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QUESTION OF ANTARCTICA

Study requested under General Assembly resolution 38/77

Report of the Secretary-General

PART TWO

Views of States

Volume I

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I. INTRODUCTION

1. At its 97th meeting, on 15 December 1983, the General Assembly adopted resolution 38/77, entitled "Question of Antarctica", the operative part of which reads as follows:

> "The General Assembly,
>
> "...
>
> "1. Requests the Secretary-General to prepare a comprehensive, factual and objective study on all aspects of Antarctica, taking fully into account the Antarctic Treaty system and other relevant factors;
>
> "2. Also requests the Secretary-General to seek the views of all Member States in the preparation of the study;
>
> "3. Requests those States conducting scientific research in Antarctica, other interested States, the relevant specialized agencies, organs, organizations and bodies of the United Nations system and relevant international organizations having scientific or technical information on Antarctica to lend the Secretary-General whatever assistance he may request for the purpose of carrying out the study;
>
> "4. Requests the Secretary-General to report to the General Assembly at its thirty-ninth session;
>
> "5. Decides to include in the provisional agenda of its thirty-ninth session the item entitled "Question of Antarctica".

2. Pursuant to paragraph 2 of resolution 38/77, the Secretary-General, on 8 February and 29 June 1984, addressed a note verbale to the Governments of States Members of the United Nations. As at 29 October 1984, replies containing such views have been received from 54 Governments. Replies received subsequent to this date will be issued as addenda to the present study.

3. This part of the study contains the substantive content of the replies of Governments and does not include the accompanying annexes. The annexes may be consulted in their original form, upon request, addressed to the Office of the Under-Secretary-General for Political and Security Council Affairs of the Secretariat.

II. VIEWS OF STATES

1. ANTIGUA AND BARBUDA

[Original: English]

[15 August 1984]

1. The study on Antarctica should examine ways by which the 1959 Antarctic Treaty can be modified to accommodate (a) the principle of universality in terms of accession to the Treaty; and (b) a system by which the supreme decision-making body of Antarctica is made up of the existing Contracting Parties as permanent members and representatives of regions as non-permanent members. The regional representatives should be elected on a rotational basis from among the member States of the various regions as established by practice within the United Nations, except where such a member State is already a permanent member by virtue of being a Contracting Party.

2. The implementation of paragraph 1 above will necessitate amendments to Article IV of the Antarctic Treaty. 1/ There will have to be consequential amendments to all the articles in order to place obligations upon all States which are signatories to the Treaty and not only upon the Contracting Parties within the existing Treaty.

3. The procedure for decision-making should be clearly established and should not accord a veto to any State or groups of States.

4. A secretariat should be established for the Antarctic Treaty. The secretariat should be kept small, but a principal component should be an information division to promote information and education about Antarctica in order to counter-balance the great deal of ignorance which exists about the region.

5. The new decision-making body, comprising the representatives of the existing Contracting Parties and representatives of the regions, will assume such tasks and functions as are now undertaken by the meeting of representatives of the current Contracting Parties.

6. There should be a general assembly once a year at the United Nations in New York. The secretariat of the Antarctic Treaty should also be housed within the United Nations organization in order not to establish yet another large bureaucracy.

7. Attention should be paid to the system of exploiting the resources of Antarctica. A system of licensing should be worked out with the benefits of such exploitation being placed into a special fund from which all nations can draw. Funds should have three components as follows: grants to least developed States, soft loans to less developed States and hard loans to more developed States. This

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1/ United Nations, Treaty Series, vol. 402, No. 5778.

fund should be administered by the World Bank, but should be outside normal World Bank procedures.

8. The articles of the Antarctic Treaty which renounce military and nuclear activity should continue to apply.

9. The Convention for the Conservation of Antarctic Seals, the Agreed Measures for the Conservation of Antarctic Fauna and Flora and the Convention on the Conservation of Antarctic Marine Living Resources should become integral parts of the Treaty.

10. Work on the minerals régime, which is currently being undertaken by the Contracting Parties, should cease until a new mechanism for administering Antarctica is established.

11. Recognized conservation organizations should be accorded observer status at meetings of the Antarctic Treaty general assembly.

2. ARGENTINA

[Original: Spanish]

[12 July 1984]

INTRODUCTION

1. The General Assembly, by its resolution 38/77 of 15 December 1983, entitled "Question of Antarctica", requested the Secretary-General to prepare a comprehensive, factual and objective study on all aspects of Antarctica; hence, the Secretary-General's note (PSCA/POL/84/16), in which he asked the States Members of the United Nations for any views and information they might wish to provide pursuant to the proposed objective.

2. In accordance with the Secretary-General's request and the norms established by the Antarctic Treaty, concluded in 1959, the Argentine Government is providing this information for the required purposes; it illustrates and exemplifies Argentine rights and actions in its territory, located between latitude 60°S and longitudes 25° and 74°W. It also refers to relevant aspects of the system established by the above-mentioned Treaty.

3. The report, which is accompanied by an annex, 2/ has therefore been divided into the following three sections:

I. The historical, political, legal and economic background to Argentina's presence in Antarctica;

II. Argentina's scientific activity in Antarctica;

III. The Antarctic Treaty and system.

4. The Argentine Government, as an expression of its constant desire to co-operate with the Secretary-General, may later provide any additional clarifications or information as may be relevant.

I. THE HISTORICAL, POLITICAL, LEGAL AND ECONOMIC BACKGROUND TO ARGENTINA'S PRESENCE IN ANTARCTICA

5. The history of the continents began when man appeared on them and began to keep chronological records of the salient events which structure and form civilizations. In this sense, the human presence on the Antarctic continent is relatively recent.

2/ The annex is not reproduced in the present document, but may be consulted, in its original form, upon request addressed to the Office of the Under-Secretary-General for Political and Security Council Affairs of the Secretariat.

6. Antarctic history began when Christopher Columbus landed in America and the Spanish tried to find the south-west passage which would open the way to the Orient. Ferdinand Magellan's expedition successfully carried out Spain's proposed mission in 1520, by discovering the strait which bears Magellan's name and which enabled the expedition to continue west and complete the first journey around the world.

7. By the fifteenth century, the Spanish Crown considered the Antarctic regions as belonging to Spain. In fact, in 1493 Pope Alexander VI delimited the possessions of Spain and Portugal in the bull Inter Caetera, allocating to Spain the islands and lands discovered in the New World, which extended west of the meridian situated 100 leagues west of the Cape Verde Islands. The line of demarcation extended from the North Pole to the South Pole. This dividing principle was ratified by the kings of Spain and Portugal in the Treaty of Tordesillas of 1494, although it established the imaginary line 370 leagues west of the Cape Verde Islands. This treaty was then submitted for the approval of the Pope, who confirmed it in 1506.

8. Thus, Spanish jurisdiction in the New World reached the South Pole itself, and so it was understood by the Crown, as proven by the fact that Charles V established the Province of the Strait in 1534, authorizing exploration and conquest up to "... the so-called Strait of Magellan and the land on the other side of it ...".

9. Spanish exploration attempts in the polar regions were unsuccessful, but the efforts of the Spanish Crown clearly show Spain's intention of exercising dominion over the southern territories, which by royal decision were incorporated in the viceroyalty of Río de la Plata, established by royal letters patent on 1 August 1776.

10. During the seventeenth century, Spanish ships repeatedly crossed the parallel 60°S, thereby making discoveries and sightings of the sub-Antarctic islands.

11. In 1756 the Spanish ship León, while on route from Peru to Cadiz, was blown off course by a storm, and on 28 June of that year it sighted an island, which it circumnavigated and named "San Pedro" (South Georgia).

12. Six years after the discovery of the island of San Pedro, another Spanish ship, the Aurora, also on route from Lima to Cadiz, discovered a group of islands between San Pedro and the Malvinas Islands. The Spanish called the new lands "Islas del Aurora". These islands are recognized in current international toponymy as the "Shag Rocks".

13. The nineteenth century marked a great change in the Spanish-American territory, which began to fight for its independence from the Spanish colonial power. In this warlike atmosphere, Argentine Admiral Guillermo Brown embarked on a pirate venture in 1815 to harass the Spanish fleet in the Pacific Ocean with two ships, the frigate Hercules and the brig Trinidad. To that end he set sail southward and, as the ships passed Cape Horn, a heavy storm forced them into the Antarctic Sea, to latitude 65°S. Admiral Brown's logbook indicated the presence of land nearby, and this indication - noted as a routine matter - revealed what was

already known to the sailors of Río de la Plata namely, the presence of islands to the south of the Drake Passage, where seal furs and blubber could be harvested in large quantities.

14. The event described above is confirmed in Argentina's official archives by the petition submitted by the Argentine trader Juan Pedro Aguirre to the Consulate in Buenos Aires - the competent Argentine maritime and trade authority of that time - on 18 February 1818, requesting permission to set up a sealing enterprise on some of the islands "which are uninhabited near the South Pole of this continent".

15. From the end of the eighteenth century, seal-hunters, sailors and traders from the port of Buenos Aires, capital of the then United Provinces of Río de la Plata, made numerous incursions among the islands of the Antarctic Sea - situated to the south of parallel 60°S - whose natural resources they had discovered and exploited. This fact was corroborated in 1818 by the United States ship Hersilia which, by following the Argentine sealer Spiritu Santo, arrived at Deception Island in the South Shetlands.

16. The Government of Buenos Aires issued a historically and legally momentous decree on 10 June 1829, establishing the Military Political Commmand of the Malvinas Islands. This decree by the Argentine authorities was the first known legal norm which required the protection and conservation of the fauna in the islands adjacent to Cape Horn, that is, the Antarctic islands. The seal population had been subject to a brutal extermination campaign since the turn of the century on the Patagonian coasts and the Argentine and adjacent archipelagos, that is, the Antarctic archipelagos. This conservationist law was an attempt to preserve from indiscriminate exploitation the only known region where there was still a seal population which could be exploited commercially.

17. From the mid-nineteenth century, scientific pursuits attracted men to the still unexplored lands of the far south; vessels transporting scientists alternated with sealing and whaling ships.

18. In 1880, the President of Argentina, Julio A. Roca, gave Argentina's support to a southern expedition being organized by the Italian sailor Giacomo Bove, who had requested that the country sponsor the expedition; it was conducted through the Argentine Geographical Institute. Bove's polar expedition did not complete its Antarctic stage, but it brought out the concern being expressed in Argentine scientific circles to incorporate these far-off regions into the realm of general knowledge. A special interest in the then recent Antarctic investigation was developed by the Argentine Geographical Institute, especially by its President, Estanislao Zeballos, a fervent defender of Argentina's southern mission.

19. At the same time, new petitions were being submitted to the Argentine authorities for the establishment of trading posts in the South Shetland Islands and the Antarctic Peninsula. In 1892, the Argentine engineer, Julio Poper, a resident of the island of Tierra del Fuego, petitioned the Argentine Government for this purpose.

