch per unit effort falling rapidly		Total population: Ross, 100,000; Weddell 200,000 to 500,000; Crab-eater, 30 million.
Technologically recoverable	Now. Japan, Soviet Union, Poland, FRG, Chile and Norway now taking approx 20,000 tonnes p.a.	USSR now marketing *Notothenia rossi*. FRG, Japan and Poland evaluating exploitation	Now	Now	Now

Whales	On-shore minerals	Off-shore hydrocarbons	Icebergs
(Blue, Humpback, Sperm, Fin, smaller Minke, Sei, Southern Right whale)	Occurrences of beryl, chromium, cobalt, copper, gold, graphite, manganese, marble, mica, molybdenum, optical quartz, phosphate rock, platinum, sand and gravel, silver, tin, uranium. Deposits of coal, iron ore		
Most migrate to seas around Antarctic continent in summer	Antarctic continent	Continental shelf surrounding Antarctica. Particularly promising areas: Weddell Sea, Ross Sea, Amery Ice shelf, Bellingshausen Sea, Scotia Sea	Seas surrounding Antarctica
As for krill. International Whaling Commission controls the 'orderly development of the whaling industry' via establishment of annual whale harvest quotas	National sector claims or Antarctic Treaty (There is some dispute over the entire status of the Antarctic Treaty in international law, and more specifically its competence in the matter of resources.)	As for on-shore minerals, or high seas (The Treaty applies to the area below 60° S. latitude but states that nothing in it 'shall prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law with regard to the high seas within that area'. The implications of this reservation have not been fully determined. Recommendations of the Antarctic Treaty meetings are usually applicable up to the 60° line.)	As for krill
Total population: Blue, 2,000; Fin, 90,000; Sei 75,000. Current biomass is one-seventh initial stock	Only coal and iron ore found in sufficient quantities to qualify as deposits	1976 US Government estimates for five most promising areas are 'tens of billions of barrels' of oil. (1973 estimate suggested *discoverable* gas reserves of 4.1×10^{15} cubic metres of gas.)	1.4 trillion tonnes break off from Antarctica each year
Now	–	Ten to twenty years?	Now. Saudi Arabia planning to exploit in near future

involved and others carrying out 'substantial scientific research activity' in the region.

Exclusive and unrepresentative

One subject that was not included in the settlement was resource exploitation and the treaty's competence here is unclear. Its overall mandate is weakest in those areas where the most important resources are to be found: the continental shelf and surrounding waters. The settlement applies to the area below 60° South latitude but explicitly states that nothing in it shall 'prejudice or in any way affect the rights ... of any state under international law with regard to the high seas within that area'. Besides, as a general observation, no duties or obligations arising from the treaty can be imposed on non-treaty states.

The first thing to be noted is that the treaty forum is both exclusive and unrepresentative. Membership is confined to states which happened to be active in Antarctic affairs in 1957, together with any countries technologically powerful enough to undertake 'substantial' work in the area today. If Poland joins the ranks of the twelve in London in September it will be the first country to have gained consultative status since the treaty was signed. These then are the countries which will be discussing Antarctica's future: ten, or possibly eleven rich nations and two hardly representative developing countries.

There are major divisions within the group. In theory all claimant states still lay claim to the resources within 'their' territorial sectors, adjacent continental shelves and territorial seas. At present only Argentina and Chile have proclaimed 200-mile (320 km) maritime zones off these territories, but other claimants may follow suit and declare sovereignty over the living resources within corresponding areas in accordance with the growing international trend. Non-claimants maintain that there is freedom of access to the whole area and its resources. The existence of an unclaimed sector and the overlapping of claims in the Antarctic Peninsula add further dimensions to this dispute.

However, the indications are that whichever way the issue is resolved, the outcome will be iniquitous from the global point of view. Bearing in mind that living and non-living resources may be treated differently, and that all sorts of mutations or combinations are possible, three basic scenarios may be identified.

Three possible futures

The first scenario involves a pooling of sovereignties. Consultative parties to the treaty would issue a declaration of joint sovereignty over the continent and its shelf. The twelve (or thirteen) would then 'own' the resources in this area. Such a move might well be accompanied by the drawing of a joint economic zone around the land mass.

In a second scenario the territorial issue is resolved in favour of the claimants. On land this would mean national sovereignty over each pie slice of the continent. At sea it would take the form of national economic zones. (Adjustment would of course be necessary for the overlaps and unclaimed portion.) Certain bodies

have already suggested closing off krill fishing grounds. In the United Kingdom the Confederation of Fried Fish Caterers Associations is pressing the government to lay claim to vast areas of the South Atlantic by drawing 200-mile zones around a number of 'British' islands in the vicinity.

In the event that either of these two scenarios is implemented, access to and benefit from the resources of the area would be denied to the greater part of the international community. The third—and most likely—arrangement to emerge from treaty discussions would be one allowing freedom of access to the resources—a strict transposition of the scientific research provisions of the Antarctic Treaty to the field of resource recovery. This is the approach advocated by the USA in the case of minerals and by most of the treaty parties in the case of krill fishing. At first glance it might appear to hold out promise for the international community. After all no one is to be barred from the area. Yet no more than a handful of countries will have the wherewithal to exploit Antarctica's non-living resources for some time to come, indeed perhaps until these are depleted. Similarly, the nature and behaviour of krill, the sophisticated techniques involved in harvesting, processing and marketing, and our general unfamiliarity with the resource will put it beyond all but the most advanced fishing nations.

Stretch the Treaty?

If the Antarctic Treaty is stretched to take in resource management it may fail in its initial objective of ensuring that Antarctica does 'not become the scene or object of international discord'. It must make room for other organizations and initiatives, such as the project planned by the UN Food and Agriculture Organization and the UN Development Programme to assist in the exploration, exploitation and utilization of krill for the world as a whole, not to mention more ambitious proposals put forward by the International Ocean Institute for the establishment of an International Fishing Enterprise. Apart from being more equitable such arrangements also go much further towards meeting the need for integrated management of the living resources of the Southern Ocean. The urgency of close co-ordination is evident—krill harvesting will determine sustainable whale fishing and vice versa.

Antarctic resources, and particularly the protein-rich krill, have a role to play in the construction of a new international economic order. However, they can scarcely be equitably exploited under the Antarctic Treaty umbrella. This does not mean that the entire settlement should be abandoned, nor that all the resources of Antarctica should be exploited. The recovery of offshore oil and gas may well be found to produce environmental hazards that are quite out of proportion to the amount of energy obtained. What it does mean is that if krill is to be fished for people and not for Japanese restaurants, German delicatessen counters or livestock, the management of resource exploitation should come under wider international auspices than those provided by the Antarctic Treaty. □

Excerpt from Marine Policy April 1977

Resources in Antarctica

Potential for conflict

Barbara Mitchell

The discovery of valuable resources in the Antarctic continental shelf and waters raises numerous potential conflicts. It calls into question the 1959 Antarctic Treaty in which twelve nations set Antarctica aside as a peaceful scientific preserve. Resource exploitation will not be easily accommodated in the present framework and the twelve are undecided as to whether it should take place. The choice also revives old jurisdictional disputes between these countries and triggers off new ones between the twelve and the rest of the international community. Solutions will require great ingenuity.

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Ms Mitchell thanks the General Services Foundation and the Nuffield Foundation for the financial assistance which made this research possible.

It was no accident that resource management was omitted from the 1959 Antarctic Treaty. The conflicts that the issue arouses would have prevented the conclusion of that agreement. Under today's changed circumstances, the controversy is greater still and this time the issue cannot be shelved.

Resources at stake

Interest in the economic potential of Antarctica is not new: whales and seals have been hunted in the area and over the years there has been intermittent speculation about the minerals that might be found under the ice cap. Of late, however, this interest has acquired a new and more urgent dimension.

It is the marine resources of the area, those found in the shelf and waters surrounding the continent, that are attracting immediate attention. In the first place, there are signs that the western continental shelf may contain oil and gas. The work of 'Eltanin' and 'Glomar Challenger' has indicated the presence of sediments, mostly of Tertiary age, in places as thick as 2000 metres. The finding of traces of ethane and methane in three of the four holes drilled in 1972-73 by 'Glomar Challenger' has lent further support to this theory.[1]

Inevitably, there has been speculation as to the amounts involved. In 1973, on the basis of the geological histories of the surrounding continents and exploration for oil and gas elsewhere, the US Geological Survey produced an estimate of the *discoverable* petroleum and natural gas resources of the continental margin of Western Antarctica. The total for the Bellinghausen, Ross and Weddell Sea was put at 45 billion barrels of oil and 115 trillion cubic feet of natural gas.[2] There has been serious questioning of the basis on which these figures were calculated, but 1976 US estimates, though less precise, are no more conservative. They suggest that the shelf could contain tens of billions of barrels of *recoverable* oil. (One third of discoverable oil is held to be recoverable.[3])

Offshore Antarctic exploitation will have to contend with the unique and extremely hazardous combination of icebergs and pack ice, but the technology required may not be very different from that being developed elsewhere. There is an increasing worldwide need for deep-water technology and subsurface completion systems. Several governments have already been approached by companies with preliminary enquiries about the possibilities of offshore exploration in Antarctica.[4] Even if Antarctic oil is never exploited, more exploration

[1] *Antarctic Resources*, Report from the informal meeting of experts, Oslo, Fridtjof Nansen Foundation at Polhogda, 30 May - 10 June 1973.
[2] Unpublished paper on Antarctic mineral resources, United States Geological Survey, 1973. See also N.A. Wright and P.L. Williams, *Mineral Resources of Antarctica*, United States Geological Survey Circular 705, 1974.
[3] C.D. Masters, 'Estimating the Antarctic oil resources', *The Washington Post*, 12 March 1975.
[4] *Nansen Foundation Report, op cit*, Reference 1.

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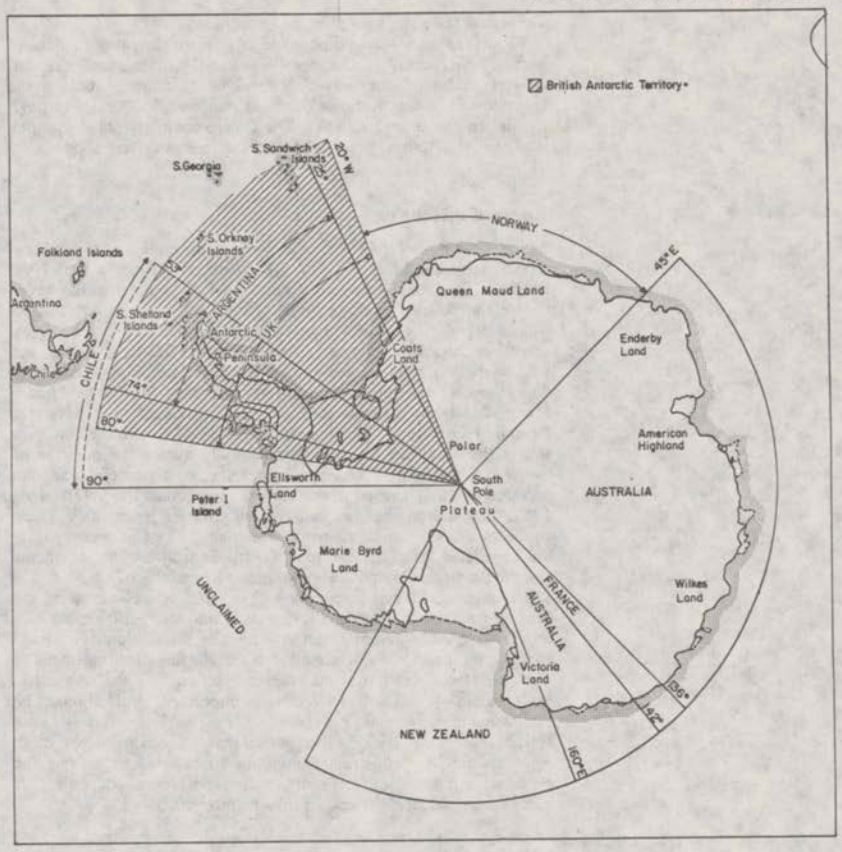
Figure 1 (including facing page). The claims made in Antarctica.

will raise many of the same problems. Furthermore, in other areas, oil companies have sought exclusive rights well before they wished to begin exploration.

The waters of the Southern Ocean contain a number of potentially important and currently underexploited food resources such as krill, squid and fish. The nutritional value, shoaling characteristics and abundance of krill single it out as a potentially valuable resource. It has a high protein content and is comparatively easy to harvest, although subsequently difficult to handle. The estimates of standing stocks and potential yield of krill to man vary greatly, but it is generally agreed that these are high in comparison to the stocks and yield of conventional fisheries. Recent Soviet papers quoted in a 1975



FAO report on krill consider the potential yield of stocks to be at least 100 million tons per year.[5] The Second Report of the UK Fisheries Research and Development Board suggests that an annual fishery of 50 million tons could be sustained.[6] Compared to a total world marine catch of 59·9 million tons in 1974 these figures are striking.[7]

Growing world food requirements and the encroachment of coastal-state jurisdiction on traditional fishing grounds will increase the pressure on governments, particularly those with distant-water fleets, to exploit krill. The Soviets have been active in this field for about ten years; both they and the Japanese are now marketing krill-based products. Experimental work was carried out by the West Germans, Chileans and Poles in 1975-76, and the Norwegians and

[5] Lagunov *et al* (1973), cited in *Informal Consultation on Antarctic Krill*, FAO Fisheries Reports, No 153, FAO, Rome, 1975.

[6] Fisheries Research and Development Board, Second Report, 1974/75, Her Majesty's Stationery Office, London.

[7] The estimated catch from all marine areas was 59 997 279 metric tons; *Yearbook of Fishery Statistics*, Vol 38, FAO, Rome, 1975.

Taiwanese have plans for a similar expedition in 1977.

Finally, reference should be made to a recent revival of the idea of harvesting icebergs.[8] In October 1976, Saudi Arabia announced that it had commissioned a study by a French engineering concern on the feasibility of towing icebergs over a distance of 5000 miles through the Indian Ocean and Red Sea. The Cicero company hopes that this study will lead to a contract to begin the actual work very soon.[9]

Roots of dissension

Between 1908 and 1942 claims to parts of Antarctica were made by Argentina, Chile, Norway, the UK, Australia, France, and New Zealand. Three of these overlap, although 15% of the area has never been claimed (see Figure 1). None of these claims has ever received wide recognition and, indeed, they are all vigorously contested by several countries with long-standing interests in the area; in 1924 the US asserted that it neither recognised nor claimed sovereignty in Antarctica, an example which was later followed by the Soviet Union. Japan, South Africa and Belgium do not possess and have not formally recognised any claims. In 1959 all twelve of these countries signed the Antarctic Treaty which skilfully avoids the question of ownership and simply sets the area aside as a peaceful scientific preserve. Although seven new members have joined the Treaty since 1959, only the original twelve have full consultative rights.[10] These countries are now discussing resource management in two separate but connected fora; the Antarctic Treaty Consultative arrangements and the Scientific Committee on Antarctic Research (SCAR).

The prospect of resource exploitation presents a challenge to the existing framework. First and foremost, it may detract from the four objectives of the present arrangements; the prohibition of military conflict, the promotion of scientific research, the encouragement of worldwide cooperation, and the protection of the Antarctic environment. These objectives are important and should be considered in more detail.

The Treaty begins with a recognition that 'it is in the interest of all mankind that Antarctica shall continue to be used exclusively for peaceful purposes and shall not become the scene or object of international discord'. Article 1 prohibits *inter alia*,

> any measure of a military nature such as the establishment of military bases and fortifications, the carrying out of military manoeuvres, as well as the testing of any type of weapons.

In 1959 there was apprehension that Antarctica might be used for the launching of ICBMs and the presence of the Soviets on the continent was viewed with alarm by the surrounding countries.[11] Although one should not overestimate the potential military role of Antarctica today, as long as the continent has any conceivable strategic value there are strong arguments for it to remain demilitarised. An important underpinning of this objective is the right of inspection enshrined in the Treaty.[12] All installations and equipment as well as ships and planes discharging or embarking cargoes or personnel are open to inspection by any of the consultative parties.

A second rationale for the Treaty was the 'substantial contributions to scientific knowledge resulting from international cooperation in scientific investigation in Antarctica.' Indeed, the

[8] W.F. Weeks and W.J. Campbell, 'Icebergs as a fresh water source: an appraisal', *Journal of Glaciology*, Vol 12, 1973 p 65. The Rand Corporation has assessed such a scheme for the National Science Foundation. See J.L. Hult and N.C. Ostrander, *Antarctic Icebergs as a Global Fresh Water Resource*, Rand Corporation, Santa Monica, CA, 1973.

[9] 'Saudi Arabia commissions iceberg study', *The New York Times*, 3 November 1976.

[10] Brazil, Czechoslovakia, Denmark, the German Democratic Republic, the Netherlands, Poland, and Romania have acceded to the Treaty.

[11] R.D. Hayton, 'The Antarctic settlement of 1959', *American Journal of International Law*, Vol 54, 1960, pp 348-371.

[12] The Antarctic Treaty, Article VII.

Treaty was in large part an offshoot of the work of the International Geophysical Year (IGY) in which Antarctica was selected as a special focus. Testifying before the US Senate Foreign Relations Committee conducting hearings on the Antarctica Treaty in 1960, the geologist Laurence Gould was convinced that

> The most important export of Antarctica is going to be scientific data. And that is terribly important indeed. There is no single field of geophysics which does not demand for its completion data which can come only from Antarctica.[13]

Although some would dispute this as being the overriding value of Antarctica today, and others feel that the science policy involved can never be easily isolated from economics and politics, Antarctica still has an important role to play in scientific research.[14]

The real significance of the present regime may be far less tangible. A product of the twin objectives of demilitarisation and scientific research, it was hinted at by the signatories when they declared their conviction that

> a treaty ensuring the use of Antarctica for peaceful purposes only and the continuance of international harmony in Antarctica will further the purposes and principles embodied in the Charter of the United Nations.[15]

It is, of course, impossible to assess the part played by the present Antarctic framework in alleviating world tensions. This would have been greatest in 1959 at the height of the Cold War when any rapprochement between the Soviets and the US was an achievement. Although one can exaggerate its value as a precedent or model for agreements in such areas as outer space and the seabed, Antarctic cooperation does seem to have had significant spin-off effects on joint scientific efforts in the Arctic and elsewhere.

Environmental protection has also been a central feature of the biennial Antarctic Treaty Consultative meetings since 1959. A number of recommendations have been passed dealing with specific aspects of the environment.[16]

Reassessment of objectives

Scientific research, demilitarisation, peaceful coexistence, and environmental protection are complementary goals. Exploitation, particularly of minerals, will not fit easily into this framework. One can hardly imagine companies welcoming inspection; the introduction of commercial interests into the area will almost certainly lead to restrictions on the freedom of movement and information, one of the mainstays of the existing arrangements. Exploitation and all it entails could also seriously impair Antarctica's role as a relatively undisturbed scientific laboratory. In general, the environmental implications of resource exploitation may be very serious indeed: it would be rash to tamper lightly with an ecosystem as delicately balanced and as important to the rest of the world as that of the Antarctic.[17] There will have to be a reassessment of goals in Antarctica.

There is, however, little agreement as to who should be making this reassessment. Neither claimants nor non-claimants abandoned their original stands on sovereignty when signing the Treaty. Furthermore, the Treaty itself adds a new layer of disputed jurisdiction, by effectively limiting the number of Consultative Parties. Consultative membership is only open to an acceding state

[13] Testimony of Laurence Gould, Hearings before the Committee on Foreign Relations, US Senate, 86th Congress, 2nd Session, June 1960.
[14] F.M. Auburn, 'The white desert', *International and Comparative Law Quarterly*, Vol 19, April 1970, pp 229-256.
[15] The Antarctic Treaty: the preamble to the Treaty.
[16] Of these, the Agreed Measures for the Conservation of Antarctic Fauna and Flora are generally considered to represent one of the most advanced conservation regimes in the world.
[17] B. Mitchell, 'Antarctica: A Special Case?', *New Scientist*, 13 January 1977.

during such time as ... (it) ... demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition.[18]

Isolated elements of the international community have never been very happy about this exclusion; the resource question threatens to make their discontent an international issue.

In short, the conflicts raised by the discovery of resources revolve around two main issues. First, how the area should be used and second, who should decide who is to use it. It should be noted that there is a limit to the extent to which these questions can be separated.[19]

Exploitation or moratorium?

As a decision on the future use of Antarctica is dependent on national priorities in the area, it is hardly surprising that the twelve have different views on the matter. As yet this debate is confined to their ranks although one might speculate, extrapolating from the Law of the Sea negotiations, that, should the developing countries become involved, they would favour strict regulation of any exploitation.

Of the twelve, the USA is markedly the most interested in mineral exploitation. The USA is the key player in Antarctic negotiations and in the best position to develop the technology to recover the oil and gas. To a certain extent the situation within the US Government bureaucracy reflects in microcosm the conflicts among the twelve over the future of the area.

Although the USA has consistently maintained that there is nothing in the Treaty forbidding exploitation, there have been some significant fluctuations in its policy in the past few years. A National Security Council Decision Memorandum (NSDM) of 1973 suggested that no country, including the USA, should exploit Antarctica's minerals unilaterally. It further recommended that the USA discourage any exploitation and exploitation-linked exploration in the near future, until Treaty nations had developed an approach.[20] The State Department, fearful that exploitation would end an era of peaceful cooperation, was reported to be advocating a moratorium.[21] However, the opposition of the resource-oriented agencies, Interior, Treasury and the Federal Energy Administration, which wanted the USA to retain the option of unilateral exploitation, did much to neutralise the effect of the NSDM.[22] Statements made by the US delegation in the June 1975 Antarctic Treaty meeting indicate that the resource-oriented agencies have had considerable impact.[23] The USA held out the very real threat of unilateral action:

In the absence of a shared understanding, those countries who do not recognise claims to sovereignty would surely have to assert the right to commence mineral resource activities at their will, subject only to applicable provisions of the Antarctic Treaty.[24]

As the energy crisis intensifies the pressures for unilateral exploitation will increase, but there are indications that the USA will continue to stress the importance of strict environmental control in the event of mineral exploration and exploitation. It recently commissioned an environmental impact statement on the effects of mineral extraction from the Institute of Polar Studies at Ohio State University.

There could not be greater contrast between this position and that taken by the Soviet Union and Japan. Such is the vehemence of the Soviet Union's opposition to offshore oil exploitation that the agenda of a meeting convened in Paris in June 1976 to consider the subject

[18] The Antarctic Treaty, Article IX:2.

[19] For example, support provided by Argentina and Chile for a moratorium on exploration and exploitation is at least in part a move to prevent inroads being made into their 'sovereignty'.

[20] J. Rose, 'Antarctic condominium: building a new legal order for commercial interests', *Marine Technology Society Journal*, Vol 10, No 1, 1976, pp 19-27. D. Shapley, 'Antarctica's future: will Oslo talks on resources mean that scientists have to move over?', *Science*, Vol 187, 7 March 1975, pp 820-821.

[21] D. Shapley, 'Antarctica: world hunger for oil spurs Security Council review', *Science*, Vol 184, 17 May, 1974.

[22] J. Rose, *op cit*, D. Shapley, *op cit*, Reference 20.

[23] D. Shapley believes the resource agencies lost that round of the battle. D. Shapley, 'North Pole, South Pole resources eyed', *Science*, Vol 189, 1 August 1975, p 365.

[24] Statement by Dr Robert E. Hughes, US Representative, Eighth Antarctic Treaty Consultative Meeting, 12 June 1975.

'"Antarctic resources – the question of mineral resource exploration and exploitation" in all its aspects in relation to the Treaty' had to be peppered with qualifications and reservations, and it proved impossible to convene another formal meeting to discuss the subject. The Soviet Union is proposing a renewable moratorium of ten to fifteen years on the 'industrial' exploration and exploitation of mineral resources.

Both the Soviet Union and Japan are stressing the environmental argument. Noting that the USSR has the largest and most explicitly resource-oriented geological research programme in Antarctica, observers put forward other explanations for its position. According to one school of thought, the USSR is simply anxious to gain time in which to develop the technology to compete on an equal footing with the USA for the prime mineral sites. Another possibility is that the USSR might be seeking to discard the Treaty and curry favour with the Third World. Alternatively, those responsible for the Soviet scientific research effort in Antarctica may be anxious not to lose their large research budget.

As mentioned above, the opposition of Argentina and Chile to exploitation can be traced, in large part, to apprehension about losing control over their territorial claims. Chile, which imports 60% of its oil, has stated that it will favour exploitation when its claims are recognised. There are, however, signs of a new environmental awareness in these two Latin countries, and as the nearest Treaty parties to the Antarctic continent they have every reason to be sincere in this matter.

Until recently, New Zealand was also adamantly opposed to any mineral exploitation. In June 1975 it proposed that the area be declared an international park. Whether for reasons of its own economy or the need to find a realistic solution to the problems of the twelve, it is now prepared to face the eventuality of exploitation. Every emphasis, however, is given to environmental control.[25] The French, in spite of a difference of views between the various departments concerned, are also in favour of going ahead.

Within the twelve virtually every shade of opinion on mineral recovery, from firm advocacy of a moratorium to assertion of the right to exploit, is to be heard. In comparison, the krill debate is a quiet one. Krill exploitation is not felt to present such a threat to the environment and the Treaty regime, and besides, a considerable number of Treaty powers consider living resources to be high-seas resources. The Soviet Union, Japan, and possibly Chile have already made substantial investments in krill exploitation. A difference seems to have emerged, however, between the Sovet Union and the rest of the group. The USSR appears to have been boycotting the meetings of the SCAR Group of Specialists on the Living Resources of the Southern Ocean as though it were reluctant to be bound by any management decisions that might be reached in that forum. The remaining eleven might decide to tackle this resource on an entrepreneurial basis. In this case it would be a good idea if each country undertook to exchange catch statistics and limit annual increases in fishing effort.

Solidarity over living resources has probably been increased by a 'threat' from outside. The FAO, in conjunction with UNDP, is considering a project to assist in the exploration, exploitation, and utilisation of the living resources of the Southern Ocean for the benefit of developing countries as well as Antarctic Treaty Parties.

[25] Informal Working Paper submitted by New Zealand to Paris meeting on Antarctic mineral resources, June-July 1976.

Claimants v non-claimants

Perhaps the most immediate problem facing the twelve is the old jurisdictional one from within their own ranks. This tangle has remained unchanged since 1959. The resource issue has undermined the consensus which existed among the twelve that the questions it raised could be left unanswered. The clash over mineral-resource exploitation is really one between concepts of sovereignty and freedom of access. Claimants claim ownership of resources in their sectors and the adjacent shelves, and non-claimants would like freedom of access to the resources of the entire area.

The position of Argentina and Chile has changed little over the years. Their claims are inextricably bound up with national pride and prestige. According to their national legislation, and perhaps more importantly, according to domestic public opinion, the Antarctic sectors are part of metropolitan territory. As Argentina said at the opening of the Washington meeting at which the 1959 Treaty was signed, '... Antarctica has taken root and established an awareness in the soul of the Argentine Nation.'[26] The demonstrations of ownership have been endless: maps have been drawn, churches built, and once the Argentine Cabinet went so far as to hold a session on the ice.[27]

Refusal to concede sovereignty has always been a basic condition of any agreement by the two Latin states to participate in Antarctic negotiations. Proposals made by the USA in 1948 that the small group of countries involved in Antarctica should merge their claims and interests were unacceptable to Argentina and Chile.[28] At the time their idea of cooperation was limited; Chile stated that it was only interested in international cooperation in scientific studies, the possibility of concluding an agreement providing for the exchange of information, and a formula to avoid incidents of an international character which might affect cordial relations. Several authors indicate that the Latins were reluctantly dragged into the Treaty:

> ... faced with a widely popular, concrete proposal, and the likelihood that the conference would be held in any event, Chile and Argentina agreed to participate.[29]

The Latins are showing signs of a greater willingness to compromise. Words and concepts such as 'regime' and 'Antarctic Treaty system', formerly anathema to them, are becoming more acceptable. It has even been suggested that they might be prepared to contemplate exploitation by others in 'their' areas in return for payment of royalties.

In contrast to the Latins, Australia supported the US initiative which resulted in the 1959 Treaty, although it felt that the whole project could be better approached on a minimum essential basis. In recent talks Australia seems, however, to have retreated to a more territorialist position and has virtually joined ranks with Argentina and Chile.

The fight against the claims is lead by the USA. Despite the protests of writers, private citizens and Senators, it has consistently refused to make a claim. This may not be unconnected with the fact that after the war the places to which the USA might have asserted rights were claimed by the UK, New Zealand, Argentina, and Chile, countries with which it was undesirable to have a clash of interests. The largest and most interesting parts had gone. The USA has, however, always reserved the right to make claims, but, despite

[26] Conference on Antarctica, Washington, DC, 15 October 1959, mimeo, cited by R.D. Hayton, *op cit*, Reference 11.
[27] 'Argentina's capital: a polar island', *The New York Times*, 11 August 1973.
[28] J. Hanessian, 'The Antarctic Treaty, 1959', *International and Comparative Law Quarterly*, Vol 9, July 1960, pp 436-477.
[29] R.D. Hayton, 'Polar problems and international law', *American Journal of International Law*, Vol 52, 1958.

renewed speculation, there seems little likelihood of this happening. A predictable corollary of this position is the refusal to recognise claims. Less predictable are the lengths to which the USA is prepared to take this view. Over mineral-resource exploitation it steadfastly refuses to make any concessions to the territorial claimants.

Thus in 1975 it said:

> Non-discriminatory guaranteed access by the USA and others for exploitation purposes to any part of the Antarctic Treaty area except specially protected areas is critical to avoid prejudicing our underlying juridical position.[30]

Less extreme are the positions taken by Belgium, New Zealand, Norway, the UK and France. Belgium, itself a non-claimant, is prepared to go some way towards meeting the aspirations of claimants and particularly those of the southern hemisphere. New Zealand and Norway are probably the least committed of the claimants. Under Prime Minister Walter Nash, New Zealand told its partners at the Washington Conference that it was prepared to forego its claim.[31] Although it accepted the final compromise it was disappointed that a more imaginative and adventurous solution had not been adopted. This was very much Nash's personal view, but traces of it are to be found in New Zealand's policy today. Norway has taken a similar, if somewhat lower-profile stand. In 1948 it was prepared to accept proposals to amalgamate claims in the area. According to one commentator, Norway's claim, made only in 1939, was essentially designed to forestall a move on the part of the Germans, and 'to be on the safe side' in the case of an eventual settlement. The maintenance of this claim might well prove an embarrassment to Norway with its limited resources and manpower.[32]

The UK has been a firm advocate of the merging of claims and interests in the area and in 1958 launched an initiative designed to bring this about.[33] It has always maintained the need to ensure that knowledge of the Antarctic and freedom of access to it should not be limited by political considerations, and would have preferred an organisation vested with effective and comprehensive powers to the arrangements that were agreed upon at the 1959 Washington Conference.[34] But in recent years the UK's internationalist approach, particularly to the minerals issue, has been muted.

Perhaps some of this spirit will re-emerge today. France with severe energy problems at home and the smallest claim (well under a twelfth of the continent) might also be persuaded to compromise.

In spite of these moderating influences, the outlook is not promising. Although most claimant states are willing to compromise they would be unable to move as far as the US position requires. In this respect perhaps it is the USA and not the traditional villains of the piece, the claimants, who should be chastised for holding up agreement.

For the time being it is unclear whether the ownership of living resources will give rise to such dispute between the twelve. The present state of flux of the Law of the Sea and particularly of coastal-state jurisdiction is reflected in the Antarctic. Most of the claimant states claim territorial seas and the Latins have already proclaimed 200-mile zones off their territories, an example which other claimants may well follow. It is uncertain whether such declarations would be accompanied by attempts to maintain exclusive control over the living

[30] 'US policy with respect to mineral exploration and exploitation in the Antarctic', Hearing before the Subcommittee on Oceans and International Environment of the Committee on Foreign Relations, US Senate, 94th Congress, 1st session, 1975.

[31] 'Opening statement by New Zealand representative', Conference on Antarctica, *op cit*, Reference 26.

[32] F. Sollie, 'Arctic and Antarctic – current problems', *Conflict and Cooperation*, Vol 2, 1969.

[33] J. Hanessian, *op cit*, Reference 28.

[34] *Ibid*. See also Conference on Antarctica, *op cit*, Reference 26.

resources within the zone. The non-claimants, of course, consider all these waters to be high seas.

International community v the twelve

In 1975 the subject of Antarctica was raised at the UN Economic and Social Council and General Assembly by the representative from Sri Lanka.[35] In May 1976 Guinea insisted that control over the proposed FAO/UNDP Southern Fisheries Programme be shared equally by developed and developing countries, pointing out the need for a new Antarctic Treaty. The Chinese are also showing signs of interest while some Arab countries are proposing that the future Seabed Authority take Antarctica under its wing, and manage the offshore oil reserves.[36] It may be only a matter of time before a coordinated protest movement gets under way.

How serious is this conflict likely to be? How adamant are the twelve about excluding the international community?

In the past a number of the twelve spoke of the need to open Treaty membership to the international community. In an article in *Soviet News* in 1958 the USSR suggested that the projected international treaty would be much more effective if all states wishing to do so were to take part in discussion of the question.[37] The matter was of interest not only to those states already carrying out work but to those which would like to undertake work in the future. The article gave as an example the interest of India. Walter Nash consistently promoted the idea of an international regime.[38] After the Washington Conference, New Zealand stressed its view that the settlement did not set up a monopolistic regime for the twelve. Although the UK envisaged that administration would remain in the hands of the twelve, it also wanted the widest possible range of countries to be included in the agreement. It was, furthermore, its understanding that the Treaty would be 'almost entirely a self-denying ordinance on the part of the signatories, who will derive from it virtually no privileges but only obligations'.[39]

Perhaps the possibility of resource exploitation has altered the picture. Certainly, informal talks held at the Nansen Foundation in 1973 revealed very little interest in widening the debate.[40] The only new countries that are likely to be admitted to consultative membership are West Germany and Poland, and this on the strength of their activities in the area.

While it appears that there will be no move to prevent non-Treaty countries from enjoying the living resources, no attempt will be made to assist in this process. Thus most Antarctic Treaty Consultative Parties are apprehensive about the expensive FAO/UNDP proposals mentioned above. There is a marked preference for a regulated version of the principle of freedom of access.

With regard to minerals, the same freedom of access is advocated by non-claimants but opposed by the claimants. It is, besides, a particularly illusory freedom in the case of offshore oil and gas extraction which will be open only to the technologically powerful. However, the idea elaborated in the Law of the Sea negotiations, that the minerals of the deep seabed are to be shared by mankind, has done much to persuade the twelve of the necessity of sharing revenue from mineral exploitation in Antarctica with the international community.

[35] UN Documents E/AC.24/SR 555-581, and A/PV. 2380.

[36] 'Why does the Polar Bear intrude into Antarctica?', *Hsinhua News Agency*, 30 April 1976.

[37] 'The future of the Antarctic, text of Soviet Embassy's reply to United States State Department', *Soviet News*, 9 June 1958.

[38] 'Remarks by PM Nash suggesting a UN trusteeship', *The Times*, January 1956, cited by J. Hanessian, *op cit*, Reference 28. Walter Nash proposed the establishment of Antarctica as a 'world territory' under the control of the UN.

[39] Conference on Antarctica, *op cit*, Reference 26.

[40] *Nansen Foundation Report*, *op cit*, Reference 1.

Solutions

In the days when a famous geologist could declare that he 'would not give a nickel for all the resources of Antarctica', it was possible to sidestep the question of resource management.[41] Today it is not.