20. In 1894, an Argentine trader and businessman, Luis Neumayer, requested the permission of the Argentine Minister of the Interior to explore and reconnoitre "Tierra de Grand". Neumayer said that, having reconnoitred nearly all the Patagonian territory and hoping to expand his explorations into the hitherto unexplored "Tierra de Grand", he sought permission to do so on his own. Basing his request on political and economic reasons, he said that these lands should be investigated and explored under the flag of Argentina, to whom they belonged.

21. The Argentine authorities competent in the matter made a pronouncement on the legal basis of Neumayer's request; as a result, on 29 December 1894, the President of Argentina, Luis Sáenz Peña, issued an administrative decree authorizing Luis Neumayer to explore the territory to the south of Patagonia known as "Tierra de Grand", although prohibiting any type of exploitation.

22. Admiral Solier, Commander of the Argentine Navy, in giving his support for the signing of the presidential decree authorizing Neumayer's expedition, indicated that it was an act of sovereignty over the lands which belonged to the Argentine Republic because of their geographical location, and whose peaceful possession was thus reaffirmed.

23. Towards the turn of the century, the interest of world scientific circles in the Antarctic continent grew. In 1895, the sixth International Geographical Congress was held in London, and, in 1899, the seventh International Geographical Congress met in Berlin. Both were attended by the most outstanding scientists in the field, and their conclusions led to the recommendation to organize an international scientific expedition to the Antarctic to carry out, as had already been recommended to the Argentine Geographical Institute in 1882 by Professor Bachman of the Argentine University of Córdoba, simultaneous observations of natural phenomena in that region.

24. Baron von Richthofer, who had presided over the seventh International Geographical Congress, recommended to the German Imperial Legation in the River Plate States that it submit a request to the Government of the Argentine Republic for the construction of a scientific station on the island of Los Estados, and explained that "... the main task of the Argentine Government would be to have the same meteorological and magnetic studies carried out as those in which the two expeditions (German and British) would be engaged during the same period, that is to say, from the month of October 1901 until approximately April 1903 ..." and, he went on, "... since the Government of the Argentine Republic has always shown great interest in the regions of the South Pole, the leadership of the aforesaid Congress hopes that Argentina will not deny its assistance to this international undertaking, from which it is hoped that results of major importance to science will be obtained ...".

25. The Argentine Government, involved with its polar interests, showed no reluctance in taking up this invitation. On 10 October 1900, the Cabinet Ministers by general agreement entrusted the Department of the Navy with the construction of the meteorological and magnetic observatory on the island of Los Estados, in the Año Nuevo group of islands, one of Argentina's island territories; since that time, the island has been known as Observatorio Island. The observatory was inaugurated and began operating on 1 March 1902, continuing without interruption until 31 December 1917.

26. A further milestone in the strengthening of Argentine sovereignty in the Antarctic region occurred on 22 February 1904 when the Argentine Government took over a small meteorological and magnetic observatory and other installations, constructed by the members of a private expedition on Laurie Island, in the South Orkneys. These installations became the first permanent Antarctic base inhabited by man. Another important event was the construction close by of the first post office to function in Antarctica, by order of th State Post and Telegraph Administration of the Argentine Republic. The continuous occupation by Argentina therefore constitutes the oldest permanent presence on the Antarctic continent. For the next 40 years, the Argentine Republic was the only permanent occupant of Antarctica, a fact which provides a powerful title to its claim to sovereignty in the region.

27. Also in 1904, an Argentine fish-processing factory was established in the sub-Antarctic island of South Georgia; this was the beginning of the modern whaling industry in southern waters. The Argentine Navy has since then been responsible for periodically relieving the crew of the observatory in the South Orkney Islands as well as providing support and supplies to the factory in South Georgia.

28. In January 1905, Argentina established the second permanent meteorological station, which was recorded as being in the southern lands adjacent to Antarctica. The first information on the station, constructed by the Ministry of Agriculture near the Compañía Argentina de Pesca at Grytviken, in South Georgia, dates from this time. This settlement was the fruit of the pioneering spirit with which the Argentine Republic has continued a real and effective occupation in the Antarctic region.

29. The decree of 7 December 1906, by which the President of Argentina appointed a commissioner for the South Orkney Islands and another commissioner for Wandel Island and nearby islands and territories, demonstrates the effective exercise of Argentine jurisdiction in the southern regions.

30. On 30 April 1940, the National Antarctic Commission was created in Argentina by executive decree to deal with all matters connected with Argentine interests in Antarctica.

31. In 1941 the Argentine Naval Hydrographic Service planned and carried out reconnaissance, survey and marker-laying and other operations, as part of a plan to conduct research and construct bases; thus, Argentina intensified its Antarctic activities.

32. During the Antarctic campaign of 1941/1942, the commander of the Argentine naval vessel 1° de mayo, when visiting Deception Island, the Melchior Archipelago and the Argentine Islands while on exploration and hydrographic assignments, confirmed the geographical area of the Argentine Antarctic sector in a ceremony carried out on Deception Island in the South Shetland Archipelago. This simple ceremony was limited to emphasizing Argentina's action and intent in Antarctica, which had already been clearly established by the events and legal acts marking Argentina's southern involvement since the dawn of our birth in 1810 as an independent nation, and the inheritor of Spanish rights to the region.

33. From then on, a period of marked development of Argentine activity in Antarctica ensued, with various installations being set up in succession during the annual Antarctic expeditions. At present, Argentina possesses the following installations in the Antarctic territory:

(a) Eight permanently occupied bases, namely, Belgrano 2 (1970), Belgrano 3 (1980), Brown (1951), Esperanza (1952), Marambio (1969), Orcadas (1904), San Martín (1951) and Jubany (1982);

(b) Seven temporarily occupied bases;

(c) Forty-two shelters of which transitory use is made by research and exploration expeditions.

34. All these stations have been occupied continuously, with Argentina thus exercising the right of first occupancy. Scientists and technicians from the Argentine Antarctic Institute and from the National Antarctic Directorate, as well as military and civilian personnel from the Argentine armed forces, have worked continuously in these stations until the present time.

35. By Executive Decree No. 9905 of 7 April 1948, the Argentine Antarctic sector and those Atlantic islands not under a different national authority were included in the jurisdiction of the maritime governor of the national territory of Tierra del Fuego. Later, by Executive Decree No. 2191 of 28 February 1957, this national territory was named "National Territory of Tierra del Fuego, Antarctica and Islands of the South Atlantic".

36. Argentina has been continuously present in Antarctica for a record period of over 80 years, which very clearly shows the Republic's firm southern commitment. During Argentina's long Antarctic history, there have of course been many administrative, jurisdiction and government acts connected with the activities in the Antarctic sector and the defence of Argentine rights. There are also those matters connected with family relationships, as a result of the permanent presence in the zone of direct dependants of personnel working in these latitudes, such as births and marriages, which are registered as having occurred and having been celebrated in the national territory.

37. Rescue missions carried out by Argentina in behalf of foreign expeditions which ventured into its Antarctic sector - such as the expedition of Otto Nordenskjöld in 1902 and the precautionary search for Jean Charcot in 1904 - form part of Argentina's southern heritage, as examples of its gallantry and generous pioneering spirit. The Argentine polar vessel Corbeta Uruguay, specially outfitted for southern navigation at the dockyards of the Republic, played a vital role in both instances. In other cases, the unselfish support given by the Argentine Government to scientific expeditions of third countries enabled these to conclude successfully, as happened with the expedition of Adrian Gerlache in 1899.

38. Above all, it is undoubtedly the unselfish sacrifice and undaunted efforts of Argentines who had the good fortune to live and brave the elements in these latitudes which, over the generations, has made it possible effectively to establish Argentine Antarctica as an inseparable part of the national territory.

39. The following should be said as a corollary to the foregoing:

(a) Fifteenth-century Spain considered the Antarctic territories as its own, based on the well-known terms of the Papal Bull Inter Caetera of 1493, issued shortly after the discovery of America, and on the provisions of the Treaty of Tordesillas of 1494, which fixed the limits of the territories of the Spanish and Portuguese crowns and assigned to Spanish rule the territories and islands of the New World situated west of an imaginary line traced from one pole to the other, 370 leagues west of the Cape Verde Islands.

(b) The Antarctic territories claimed by Argentina were thus part of the viceroyalty of Río de la Plata and were occupied wherever possible and to the extent that the law of nations could require at that time.

By virtue of the general principles governing the succession of States, the polar regions became part of the territory of the United Provinces of Río de la Plata, now Argentina, which throughout its independent existence as a nation has enjoyed and improved on the rightful inheritance of its forebears.

(c) By the same token, the successive authorities which held power from 1810 were aware of the need to continue effective occupation of our southern territories. Argentina's interest in the south was consolidated by events and by the legal acts of the highest authorities of the nation and the activities of its citizens. Soon after independence, seal hunting was authorized in Antarctic waters. Thus, for example, the Argentine vessel Spiritu Santo and others registered in the port of Buenos Aires were the first to visit and use the islands of the South Shetland Archipelago.

(d) To the above can be added the fact that the Argentine Republic has for more than 80 years continuously and effectively occupied its Antarctic territory. This is an exceptional situation in modern history and an important qualification which legitimizes Argentina's right to territorial sovereignty.

(e) Geographical proximity is one more element which contributes to the exercise of Antarctic sovereignty by the Republic. Argentina - the South American part of its territory - together with Chile are the two countries situated closest to the Antarctic continent, being about one thousand kilometres away, which is less than half the distance of the country next under consideration, based on the same criterion.

(f) Geological continuity can be mentioned as an additional basis for the link between the South American part of Argentina and Antarctica. The Andes mountain chain continues via the mountain range known as the "Antartandes" (Antarctic Andes). This constitutes a factor pointing to the reciprocal environmental dependence between the ecosystems of the Antarctic continent and the southern region of the American continent.

II. ARGENTINA'S SCIENTIFIC ACTIVITY IN ANTARCTICA

40. Since the long-distant time when seal hunters from Río de la Plata reached the then-unknown Antarctic islands until our own times, there has been much progress in geographical and scientific knowledge of the Antarctic region.

41. From the end of the past century, records were kept in Argentina of attempts to organize expeditions of a scientific nature to the polar region. Although for various reasons they were not carried out, these projects testify to an awareness of Antarctica already rooted in Argentine scientific circles, to their interest in setting up observation and research posts in this area and to the importance attached to Argentina's actively sharing in the acquisition of scientific knowledge concerning the Antarctic through research and exploration of the region.

42. These aims began to be achieved at the beginning of the twentieth century. The first permanent settlement in the region - the South Orkney station of the Argentine Ministry of Agriculture - necessitated annual visits that enriched cartographic and hydrographic knowledge of the Antarctic. Another factor that contributed to a better scientific knowledge of the area was the spread of the whaling industry, pioneered by the Compañía Argentina de Pesca, based on the island of San Pedro (South Georgia) from 1904 onwards.

43. The greatest development began in the 1940s, when a more systematic study of the Antarctic region was undertaken. The start of annual Antarctic expeditions and the fixed settlements that were beginning to populate the coast of the Antarctic continent and its islands - Melchior, Deception, San Martín, Esperanza, Almirante Brown and Media Luna, etc. - enabled scientific teams to study the specific phenomena of the sciences of the atmosphere, the earth and the sea; this contributed to a full understanding of the geography of our southernmost territories. The fixed settlements also facilitated the penetration and better understanding of the continental hinterland. The expeditions that set out from the bases marked out routes throughout the length and breath of the territory, making it possible to reach the South Pole itself. Notable among the expeditions were those which linked the extreme north of the Peninsula (Esperanza base) with the extreme south and with the opposite coast (General San Martín base) and others which explored both longitudinally and transversely the immense ice-cap south of the Weddell Sea.

44. Year after year for almost half a century Argentine ships have brought equipment, food, tools, precision instruments and medicines to those who staff the bases; at the same time, projects for geographical, hydrographical and oceanographic studies have been constantly developed and executed during these voyages.

45. The use of aircraft, following the pioneer flight in 1947 which, setting out from the province of Santa Cruz in Argentina's South American territory, crossed the Antarctic Circle (66°33'S) and returned to the airport of departure without a stopover, led to a significant advance in various fields of Antarctic knowledge and development. Aerial photogrammetric flights have provided the exact outline of the coast. Small aircraft have allowed communications and rescue operations between

bases, even at critical times of the year. The use of helicopters has greatly facilitated the transport of supplies and the transfer of personnel to and from ships, as well as the transport of teams and equipment for scientific tasks in areas which, without this special means, would be totally inaccessible. The installation of the Vicecomodoro Marambio base on the island of the same name to the east of the Antarctic Peninsula has allowed aircraft with conventional landing gear to operate all year round; it has also proved a good alternative airport for transpolar flights.

46. A process of extreme importance for world science began in the middle of the present century. A vast plan for scientific co-operation was developed by specialists in the fields of meteorology, geomagnetism, the study of aurorae and the ionosphere, solar activity, cosmic radiation, glaciology, oceanography, data from satellites and rockets, seismology and gravimetry, communications and logistics. This resulted in what came to be called the International Geophysical Year (IGY), a remarkable success in the history of Antarctica since it initiated the period of co-ordinated international co-operation in the exploration of the southern polar cap which culminated politically in the Antarctic Treaty.

47. The Year started on 1 July 1957 and ended on 31 December 1958. During this period, 55 observatories were functioning in the Antarctic and the sub-Antarctic islands.

48. The States that participated in this noteworthy undertaking in the Antarctic region were the Argentine Republic and 11 other countries which later formed the Special Committee on Antarctic Research and, following the IGY, signed the Antarctic Treaty in 1959.

49. By the decree of 3 July 1956 the National Commission for the International Geophysical Year was set up in our country to co-ordinate the scientific activities of all the national institutions involved. Our research programme included oceanography, glaciology, geomagnetism, seismology, air chemistry, meteorology, and the study of aurorae and the ionosphere, and led to very productive results between January 1957 and December 1958.

50. As a follow-up to IGY, a further programme of international scientific co-operation was carried out between 1 January 1964 and 31 December 1965. Argentina, together with 63 other countries, participated in the International Year of the Quiet Sun. Studies were carried out in the fields of meteorology, geomagnetism, aurorae and air luminescence, the ionosphere, solar activity, cosmic radiation, outer space and the upper atmosphere. These studies were of great technical value because of their practical applications, and they enabled instruments and techniques used during the IGY to be perfected.

51. Because of its geographical situation, Argentina occupied a special position in the work undertaken during the International Year of the Quiet Sun. The Antarctic observation part of its programme received particular attention; in the Filchner Ice Shelf area of the Weddell Sea the findings were most significant. The Government defined its participation in the International Year of the Quiet Sun in its Decree No. 2685 of 23 May 1962, and in 1963 an ad hoc committee was formed comprising competent specialized national agencies.

52. The scientific and technical research activities conducted by the Argentine Republic in the Antarctic since IGY may be grouped into three categories: earth sciences, biological sciences and atmospheric sciences.

53. In the earth sciences, studies have been made in the following disciplines: oceanography, geology, paleontology, paleomagnetism and glaciology.

54. Activities in the above-mentioned disciplines have, in broad outline, consisted of:

(a) Oceanography: automatic recording of tides, surface observation, the sampling of surface water and deep water and bathythermographic recording by oceanographic stations, the determination of the Antarctic Convergence by observing surface temperature, sound propagation, measurement of the penetration of direct and reflected sunlight into the sea, etc.

(b) Geology: geological expeditions to study paleontology and vulcanology, the collecting of petrographic and bathymetric samples, geochemical and volcanic eruption studies, paleomagnetic studies of lava, mining and paleomagnetic studies, gravimetric surveys, intensive studies of fumaroles, geochronological and geochemical studies, geological and geophysical surveys, earth magnetism soundings, aeromagnetic measurements from under-water platforms, etc.

(c) Geomagnetism: absolute observation and continuous recording of variations and disturbances, absolute observation of D, H, and Z components, continuous photographic recording of D, H, and Z components of the Earth's magnetic field, determination of sensitivity, temperature coefficient and other parameters for the interpretation of readings, gravimetric and geomagnetic measurements, extraction of bottom samples for comprehensive geochronological study, bathymetry with XBT, study of seismic reflection and refraction, etc.

(d) Seismology: survey of horizontal components and photographic survey of the vertical component.

(e) Glaciology: observations made in pits and drill holes, movement of glacial ice and the ice barrier, density and accumulation of snow, observations of sea ice and coastal ice, study of barrier dynamics, observations of light snowfalls, sketching of ice maps, aerial photographic reconnaissance of barriers, measurement of the temperature, hardness and density of glaciological pits, glaciological exploration flights for visual observation of sea ice, measurement of thickness and hardness of ice, paleoclimatic studies, preliminary glaciological studies of ice cores and of the dynamics and stratification of ice, etc.

55. In the atmospheric sciences, the following studies have been undertaken:

(a) Meteorology: synoptic surface observations, radio soundings, climatological observations, observations of altitude, observations by means of pilot balloons, recording of solar and cosmic radiation, measurement of carbon dioxide in the air, daily weather charts, surface observations using synoptic and climatological stations, heliophany (measurement of the duration of sunlight when

the sun is partly below the horizon), total cosmic radiation, preparation of special synoptic and forecasting charts for Antarctic areas and their transmission via radio teleprinters and facsimile machines, protection of air and sea navigation south of latitude 60°S, reception of satellite images by means of automatic picture transmission (APT), observation of optical phenomena, observations by means of sounding rockets, radio-teletype transmission of messages using the SYNOPS code, SAREP images (coded interpretation of satellite photographs), and the operation of a receiving station for signals from the MIRISAT satellite.

(b) Auroras: visual observations, photographic observations with an all-sky camera within the auroral ring in black and white and in colour, and continuous photometric recording.

(c) Ionosphere: vertical incidence soundings, recording of cosmic whistles and cosmic rays, medium-sensitivity soundings, recording of atmospheric whistlers, recording of cosmic radiation, radiometry, ionospheric soundings, launching of stratospheric X-ray-measurement balloons, launching of Gamma-Centaure sounding rockets, observation of radioelectric whistlers, chorus and hiss, high- and low-sensitivity soundings, etc.

56. In the biological sciences, human behaviour under extreme conditions is being studied, as is the ecological system in different areas. The following studies are being carried out within the various disciplines:

(a) Biology: ringing of birds, observation of ringed birds, collecting of biological samples (animal and vegetable), surveying of marked mammals, observation of birds and mammals, collecting of biological material (marine invertebrates, skeletons of birds and mammals, algae samples), capture of Antarctic fish, collecting of lichens and mosses, collecting of animal bones, marine invertebrates, dried algae and melt-water to determine the content of strontium-90 and stable strontium, collecting of botanical specimens (mosses, lichens and grasses), identification of yeast-type fungi, collecting and study of microbial flora, study of serum proteins in Antarctic seals, collecting of coastal and deep-sea invertebrates and fish and their taxonomy and bio-ecology, bacteriological studies of the marine environment, aerial photographic reconnaissance of colonies of marine birds and mammals, studies of an ecological model within a natural environment, complemented with laboratory studies, studies of the population dynamics of the elephant seal and the leopard seal, histological studies of the lungs of the weddell seal, study of energy transference along an existing trophic chain in its natural environment as well as in a closed artificial environment, parasitological studies of certain species of fish and seals which display individual properties of ecological, zoo-geographical and economic importance, chemical, radio-chemical, and spectrometric measurements using special methods and equipment for the detection of very low levels of activity in melt-water obtained from snow and in marine algae and bones of the Gentoo penguin (Pygoscelis papua), study and location of krill larvae and adult krill, study of the ontogenetic growth, eco-physiological survey and monitoring of penguin species, studies of the distribution, biomass, population composition and census of benthic fauna, fish, birds and mammals, etc.

(b) Microbiology: collection of microbiological specimens, isolation of micro-organisms from the air, snow and the ground, etc.

(c) Human physiology: various analyses in immunology and comparative physiology, determination of various physiological values, psycho-physiological research, studies of biological response to cold, animal physiology, collection of histological material of mammals, cellular cardiological study and study of peripheral resistance of the Gentoo penguin, monitoring of caloric diets, monitoring of serum hormones and of metabolic alterations, study of environmental influence on visual perception of luminosity, chromaticity, area and distance, study of the diurnal and seasonal rhythm of steroid excretion in the urine, studies of environmental pollution, immunoserological studies of Antarctic personnel and the removal of anti-viral antibodies, study of the functioning of the nervous system under low temperatures, isolation of aerobic and anaerobic germs in soil, water and fauna, isolation of the influenza and encephalitis viruses, determination of the role of migratory and non-migratory birds in the transmission of viruses, and study of human behaviour and its biochemical correlations.

(d) Animal physiology: study of the carbohydrate metabolism, the circulatory function and the suprarenal gland of the penguin, collecting of histological material from mammals for biochemical study, immuno-serological studies, research into microbiology and immunology in isolated colonies, determination of the insecticides contained in the tissues of birds and mammals, determination of antibodies, anti-viral substances and anti-bacterial substances in the blood of birds, and study of enzymes in Weddell seals in relation to their capacity for prolonged immersion.

57. On the topic of exchange of personnel, United States, Australian, Canadian, French, Soviet, German, British, Italian, Romanian, Spanish, Japanese, Brazilian, Chinese and Peruvian scientists participated in Argentina's successive Antarctic expeditions. Of course, on various occasions, Argentine scientists have taken part in the Antarctic expeditions of other countries.

58. It is to be emphasized also that many of the scientific programmes for which the Argentine Antarctic Institute is responsible have been or are being carried out in collaboration with institutions in other countries, such as: the Oceanographic Institute in Bedford, Canada, institutes in Hamburg and Kiel and the Max Planck Institute in the Federal Republic of Germany, the Glaciological Laboratory in Grenoble, France, the National Science Foundation in the United States of America, the University of Leicester, in the United Kingdom, the University of Poitiers, in France, the Ecological Institute of the Polish Academy of Sciences, and the Ecole normale superieure in Paris.

59. Finally, it is worth mentioning that the Argentine Republic participates actively in the collection and dissemination of meteorological information. Four stations are involved in this activity in Antarctica: the United States McMurdo base, the Soviet Mirny base, the Australian Mawson base and the Argentine Marambio base.