The conundrum is harder than ever to solve. New rifts have appeared while old ones remain. First, 'outsiders', particularly the developing countries, have 'found their voice' and are objecting to their exclusion from discussions. On the whole these moves are rejected by the Antarctic Treaty powers. Second, even if habits of cooperation established by the Treaty have made it possible to discuss a subject that was taboo in 1959 the differences between parties do not appear to have diminished. Indeed, there is now a real possibility that the USA will voluntarily turn to the international community in an attempt to overcome the obstacles it considers claimants are presenting to the achievement of US goals.

There are no easy solutions. At the Paris talks on mineral-resource exploitation, the New Zealand delegation tabled a discussion paper which goes some way to producing compromises in the three areas of conflict.[42]

In the first place, it suggests that the twelve designate certain geographical areas as prohibited zones for the purpose of resource exploration and exploitation. In the rest of the area the approval of a Regulatory Committee is required before there can be any exploration or exploitation. A Participating Government considering the initiation of activities will submit a proposal to the Committee with details of the nature and extent of the proposed activity and an environmental impact assessment. The paper stresses:

> It shall be the responsibility of the proposing Government to demonstrate that the activities proposed do not substantially or materially damage the Antarctic environment.[43]

The unanimous agreement of the Regulatory Committee is required before exploitation can be carried out. The idea here is that applicants will come to an informal understanding with the claimant or claimants involved in order to forestall a possible veto. This may involve payment of a fee or acceptance of a degree of control by the claimant. In common with the 1959 Treaty this proposal sidesteps the problem of ownership.

In the third area of disagreement, the status of 'outsiders', the paper also makes intriguing suggestions. It is proposed that the Declaration outlining these arrangements for mineral recovery be brought to the attention of the United Nations in order to obtain the support and involvement of the international community. More specifically, although the Regulatory Committee is to be initially composed of representatives of the twelve original signatories of the Antarctic Treaty, representatives of other states and international organisations may be invited to attend as observers. Furthermore, it is recommended that the participating governments indicate their recognition of the need to share any proceeds of resource exploitation on a just and equitable basis with the international community, with due regard to the legal status of the continent and shelf, the efforts of countries which have participated in developing the continent and the needs of the developing countries.

Such a solution deserves consideration. Although the problems are different, an exercise of similar mental ingenuity might produce an answer to the issue of living resources.

[41] Testimony of Laurence Gould, *op cit*, Reference 13.
[42] New Zealand Informal Working Paper, *op cit*, Reference 25.
[43] *Ibid*.

Barbara Mitchell gained a Translator's Diploma at the School of Interpreters, University of Geneva, a Conference Interpreter's Diploma at the Polytechnic of Central London, and the degree of MA in International Relations at the University of Sussex. Before taking up her present position she was engaged in research at the Institute for the Study of International Organisation at the University of Sussex. She is currently involved in the Antarctic Project at the International Institute for Environment and Development. Her main publications include 'The Campaign Against Waste; report of a meeting held in Louvain on 12 December 1975' (distributed by the European Environmental Bureau, Vautierstraat 31, B1040 Brussels, Belgium), and 'Antarctica: a special case?', New Scientist, 13 January 1977.

Senator PELL. Thank you very much, indeed, Mr. Stein.

Mr. Meeker, the committee is pleased to hear from you now.

STATEMENT OF LEONARD C. MEEKER, DIRECTOR OF INTERNATIONAL PROJECT, CENTER FOR LAW AND SOCIAL POLICY, WASHINGTON, D.C.; ACCOMPANIED BY JOHN ROBINSON, INTERN, CENTER FOR LAW AND SOCIAL POLICY

Mr. MEEKER. Thank you very much, Mr. Chairman.

With me this morning on my left is John Robinson, a colleague from the Center for Law and Social Policy.

Rather than review my statement here for the record, I would like to concentrate on just a few major points.

REGIME FOR LIVING RESOURCES

First of all, it seems to the organizations on whose behalf I am appearing this morning that the most urgent requirement is for the parties to the Antarctic Treaty to address first a regime for living resources. That is true because those resources are already being exploited on an experimental basis which will soon become commercial.

There is need, also, for a regime to deal with exploitation of the mineral resources, and that should come next.

KNOWLEDGE OF KRILL LACKING

At the present time, as has been pointed out this morning, there is really no dependable knowledge about the size of the stock of krill or about the proper and sustainable amount of harvest of krill that could be carried on. Information of that sort can be obtained only as a result of careful study.

INTERIM LIMITS ON EXPLANATION OF KRILL RECOMMENDED

In order not to take imprudent steps now and in order not to disturb the accuracy of studies that should be undertaken, we would favor very strongly the adoption immediately of some interim limits on exploitation of krill as from now. Those limits could not be related to what a sustainable yield of stock would be because we don't know that yet. Those limits ought to be related instead to the current fishing effort with respect to krill. We should try to hold exploitation of krill in the immediate future to levels not greatly above what is currently being taken. Then, we should also arrange for the establishment, by treaty, of a permanent regime. This regime ought to have a number of features.

REGULATORY BODY

First of all, it will need a regulatory body which will set the permissible take of living resources. It must allocate those as between countries, otherwise total overall quotas would be ineffective.

SCIENTIFIC BODY

The regime must also have, we think, a scientific body independent of the regulatory body. The purpose of the scientific body is to conduct fundamental basic research and studies and also to express itself quite independently of any political pressures or considerations as to what the facts are on the Antarctic ecological system from time to time, and let the regulatory body know the condition of the stocks and also its view as to what is sensible harvesting.

APPROPRIATE FUNDING

There needs to be funding, certainly, appropriate funding, both for the research that would be carried out by the scientific body, and funding for the personnel, the management personnel, that would be required by the regulatory body.

ENFORCEMENT PROCEDURES

I think what Mr. Scully has proposed in regard to enforcement is a very practical way of proceeding. There do need to be international observers and they can be funded and arranged for by the international regulatory body.

The regime should be open to any parties to the Antarctic Treaty and also to other countries which may later become active in the exploitation of living resources. Only in this way, only if the treaty does cover all those who are the major actors in exploitation, can it be effective and can the environment of the area be properly protected.

VETO RIGHTS

No country under the regime should have veto rights. There should be appropriate dispute settlement provisions, perhaps through a decision of the International Court of Justice, or in some other way which could not be frustrated by the objections of a single party to the treaty or a party to the dispute.

LIMITATIONS ON NATIONAL EFFORTS

We think that in addition to having quotas on overall catch and national quota limits, it would be altogether prudent to have limitations on national efforts, because if there are simply quotas alone, what can happen is that each country participating in the arrangement may over-capitalize in its fishing effort and then, once having a larger fleet than would really be justified by the quota allocated to that nation, pressures may develop which tend to be irresistable over time to increase the quotas, not in terms of what science would tell you and good sense would tell you make sense, but in terms of what the economic and political pressures of participating countries would be.

Those, I think, are our first views on a regime.

Senator PELL. I thank you.
[Mr. Meeker's prepared statement follows:]

PREPARED STATEMENT OF LEONARD C. MEEKER ON BEHALF OF THE ENVIRONMENTAL DEFENSE FUND, FRIENDS OF THE EARTH, NATIONAL AUDUBON SOCIETY, NATURAL RESOURCES DEFENSE COUNCIL, AND THE SIERRA CLUB

I appreciate the opportunity to appear before you today on behalf of five environmental groups, the Sierra Club, Friends of the Earth, National Audubon Society, Environmental Defense Fund and Natural Resources Defense Council,[1] to discuss U.S. policy regarding the conservation and protection of Antarctica's living resources. These organizations have had a long history of interest in Antarctica and the protection of its resources. We have urged consistently for the last severeal years that United States policy on Antarctica be developed publicly. We have been concerned that the U.S. was developing its Antarctica policies with no substantial public input and with only limited guidance from Congress. We are encouraged now that the State Department has taken the initiative to establish an Advisory Panel on Antarctica, and that public members are being included in delegations to international meetings. It is also a positive development that the Department is complying with NEPA in drafting an environmental impact statement on the proposed regime.

We appreciate the action of the Subcommittee in scheduling on short notice a hearing on the Antarctic region. Congressional oversight regarding the future of Antarctica has been minimal in recent years. Closer attention by the Congress is fully warranted as we enter the critical stage of resource exploitation in Antarctica. We think it is appropriate and constructive for the Executive Branch to receive advice from the Senate concerning Antarctica before any new international agreements are presented to the Senate for formal action.

Since 1973, the Antarctic Treaty powers have discussed minerals and living resources in some detail, but always in secret. The original parties to the Treaty deliberately chose not to establish an open international organization. All consultative meetings, normally held every two years, are secret. All recommendations to the individual governments at these meetings must be unanimous. At the consultative session held in London last September, the Treaty parties agreed to draft a living resources regime during 1978.

A number of nations, including the USSR, Japan, Germany, Poland, South Korea, the Republic of China (Taiwan), and Chile, are now developing commercial fishing capabilities, primarily for krill. Oil and gas are widely believed to exist in Antarctica in significant quantities, although they may not be exploitable for some time. What happens at the forthcoming special consultative session in Canberra regarding a living resources regime could have substantial implications for other resource exploitation in the future.

The initial focal point of the living resources regime is krill, a small crustacean of high protein composition. Krill is a principal link in the food web of the Southern Ocean. Krill may have the potential to become a major world fishing product. The present total world marine fish catch is about 60 million tons per year. Some experts have estimated that perhaps 50 million metric tons of krill could be harvested annually on a sustainable basis, but this could cause serious ecological consequences.

There is general agreement among scientists that the ecological structure of the Antarctic region is extremely vulnerable to disturbance. Moderate changes in the density or number of particular organisms could destabilize conditions for others. Most experts agree that it is impossible at this time to establish scientific fishing limits for krill or to define with any degree of precision the

[1] EDF, whose principal place of business is 475 Park Avenue, New York, New York 10016, has a membership of approximately 45,000 persons and a 700-member Scientists' Advisory Committee, including members residing in 18 foreign countries. FOE, whose principal place of business is 124 Spear Street, San Francisco, California, 94105, has a membership of 20,000 persons and is affiliated with "sister organizations" in 12 foreign countries. The National Audubon Society, whose principal place of business is 950 Third Avenue, New York, New York 10022, has a membership of approximately 340,000 persons, including members in more than 100 foreign countries. NRDC, whose principal office is 122 E. 42nd Street, New York, New York 10017, and which has additional offices in Washington, D.C. and Palo Alto, California, has a membership of approximately 22,000 persons, including members residing in 8 foreign countries. The Sierra Club, whose principal office is at 530 Bush Street, San Francisco, California 94104, has a membership of approximately 180,000 persons, including persons residing in 67 foreign countries.

interrelationships between krill and other species. Because exploitation of marine resources in the Antarctic is likely to be ecologically significant in the near future, adequate data must be obtained quickly if the normal functioning of the ecosystem is to be understood. Without accurate baseline data before massive exploitation, it will be virtually impossible to evaluate the effects of human intrusion on the ecosystem and to develop a sound strategy for the exploitation of Antarctica's resources. Up to now, no such data-gathering has been done.

At the outset, some maximum level of exploitation of krill must be set for the initial years of the regime, until sufficient data are available to set scientifically sound limits. For example, a biologist at the United Nations Food and Agriculture Organization currently takes the view that an annual krill harvest in excess of a few million tons may adversely effect both krill stocks and the organisms that feed on krill. The environmental organizations therefore propose that commercial exploitation of Antarctic marine living resources be limited to their present levels, with only specified annual increments allowed, until such time a rational, effective conservation regime can be established. This is the most responsible position to take in view of the paucity of data available about the Antarctic ecosystem.

We recognize that an interim, graduated limitation on commercial exploitation may be difficult to achieve because of political considerations, but this action seems essential if the Consultative Parties intend to develop a true conservation and management regime. There is no way to justify the negotiation of a living resources regime that lacks an effective management component based on sound conservation principles.

Nations that are signatories to the Antarctic Treaty obligate themselves "to exert appropriate efforts" consistent with the United Nations Charter "to the end that no one engages in any activity in Antarctica contrary to the principles or purposes" of the Treaty. The Treaty provides a consultative mechanism for consulting and recommending to member governments measures regarding, inter alia, preservation and conservation of living resources in Antarctica." While the Treaty is silent as to exploitation and disposition of Antarctic resources, it seems clear that any resource exploration and exploitation in the Antarctic Treaty area, regardless of who does it, ought to be conditioned on appropriate environmental protections.

The environmental organizations are concerned lest the Consultative Parties approve at the Canberra session a regime for exploitation of living resources that does not embody appropriate environmental protection as required by the Treaty. In this connection, we are troubled particularly by the statement in the Final Report of the Ninth Consultative Meeting, ANT/IX/63(Rev.) (October 12, 1977), at page 4, that "the regime would exclude catch allocation and other economic regulation of harvesting." This statement, if carried to its logical conclusion, holds the possibility that key aspects of a rational management regime might be excluded. Particularly when coupled with the Consultative Parties' desire to establish a "definitive" regime by the end of 1978, the danger of a weak regime founded on inadequate data seems obvious unless special precautions are taken. The issue of national effort restrictions and catch allocations must be dealt with in the regime, even if only by a formula related to the accumulation of scientific data. It is only too easy to foresee even a conservative total catch limit being practically unenforceable if there is no agreement on national quotas.

The United States is now preparing its position for the special consultative session in Camberra. In order to ensure that the proposed regime amounts to more than a system for the exchange of information, we would suggest that the U.S. proposal for the marine living resources regime should include at least the following features:

1. The regime should provide for the effective conservation of marine living resources of the Antarctic ecosystem as a whole, not limited to the area South of 60 degrees South. A principal purpose of the regime should be to establish a management system that sustains stocks in accordance with the maintenance of the integrity of the Antarctic marine ecosystem. We note that this was a stated goal of the Consultative Parties in recommending that a living resources regime be established. We urge that the United States do everything possible to begin implementing conservation at once, on an interim basis before the regime is adopted and made operative.

2. The regime should create an independent regulatory body to carry out management and conservation mandates. Such an entity should have the power to:

(*a*) call for appropriate research on Antarctica's resources and natural processes;

(*b*) adopt appropriate, mandatory regulations to assure that any harvesting of resources takes place in accordance with sound conservation principles, including such items as catch limits, country allocations, effort and gear restrictions, closed seasons, prohibited areas, protected species, and effective environmental controls over all vessels and equipment;

(*c*) enforce its regulations, including the power to conduct investigations and inspections, and to monitor the exploitation activities of all countries.

3. The regime should establish an independent scientific body whose principal functions would be to coordinate and carry out appropriate research and to disseminate data about all relevant aspects of the Antarctic ecosystem. This body would respond to specific requests for data and research from the regulatory body, would undertake studies on its own initiative, and would obtain scientific information from other sources. All information and data compiled by the scientific body should be public. A principal goal of the scientific body should be to understand the food chain energetics of the Antarctic ecosystem sufficiently to allow optimal programs of exploitation for man's benefit, considering all relevant factors. This body must have the power to assess the status of stocks and fix appropriate harvesting levels.

4. The regime should embody the principles set forth in Article IV of the Antarctic Treaty. In this and other respects, the regime should be treated explicitly by the Consultative Parties as a measure in furtherance of the principles, purposes and objectives of the Antarctic Treaty. The regime should be embodied in a new Treaty negotiated among the Consultative Parties and other states actively engaged in research or exploitation of Antarctic marine living resources, with the participation as well of the Food and Agriculture Organization. The regime should be open to accession by states that, in the future, become Consultative Parties or demonstrate the desire and capability to engage actively in research or exploitation.

5. The regime should provide a mechanism for the funding of necessary research and management personnel to assure that its goals and responsibilities can be met. In this connection, we urge that the Biomass project be fully funded and implemented. As the report of SCAR/SCOR meeting at Woods Hole in 1976 states:

> With a few exceptions, little is known of the biomass and productivity of the living marine resources [of Antarctica] other than the marine mammals. . . . [H]arvesting should be planned and managed on the basis of a knowledge not only of the population dynamics of the resource itself, but also of its interaction with the other parts of the ecosystem.
>
> The present size and annual production of the krill population of the Southern Ocean is unknown except within broad limits. Crude guesses have been based on estimates of primary productivity, ecological efficiency, and the role of krill relative to other herbivores in the region.
>
> Between the period of *Discovery* investigations in the 1930's and the recent work on krill, which has been mainly directed towards studying the possibilities of commercial harvesting of krill, biological research in the open waters of the Southern Ocean has been grossly neglected. Greatly increased research efforts are now required. . . .

Biomass will fill large gaps in our understanding of Antarctica and the Southern Ocean, and will provide information necessary for the wise management of its resources. Even if funded as anticipated, however, the basic research program contemplated by Biomass will not be completed until 1986. Therefore, we urge that the living resources regime explicitly provide for utilization of Biomass results.

6. The regime should take account of the desirability of allocating some significant portion of the protein resources of the Southern Ocean among those nations which are most protein deficient. The living resources of the Southern Ocean constitute an important potential source of protein for the world. It is evident, however, that only a few nations now possess the capital and technological capability to harvest krill commercially. In deciding on any regime, it

should not be assumed automatically that the fruits of exploitation would go only to the exploiting nations. Rather, consideration should be given to a regime that would recognize and give effect to the needs of protein-deficient countries. In this respect, Antarctica presents an opportunity for peaceful and constructive cooperation among members of the international community for the common good of all.

7. The regime should reject the concept of veto rights in its voting structure. All decisions should be made on the basis of a majority, perhaps two thirds. Disputes should be settled through binding arbitration or decision of the International Court of Justice. Once promulgated, the rules adopted by the regulatory body should be binding on all parties to the new Treaty. The regulatory body's decision-making process should be open to the public.

In order to avoid the failures of other international efforts to regulate marine resources, the regime must draw all nations engaged in exploitation into its regulatory sphere, must establish uniform enforcement of its conservation regulations, and must deal with the problem of overcapitalization of industry which has led inevitably in the past to overexploitation. In this connection, we note that the establishment of quotas on a first-come, first-served basis stimulates capitalization, which in turn creates enormous pressure to liberalize quotas to cover the investment. Effort limitations must be considered to be linked to any quota arrangement.

CONCLUSION

All of mankind shares an interest in ensuring that the geophysical, biophysical and biological processes of Antarctica are not harmed significantly by human activities. Contrary to the impressions of many, the Antarctic is not an isolated or quaint phenomenon. Rather, it plays an important role in the global natural processes that control life on earth. Antarctica influences natural events elsewhere, and is in turn influenced by environmental changes in other parts of the world, although we do not have detailed knowledge as to how these processes work. As the National Academy of Sciences has stated:

> The relationships appear to be such that it is not exaggerating to say that a geophysical change such as a glacial shift on the Antarctic continent or an unusual warming can affect shelf ice, changing the distribution of sea ice, altering the process by which waters recirculated to the South become cold again, sink, and travel outward in the abyssal circulation, changing the locations of waters of a given temperature interacting with the atmosphere very far to the north, shifting the breeding regions of marine life and the growing regions of weather-vulnerable crops.

Antarctic waters are among the world's most biologically productive. Antarctic bottom water flowing to the north carries nutrients to important fisheries in many parts of the world. What would it take to disturb the natural processes sufficiently to cause seriously adverse consequences? At our present level of knowledge, we simply do not know.

Antarctica presents man with a rare opportunity to act carefully and responsibly in imposing comprehensive international controls before living resources are overexploited or otherwise damaged irreversibly. An ecosystem approach as opposed to a focus on only one species has been agreed to at the Ninth Consultative Session under the Antarctic Treaty. While whales and seals covered by other conventions apparently will not be regulated directly by the new regime, it is to "take into account the relationship of such species to those species covered by the regime." The regime will extend north of the Antarctic Treaty's jurisdiction to cover areas north of 60 degrees South latitude "where that is necessary for the effective conservation of species of the Antarctic ecosystem. . . ." It is essential that these positive and far-sighted principles not be lost during the negotiation of a framework providing for proper management of Antarctic living marine resources. As the Draft EIS acknowledges, there are dangers in a gradualist approach to regulation. Evidence from other efforts to conserve marine resources leads directly to the conclusion that "after-the-fact" regulation is not effective, primarily because of the substantial economic stakes that exist when exploitation develops without regulation.

We trust that the United States will continue to play a strong leadership role regarding Antarctica, so that this opportunity is not lost. Although the U.S. has no present commercial interest in the commercial harvesting of Antarctica's living resources, this country is a leader in research on Antarctica. The U.S.

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has a strong interest in the conservation of Antarctica's resources, and in assuring that valuable new protein resources be developed for the world. Finally, we have an interest in preventing international conflict over Antarctica and its resources. The proposed regime should be an important step in accomplishing our overall policy goals for Antarctica. It will be a model for a later regime dealing with Antarctica's mineral resources.

Thank you, Mr. Chairman, for this opportunity to offer our views. We appreciate your holding hearings on this important and so far not well-publicized issue.

Senator PELL. I appreciate very much the specific nature of your presentation.

I am struck by your thought that the limitation should not be on quotas but on efforts. I guess an analogy would be the old idea that if the bar is going to close at 12, people may tend to drink too much, knowing that it will close relatively early, and if they knew it would stay open longer, they would probably drink less. I like the specific nature of your suggestions.

STATE DEPARTMENT REACTION TO MR. MEEKER'S SUGGESTION

I would like to get a reaction, if I may, from Mrs. Mink or Ambassador Brewster concerning their thoughts if we get anywhere down this specific path, which is where I would like to see us go.

Ambassador BREWSTER. Mr. Chairman, there are some very substantial points of agreement.

First, we do, of course, agree that we must address the marine living resource question first, then the minerals.

We suggest that there be an interim level or an interim limit on catch.

This is one suggestion the representative of the Center made at a public meeting on December 20, which we are reviewing prior to making a final decision on it.

With respect to catch levels for nation states, we have not yet taken an agency position on this. But my own view is that it would be premature to do it now, premature because I don't think it is negotiable ab initio.

We agree entirely that there must be a scientific body and that it must be independent.

We agree that there has to be a mechanism for funding for personnel and other things.

We also agree that it should be open to the Antarctic Treaty parties and to others for fishing. That is, in fact, the purpose of the two-step approach: first negotiating a draft regime in the Antarctic Treaty forum and then having a second Conference to which other countries will be invited to act upon and adopt the final instrument.

We agree that there should be no veto, and that the convention should provide for some kind of dispute settlement.

With respect to limitations on national efforts, this is an idea that I have no personal view on, and again, there is no position of the Government on this.

Senator PELL. Thank you.

Mr. LEVENTHAL. Mr. Chairman, might I just add one thought?

Senator PELL. Certainly, Mr. Leventhal.

NATIONAL QUOTAS

Mr. LEVENTHAL. This is on the question of whether or not there should be national quotas.

I think it is reasonable to expect that if, in the course of negotiation, a total quota were established, or a total quota system, what might yet evolve from that, by means of informal agreement among the parties, would be national allocations, similar to what is now done, under the International Whaling Convention, whereby the total quotas are established and the parties meet informally to work out understandings as to what the national catches should be.

So, it may be at this point a distinction without a difference if ultimately there is an understanding among nations which have the principal activity in krill. Under such an understanding national allocations could be worked out.

Senator PELL. Thank you.

MORATORIUM ON MINERAL EXPLOITATION

What is the view of the panel here with regard to a moratorium on mineral exploitation? Do you feel that there should be one?

I find that I personally am torn on that point. I think we ought to know a little bit more, at least with regard to mineral exploration, if not exploitation.

What are your views?

Mr. MEEKER. The Soviet Union has, in fact, proposed a moratorium on exploitation.

Senator PELL. But there is no moratorium on exploration at this time, is there?

Mr. MEEKER. Not so far as I know.

It seems to me that the first thing that has to be done is to find out, if possible, what is probably there, and that will require a good deal more exploration. It may take some period of time.

I would think that as that process goes forward, it would be sensible to begin setting up a regime to govern exploitation of mineral resources. Just as in the case of living resources, I don't think the regime can itself specify quotas or national allocations. But the regime should provide a structure of machinery which can make decisions and arrange for formal allocations, if that is the way the parties prefer to do it.

NGO INPUT INTO DEVELOPMENT OF GOVERNMENT POSITION

Senator PELL. Do you feel that your groups have had an adequate opportunity to make an input into the Government's development of its position?

Mr. MEEKER. I think that for the first time now we are having that opportunity and we appreciate it very much. There has been the problem, to which you referred and which Ambassador Brewster has discussed also, of the confidential character of documents. Of course, the business of the Antarctic Treaty parties is public business and is not to any visible extent marked by security considerations. So, I would think that rather generally documents which are exchange among the

parties, their proposals and other documents, should be accessible to the public. Not all the processes of negotiation naturally will be disclosed. I think everyone understands that. But some practical accommodation can be worked out and I think it should be, over a little time.

We appreciate very much the State Department's action in moving to set up an advisory committee and in including some representatives of nongovernment organizations in the delegations to meetings.

If those members of delegations are enabled to share their knowledge and to share the documents to which they have access at the meetings, then we will have moved quite a way forward.

Senator PELL. Mr. Stein?

Mr. STEIN. I would agree with what Mr. Meeker has said and add that from my experience, the U.S. Government is much better than many others in the way it both permits nongovernmental participants to take part in the governmental decisionmaking and planning before it goes to conferences, and includes nongovernmental individuals as representatives on official governmental delegations. I think that this is a good thing, and hopefully a little bit of it will rub off as it goes on. I would support Mr. Meeker, again, in hoping that the United States will continue to push rather hard for opening these documents and the processes to others, because there are many scientists and environmentalists in many countries who do have a very active interest in the future of Antarctica.

One question exists about the moratorium. Again, I would agree with Mr. Meeker. I was looking the other day through the very excellent book by Jessup and Taubenfeld on Antarctica and outer space, which was written in 1959, at which time they said that there was a lot of coal in Antarctica, but first, it was of a very low grade and second, it was in a position where nobody would really want to get it out.

Of course, times have changed substantially since then, and I think that the nature of the regime and what the environmental hazards would be should certainly be worked out in advance of any exploration and exploitation.

Senator PELL. I think the view you are advancing is that of a "Mother Earth" viewpoint. But looking ahead, has private industry expressed much in this area? I would direct this question to the representatives of the Department of State. As you know, in the deep seabed, private industry has taken a very strong role. Has it expressed the wish to be participating in these negotiations?

Ms. MINK. No, I know of no such expression of interest in participating in this.

Senator PELL. So, speaking for the environmentalists, in this area at least, in this particular global commons, you have a clear field, or so it would seem.

Mr. STEIN. For the time being.

Senator PELL. That is why it is important, I think, to work out as specific a treaty as can be done.

I thank you all very much, indeed, for being with us.

This hearing is concluded and the committee is adjourned.

[Whereupon, at 12:47 p.m., the subcommittee adjourned, subject to the call of the Chair.]

APPENDIX

UNITED STATES
DRAFT
CONVENTION FOR THE CONSERVATION OF ANTARCTIC
MARINE LIVING RESOURCES

The Contracting Parties:

RECOGNIZING the importance of the Antarctic marine ecosystem;

NOTING the concentrations of marine living resources found in Antarctic waters and the possible potential of these resources as a source of protein;

CONSCIOUS of the urgency of ensuring effective conservation of Antarctic marine living resources and of maintaining the health of the Antarctic marine ecosystem as a whole;

CONCERNED that unregulated exploitation of these resources could threaten the Antarctic marine ecosystem and its component species;

RECOGNIZING that there is a general international interest in ensuring effective conservation of these resources and in maintaining the health of this ecosystem;

DESIRING to maintain the ecosystem structure, and the relationships among its component species so as to preserve a full range of conservation options for future generations;

RECOGNIZING the aesthetic and scientific, as well as nutritive values of these resources and the ecosystem of which they are a part;

CONSIDERING it essential to increase knowledge of the Antarctic marine ecosystem and its compontents so as to be able to base exploitation decisions on information adequate to assess the impacts thereof;

AWARE that it is in the interest of all mankind to preserve the waters surrounding the Antarctic continent for peaceful purposes only and to prevent their becoming the scene or object of international discord;

RECALLING the Antarctic Treaty;

DESIROUS of furthering the principles and purposes of the Antarctic Treaty;

RECALLING the Agreed Measures for the Conservation of Antarctic Fauna and Flora, adopted under the Antarctic Treaty;

RECALLING also the International Whaling Convention and the Convention for the Conservation of Antarctic Seals;

Have agreed as follows:

ARTICLE I

1. This Convention shall apply to the Antarctic marine ecosystem.

2. For the purposes of this Convention:

A. The Antarctic marine ecosystem includes the marine areas south of the Antarctic convergence and all species of living organisms, including birds, found therein, as well as the relationships and interactions of those species with each other and with their physical environment.

B. Antarctic marine living resources means the populations of any species referred to in subparagaph A, above.

ARTICLE II

1. The Contracting Parties agree that any harvesting and processing of Antarctic marine living resources by their nationals and vessels take place in accordance with the provisions of this convention.

2. In particular, the Contracting Parties, shall ensure that their nationals and vessels comply with conservation measures adopted by the Commission established pursuant to Article V, including application of sanctions to their nationals and vessels for any violation of such measures.

3. The Contracting Parties agree that harvesting by their nationals and vessels shall be conducted so as to take maximum advantage of the vessels' presence in the ecosystem in order to provide needed data, identified by the Commission, on the direct or indirect impacts of harvesting on target species and indicator species.

ARTICLE III

Any harvesting of Antarctic marine living resources shall take into account the potential need to restore depleted stocks and shall be conducted in accordance with the following conservation standard:

A. Prevention of the depletion of any target, dependent, or related populations of Antarctic marine living resources to levels below those which produce the greatest net annual increment in population, number or biomass, and

B. Prevention of any irreversible or long-term changes in the structure and species composition of the Antarctic marine ecosystem or in the relative abundance of target, dependent, or related populations of Antarctic marine living resources.

ARTICLE IV

1. The Contracting Parties shall provide to the Commission all catch and effort statistics for their nationals and vessels engaged in harvesting of Antacrtic marine living resources.

2. The Contracting Parties shall, to the greatest extent feasible and practicable, provide to the Commission, the results of studies relevant to the conservation of Antarctic marine living resources.

ARTICLE V

1. The Contracting Parties hereby establish the Commission for the Conservation of Antarctic Marine Living Resources (herein referred to as the Commission).

2. The Commission, acting on the advice of the Scientific Council established pursuant to Article VIII, shall be responsible for the development, adoption, and revision of conservation measures to implement the conservation standard set forth in Article III.

3. The Commission, in addition, shall perform the following functions:

A. Acquisition of data on the status and dynamics of the Antarctic marine ecosystem;

B. Acquisiton of data on the status and trends of populations and on factors affecting the distribution, size, and productivity of target and associated populations of Antarctic marine living resources;

C. Acquisition of catch and effort statistics on harvested populations of Antarctic marine living resources;

D. Analysis and dissemination and publication of the information referred to in subparagraphs A, B, and C above;

E. Identification of conservation needs and monitoring of the effectiveness of the conservation measures;

F. Establishment of an observer system to oversee compliance with the provisions of this Convention and conservation measures adopted pursuant thereto;

G. Identification of resarch needs with regard to Antarctic living marine resources and the Antarctic marine ecosystem and promotion or conduct of studies needed to identify and evaluate conservation measures; and

H. Such other activites as are necessary to fulfill the purposes of ths Convention.

4. The Commission, in perforing its functions, shall rely on the work and recommendations of the Scientific Council.

ARTICLE VI

1. Each of the Contracting Parties shall be represented on the Commission by one representative (or alternate) who may be accompanied by appropriate advisers.

2. Each Contracting Party represented on the Commission shall have one vote.

3. Decisions of the Commission on matters of substance, including the adoption of conservation measures and their later revision, shall be taken by the affirmative vote of two-thirds of the Contracting Parties present and voting. All other decisions, including decisions on whether a matter is one of substance, shall be taken by simple majority of those present and voting The Commission shall determine by simple majority of those present and voting the other rules of procedure for the conduct of its meetings.

4. The Commission shall meet annually, and in special session if called by the Chairman of the Commission upon determination of the existence of a matter requiring the urgent attention of the Commission or upon the request of one-third of the Contracting Parties represented in the Commission.

5. At its first meeting, the Commission shall elect from among the Contracting Parties, there represented, a Chairman and Vice-Chairman, each of whom shall serve for a term of two years and shall be eligible for re-election but not to a succeeding term.

6. The Commission shall establish its headquarters at _____ and, unless otherwise decided by the Commission, all meetings of the Commission shall be held at its headquarters. The first meeting of the Commission shall be held within six months of the entry into force of this Convention.

ARTICLE VII

1. The Commission shall appoint an Executive Secretary, from among a list of candidates submitted by the Contracting Parties, who shall serve at the pleasure of the Commission. The Executive Secretary, subject to such rules and procedures as may be determined by the Commission, shall select, direct and supervise the staff of the Commission.

2. The Executive Secretary and staff shall perform all functions entrusted to them by the Commission, including, inter alia:

A. Preparing budget estimates for review by the Commission;

B. Authorizing the disbursement of funds in accordance with the Commission's budget;

C. Accounting for the funds of the Commission;

D. Maintaining coordination with the organizations referred to in Article XIV of this Convention;

E. Providing for the acquisition, analysis, dissemination and publication of the information and data referred to in Article V, Paragraph 3;

F. Preparing scientific, administrative and other reports for consideration by the Commission and its subsidiary bodies.

ARTICLE VIII

1. The Contracting Parties hereby establish the Antarctic Scientific Council.

2. The Scientific Council shall:

A. Establish criteria and methods, including data standards, confidence levels, and identification of indicator species, to be used for determinations concerning the conservation measures referred to in Article V;

B. Regularly assess the status and trends of the populations of Antarctic living marine resources and of the Antarctic marine ecosystem as a whole;

C. Analyze data concerning the direct and indirect effects of harvesting on the populations of Antarctic marine living resources and the ecosystem as a whole;

D. Assess the effects of proposed increases in harvesting and proposed conservation measures;

E. Transmit recommendations to the Commission regarding measures and research to implement the conservation standard set forth in Article III; and

F. Conduct such other acitivities as the Commission may direct to carry out the purposes of this Convention.

3. Each Contracting Party may appoint qualified experts to serve as members of the Scientific Council. Such members shall serve in their individual capacities.

4. In the performance of its functions, the Council shall provide the most objective and thorough analyses possible and base its recommendations solely upon biological-ecological considerations, and shall provide written reports describing the assumptions, data, and methods upon which research and management recommendations are based.

5. The Council shall publish the assessments analyses, reports, and recommendations it provides to the Commission.

6. The Council shall determine its own rules of procedure and organization. The Council shall meet as frequently as is necessary to make its assessments, analyses, reports, and recommendations available to the Commission on a timely basis.

7. The Contracting Parties shall make their initial appointments of experts to serve on the Scientific Council within two months of the entry into force of this convention and transmit their names to the depositary Government. The Council, at its first meeting, shall determine its rules of procedure and organization, employing for this purpose the rules of procedure set forth in Article VI.

ARTICLE IX

The Commission may establish such subsidiary bodies as it deems necessary to fulfill the purposes of this Convention.

ARTICLE X

1. The Commission, at each regular meeting, shall adopt a budget for the expenses of the Commission and its subsidiary bodies for the following year.

2. For the first five such budgets after entry into force of this Convention, the expenses of the Commission and its subsidiary bodies shall be shared equally by the Contracting Parties.

3. For the sixth annual budget of the Commission, and those thereafter, one half of the expenses of the Commission and its subsidiary bodies shall be shared equally by the Contracting Parties. The other half of the budget shall be contributed by the Contracting Parties in accordance with the proportion of the total catch of Antarctic marine living resources taken by their nationals and vessels and on the basis of a precise formula to be adopted by the Commission.