60. In the annex 1/ to this report can be found a chronological and more detailed description of the scientific and technical research activities which have been and are being carried out by Argentina in the Antarctic.

61. We must mention here that Antarctic tourism is an activity to which Argentina attaches much importance. In fact Argentina considers that Antarctic tourism is a useful way to boost and disseminate general knowledge of the frozen continent and of the activities being carried out there by Argentina. This is proved by the cruises undertaken from 1958 onwards in modern ships which follow Argentina's Patagonian coast on their way to the Antarctic territory. These tourist trips have conformed to the specific recommendations of the national authorities, and have respectfully observed the measures adopted by the Consultative Parties to the Antarctic Treaty for the preservation of the environment and the ecological balance on the continent.

III. THE ANTARCTIC TREATY AND SYSTEM

62. The Antarctic Treaty, 1/ which was signed in 1959 by 12 nations and came into effect in 1961, now has 31 States parties (16 of which have consultative status) drawn from all latitudes and continents, reflecting varying degrees of development and political systems of government.

63. The Treaty is open for accession by all States. In addition, any State party that demonstrates its interest in Antarctica by conducting substantial scientific activity there - such as the dispatch of a scientific expedition or the establishment of a base - may acquire consultative status, which entitles it to participate in the meetings provided for under article IX, paragraph 1, of the Antarctic Treaty.

64. Its open and dynamic nature is evidenced not only in the recent accession by Spain, China, Hungary, Finland and Sweden but also in the acquisition of consultative status by Brazil - which acceded in 1975 - and India, as a result of having carried out substantial scientific research. Poland and the Federal Republic of Germany acquired that status in 1977 and 1981 respectively.

65. The extent of a State's participation in the system - the Treaty and its supplementary instruments - depends on its interest and activities. Mere accession confers a number of rights. By carrying on scientific activities under the Treaty or, for example, other tasks having to do with living species under the Convention on the Conservation of Antarctic Marine Living Resources, a State can achieve a higher degree of participation.

66. This opening of the Treaty and the various degrees of participation are just and equitable because quite aside from rights, titles and propinquity, there are States which have done and continue to do more than others in the frozen continent.

67. The Antarctic Treaty has been one of the most efficient and imaginative instruments devised this century within the framework of international co-operation. Its entry into force led to the creation of the first demilitarized, nuclear-weapon-free zone of peace in modern times. One of the fundamental objectives of the Treaty is to ensure that Antarctica is used exclusively for peaceful purposes and that all military measures such as the establishment of military bases and fortifications are banned; it prohibited tests of all kinds of

weapons, nuclear explosions and the disposal of radioactive waste material. Implementation of the Treaty resulted in the establishment of the first major scientific laboratory and ecological reserve in any area of the world; it guaranteed freedom of scientific investigation in the Antarctic continent and promoted the exchange of information on scientific programmes and on their findings and the exchange of scientific personnel; it established a broad system of inspection by observers in order to promote the achievement of the objectives and to ensure that the Treaty principles were observed; it eliminated the possibility of disputes over sovereignty among Parties, since the status quo established in article IV has given rise to a complex balance between countries claiming sovereignty ("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")

and countries not making such claims ("Nothing contained in the present Treaty shall be interpreted as:

> "(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");

and, finally, in general, it paved the way for the study and preservation of the Antarctic continent and its links to and communication with the rest of the world.

68. Co-operation with international bodies has been and continues to be intense within the area of competence of each body. The Treaty system provides for co-operation with the World Meteorological Organization (WMO), the World Health Organization (WHO), the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations (FAO), the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Scientific Committee on Antarctic Research (SCAR), which has had such significance in Antarctica's history and the Scientific Committee on Oceanic Research (SCOR).

69. In addition, the Antarctic Treaty endorses the purposes and principles of the Charter of the United Nations and is open to accession by Members of the United Nations; in the more than 20 years since the Treaty came into force, it has become tacitly accepted by the rest of the international community and, on occasion, the latter has pointed this out - FAO did, for example, in 1975 at its World Conference, when it recognized the competence of the Treaty in matters relating to the Antarctic ecosystem.

70. The legitimacy of the Antarctic Treaty and that of the system to which it gave rise and the service which it has rendered and will continue to render mankind as a whole should be beyond discussion.

71. With respect to its operation, it can be said that the adoption of a set of recommendations by the Consultative Parties - on such wide-ranging subjects as knowledge of the Antarctic continent, land, sea, air and telegraphic communications within that area and between it and the rest of the world, meteorology, tourism and the preservation of its fragile ecosystem - has proved efficient and effective not only for the parties to the Treaty but for all mankind which enjoys the benefits thereof.

72. In order to give practical form to those measures the Contracting Parties have elaborated various acts which have the necessary legal validity.

73. In addition, the Consultative Parties have formulated such conventions as the Convention for the Conservation of Antarctic Seals (1978) and the Convention on the Conservation of Antarctic Marine Living Resources (1982).

74. Furthermore, they have agreed to abstain from mining while they consider the elaboration of a régime for the possible development of Antarctic minerals with full respect for the ecology of Antarctica and the interests of all States. All these - the Antarctic Treaty, recommendations, juridical acts within Antarctica, agreed measures and supplementary instruments - constitute what has been called the Antarctic system, regarding which it is worth drawing attention to the following:

A. Agreed measures for the conservation of Antarctic fauna and flora

75. With a view to achieving the aims and purposes of the Antarctic Treaty, a variety of recommendations have been adopted starting at the earliest consultative meetings.

76. However, it was in 1964, at the Third Antarctic Treaty Consultative Meeting, that the important "Agreed Measures" were adopted in recommendation III-VIII which takes into account the scientific importance and unique nature of Antarctic fauna and flora, their habitat, their defencelessness and their interrelationship with the environment, in order to promote the protection, scientific study and rational use of those resources. Accordingly, it outlines various measures applicable to the area covered by the Treaty, indicating that Governments shall prohibit the unauthorized buying or selling, killing or wounding, capturing or molesting of the species (mammals or birds) and regulating any permits which they might grant.

77. It also establishes specially protected species the rules for which are stricter and subject to the reproductive level of the species and to ecological balance. In addition, it established specially protected areas where the protective measures are even stricter. A similar though different approach was taken in 1972 by SCAR, when it established sites of special scientific interest - that is to say, areas to be utilized exclusively for conducting research programmes. Each site has a specific master plan outlining the scientific research to be carried out and limiting access and the taking of samples. It also provides for the subsequent exchange of scientific information in accordance with the provisions of article III of the Treaty.

78. Other recommendations on pelagic sealing and oil pollution were adopted at the Third Antarctic Treaty Consultative Meeting; however, it is worth recalling in particular recommendation III-IX, in which it was agreed that until such time as the Agreed Measures for the Conservation of Antarctic Fauna and Flora specified in recommendation III-VIII became effective, those Agreed Measures should as far as feasible be considered as guidelines.

79. Those recommendations were complemented at subsequent consultative meetings by provisions that were adopted in stages and that now constitute a significant body of rules on the matter within the scope of the Antarctic Treaty.

B. Convention for the conservation of Antarctic seals

80. This Convention was adopted at a diplomatic conference of the Consultative Parties held in 1972 and came into force in 1978. The Convention is aimed at the conservation of Antarctic seals and the regulation of sealing for the same purpose. Three particular species of seals are totally protected from being hunted, while catch limits have been set for a further three species.

C. Convention on the conservation of Antarctic marine living resources

81. Negotiations on this Convention were begun in 1977 in reponse to the development of commercial fisheries as an important activity in Antarctic waters, and also in response to the experience gained concerning ruthless exploitation of fishery resources in the North Sea. There was particular concern that indiscriminate fishing for krill, which occupies a fundamental position in the food chain of Antaractic marine species, might threaten the entire marine ecosystem.

82. Several international organizations contributed to the Convention: FAO, the International Whaling Commission, SCAR, SCOR, the International Union for Conservation of Nature and Natural Resources (IUCN), and IOC. The Convention was concluded at Canberra in 1980 and came into force in 1982.

83. The Convention established a wide-ranging conservation régime, which was furthermore open to all States interested in researching or exploiting Antarctic marine living resources, including States which are not parties to the Antarctic Treaty.

84. The Convention aims at rational management of marine resources while taking the total environment into account. To this end it adopted a particular view of the ecosystem, stipulating that all marine living resources south of the Antarctic Convergence are to be considered part of a unitary ecosystem. Furthermore, it considered that conservation measures should include designation of the quantity of any species which may be harvested, designation of regions and sub-regions based on the distribution of populations of Antarctic marine living resources, designation of protected species, designation of open and closed seasons for harvesting, opening and closing of areas, regions and sub-regions for purposes of scientific study or conservation, including special areas for protection and scientific study,

and regulation of methods of harvesting, including fishing gear, with a view to avoiding undue concentration of harvesting in any region or sub-region.

85. In order to implement and decide upon conservation measures, the Convention established a Commission, as well as a Scientific Committee to give specialist opinions to the Commission and to provide a forum for consultation, co-operation and exchange of scientific information.

86. It should finally be mentioned that the Convention is open for accession by any State with an interest in research on living resources and fisheries and that, at the same time, with regard to maritime jurisdiction, it explicitly states the rights reserved under article IV of the Antarctic Treaty for coastal States and invoked by countries which, like Argentina, claim sovereignty in Antarctica. At the same time, it safeguards the position of countries which do not recognize sovereignty in that it reaffirms the existing state of the legal positions of all parties and allows international co-operation to take place notwithstanding any differences of position which may exist.

D. Legal régime for the exploration and exploitation of mineral resources

87. The subject of the possible exploration and exploitation of Antarctic mineral resources has become more and more prominent in the Antarctic scenario, until it is now one of the most important questions in this regard, because of its implications for and possible effect on the Antarctic environment. This is why the Consultative Parties have accepted a moratorium on mining activities in Antarctica until a régime to control such activities has been established. The Parties are at present considering means to ensure that any future exploration and exploitation are conducted under strict environmental safeguards.

88. At the same time, the Consultative Parties are aware not only that the régime in question must be contained within the ambit of the Treaty, but also that the interests of both those claiming and those not claiming access, as well as the interests of the rest of the international community as a whole, must be taken into account in its elaboration.

89. As far as the presence of minerals and hydrocarbons in Antarctica is concerned, estimates until now have been purely speculative and based on analogies with adjacent continents and on geological hypotheses. The presence of mineral resources in the continent in quantities which warrant commercial exploitation has not been established: there is a lack of evidence concerning whether for example, deposits of coal and iron ore are of good quality, or are situated in regions where access may be difficult.

90. In Argentina's Antarctic territory, the Antarctic Andes mountain chain, which is of the same geological formation as the rest of the Andean chain extending through Patagonia, implies the presence of deposits of metallic ores, but the extent and quality of such deposits are still uncertain.

91. Moreover, nobody yet has a precise idea about the presence of natural gas or oil, which could be confirmed only by exploration that would provide information on the extent and quality of possible deposits. None of these mineral resources represents real reserves until its existence has been proven and the economic return it might provide is known, taking into account the cost of exploitation and the technology to be used. In this regard, it should also be borne in mind that the technology needed to allow exploitation of any oil deposits under the climatic conditions of Antarctica, apart from the ice, and depths of water encountered, has yet to be developed.

92. In short, we can therefore say with certainty that a deposit that can be economically exploited on the basis of present-day technology and costs has not yet been found. It will take a few more years to become clear whether future developments will alter the situation.

93. Meanwhile, the Contracting Parties have recognized that some basic rules must be established before there is any increase in pressure to begin mining activities.

94. Interest has also been shown in exploration, which has to be strictly controlled and regulated in an area with such a fragile environment. The principles which guide the negotiations are to be found in recommendation XI-I adopted at the Eleventh Antarctic Treaty Consultative Meeting, held in Buenos Aires, Argentina, in 1981. The recommendation, among its more noteworthy provisions, calls for prompt establishment of the régime which will regulate possible activity concerning mineral resources in Antarctica, to be open to all those States which undertake to comply with and respect the principles and objectives of the Treaty, while the régime shall not be detrimental to the interests of the rest of the international community. The recommendation likewise emphasizes that the protection of the special Antarctic environment and its dependent ecosystems should receive particular consideration under the minerals régime, and, moreover, should include means to evaluate the possible impact of mining activities on the Antarctic environment and to determine whether such activities are acceptable.

95. The Argentine Republic has supported the continuation of an effective moratorium on the exploration and exploitation of Antarctic mineral resources while progress is being made towards the adoption of the above-mentioned régime, because it is of the opinion that, before that time, further studies have to be undertaken, particularly on implications for the environment and on measures for its protection. Moreover, in common with the other Consultative Parties, Argentina is seeking to design a just, equitable and open régime, which will be acceptable by the rest of the international community.

Argentine activity within the framework of the Antarctic Treaty system

96. Argentina has from the beginning played a very active role in Antarctic activities. Once the Antarctic Treaty was signed, Argentina effectively endorsed this régime of new international co-operation while continuing its tasks of evaluation and occupation in the sector which it claims as its own.

97. The Second Antarctic Treaty Consultative Meeting, held in Buenos Aires in 1962, adopted important recommendations aimed at ensuring the exchange of scientific information and the exchange and evaluation of information about the state of living resources in the Antarctic, a recommendation for the holding of a meeting of four specialists in Antarctic radio communications, and the important recommendation II-VIII, which invited Governments to encourage international co-operation and the interchange of scientific personnel, observations and results. At the same time, the Consultative Meeting helped to promote support for the International Year of the Quiet Sun (1964/1965), whose aim was to carry out geophysical studies at a time of low solar activity so as to obtain a better understanding of the data relating to Earth-Sun interaction obtained during IGY.

98. Almost 20 years later, Buenos Aires once more received the Consultative Parties to the Treaty, which met for their Eleventh Antarctic Treaty Consultative Meeting. This turned out to be a particularly important meeting, because it adopted the aforementioned fundamental recommendation XI-I which invited the Governments of the Consultative Parties, taking into account progress made towards the early adoption of a régime for Antarctic mineral resources, to call a Special Consultative Meeting to work out the régime, decide on the form it will take, etc. At the same time it established the principles on which the régime should be based and the measures which it should include.

99. Also this same year, the Third Special Consultative Meeting was held in Buenos Aires, at which the Federal Republic of Germany acquired consultative status.

100. The Argentine Republic has actively participated in all consultative meetings, during which it has constantly brought to the fore, as has each of the other Contracting Parties, its legitimate interest in and concern for the preservation of the very special and fragile Antarctic ecosystem, given that any changes which might be produced in this system would have negative consequences with regional and world-wide repercussions.

101. In the case of Argentina this concern is increased by the proximity of the South American part of its territory to the Antarctic continent, by which it is influenced, making it into a dependent or related ecosystem.

102. This declared interest was made even more clear by the Republic during the negotiations for the Convention on the Conservation of Antarctic Marine Living Resources, as well as in the current negotiations to establish a régime governing the exploration and exploitation of mineral resources.

103. With regard to its participation in the Fourth Special Consultative Meeting, on mineral resources, Argentina has, while reserving its rights to a sector of the Antarctic continent, agreed, as a Consultative Party to the Antarctic Treaty, to negotiate an appropriate set of norms as well as a mechanism for international regulation of prospective mining activities in Antarctica. Even though this kind of activity is not expected to take place in the near future, the aim has been to avoid in this way the possibility that mining exploration or exploitation might take place in an irrational manner, thereby harming the vulnerable Antarctic ecosystem or the ecological system of areas close to Antarctica, or the rights and

legitimate interests of countries of the region. A primary objective of Argentina in the ongoing negotiations is to set up a régime in which the main consideration will be the protection of the Antarctic environment and its dependent or associated ecosystems.

104. At the same time, Argentina is of the opinion that the future legal instrument must reflect the prevailing legal status of the Antarctic territory, as provided for in article IV of the Antarctic Treaty.

105. In this same vein, the Argentine Republic wishes to encourage the drawing up of an instrument which will not prejudice the interests of the rest of the international community in Antarctica and which will favour international co-operation in this area of activity, especially with developing countries, both those which are now parties and those which may accede later to the Treaty and/or the régime and which may have an interest in taking part in mining activities in Antarctica.

106. It should finally be stated that the Argentine Republic has adopted, as part of its internal legislation, all the recommendations which have emanated from the 12 consultative meetings held until the present, as a means of promoting compliance with the principles and objectives of the Antarctic Treaty.

107. Argentina, a developing country, has co-operated and is co-operating with the other active parties to the Antarctic Treaty in the provision of staff and resources and the conduct of continuous activities directed towards the preservation and understanding of the Antarctic ecosystem, and maintaining communications with the rest of the world. All this has been and still is a difficult and bold enterprise, demanding great sacrifices, especially from a developing country.

108. The following ideas emerge from the foregoing:

(a) The Argentine Republic is convinced that any comprehensive revision or replacement of the Treaty system may destroy it, to the detriment of international law and order, and could have grave consequences for international peace, security and co-operation. It would be somewhat unrealistic to think that, in the present world situation, a new or better legal régime could be agreed upon for Antarctica. Undermining the Treaty could lead to an arms race in the region and to new territorial claims, with resulting conflict. No country or group of countries would benefit, nor would the international community as a whole, if Antarctica were to be transformed into a stage for international discord and conflict.

(b) The Antarctic Treaty and system have clearly demonstrated that they are efficient, practical, dynamic and open to all interested States, and all efforts should be made to preserve and maintain them. They have potential for improvement, and their consolidation will facilitate making use of this potential.

(c) Therefore, Argentina has serious reservations, as do the other Consultative Parties, about any attempt to revise or replace the present Treaty system.

(d) On this same topic, it must be stressed that the case of Antarctica contrasts with that of other regions or areas of the planet which have been put forward - mistakenly - by way of comparison, such as the sea-bed beyond national jurisdiction, as well as that of outer space. That is because in the case of Antarctica there is not, as there was elsewhere, a legal vacuum; here we find a régime consisting of the elements outlined in the previous section. This activity, moreover, is many-sided and has been going on for a long time.

(e) The Antarctic system allows for further change and refinement, and this potential can be utilized by any State which belongs to the system or wishes to become part of it. It is in this direction that interested countries could orient their endeavours, and this is indeed what the States parties are doing in their efforts to achieve better international co-operation, particularly those States which constitute the United Nations system.

Buenos Aires, June 1984

[The annex which accompanied this reply may be consulted, in its original form, upon request addressed to the Office of the Under-Secretary-General for Political and Security Council Affairs of the Secretariat.]

3. AUSTRALIA 3/

[Original: English]

[31 July 1984]

1. The Australian Government is happy to co-operate fully with the Secretary-General in the preparation of the study. Accordingly, it has approached the Secretary-General's request from three perspectives:

(a) First, the requirement that the study be "comprehensive, factual and objective" creates a need for an adequate information base. Widespread international interest in Antarctica has developed only recently. The background information essential for an understanding of all important aspects of the question of Antarctica is widely scattered and often not well appreciated. Informed conclusions cannot be reached on the basis of inadequate or inaccurate information. Australia considers that, without a thorough analysis of the historical and scientific, as well as legal and political, background to Antarctica, it will not be possible to achieve a "comprehensive, factual and objective study";

(b) Secondly, as a country which has been actively involved in Antarctic exploration, research and management for over 70 years, Australia's accumulated national experience will be of value to the Secretary-General in conducting the study. Australia considers that for the study to be objective, it must take into account the particular national perspectives of countries such as Australia, which maintain territorial claims in Antarctica, are geographically proximate to Antarctica, or have long been active in research and management on the continent. On the basis of its long experience, Australia considers itself well qualified to make informed judgements on developments in Antarctica to date as well as on the management of Antarctic affairs in the future;

(c) Thirdly, consideration of the question of Antarctica should proceed from, and be firmly based on, contemporary realities. The existence of long-standing claims to territorial sovereignty in Antarctica, and disagreements about the status of those claims, is a basic fact of life which needs to be taken into account. Similarly, full account must be taken of the Antarctic Treaty, an international agreement which has been in force for nearly a quarter century, which is in harmony with the principles and objectives of the Charter of the United Nations and which was specifically designed by those active in Antarctica to provide a framework for the peaceful and effective management of legitimate Antarctic activities while putting aside conflicting national positions with respect to territorial sovereignty in Antarctica. Australia considers it important that the achievements and performance of the Antarctic Treaty and the associated agreements, measures and

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3/ All materials accompanying this reply, including annexes and appendices, may be consulted upon request addressed to the Office of the Under-Secretary-General for Political and Security Council Affairs of the Secretariat.

recommendations, together known as the Antarctic Treaty system, must be known and understood. In Australia's view, the Antarctic Treaty system, which is adhered to and respected by all States active in Antarctica, has proven over time to be a remarkably successful instrument of peaceful international co-operation.

2. With these perspectives in mind, the Australian contribution provides background and reference material relevant to the study, with special reference to Australia's Antarctic experience and the value it attaches to the Antarctic Treaty system. It is divided into six sections. The first section deals with the history of Australian involvement in Antarctica, outlining Australia's past exploration and scientific research activities, as well as Australia's current level of activity in Antarctica, and describing the basis of Australia's continuing claim to territorial sovereignty in the Australian Antarctic Territory. The second section outlines the organizational structure of Australia's Antarctic programme and details Australia's scientific research programme, with particular reference to the special scientific opportunities afforded by the unique nature of the Antarctic environment and the significant achievements of the programme. The third section describes Australia's co-operative scientific programme in Antarctica, including co-operation with international and intergovernmental organizations, as well as bilateral scientific co-operation, and summarizes the benefits to the world community flowing from scientific research in Antarctica. The fourth section details the living and non-living resource potential of the Australian Antarctic Territory and looks at the practical difficulties facing resource activities in Antarctica and the environmental aspects of resource exploitation. The fifth section provides a detailed analysis of the Antarctic Treaty, the principal recommendations and measures adopted by Antarctic Treaty Consultative Parties, the Convention on the Conservation of Marine Living Resources and the negotiations towards an Antarctic minerals régime. It also describes Australia's contribution towards the work of the Consultative Parties. The final and most important section canvasses the achievements of the Antarctic Treaty system, looks at a number of criticisms of the Treaty system which have been raised in the course of recent international consideration of Antarctica and draws conclusions.