ARTICLE XI

1. The conservation measures referred to in Article V, may include all steps the Commission considers necessary to fulfill the purposes of this convention. These measures may address, inter alia:

A. protected and unprotected species;

B. the overall quantity of any species which may be caught;

C. the size, sex, and age of species which may be caught;

D. open and closed areas, including special areas for the protection and scientific study of particular species;

E. limitations upon fishing effort;

F. regulation of fishing gear and fishing techniques.

2. Conservation measures, adopted by the Commission in accordance with Artice VI, Paragraph 3, shall be binding and shall enter into

force ninety days after the Commission notifies them to Contracting Parties. Conservation measures, once adopted, shall remain in force until revised by the Commission in accordance with Article VI, Paragraph 3.

3. Contracting Parties proposing changes in conservation measures shall provide to the Scientific Council and the Commission data and analyses, together with any other relevant information that may be available, to assist in providing assurance that the proposed changes are consistent with the conservation standard set forth in Article III.

4. In adopting conservation measures, the Commission shall take into consideration any relevant regulations or measures established pursuant to the International Convention on Whaling or the Convention for the Conservation of Antarctic Seals, and shall ensure that there is consistency between the obligations under such regulations and measures and conservation measures which may be adopted by the Commission.

ARTICLE XII

The Contracting Parties agree to conduct their activities with respect to any taking of whales and seals within the Antarctic marine ecosystem in such manner as to comply with, or be no less protective, than any relevant conservation regulations or measures established pursuant to the International Whaling Convention and the Convention for the Conservation of Antarctic Seals.

ARTICLE XIII

1. The Contracting Parties agree that the international observer scheme provided for in Article V, Paragraph 3, Subparagraph H, shall include the following elements:

A. Each Contracting Party may designate observers and transmit their names to the Commission.

B. The names of observers designated shall be transmitted to the Commission which shall certify those qualified and maintain an up-to-date register of qualified observers.

C. Each observer certified by the Commission shall have freedom of access to vessels engaged in harvesting or processing of Antarctic marine living resources within the Antarctic marine ecosystem.

D. Contracting Parties whose vessels engage in harvesting or on-board processing of Antarctic marine living resources

Convention shall be interpreted as affecting the provisions of Article IV of that Treaty.

2. The Contracting Parties agree that nothing in the present Convention shall be interpreted as affecting the views of any Contracting Party as to the nature and extent of coastal state jurisdiction over the living resources of the sea recognized under international law.

ARTICLE XVII

Each of the Contracting Parties undertakes to exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in the seas to which the present Convention applies contrary to the principles and purposes of the present Convention. Each Contracting Party agrees to notify the Commission of any such activity which comes to its attention.

ARTICLE XVIII

1. If any dispute arises between two or more Contracting Parties concerning the interpretation or the application of this Convention, these Contracting Parties shall consult among themselves with a view to resolving the dispute by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, or other peaceful means of their choice.

2. Any dispute of this character not so resolved shall, with the consent, in each case, of all parties to the dispute, be referred to the International Court of Justice for settlement, but failure to reach agreement on reference to the International Court shall not absolve the parties to the dispute from the responsbility of continuing to seek to resolve it by any of the various peaceful means contemplated in Paragraph 1 of this Article.

ARTICLE XIX

1. This Convention may be amended at any time. The text of any amendment proposed by a Contracting Party shall be submitted to the Depositary, which shall transmit it to all the Contracting Parties.

2. If one-third of the Contracting Parties request a meeting to discuss the proposed amendment, the Depositary shall call such a meeting.

3. An amendment shall enter into force when the Depositary has received the instruments of ratification or acceptance thereof from all the Contracting Parties.

within the Antarctic marine ecosystem, or in scientific research on such resources shall inform the Commission of the times and places of embarkation of those vessels, the duration of their voyages, and their anticipated times and places of debarkation.

ARTICLE XIV

1. The Contracting Parties agree that there should be a working relationship between the Commission and the Food and Agriculture Organization of the United Nations, the International Whaling Commission, and any Commission established pursuant to the Convention for the Conservation of Antarctic Seals. The Commission shall undertake to establish those relationships.

2. The Contracting Parties agree that there should be a working relationship between the Commission and the Scientific Committee on Antarctic Research and the Scientific Committee on Oceongraphic Research of the International Council of Scientific Unions. The Commission shall undertake to establish those relationships.

3. The Contracting Parties agree that there should be cooperation between the Commission and international fisheries commissions and conservation and scientific organizations which could contribute to the work of the Commission. The Commission may establish appropriate relations with such commissions and organizations.

4. The organizations referred to in Paragraphs 1 and 2 above may participate as observers in the work of the Commission and its subsidiary bodies. In addition, the Commission may invite other appropriate international organizations, non-governmental organizations, and governments which are not members of the Commission to participate as observers in the work of the Commission and its subsidiary bodies.

ARTICLE XV

1. Each Contracting Party shall provide to the Commission, in such form and at such intervals as the Commission shall prescribe:

A. The data referred to in Article V;

B. A complete account of steps it has taken to implement the conservation measures adopted by the Commission.

ARTICLE XVI

1. The Contracting Parties affirm the provisions of Article IV of the Antarctic Treaty and agree that nothing in the present

ARTICLE XX

This Convention shall be open for signature at _____ from _____ to _____ 1978 by States participating in the Conference on the Conservation of Antarctic Marine Living Resources held at _____ from _____ to _____ 1978.

ARTICLE XIX

This Convention is subject to ratification or acceptance. Instruments of ratification or acceptance may be deposited with the Government of _____, hereby designated as the Depositary.

ARTICLE XX

This Convention shall be open for accession by any other State which is engaged in harvesting or Antarctic marine living resources or in substantial research on such resources.

ARTICLE XXI

1. This Convention shall enter into force on the thirtieth day following the date of deposit of the eighth instrument of ratification or acceptance.

2. Thereafter this Convention shall enter into force for each ratifying accepting, or acceding State on the thirtieth day after deposit by such State of its instrument of ratification, acceptance, or accession.

ARTICLE XXII

Any Contracting Party may withdraw from this Convention on 30 June of a year by giving notice on or before 1 January of the same year to the Depositary, which upon receipt of such a notice shall at once communicate it to the other Contracting Parties. Any other Contracting Party may, in like manner, within one month of the receipt of a copy of such a notice from the Depositary, give notice of withdrawal, so that the Convention shall cease to be in force on 30 June of the same year with respect to the Contracting Party giving such notice.

ARTICLE XXIII

The Depositary shall notify all signatory and acceding States of the following:

A. Signatures of this Convention , the deposit of instruments of ratification, acceptance, or accession and notices of withdrawal;

B. The date of entry into force of this Convention and of any amendments to it.

ARTICLE XXVI

1. This Convention, done in the English, French, Russian, and Spanish languages, each version being equally authentic, shall be deposited in the archives of the Depositary Government which shall transmit duly certified certified copoies thereof to all signatory and acceding States.

2. This Convention shall be registered by the Depositary pursuant to Article 102 of the Charter of the United Nations.

IN WITNESS WHEREOF, the undersigned, duly authorized, have signed this Convention.

Done at----------

ANTARCTIC TREATY
SPECIAL PREPARATORY MEETING

ДОГОВОР ОБ АНТАРКТИКЕ
СПЕЦИАЛЬНОЕ ПРИГОТОВИТЕЛЬНОЕ СОВЕЩАНИЕ

TRAITÉ SUR L'ANTARCTIQUE
REUNION PREPARATOIRE SPECIALE

TRATADO ANTARTICO
REUNION PREPARATORIA ESPECIAL

PARIS 28 JUIN 1976

ANNEX C
RPS - 10

ANTARCTIC MINERAL RESOURCES

Document presented by the
United States Delegation

This informal assessment was prepared for internal use within the U.S. Government. It brings together information from a variety of sources. Comments would be welcome.

1976

(109)

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ANTARCTIC MINERAL RESOURCES

1. Summary and Conclusions

a. Land Areas

Geological theory and scientific findings indicate a strong likelihood that significant deposits of hard minerals are present in the Antarctic land mass, but a small likelihood that this is true for petroleum. Although hard mineral occurrences have been discovered, the magnitude and quality of the occurrences have not been determined, so they should not be thought of as mineral resources. In addition, the economics of exploration, extraction, and transportation in the land areas are such that no industrial exploitation of most hard minerals appears likely in the foreseeable future. It is possible that if large high-grade deposits of rocks containing high value metals such as platinum or chromium were discovered in relatively accessible areas, it might be economically feasible to exploit them. Among the mineral occurrences discovered, only iron and coal have actually been found in quantity. However, the low grade and remote location of the iron and coal have made exploitation economically unfeasible, even in the case of coal for local use.

b. Offshore Areas

(1) Manganese Nodules. The valuable metal content of manganese nodules declines progressively with distance from the equator, and those on the Antarctic seabed have significantly less valuable metal content than nodules found elsewhere. They are considered, therefore, not to be of commercial interest for the foreseeable future.

(2) Hydrocarbons. Interpretation of the geologic and geophysical data so far accumulated indicates a good probability that quantities of oil or gas or both are present in the Antarctic continental shelf. At the same time, these data are insufficient to establish the probabilities of occurrence of economically recoverable deposits of petroleum. The combination of water depth, ice conditions, severe weather, transportation costs, and short annual working time imply production costs of such magnitude that other areas will be more attractive to industrial exploitation for some time, given current assumptions on the economics of hydrocarbon development.

Industrial mineral resource activities that normally precede industrial exploitation could commence at almost any time with little forewarning.

2. Stage of Antarctic Mineral Resource Development

No significant steps have been taken in Antarctica to develop its mineral resources, although the geologic and geophysical studies so far carried out will be useful to such an effort. The various papers on mineral resources (Potter, 1969; Nansen Conference report, 1973; Wright and Williams, 1974; Splettstoesser, 1975) have been treatments of existing knowledge of mineral resources. They have not addressed the problem of the magnitude, character, and regional location of any of the undiscovered mineral resources. The data and analyses available from the basic research programs are insufficient for a reliable resource assessment.

3. Onshore Mineral Resources in Antarctica

Minerals of possible commercial interest in the Antarctic land mass may include hard minerals, coal, and petroleum. A number of general considerations appear to reduce the likelihood that the Antarctic land mass will be considered an area of interest for most types of commercial mineral activity in the foreseeable future. First, approximately 98 percent of the land mass is covered by a permanent ice sheet of varying depth. While this still leaves a substantial area ice-free and it is in these areas that mineral occurrences have been noted, by and large the technical difficulties and expense of overland transport through the surrounding ice and snow to possible ports of export could be immense. Second, it is generally agreed among geologists that there is little likelihood of petroleum deposits on the land mass, which reduces the potential finds to hard minerals. However, virtually all hard mineral production requires large quantities of fresh water, and to keep it liquid in the Antarctic during processing would, of course, place a greater processing expense on such operations than in most other mineral-producing regions. Third, current experience in land-based mining in Northern Canada indicates that it may be difficult to obtain or to keep an adequate labor force at a reasonably competitive wage scale.

The following statement of the Technical Working Group of the Expert Meeting on Antarctic Resources, which was held in Oslo in June 1973 under the auspices of the Nansen Foundation, is also of interest in connection with the assessment of the relative economic potential of the Antarctic land mass:

"In relation to the land area it was noted that, although there have been a large number of mineral occurrences in the Antarctic, none of these appeared likely to be commercially attractive within the present century. The Working Group had available to them less geological and geophysical information about the continental shelf area than about the land area. An opinion was expressed, however, that the continental shelf is inherently more accessible to investigation."

Despite the foregoing pessimistic appraisal, it may nevertheless be desirable to consider the possible development of deposits for particular minerals of outstanding interest, discussed below.

4. Overview of Specific Onshore Minerals

Occurrences have been noted by scientific expeditions of the following:

Metals		Nonmetals	
Beryl	Manganese	Coal	Optical quartz
Chromium	Molybdenum	Graphite	Phosphate rock
Cobalt	Nickel	Marble	Sand and gravel
Copper	Platinum	Mica	
Gold	Silver		
Iron	Tin		
	Uranium		

The U. S. Geological Survey has published a compilation and analysis of reports of Antarctic minerals (Circular 705). The mineral occurrences are described in this circular as " . . . occurrences that could constitute a resource if present in sufficient quantity but that have not been studied adequately to determine quantity." In terms of likelihood of discovery, the report states that the best discovery probability in any part of Antarctica is in the Andean orogen, where it is estimated to be 0.075 (75 chances in 1000). Should advances in technology permit a cheaper, more precise search through the ice, exploration might be more effective in the future. Prediction of such advances, however, is purely speculative. Two metals appear of notable interest: chromium and platinum. In addition to these, there is strong current interest in manganese nodules from the deep seabed, and the energy minerals, coal and petroleum. Each of these minerals is discussed below.

a. Chromium and Platinum

The Dufek intrusive complex is one of the world's

largest layered complexes. Other such complexes are the Bushveld in South Africa and the Sudbury in Ontario, both of which rank among the most valuable mineral districts in the world. It is possible that the Dufek intrusive complex is also highly mineralized, although available data are inadequate to make an accurate appraisal of its potential. If it is mineralized it should contain deposits of platinum nickel, copper, and chromium. Platinum and chromium in particular would be of interest as they are relatively scarce world wide resources.

The mineral chromite is essential as refractory linings of high temperature furnaces, and for the production of chromium metal, which is used as a steel-alloying element or a corrosion-resistant plating. All known chromium ores are mixtures of chromite and other minerals, and generally must be concentrated through flotation or other processes using fresh water before being marketed. Any activity requiring large quantities of fresh water in the Antarctic would be highly energy-intensive and not competitive in this respect with current sources of chromite.

Platinum is essential in many industrial processes as a catalyst. Recently, platinum and associated platinum group metals have seen an expansion of demand for catalytic converters on automobile engines.

b. Coal

According to the Geological Survey, coal deposits are known at many places around the perimeter of East Antarctica. Available information, although by no means conclusive, suggests that coalbeds are present from coast to coast under most of the great central ice mass. The Geological Survey suggests that the known Antarctic coal deposits could perhaps be used locally for heating and power production. However, this has not been done to date, and there has been no evidence of commercial interest in these deposits, nor is there likely to be as the value of coal is too low to consider for export from Antarctica.

c. Land-based Oil and Gas

U. S. Geological Survey Circular 705 states:

"The onshore part of Antarctica, for all practical purposes, can be eliminated from a discussion of petroleum resources, although large basins have been inferred by geophysical sounds (for example, Wilkes basin and Polar basin). The land is covered by a very thick cap of ice that is in large part moving, and the sedimentary rocks that do stick out through the ice are largely metamorphosed, highly fractured, and intruded by igneous rocks. These conditions are not conducive to the preservation of oil and gas."

5. Offshore Mineral Resources

a. Manganese Nodules

The only hard mineral identified as potentially mineable offshore in the Antarctic consists of manganese nodules. With respect to this mineral, Wright and Williams (U. S. Geological Survey Circular 705) state:

"Nodules that accumulate near the equator are metal-rich, whereas those that accumulate farther from the equator are leaner in metals. For this reason, the manganese nodules of the Antarctic environment represent the least desirable segment of the nodule resources of the oceans. This is not to say, however, that they could not be considered for mining at some later date."

This opinion conforms to those of representatives of the companies known to be interested in harvesting manganese nodules. The area of current interest is generally stated as the Pacific Ocean near the equator. Considering the greater distance and more more limited access to the Antarctic waters, because of the presence of ice, the above-quoted statement and conclusions appear reasonable.

6. Offshore Oil and Gas

As in the case of neighboring continents, the Antarctic continental shelf may be expect to be made up in part by thick, unmetamorphosed sedimentary rocks. This is confirmed by the fragmentary data so far collected by marine geologic surveys.

Several years ago methane and ethane were encountered in stratigraphic drilling in the Antarctic continental shelf under the Ross Sea. However, the information from various scientific projects studying the geologic origins of Antarctica, as well as some geophysical surveys, is insufficient to determine the existence of hydrocarbons in commercially interesting quantities. The necessary seismic, magnetic, and gravity tests have not been run. Such tests would have to be done before any drilling would be justified to test areas of promise. Lacking this work, assessments can be derived from public information generated by scientific research in the area, and would necessarily reflect a conservative view of resource potential so as not to raise unrealistic hopes as to resource potential or industry capacity to produce in the area.

Given the dearth of information on the area, any numerical estimates would be considered only as order of magnitude guesses and not as hard figures without further research. Specific evaluation will have to await results of extensive seismic, magnetic, and gravity surveys to determine the location of possible oil-bearing structures. Following that, exploratory drilling would be necessary before a decision could be taken concerning commercial production opportunities.

With these caveats in mind, it appears that the Antarctic continental shelf could contain potentially recoverable oil in the order of magnitude of tens of billions of barrels, but it is less likely that no potentially recoverable resources occur or that even larger amounts exist. The most prospective areas indicated by present knowledge are the Mesozoic section of the Weddell Sea Basin, the Cenozoic portions of the Ross Sea Basin, the basin underlying the Amery Ice Shelf, the Bellingshausen Sea, and the Scotia Sea.

Weddell Sea

Geological characteristics of the Weddell Sea continental shelf are little known, but possibly can be inferred from nearby on-land exposures. Folded Paleozic sediments of great thickness occur in the Pensacola and Ellsworth Mountains, and great thicknesses of folded Paleozoic(?)-Mesozoic marine sediments make up the 1,500 km-long Antarctic Peninsula adjoining the western part of the sea. On James Ross Island, 5,000 m of Upper Cretaceous continental to marine clastic sediments are exposed and are overlain by a thick Tertiary sequence. This section contains good reservoir and cap rocks as well as shales that might be good source rocks. Slight folding might provide structural

traps. Upper Cretaceous continental to marine clastic sediments may underlie much of the shelf.

Water depths over the Weddell Sea continental shelf are not well-known because of the difficulty of ship access. Nevertheless, depths over nearly all of the shelf are believed to range from 600 to 1500 feet. The permanent ice pack extends over most of this area to beyond the 3000 feet depth line. The only exceptions are narrow belts along the coasts of Coats Land and near the tip of the Antarctic Peninsula where some open water forms in February.

Ross Sea

The Ross Sea continental shelf is underlain mostly by glacio-marine sediments of Oligocene to Holocene age. This section, which is about 5,000 feet thick, contains some permeable sandy horizons. Broad folds occur and may provide structural traps. Showings of methane were obtained from three of the four drill holes in the central part of the sea and near McMurdo Sound, and ethane was obtained in one drill hole; however, the significance of these gas shows is not known, and they do not necessarily indicate the presence of larger amounts of hydrocarbon. Basement materials below the Tertiary section are poorly known, having been sampled at only one site where they are crystalline metamorphic rocks. Elsewhere, older sediments similar to those in the nearby Transantarctic Mountains may occur. Sedimentary sections of great thickness and ranging in age from late Precambrian to Mesozoic characterize the mountain area, but no hydrocarbon occurrences are known or expected there.

Most of the continental shelf in the Ross Sea has water depths between 600 and 3,000 feet. Only very small areas are shallower than 600 feet, and less than half is shallower than 1,500 feet. Although the entire sea is covered by pack ice throughout most of the year, open water forms over most of the area for a month or more during summer. Even the discontinuous pack ice is typically present in a belt separating the ice-free area from the open sea, and icebergs remain a problem in the entire area. Furthermore, surface currents would put strong pressure on any surface installations that did not move with the ice.

Bellingshausen Sea

The sea is normally covered by pack ice for the entire year except for a narrow band along the coast (Ellsworth Land) that is ice-free, or nearly so, in February. The depth over the shelf is almost exclusively between 600 and 3,000 feet.

Tertiary sediments similar to those of the Ross Sea area can be expected to underlie the continental shelf of the Bellingshausen Sea. Drilling to date has penetrated only about 700 feet of Pliocene and younger clay and silty clay offshore from Thurston Island and 2,000 feet of Oligocene to Pliocene terrigenous clastic sediments offshore from the Antarctic Peninsula. No gaseous hydrocarbons were apparent in the cores. The geology of onshore regions includes mainly Mesozoic and Tertiary and sedimentary and volcanic materials similar to those of the South American Andes.

Scotia Sea

Only a small part of the southern end of this sea is south of 60°s. The marine geology of the Scotia Sea is very poorly known, in large part probably due to the typically inclement weather and heavy seas. Weather forced early abandonment of the one attempted drill hole. The geology of continental shelf areas is probably similar to that of the Bellingshausen Sea.

Amery Ice Shelf

The Amery Ice Shelf is partially restricted to a fjord. Seismic data indicate the presence of 3,500 meters of sediments. Onshore outcrops include 500 meters of Permian sandstones. This section of Antarctica is analagous to the coastal basins of India, West Africa, and Brazil. The presence of reefoidal limestones and black shales indicates the possibility of oil source rocks.

While a relatively narrow zone of pack ice remains along the coast adjacent to the Amery Ice Shelf during the warmest two to three months, much of this East Antarctica Continental Shelf has ice conditions that are considerably less difficult than in the areas discussed previously. A few shore areas become completely open to the sea for a short period, and in some other areas the pack ice margin retreats shoreward of the 1,500 feet depth line.

(APP-22)

Annexe
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ANTARCTIC TREATY
NINTH CONSULTATIVE MEETING

ДОГОВОР ОБ АНТАРКТИКЕ
ДЕВЯТОЕ КОНСУЛЬТАТИВНОЕ СОВЕЩАНИЕ

TRAITÉ SUR L'ANTARCTIQUE
NEUVIÈME RÉUNION CONSULTATIVE

TRATADO ANTARTICO
NOVENA REUNION CONSULTIVA

LONDON

ANT/IX/51 (Rev I)
Date: 29 September 1977
Original: English

Agenda Item 5

REPORT OF THE GROUP OF EXPERTS ON MINERAL EXPLORATION AND EXPLOITATION

1. The Expert Group was established in accordance with Recommendation VIII-14, operative paragraph 4, and the Report of the Special Preparatory Meeting held in Paris in June 1976. The Group met between 20 and 29 September 1977.

2. The Group conducted its business according to the terms of reference established at the Special Preparatory Meeting (ANT/IX/2) and the Guidelines submitted to the Plenary (ANT/IX/4 and 5).

3. At its first session the Expert Group elected Dr M W Holdgate as its Chairman.

4. The Expert Group adopted the following Agenda

I To review the present state of technology for exploration and exploitation of minerals in the Antarctic

- (a) geophysical and other exploratory techniques
- (b) construction techniques for on-shore or off-shore installations
- (c) drilling and other extraction techniques
- (d) processing and storage techniques
- (e) transport techniques.

II To review the probable impact of such exploration and exploitation on the environment.

III To review measures for the prevention or restoration of damage to the environment

- (a) techniques for the prevention of pollution
- (b) remedial and restorative techniques

(c) techniques for monitoring
(d) techniques for the assessment (prediction) of environmental impact.

IV To suggest preliminary guidelines on appropriate methods for exploration and exploitation and on preventive, corrective and restorative measures for the protection of the environment.

5. The attached record of the discussions and conclusions of the Expert Group is presented in the following order:

I Guidelines on appropriate methods for mineral exploration and exploitation in the Antarctic, and for the protection of the environment

II A record of the group's discussion, arranged in accordance with Items I - III of its Agenda.

6. The Expert Group notes that the implementation of all the guidelines, including the proposals for scientific research, set out in the Report would demand substantial effort before exploratory drilling or the extraction of hydrocarbons or other minerals began (if this in fact does occur) in the Antarctic.

7. The Group also stresses that these guidelines will need regular review as technology and scientific understanding advance. The standards, pollution levels, environmental impact and other parameters referred to in the Guidelines and Report will also need careful quantification.

8. The Report is submitted to the Plenary for consideration.

I.

GUIDELINES ON APPROPRIATE METHODS FOR MINERAL EXPLORATION AND EXPLOITATION IN THE ANTARCTIC, AND FOR THE PROTECTION OF THE ENVIRONMENT

Introduction

1. The Expert Group consider that were it thought possible to commence mineral exploration or exploitation in the Antarctic, guidelines would need to be developed and agreed covering scientifi baseline studies, site studies, environmental impact assessment and many technical details of the actual operation of activities related to minerals.

2. Not only should existing international agreements such as thos on safety at sea, pollution from shipping, dumping at sea and other marine environmental matters be upheld, but consideration should be given to the development (in pursuance of Recommendation VIII-II of special rules related to the exacting climatic conditions of the Antarctic, and the importance of safeguarding its unique environmen and ecosystems.

3. Programmes of scientific research, monitoring and information exchange should be set in hand, according to procedures established by Consultative Meetings under the Antarctic Treaty, so as to provide as complete a foundation as possible before exploration or exploitation is likely to be considered.

Geological and Geophysical Investigations Prior to Exploratory Drilling for Hydrocarbons

4. Areas which may contain hydrocarbons are likely to be identifi only after extensive, basic geophysical and geological surveys. Before any exploratory drilling was undertaken there would be a nee for further detailed geological and geophysical studies and the investigation of environment factors that determine the feasibility of safe drilling operations. This second category of information should include sea state data; weather trends during different seasons; currents; pack ice distribution, types and pressures; iceberg size, frequency, drift rate and direction; and location of contemporary icebergs scour. Information is also needed about the

/composition

composition, stability and strength of sea bed sediments and strata on which installations might be based.

5. Most established geological and geophysical techniques, including geological and geochemical surveys and magnetic, gravimetric and seismic profiling systems, can be used safely and successfully for exploration for mineral resources in the Antarctic at appropriate seasons. Their initial environmental impact is likely to be no greater than that of present research activities, and can probably be controlled in the way that research is controlled (for example under the Agreed Measures for the Protection of Antarctic Fauna and Flora), but revised standards may be required should there be a marked increase in the scale of these activities.

6. Seismic techniques using high explosives as an energy source are required for geophysical research on deep crustal structures, and may be used occasionally in hydrocarbon exploration at sea, to confirm the findings of other methods. However, the detonation of explosives can have severe local impact on the biota and their use should be kept to a minimum. They should not be used on land (or in fresh waters) of biological or geomorphological interest.

Exploratory drilling for hydrocarbons at sea

7. Before any exploratory drilling is undertaken, there should be foundation investigations using methods such as high-resolution seismic and a range of physical studies of sea bed conditions at the proposed drill site.

8. Because of the special environmental conditions and environmental sensitivity, any exploratory drilling in the Antarctic should be arranged with particularly thorough attention to safety precautions, both in the design of the equipment and installations and in its operation.

9. Floating structures used for exploratory drilling in the Antarctic should conduct their operations so as to be able to stop drilling rapidly and move away when threatened by icebergs, and subsequently recover their boreholes, without risk of pollution.

/Because

Because it is most efficient to undertake such disconnection in an orderly way, early warning of approaching icebergs and storms that might also require movement off station is essential.

10. There is a divergence of expert opinion on how far technological developments might permit exploratory drilling from installations on the sea bed within the mid-term (10-25 years). Such developments would allow operations in areas inaccessible at present (although not below ice shelves). It would be essential for such installations (and similar sea bed installations used in exploitation) to be located in areas not liable to iceberg scour.

11. Platforms and other installations for use for oil exploration or exploitation in the Antarctic should, wherever possible, be constructed outside the region and towed to their location. On-shore bases for the support of exploratory and exploitative activities should be kept as few and as small as possible and sited with great care so that the least possible environmental damage results. Installations for oil exploitation in the Antarctic should be as self-contained as possible.

12. Under the exacting conditions of the Antarctic, and because of its environmental sensitivity, special attention should be given to the thorough training of technical personnel and to the elaboration and enforcement of strict codes of conduct governing drilling operations.

Design of installations for the exploitation of hydrocarbons at sea

13. There is no technology presently suited to year-round oil production in the Antarctic. The concepts behind such potential technology are being developed actively, and may lead in the direction of self-contained, unmanned installations on the sea bed. It is important that guidelines are agreed to ensure that design, installation and maintenance are to the highest standard so as to prevent pollution, waste of energy and other resources, and hazard to human life. These guidelines will need continual review as the technology is developed.

14. Risk analyses should be performed to identify possible modes of failure of installations under the extreme environmental conditions of the Antarctic (which would need careful definition to this end),

or through accident, and provision should be made for redundant paths or systems to insure against serious failure.

15. High standards should be set for the processing of hydrocarbons exploited in the Antarctic. As a general rule, gas should not be flared but used to provide energy for local needs, re-injected, or exported from the Antarctic. Water emerging with the oil should be re-injected.

16. Storage systems should be designed so as to ensure that hydrocarbons are separated from displaced seawater in accordance with agreed standards.

17. Further studies are needed in order to develop suitable vessels for use in the transportation of hydrocarbons from the Antarctic. These vessels should conform to advanced design standards and include systems for the prevention of the discharge of oily ballast water or polluted seawater south of 60° South.

Mineral Exploration and Exploitation on Land

18. Exploratory drilling is unlikely to be undertaken widely on land in the Antarctic, but should be carefully localized and controlled so as to minimize the disturbance of vulnerable Antarctic soils and the importation of chemical and microbial contamination.

19. Although the mining of minerals on land in the Antarctic is not likely in the foreseeable future, were it to occur severe local impact could be caused. This could also result from quarrying of aggregate and rocks for use in construction. Processing of ores would demand substantial energy and water, and generate large volumes of wastes. Sites and associated transport routes for any such mining or quarrying need a thorough environmental evaluation, and its operation would need careful monitoring to minimize damage.

Environmental Impact Assessment and Environmental Protection or Rehabilitation

20. Methods for environmental impact assessment in the Antarctic should be developed in accordance with recent developments in the concept. Such assessments should involve the close association of environmental scientists, specialists in the technology of mineral exploration and exploitation, and others concerned with the regulation of such activities. Impact assessment should be so

/conducted

conducted as to aid the adjustment of proposed developments so as to reduce their environmental effects, and should lead on to continuing monitoring.

21. Methods for the containment, recovery or safe dispersion of oil spilled at sea in the Antarctic in all but ideal conditions do not exist at present, and need urgent development. Research on this topic (or on that described in the following paragraph) should not, however, involve the deliberate release of oil onto the sea in the Antarctic.

22. Knowledge is insufficient at present to allow reliable estimation of the impact of possible oil spills on Antarctic ecosystems, and it is vital that research on this subject be expanded.

23. There are no effective methods for the full restoration of sites on land, on ice, or at sea in the Antarctic disturbed by mineral exploration or exploitation. Artificial re-vegetation of land areas, as practised in the Arctic, does not appear appropriate in the Antarctic because of differing habitat conditions and a lack of suitable indigenous plant species. The most that can be done is to grade land surfaces and remove all possible extraneous material.

III

RECORD OF THE DISCUSSION OF THE EXPERT GROUP

A. REVIEW OF THE PRESENT STATE OF TECHNOLOGY FOR EXPLORATION AND EXPLOITATION OF MINERALS IN THE ANTARCTIC

(i) General Considerations

1. In discussing mineral exploration and exploitation techniques it is desirable to discriminate between the position on land (and there between ice-free and ice-covered terrain) and at sea. Marine situations should be examined in three categories: areas of sea bed situated beneath floating ice shelves several hundred metres thick, areas beneath pack ice that persists for 9 or more months in the year, and areas beneath seas open for at least three summer months.

2. It is also useful to distinguish three successive stages in the process commencing with exploration and ending in the exploitation of minerals. These stages are:

(i) basic exploration, which involves many activities inseparable from those in normal geological and geophysical research and seeks to define the structures of the strata most promising for detailed examination.

(ii) exploratory drilling in restricted areas chosen as a result of such preliminary investigations;

(iii) full-scale exploitation.

3. Although there is a wide range of opinions concerning the likely location and extent of hydrocarbon and other mineral deposits in the Antarctic, at present there is no proof that significant deposits exist south of latitude 60° south. However, the Expert Group agrees with a number of previous national and international evaluations, including those by SCAR, that exploration for hydrocarbons on the continental margins around Antarctica is foreseeable, and commercial exploitation is a

/possibility

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possibility in the longer term. The exploitation of metallic minerals and fossil fuels on land appears much less probable in the foreseeable future, while there are more accessible deposits in other regions, but it would be unwise to exclude it completely. Should offshore oil or gas reserves be exploited, moreover, there could be onshore mining of rocks and quarrying of aggregates for use in construction. While the technology for exploration for and exploitation of hydrocarbons has received most urgent attention therefore, some attention has been given to that employed for other minerals.

4. The Antarctic remains one of the world's least known regions. Much of its land surface is mantled in ice, and its shallow seas obscured by ice shelves and pack. The development and application of geophysical methods, especially those employing remote sensing, are vital to its exploration for science, irrespective of possible mineral exploitation. Only about 1% of other geologically comparable areas contain hydrocarbon resources, so that most of this exploration is unlikely to lead to possible commercial development.

5. Exploration or exploitation of hydrocarbons seems likely to be technically feasible at some time, but estimates of the likely time scale vary and there was a wide divergence of views in the Expert Group. No delegation believed that exploratory drilling in the Antarctic would begin in less than 5 years, and most of the experts considered that it was unlikely in less than 10 years. The time scale for possible exploitation is even more uncertain, but in the much less exacting conditions of the North Sea ten years elapsed between exploratory drilling and the commencement of exploitation.

6. It is important that a sufficient environmental data base to allow wise decisions about the conduct of exploratory drilling is obtained. Information is needed about sea states and depths; the persistence of storms and of spells of good weather; currents; pack ice (including pressures in pack); iceberg size, depths, frequency and rate of movement; and the depths of iceberg scour in areas that might be explored for hydrocarbons.

/In

In such areas information is also needed on the composition and stability of sea bed sediments and rocks to which structures might be moored or on which they could be based. Areas of faulting and slumping, which could threaten the integrity of structures, need to be defined. Techniques to determine all these features are available (including side scan sonar and high-resolution seismic studies of the sea bed) but this programme of data gathering could well take ten years.

7. The design of structures for drilling, production, oil collection, processing, storage and transportation of the final products from the Antarctic must be based on recommended practices. Guidelines will need to be laid down to ensure that structures are designed, installed and maintained in a manner that provides safeguards against pollution, the waste of resources, or risks to life.

(ii) Geophysical and other exploratory techniques

8. Geophysical exploration needs to be combined with other techniques. On land the continued mapping of ice thickness and sub-ice relief and the extension of geological investigations are needed as well as gravimetric magnetic or seismic investigations if crustal structures are to be defined. At sea bathymetric surveys and geological sampling of the sea bed are important, alongside more specialised geophysical techniques.

9. Aeromagnetic techniques using a fairly widely spaced network of traverse lines are particularly appropriate to the search for basins containing substantial thicknesses of sediment. At sea, methods involving the sampling of water just above the sea bed in the search for traces of hydrocarbon seepage is another possible environmentally safe technology, as a supplement to the seismic studies that are likely to be instituted on an increasing scale.

10. Seismic surveys undertaken at sea involve two kinds of technique. Reflection methods, now widely used by the petroleum industry, involve long multi-channel arrays and energy sources which include non-explosive systems (such as "air guns"). Despite the problems posed by sea ice, these systems can be used in many parts of the Antarctic at certain seasons. They can give penetration of the sea bed for up to 10-15 km, which is sufficient for exploration for hydrocarbon minerals and they have no damaging impact on the marine flora and fauna. However, additional velocity information may be required, and therefore many commercial operations also use refraction methods to a limited degree. These methods involve "air guns", or occasionally high explosives. Use of explosives is not considered essential in exploring for hydrocarbons, and it has been prohibited in some regions (such as the Norwegian continental shelf) because of the severe local damage it can cause to the marine biota.

11. Refraction seismic studies using explosives, on the other hand, are unavoidable at present in certain fundamental fields of crustal geophysics where the aim is to study deep structure (to 30-40 km) as when examining the relationship between the Antarctic and other continents.

/12.

12. While satisfactory geophysical methods appear to be available for scientific exploration and the search for minerals in Antarctica, there are dangers in over-generalization. One thing is however clear. The present ignorance of the structure of much of the Antarctic land and continental margin*, coupled with the hostile environment and the extent of ice cover, means that the exploratory phase is likely to be prolonged in most areas, before exploratory drilling could be considered.

(iii) Drilling and other extraction techniques

13. Considerable experience of drilling has been gained on land in the joint Japanese-New Zealand-United States Dry Valley Drilling Project. Technology developed in the Arctic could be used under certain conditions to explore for and exploit hydrocarbons on land in the Antarctic. Conversely no technology exists for drilling through moving ice-sheets on land and it is unlikely that there will be much incentive to develop it.

14. In considering off-shore drilling technology it is useful to discriminate between strictly technological aspects (for example relating to platforms, drilling systems or prevention of blow-outs) and environmental factors determining the period for which drilling is feasible and the special hazards to be guarded against.

15. It is important to discriminate between drilling to only shallow depths to obtain geological samples of sea bed strata for scientific purposes and exploratory drilling for hydrocarbons. The latter requires blow-out preventers and other safety devices while the former may not. Generally shallow drilling to confirm sea bed geology should precede deep drilling for hydrocarbons.

16. Technology already exists for drilling from dynamically positioned mobile structures in depths below 1,000m. It appears theoretically possible in the Antarctic in areas free of ice and where massive icebergs are infrequent for at least three months in summer. Such areas are rare and of very limited extent.

/Thorough

*In this report the term "continental margin" is used to include the continental shelf, continental slope and continental rise.

Thorough studies of environmental conditions in such areas would be required before operations could be conducted without risk.

17. The Expert Group was informed by several delegations of the development of technology (such as large floating caisson structures) in their countries that would allow drilling in deeper waters and in areas covered with Arctic pack ice throughout the year. Such technology would need very careful evaluation before its use was considered in the Antarctic, but it might allow the exploration of larger areas on the Antarctic margin (but not the regions below thick ice shelves).

18. Experience off Labrador has come from the use of a Pelican-type dynamically positioned ship. Such a vessel may not be ideal for exploratory drilling in the Antarctic and a floating dynamically-positioned structure may be preferable.

19. Ice conditions in the Antarctic, which differ in many ways from those in the Arctic, pose certain special problems. There is an annual discharge to the oceans around Antarctica of about 4,000 km^3 of icebergs, many of which persist for several years. Antarctic icebergs are much larger, and many could not readily be towed away from a drilling platform. A platform would therefore need to be able to cease work and move away if threatened. Experience off Labrador confirms that towing can change the direction of drift of the smaller icebergs sufficiently to approximately halve the number of times the drilling vessel needs to disconnect from the borehole, but in the Antarctic the benefit might be considerably less. Towing is at present impracticable with icebergs exceeding two million tonnes weight, and when the sea is rough, or the berg inconveniently shaped or unstable.

20. Technology exists for shutting down and disconnecting from wells, and re-entering them afterwards without risk of pollution, but it is desirable to conduct the shut-down process in an orderly fashion because this facilitates re-entry, and hence an effective "early warning" system of approaching icebergs would be needed. Forecasts of the frequency of such encounters are also required since drilling would be unacceptably protracted if it had to stop very often. Such operations would also demand reliable meteorological information in advance of developing storms.

/Environmental

Environmental studies designed to ensure the safety of exploratory drilling activities appear to need urgent development.

21. Exploratory drilling is not an end in itself. It costs large sums, and is undertaken in the hope that it will lead on to exploitation. Hence the technology for exploration and exploitation needs to be considered together, but there is the important difference that while the former can be done satisfactorily in areas of sea open for 3 months in summer the latter demands operations for a much longer period, for which there is no technology appropriate to the Antarctic at present.

22. It is important to discriminate between the process of drilling (whether for exploration or production wells) and the control of production. Drilling is always done at present from ships or platforms at the sea surface, but there are several systems allowing control of production wells by structures on the sea bed. At present all of these are in shallow water and many are controlled from a surface vessel to which oil is piped.

23. Existing technology does not appear suitable for exploratory drilling in those parts of the Antarctic seas covered almost throughout the year by pack and fast ice of many years' accumulation or by floating ice shelves and glaciers. For these reasons most of the seas on the Antarctic margin are inaccessible for exploratory drilling at present, and fixed or floating platforms of the kind used in oil exploitation today seem equally unsuited to these areas. Technology permitting drilling from installations on the sea bed in other regions is being developed and may help to overcome this obstacle except in those areas where icebergs ground on the sea bed. Advances are also being made in the design of systems both for drilling and operating production wells on or below the sea bed in deep waters. The water depth presents no inherent problem because such systems would be unmanned and their maintainance would be likely to be undertaken by submarines rather than divers. Such systems have not yet been developed for the conditions prevaling in the Antarctic.

(iii) Construction techniques for on-shore and off-shore installations

24. At present several kinds of platform are used in oil exploitation at sea. Fixed structures of concrete or steel are being used today in depths of water down to 130 and 300 m respectively, and have been developed for safe operation even in seismic zones. One floating platform, linked by risers to production wells is in use in the North Sea. About 100 underwater well head systems are in use, mainly in shallow water and none below 300 m. Despite considerable advances in the desi of platforms, risers (the link between ocean floor and surface platform) and safety devices, none of these platform systems is

/suitable

suitable in their present form for installation in the Antarctic. While considerable progress has been made in developing surface platforms to withstand storms, and pack ice, none is proof against icebergs on an Antarctic scale. At the present, the design of equipment for use in oil exploitati in the Antarctic remains in the conceptual stage.

25. The first action in evaluating a newly discovered oilfiel is to determine its size, and where the technology for exploitation is very expensive, a field needs to be very large if it is to be worth exploiting. In the Antarctic a further constra would be imposed by limited access. It is difficult to envisa any Antarctic oilfield being exploited if it were only accessil to transport removing the production for 3 months of the year even though this period would suffice for the actual drilling of wells.

26. In the North Sea, using today's technology (but with year-round access), before an oilfield is exploited the potential recoverable reserves need to be of the order over 100-200 milli barrels. In the Antarctic it is likely that only very large fields would be attractive for exploitation. The limit will however depend on world energy costs and on the available technology in the future. Should oilfields be found and techn allow their exploitation, it would be unwise to assume that th might not become economically attractive in the future.

27. Any structures used for oil exploitation in the Antarctic would almost certainly be constructed in a region of warmer wa outside the region and towed to the point of installation. Th are no technological problems in this process, but seas in the area of installation would need to be ice-free at least for th period of 1-3 days needed for correct positioning.

28. The logistic support of exploitation activities will also need careful planning. It could involve the construction of supply bases on land in the Antarctic if there were suitable sites nearby, or outside the region (the latter being the more likely). Structures used in the Antarctic are likely to be more self-contained than those used elsewhere, in less exacting climates. These features are likely to reduce the extent of major construction activities on land with their associated environmental impact.

/29.

29. Should mineral exploration or exploitation occur on-shore the associated construction of bases for support personnel, processing plant, or other installations would be possible adapting technology already developed in Arctic regions and in the building of the larger Antarctic stations.

(iv) Processing and storage operations: hydrocarbon minerals at sea

30. All oil emerging from a well is a mixture of liquid hydrocarbons, gas and (especially as the exploitation of a fiel continues) water. The gas needs to be separated from the oil before the latter can be transported (since transport of oil in tankers takes place at atmospheric pressure). The hydrocarb gases produced are generally either flared (burned) or re-injec thereby maintaining pressure and helping continued exploitation The water is separated from the oil and can also be injected back into the oil reservoir or into some other strata.

31. Existing technology for this separation and reinjection could be employed in any fixed or floating surface production platforms used in the Antarctic (it would be more difficult to liquefy the separated gas and remove it for marketing). Some gas could be used as a fuel, power drilling and other operations: The Expert Group advises that gas should not genera be flared in the Antarctic (Guidelines para 15). Appropriate technology has also been developed and tested in production well head structures on the sea bed, operated by remote control from the surface, could be developed as an intergral part of the perfection of such submerged structures for use in the Antarctic.

32. Substancial storage capacity might be required at install-ations at sea from which separated oil was loaded directly into ships, because of the inevitable interruption of surface shippin operations by storms, and occasionally by heavy pack or icebergs Even sub-sea installations loading into submarine tankers might require considerable capacity.

(v) Processing and storage operations: minerals on land

33. If minerals were exploited on-shore in the Antarctic, it is likely that they would also (as elsewhere in the world) need to be enriched before transport away from the mining area.

/This

This processing would demand substancial installations, although the technology would be likely to be the same as was applied elsewhere, for example in the Arctic. Large amounts of fuel would be required since the processing of such ores is an energy-intensive process. Large volumes of water would also be needed - again demanding energy, in most parts of the Antarctic, to melt ice. Substantial volumes of wastes would be produced.

(vi) Transport techniques

34. Transport would be required for two purposes should mineral exploration or exploitation occur in the Antarctic. It would be needed to support personnel and installations and to remove the products of their activities. Present technology, as used to supply Antarctic bases, would be adequate for the support role although the volume of equipment and numbers of people moved might be much greater (in exploratory drilling two or three service ships might be needed to support the 100 or so men on a rig and the tugs employed in iceberg towing). Small storage bases might be needed on shore should this be possible near enough to areas being explored. However, exploitation of hydrocarbons would require a considerable increase in the number of personnel at drilling installations, with the possible resulting need to build land bases with the least possible damage to the environment.

35. It seems likely that separated oil would be loaded directly into ships at installations at sea for removal from the Antarctic. Either specially designed surface vessels ot by submarines could be used to remove oil. Information obtained during the voyage of the "Manhattan" may allow the design of tankers that could operate commercially through Arctic pack ice. The attraction of submarines lies in their greater certainty of year-round access. The concepts behind the design of both types of vessel are being explored actively, and it is likely that technology would be available by the time Antarctic oil exploitation became possible on other grounds. Pipelines, however, provide a third option. Their use is unlikely in many parts of the Antarctic, especially because of iceberg scour but also because there is little attraction in removing oil from the open sea to coastal

/areas

areas which might be no more easily accessible by tankers, modern techniques of tunnelling in the sea floor at depths of up to 300 m could possibly be developed to the point where pipelines could be adequately protected.

B. ENVIRONMENTAL IMPACT OF MINERAL EXPLORATION AND EXPLOITATION

36. The Expert Group could not undertake a thorough study of the impact of mineral exploration and exploitation on the Antarctic environment. However the discussion of the technical aspects of mineral exploration and exploitation in the Antarctic showed that the question of the impact of these activities on the environment has been studied very inadequately and that there is an urgent need for a further examination of this problem. The Expert Group considers that measures for the protection of the Antarctic environment need to be worked out prior to any commercial exploration for, or exploitation of mineral resources in Antarctica should such activities occur there.

37. The Expert Group had before it the Report of the SCAR Group of Specialists on the Environmental Impact Assessment of Mineral Exploration/Exploitation in Antarctica (EAMREA) prepared at the request of the Eighth Consultative Meeting and the Special Preparatory Meeting in Paris in June 1976. Attention was also drawn to a number of other papers, including those presented to the Special Preparatory Meeting in Paris by the Soviet delegation (Paper RPS 6) and by the Australian delegation (Paper RPS 11) and the summary of the Report on Environmental Impact Assessment by Dr D H Elliot (ANT IX/INF 2). The Expert Group considered that the EAMREA Report, taken in conjunction with the other papers, provided a useful starting point for the assessment of the likely impact on the Antarctic environment of various possible technological developments and for the development of a programme to provide more precise assessments.

38. The Expert Group advises the Consultative Meeting that technological and ecological experts need to work together in the further evaluation of these questions. Only through a direct interaction of this kind will it be possible to define the ways in which new technological advances may alter physical and chemical properties of the Antarctic as a habitat and apply the most recent advances in scientific understanding of Antarctic environments and ecosystems so as to predict the ecological changes that are likely to result. A series of carefully prepared expert seminars

/or

or workshops bringing together appropriate specialists may well provide the most effective forum for this dialogue.

39. More research will unquestionably be required before satisfactory predictions can be made of the nature and scale of the impact of possible alternative mineral exploration and exploitation technologies in the Antarctic. Opinions expressed in the Report (e.g. in paragraphs 5, 6, and 19 of the Guidelines and paragraphs 9, 10, or 20 of the Record of The Group's discussions, should be regarded as provisional, pending such research.) The Expert Group did not attempt to specify all the subjects needing attention, but did identify the following areas:

(i) basic bathymetric, geological, geophysical and geochemical studies leading to a more realistic definition of those areas in the Antarctic where exploration for minerals may be considered, and where surveys consequently need to be undertaken to define environmental and ecological features;

(ii) research leading to improve weather forecasting, and data on current directions and velocities and on the distribution and frequency of occurrence of various sea states, ice conditions and icebergs of various dimensions;

(iii) definition of the fundamental structure and functioning of those types of Antarctic ecosystem most likely to be affected by mineral exploration and exploitation, including the flow of nutrients and energy through the system and primary and secondary biological production (and the factors influencing them). Simulation modelling of the essential processes within these ecosystems could assist the prediction of how they are likely to respond to various impacts;

(iv) surveys to determine baseline levels in the environment (including ice caps) and in plants and animals of hydrocarbons and other substances whose environmental concentrations may be raised as a consequence of mineral exploration and exploitation;

/(v)

(v) research to establish quantitatively the effect on Antarct organisms which are particularly important ecologically or economically (e.g. krill) of a range of concentrations of hydrocarbons and other possible pollutants;

(vi) research on the mechanism and rate of biodegradation of oils of various kinds under Antarctic conditions (it being emphasised that this research should not involve the deliberate liberation of oil in the Antarctic).

Ecologists who were members of the Expert Group stressed the need for selection, based on a critical analysis of existing knowledge, in the development of this research programme. It would be quite impossible to measure all environmental variables, or describe all Antarctic ecosystems in detail. The dialogue between technological and ecological experts described in paragraph 38 should have as a major objective the selection of key factors and organisms for detailed study.

40. The first of these areas of research is equally important if the potential of the Antarctic as a source of minerals is to be evaluated. The Expert Group recorded its view that the estimate* published in the Oil and Gas Journal for November 1976 and quoted in the Report of the SCAR EAMREA Group that 45 billion barrels of oil and 115 trillion cubic feet of gas "may" occur on parts of the Antarctic continental margin, even with the qualifications attached to it by the EAMREA Group, was only a speculation and should not be cited unless supported by much firmer evidence.

41. There are other fields of research which the Expert Group noted as essential if exploration for minerals in the Antarctic was to be properly directed, and its impact predicted and controlled. The studies mentioned in paragraph 39 (ii) above fall into this category and form part of the data base that the Group considered was essential before exploration for hydrocarbons could safely begin on the Antarctic margin. The following other topics were mentioned:

(i) detailed site investigations in areas that might possibly be considered for exploration;

/(ii)

*The Expert Group was informed that this figure originated from an unpublished, highly provisional calculation, using methodology which has since been revised, in an internal document within the United States Geological Survey.

(ii) research on methods for the containment, recovery or safe dispersal of spilled oil (the Expert Group emphasised that this was a topic of the highest priority);

(iii) studies on the likely physical condition of oil spilled on the cold Antarctic seas, and on mathematical models for the prediction of the movements of oil slicks under Antarctic conditions (there are numerous existing models, developed in other regions, which could provide a starting point);

(iv) techniques for the safe disposal of wastes arising from mineral exploration and exploitation in the Antarctic.

42. If mineral exploration or exploitation were to occur in the Antarctic it would be essential to monitor both the operations themselves and consequential changes in the environment. There would need to be a system providing immediate warning of an accident leading to significant pollution and monitoring of the dispersion and effects of the pollutants released, and of the effectiveness of any measures for containment or recovery. This would be particularly difficult under Antarctic conditions.

C. MEASURES FOR THE PREVENTION OR RESTORATION OF DAMAGE TO THE ENVIRONMENT

(i) Prevention of Pollution by Oil

43. Problems of oil pollution can arise during drilling (whether for exploration or production), extraction, processing, storage or transportation under both normal operations and in the event of accident. Some delegations considered that these problems may be especially acute in the very cold Antarctic seas where the natural degradation of oil is likely to be extremely slow.

44. Thorough surveys in advance of drilling are essential for the prevention of pollution. High resolution seismic studies can detect layers where gas pockets may be encountered near the surface. Pressure measurement is also desirable during drilling. In a permafrost environment frozen hydrates (or hydrates and oil) may sometimes be encountered and present an added hazard.

45. At any time during drilling, fluid under pressure (gas, oil or water) may be encountered. It is therefore important to maintain at all times all the equipment and materials necessary to control unexpected pressure. This equipment includes blow out preventers, communications and remote control equipment, reserves of mud, and additives and degasification equipment. It should be noted that these muds may contain special additives to make them suitable for use in the Antarctic and these have a potential to cause some local pollution if released in the environment. When the well has reached a certain depth casing is carried out. Casing of a well is a very important safety factor, and it will be necessary to determine length of each casing appropriate to the nature of the rock formation and the pressures that may be encountered. Cementing practices must be good enough to ensure that oil cannot escape laterally through the casing into flanking rocks and ultimately to the surface. Over-design is essential in exploration wells in new areas.

46. Additional pollution prevention measures should include proper procedures for well work-over (including the cleaning of operating systems, and replacement of components). These are naturally vulnerable operations because some control equipment is often itself taken out of use, and precautions must be

/especially

especially strict in extreme environments.

47. Accidents on oil rigs, leading to environmental hazard, commonly involve human error and no technology can eliminate this, but it can reduce its probability and the scale of the consequences. Generally speaking human errors are commonest in routine operations involving less qualified personnel. In opening up a new region, in an exploratory phase, highly skilled staff are likely to be employed and the risk of error reduced. Because the Antarctic is a peculiarly hostile environment, more than normal care is likely to be taken during the early stages. The risks from human error are likely to increase once there is a transition from exploration to exploitation, with a strong element of routine. But there is no reason to predict a higher likelihood of human error in the Antarctic than elsewhere (the reverse is more likely) because operating conditions are never likely to be easy. Therefore, the training of personnel is an essential element in these safety precautions, and this must include "refresher" courses bringing staff up to date with new methods.

48. On drilling platforms at sea the prevention of pollution is of the first importance because opportunities for rehabilitation if spillage occurs are few or non-existent under the exacting conditions of the Antarctic. It is essential to undertake exploration cautiously, to prevent blowouts. It is essential to be able to stop and re-start drilling, and to abandon and re-enter wells without risk of pollution: wherever possible equipment should be recovered before the link with a well is severed but in emergency a platform can move off station in under a minute without risk of pollution. With sound technology, training and vigilance the risk of blow-outs would be very small.

49. The maintenance and repair of Antarctic installations and anti-corrosion measures (for example the use of sacrificial anodes may also have some environmental impact.

50. Where drilling takes place on land it is important that minimal damage is done to permafrost soils (wells being sealed

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as to avoid this), that reservoirs of fuel used to power drilling are located on an insulated bed, that all fuel tanks are surrounded by bunds to contain spillage, that care is taken to minimize contamination with oil, muds, chemicals and microorganisms, that all debris is incinerated or removed, and that the land area is afterwards rehabilitated as far as possible. It is particularly important to ensure that water does not penetrate and freeze between the casing strings of wells, since the resulting expansion could cause bursting and pollution.

51. The techniques of risk analysis, covering fire as well as the other hazards identified above should be applied in the design of all equipment for use in oil exploration or exploitation in the Antarctic, and a substantial safety margin provided. Fire is equally a hazard on land, where its threat is increased by the generally unavailability of liquid water for fire-fighting except in limited areas near freshwater lakes and the sea.

52. Oil storage below the sea depends on the displacement of sea water from the tanks. The interface is always kept within the tank, and there are reliable ways of preventing hydrocarbons being discharged, but when water is drawn off it is necessary to separate the oil. Special techniques and standards will need to be drawn up for seabed storage systems in the Antarctic.

53. A major risk of oil spillage probably lies in the transfer from production wells to storage and thence to tankers. If seabed pipelines are used, it will be because technology allows their burial below the depth of iceberg scour, in stable areas not liable to substantial movements.

54. Tankers to be used in the Antarctic will almost certainly be specially built. In addition to being ice strengthened and having greater power such tankers will presumably operate within the guidelines of the safety and marine pollution prevention conventions to which the Antarctic Treaty nations are signatory. The ship design, construction and equipment features may include segregated ballast, double hulls or double bottoms, crude washing, inert gas systems, and discharge monitoring and control devices or some combination of these. The adoption of such features would

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prevent pollution through the discharge of oily ballast water, which remains a significant source of marine pollution in other areas. It is anticipated that Treaty Countries would operate their ships in an environmentally safe manner with special regard for the fragile nature of the Antarctic environment.

55. There are few suitable sites for tanker terminals on land in the Antarctic. If oil were brought ashore and then exported in tankers, bilge and ballast handling and treatment facilities might be needed (depending on ship design, discussed in paragraph 54), and the scale and nature of these must be geared to local needs. A standard for the permissible maximum oil concentration in process water discharged to the sea should be set, together with standards for volatile hydrocarbons released to air: both must depend on assessments of the environmental quality to be sustained. It is important to note that if tankers arrived in the Antarctic in ballast, from ports elsewhere, the ballast water could contain a range of dissolved industrial effluents, and these could bring low concentrations of new contaminants to the Antarctic even if oil levels in the emissions were satisfactorily controlled.

(ii) Prevention of pollution from mining and processing of minerals on land

56. Major local pollution could be caused by mining quarrying and processing of coal or hard rock mineral resources on land in the Antarctic, especially for elements like iron, where large volumes of spoil would be produced. Such mining or the quarrying of construction materials on land could release large amounts of dust, contaminate drainage with metal salts, and produce tailings or waste heaps with high concentrations of toxic metals. Not only could these have a deleterious effect on land, freshwater and inshore marine biota in the vicinity, but they could also be a hazard to human health, especially if water supplies were contaminated.

(iii) Rehabilitation

57. Areas of Antarctic land damaged by mineral exploration and exploitation cannot be rehabilitated in the fashion adopted in the Arctic, involving the fertilization of the soil and the sowing of

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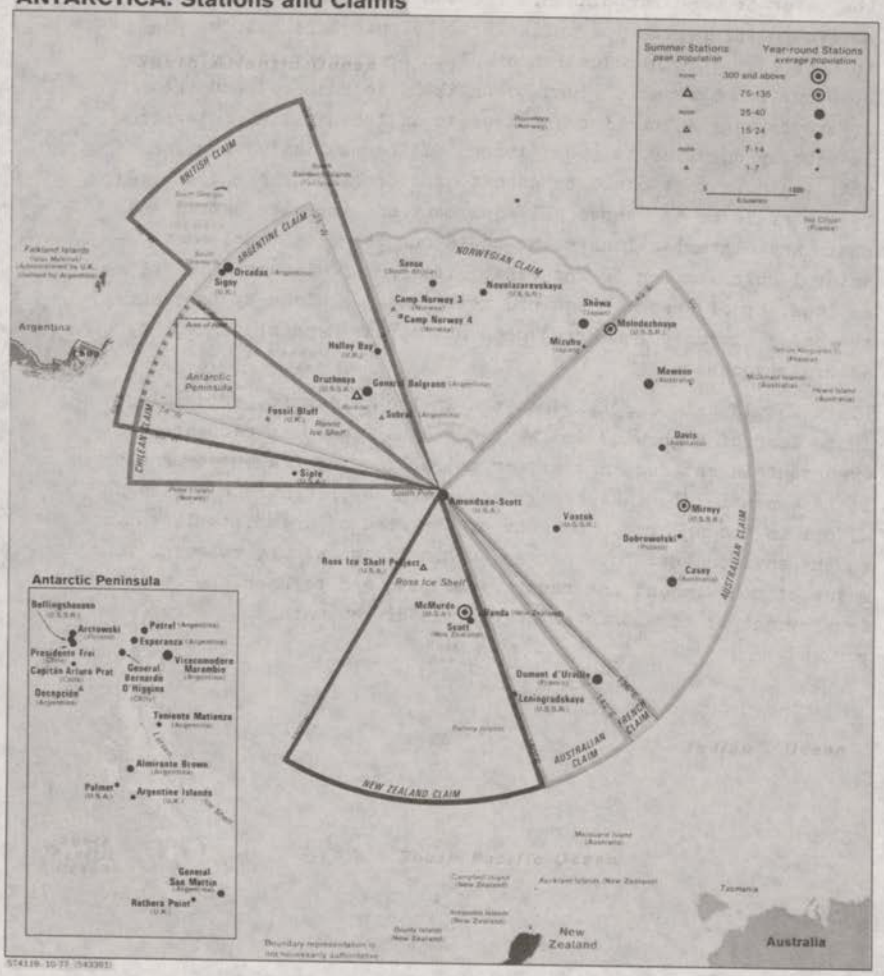
the seeds of vascular plants. The two vascular plant species native to the region are unlikely to be suited to cultivation in this way, the introduction of alien species would contravene conservation agreements (and be unlikely to succeed) and the bryophyte vegetation of coastal areas in the Maritime Antarctic is equally unsuited to propagation. It seems likely therefore that the most that could be done to restore land sites disturbed by man would be to remove all equipment and imported debris and shape any disturbed land so as to favour the slow process of natural colonization. The rehabilitation of disturbed ice sites on land, or of areas of sea bed, (other than a clean-up procedure to remove extraneous debris) does not appear feasible except by slow natural processes.

58. Should oil be spilled at sea in the Antarctic, especially in periods of high wind and waves or among ice, its recovery or even containment does not appear possible using present technology. It is essential to take every precaution to prevent the spillage of oil in the Antarctic because of the risk of unacceptable impact on the environment, but in case such spillages occur, research into means of containment and recovery of oil, and perhaps the further development of non-toxic biodegradable dispersants should be pursued.

ANTARCTICA: Stations and Claims



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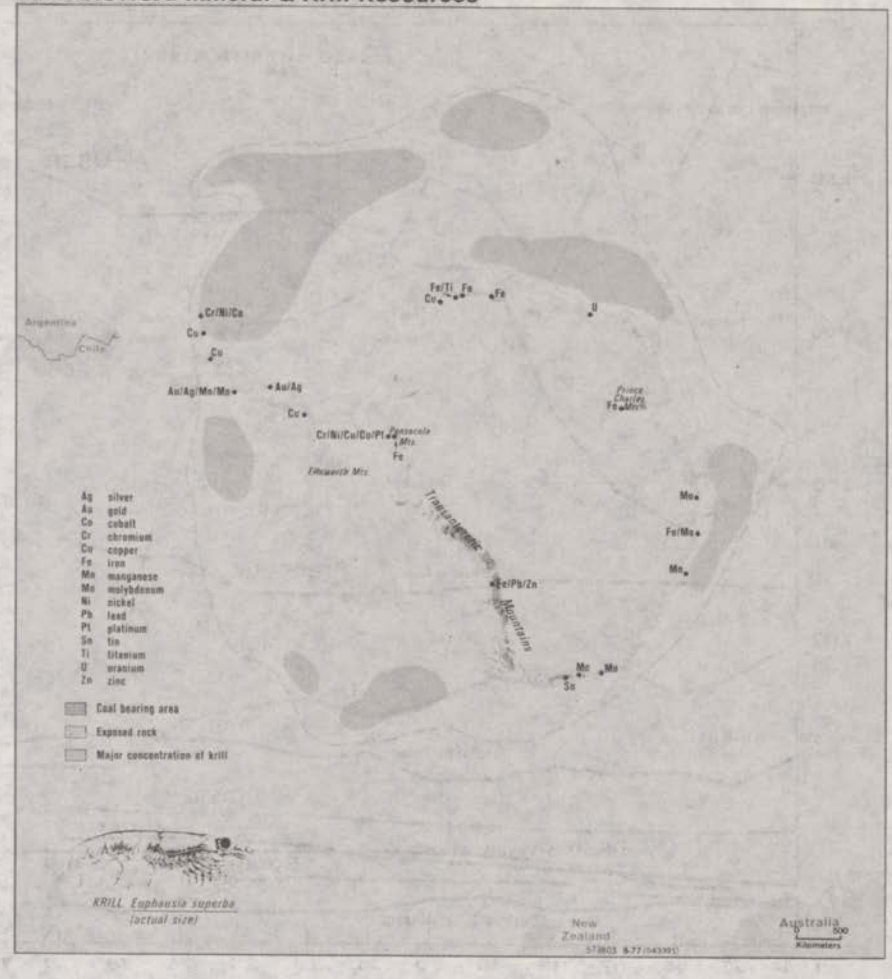
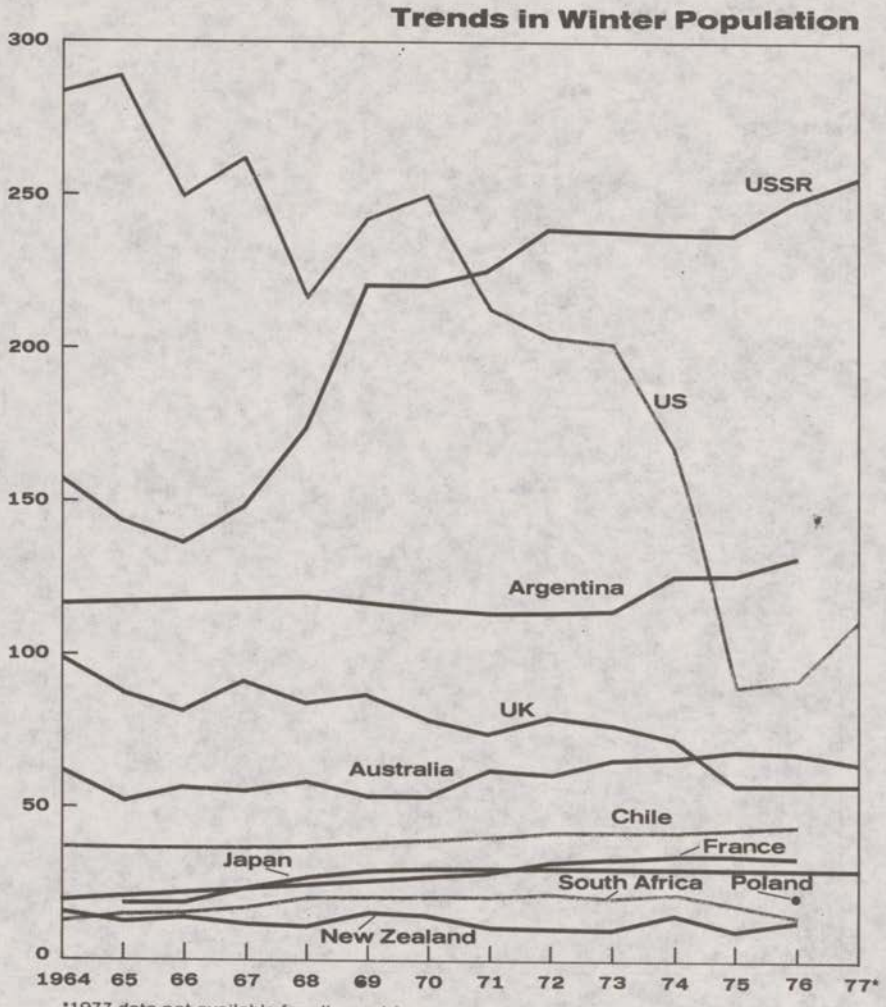
ANTARCTICA: Mineral & Krill Resources





*1977 data not available for all countries.

Note: Antarctica's summer population changes with each ship or aircraft arrival. The approximate peak 1976/77 summer population of each country was: US 900; USSR 600; Argentina 300; Chile, Australia, New Zealand, and the United Kingdom 100-200; France and Japan 60-70; Poland 50; South Africa and Norway 15-20.

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REPORT TO THE
COMMITTEE ON FOREIGN RELATIONS
UNITED STATES SENATE
BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

Financing Research In Antarctica: Tighter Control Of Logistic Support Costs Needed

The National Science Foundation manages the U.S. Antarctic Research Program but the Navy provides most of the logistic support. This support totaled about $39 million in fiscal year 1977. Although the Foundation is now reimbursing the Navy for all major program costs, some costs are still being borne by the Navy.

The Coast Guard's icebreaker services are only partially reimbursed by the Foundation; these costs approximated $5.4 million in 1977.

Improved procedures are needed for estimating, justifying, and reviewing logistic support costs; managing logistic support contracts and agreements; and accounting for costs.

ID-77-59

DECEMBER 30, 1977

COMPTROLLER GENERAL'S
REPORT TO THE COMMITTEE
ON FOREIGN RELATIONS
UNITED STATES SENATE

FINANCING RESEARCH IN ANTARCTICA: TIGHTER CONTROL OF LOGISTIC SUPPORT COSTS NEEDED

D I G E S T

The United States is one of 12 nations that signed the Antarctic Treaty in 1959 providing in part for the peaceful use of Antarctica for cooperative scientific research. In maintaining an active and influential U.S. presence, scientists from universities, research institutes, and Government agencies conduct research in glaciology, biology, geology, and other areas on the continent's ice shelf and in the surrounding oceans.

U.S. personnel in Antarctica in 1976 ranged from about 500 during the summer to 80 in the winter. Four permanent stations--McMurdo, South Pole, Palmer, and Siple--are maintained year round. Two research ships are also used--the Foundation-owned "Hero" and the U.S. Navy-owned "Islas Orcadas" which is partly funded by the National Science Foundation.

The United States Antarctic Research Program is managed by the Foundation's Division of Polar Programs. In fiscal year 1977, the Government spent over $50 million on the Antarctic program.

--Direct cost of the scientific research was $6.2 million.

--$44 million was spent on logistic and other support, including $5.4 million in Coast Guard support.

The Department of Defense supplies most of the logistic support through the Navy's Operation DEEP FREEZE. Other support is provided by the Coast Guard and by a private contractor. Prior to fiscal year 1972, the Navy funded most logistic support costs. The Office of Management and Budget transferred budgeting and funding responsibility to the Foundation beginning in fiscal year 1972. Although major logistic support costs are now being funded by the Foundation, repair of aircraft components

and some food and base support services are still being funded by Defense. Precise costs for all these items were not available. In addition, the Coast Guard furnished icebreaker services estimated at $5.4 million in fiscal year 1977, but only $622,000 was billed to and paid by the Foundation.

In reviewing the logistic support force cost estimates and the accounting procedures for the Antarctic Research Program, GAO found that:

--The Navy's estimates often were unsupported by documentation and were accepted uncritically from other Department of Defense participants. The estimates were inflated to provide margins for contingencies.

--The Foundation relies on the Navy to account for support costs and to bill it for reimbursement. The Foundation's review of Navy billings was insufficient to prevent duplicate payments or to verify the reasonableness and adequacy of services performed.

--The Foundation's internal control and accountability for logistic support funds were inadequate. Poor accounting procedures prevented program officials from being aware of $1.5 million in unliquidated obligations, summary financial data was not readily available, and accounting records were not adequately reconciled.

--The Foundation's procedures did not insure that funds were used appropriately or effectively for logistic support.

RECOMMENDATIONS

GAO recommends that:

1. The Secretary of Defense identify the logistic support for the U.S. Antarctic

Research Program that is borne by the Department of Defense and establish procedures to accumulate or estimate costs which should be billed to the National Science Foundation. (See p. 18.)

2. The Secretary of Defense and the Director of the National Science Foundation improve coordination of logistic support finances by establishing better procedures for estimating logistic support costs and documenting the estimates to allow for adequate review of the budget. (See p. 24.)

3. The Director of the National Science Foundation improve accounting procedures for logistic support funding of the U.S. Antarctic Research Program and strengthen the Foundation's capability for managing and monitoring the program's support contracts and agreements. The corrective measures should include procedures for precisely matching logistic support expenditures with obligations and for periodically reconciling its records of account with those of the Navy. (See p. 28.)

AGENCY COMMENTS AND GAO EVALUATION

Navy officials said they would review and identify unreimbursed support costs for such items as food for civilian personnel, and repair of aircraft components and would seek reimbursement from the Foundation for costs that could be reasonably identified in a cost-effective manner in the future. The Navy stated that the additional costs of food for military personnel are included in the man-year composite rates established by Defense and that a change from Defense accounting procedures to provide for billing at actual cost would not be cost-effective.