3. The request in General Assembly resolution 38/77 of 15 December 1983 for the preparation of a "comprehensive, factual and objective study on all aspects of Antarctica" involves a task which is daunting in its scope and magnitude even for those countries with many years of experience in Antarctic affairs. Nevertheless, if objective judgements are to be reached concerning Antarctica and the best means of promoting international co-operation there, it will be important to ensure that all relevant available information is taken into account and that judgements are not reached precipitately, without full consideration of the relevant issues. In this regard, Australia believes it will be important that the views of those States which have long-standing experience in Antarctica be fully reflected in the study. Australia hopes that the Secretary-General's study will provide a thorough and objective basis for informed debate and consideration of the question of Antarctica by the international community. Australia believes that its contribution to the Secretary-General's study presented herewith will assist in the achievement of this objective.

I. HISTORY OF AUSTRALIAN INVOLVEMENT IN ANTARCTICA

A. Australian Antarctic history

Early involvement

4. Owing to its remoteness, harsh climate, and lack of an indigenous human population, the history of Antarctica is unlike that of any other continent. Since the time of early Greek civilization some 600 years before Christ, there had been speculation about the existence of a continent at the bottom of the world. As late as 200 years ago, it was believed that a large continent "Terra Australis" occupied most of the southern half of the world.

5. During his voyage of 1772-1774, Captain James Cook circumnavigated the globe in high southern latitudes, probing further south with his ships "Resolution" and "Adventure" than any man before him. Although he did not discover the Antarctic continent, his voyage proved that if there were a far southern land mass, it would lie within the Antarctic Circle and be "a barren waste of ice and snow".

6. Cook, however, did discover several of the sub-Antarctic islands in the south Atlantic Ocean, and his reports of their teeming seal colonies soon led to the establishment of the British southern sealing industry. Sealers from many nations joined in the search for other areas to be exploited, and in doing so they discovered new land, including Macquarie Island in 1810 and Heard Island in 1833. Further south, several reports were made in 1820 of the first certain sightings of the Antarctic mainland.

7. Voyages of exploration under various national flags followed during the nineteenth century. A Russian expedition under Bellingshausen, a French expedition led by Dumont d'Urville, an American expedition under the command of Lieutenant Charles Wilkes, and a British expedition led by James Clark Ross, added considerably to the knowledge of the Antarctic regions. All of these expeditions called at Australian ports for rest and supplies, and in doing so aroused great interest, especially among the scientific community of the young colony. However, early interest in Antarctic geography and science did not bring about direct participation by Australia until the last years of the nineteenth century.

8. In the 1880s, the Australian scientific community made its first attempts to organize an Australian expedition to Antarctica. 4/ At a meeting of the Royal Society of Victoria, in 1886, Baron Von Mueller proposed that a scientific station be established on Macquarie Island or on the Antarctic continent. An Australian Antarctic Exploration Committee was formed, but lack of funds prevented an expedition being organized.

4/ See R. A. Swann, Australia in the Antarctic (Australia, Melbourne University Press, 1961). For a more general description, see also Australian History in Antarctica (Antarctic Division, 1982), a copy of which is included in the materials accompanying this contribution [see footnote 3].

9. Australia's direct involvement in the Antarctic began when Henrick J. Bull, a Norwegian resident in Melbourne, organized a small Norwegian whaling expedition in the ship "Antarctic" to investigate whaling prospects in the area south of Australia. A landing was made at Cape Adare in the north-west of the Ross Sea in January 1895 - the first known landing on the southernmost continent.

10. One of the crew, a Norwegian named Carstens E. Borchgrevink, who had lived in Australia from 1888, later succeeded in raising sufficient funds in the United Kingdom of Great Britain and Northern Ireland and Australia to organize and lead the British Antarctic Expedition, which in 1899 became the first party to winter on the Antarctic continent. Their base was at Cape Adare, at the north-western end of the Ross Sea. Louis Charles Bernacchi, a young Tasmanian physicist of Italian parentage, who had come to Australia as a child in 1884, was a member of that party.

11. In the first decade of the twentieth century, a number of Australian scientists worked with British Antarctic expeditions in the Ross Sea area. Some of the financial support for these ventures came from the new Australian Government, State governments and private bodies.

12. Bernacchi returned to Antarctica as a physicist with Captain Robert Falcon Scott's first (1901-1903) expedition. Other Australians, Dr. (later Sir) Douglas Mawson, Professor (later Sir) Edgworth David and Dr. Forbes Mackay, were members of the scientific staff on Sir Ernest Shackleton's 1907-1909 expedition. In January 1909, these scientists became the first men to reach the South Magnetic Pole, which was then situated in the interior of George V Land. Mawson and David were also members of a party which first climbed the active volcano, Mount Erebus, near McMurdo Sound. Australians, Griffith Taylor and Frank Debenham, studied geology and glaciology on Scott's last expedition from 1910-1913, and Ivan Gaze, Frank Hurley, Owen Jack and Richard Richards took part in Shackleton's 1914-1917 Imperial Trans-Antarctic Expedition.

13. In the summer of 1911-1912, a Norwegian party under the leadership of Amundsen, followed by Scott and his party, reached the South Geographic Pole. These events, especially the tragic ending to Scott's journey, somewhat over-shadowed the achievements of the Australasian Antarctic Expedition (AAE) of 1911-1914, organized and led by Mawson. AAE was well staffed and equipped, and carried out extensive scientific observations over a wide area, including research in the southern Ocean using the expedition's vessel "Aurora". "Aurora" was under the command of Captain John King Davis, second in command of AAE.

14. Bases were established at Commonwealth Bay in King George V Land, on the Shackleton Ice Shelf in Queen Mary Land, and on sub-Antarctic Macquarie Island. Over 1,100 kilometres of coastline were explored by sledge and ship, one party penetrating 400 kilometres inland towards the South Magnetic Pole. Radio, then in its infancy, was used for the first time in Antarctica during this expedition. A radio station established on Macquarie Island was used to relay messages to Australia from Commonwealth Bay.

15. During a journey of exploration eastwards from Commonwealth Bay with two companions, Ninnis and Mertz, Mawson displayed outstanding heroism and

endurance. Ninnis was killed when he fell into a crevasse, and Mertz died on the return journey to the base. Mawson, with little food and equipment, walked almost 200 kilometres alone, arriving at Commonwealth Bay in very poor condition - one of the greatest feats of human endurance known. The Australasian Antarctic Expedition laid the firm foundations for Australia's continued participation in Antarctic research and exploration.

16. Between the two world wars, Australians were involved in exploration of Antarctic regions not only directly to the south of Australia, but also in other areas of the continent. During his lifetime, Sir Hubert Wilkins made more than 30 polar expeditions to both the Arctic and Antarctic. He took part in several ventures (some as leader), to the Antarctic Peninsula, Ross Sea and Mac Robertson Land regions. 5/ In November 1928, he and his pilot, K. B. Eielson, made the first long flight in Antarctica and subsequently reconnoitred large areas of the Antarctic Peninsula region from the air. John Rymill from Penola, South Australia, led a remarkable expedition to the Antarctic Peninsula in the early 1930s. This expedition was the forerunner of modern operations during which teams travelling overland in summer are supported from the main base by aircraft. Large areas between the Weddell and Belklingshausen Seas at the southern extent of the Antarctic Peninsula were traversed over a two-year period.

17. Sir Douglas Mawson, by this time knighted for his leadership of AAE, organized and led the British, Australian and New Zealand Antarctic Research Expedition (BANZARE), during the summers of 1929 and 1931, to explore the region of the Antarctic directly to Australia's south. 6/ Travelling in the "Discovery", one of the ships used by Robert Falcon Scott's expeditions, as close to land as the pack-ice would allow, the BANZARE expedition discovered and mapped the coasts of Mac Robertson and Princess Elizabeth Lands, and recharted the coastline of Wilkes Land. Flights made by seaplane from the ship significantly increased the expedition's area of coverage.

18. During that expedition, British sovereignty was proclaimed at seven localities, and two years later the Australian Antarctic Territory (AAT) was established, comprising all the islands and territories, other than Terre Adelie, situated south of the 60th degree of latitude, between 45 and 160 degrees of east longitude. With an area of some 6 million square kilometres, the AAT comprises three sevenths of Antarctica. Its coastline of 7,500 kilometres is about one quarter of that of the whole continent.

The Australian National Antarctic Research Expeditions

19. After the extensive work of BANZARE, moves to mount a new Australian Antarctic expedition were interrupted by the outbreak of war in 1939. In 1947, the

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5/ See J. Grierson, Sir Hubert Wilkins - Enigma of Exploration (Robert Hall, 1960).

6/ See A. G. Price, The Winning of the Australian Antarctic: Mawson's BANZARE Voyage 1929-31 (Angus and Robertson, 1962).

Australian Government decided to take over and finance fully Australia's Antarctic programme and so established the Australian National Antarctic Research Expeditions (ANARE) which continue to this day. 7/ ANARE includes many governmental, university and other organizations around Australia, which participate in work in Antarctica.

20. Group Captain Stuart Campbell, who had been in charge of flying during two previous expeditions, was appointed as the leader of the first Australian National Antarctic Research Expedition in May 1947. During the 1947-1948 summer, the Royal Australian Navy vessel L.S.T. 3501 (later H.M.A.S. "Labuan") was used to establish scientific stations on both Heard Island 8/ and Macquarie Island. "Wyatt Earp", the second ANARE ship operating that summer, failed to reach the Antarctic coast because of heavy pack-ice barring its way. Its aim had been to carry out a systematic reconnaissance of the coast of the AAT in order to plan the establishment of a permament scientific station on the Antarctic mainland.

21. Early in May 1948, the Australian Government set up the Antarctic Division within the then Department of External Affairs as a permanent agency responsible for providing the administrative and logistic support for ANARE. In January 1949, Phillip Law (later Dr.), a member of the "Wyatt Earp" expedition, was appointed Director of the Antarctic Division. Phillip Law's work during his period as Director from 1949-1966 was outstanding. Aided by a dedicated staff, his period in charge of the Antarctic programme saw Australia firmly established in Antarctica. He planned and led the expeditions which established the Davis and Mawson stations, and during nearly 30 voyages south raised the Australian flag at many locations never before seen by man.

22. Between 1949 and 1953, the Antarctic Division extended and developed its scientific work at the two island stations, while examining the possibilities of establishing an Antarctic mainland station. The chief difficulty was the lack of a ship capable of penetrating the pack-ice which surrounds Antarctica. From 1950-1952, design work was carried out for an Australian Antarctic vessel, but construction did not proceed as a Danish shipping company was found that could provide suitable vessels to enable ANARE to establish a station on the Antarctic continent. The "Kista Dan" was chartered in 1953, and with this specially strengthened vessel the Antarctic Division organized an expedition to set up a permanent station in the Australian Antarctic Territory.

23. On 13 February 1954, a scientific station was established in Mac Robertson Land and named after Sir Douglas Mawson. At that time, the only other permanent stations on the Antarctic continent were in the Antarctic Peninsula region.

24. In January 1957, a second Australian continental station was established on the edge of the ice-free Vestfold Hills, 650 kilometres east of Mawson. This

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7/ See P. G. Law and J. Berchervaise, ANARE Australia's Antarctic Outposts (Oxford University Press, 1957).

8/ See A. Scholes, Fourteen Men - Story of the Australian Antarctic Expedition to Heard Island (Cheshire, 1949).

station was named after Captain John King Davis who had captained AAE, BANZARE and other expedition ships. The ANARE station on Heard Island was closed down in March 1955 after seven years of continuous operation.

25. With two mainland stations operating, Australia was in a favourable position to participate fully in the Antarctic programmes of the International Geophysical Year (IGY). This was a co-operative scientific effort by many nations to obtain simultaneous world-wide observations of many phenomena during the period of maximum solar activity in 1957-1958.

26. Early in 1959, at the end of IGY, Australia took over administrative control of Wilkes station which had been built in the AAT by an expedition of the United States of America in 1957. The Antarctic Division continued to operate Wilkes for the ANARE until 1969, when, because of inundation by snow, it was replaced by the Australian designed and built station, Casey, some 2 kilometres away.

27. During the construction of Casey from 1965 to 1968, Davis was closed, but it reopened in 1969. Hence, Australia now maintains four stations in the vast region to the south, three on the Antarctic continent (Casey, Davis and Mawson) and one on sub-Antarctic Macquarie Island.

28. Australia has had one or more stations operating on the coast of the Antarctic continent since the mid-1950s. In addition to enabling the collection of scientific data, these stations also serve as stepping-off points from which to explore the interior of the Antarctic continent. In addition to field work carried out on the continent, some 15 voyages of coastal exploration of previously unknown territory have been undertaken by ANARE expedition ships.

29. Within a radius of 800 kilometres of Mawson lie numerous mountain ranges with areas of exposed rock, together with the world's largest glacier, the Lambert Glacier, which drains ice from a huge area of the East Antarctic ice-sheet. To the east of the glacier are the ice-free Vestfold Hills, which are also of great scientific interest.

30. To the west, in Kemp Land and Enderby Land, there are about a dozen significant mountain ranges, though these are small in comparison with the large Prince Charles Mountains to the south-east. The Prince Charles Mountains run north-south for 600 kilometres from a point some 200 kilometres south-south-east of Mawson station. The Prince Charles Mountains were sighted by a three-man group from the first wintering party at Mawson, and during the following two years other parties reached and explored the northernmost parts of the range for the first time.

31. ANARE expeditioners have carried out extensive exploration and investigation of these areas, using aircraft, over-snow vehicles and dog teams. 9/ From 1956 to

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9/ A detailed description of Australian Antarctic transport systems is contained in Australian Antarctic Transport (Antarctic Division, 1984). Background information on ANARE field work is contained in the ANARE Field Manual (Antarctic Division, 1982). Copies of these pamphlets are included in the materials accompanying this contribution [see footnote 3].

1960, the Royal Australian Air Force seconded aircrew to the expeditions at Mawson to fly and maintain ANARE aircraft. This development greatly increased the flexibility and effectiveness of the expeditions. Regular flights, almost year-round, were made for aerial photography, to support parties working in distant parts of the hinterland and to carry people and equipment between Mawson and Davis.

32. During the International Geophysical Year of 1957-1958, tractor trains travelled some 600 kilometres southwards from Mawson to the southern-most fringes of the Prince Charles Mountains. On the journey, using seismic and gravity methods, ice thickness and bedrock topography were measured. Further visits were made to the Prince Charles Mountains over the next few years and a summer camp known as "Binder's Base" was established in the south-east of the area, near the end of the seismic traverse. The camp was set up by an overland traverse and supported by a DC3 aircraft based at Mawson station. Using dog teams, an extensive surface reconnaissance of the surrounding mountainous area was made. In 1961 a traverse party again travelled south from Mawson and visited the southern Prince Charles Mountains. Tractor trains and dog teams were used. On reaching Binder's Base, the dog teams continued south, extending the work done the previous year and carrying out the first ascent of Mount Menzies (3,355 metres) - the highest peak in the Australian Antarctic Territory. The dog teams then returned to Mawson separately from the tractors, travelling a total distance of 1,000 kilometres.

33. Exploration to the west of Mawson began during the first year the station was opened (1954), with a traverse being made to the Edward VIII Gulf area using huskies. These journeys continued during the late 1950s, parties being flown to points in Kemp Land and Enderby Land. While making their way back towards Mawson, they surveyed the surrounding mountains. Similar parties were placed ashore from the vessel "Thala Dan", which carried out detailed exploration along the coasts of Kemp and Enderby Lands during the summers of 1960 and 1961. Landings were made from the ship at several places. By using astronomical methods, accurate positions of features were determined. While much of this coastline had previously been seen from a distance, few landings had been made there.

34. During the summers of the early 1960s, ANARE carried out a shipborne investigation of Oates Land in the easternmost region of the AAT. Several landings were accomplished and many flights were made using fixed-wing aircraft and helicopters for aerial photography and accurate positioning of land features for mapping control.

35. Heard Island was visited on several occasions from 1963 to 1971, allowing a continuation of scientific observations of the island to be continued.

36. From 1962 to 1964, traverses from Mawson proceeded eastwards to the Amery Ice Shelf where extensive studies were carried out over the shelf and Lambert Glacier. Following this work, it was decided to place a wintering party on the shelf to obtain an ice-core through the ice-sheet. Four men and their equipment were landed on the ice shelf in 1968. Using primitive equipment, and, despite extremely difficult conditions, they managed to drill almost to the bottom of the shelf - a depth of 315 metres. The samples of ice obtained represented snow deposited in the interior of Antarctica tens of thousands of years ago. The samples were returned to Australia and studied intensively by scientists.

37. During the summers from 1969 until 1974, a major multidisciplinary programme involving detailed topographic and geological mapping, glaciology, geophysics and biology was conducted in the Prince Charles Mountains and the Lambert Glacier basin. The programme represented a major undertaking from the viewpoint of logistics as well as science.

38. Early in 1969, a camp was established at Landing Bluff on the north-east corner of the Amery Ice Shelf. Using helicopters and fixed-wing aircraft, scientists were flown to points of interest in the northern Prince Charles Mountains. During the following summer season, a traverse party from Mawson established a camp at Moore Pyramid in the northern Prince Charles Mountains to serve as a base for scientific observations in the surrounding area during the summers of 1969-1970 and 1970-1971. During the following three summers, operations in the Prince Charles Mountains were carried out from a camp established in 1971 at Mount Cressell, 600 kilometres south of Mawson. During this period, the Moore Pyramid camp served as a staging point for aircraft flights from Mawson to Cresswell.

39. At the completion of the six-year Prince Charles Mountains programme, which produced much valuable information, summer work turned to the Enderby Land and Kemp Land region west of Mawson. Despite previous aerial photography, traverses and surveys, a detailed investigation of the area still had to be made. As was the case with the Prince Charles Mountains survey, tractor trains travelled from Mawson during spring to establish camps ready for the arrival of summer parties from Australia. A camp was set up at Knuckey Peaks late in 1974 and a new base was established at Mount King in the following year, about 100 kilometres to the north-west. Extensive geological, geophysical, cartographic, biological and glaciological work was carried out from the Mount King Camp during the next three summers.

40. While most field surveys in the Mawson-Davis region have emanated from Mawson, some field work has also been carried out from Davis station. Several short thrusts have been made inland over the ice-sheet, and detailed examinations have been made of the geology and biology of the Vestfold Hills.

41. Unlike the Mawson and Davis hinterland, the region behind Casey station is not mountainous and stretches inland in an unbroken expanse of ice and snow for thousands of kilometres. Within 150 kilometres of the station lies Law Dome, a small dome of ice over 1,000 metres above sea level. It is a miniature version of the huge Antarctic ice-sheet, and studies of it provide information on the behaviour of the ice-sheet. Until the late 1960s, glaciological research was largely concentrated in this region.

42. In 1962, a six-man party travelled overland from Wilkes to the then unmanned Soviet station, Vostok, to make geophysical and glaciological measurements of the ice-sheet. 10/ The return journey of 2,600 kilometres was accomplished under severe conditions, with temperatures dropping at times to below -80°C.

10/ See R. B. Thompson, The Coldest Place on Earth (Reed, 1969).

43. In 1969, 1972, 1974 and 1977, 10 boreholes were drilled into the ice-sheet of Law Dome as part of the Antarctic Division's glaciological programme. The deepest was drilled down 475 metres from the summit of the Dome, in the spring of 1977. In 1973, ice-movement markers were established, and other observations were made south from Law Dome. Further traverses in 1975, 1976, 1978 and 1979 extended this study to a point some 1,000 kilometres inland of Casey. In the early 1980s, the network was extended to the east of Casey, and in 1983 work commenced in new territory to the west. This work forms Australia's contribution to the International Antarctic Glaciological Project (IAGP) which is studying the large East Antarctic ice-sheet.

44. In the 1980s, large summer field programmes have been mainly marine in nature, with research being undertaken from the expedition vessel "Nella Dan" in the Prydz Bay region between Davis and Mawson. These voyages have concentrated on marine biology to support the BIOMASS (Biological Investigation of Marine Antarctic Systems and Stocks) programme, and geophysical studies of the sea-bed.

45. For over 25 years, the men and women of ANARE have made a significant contribution to mankind's knowledge of a vast area of the world. As a result of this work, there are no further significant features remaining to be mapped in the AAT. ANARE mapped over 3,000 kilometres of coastline and photomapped over 1 million square kilometres of previously unknown territory. Landings were made for the first time at many points along the coastline of the AAT, from Oates Land in the east to Enderby Land in the west. Despite formidable obstacles, the exploration and study of the Australian Antarctic Territory by ANARE is adding greatly to man's knowledge of the vast Antarctic continent.

B. Australia's Antarctic stations

The stations today

46. In order to carry out year-round programmes of scientific research, Australia maintains four permanent stations in the vast area to her south. Three are on the Antarctic continent in the Australian Antarctic Territory (Casey, Davis and Mawson), and the fourth is on Sub-Antarctic Macquarie Island. 11/ The establishment, operation and maintenance of these facilities is the responsibility of the Antarctic Division of the Australian Department of Science and Technology.

47. The establishment and maintenance of the stations in such a formidable environment requires a major exercise in logistics. Each facility is cut off from the outside world for eight months of the year. None of the requirements of the stations, except water, is available in Antarctica. Every piece of equipment, from the smallest nail to food, clothing and the largest building has to be sent from Australia. At present Casey, Davis and Mawson are being rebuilt, a task that is expected to cost $A58 million and to take until 1990 to complete.

11/ Details of these stations are contained in Australia's Antarctic Stations (Antarctic Division, 1982), a copy of which is included in the materials accompanying this contribution [see footnote 3].