The Navy's stated intention to identify and seek reimbursement of any remaining Antarctic support costs should aid in having the National Science Foundation bear the total costs of the Antarctic program. Navy and Foundation officials stated that steps had been taken to better estimate logistic support force costs, including provision for better documentation, which should allow appropriate budget review.

The Foundation did not believe it was necessary to match expenses precisely to obligations for logistic support costs and indicated that it will continue to rely on the Navy to account for funds made available to them. GAO believes that corrective measures should include procedures for precisely matching logistic support expenditures with obligations and for periodically reconciling its records of account with those of the Navy.

Transcript of a Public Meeting on U.S. Participation in Negotiation of a Regime for Conservation of Antarctic Living Resources

December 20, 1977

Department of State

Transcript of Public Meeting
on
Antarctic Marine Living Resources
December 20, 1977

I N D E X

** A list of participants appears
at the end of this document.

DEPARTMENT OF STATE

The Open Meeting on Antarctic Marine Resources conducted by the Bureau of Oceans and International Environmental and Scientific Affairs, Department of State, was convened on Tuesday Afternoon, December 20, 1977, at the hour of 2:30 o'clock in Conference Room 1105, New State Building, Washington, D.C.

CHAIRMAN BREWSTER: Good afternoon and welcome to the Department of State for the meeting on Antarctic Marine Living Resources.

My name is Robert C. Brewster, I am the Acting Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs.

I would like first to introduce those of us from the various government agencies who are here and then ask one member of this group to give a brief background on the subject which we are discussing.

Beginning on my right. Mr. Tucker Scully, the Department of State, Office of Oceans and Fisheries Affairs.

On his right is Mr. James Storer, the National Oceanographic and Atmospheric Administration.

On my left, Ms. Jean Bailly, the Office of the Legal Advisor, Department of State.

Mr. Ted Sellin, Polar Affairs Officer, Department of State.

And Mr. George Llano, of the National Science Foundation.

I will ask Mr. Scully if he will give us a brief introduction to the subject.

MR. SCULLY: Thank You.

I will try to be brief, and I think what I would like to do is to start with the Ninth Antarctic Treaty Consultative Meeting that was recently held in London, and then work backward to show the context in which the action of the Consultative Meeting on Antarctic marine living resources fits.

The representatives of the 13 Consultative Parties in London, in the meeting which took place at the end of September and early October, adopted a recommendation (Recommendation IX-2) on Antarctic Marine Living Resources. The recommendation has three parts:

One, dealing with scientific research with regard to Antarctic Marine Living Resources;

Another, dealing with interim guidelines for the conservation of such resources;

And the third part, which I would like to dwell on, the establishment of a definitive regime, a "definitive conservation regime" as it is called.

In the latter part of the recommendation, the representatives there present, recommended to their governments that a definitive regime for the conservation of Antarctic marine living resources be established and be concluded before the end of 1978.

The representatives further recommended that there be convened a Special Consultative Meeting to elaborate a draft definitive regime, and to answer a number of additional questions including: the determination of the form of that regime; to prepare, if necessary, rules of procedure for a subsequent decisive meeting to conclude a definitive regime; to decide on participation in that second decisive meeting; and to determine the data and place of that decisive meeting.

The representatives of the consultative parties also agreed on a number of principles which should be forwarded to the Special Consultative Meeting for its consideration in terms of incorporation into the work of the Special Consultative Meeting -- that is, elaboration of the draft definitive regime.

Then, at the end of the Consultative Meeting, the Delegation of Australia offered to host this Special Consultative Meeting to be held at the end of February. Therefore, the next step in the consideration of a regime to conserve Antarctic marine living resources will take place in Canberra at the end of February -- beginning on February 27 -- for a period of three weeks.

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Now to try to place the action of the Ninth Consultative Meeting roughly in context, the representatives at the Consultative Meeting were operating within the consultative system which was set up under the Antarctic Treaty in which the representatives of those states enjoying consultative status meet periodically to discuss measures, propose measures, in furtherance of the principles and purposes of the Treaty -- and, among other things, to consider measures or agreed recommendations to their governments on the subject, among others, of the preservation and conservation of living resources in Antarctica.

There have been nine such consultative meetings since the Antarctic Treaty entered into force in 1961.

Among other actions that the consultative parties have recommended to their governments have been the Agreed Measures for the Conservation of Antarctic Fauna and Flora which have been observed by the treaty parties as interim guidelines pending their entry into force. (We now have legislation pending to bring them fully into force for the United States.)

The Consultative Parties also, back in the late '60s, developed interim guidelines for the voluntary regulation of Antarctic pelagic sealing, which eventually led to the Convention for the Conservation of Antarctic Seals -- which was concluded as a separate international agreement in London in 1972.

Much of the work, or much of the ground work, for the actual consultative meeting, recommendations on marine living resources, has been laid by the nongovernmental organization which has served, informally at least, as the scientific arm of the consultative mechanism -- that is the Scientific Committee on Antarctic Research -- "SCAR" as it is known -- which is affilitated with the International Council of Scientific Unions -- a nongovernmental umbrella organization.

SCAR was behind much of the work which led to the Agreed Measures and to the Convention for the Conservation of Antarctic Seals.

And beginning in the late '60s, SCAR's Working Group on Biology, which had addressed many of these issues, began to turn its attention to the question of Antarctic marine living resources, with specific emphasis upon questions of the resources in the Southern Ocean.

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The SCAR working group on Biology, in the early 1970's created a subcommittee on the marine living resources of the Southern Ocean which was later upgraded to the Working Group on the Living Resources of the Southern Ocean.

The formation of this Working Group responded to a number of factors including the increasing interest displayed by a number of nations in the potentially harvestable resources of the Southern Ocean -such as Japan and the Soviet Union (and later Poland and West Germany) and specifically focusing upon krill, and general interest in various international bodies with increasing world needs for protein. The SCAR Working Group began to recommend or to develop recommendations for the coordination of international cooperation in the study of the living resources of the Southern Ocean, with a view to providing an adequate data base and development and implementation of conservation measures.

The Working Group recognized that the Southern Ocean, with its rather short food chain and unique ecosystem, was an area in which the conservation measures might well be needed sooner rather than later.

This issue of the marine living resources of the Southern Ocean was discussed at the Seventh Consultative Meeting, and again at the Eighth Consultative Meeting in 1975, at which time a specific recommendation was developed -- among other things, calling for expanded efforts by the consultative parties to conduct research into these resources and to further international collaboration and cooperation in such matters. The recommendation specifically welcomed the possible convening, under the auspices of SCAR, of a conference on marine living resources, which was held later in 1976 at Woods Hole, Massachusetts, data from which is providing important contributions to our scientific knowledge of Antarctic marine living resources.

The Eighth Consultative Meeting in 1975 recommended that the question be kept on the agenda and be discussed at the Ninth Consultative Meeting. It was, at the Ninth Consultative Meeting and in several preparatory meetings leading up thereto. At those meetings (both the preparatory meetings and the Consultative itself) the representatives of the 13 Consultative Parties all shared a view that the development of some arrangement or measures to provide for the conservation, or steps leading to the conservation, of Antarctic marine living resources was a matter of some urgency.

And this led to the recommendation with which I began -- Recommendation IX-2 on Antarctic Marine Living Resources.

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At that Ninth Meeting the United States, which supported Recommendation IX-2, set forth preliminary views on a regime to conserve Antarctic living resources in the general statement made by Ambassador Brewster. We made five points with regard to the development of a conservation arrangement which, as we stated, is required:

First, that such a conservation arrangement be directed to fishery resources, and not applied to species already regulated pursuant to existing international agreements -- i.e. whales pursuant to the IWC, or seals pursuant to the Convention for the Conservation of the Antarctic Seals -- when it comes into force -- provided that such arrangements take into account the relationship of such target species to other species and to the Antarctic ecosystem as a whole.

Secondly, we made the point that such a conservation arrangement should provide for effective conservation of the species that it covers, throughout their entire range.

Third, that such an arrangement should provide for and encourage participation by all interested states.

Fourthly, that it should provide for an institutional mechanism, a separate institutional mechanism which would both develop and implement conservation measures themselves and provide for the necessary collection and analysis of data which would provide the basis for effective conservation measures.

Finally, we stated the view that such a conservation arrangement should provide for effective enforcement to insure compliance with conservation measures.

Now, following the Ninth Consultative Meeting, we stand on the verge of opening negotiations on the details of a conservation regime -- such a negotiation will begin at the end of February in Canberra. We are beginning the process of developing our specific positions -- our policies on such a regime -- and it is in that context that this meeting is taking place. It is in that context that we are moving to develop a draft Environmental Impact Statement and taking a number of actions to insure that we get our own house in order in the federal government and that we have the views of the interested public in trying, in this case, to develop policy in as rational and as open a fashion as we can.

Having said that, I turn it back to you, Sir.

CHAIRMAN BREWSTER: Thank you, Tucker. I open the floor to comments.

MS. PAT SCHARLIN: Tucker, could we get into any discussion at all on what the United States views as the meaning of "conservation" in terms of its conservation regime? This is always a question, I think, that puzzles us most.

MR. SCULLY: Well, let me start by saying that we are delighted to have your views on what the concept of conservation means, as well.

There is, as you know having been at the London meeting, potential for a number of divergences in view as to what the concept of conservation means.

I think that at the Consultative Meeting itself there was some concern expressed by representatives of countries who have an interest or potential interest in the harvesting of the resources that the term "conservation" also includes an element of what is described as "rational utilization."

In other words, there was some fear on the part of states with exploitation interests, that the term "conservation" by itself, could be interpreted as meaning no harvesting whatsoever of any of the potential resources of the Southern Ocean.

I am not sure how many of you have received copies of the report of the Ninth Consultative Meeting.

There was an agreement among the participants, which was not included in the recommendation, Recommendation IX-2 itself -- but in the report -- that the term "conservation" did imply rational utilization. In other words, the term conservation is not inconsistent with the concept of harvesting -- but that it does mean in some fashion the application of standards and criteria to any harvesting that might take place, so as to ensure that such harvesting would not result in overexploitation of a single species or of harm to the dependent species, or to the Antarctic ecosystem as a whole.

But I think, again, the concept of what is meant exactly by "conservation" is certainly a subject on which we would like to have as much advice as possible.

MR. GOTTSCHALK: Mr. Ambassador.

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CHAIRMAN BREWSTER: Yes, sir.

MR. GOTTSCHALK: My name is John Gottschalk. I am representing the International Association of the Fish and Wildlife Agencies; and at this point I think it might be appropriate for me to insert in the record our views on this subject, particularly since I am going to have to leave the meeting a little earlier -- so if I may --

CHAIRMAN BREWSTER: Please, Mr. Gottschalk.

MR. GOTTSCHALK: I will proceed. Now the International Association of Fish and Wildlife Agencies is a voluntary organization of state and federal agencies in the United States, Canada and Mexico. Our charter incorporates the entire Western Hemisphere but because of preoccupation with domestic affairs in the United States we haven't been able to attract any members in South America.

Nevertheless, our members are concerned and interested in this whole problem.

I would like to say, to start with, that we find ourselves in basic agreement with the position of the United States and the countries in the last meeting -- as we understand them. We feel that it is essential that a conservation program or regime be established to guarantee the future productivity of the living resources of the area encompassed by the Antarctic Treaty.

Further, we are pleased that the emphasis has been placed on the acquisition of knowledge through scientific research. These concepts are essential for any useful and effective conservation program for a vast and vital area of the earth's surface.

It is, of course, absolutely essential that these concepts be embodied in working programs before there is any wholesale effort launched to begin the commercial exploitation of the resources of the area.

Perhaps it is unnecessary to point out in this group that where there is a substantial commercial stake in resource development there are usually powerful forces at work to frustrate these basic principles of conservation. Hopefully, the United States can be a leader in promoting the rational utilization of the living resources found in the Antarctic seas, rather than a passive observer of their exploitation.

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At the very minimum, our posture should be to insist upon a conservative approach towards the protection of these resources.

If there is to be utilization, then let us do what we can to assure the long term viability of the resource base.

Tied in with and perhaps basic to this position is that of advocating the principle of optimum, rather than maximum sustainable yield.

Granted, there are real and difficult problems in defining the output yield in general, but nevertheless it is the best means of insuring prior recognition of the possibility of indirect adverse effects of exploitation.

Then certainly, any utilization of krill, for example, must be done with one eye on the impact of such activity on the sea bird population. Not only has that population an intrinsic value of its own, it may well serve as a vital nutrient transfer mechanism that recycles krill into the nutrients that keep the whole system producing.

The need to have these ecological considerations in the forefront of the decisionmaking process is underscored by the fact that the Antarctic Ocean ... is characterized by few species but vast numbers of individuals.

In these situations, population dynamics take on properties different than those expected in more temperate climes where there may be a greater diversity of species. The level at which exploitation can be expected to be sustained is apt to be underestimated in the presence of great numbers of individuals, as in the case of the euphausia.

In America in particular, with its history of wanton destruction of the bison, the passenger pigeon -- to name only two species -- we should be all too sensitive to the need to approach utilization with consummate care.

At present, the nations signatory to the Antarctic Treaty are essentially the only ones involved in the decisionmaking process as it relates to the living marine resources. History has shown time and again that it is imperative to gain the support of all those whose support will ultimately be needed in a program, by enlisting them in the planning process at the earliest practicable date.

Therefore, it seems apparent that steps should immediately be taken to bring into the purview of the protocol

for the conservation of the Antarctic living marine resources, those nations which have now, or shortly will have, or may have, an interest in these resources

Furthermore, in the light of the potential interest of many countries who have as yet ill-defined ambitions for participating in one way or another in Antarctic affairs -- it would seem prudent to have the Food and Agricultural Organizations of the United Nations, and perhaps UNESCO as well, as full fledged partners in the endeavor. Not only would this bring these groups into a cooperative role but would also make possible direct contributions to research and management by the U.N. organizations.

A few years ago an economist looking academically at the the whale resource, concluded that for maximum economic return it would perhaps be best to exterminate the world whale population and exploit directly the krill and other forms at lower trophic levels in the energy sequence.

It is being neither unrealistic nor apprehensive to say that as the world's food sources dwindle in relation to demand, we will hear more of this line of reasoning. It of course denies the inherent right of forms of life other than homo sapiens to exist in a natural state on this planet.

Without belaboring this point, we suggest that the world is still some generations away from reaching such a condition. In the meantime, therefore, it is essential to do what we can in man's own interest, to protect and enhance the productivity of the natural biotic systems of the earth. We have surely learned that it is possible to use without destroying, to manage on a sustained yield concept. We trust that it will be the policy of the United States to do its utmost to advocate and establish these concepts as they relate to the living marine resources in the Antarctic.

Thank you for this opportunity to give this statement.

CHAIRMAN BREWSTER: Thank you. Yes?

MR. JAMES BARNES: Thank you, Ambassador. I am Jim Barnes, and I would like to turn for a few minutes to the point before, about conservation and what that might mean.

In the report, and the pages aren't really numbered here -- but it's point number ten -- it's explicitly stated: The Working Group agreed to include in its report the understanding of the Group, that the word "conservation" as used in the draft

recommendation, includes rational use in the sense that harvesting would not be prohibited. But the regime would exclude catch allocation and other economic regulations of harvesting.

Now I think one of the principle concerns that most of the organizations at the Center, that the Center works with in many environmental areas, and specifically Antarctica, is this concept of economic regulation and what is not included, or what may be excluded from this regime we are trying to set up.

Because it seems to us that you cannot have a sound living resources regime without it being based on management and some conservation principles -- and we don't really see how you can have sound conservation and management principles embodied in a regime if you are going to exclude all catch-all cases -- and what I am afraid might be included in this phrase "other economic regulation of harvesting."

And specifically we would like to know, I guess, whether in the view of the State Department the term "economic regulation" includes things like catch limits -- gear restrictions -- effort restrictions -- closed seasons --closed areas and things like that. Because if that phrase does include those things, and we are excluding them from the regime, it is difficult (in the opinion of many environmental groups anyway) to have an effective management regime.

MR. SCULLY: Could I have just one point on that? I think that it is not our understanding that those terms would exclude any of the conservation measures that would or could be applied to regulate harvesting.

MR. JAMES BARNES: What about catch allocations which are specifically delineated?

MR. SCULLY: The reason for the inclusion of catch allocations was that it was the understanding of those participating that they would not devise, at least at this stage of the game -- national quotas.

There would be total allowable catches.

There could be quotas but not in the regime itself.

There would not be a specific, as I understand it, division between country x, country y and country z --

MR. JAMES BARNES: But you are anticipating that the re-

gime initially even will try to establish a total quota for krill, for example?

MR. SCULLY: Yes, that would be one form of conservation measure we would see as being envisaged. Yes.

MR JAMES BARNES: What was intended with this phrase "other than economic regulation of harvesting", then?

We don't understand -- I think I speak for many groups in saying this -- that we don't really understand what other economic regulation of harvesting encompasses -- and what the intent of the people who drafted this, was -- what it's intended to cover, by employing that phrase.

MR.SCULLY: Well, I will speak for what my understanding of what the phrase means, which is that it was not intended at this stage to engage in dividing between specific nations the allowable catches which could be set pursuant to the regime -- which the regime would envisage.

DR. AUBURN: Sorry, I'm Francis Auburn, from the University of Auckland.

To keep on with this I think this is a vital point.

The words used are: "catch allocation" and "economic regulation" or "and other economic regulation."

Now "catch allocation" would clearly be excluded.

The point we have to return to, I think, is a vital point: -- what does "economic regulation" mean? Obviously, it doesn't include catch allocation -- what does it include? Because there is the considerable feeling that if "economic regulations" is interpreted widely, including these measures we have looked at here, then the practical consideration of the essential parts of a regime may not be worth much.

Well, to get back to: What does economic regulation mean? What does it mean in this fine report?

MR. SCULLY: I think your point may be well taken and I think that, if in fact the interpretation can be that it would preclude certain kinds of conservation regulations, we would oppose it. We would certainly oppose that interpretation of it.

It is our view, at least our preliminary view included

in the general points that we made at the meeting itself, that the "conservation arrangement", as it was called at that time, to be established would in fact be specifically called upon, or would be specifically empowered, to develop and implement all necessary conservation regulations.

And if the interpretation -- if an interpretation of that point in the report is contrary to that, then I think we would certainly have to be ourselves aware of it: (a) in developing our position on this issue; (b) and then once the position is developed, in trying to negotiate it.

MR. JAMES BARNES: Could we ask whether the United States in the context of these recent negotiations made a commitment of any sort to other nations in return for getting unanimous agreement on the recommendations set up for the regime? If they made some kind of a commitment not to push for some of these economic -- or what I would call "economic regulations" but maybe that's a term we should not be using because we don't understand --

But you know -- things like allocations, gear and effort restrictions?

CHAIRMAN BREWSTER: No, it did not. Let me make two comments about this phraseology, which may be helpful:

One, it appears in the report of the Working Group. It does not appear in the recommendation itself.

Second, it had its origin in a concern expressed by several states which are active in exploration of krill and perhaps could be considered as moving most rapidly toward commercialization.

The concern was that the recommendation, as it stood, did not make clear that conservation should not be interpreted to prohibit all catch of krill. That definition was not incorporated in the recommendation. It found its way into the report of the Working Group because the United States, as did other countries, agreed that the term "conservation" did not exclude exploitation of krill.

MR. JAMES BARNES: Well, I think one of the things -- and this is really good to know because there has been an awful lot of concern among organizations that we deal with -- having looked at the recommendations and so forth and not seeing anything --

Seeing a lot of very nice thoughts about conservation, etc. -- but not anything about how you actually work it out.

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And that, coupled with this kind of language expressed -- has led to a lot of concern about exactly what kind of regime is going to be set up. And I might say that some of the information that we come across, comes from overseas where people have access to other sources of information -- from other governments -- and none of that information has been very positive in this regard.

And it is, I think, widely thought in the environmental community that this regime is going to be a weak regime, etc, and won't have any teeth. And that really, I think, furnishes the major focus of our concern as we approach this critical drafting stage in February in Canberra.

CHAIRMAN BREWSTER: We can't predict what kind of a regime it will be.

I would reiterate that the five principles that we went to the Ninth Consultative Meeting with, and which were largely encompassed in this recommendation, and one of those is certainly an enforcement system, remain the governing principles of the administration.

As Mr. Scully indicated, we have not finalized our ideas on the nature of this regime. Indeed, we have no draft regime and no draft convention to suggest. We will be elaborating those on the basis of our meeting here today, some consultations I expect to have together with Mr. Scully later in January, and further studies in the EIS. But our efforts are certainly going to be devoted to achieving a legitimate conservation regime, one with teeth in it.

MR. JAMES BARNES: Would it be the State Department's current intention to propose to the next special session, for example, that all the traditional elements of a sound conservation and management regime be included -- such as the one to catch limited -- for catch limits -- different kinds of gear -- and effort restriction -- closed areas -- all the things that would logically be incorporated into a sound conservation --

CHAIRMAN BREWSTER: I really haven't gotten that far.

MR. JAMES BARNES: When will the draft EIS be available?

CHAIRMAN BREWSTER: February 1st, and I hope to distribute it within a week, and have a public meeting subsequent thereto in order to receive initial comments on it before decisions are taken on our negotiating position.

Then there will be the usual 45-day period which I assume will transpire before what we anticipate to be the conference to draft the final definitive regime, or convention, takes place.

We use the word "definitive regime" because the term "convention" was one which at least one country could not accept in a written document.

MR. HARGROVE: I am Larry Hargrove, of the American Society of International Law; I had a couple of questions growing out of this discussion:

One is this: It would seem to me from the very fact that the recommendation includes the Section 2 interim guidelines, which are directed toward continuing exploitation activities.

And also from the explanation that has been given as to the meaning of a conservation regime -- i.e. it is interpreted as envisaging the possibility of exploitation as opposed to no exploitation.

It would seem to me that from these two factors one could resonably conclude that the political judgement of the participants in the meeting was that a moratorium on exploitation of the presently commercially interesting species was not achievable -- leaving aside the question of whether it might be desirable.

Is that a correct appraisal? Does the United States have any independent judgement on the desirability of the moratorium, leaving aside the question of its political achievability?

And if so, what is your expectation as to the position you might take in the coming negotations?

That is one question.

CHAIRMAN BREWSTER: Yes. With respect to your first question, the idea of a moratorium was not, to my recollection, explicitly discussed.

Was it in your Working Group?

MR,SCULLY: Not as such.

The question of a moratorium, at least a temporary moratorium on harvesting, is an option that we will be considering and will be considered with the EIS. And therefore, I think

that it's a question on which our minds are still open.

We would have to, in making and developing our policy on our negotiating positions as we go along -- try to make some reasonable judgements as to what the negotiating situation is -- make some political judgements as to what we can do.

And, of course, one will have to be looking at two objectives, let's say, between which there may be some tension. One of these is to establish the conservation regime which is as effective as possible in the conceptual sense. This would argue, perhaps, for a moratorium until all of the necessary machinery etcetera is in place and working.

On the other hand, if one wants a conservation regime to be effective, it has to include all those who engage in activities relating to the resources involved. There may well be states which are interested in possible commercial harvesting in the near future that would resist a moratorium very strongly.

But this is the kind of process -- making those kinds of judgements will be the kind of process that we are beginning now in looking toward the negotiation, or the beginning of negotiations.

MR. HARGROVE: I would gather then, from what you say, that you haven't ruled out the possibility of putting on the table, or discussing if somebody else puts on the table, an interim moratorium of some sort -- notwithstanding the fact that the Germans or the Soviets or others might find that a distasteful component of a conservation and management regime.

CHAIRMAN BREWSTER: No, we would not.

MR. HARGROVE: Let me ask another question: The position with which you went into the recently concluded meeting, particularly in respect of the fifth point which speaks of effective enforcement arrangements -- as well as your introduction a few minutes ago, Mr. Scully, would seem to me to suggest that you have in mind that a treaty is the end product of this negotiating process. That certainly would be consistent with the analogy of the sealing convention, for example.

The recommendation, however, in its Section III envisages that the Special Consultative Meeting will, among other things, determine the form of the definitive regime, including the question of whether it ought to be a convention.

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Is it the U.S. position that a treaty ought to be the end product?

And if not, how would the United States, or states which may favor some other form, envisage putting an effective management regime, particularly one with some enforcement measures, into effect?

CHAIRMAN BREWSTER: It is the United States' position that a treaty should be the end outcome of this process. As a matter of fact, our preference was that the Antarctic Treaty powers provide, as the next step, for the calling of a conference to write such a treaty.

The result was instead what you see -- which is a special meeting of the Consultative Parties to do a draft, and then to decide on the further step.

There was almost complete unanimity on the necessity for a conference which would result in a convention or treaty. Those were not the precise words used. The recommendation speaks of a "definitive regime" and uses circumlocutions, but the understanding of all of us was that that would be the outcome and it is our hope and expectation that when we meet in Canberra there will be unanimity on that, in proceeding directly to that.

MR. HARGROVE: Could I add one point to that?

CHAIRMAN BREWSTER: Surely.

MR. HARGROVE: I think that it is also a logical consequence of our position that a conservation regime should apply to the full range of species covered -- that a treaty would be required as the instrument in which to frame that conservation regime -- because, that means going more than 60 degrees South Latitude.

CHAIRMAN BREWSTER: That is to say, if the alternative to a treaty would be an agreed measure --

MR. SCULLY: From a practical point of view, I don't know that any other alternatives have been put forward, other than something like agreed measures done specifically pursuant to the Antarctic Treaty and specifically limited to the Antarctic Treaty area.

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CHAIRMAN BREWSTER: There was general agreement that in fact a regime would have to go north of 60 degrees South. We had anticipated that this might in fact be a stumbling block, but after initial discussion it did not turn out to be. There was, I think, unanimity on this point, was there not?

MR. SCULLY: On that part.

CHAIRMAN BREWSTER: And by definition it would have to be handled by the treaty.

MR. GOTTSCHALK: One other question, if I may.

CHAIRMAN BREWSTER: Yes, sir.

MR. GOTTSCHALK: Along these lines we are obviously concerned about the nature and amount of regulatory mechanisms that might be needed and put into force, and it occurs to us that this is going to require some kind of a management authority established under any treaty that might come up.

Would this be covered in the Environmental Impact Statement in detail, so that we could analyze the character of the machinery that would be established with respect to the capability for management -- including enforcement? Would this all be covered by EIS, or would it just be tacitly assumed that there would be a system development?

MR. SCULLY: If I could make one point on that. Looking at the question of drafting an EIS, one has to reach some happy medium between trying to anticipate in detail all of --

MR. GOTTSCHALK: In other words there is an infinite array of --

MR. SCULLY: Exactly, yes.

A specific or proposed management system with all of the necessary details filled in, I think that is one extreme--

And the other extreme is just to assume a mechanism.

What we would hope to do in the EIS is to try to meet both concerns somewhere in the middle. In other words, try to have some description of the kind of mechanism that would be necessary in terms of the functions it would perform -- and in a kind of general outline, without trying to get too specific concerning the details.

MR. GOTTSCHALK: So in effect, you would set forth a series of management principles without being specific as to how they might be employed?

MR. SCULLY: I hope so.

MR. GOTTSCHALK: For example, you need to have some population estimates , and estimates of the impact of a particular rate of exploitation -- and a lot of other things of that nature.

Hopefully, if those could be set forth well enough so that we get some handle on how effective they might be.

MR. SCULLY: Well on that point, if I might continue a bit -- It's hard to say how far one can go in discussing population dynamics and stock assessments or whatever because we are still dealing in an area where we don't have the kind of data base and establishing the means for not only assessing and assimilating basic scientific data, which may already be available -- but also for providing a means for incorporating and assessing catch data or other kinds of statistics and providing an effective mechanism which would provide a digestible data base upon which to base the necessary conservation measures.

I am not sure how far one can go in that sort of thing, in advance --

MR. GOTTSCHALK: You certainly can't fill in the specific figures, but there might be a general outline of the approach.

MR. STORER: Well the principles you would use and what you would need in order to determine the management measures -so you wouldn't include in the EIS the actual data --

MR. GOTTSCHALK: No. But you would expect that the kinds of influences -- the approaches you would use to establishing measures, would be excelled.

But again, there is a wide array.

MR. SULLIVAN: Mr. Ambassador, my name is Carl Sullivan and I represent the American Fisheries Society and I would like to read a statement into the record if I might.

I do have it in letter form and will give the reporter a copy.

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The American Fisheries Society (AFS) supports the negotiation among the interested nations of the world of a regime for the conservation, rational utilization and management of fisheries in Antarctic waters. The Society's interest stems from concern for the fisheries of Antarctica for the Society, chartered in 1870, is the world's oldest and largest scientific/professional organization dedicated to the advancement of fisheries science and the conservation of renewable aquatic resources.

In the negotiation of the Antarctic fisheries regime we urge that careful consideration be given to the inclusion of the following provisions:

1. Research. The regime should provide for an accelerated, fully coordinated fisheries research effort with particular emphasis given to development of an inventory of all renewable resources plus an estimate of recruitment potential. No utilization/management regime will have much chance of success unless it is based upon a comprehensive understanding of the resource. Every signatory nation should make a commitment to this end.

2. Interim Exploitation. During the negotiation of a management regime it seems likely, and not unreasonable, that some exploitation of Antarctic resources will continue. We urge, however, that caution will be the guiding principle in any such interim exploitation. The often tragic consequence of overharvest should be familiar enough to every country so that such a scenario will not be repeated in Antarctic -- the last of the world's virgin areas. A pledge of harvest moderation from all nations would not only protect the resource but would improve the climate for negotiations.

3. Optimum Sustainable Yield. In the absence of a better plan, the American Fisheries Society supports management for OSY with particular attention given to a broad ecosystem approach in which the stocks of all organisms are viewed not only for their potential yield to man but in terms of their relationship to all other organisms in the Antarctic ecosystem.

4. Pollution Abatement. Even though the Antarctic may be already somewhat contaminated by modern civilization's debris, no effort should be spared in preventing further degradation. From the outset of negotiations every nation should be expected to affirm a strong commitment to prevent all forms of pollution plus a strategy for surveillance and enforcement.

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American Fisheries Society believes that it is possible for man to make highly beneficial use of of the vast renewable resources of the Antarctic. In utilizing these resources, however, we see many threats to a healthy environment. Experience teaches us that even single nation management regimes in comfortable climates are far from perfect. Implementation of a successful management multinational management regime in the world's harshest climate will perhaps be the toughest challenge ever faced in fisheries diplomacy.

CHAIRMAN BREWSTER: Thank you, Mr. Sullivan.

MR. SULLIVAN: Thank you for the opportunity to be heard; and I will pass these copies along to you.

MR. CHAPLIN BARNES: Mr. Ambassador, I am Chaplin Barnes, of the National Audubon Society. I know that on numerous occasions you have said that you favor the creation of a public advisory committee. Since you favor the creation of a public advisory committee, I wonder where the thinking of the Department now is on that issue -- and whether that's the form that you are going to go for -- or what we might expect.

CHAIRMAN BREWSTER: I can very easily answer what the thinking of the Department is. I have more difficulty in replying what the action of the Department is. (Laughter.)

I still wish, and so does the Department wish, to establish an advisory committee. There is, as I think you are aware, a general attempt on the part of the Administration to cut down on the number of advisory committees, and it has to be acknowledged that there are a large number of them whose purposes and existence are perhaps questionable. So that has been the practical impediment to our doing it.

What I am currently hoping to do is to utilize one of the presently authorized and established committees of the Department and to create in that an Antarctic section that obviates the necessity for an approval at various levels both in the Department and in other government organizations. That is what I am attempting to do.

I am unable to say (a) whether I will be successful; or (b), when.

MR. JAMES BARNES: To follow that up a little bit, one of the other things that I think has concerned a lot of us about our role in forums like this, is our access to data and I would just mention one thing specifically that came up

in the last couple of weeks:

We tried to get access so that we could comment on them -- to the drafts by other nations of the proposed living resources regimes, and we were told that we couldn't have those, at least at this time.

It makes it a little bit difficult for us to comment intelligently on, you know, the real world --. which is the world of the Antarctic consultative parties negotiating -- if we don't have access to that kind of information and data -- and it is often the case in our experience that advisory committees can circumvent that particular problem because of the restrictions on the information.

CHAIRMAN BREWSTER: Precisely, and that is one of the reasons that I had planned, beginning now a year ago -- and that was a year ago in November -- to establish an advisory committee precisely for that reason.

But absent the advisory committee, we are faced with the fact that the practice of the Antarctic Treaty is to classify, or to treat as classified, all of its documents and we are required to so hold them.

Those documents submitted by the United States have a different status, and we have made them available.

Within the Antarctic Treaty, specifically the Ninth Consultative Meeting, the United States fielded a proposal to change this system, and it was met with great approval in private but no support in the plenary meetings whatsoever. In fact, the references to the United States proposal for the requirement for greater information being made available to the public and the fact that the declassification of documents had been discussed was at one juncture deleted from the final report. It was put back in, and it will be on the agenda of the Tenth Consultative Meeting.

I have to add that the apprehension some of our partners in the Antarctic forum feel is justified. There are some delegations which are able to submit working papers and to discuss ideas and proposals in the Antarctic Treaty forum which they are unable to discuss in their own countries and, I suspect, they may be unable to discuss with certain officials in their foreign ministries. And they are apprehensive that a release of documents, or a system which would require the Consultative Parties to classify those documents they wish to classify

-- would create problems for them.

MR. JAMES BARNES: Well, would it be useful to conceptualize this as being composed of several parts and, putting aside all the other range of documents that we may be talking about and letting the conventional rules apply to those at least for the time being -- and take out as one category, all the documents that relate to the living resource regime (which as we all see is going to be drafted outside, at least partly outside the context of the Antarctic Treaty anyway) and you know without access to those documents, it makes it rather impossible for interested members of the public, anywhere in the world, to have the kind of input that I think you and our government at least, feel they should have.

I think that those documents in fact, are quite different than some of the ones you may be referring to and I can't really see why there is such a great problem in releasing those -- unless the institution of the consultative parties as a group, feel that by giving those documents they will breach their general position irrevocably in some way.

CHAIRMAN BREWSTER: That is one concern, and the other is that they may refer to other documents or other discussions which they are unwilling to declassify or to make available.

I have to honestly state that I don't think that at this juncture there is anything I can do about that.

MS. SCHARLIN: Mr. Ambassador, I wonder if we can talk a little bit about the whole question of the territorial claims raised in my letter, and which you did answer.

But I wondered if you might elaborate a little more on how Article IV could be, perhaps utilized to deal with this issue -- especially if the conservation regime does extend to the full range of the species.

CHAIRMAN BREWSTER: To be used with respect to marine living resources?

MS. SCHARLIN: Yes.

MS. BAILLY: I think, Pat, that it remains to be seen what develops in the negotiations and in consultations before the meeting. But a possibility is sort of the way it was treated in this agreed recommendation. There is a principle, in Section III Number 3, Subparagraph d which is not really terribly different that the principles that are embodied

as well in the Antarctic Sealing Convention, which would be a precedent.

And I think Article II in that convention has -- it's a disclaimer in fact -- it goes about setting up the regime and the mechanism -- and then there is a disclaimer on it which basically says that the provisions of Article IV are not prejudiced by this regime.

That's a possibility, and then you would just do the rational kind of conservation regime that you, hopefully, could negotiate. That's a possibility.

But it remains to be seen just how it all comes out -- but that's the way it came up in the Sealing Convention.

MS. SCHARLIN: Are there other alternatives that you might have to be worked out? In other words, in terms of the reaction of a certain -- of the claimant states -- would there be other alternatives in dealing with this?

MS. BAILLY: Well I think that is a point.

MS. SCHARLIN: That seems to be one -- I get the feeling, you know -- "what else?"

MS. BAILLY: I think at this point we are obviously not going to recognize some kind of 200 mile zone given the United States position.

CHAIRMAN BREWSTER: That's one alternative which several countries have asked us to embrace. We have declined to move to their position -- and will continue to decline.

MS. BAILLY: Well I think, given this agreed recommendation, it was unanimously agreed upon, that kind of approach could be anticipated.

DR. AUBURN: Has somebody got an idea of what the actual annual catches were of krill -- of either the Soviet Union or Japan -- or even over the last five years? Have you any figures on that?

COMMENT: I think they are relatively slight.

The Russian one varies from something like the recent years of 2,000; perhaps up to 10,000.

The Japanese is perhaps one or two thousand.

MR. JAMES BARNES: Is that tons a year?

(Confirmed, yes.)

MR. SCULLY: I think I have seen the figure of a maximum in any of the years -- and these are fairly rough estimates based on FAO data -- of a maximum in any given year in the vicinity of 20,000 total.

CHAIRMAN BREWSTER: I think we have to add the caveat that we are not certain that these are precise. These are estimates, aren't they?

MR. STORER: Right.

MR. JAMES BARNES: Could I return for just a minute to the claims point?

Is it conceivable, or is this a problem that we have to be aware of -- that if we established a regime that had what I would call "effective, sound conservation management principles and enforcement mechanisms" that some of the nations who are most aggressive in pursuing their territorial claims would at that point, insist on a recompense of some sort, or recognition of their claims to be effected by this regulation? I mean, is there any kind of a linkage there at all?

Or is it your understanding and feeling that these nations are going to agree to agree to adhere to a living resources regime without regard to their territorial claims -- and we can just sort of leave them separate and aside?

CHAIRMAN BREWSTER: Subject to what you two gentlemen have to say, it is not my feeling that we know the answer to that yet.

The first idea that you mentioned has at least been surfaced informally in the discussions. But for myself, I don't think I know which way I think that one is going.

Do you or Jim have a feeling?

MR. SCULLY: I think one can only look at and assess some of the forces that are operating upon the nations involved; and though it's probably difficult and a little bit presumptuous to try to put oneself in the place of, say, a nation which is strongly attached to its territorial claims.

One could at least postulate that there is in such a country a political desire to insure that its position on territorial claims might prevail.

There also may be countervailing forces which involve the honest recognition that there is a conservation problem that can only be solved through some form of an effective international agreement.

So I think that at least there is some ground for arguing that there is hope for a consensus which will help to achieve an acceptable objective for all concerned.

MR. JAMES BARNES: What would the U.S. do, or what do we think we might do if it were presented in the context of this next special session that "country x" refused to sign onto a limited resources regime unless its claim were -- you know -- given some recognition by -- even a token payment -- for example, something that would in effect go beyond the provisions of Article IV and actually enhance their claim.

Do we have a position on that? Are we going to have a firm position on that?

MS. BAILLY: That's extremely unlikely to happen, given this unanimously agreed document that specifically raises that compromise and says that the compromise is not to be upset. I think that would be extremely unlikely and I think think that we would go back to this document.

I think the understanding was quite clear at the meeting as well; so that it would be very unlikely, I think.

CHAIRMAN BREWSTER: I only said, that doesn't mean it won't be raised.

MR. JAMES BARNES: As to a moratorium again, is this an idea that the United States might consider presenting at the next session?

Because I think there are a number of groups -- in fact, we have considered submitting a statement today but we don't have it in a fashion that I think would be appropriate to submit -- but I think there would be general concensus among most of the environmental groups that we have talked to, that an interim moratorium along the lines of what the American Fisheries gentleman suggested, makes an awful lot of sense in view of the paucity of data that we have about the area etc.

And we recognize that there are political difficulties with doing that, especially since we are harvesting ongoing -- and we are prepared to suggest a sort of modified moratorium which might go along the lines of a commitment by nations not to fish for more than they are now fishing for -- until such time as we have adequate base line data and other information that you really need to establish a rational conservation management regime.

And looking towards that concept of optimum instead of maximum return of the resources.

CHAIRMAN BREWSTER: Certainly we would consider it.

I also would have to tell you that my present opinion -- and as I said earlier the position of the State Department or the U.S. Government has not been determined -- but my own present view of that is that it is in all probability something that one could not negotiate.

To the best of our knowledge, the commercial exploitation of krill is not yet a fact. We are aware of its appearance in various markets in certain forms, but I don't think that the whole process of commercialization has yet been developed.

The information we have, however, strongly suggests that commercialization could happen rather rapidly. I would assume that the countries that are working on that most assiduously (of which the United States is not one) would be precisely the countries which would have difficulty with that kind of an approach now. That attitude is in part reflected in the words of the working group which we previously discussed and which we agreed to the assurance that "conservation" did not mean no "harvesting".

So on the basis of what I know now, I would have to say I think such a proposal, desirable though it might be, is probably not negotiable. But I come back to say that we will consider it.

MR. JAMES BARNES: Well I think the point to stress here -- and I haven't heard anybody I've talked to who are here today, suggest sort of a complete moratorium.

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CHAIRMAN BREWSTER: Yes --

MR. JAMES BARNES: What has been suggested is what we have characterized as an "interim moratorium" which I don't personally see as being inconsistent with the language necessarily that was drafted because that looks towards, you know, the long term.

And the point here, is that it may be impossible to establish a really rational conservation and exploitation scheme unless you have the data and if exploitation was to take place in a rapidly increasing scale over the next five or six years at exactly the time that the key data is supposed to be getting assembled -- it would be an impossible situation.

And that's where the context -- I think most people I have heard discuss an interim moratorium, have raised the idea.

Do you have the same feeling that even that formulation is really politically tenuous?

CHAIRMAN BREWSTER: I am not sure I would accept the premise that "if commercialization does start then regulation would be impossible."

MR. JAMES BARNES: Well, large scale -- if it really went in a mammoth --

CHAIRMAN BREWSTER: If the regime which is negotiated provides a mechanism for doing that, and if, let us say, it does not provide for unanimity, I would think we might well have the mechanism and also the scientific data for some sort of mechanism to produce both the data and the action.

MR. STORER: Let me make a point on that comment which is an interesting one:

One of the proposals for management put forward by a consultant for FAO, his own concept, was that you might, in the Antarctic, (once you had a convention and a mechanism), establish a fairly low total allowable catch figures.

And then have fairly small allowable incremental margins in any one period -- let's say a year -- so that you wouldn't assumedly have in any one period, a doubling of the catch, but you might allow only ten percent increase a year by any country and be able to review this annually to see what the impact is.

While that is just a proposal, it is an intriguing one.

MR. JAMES BARNES: It sounds very responsible to me.

MR. STORER: Yes, and it's one of the nice things about -- if we get this thing going in time, it would be a first time we might be able to look at this and to consider growth intelligently, with some ability to --

It's just an individual proposal made by a consultant.

MR. JAMES BARNES: No. I like the propsal. I think it is very interesting and good.

And along that line, one of the things that some of the people who have consulted with us about this, as suggested, is that there are many ways to use krill.

For example, it -- when it appears that historical stocks of the (baleen) whales are down, you know, to ten percent of their historical level -- and some people suggest that -- of course they eat a lot of krill -- and if they were returned through a sound management scheme to their historical levels (which is certainly possible) -- but it's not possible with large commercial exploitation of krill arguably -- that would be an assured, and very high quality protein resource of so many million tons.

It probably wouldn't be anything of the size that you have heard bandied about 50 million tons a year or whatever, of krill -- but it would be a certain kind of protein resource -- and that is an option that a sound regime could consider.

And those are the kinds of interplays and considerations we think are really important, you know, to deal with; and as I say, we have a unique opportunity here to deal with -- starting from the position that we haven't already decimated the stock, we can be intelligent about what we do.

Mr. HARGROVE: Larry Hargrove again, from the American Society of International Law.

It would seem to me that the model, which has perhaps implicitly been in the minds of all of the states participating in this embryonic negotiation thus far, is that of a fairly typical high seas fishery conservation management regime

-- a negotiating model and a model that would guide the end product (although there are some special twists that would apply with respect to resources in the Southern Ocean.)

There are, however, some different models of recent experience as regards international negotiations for the management of ocean resources; and in that connection I wonder -- models which might recommend themselves to certain states either participating or not participating in the discussion of these negotiations --

So for that reason I wonder if you feel under any pressure from any source to broaden the participation in these negotiations beyond the class of states that are mentioned in the recommendation, which is a fairly narrow though not unreasonable class -- namely --I gather the consultative parties that are actively engaged in research and exploitation.

MR. SCULLY: Let me try to answer that.

Obviously that question raises a number of very broad issues, but let me try to put forward a few ideas that occured to me in response thereto.

First of all, I think from the juridical point of view, the concept of the high seas basis of regulation has been a very appealing one to the United States given its position on territorial claims.

But leaving that aside, I think that the question you essentially raise is a common heritage question, or the question of the distribution of the potential benefits from the exploitation and potential exploitation of new sources of protein in the Southern Ocean.

It has been our view, or at least in preliminary fashion, that what we are essentially now addressing is a conservation regime and the requirements for conservation are what lie behind the standard for participation in the negotiations.

In other words, these requirements are to make sure that all those countries engaged in activities related to the resources, are involved and engaged in developing the regime, if possible, and bound by the obligations of the regime once it is established.

Now with regard to the question of broader participation, or some relationship to the international community as a whole, I don't know that we have an answer.

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One idea that appeals to me is the idea of building in the right kind -- and I think it was suggested by Mr. Gottschalk earlier -- of building in the right kind of relationship with international institutions that would represent the international community as a whole or which might represent the needs of certain segments of the international community, specifically those which are most in need of -- or could most benefit, let's say, from the large scale development of new sources of protein.

MR. HARGROVE: Well if I may just press this one moment, that doesn't quite answer the question.

The question, more precisely is: Do you expect that you will get to the so-called "decisive meeting" without having any real pressure applied from states falling outside this group to be allowed to crash the party.

MR. SCULLY: Which group do you mean? The group that's other than consultative --

MR. JAMES BARNES: The Group of 77.

MR. HARGROVE: I would assume that the Section III here at least implies that participants in this recommendation had in mind that the group negotiating the final regime would be the consulting parties and those who are engaged in research and exploitation with respect to these resources -- and there has been talk in public fora by people who don't fall into that class, about the concept that this resource might be treated as something the economic grant of which belongs to the international -- members of the international communities ... ought to participate in the negotiating arrangements for the exploitation.

Do you feel that that is a practical problem?

MR. SCULLY: I am not in a position of predicting. It's potentially a problem, obviously.

Again, looking at it from a personal point of view, I think the implications of accepting a premise that in some fashion the international community might claim economic "rent" for resources on what we would consider to be the high seas, that there's some obligation to share that with the international community as a whole -- are interesting.

I don't know whether this probably will arise or not. I would hope that a rational means can be found to solve it.

Rather than having, let's say, a 150 nation negotiation which is going to involve the political decisions on how to run a resource management regime, it might be possible to do something that in my view would be more rational, which would be to build the kind of institutional relationships which would, hopefully, allow for the so-called international community interests to be meshed with so-called conservation interests, into something of the benefit of all. But that might be kind of panglossian.

MR. HARGROVE: Lots of luck.

MR. JAMES BARNES: Yes --

CHAIRMAN BREWSTER: It is an obvious problem, an obvious danger, I don't know how it will eventually come out.

At this juncture, I would like to recess the meeting for fifteen minutes.

We will reconvene at 4:10.

(Proceedings were recessed briefly, after which they resumed as follows:)

CHAIRMAN BREWSTER: Can we reconvene? Is there any further discussion?

MR. KNIGHT: Oh, I guess I can start off. I just have a question of someone which might be conceived of as fairly important, I think. I would like to know what your thought is, or if you have thought about possible public representation on the delegation to Canberra.

I know that -- I think Pat went to the Ninth Meeting --

CHAIRMAN BREWSTER: Yes.

MR. KNIGHT: But I was wondering if you were thinking of having more than one.

CHAIRMAN BREWSTER: Yes, I have thought about it.

I do intend to have more than one and I intend also to again invite Congressional representation.

My thoughts and recommendations are subject to confirmation -- "confirmation" isn't the right word -- the responsibility for final decision rests with another bureau, but I

expect to recommend more than one public representative for the delegation.

Are there any further comments or questions?

If not, I would first like to thank you for coming and participating in this meeting, and I hope that if you have additional thoughts or new thoughts, you will communicate them to us.

If you have not registered when you came in, I would appreciate your doing so. That will provide us with a list of people to whom we can send our notices about the second meeting, which I anticipate in February, to discuss the Environmental Impact Statement. I also hope to use the same list to mail to those of you who have been here or otherwise indicated an interest you a report of the Special Consultative Meeting at Canberra.

Thank you, very much.

(Proceedings ended at 4:25 p.m.)

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Mr. James Barnes	Center for Law and Social Policy
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Mr. Robert Brewster	OES, Department of State
Mr. Steven Burton	College of Law, U. of Iowa
Mr. Thomas Clingan	University of Miami
Mr. Louis DeGoes	National Academy of Sciences
Ms. Janice Dodge	Tetra Tech., Inc.
Mr. D.W. Frenzen	National Science Foundatin
Mr. John Gottschalk	International Assoc. of Fish and Wildlife Agencies
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THE FUTURE OF ANTARCTICA

Earthscan Press Briefing Document No. 5

- Antarctica is the coldest, driest, highest, windiest, least accessible, worst known and generally most unpleasant of all the seven continents.

- Since 1959, it has been administered by Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, UK, USA and USSR, under a treaty which froze territorial claims, banned military activity and established a regime of free and open scientific cooperation.

- Before 1959, Australia, France, New Zealand, Norway and UK had mutually agreed territorial claims, while Argentina and Chile had claims which conflicted with each other's and with the UK's.

- The Antarctic Treaty has worked far better than most international agreements. But in the last few years there has been growing discussion about important resources:

  * krill (shrimp), perhaps enough to double the world's fish catch;
  * offshore oil, perhaps as much as in Alaska;
  * icebergs, to be towed to thirsty lands thousands of miles away;
  * iron ore, uranium and other minerals on land.

- The treaty contains no provision to exploit these resources, and the territorial claimants may insist on their "ownership". If the treaty cannot now be extended to cover resources, it may collapse altogether. The 12 Antarctic Treaty powers are meeting in London in September 1977. Resources will be the key item on the agenda.

- Antarctic issues are intensely political:

  * can krill be exploited without overfishing?
  * should the technologically-advanced states monopolise krill?
  * should krill be harvested as a luxury dish, as fishmeal to feed animals, or as a high-protein food for hungry people?
  * should Antarctica's rich resources be controlled by the 12 Antarctic Treaty states, or should there be a "common heritage" solution?
  * would it be sensible to abandon the successful treaty machinery and scientific cooperation for the political uncertainties of the UN?

Earthscan, a media service covering selected global environment problems, is funded by the United Nations Environment Programme and operated on an editorially-independent basis by the International Institute for Environment and Development (President: Barbara Ward). IIED, incorporated in the USA as a non-profit corporation under the laws of the District of Columbia, and in the UK related to the IIED Trust, has tax-exempt status in both countries. It was inaugurated in 1972 [illegible] Clark and Anderson Foundation.

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1. WHAT IS ANTARCTICA?

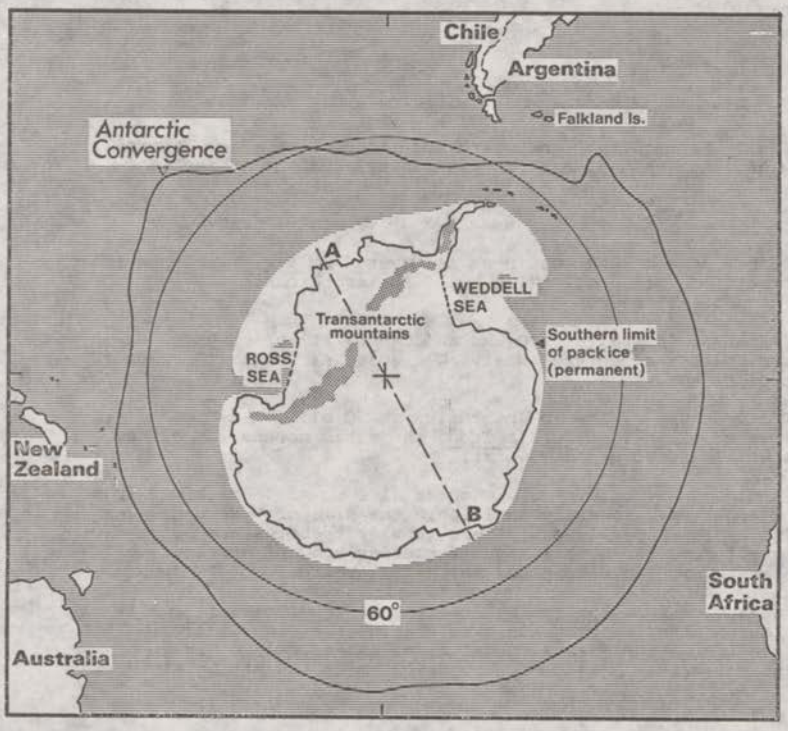
- The Antarctic Treaty applies to the land areas south of 60°S latitude. This area includes the whole continent of Antarctica, the South Shetland and South Orkney Is, but not the Falkland (Malvinas) Is, or South Georgia.

- For the purpose of SCAR (Scientific Committee on Antarctic Research) the Antarctic is bounded by the Antarctic Convergence, a significant biological boundary. Lying between 47° and 63°S, this is one of the most dramatic oceanic features in the world: a sharp change of surface temperature within a short distance, sometimes as much as 4°C (7°F), as cold Antarctic waters sink below warmer waters moving south.

- The Antarctic continent covers one tenth of the world's land surface: as large as China, Argentina, France, Nigeria and New Zealand combined.

Mountains:

- Antarctica is the remotest continent: the others are all tied together by land links, or only separated by narrow straits. Antarctica is 950 km (600 mi) from the nearest land at Cape Horn.



- Antarctica is a continent of land covered with thick ice; the Arctic is mainly an open ocean covered with moving, floating pack ice.

- The only people living within the Antarctic Circle (66½°S) are scientists and support personnel, whose overwintering population is a mere 750. By contrast, over two million people live within the Arctic Circle (66½°N). Murmansk, USSR, 69°N, the largest Arctic city, has a population of 310,000.

- Antarctica's average height is 1,830 metres (6,000 feet), and its highest point is the Vinson Massif at 5,140 m (16,860 ft). In places, ice free areas are found as "dry valleys".

- The Transantarctic Mts roughly divide Antarctica in two. East (or Greater) Antarctica is geologically older: a vast ice plateau rising to over 4,000 m (13,000 ft). West (or Lesser) Antarctica is dominated by a series of folded mountains, isolated peaks or "nunataks", which push up through the ice and snow cover.

- If the ice melted, West Antarctica would be a series of isolated islands; East Antarctica would be mountainous, with a central lake whose bottom was 2,500 m (8,200 ft) below sea level.

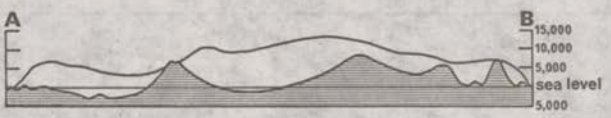


Figure 2 Section through Antarctica (along line AB on Figure 1), showing land (shaded) and ice cap (white); height in feet.

Ice:

- 98 per cent of the continent is covered by ice, with an average thickness of over a mile (1.6 km). At its thickest the ice is 4.5 km (2.8 mi) deep.

- Permanent iceshelves 100-250 m (300-800 ft) thick have formed at several places along the coast. The Ross Sea iceshelf is about the size of France.

- Total volume of ice in Antarctica is 30 million cubic km (7.2 million cu mi). If it all melted, the world oceans would rise between 45 and 90 m (150-300 ft).

- Tabular icebergs, up to 250 sq km (100 sq mi), break off from the iceshelves. Recently an iceberg the size of Luxembourg was adrift in the Weddell Sea. These tabular icebergs are quite different from the more irregular glacier-spawned arctic-type icebergs, which do also occur in the Antarctic.

- Antarctica is a "pulsating" continent. In winter, it more than doubles in size, as pack ice stretches up to 1,100 km (700 mi) from the coast. On the Greenwich meridian, Antarctica is 3,600 km (2,250 mi) across in summer, and 5,400 km (3,400 mi) in winter.

Climate:

- For six months (Oct-March), Antarctica has little or no daylight.

- The world's lowest temperature was recorded by Russians at Vostok, high on polar plateau: -88°C (-127°F).

- Winds sometimes exceed 300 kph (200 mph). Strong steady winds often race clockwise along the coasts. Offshore, these westerly winds blow unobstructed around the whole polar ocean, and pile up the roughest seas in the world.

- Precipitation inland is very light. Annual snowfall at S. Pole is less than an inch of water equivalent (2.5 cm); it is far drier than most deserts. On the coast snowfall is about 50 cm (20 in), and in the interior 5 cm (2 in). Antarctic blizzards are mainly snow being blown about from one place to another, without fresh snowfalls.

Biology:

- While the Antarctic land mass is by comparison almost lifeless, the antarctic seas are among the most biologically productive in the world: the standing biomass is seven times greater than in sub-antarctic seas.

- Seals inhabit the pack ice or haul out on beaches. There are no land mammals or land birds.

- Over 40 species of seabird breed in Antarctica, mainly near the coast. The emperor penguin perversely breeds during the Antarctic winter.

- Mites, springtails, lice and midges are the main fauna. One mite, Nanorchestes antarcticus, has been found at 2,245 m (7,365 ft) at 85°S. The flightless midge Belgica antarctica, up to 3 mm long, is Antarctica's largest resident free-living organism.

- The only plants, other than microscopic soil fungi and algae, are lichens and mosses. There are no higher plants (shrubs, trees, grasses or herbs) on the Antarctic mainland.

2. WHO DISCOVERED ANTARCTICA?

- The Greeks postulated a great southern continent to "balance" the continents in the north. The Maoris of New Zealand have vague legends of a white land somewhere to the south.

The Explorers:

- Bouvet de Lozier (France) discovered Bouvet Island in 1739, and saw tabular icebergs.

- De Kerguelen-Trémarec discovered Kerguelen Island in 1772, calling it Land of Desolation.

- Documented Antarctic history begins with Captain James Cook (UK), who circumnavigated the continent (1772-75). He probed south at several points, but each time was turned back by heavy pack ice without sighting the mainland. He discovered S. Georgia, and proved that if Terra Australis existed it was south of 60°th parallel.

- 1820-21: Sightings of mainland reported by ships under command of Capt Edward Bransfield (UK), Admiral Fabian von Bellingshausen (USSR), and Capt Nathaniel B. Palmer (USA). Capt John Davis (US) is thought to have landed at Hughes Bay, Antarctic Peninsular, on 7 Feb 1821.

- 1840: Capt Dumont d'Urville (France) discovered Adelie coast on the mainland, and claimed it for France.

- 1840: Lieut Charles Wilkes (US) mapped coast of Wilkes Land (100-160°W).

- 1841: Sir James Ross (UK) penetrated pack ice, gained open water of Ross Sea, reached Antarctic coast and claimed for Britain.

- Then there was a lull for 50 years, until whaling and scientific curiosity revived interest.

The Heroic Age:

- 1898: Lieut Adrien de Gerlache (Belgium) led party on Belgica, became first expedition to overwinter: aboard ship frozen in pack ice.

- 1899: C.E. Borgrevink (UK) overwintered on land.

- Erich von Drygalski (Germany) explored Kaiser Wilhelm II Land in 1902; Otto Nordenskjöld overwintered in Weddell Sea 1901-03; French yachtsman Jean Charcot explored in 1904 and 1908-09; there was a Japanese expedition in 1911-12, and an Australian one in 1911-14.

- 1904: Argentina took over Scottish station in South Orkneys; has maintained it without a break since.

- British National Antarctic Expedition, 1901-04, in specially-built ship Discovery, under Capt Robert Scott, explored west of Ross Sea, hauling sledges by hand 480 km (300 mi) inland from ship.

- 1908-09: Ernest Shackleton (UK) pioneered route towards pole, reaching 88° 23'S: 156 km (97 mi) from the South Pole. Shackleton had advertised in London newspaper: "MEN WANTED for Hazardous Journey. Small wages, bitter cold, long months of complete darkness, constant danger, safe return doubtful. Honour and recognition in case of success - Ernest Shackleton." Speaking of it later, he said: "It seemed as though all the men in Great Britain were determined to accompany me, the response was so overwhelming."

- 1911: Roald Amundsen (Norway) landed in the arctic ship Fram. His party of five men on skis and dogs reached the South Pole on 14 Dec 1911. Meanwhile, Scott and four others reached the pole on foot on 17 Jan 1912. On return journey, Capt L.E.G. Oates, sick, crawled out and died in the snow, so as not to hold up his companions. But a blizzard prevented their further movement, and all perished.

- 1912: Wilhelm Filchner (Germany) in "Deutschland" charted Luitpold Coast in Weddell Sea.

The Mechanical Age:

- Admiral Richard E. Byrd (USA) successfully introduced mechanised exploration and airplanes to Antarctica in late 1920s, although Shackleton and Scott had tried motorised sledges.

- 1925-39: British investigations on Discovery of Southern Ocean laid basis of present knowledge.

- 1929-31: New Zealanders appeared in own right with the British-Australian-New Zealand Antarctic Research Expedition.

- 1938-39: German expedition under Alfred Ritscher dropped metal swastikas over region now claimed by Norway, and claimed it for Germany.

- 1942: First Argentine expedition.

- 1947: First Chilean expedition.

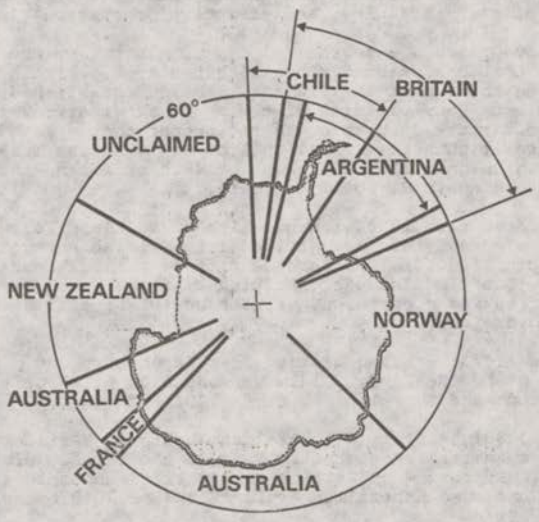
- At the same time, large-scale sealing (1820-30 and 1880s) and whaling (1904-65) was taking place, stopping only when there were too few animals left to be worth killing.

3. WHO CLAIMS ANTARCTICA?

- Seven nations (Argentina, Australia, Chile, France, New Zealand, Norway and UK) made formal territorial claims between 1908 and 1946.

- Claims are based on: discovery; occupation; performance of administrative acts such as issuing decrees, printing postage stamps and setting up post offices; prior claims even without discovery; continuity; contiguity; the so-called sector principle (moving inwards from Antarctic perimeter).

Figure 3 Territorial claims in Antarctica.



- All claims are pie-shaped. Most extend from 60°S to South Pole; the southern limit of the Norwegian claim is not defined, nor is the northern limit of the Chilean claim.

- Only five claims (Australia, France, New Zealand, Norway and UK) are mutually recognised.

- The claims of Argentina, Chile and UK overlap in the Antarctic Peninsula.

- 15 per cent of the continent - Marie Byrd Land, or the Pacific Sector - has never been claimed, although at times it has been tacitly regarded as a potential US sector.

- Belgium, Japan, South Africa and USSR do not formally recognise any claims.

- The USA and USSR "reserve their rights", and USA has rejected all existing claims.

- The U.K., New Zealand and Australian claims, which all derive from British claims, together cover two thirds of the continent.

- Conflicting interest in the Antarctic Peninsula has been reflected in a multiplicity of names: Trinity Land or Graham Land (UK), the Palmer Peninsula (US), Tierra O'Higgins (Chile), Tierra San Martín (Argentina).

Claimant states:

- Argentina: Argues that "Antartida Argentina" has been part of territory since founding of republic; formal claims made since 1908. Claim is based on succession to original Spanish "rights", geographical proximity, geological affinity, and effective occupation since 1904.

- Chile: In 1940 issued a decree "to fix with accuracy the limits of a sovereignty that has existed since 16th century". Little was done to substantiate this until 1947, when a station established. Chile and Argentina both deny validity of claims based on discovery alone, insisting on effective occupation as the proper test. Both trace their historical rights to a Papal Bull of 1493 and the Treaty of Tordesillas, which gave all lands west of 46th meridian (and thus presumably extending to S. Pole) to Spain.

- UK: Claim dates from 1908 with creation of Falkland Island Dependencies. In 1962 this was divided into British Antarctic Territory (south of 60°S), and Dependencies of the Falkland Islands: S. Georgia, S. Sandwich Islands. British claim is based on discovery, formal acts of taking possession, maintenance of several stations and exercise of sovereignty.

- New Zealand: 1923: British claimed Ross Dependency and placed it under control of New Zealand. Claim was based on discoveries by Ross in 1841 and Scott and Shackleton between 1901 and 1912.

- Australia: 1933: UK claimed Australian Antarctic Territory and placed it under Australian control. This is the largest claim: 6½ million sq km. Supported by British discoveries and exploration of 19th century, and some Australian explorations of 20th century.

- France: 1924: Formal claim over Terre Adélie rests on discoveries of Dumont d'Urville in 1840.

- Norway: 1939: made a formal claim over Dronning (Queen) Maud Land, to prevent German activity in area in which Norwegian whaling vessels had long operated and Norwegian explorers been active.

Figure 4 Degrees of longitude claimed by each country.

	Boundaries	Percentage of 360°
U.K. (undisputed)	20°- 25°W	1%
Norway	20°W - 45°E	18%
Australia	45°- 136°E 142°- 160°E	30%
France	136°- 142°E	2%
New Zealand	160°E-150°W	14%
Chile (undisputed)	90°- 80°W	3%
Total undisputed	25° - 150°W and 80°- 90°W	68%
Unclaimed	150°- 90°W	17%
Chile/U.K. overlap	80°- 53°W	8%
U.K./Chile/Argentina overlap	74° - 53°W	6%
Argentina/U.K. overlap	74° - 25°W	14%
Total disputed	80° - 25°W	15%
Total Chile claim	90° - 53°W	10%
Total U.K. claim	80° - 20°W	17%
Total Argentina claim	74° - 25°W	14%

Non-claimant states:

- Soviet Union: Russian interest in Antarctica was revived in 1939, after more than a century of inactivity, when Soviet government protested to Norway over her claim to Queen Maud Land, noting "longstanding interest" of Russia in Antarctica, and citing voyages of Bellingshausen as proof of Russian rights. The Soviet government stated in 1958 that it "has not recognised and cannot recognise as lawful any separate settlement of the question regarding state jurisdiction over the Antarctic". It reserves all rights based on Russian discoveries and explorations, including the right to present appropriate territorial claims.

- United States: Has been exploring Antarctic for over 150 years. Stated in 1924 that discovery of a new land must be followed by actual settlement to validate a claim. Despite protests of writers, private citizens and senators, US has consistently refused to make an official claim. However, large numbers of unofficial claims exist on US behalf. Byrd's expedition in 1939 was told by President Roosevelt it could drop from airplanes or deposit in cairns claims "which might assist in supporting a sovereignty claim by the United States government". In 1946 the US sent the largest ever expedition to Antarctica: "Operation Highjump". Originally secret directives indicate that one of its objectives was extension of "US sovereignty over the largest practicable area of the Antarctic continent". The unclaimed Marie Byrd Land (Pacific sector), surveyed and named by the first Byrd expedition, has often been regarded as a potential US claim.

- Japan: No formal claim ever made, although in late 1930s the Japanese press agitated for a Japanese claim. Japan renounced "all claim to any right or title to or interest in connection with any part of the Antarctic area" in the Peace Treaty of 1951.

- Germany: A German sector has been drawn 17°E to 5°W, in the Norwegian sector. No official announcement was ever made, but in 1938-39 a German expedition made unofficial claim on Hitler's behalf.

- Brazil, Peru and Uruguay have speculated on an informal basis about possible claims, and Brazil is reported recently to have made one.

- Poland: Tradition of polar work, but no claims. In 1958-59 briefly used a Soviet station.

Subantarctic islands:

- Several countries have long-standing claims to subantarctic islands north of 60°S, among them Norway: Bouvet Island and Peter I Island (claimed 1928 and 1931 respectively); France: Crozet Islands and Kerguelen Archipelago (1924, based on discovery in 1772); Australia: Macquarie Island (incorporated by UK into Tasmania, then colony of Van Diemen's Land, in 1825) and Heard Island and MacDonald Island (claimed by UK in 1908 - to Australia in 1947); South Africa: Prince Edward Islands (annexed by UK 1908, transferred to SA 1947); UK: South Georgia and South Sandwich Islands (1908, based on claims dating from 1775; also claimed by Argentina); New Zealand: Auckland and Campbell Islands (discovered 1806 and 1810).

- These islands were valuable as bases for sealers and whalers, but are largely useless today, although with a 200-mile Exclusive Economic Zone (EEZ) some could control important oil or gas fields.

A rising temperature:

- Several incidents between Chile, Argentina and UK highlit the urgency of a solution to the territorial issue.

- 1943: British visit to Deception Island (South Orkneys) revealed brass cylinders claiming Argentine possession, left from year before. Britain, fearing a pro-German Argentina might control both sides of vital Drake Passage between Atlantic and Pacific, established base, removed cylinders and returned them to Argentina through diplomatic channels. British returned to Deception Island in 1944, found earlier British signs had been replaced by painting of Argentine flag. British destroyed this and set up stations.

- 1952: An Argentine party in Hope Bay, S. Orkneys, opened fire over the heads of a British party attempting to reoccupy a Falklands Islands Dependencies station. Argentine Foreign Office later stated this was a friendly greeting.

- 1953: British policemen from Falkland Is destroyed an Argentine hut in the S. Orkneys.

Towards a settlement:

- Argentina and Chile both refused UK invitation to go to the International Court of Justice in 1947 and 1955, insisting that their sovereignty was so clear that no third power could judge this domestic question.

- 1948: US proposed that small group of countries (which excluded the USSR) involved in Antarctica should merge claims and interests and establish a condominium. In 1957 the UK proposed another joint scheme, but with the inclusion of the Soviet Union.

- 17 Feb 1956: Arthur S. Lall, Indian permanent representative to the UN, requested that "the question of Antarctica" be included on provisional agenda of General Assembly. India wanted to secure international agreement for the development of Antarctic resources for peaceful purposes, for non-militarisation of the area, banning of nuclear weapons testing, and reference of future disputes to the International Court. Several nations, including Sweden, indicated interest, but India's proposal was withdrawn, largely because of opposition in Chile and Argentina, and lack of support from US and UK.

- 15 July 1958: Ambassador Lall again requested that question be put on General Assembly agenda. "It would be appropriate and timely for all nations to agree and affirm that the area will be utilised only for peaceful purposes and for the welfare of the whole world."

- Again, India met with little support, since by then a proposed 12-nation Antarctic Treaty Conference looked as though it might take place. India urged that UN should have a chance to comment and offer suggestions on possible participation of non-signatory governments in regime provided by treaty.

- Prime Minister Nash of New Zealand suggested in 1956 a form of UN trusteeship for Antarctica, which would be a "world territory" under control of UN. In 1958 Nash suggested that any arrangement for international control should have approval of UN.

International Geophysical Year 1957-58:

- Antarctica was one of the six regions of the globe singled out for special attention in IGY. Twelve countries (the seven claimants plus Belgium, Japan, South Africa, USA, USSR) implemented Antarctic scientific research programmes of unprecedented scope. Over 40 stations were established south of 60th parallel. US effort alone involved a maximum of 3,000 men and 12 ships; US scientists shipped home more than 27 tons of data.

- At the close of IGY, many diplomats and scientists felt the international cooperation, and the "gentlemen's agreement" shelving political activities, should be perpetuated.

- On 2 May 1958 US proposed to other IGY participants that they should join "in a treaty designed to preserve the continent as an international laboratory for scientific research and ensure that it be used only for peaceful purposes".

4. WHAT IS THE ANTARCTIC TREATY?

- The Antarctic Treaty was signed in 1959, and became operative in 1961, when all 12 powers (Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, UK, USA, USSR - called consultative members) had ratified it.

- Since then, Poland (1961), Czechoslovakia (1962), Denmark (1965), Netherlands (1967), Romania (1971), German Democratic Republic (1974), and Brazil (1975) have acceded to the treaty (which does not make them full consultative treaty powers), and Federal Germany and Uruguay have expressed interest in doing so. Poland has applied to transfer from acceding to the treaty to become a full treaty member, and this will be considered by the other powers in July 1977. Brazil is also considering asking to do this.

- The treaty recognises "that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes". Its main provisions are as follows (Earthscan's emphasis in each case):

* Antarctica is to be used "for peaceful purposes only"; all "measures of a military nature" including the testing of weapons, military manoeuvres, and the establishment of military bases are banned, but use of military personnel or equipment is allowed for scientific or other peaceful purposes (Article I).

* "Freedom of scientific investigation in Antarctica and cooperation toward that end, as applied during the International Geophysical Year, shall continue." (Art II). Scientific plans, observations, results and personnel are to be freely exchanged (Art III).

* The treaty freezes the legal status quo in Antarctica. Previously asserted rights or claims for territorial sovereignty are unaffected by the treaty. Nothing done while the treaty is in force can constitute a basis for asserting, supporting or denying any territorial rights. New claims or enlargements of existing claims are banned during the period the treaty is in

* Nuclear explosions and the disposal of nuclear waste in Antarctica are banned (Art V).

* The treaty applies to "the area south of 60°South Latitude, including iceshelves", but states that nothing in it shall "affect the rights....of any state under international law with regard to the high seas within that area" (Art VI). The treaty fails to define how much of the sea south of 60°S is not high seas.

* Appointed observers from consultative treaty powers have the right of free access to any area and may inspect all stations, installations and equipment, by air or on the ground (Art VII). (This is the first time both US and USSR have agreed on an on-site inspection system to ensure against unauthorised military activity.)

* Full membership is reserved for the original 12 signatories and any "acceding" state "during such time as" it "demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition". These parties meet to exchange information and to recommend additional measures to further the treaty (Art IX).

- No treaty secretariat exists, but biennial consultative meetings are held behind closed doors. At these meetings over 100 recommendations have been adopted, not all of which have been ratified, on subjects from the routing of meteorological traffic to the issuing of a tenth anniversary postage stamp.

- Environmental protection has been a major focus. The Agreed Measures for the Conservation of Antarctic Fauna and Flora have been adopted as interim guidelines, pending ratification.

5. WHAT IS SCAR?

- In 1957 the IGY Antarctic Conference asked ICSU (International Council of Scientific Unions, a federation of scientific institutions) to set up a committee to examine the merits of continued scientific activity in Antarctica. In 1958 ICSU set up SCAR, the Scientific (originally the Special) Committee on Antarctic Research. Its area of interest is south of Antarctic Convergence, although it also deals with some islands to the north.

- SCAR coordinates and exchanges information about scientific activity in Antarctica. SCAR conducts most of its business via working groups, which suggest priorities for research in their special disciplines and organise symposia to discuss progress.

- Although the initial members of SCAR were the 12 treaty powers, membership is only open to countries "actively engaged in Antarctic research" - a different requirement from treaty membership. In 1967 Belgium closed its Antarctic base, and has not attended SCAR meetings since. In 1976 SCAR resolved that an overwintering station was not essential to SCAR membership, and that a marine science programme would serve instead.

- SCAR membership is also open to scientists nominated by ICSU, and to each international scientific union (eg International Union of Biological Sciences) federated to ICSU, and to the World Meteorological Organisation.

- SCAR, based at the Scott Polar Research Institute, Cambridge, UK, has an executive committee of three, and holds full meetings of national delegates every two years. Each nation produces an annual report, and this is the basic means of disseminating information about Antarctic scientific programmes.

- Although there is no direct, formal link, SCAR is regarded by Antarctic Treaty governments as a source of scientific advice. For example, in 1976 it produced, at the Antarctic Treaty's request, a preliminary assessment of the environmental impact of mineral resource exploration and extraction.

- SCAR, together with the Scientific Committee for Oceanographic Research (SCOR), has developed an international research programme on the biology of living resources in the Antarctic, called BIOMASS.

Conservation:

- SCAR recommended to governments in 1964 a set of "Agreed Measures for Conservation of Antarctic Fauna and Flora".

- These measures have still not become effective, because Australia, Belgium, Japan and US have not yet ratified them (President Carter recently proposed legislation). In the meantime, the measures are applied as guidelines. This testifies to strength of informal agreement among the Antarctic scientific community and its sponsoring governments.

- The measures provide for:

  * Overall protection for all native mammals other than whales, and for native birds and their eggs. Permits may allow killing for indispensable food, or for scientific specimens, provided no more wildlife is taken than numbers which the local population can make good next season.

  * Special protection of rare or vulnerable species, or sites of scientific interest.

  * Low flying of helicopters over penguin colonies and other harm to wildlife is to be minimised.

  * There is a ban on the import into Antarctica of non-indigenous species except under permit. Only lab animals and plants, sledge dogs, domestic livestock (but no poultry) are allowed.

6. WHY ARE SCIENTISTS SO INTERESTED IN ANTARCTICA?

- Antarctica is a stable platform, almost entirely untouched by man; it is distant from any industry and most forms of pollution; it is a large repository of ice; has a harsh, cold climate, cut off from sunlight for many months; it includes the south magnetic pole; it is the hub of atmospheric circulation and marine currents, especially in the southern hemisphere.

- Antarctica is an unique datum point from which to monitor global climatic change or pollution. Thus, DDT found in the eggs and flesh of Adelie penguins, crabeater seals, fish and Antarctic snow, testify to the global extent of DDT pollution.

- The discovery of a Triassic reptile skull in the Transantarctic Mountains in 1969 provided major support for the theory of continental drift and the concept of Gondwanaland.

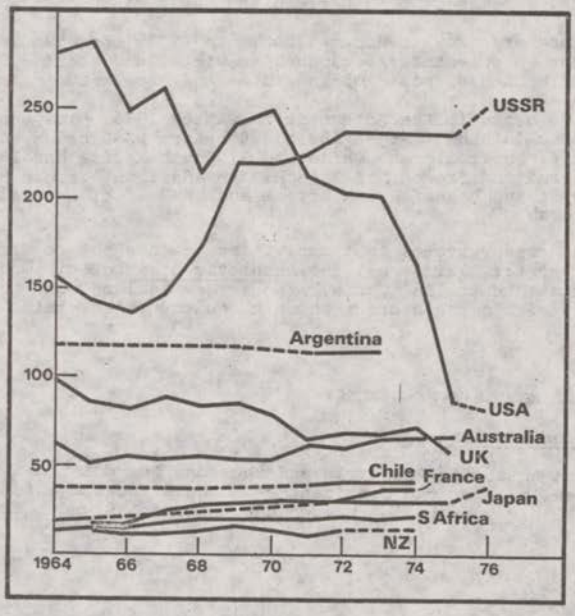
- The Antarctic ice cap may preserve a frozen record of climatic change covering several ice ages.

- During 1977 an attempt has been made to drill through the Ross Ice Shelf and lower nets, traps, baited lines and TV cameras into the water below to study "the only remaining community of marine animals left undisturbed since the Pleistocene".

Antarctica: a harsh continent:

- Soil found in the Dry Valleys shares many properties with that found by the Mariner probes on Mars, and parallel experiments were carried out on Antarctic and Martian soil.

Figure 5 Overwintering personnel in Antarctica



- Some Antarctic species have extraordinary evolutionary adaptation to the extreme environment. Thus the glycoproteins that prevent the blood of Antarctic fish from freezing have properties similar to some industrial antifreeze compounds.

- Again, how does the Weddell seal survive the pressure changes induced by a dive to 600 metres and more? How does it find its way back to its breathing hole when looking for food under the ice pack in the winter darkness? Physicians from Boston's Massachusetts General Hospital have been studying the nostril-closing effects of Weddell seals for possible clues to "cot deaths".

- The US annual Antarctic research budget is approximately US$25 million; the USSR's budget is $10 million; Chile's is $6 million; Australia's is US$5 million.

- Science is not the sole stimulus for activities in Antarctica. Politics - particularly claim staking, territorial or otherwise - and economics are probably not far behind.

7. WHO LIVES IN ANTARCTICA?

- In 1976, about 750 personnel overwintered in the Antarctic. Of these, 34 per cent were Soviet, 15 per cent Argentine, 11 per cent US, 9 per cent Australian, and 8 per cent UK; the remainder is Chilean, French, Japanese, South African and New Zealanders.

- In summer, numbers grow to about 5,000. In 1975, for example, the US had about 20 scientific personnel in winter and about 850 in the summer; the USSR had about 105 in winter and about 500 in summer.

- There were 34 bases in the Antarctic in winter 1976, plus another 9 on subantarctic islands. Argentina had 8 bases; USSR had 6; UK had 5; USA had 4; Australia and Chile had 3; South Africa had 2; and Japan, New Zealand and France had 1 each. In addition, France had 3 subantarctic island bases; South Africa and UK 2 each; Australia and New Zealand 1 each.

- Although the treaty states that activities now are not to prejudice territorial claims, all the Antarctic bases of claimant states (Argentina, Australia, Chile, France, New Zealand, UK) in fact lie solely within the sectors which those countries claim.

8. WHAT ARE ANTARCTICA'S RESOURCES?

Minerals and Gondwanaland:

- Although the Antarctic Peninsula and the Ross Sea coast are well-known geologically, over the continent as a whole knowledge is limited, and we are unlikely ever to learn much about the rocks under the great ice sheet.

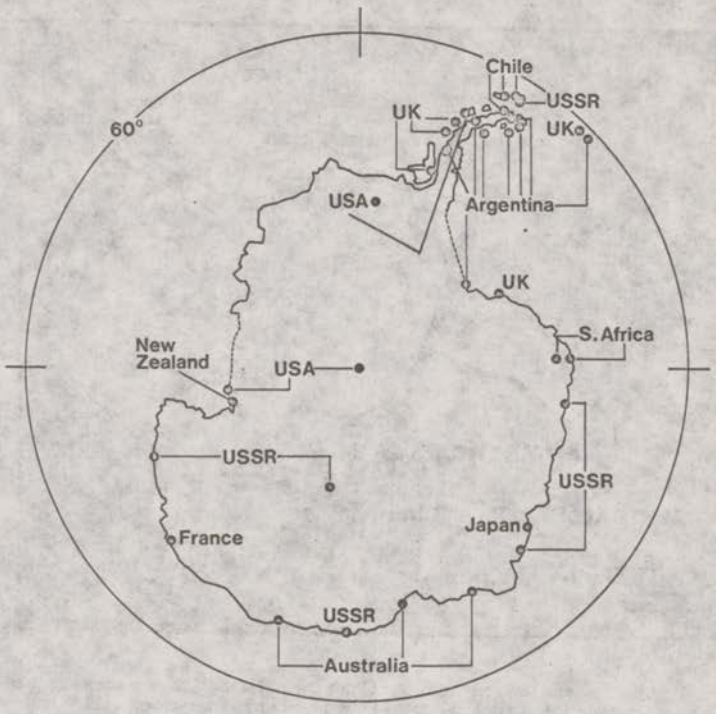


Figure 6 Scientific stations south of 60th parallel, winter 1976

- Some of the speculation about Antarctica's mineral potential - which may include uranium - revolves around the Gondwanaland hypothesis. There is evidence that Latin America, Africa, India and Australasia were joined to Antarctica until the Mesozoic Era (about 100 million years ago) when the present continents and islands began to drift apart. The chemical and geological processes that caused the formation of mineral deposits in, for example, the Andes, the S. African Rand and Australia, may have caused the formation of similar minerals in Antarctica. And the oil and gas fields off New Zealand and Australia and Tasmania may be replicated in the once-adjacent Ross Sea.

- No uranium has yet been found, but in the Norwegian, Australian and French sectors there are rocks comparable in age and type to those in which uranium occurs in Australia.

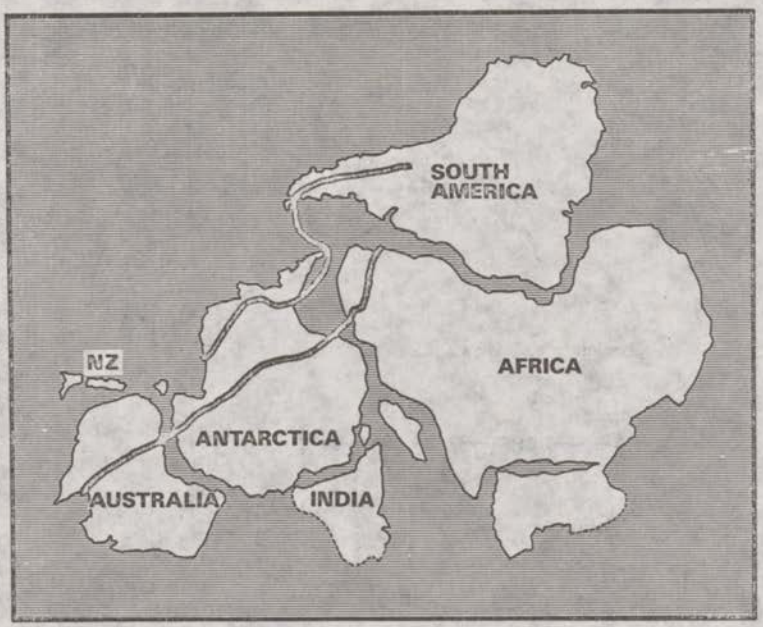


Figure 7 The Mesozoic continent of Gondwanaland. The black lines show the location of formerly continuous mountain ranges, linking the Transantarctic Mountains with the Andes, and the central Antarctic mountains with the Rand

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- Deposits of Antarctic coal, sometimes outcropped on the surface, have been known since the early Polar expeditions. East Antarctica, mainly in the Australian, Norwegian, New Zealand sectors, could contain the world's largest coalfield. But the coal is highly inaccessible, and relatively impure - it has a high ash content.

- Potentially mineable iron ore is known in precambrian rocks in E. Antarctica. In the Prince Charles Mountains near the coast of Antarctica facing the Indian Ocean (Australian sector), Soviet explorers have found what American geologists describe as a "mountain of iron". The 100 metre (330 ft) thick deposit may extend for 120 km (75 mi). The ore, 35-38 per cent Fe, could be large enough to meet present world consumption for 200 years. But it is doubtful if such iron ore is worked elsewhere in the world at present, and it is unlikely to be developed for 50 years or so until more accessible deposits are exhausted. Other major iron ore deposits may exist in Queen Maud Land (Norwegian sector) and Davis Bay (Australian sector).

- Dufek Massif: American geologists are interested in a body of rock at least 33,000 sq km (13,000 sq mi) in area, with a thickness of 6½ km (4 mi), in the Pensacola Mountains (British/Argentine/Chilean sector). It has geological similarities to some of the most minerally-productive formations in the world: the Bushveld complex in S. Africa, the Stillwater formation in Montana, and the Sudbury region of Ontario. These areas have yielded important deposits of platinum, nickel, copper and chromium; the Bushveld also produces lead, zinc, vanadium, iron, cobalt, tin and gold. So far no sizeable concentrations of metals other than iron have been found in the Dufek Massif.

Oil and gas:

- No oil or gas has yet been discovered. But there is a strong possibility they exist in parts of the Antarctic continental shelf.

* First, because Antarctica was once joined in Gondwanaland to other continents, where (especially in Australasia) oilfields and natural gas fields have been discovered.

* Second, because the US research ships Eltanin and Glomar Challenger found thick layers of unmetamorphosed Tertiary sediments - more than 2,000 m (6,500 ft) thick - in some locations on the continental shelves of Bellinghausen, Weddell and Ross Sea (off the unclaimed, the Norwegian and the British/Argentine/Chilean sector respectively). Such sediments are frequently associated with oil and gas elsewhere.

* Third, because the Glomar Challenger drilled four holes in the Ross Sea in 1972-73, in shallow water around 470 m (1,500-1,600 ft). In three of the holes ethane and methane were found: these very simple hydrocarbons are evidence for the possible formation of long-chained oil and gas hydrocarbons.

- US Geological Survey report in 1973 calculated the recoverable oil reserves of the Ross, Weddell and Bellingshausen Seas "conservatively" at 15 billion (thousand million) barrels of oil. Discoverable gas was estimated at 115×10^{12} (115 trillion) cubic feet (3 trillion cubic metres). The basis of this estimate has been vigorously criticised: it depends on crude estimates of the volume of sediment, and assumes they are of average richness.

- A more recent US government report referred to recoverable reserves in promising offshore areas being possibly tens of billions of barrels; this compares with 30-60 bb recoverable for all of offshore Alaska. This report identified as most promising the Weddell Sea (British/Chilean/Argentine sector), Ross Sea (New Zealand sector), Bellingshausen Sea (unclaimed sector), Amery Ice Shelf (Australian sector), Scotia Sea (between Falkland/Malvinas Islands and South Sandwich Islands - administered by UK but claimed by Argentina).

- At the end of 1974 the former director of Soviet Union's Institute for Arctic Geology predicted that oil exploration on the Antarctic continental shelf is an entirely realistic prospect in the very near future, and that it would be followed by production. In the same year Evgeny Tolstikov, Deputy Head of the USSR's Hydrometeorological Service, suggested that oil resources of Antarctica would surpass those of Alaska.

- No oil or gas has yet been found.

- Antarctic oil and gas would be extremely difficult to exploit.

  * First, icebergs and pack ice could damage drilling rigs and ships.

  * Second, icebreakers would be needed for reliable access.

  * Third, because icebergs average 100,000 tonnes and extend 120-150 m (400-500 ft) below the sea surface. Icebergs of this size could gouge scratches 12 m (40 ft) deep or more into the bottom sediments, and destroy submerged drilling platforms or any equipment projecting above the seafloor.

  * Fourth, because the continental shelf is deeper than off other continents: its seaward edge is 500 m (1,650 ft). The base of the continental slope is 3,000 m (9,800 ft).

  * Fifth, because Antarctica is remote from the principal industrial and commercial centres in the northern hemisphere.

- These difficulties may not be insuperable:

  * Technology for deep drilling is advancing worldwide. Off Gabon, West Africa, test wells have been drilled in 700 m (2,300 ft) of water.

  * In ice-infested seas in Arctic, particularly the Beaufort Sea (off Alaska and Yukon) and Davis Strait (between Baffin Island and Greenland), subsea completion systems and moveable drilling rigs etc have been developed which would overcome some (but not all) of the Antarctic problems.

  * A majority of the scientific and technical experts meeting at the Nansen Foundation, Norway, in 1973 concluded that it was "only a matter of time before the attention of oil and gas companies turns to a consideration if not the active investigation of the Antarctic". And a 1974 report from the US National Petroleum Council concluded that the problems of extracting oil from the polar areas are not insurmountable.

- Pressures to explore (if not exploit) already exist. Australia, New Zealand and UK have been approached by companies with preliminary enquiries.

Krill:

- Krill is a Norwegian whaling term meaning "whale food" and refers to many species of planktonic crustaceans. Krill is usually taken to refer to the dominant species: the shrimp-like Euphausia superba.

- Krill is found both north and south of 60°S, but south of the Antarctic Convergence. Has a circumpolar distribution, but concentrates in Atlantic, Indian Ocean and Ross Sea. Krill are herbivores, feeding on the abundant phytoplankton (mainly diatoms) which grow in the nutrient-rich cold waters.

- Euphausia superba looks like a shrimp. It is about 5 cm (2 in) long with antennae adding another 2½ cm (1 in). At night it lights up and a shoal becomes a mass of living blue-green fire. We do not know whether the Antarctic contains one or several distinct krill populations.

- Krill swarm regularly, making for easy harvesting. Some shoals are a metre (three feet) across - others are half an acre (quarter hectare). During Jan-April shoals contain about 12 kg per cubic metre of krill (35 lb of krill per cubic yard). The West Germans report catch rates of 40 tonnes per hour.

- The UK fisheries research board suggests that 50 million tonnes could be taken annually on a sustainable basis; FAO and others have quoted substantially higher figures. This compares with a total world marine catch of 60 million tonnes in 1974.

- Krill contains around 15 per cent protein (by wet weight), roughly the same as beef steak, shrimp or lobster.

- An annual catch of 70 million tonnes of krill could provide 20 grams of protein daily for 1,000 million human beings - a quarter of the existing human race.

- There are a number of drawbacks to a commercial krill fishery:

  * Krill swarms can be difficult to locate.

  * Small mesh but large mouth nets needed - this causes high drag and means powerful vessels (up to 3,000 shaft horse power).

  * Krill spoil rapidly (perhaps because their stomach enzymes are adapted to low temperatures, thus making preservation by freezing difficult), so there must be primary processing on board factory ships.

  * Because of these problems, krill vessels would probably cost $10-20 million each.

  * Distance: Antarctica is a one month voyage from Europe, N. America or Japan. Local bases might be needed for processing and manufacture of krill products.

  * Processing difficulties: it is, for example, difficult to remove the chitin covering from krill. Chitin is acceptable in fishmeal but in human food gives an unusual texture and flavour.

  * Harvesting season is short - 3-5 months.

  * Consumer unfamiliarity with final products.

- In spite of these difficulties, Japan and the Soviet Union are already undertaking routine commercial harvesting and marketing of krill, and had by 1975 already invested about $170 million each.

- Experimental krill fishery has been carried out by West Germany, Chile and Poland. Interest has also been shown by Taiwan and Norway; the UK (in spite of the recent loss of traditional fishing grounds off Iceland) is pessimistic.

- Encroachments on traditional fishing grounds as a result of the application elsewhere of the 200 mile Exclusive Economic Zone may encourage other distant water fishing nations to turn to krill.

- After catching krill experimentally since 1961, USSR went commercial in 1967. Russia probably lands 5,000-10,000 tonnes annually, perhaps as high as 40,000 tonnes in 1971.

- USSR began marketing in 1970. "Okean" brand krill pâté sold frozen and sterilised in cans at about $1.90/kg. Sold to consumer to be used in butter, cheese, vegetable and mayonnaise products, and used by catering trade in salads, pâté, butter, stuffed eggs and tomatoes, Siberian dumplings and fish balls. Manufactured products include shrimp butter or cheese spread ("Korall"), snack products, sausages. Cheese spread particularly successful: sold at about $2.15/kg.

- Japan brought back 5,000 tonnes (1975-76); current value of Japan's landed catch $425-500/tonne. Krill is sold whole, cooked or sea-frozen, retailing in frozen blocks at around 40 US cents per 300 gram pack. The krill are very similar to small native shrimps, which are a traditional item in Japanese diet. Krill are fried whole, served cold with grated radish, or are incorporated into rice dishes and rice cake.

- These Japanese and Soviet delicatessen type products are of relatively high unit value and low tonnage potential. They are unlikely to utilise fully the potential of the resource.

- West Germany is looking towards protein concentrate or animal feed, as well as to artificial "crab" meat. Chile already produces frozen krill "sticks", rather like "fish fingers".

- Russians and Japanese are also engaged in production of krill meal. It makes an excellent animal feedstuff, or a feed component for farmed fish. The landed cost of krill will be much greater than other industrial fish species, so the availability of using krill solely for fishmeal production is doubtful.

- The possibility of harvesting krill through introduced predators has been raised on several occasions. Salmon might be established in Southern Ocean and then cropped as they returned to breed in, eg, Chile. Other ecologists feel it would be simpler to allow whales to become re-established, and harvest them.

- A $200,000 Southern Ocean Fisheries Survey Programme is being funded by UNDP and executed by FAO (1976-77). FAO proposed in 1977 a $45 million ten-year programme to explore, exploit and utilise living resources south of 45°S for the benefit of the world as a whole and the developing countries in particular; the proposal was withdrawn recently following (inter alia) opposition from the Antarctic Treaty powers.

Krill and anchoveta: a comparison:

- Anchoveta are very small fish taken off the Peruvian coast and made into fishmeal and exported as feed for chickens, pigs and other livestock. Practically unknown until the 1950s, anchoveta soon constituted one sixth of total world fish catch. Anchoveta feed on phytoplankton, which is nourished along Peruvian coast by a cold nutrient-rich ocean current (El Niño) from Antarctica. In 1967, the catch was nearly 10 million tonnes, but by 1972 the fishery had virtually collapsed, mainly from gross overfishing. Anchoveta are not widely used to feed

Figure 8 Antarctic resources

Resource	Location	Potential yield	When exploitable
Krill	Antarctic seas: mainly South Atlantic, also Indian Ocean and Ross Sea	Could double world marine fish catch	Now
Fish	Continental shelf of mainland and islands	Substantial	Now
Lobster, crabs	Off subantarctic islands	Substantial	Now
Seals	Iceshelves, pack ice, around Antarctica and islands	Very great	Now
Whales	Antarctic seas (migrate north in winter)	Potentially high, but stocks now low	Now
Icebergs	Antarctic Ocean, many well away from continent	Enormous: could supply needs of Peru, Australia, Arabia, etc	1970s-80s
Oil and gas?	Continental shelf especially Amery ice-shelf and Weddell, Bellingshausen, Ross Seas. Also Scotia Sea E. of Falklands	Possibly as big as Alaska	1980s-90s
Coal	Largest fields in Australian, NZ, Norwegian sectors	Possibly biggest field in world but low grade	Next century?
Iron	East Antarctica: Australian and Norwegian sectors	Very large but low grade deposits	Next century?
Copper, uranium and other minerals(?)	East and West Antarctica?	Not known	?

Fish:

- Other living resources of the Southern Ocean are also attracting interest: crabs, lobster (found on shelves of subantarctic archipelagoes) and fish (near slopes of Antarctic islands and continent).

- Of the fish the Nototheniids (white-blooded fish - they have no haemoglobin or other blood pigment) are probably the most significant. Also Patagonian hake and blue whiting.

- Russians and Japanese were recently reported to have harvested about 340,000 tonnes of Antarctic cod (Notothenia rossi) from Antarctic S. Atlantic over a six month period. Federal Germany, Japan and Poland are also evaluating possibility of Antarctic fisheries.

Mammals:

- Fur seals are now recovering from gross overexploitation of 19th century.

- Arising out of SCAR and Antarctic Treaty, the 1972 Convention for the Conservation of Antarctic Seals prohibits the taking of Ross, southern elephant and southern fur seals. Quotas are set for other species, and populations monitored.

- If fur seals continue being protected, they could produce a rich annual harvest, like the northern fur seal industry centring on Pribilof Islands in Bering Sea. Annual kill from Pribilof seal colonies is about 60,000 pelts worth approximately $4 million.

- Whales were Antarctica's principal value in the past. Antarctic whaling goes back to about 1904 - not as long as whaling in other waters.

- Diminishing whale herds led to the formation of International Whaling Commission in 1932, to regulate the "orderly development of the whaling industry" through annual quotas. It has not been notably successful at conserving whales.

- In the Antarctic, blue, humpback and fin whales are currently protected from all exploitation, and quotas are set for sperm, minke and sei whales. All nations except Japan and USSR have now abandoned Antarctic whaling; Norway withdrew in 1968.

Ice:

- The Antarctic ice cap contains 70 per cent of the world's store of fresh water, and 90 per cent of the world's ice. 1.4 trillion (1.4×10^{12}) tonnes break off annually to melt into the Southern Ocean - 350 tonnes of ice per year for each human being.

- Recent studies by the French engineering consortium Cicero for the Saudi Prince Mohamed Al Faisal indicate that it would be economically and technically feasible to tow some of these icebergs to Peru, Chile, California, Australia, Arabia and elsewhere.

- Prince Mohamed is close to signing a $170 million contract with Cicero, which estimates that an iceberg of 85 million tonnes could be towed 8,000 km through the Indian Ocean, cut up into slices at the entrance to the Red Sea, and the small ice slices delivered to Jeddah.

- The water so produced would cost about 53 US cents/cubic metre. Desalinated seawater currently costs Saudi cities about 79 cents/cubic metre. A larger, one million tonne iceberg would cost only 21 cents/cubic metre of delivered water in Jeddah. Costs of water delivered to southern hemisphere cities would be a fraction of this.

- A similar scheme was investigated in 1973 by the RAND Corporation (USA) for delivery of icebergs to Southern California.

Cold storage:

- Food left in the cabins of early Antarctic explorers has been found in good condition after 50 years or more, due to extreme cold and absence of mould or rodents.

- Proposals have been made to store wheat, meat, and New Zealand butter in Antarctica. If krill were used as emergency world food reserve, it could perhaps be stored in Antarctica.

- Problems are costs of transportation from Antarctica, wind erosion, snow and ice penetration.

- US figures (1969) suggested that freight costs from grain-growing country to Antarctica plus interest charges on equipment alone would be so high that at least 16 years storage of wheat in Antarctica would be needed before the system was economical.

- Australian parliament has discussed storing meat in Antarctica to accommodate oversupply. US figures (1969) suggest this would repay the cost of refrigerated shipping within 6-8 years.

Tourism:

- Tourists are attracted to Antarctica by its unique wildlife, its scenic beauty, the aura of adventure and the wilderness aspect.

- Tourism is the only commercial activity on the Antarctic mainland at present. A Chilean party went to S. Shetlands in 1959, and the first commercial tour went to Antarctic Peninsula in 1966. Since then there have been two or more cruises per year.

- The main tour organiser is Lindblad Travel of New York. The 25-32 day guided package cruises to the Antarctic Peninsula visit research stations, abandoned whaling stations and penguin rookeries.

- Lindblad prices (ex-New York) range from $4,286 to $8,084 per person for a 3-4 week cruise. Several hundred tourists now visit Antarctica each year, but estimates of demand run to 1,000 or more.

- According to the Lindblad brochure: "Our ship will glide through cobalt-blue waters dwarfed by precipitous peaks rising abruptly from the waters edge and stretching into the blue sky above....You experience the thrill of treading on land which was until recently reserved only for explorers....The Antarctic is relatively free from the influence of man,and is today what most the rest of the world was like long ago ....participate in an exciting adventure you will never forget."

- Argentina may turn its Marambio Air Base into a tourist resort.

Radioactive waste disposal:

- Article V of the Antarctic Treaty prohibits radioactive waste disposal, but goes on to state that rules concerning nuclear energy and radioactive waste, established under any new international agreements, and signed by all the Antarctic Treaty powers, shall apply in Antarctica. In other words, the treaty could be overruled. (Nuclear reactors are allowed.)

- Growing worldwide use of nuclear energy and increasing opposition to conventional disposal has led to waste disposal being actively considered for Antarctica.

- 1972: International Radionuclide Depository in Antarctica proposed at IAEA symposium. 1973: US National Academy of Sciences suggests proposal be thoroughly investigated.

- 1974: SCAR meeting held at Scott Polar Research Institute in Cambridge on disposal of radioactive nuclear wastes in Antarctic ice sheet. Antarctic Treaty meeting in Oslo in 1975 urged governments to oppose disposal of nuclear waste in the treaty area.

- Although surface storage and anchored emplacement in the ice at a depth of 200 to 500 m (650-1650 ft) have been suggested, the favourite proposal is the so-called hot mole method, in which glassified radioactive waste would be placed on the surface of ice, and melt its own shaft down into the ice to ice-rock interface; ice would rapidly refreeze above the containers.

- Advantages:

  * Removal of waste from populated areas (reducing risk to health and risks of sabotage) and from all contact with biosphere. Possible disposal sites are 600 to 1,000 km (375-625 mi) inland, remote from nearest natural fauna and flora, isolated from sea.

  * Ice and polar climate provide sink for radioactive heat.

  * Large area of ice provides enough space for hot moles not to be in close contact with each other.

- Disadvantages:

  * Lakes, which may communicate with the ocean, are known to exist under the ice, and hot moles might contaminate them. Canisters might melt ice, which could then shift and pulverise the canisters.

  * A major uncertainty is that of whether the ice sheet will exist for 250,000 years - the time considered necessary for isolation of plutonium wastes from biosphere. Glaciologists are only prepared to guarantee ice sheet for 10,000 years.

  * The most important drawback is that, in the event of an accident, a hot mole would be completely inaccessible.

Military:

- The Antarctic Treaty prohibits any military activity, but permits military personnel or equipment to be used for scientific research or other peaceful purposes.

- Antarctica is potentially of military value because of its large size, and its position as the key to the only links (Drake Passage only 950 km (600 mi) wide) between the Pacific, Atlantic, Indian oceans in event of closure of Suez and Panama canals.

- An unfriendly nation might use Antarctica to attack nearby countries: Antarctica is relatively close to the southern tip of New Zealand (2,500 km; 1,500 miles), Melbourne and Buenos Aires (3,000 km; 1,900 mi), and Cape Town (3,800 km; 2,400 mi).

- The first military force to get ashore would have great advantages: few harbours, inaccessible coast.

- Antarctica's strategic potential has been used: German raiders operated on small-scale in subantarctic waters during World War II, sinking several hundreds of tons of shipping. Its strategic value was certainly accorded greater importance in past.

- 1939: Cordell Hull (USA) stated that considerations of continental defence made it vitally important to keep for the 21 American republics a clearer title to that part of the Antarctic continent south of the Americas than was claimed by any non-American country.

- 1947: Inter-American Treaty of Reciprocal Assistance included a pie-shaped sector of Antarctica in the American continental security zone.

- In late 1950s it was feared that Cold War would extend to Antarctica. Australia, in whose sector the Soviet Union had been assigned IGY base sites, was particularly worried. The raising of the Soviet flag in Antarctica on 14 Feb 1956 to celebrate the 20th Congress of the Soviet Communist Party reportedly caused a "sensation" in Canberra.

- The fear that ICBMs would be based in Antarctica was reported to be one of reasons underlying Antarctic Treaty.

- Although neither superpower seems militarily interested in Antarctica today, apprehension has not vanished. For example, the West European press occasionally runs stories about a ring of Soviet bases in Antarctica.

- Antarctica's strategic value seems low in nuclear age. Cruising range of nuclear-powered submarines reduces need for refuelling or other bases. A lengthy naval war is unlikely. Anything that can be done in Antarctica can be done elsewhere much more cheaply: logistic and supply costs are enormous.

- The doubtful strategic role of Antarctica is a marked contrast to the undoubtedly key role played by the Arctic, which lies far nearer vital centres of power, and directly across the shortest route between the two superpowers.

- It is difficult to disentangle military and economic aspects from ostensibly scientific activities in Antarctica, particularly when there is no ban on national military involvement for logistic purposes. For example, the US Department of Defense can legitimately play a significant role in US Antarctic policy making.

9. HOW WOULD RESOURCE EXPLOITATION AFFECT THE ANTARCTIC ENVIRONMENT?

- The Antarctic ecosystems contain relatively few species, and are extremely vulnerable to disturbance.

- Antarctica has a critical influence on oceanic and atmospheric circulation and thus on global (and especially southern hemisphere) climate.

- Although the Southern Ocean is only 5 per cent of the world ocean in area, it accounts for 20 per cent of the world's marine photosynthesis.

- Antarctica could well see a major conflict between conservationists and the fishing and mineral industries.

- Oil spills, blowouts and leakages are almost inevitable, given Antarctica's inclement weather, icebergs, pack ice. Because of cold, spilt oil would take far longer to degrade than in temperate climates. Some biologists estimate that if oil entered the Arctic Ocean, it might remain there for around 50 years; others consider this an overestimate.

- Diffusion and movement of pack ice could combine to spread an oil spill over the sea and onto the ice surface. This could alter radiation balances, perhaps melting ice, and affecting its rates of destruction and formation.

- A huge spill of crude oil altering rate of formation and degradation of sea ice could conceivably affect planetary albedo (reflectivity), with global climatic implications. Climate-dependent agriculture and fisheries in temperate latitudes could then be affected.

- Coastal bottom-living organisms could be affected by changes in water circulation, local turbidity, repeated oil contamination, persistence of oil in intertidal sediments, changes in ice and extent of open water.

- The main ecological damage of spilt oil, in Antarctica as in temperate seas, would be on seabirds.

- The urgent need is for adequate research on the environmental impact of oil in Antarctica before exploration and exploitation.

- Antarctica plays a major role in abyssal (deep ocean) circulation, influencing waters very far to the north. Antarctic bottom water carries nutrients which feed economically-important fisheries in many parts of the world - eg Peruvian anchoveta, Argentine hake, Brazilian tuna, South African pilchard, Australian herring.

- Krill is the main link in the complex food web of the Antarctic waters. Krill has been found in the stomachs of over 30 different fish species, belonging to 12 families of Antarctic, subantarctic and even migratory subtropical fish. Whales and many other organisms depend almost entirely on krill.

- An uncontrolled krill fishery could affect the rate of recovery of whale stocks (by depriving them of food), as well as reducing the population of other living resources which are of potential value.

- There may be several separate krill stocks: concentration of

- Our knowledge of krill is scanty. Collapse of the Peruvian anchoveta fishery is a warning of the dangers of overfishing.

- Onshore mineral exploitation is likely to be highly concentrated, because of the few ice free areas. There could be significant impact from vehicles, exploratory drilling and waste disposal. The necessary increases in personnel and import of materials could, without adequate care, all be environmentally hazardous in Antarctica.

- Most Antarctic birds nest near the coast, where human enterprise is most likely to locate its facilities.

- Even minor widespread pollution from airborne effluents is likely to affect significantly the usefulness of Antarctica as a baseline.

- Resource exploitation, unlikely to be harmful on a small scale, could have significant impact on a large scale. At a minimum, we need to evaluate the sensitivity or resilience of Antarctic ecosystems in advance, and adjust the stresses so that the resilience is not exceeded.

10. WHY IS THE ANTARCTIC TREATY UNDER HEAVY STRAIN?

- The Antarctic Treaty was based on the suspension of the sovereignty issue. The potential exploitation of krill, oil and other resources, plus the new 200-mile zones which might place much of the oil and krill within national jurisdiction, mean that the 1959 agreement to put sovereignty on one side can probably not survive in its present form.

Inability of treaty to cope with resources:

- The original text of the Antarctic Treaty is ambiguous about resource exploitation. It does not refer at all to non-living resources, and the only reference to living resources is a provision to formulate measures for the "preservation and conservation of living resources in Antarctica". This has been done through (inter alia) the Agreed Measures for the Conservation of Antarctic Fauna and Flora (which are not yet in force).

- The treaty powers disagree as to whether mineral exploitation (on land or on the seabed) would be compatible with the treaty.

- One group feels that major amendment of treaty would be necessary, since mineral exploitation would disturb scientific research, be environmentally hazardous and involve problems of jurisdiction.

- Another group argues that the treaty does not prohibit the exploration and exploitation of mineral resources, and takes the view that economic exploitation is one of the "peaceful purposes" referred to in Article I of the treaty.

- The treaty in its present form appears to provide an unworkable basis for resource exploitation. It offers no solution to the issue of territorial ownership; it does not specify whose national law is to prevail in the event of disputes between states; and the Antarctic practice of the free exchange of information (which is the basis of the scientific cooperation) and on-site inspections (which underpin demilitarisation) runs counter to the practice of mining companies.

- Elsewhere, EEZs are encroaching on traditional fishing grounds. For example, USSR will be deprived of 6 million tonnes of fish per year when EEZs come into force worldwide.

- Oil and gas may be present in substantial quantities. Australia, New Zealand, UK, Chile and Argentina especially have the alluring prospect of major oilfields off the coast of "their" sectors of Antarctica.

- In 1975 the treaty powers recognised "the need to promote and achieve within the framework of the Antarctic Treaty the objectives of protection, scientific study, and rational use of marine living resources, and recommended further study.

- In 1975 the treaty powers discussed mineral exploitation and expressed the "need for restraint while seeking timely agreed solutions by the Consultative Parties to problems raised by such questions".

- There are political problems about krill, too.

- The treaty powers as a whole have demonstrated a proprietary attitude towards marine living resources, by their opposition to the FAO southern oceans programme, by resolutions at treaty meetings, etc.

- The Antarctic Treaty states that it does not impinge upon the freedom of the high seas south of 60°S - and krill is a high seas resource. If Antarctica had an EEZ, much of the krill would no longer be on the high seas. And Chile and Argentina already claim sovereignty over 200-mile zones off their Antarctic sectors.

- Although krill are found south of Antarctic Convergence, some are north of 60°S, the northern boundary of the treaty area. FAO takes 45°S as the northern boundary of its Southern Ocean programme.

- The treaty powers have recognised need to promote within the framework of the treaty the objectives of protection, scientific study and rational use of marine living resources. They may well agree on a "freedom of access" approach, with possibly some exchange of catch statistics and an agreement to limit annual increases in effort.

- The real need is for a positive control of the fishery: the establishment of conservative quotas to ensure that krill is not grossly overexploited, following antarctic seals and whales, Peruvian anchoveta and other fisheries, into collapse.

Outside initiatives - NIEO, Common Heritage, UNEP, FAO etc:

- The second half of the 20th century has seen a vigorous thrust of lawmaking for areas beyond recognised national jurisdiction - eg the moon, outer space and the seabed. Inevitably, Antarctica will be seen as another such international "commons".

- Those who hold this view want the area internationalised. To them, the Antarctic Treaty regime, limited to a few largely colonial powers, is unacceptable.

- The treaty powers have tended to be hostile to outside initiatives and proprietary towards Antarctica's resources.

- Specific weight has been lent to this view by the 1970 UN Declaration of Principles, which stated that "the seabed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction..as well as the resources of the area, are the common heritage of mankind". Appropriate international machinery was to be established to provide for the development and management of this area and its resources, "for the benefit of mankind as a whole... taking into particular consideration the interests and needs of the developing countries".

- There are similarities between Antarctica and the international seabed. Both are beyond recognised national jurisdiction, and the UN Conference on the Law of the Sea (UNCLOS) negotiations may have set a precedent for internationalising Antarctica as well as suggesting a machinery (for administering the seabed) which could be extended to Antarctica.

- The UN moves towards a New International Economic Order, which have so far not produced any major shifts in economic power, would be immeasurably strengthened by the acquisition of a resource (other than the seabed) to be held by the world community.

- In 1975, in a speech to the UN General Assembly, Sri Lankan Ambassador Shirley Amerasinghe, President of UNCLOS, said: "There are still areas of this planet where opportunities remain for constructive and peaceful cooperation on the part of the international community for the common good of all rather than the benefit of a few. Such an area is the Antarctic continent.....There can be no doubt that there are vast possibilities (in Antarctica) for a new initiative that would redound to the benefit of all mankind. Antarctica is an area where the now widely accepted ideas and concepts relating to international economic cooperation with their special stress on the principle of equitable sharing of the world's resources, can find ample scope for application..."

- In 1972 the second world conference on national parks at Grand Teton, USA, unanimously recommended that the Antarctic continent and its surrounding seas be established as the first "world park" under the auspices of the United Nations. After the conference IUCN (International Union for Conservation of Nature and Natural Resources) sent diplomatic notes to the treaty nations calling their attention to this recommendation.

- The UN Environment Programme proposed to its 1975 Governing Council to extend the Antarctic Treaty "with special attention being given to ensuring that full and adequate provision is made for the protection of the environment, particularly in relation to the possible exploitation of the natural resources of the Antarctic region".

- UNEP's proposed strategy involved initiating preliminary consultations between the treaty powers and "other concerned governments"; establishing "proposed guidelines for exploration and exploitation"; and the inclusion of environmental factors in the Antarctic Treaty.

- In 1975, Maurice Strong, while executive director of UNEP, called for a moratorium on Antarctic development, at least until its consequences could be fully evaluated and the protection of the environment assured.

- The Antarctic Treaty powers managed to block any consideration or decision on this matter by UNEP.

- The growing acceptance at UNCLOS of the EEZ concept raises the question whether territorial claims in Antarctica would also have an EEZ. The Antarctic Treaty states that no new claims or enlargement of existing claims to sovereignty in Antarctica shall be asserted while the treaty is in force. Argentina and Chile have already declared 200-mile zones off their Antarctic claims, without specifying exactly what type of sovereignty they are claiming.

- EEZs off all Antarctic claims would probably be disputed by the international community at large and by non-claimant Antarctic Treaty powers in particular. Indeed, the UNCLOS draft treaty may disallow an EEZ to lands which are uninhabited, and would vest EEZ rights in colonial territories in the inhabitants rather than the colonial power.

- The growing trend towards EEZs, and the accompanying reduction in the area of high seas, might encourage the treaty powers as a whole to declare a 200-mile EEZ. However, this would require a declaration of joint sovereignty over the land as a first step, and would obviously require wholesale changes to the Antarctic Treaty.

- The primary conflict (as with oil) is between freedom of access and a common heritage approach; a second conflict is between a free-for-all leading to overfishing and a scientifically controlled fishery.

11. WHAT ARE THE NATIONAL POLICIES TOWARDS ANTARCTICA?

Consultative treaty powers:

- All state that they want to maintain the treaty. Most seem concerned above all to exclude outside initiatives.

- On mineral resources, they are agreed that they want to control exploitation. There is a general recognition that measures will be needed to make such a regime acceptable to the international community - eg by revenue sharing.

- There are deep divisions among Antarctic Treaty consultative powers as to whether exploitation of oil and land-based minerals should take place. USSR and Japan are opposed to mineral exploitation; the US in favour; the rest stand somewhere in between. At present, they are agreed on a de facto moratorium.

- There is also a division among treaty powers as to the desirable forms of mineral exploitation. By and large, non-claimants favour freedom of access; claimants want varying degrees of sovereignty for themselves in their own areas.

- On krill, the treaty powers are in favour of free access, with a degree of control that appears to consist of little more than a sharing of catch statistics and perhaps an agreement not to increase catches too fast.

Claimant states:

- Claimant states (Argentina, Australia, Chile, France, New Zealand, Norway, UK) all tend to consider that oil and other mineral resources within their claims belong to them.

- This is particularly true of Argentina and Chile. "Antarctica has taken root and established an awareness in the soul of the Argentine nation" - chairman of Argentine delegation at 1959 Antarctic Treaty conference. In August 1973 President Lastri and Sra Peron participated in a four-hour-long session of the Argentine Cabinet on the ice of Seymour Island off Antarctic Peninsula. In January 1977 President Pinochet of Chile also visited Antarctica.

- A more muted approach is taken by other claimants, especially New Zealand and Norway, but Australia with biggest claim takes quite a hard line and increasingly aligns itself with Chile and Argentina.

- New Zealand proposed at the 1975 Antarctic Treaty meeting that Antarctica be made an international park.

- All claimants now accept idea of mineral exploitation, although reservations by Australia (who has minerals and hydrocarbons at home), Chile and Argentina (whose claims might be jeopardised by exploitation).

- In 1976 New Zealand made a compromise proposal to an Antarctic Treaty meeting on minerals, which could meet concerns of claimants, non-claimants, and the wider international community, and the need for environmental protection. New Zealand proposed first that the 12 treaty powers designate certain geographical areas as prohibited zones for the purpose of resource exploration and exploitation. Second, in the rest of Antarctica the unanimous approval of a regulatory committee of the 12 powers should be required before there could be any exploitation or even exploration. (The idea here is that applicants could make an informal deal with the claimants involved in order to forestall a possible veto: a face-saving way of sidestepping the problem of ownership.) Third, representatives of "outside" states might be invited to attend the meetings of the Regulatory Committee as observers. Fourth, there would be a degree of sharing of the proceeds of resource exploitation with the world community.

- Only Argentina and Chile have so far declared 200 mile maritime zones off "their" territory; the exact degree of control they envisage is unclear. Other claimants may follow suit.

Non-claimant treaty states:

- The five non-claimant treaty states are Belgium, Japan, South Africa, USA, USSR.

- In 1975 United States called for "non-discriminatory guaranteed access by the US and others for exploitation purposes to any part of the Antarctic Treaty area except specially protected areas". In a more extreme statement in 1975, a US spokesman said: "In the absence of a shared understanding, those countries who do not recognise claims to sovereignty would surely have to assert the right to commence mineral resource activities at their will, subject only to applicable provisions of the Antarctic Treaty".

- Belgium, on the other hand, is prepared to go some way towards meeting the aspirations of claimants, especially those of the southern hemisphere.

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- The US is markedly the most interested in exploitation of non-living resources, while the Soviet Union and Japan are completely opposed. The USSR proposed in 1976 a renewable moratorium of ten to fifteen years on the "industrial" exploration and exploitation of mineral resources.

- Soviet Union and Japan have made substantial investments in krill fishing. USSR has been boycotting meetings of SCAR Group of Specialists on the Living Resources of the Southern Ocean, as though reluctant to be involved in any discussion that could lead to management decisions.

Acceding powers:

- Poland (acceded 1961) resumed activity in Antarctica in 1975, sending a fishery expedition and establishing a permanent Antarctic station in 1976-77. Has applied for membership of SCAR and for full membership of Antarctic Treaty, and is likely to be accepted.

- Netherlands (acceded 1967) is considering resuming research in the Antarctic.

- Brazil (acceded 1975) has apparently made a recent territorial assertion which overlaps with Argentina's claim. However, this would be impossible under the treaty, by which Brazil is now bound.

Other countries:

- Federal Germany sent a krill expedition to Antarctica in 1975-75, and plans another in 1977-78. Wishes to join SCAR and accede to treaty.

- Guinea: In 1976, Guinea's representative at FAO made an extended speech on the developing world's need for protein; on the need for equal control over any FAO/UNDP Antarctic programme by developed and developing countries; and on the need for a new Antarctic Treaty because Africans cannot work with South Africa.

- China: The Hsinhua News Agency in April 1976 asked: "Why does the polar bear intrude into Antarctica?", and replied: "It will either be driven out or buried under the ice and snow."

12. WHAT ARE THE KEY POLITICAL ISSUES IN ANTARCTICA?

Krill:

* How should krill be exploited? Freedom of access or common heritage?

* Who should exploit krill? The distant water fishing states only? The technologically advanced nations only?

* What should krill be used for? A luxury food? Fishmeal? Food for hungry people?

* Can the fishery be maintained on a sustainable basis without strict regulation?

* Should krill be fished as a single species or in an integrated management perspective?

- These questions all underlie the central issue: what degree of control should be exercised over the krill fishery? 20,000 tonnes is already being taken annually, and this could increase rapidly.

- The Antarctic Treaty powers are talking about an entrepreneurial approach, each country providing catch statistics and possibly agreeing to limit annual increases in catch effort.

- FAO are talking about a system which would assist in the exploration, exploitation and utilisation of krill for the world as a whole.

- The International Ocean Institute has suggested establishing an International Fishing Enterprise (along the lines of the UNCLOS proposed nodule-mining enterprise) for fishing in the international areas of the world, including Antarctica.

Oil and other minerals:

* Should oil and other minerals be exploited or not?

* What are the risks to the environment, and to Antarctica's scientific value of oil and mineral extraction?

* How important is Antarctic oil and gas in terms of the world's long-range energy needs?

* How should exploitation be managed?

* Who should manage it?

* Who should be able to participate in exploitation?

* Who should benefit from exploitation?

* Should there be any form of revenue sharing?

- The claimant states feel they "own" the resources in "their" sectors; the non-claimants want to extend the treaty's principle of "flag state jurisdiction" to cover mining stations. Most treaty powers, though, are united in wanting to keep involvement of outsiders to a minimum.

- These questions underlie the basic choice of a minerals regime. There is the option of international control of the area: application of the common heritage concept, meaning either incorporation of the area into the domain of the International Seabed Authority, or the establishment of a new agency more or less closely linked with the UN.

- Or the existing treaty could be expanded to include resources, on a freedom of access basis. Alternatively, the present pie slice option could prevail, with claimants regulating exploitation.

- In between lie the possibilities of amendments to the treaty, such as expansion of membership, inclusion of "outsiders" at various stages, revenue sharing, various forms of licensing, or the compromise scheme proposed by New Zealand.

Expand or abandon the treaty?

* Should the treaty, which has functioned smoothly for 16 years, be retained?

* Or should the debate be widened, to UNCLOS or another UN forum, with all the time and money this would involve, and the possibility of no useful agreement emerging?

The key issue

* Will the treaty powers, whose decisions have to be reached unanimously and who differ considerably among themselves, be able to come to an agreement to share the benefits of Antarctic resources?

* And will such an agreement be reached quickly enough to forestall the Group of 77 raising the common heritage issue in other organisations (FAO, Common Heritage) and thus damaging the treaty regime beyond repair?

EXCERPTS FROM

DEPARTMENT OF STATE

DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE NEGOTIATION OF A REGIME FOR CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES

February 1978

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SUMMARY

STATEMENT TYPE: Draft Environmental Impact Statement
PREPARED BY: Department of State

(Attention: Mr. William Mansfield, III
Office of Environmental Affairs
(Room 7820)
Department of State
Washington, D. C. 20520)

1. Type of Action: Negotiation of a treaty

2. Brief Description of Proposed Action:

The United States will participate in the negotiation of a regime to conserve Antarctic marine living resources. All living resources in waters south of the Antarctic Convergence, except whales and except seals south of 60 degrees south latitude, are affected. The purpose of the regime would be to ensure that any harvesting of Antarctic marine living resources take place in accordance with sound conservation principles. There are no present or proposed commercial fishing operations by the United States in Antarctic waters.

3. Summary of Environmental Impacts and Adverse Environmental Effects:

Commercial harvesting will result in the continuing and increasing removal of fish and krill from Antarctic waters. Future harvesting may include squid, birds and seals as well. It is anticipated that krill will be the most heavily exploited resource. Populations of organisms which feed on krill and are themselves potentially harvestable resources will be reduced as krill availability declines due to harvesting. The recovery rate of protected baleen whale species may be slowed. Under the proposed conservation regime, harvesting would be regulated to minimize the impact on the Antarctic ecosystem. The adverse impacts of a controlled harvest would be considerably less than impacts of uncontrolled harvesting which is anticipated in the absence of an international agreement on a conservation regime. Increased harvesting will increase shipping traffic in the Antarctic region. Ship or shore based factory facilities may cause local pollution problems. Increasing human activity will increase disturbance of the Antarctic marine ecosystem which is of

scientific interest in part because it is the least disturbed of marine habitats. The proposed conservation regime, if effective, will moderate adverse environmental impacts in accordance with the objective of maintaining the health and long term productivity of the Antarctic marine ecosystem.

4. Summary of Major Alternatives Considered:

Alternatives to the proposed negotiation of a complete conservation regime are: (a) to seek no action to conserve Antarctic living resources, (b) to pursue national action for conservation of Antarctic resources with coordination among nations, (c) to negotiate an international agreement to collect, exchange and analyze data on the Antarctic ecosystem with a commitment to later establishment of a conservation regime, (d) negotiation of a conservation regime, plus imposition of specific conservation measures in the language of the agreement or imposition of a moratorium on harvesting until such measures are developed, and (e) to negotiate an agreement prohibiting all harvesting of living resources in Antarctic waters.

5. Agencies and Parties from Which Comments Have Been Requested:

Comments on the draft statement have been requested from the following Federal agencies and Offices:

U.S. Arms Control and Disarmament Agency
Central Intelligence Agency
Council on Environmental Quality
Department of Commerce
  National Oceanic and
  Atmospheric Administration
Department of Defense
Department of Energy
Department of the Interior
Department of Justice
Department of Transportation
  U.S. Coast Guard
Department of Treasury
Environmental Protection Agency
National Science Foundation
Office of Management and Budget
Office of Science and Technology

Private Organizations:

American Fisheries Society
American Society of International Law
Center for Law and Social Policy
Conservation Foundation
The Environmental Defense Fund
Friends of the Earth
International Association of Fish and Wildlife Agencies
National Academy of Sciences
National Audubon Society
National Wildlife Federation
The Nature Conservancy
Natural Resources Defense Council
Sierra Club
Wilderness Society
World Wildlife Fund

6. Date Draft Statement made available: February 1, 1978.

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Note: Reference has been made to a report on prospects for commercial exploitation of the Antarctic krill resource (Tetra Tech, 1978) which is in press. Although the final version of this report was not available in time to be included as an appendix in the Draft Environmental Impact Statement, the report should be publicly available in the near future.

DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE NEGOTIATION OF A REGIME FOR CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES

I. PROPOSED FEDERAL ACTION

The proposed federal action is the negotiation of a regime to conserve Antarctic marine living resources through conclusion of an international agreement. The international agreement, anticipated to be a treaty, would set forth the objectives of the regime and provide the obligations, functions and machinery necessary to fulfill them.

The proposed conservation regime would apply to all the species which comprise the Antarctic marine ecosystem, except that it would not provide for direct regulation of species already covered by existing international agreements, specifically, the International Whaling Convention and the Convention for the Conservation of Antarctic Seals.

The purpose of the regime would be to ensure that any harvesting of Antarctic marine living resources take place in accordance with sound conservation principles and practices, and specifically:

-- to prevent overexploitation of any Antarctic marine living resources;

-- to ensure that harvesting of any species does not adversely affect populations of dependent or related species;

-- to ensure that any harvesting of Antarctic marine living resources is conducted in such fashion as to maintain the health of the Antarctic marine ecosystem.

In order to accomplish these purposes, the conservation regime would need to provide for:

-- acquisition of basic scientific data on the nature, interrelationships and dynamics of the Antarctic marine ecosystem;

-- acquisition of quantitative data on the standing stocks of Antarctic marine living resources and detailed data on the levels of any harvesting of such stocks;

-- assessment of the status of the stocks of Antarctic marine living resources;

--identification of stocks to which conservation measures should be applied;

-- development, implementation and effective enforcement of specific conservation measures, including catch limitations, to achieve the purposes of the regime.

The functions to be performed by the conservation regime would be of a regular and continuing nature. Their performance would require establishment of an effective organizational structure. This structure would include a plenary body or commission, in which representatives of the contracting parties to the regime would decide upon conservation measures and take other actions provided for in the international agreement. This organizational structure would also require standing bodies to:

-- collect, collate and distribute necessary basic scientific data;

-- collect, collate and distribute quantitative data on standing stocks and catch data;

-- assess and review the status of stocks of Antarctic marine living resources;

-- prepare for the periodic meetings of the plenary body or commission;

-- monitor the effectiveness of conservation measures;

-- coordinate the activities of the conservation agreement with the activities of the International Whaling Commission and with activities pursuant to the Convention for the Conservation of Antarctic Seals;

-- establish cooperative relationships with other international bodies which deal with Antarctic marine living resources.

II. ALTERNATIVES TO THE PROPOSED ACTION

Negotiation of the proposed conservation regime may be viewed as one point on a continuum of possible approaches to Antarctic marine living resources. Six general options can be identified on this continuum. One of these includes the proposed action, the other five represent alternatives to it. They range from a no regime option to seeking a ban on all harvesting, and can be described as follows:

1. No action to seek to conserve Antarctic marine living resources.

2. National action to conserve Antarctic marine living resources, with coordination among nations taking such action.

3. Negotiation of an international agreement setting forth the obligations and means to collect, exchange and analyze data on Antarctic marine living resources, coupled with a commitment to later establishment of a mechanism to develop and implement necessary conservation measures.

4. Negotiation of an international agreement establishing a complete conservation regime, setting forth the objectives of the regime and providing the obligations, functions and machinery necessary to fulfill them.

5. Negotiation of an international agreement establishing a complete conservation regime and imposing from the beginning specific conservation measures or a moratorium on harvesting until conservation measures are developed.

6. Negotiation of an international agreement flatly prohibiting all harvesting of Antarctic marine living resources.

The proposed federal action under consideration is the fourth alternative. The implications of the six alternatives are discussed below.

A. No Action

This alternative reflects an assumption that no regulation of the harvesting of Antarctic marine living resources is necessary, other than that which takes place or will take place under the International Whaling Convention or the Convention for the Conservation of Antarctic Seals. There is, for instance, no present information that U.S. fishermen

plan to fish in Antarctic waters. The presumed potential resources, at least that of krill, are large. Economic factors and operating conditions may serve to limit the extent of commercial harvesting.

However, such a laissez-faire approach to harvesting of Antarctic marine living resources would pose the maximum risks to the Antarctic marine ecosystem and to the long term potential of that ecosystem as a source of sustained protein yields. The approach would provide neither for controls on harvesting nor for the means of developing data on the potential resources themselves. The direct dependence on krill for food by most other potential resource populations makes the dangers of overexploitation particularly acute.

A variant of the no action approach would be the postponement of efforts to deal with exploitation of Antarctic marine living resources, a no-action-now approach. This option rests on either or both of two premises. One is that the magnitude of the resource is so great that harvesting need not be regulated for some time to come. The other is that the incentives for an effective system of conservation will be greatest at some point in the future, specifically when large scale harvesting, and its implications, become a reality.

There is, however, extensive evidence, based on experience in efforts to conserve marine resources in other areas of the world, that "after-the-fact" regulation is not effective. Sustained unregulated harvesting could have unforeseen, perhaps irreversible impacts on the Antarctic marine ecosystem. Initiation of effective regulation would likely be more difficult once substantial economic stakes in uncontrolled methods of harvesting are created.

B. National Action

This alternative rests on the assumption that regulation by individual countries of vessels and nationals under their jurisdiction engaged in exploitation of Antarctic marine living resources can provide the basis for adequate conservation of the resources.

National action could be coordinated through negotiation of commitments among the nations involved to regulate harvesting, ranging from a simple undertaking to control harvesting to an obligation to follow specific guidelines in regulating the nationals and vessels under their jurisdiction. This alternative could also incorporate informal commitments to share scientific and catch data and to

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report on harvesting activities with a view to ensuring sufficient coordination to prevent conflicts or overharvesting.

This alternative would seek to build an essentially voluntary system of conservation in which no nation would be bound internationally. The kinds of obligations this alternative involves could be relatively easy to negotiate.

There are, however, a number of practical difficulties inherent in this approach. It would tend to limit effective influence upon the development and implementation of conservation measures to those nations actually engaged in commercial harvesting. The voluntary nature of the system would mean that it would be less stable and could lead to application of inconsistent conservation standards to harvesting. Its impacts upon the Antarctic marine ecosystem could be quite adverse.

C. Negotiation of an International Agreement for Collection, Exchange and Analysis of Data

This alternative would concentrate upon the first necessary steps toward providing for adequate conservation of Antarctic marine living resources: establishment of the necessary obligations and means for creating an adequate data base. It would involve setting up a scientific and information collecting organization. The alternative is based upon the assumption that it is possible to obtain early agreement on those aspects of a regime which would build the needed data base, with the corollary assumption that negotiation of a full-scale regime could prove sufficiently difficult to justify a gradualist approach.

This option would satisfy one of the major prerequisites for adequate conservation of Antarctic marine living resources, the acquisition of basic scientific data. It might set forth a commitment to establish a system for developing and implementing specific conservation measures at some point in the future. Harvesting would not be regulated until the information gathering system was set up. It could involve a high level of risk to the Antarctic marine ecosystem since there would be no firm guarantees that the necessary standards and machinery to provide for conservation measures would in fact be developed. Delay in addressing the development of conservation measures could well make it more difficult to achieve agreement on an effective mechanism.

D. Negotiation of an International Agreement Establishing a Complete Conservation Regime

This alternative represents the proposed federal action, described in Section I, and rests on the conclusion that it is urgent to establish an effective system to ensure conservation of Antarctic marine living resources. It also reflects the assumption that the requirements of effective conservation are not incompatible with properly controlled harvesting of Antarctic marine living resources. In addition, under this approach, harvesting could take place in the interim period after the entry into force of the regime and prior to the development of conservation measures pursuant to the regime.

The question of the treatment of harvesting in this interim period can be dealt with in two ways, which comprise variants or sub-options of the proposed federal action. The first sub-option would be not to address specifically the interim period. This variant assumes that technological and other limitations will ensure low harvesting levels for the next several years. It rests on the view that a comparison of projected initial levels of harvesting with projected potential of stocks of commercial interest indicates that specific limitations in the interim period are not required. In other words, this sub-option assumes that harvesting will not reach levels which would pose threats to target species, to dependent species or to the ecosystem as a whole prior to the development of the regime's full capability to identify conservation needs and apply conservation measures. In the event that development of the conservation machinery requires many more years than presently anticipated, this variant would involve some risk of overexploitation.

The second sub-option involves negotiation, as a supplement to the international agreement, of catch limitations, at least for krill, during an interim period after entry into force of the regime. Specifically, this sub-option would provide for an initial overall catch limit on the species involved, set at a very conservative level, and provision for phased expansion of that limit by fixed annual percentage increases over a fixed and limited period of years. These interim limitations would be designed to minimize any possible adverse impacts upon target species, related species, or the ecosystem as a whole during the initial period of any commercial harvesting.

The first of these sub-options would likely provide the necessary margin of safety in avoiding harmful impacts

upon the Antarctic marine ecosystem, and would be the easier to negotiate. The second sub-option would be more difficult to negotiate but would reflect a more cautious and conservative approach to exploitation of resources, such as krill, with which there is little international experience. For this reason, the second sub-option or variant, providing for the interim catch limitation approach described above, is preferred.

E. Negotiation of an International Agreement Establishing Specific Conservation Measures or a Temporary Moratorium

This alternative would involve negotiation in the international agreement of specific conservation measures for some or all Antarctic marine living resources or a moratorium on harvesting until such measures can be developed. It would imply a conservation regime similar to that in the proposed federal action. The alternative would differ from the proposed federal action in one of two ways:

-- the agreement would set forth detailed conservation measures for some or all species, rather than provide for interim catch limitations or for other specific initial conservation measures to be developed by the organization established pursuant to the regime, or

-- the agreement would impose an obligation to abstain from harvesting until the conservation regime became fully operative rather than permit harvesting to take place while conservation measures were being developed.

This approach would pose fewer risks to the Antarctic marine ecosystem than the previous alternatives, including the proposed federal action. However, it suffers from several major drawbacks. There is insufficient data upon which to base specific conservation measures. An attempt to do so *ab initio* could significantly decrease incentives for nations with harvesting interests to participate in the conservation regime. A moratorium on harvesting until sufficient data is developed suffers to an even greater degree from the same negotiating disadvantages. Since a small controlled catch of krill and other species would provide data on size and distribution of stocks which are required for proper management but not presently available, a moratorium would increase the difficulty of determining necessary conservation measures. It would be extremely difficult to determine when sufficient information existed

to justify lifting the moratorium. A fixed time period for the moratorium might be considered equally arbitrary.

An effective conservation regime should include all states engaged in harvesting. This alternative risks losing the participation of such countries, thus leading to a less effective system than that of the proposed federal action.

F. A Total Ban on Harvesting

Maintenance of the Antarctic ecosystem in its present state would require a prohibition on all harvesting of Antarctic marine living resources. From the conceptual point of view, this approach obviously offers the maximum degree of protection to that ecosystem.

Seeking a ban on harvesting would ultimately represent a judgement that the health of the Antarctic marine ecosystem can be ensured only by its total insulation from human activity. By contrast, the proposed federal action is based upon the assumption that properly controlled harvesting of Antarctic marine living resources is consistent with maintenance of the health of the Antarctic marine ecosystem.

Further, a total ban on harvesting stands almost no chance of being negotiated. States interested in commercial harvesting would have no incentive to accept this alternative, and as a practical matter, it would be equivalent to no regulation whatsoever.

Preservation of the Antarctic marine ecosystem as a sanctuary or a relatively undisturbed natural habitat free from commercial harvesting is an unobtainable objective.

G. Area Covered by the Regime

There is a subsidiary set of alternatives concerning the geographic area to be covered by the regime. The conservation regime of the proposed federal action would apply to the species which comprise the Antarctic marine ecosystem. The Antarctic marine ecosystem is generally considered to be geographically defined by the Antarctic Convergence which shifts in space on a seasonal basis. Linking the regime to the species which are found south of the Convergence best provides for coverage of the full ecosystem.

III. RELATIONSHIP OF THE PROPOSED FEDERAL ACTION TO INTERNATIONAL AGREEMENTS WITH IMPLICATIONS FOR THE ANTARCTIC ENVIRONMENT

A. Agreements Pertaining to the Antarctic Region

The Antarctic Treaty reserves for peaceful uses the Antarctic continent and ice shelves, south of 60°S latitude. It encourages scientific investigation and provides for exchange of information. The Treaty does not apply to high seas areas.

In addition to the Antarctic Treaty itself, the United States is a party to several agreements which directly concern the environment of Antarctica. The Agreed Measures for the Conservation of Antarctic Fauna and Flora (not yet in force, but effectively adhered to as voluntary guidelines by the Treaty Parties) provide a stringent system of protection of native mammals, birds and plants and establish certain "Specially Protected Areas" which are to be accorded special protection in order to preserve their unique natural ecological characteristics. The Agreed Measures pertain to areas and species on the Antarctic continent and the pack ice. The International Whaling Convention regulates whaling in Antarctic waters. The Convention for the Conservation of Antarctic Seals, opened for signature in 1972, requires several more ratifications to enter into force. It will apply south of 60°S latitude.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora entered into force 2 July 1975. Although the scope of the convention is not defined geographically, it applies to blue and humpback whales in Antarctic waters. These whales are also protected species (no commercial harvesting) under the International Whaling Convention.

B. Agreements Pertaining to the Marine Environment

In addition to the foregoing international agreements, a number of agreements providing generally for protection of the marine environment would also apply to activities of Parties in Antarctic waters. These include:

-- The International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended. (Entry into force 26 May 1958)

-- The International Convention for the Prevention of Pollution from Ships, 1973. (Not yet in force)

-- The International Convention on Civil Liability for Oil Pollution Damage, 1969. (Entry into force 19 June 1975)

There are two alternatives to this approach based on geographic limits, which would provide for enforcement of conservation measures. The first is to limit the regime to the area of the Antarctic Treaty, south of 60°S latitude. Such a result could be the easiest to negotiate, at least among the Antarctic Treaty Parties. However, it would seriously compromise the effectiveness of conservation measures. Since the Antarctic Convergence lies significantly north of the Treaty area in a number of places, areas of important concentrations of Antarctic marine living resources would not be covered.

A second possibility would be to fix a geographic limit for the applicability of the regime sufficiently far north to ensure that all areas south of the Convergence were covered. The difficulty with this approach is that it would cover species not part of the Antarctic marine ecosystem and thus create difficult technical and political obstacles to negotiating the regime.

-- Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969. (Not yet in force)

-- The International Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971. (Entry into force 15 July 1975)

-- The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971. (Not yet in force)

-- Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971. (Not yet in force)

-- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972. (Entry into force 30 August 1975)

The commitments which would be undertaken by parties to the regime proposed in the federal action would be entirely consistent with their obligations under the international agreements listed above. The legal instrument setting forth the regime would provide specifically for coordination of activities pursuant to the regime with those pursuant to the International Whaling Convention and the Convention for the Conservation of Antarctic Seals (when in force). In addition, it would be desirable to provide specific reference to the Agreed Measures for the Conservation of Antarctic Fauna and Flora in the legal instrument to ensure that measures pursuant to the Agreed Measures are properly taken into account.

C. Fisheries Bodies

There are several fisheries bodies with which a regime to conserve Antarctic marine living resources might have specific relationships. These include the Regional Fisheries Advisory Commission for the Southwest Atlantic, the Indian Ocean Fishery Commission, the Indo-Pacific Fisheries Council, the International Commission for the Southeast Atlantic Fisheries, and the Permanent Commission of the Conference on the Use and Conservation of the Marine Resources of the South Pacific. The first three bodies were created under the auspices of the United Nations Food and Agriculture Organization (FAO), the other two pursuant to separate international agreements.

The proposed federal action would provide for establishment of cooperative relationships, where appropriate,

with those bodies. This could be accomplished through the close working relationship anticipated with FAO, supplemented if and where necessary with ties to any of the individual fisheries bodies.

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