48. At present, the layout of each station varies, but each has buildings housing scientific laboratories, power-houses, workshops, a small hospital, stores, photograpic darkrooms, communications facilities, and living quarters, including kitchen, mess recreation and expeditioner's rooms. When the station rebuilding programme is completed, the three continental stations will be of similar layout and design.

49. An Antarctic station requires many services in order to operate. Each is very complex: the buildings and services incorporate systems and techniques evolved over many years. Diesel engines drive alternators to supply electricity for scientific and general activities, the heat produced by the engines being piped around the station to warm buildings. Emergency generators, housed in a separate building, are maintained ready to take over should problems arise with the main generating sets or from fires in the buildings. Large tanks grouped in "fuel farms" are used to store the year's supply of diesel fuel. Water is obtained at the continental stations either direct from snow melt lakes, or is melted down from ice or blocks of snow.

50. A feature of each station is the array of large masts, some up to 50 metres high, which support aerials for radio communications with the outside world. The radio office maintains round-the-clock radio schedules with stations in Australia and Antarctica to send and receive scientific data, administrative and personal messages. A variety of modern equipment is used. However, communications with the outside world can sometimes be disrupted for days at a time by radio blackouts caused by the effects of solar activity on the earth's ionosphere. Tests are currently being carried out with satellite communication methods to improve links to the stations. Most messages are sent on teleprinters because these machines provide the most convenient way of sending the large amount of radio traffic passing between the stations each day. Morse code has almost been superceded. A radio telephone service is available which enables expeditioners to telephone almost anywhere in the world, and facilities are also provided for sending radio photographs to Australia.

51. Every expeditioner must pass a thorough medical examination before leaving for Antarctica. To deal with the accidents, illnesses and dental problems that occur from time to time, a comprehensive medical facility is available at each station. To assist the medical officer in performing the few operations necessary, several expeditioners from each station receive instructions in anaesthetics and operating assistant procedures prior to leaving Australia.

52. To maintain the diverse fleet of vehicles and equipment at the stations, large, comprehensively equipped workshops are necessary. Similarly, scientific and radio facilities are kept running using a sophisticated range of testing and repair equipment.

53. Everything is done to ensure that expeditioners remain healthy and safe during their year at the stations. Buildings are comfortable and functional for living and working, being insulated and strengthened to withstand the low temperatures and fierce winds that are part of the Antarctic environment. Specialized clothing is supplied to each expeditioner.

54. The expeditioners who man the stations for up to 15 months at a time can be divided into two categories, 12/ those who carry out the scientific programme such as, physicists, glaciologists, biologists, engineers and weather observers, and those responsible for the basic running of the station: the Officer-in-Charge, diesel mechanics, electricians, plumbers, a medical officer, cook and electronics technicians. The total number of people who spend the year at the stations varies from year to year depending on the programme. Over the past few years, just over 100 individuals have "wintered" at Australia's four stations. In the winter of 1984, the number of expeditioners at the stations was 107: 19 at Macquarie Island, 36 at Mawson, 22 at Davis and 30 at Casey. 13/ Approximately two-thirds of them are logistics personnel. Scientific personnel come from various Australian government departments, universities and other institutions and from other nations, while the logistics staff are recruited and employed by the Antarctic Division and the Department of Housing and Construction.

Casey station

55. Casey station lies on the coast of Wilkes Land some 3,800 kilometres due south of Perth, western Australia. It is situated in an area of low rocky islands and peninsulas on the edge of the Antarctic plateau. Between 25 and 35 expeditioners usually winter at Casey and, in summer, around 40 expeditioners normally work there. Given reasonable weather and ice conditions, it normally takes from 9 to 11 days to reach Casey from southern Australia by ship.

56. Year-round scientific work at Casey includes upper atmosphere physics, geomagnetism, glaciology and meteorology. As part of the glaciology programme, major traverses are made each year into the interior of Antarctica. These traverses normally depart in autumn and spring and have contributed a great deal to the knowledge of the huge ice-sheet of eastern Antarctica. During summer, biologists and geologists on short-term visits from Australia study the region around Casey.

57. During the height of summer at Casey, temperatures normally rise above freezing, while from April to October they fall into the -20° and 30°C, although during blizzards temperatures can rise to near freezing even in the middle of winter. 14/ Compared with some stations in Antarctica, Casey's winds are low, the yearly average wind speed being around 20 kilometres per hour. However, blizzards produced by low pressure systems passing close by strike with little warning and

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12/ See Working in Antarctica (Antarctic Division, 1982) a copy of which is included in the materials accompanying this contribution [see footnote 3].

13/ Details of Australian personnel wintering at Australian stations are presented in appendix 1 [see footnote 3].

14/ Details of climatic and geographic conditions in the Australian Antarctic Territory are contained in The Climate of Antarctica (Antarctic Division, 1982) and Antarctic Geography (Antarctic Division, 1982), copies of which are included in the materials accompanying this contribution [see footnote 3].

wind gusts well over 250 kilometres per hour have been recorded. Throughout the year, the hours of daylight experienced by personnel at Casey vary markedly. In January, the sun stays above the horizon almost continuously, while in June it appears for less than an hour each day.

58. The station is named after the late Lord Casey, Governor General of Australia from 1965 to 1969. Lord Casey assisted Sir Douglas Mawson in preparations for the BANZARE in the late 1920s and was the Minister of the Government responsible for Australia's Antarctic programme from 1950 to 1961.

Davis station

59. Davis lies on the rocky coast of the ice-free Vestfold Hills some 20 kilometres from the edge of the continental ice-sheet, 4,700 kilometres or about 12 days sailing across the southern Ocean from Perth. In the past 10 years, between 15 and 25 expeditioners have wintered at Davis. The population about doubles during the summer period.

60. Year-round scientific work at Davis includes upper-atmosphere physics, geomagnetism, geomorphology, limnology, biology, meteorology, and human medicine.

61. Davis offers the most interesting prospect for air transportation from Australia of any of our stations. Feasibility studies have shown that it is possible to construct an all-weather airfield on rock just a few kilometres north-east of the station in a broad valley running westwards from Lake Dingle to the large bay in which ships anchor.

62. Being the furthest south, Davis has the longest days and nights of any Australian station. In the summer, the sun stays above the horizon for most of December and January, and conversely, in winter the sun stays below the horizon for a similar period from early June when "day" is made up of one to two hours of twilight. Despite the fact that Davis is at a higher latitude than either Casey or Mawson, the climate is similar to that at those stations because of the moderating influence of the rock of the Vestfold Hills. From an extreme maximum in summer of +13°C (January) the winter extreme reaches -39°C (July). Situated some 20 kilometres from the base of the continental ice-sheet and away from the katabatic wind, Davis has a relatively low average yearly wind speed of around 20 kilometres per hour, placing it in the same wind class as Casey. However, as at Mawson and Casey, blizzards frequently bring violent wind gusts, the highest on record being 180 kilometres per hour.

Mawson station

63. Mawson, Australia's first permanent station on the Antarctic continent is now one of the longest continuously operating stations in Antarctica and the oldest south of the Antarctic Circle. It is also the ANARE station furthest from continental Australia, lying in the west of the Australian Antarctic Territory, 5,200 kilometres south-south-west of Perth (approximately 14 days by ship). Twenty-five to 30 men usually winter there, but during summer its population is at times double that number.

64. Year-round scientific work at Mawson includes upper-atmosphere physics, seismology, geomagnetism, glaciology, cosmic-ray physics, meteorology, ionospheric physics, geology and human medicine.

65. Temperatures experienced at Mawson range from a high of +11°C in January to a low of -36°C in July. Mawson is one of the windiest places on earth. Since the station is situated at the base of the ice plateau, the katabatic wind predominates. This results in an average yearly wind speed of almost 40 kilometres per hour. During blizzards, wind gusts exceeding 260 kilometres per hour are regularly experienced. As Mawson lies just south of the Antarctic Circle, the sun does not rise for approximately six weeks from early June and does not set for the same period from late November.

66. Ships normally anchor in Horseshoe Harbour less than 100 metres from the station. Around the edge of the harbour are eight bollards, and the ship ties up to these during unloading. These bollards add significantly to the security of the ship in the high winds normally experienced at Mawson. The station is one of only a few in Antarctica with such facilities.

Rebuilding the stations

67. Casey, Davis and Mawson stations are currently being rebuilt. The rebuilding programme, which commenced in 1978, is expected to take until 1990 to complete and includes the progressive replacement of all existing facilities. The programme is being undertaken for the Antarctic Division by the Department of Housing and Construction, and has been scheduled so that day-to-day scientific programmes can continue uninterrupted. Plans for the redevelopment of the three continental stations are similar and feature improved standards of living for expeditioners.

68. Buildings are oriented in a common direction parallel with the prevailing wind, thus allowing drifting snow which builds up during winter in their lee to form planned patterns and not bury buildings situated down-wind. There is good access into and between buildings and improved roads in the station area. Redevelopment plans for all stations are made up of nine basic support buildings: living quarters; sleeping and medical; two powerhouses; workshops; store; office building; recreation building; and services building. Additionally, there are special purpose scientific laboratories and remote buildings for radio transmitters, emergency stores and inflammable stores.

69. When completed, the stations will have a similar accommodation capacity to today. Winter and summer capacities will be respectively: Casey, 30 and 50; Davis, 20 and 40; Mawson, 30 and 50.

70. Davis and Mawson are being rebuilt in the same immediate area as the present stations, although they will be spread over a larger area. Casey, however, is being rebuilt some 700 metres south-west of the present station.

C. The legal history of the Australian Antarctic Territory

71. Australia's claim to sovereignty over the Australian Antarctic Territory (AAT) is based on acts of discovery and exploration by British and Australian navigators

and explorers going back to the time of Captain Cook, and subsequent continuous occupation, administration and control.

72. Specific proclamations of title on behalf of the British Crown were made at various points in what subsequently became the AAT. Explorations, discoveries and formal acts of possession were made during Shackleton's 1907-1909 expedition in Victoria Land and George V Land, during Scott's 1910-1913 expedition in Oates Land and during Mawson's 1911-1914 expedition in George V Land and Queen Mary Land. The BANZARE expedition of 1929-1931 under Mawson's leadership consolidated the work of his Australasian Antarctic Expedition of 1911-1914 and made further explorations and discoveries in Mac Robertson Land, along the coast and in Princess Elizabeth Land. 15/ In all, five formal proclamations of title were made during Mawson's 1929-1931 expedition, together covering the area of what is now the AAT.

73. In 1926 the British Government decided, in consultation with the Australian and New Zealand Governments, that it would transfer to each of them the areas of Antarctica closest to their respective territories. In the case of Australia, this decision was implemented by an Order-in-Council of 7 February 1933. After the passage of the Australian Antarctic Territory Acceptance Act 1933 through the Australian Parliament (see appendix 2) 3/ on 13 June 1933, the Order-in-Council came into force by Proclamation on 24 August 1936. By virtue of the Act, the Australian Government assumed authority over all the islands and territories situated south of latitude 60°S between longitudes 45°E and 160°E, other than Terre Adelie which is claimed by France (situated between 136°E and 142°E longitude). Australia also exercises sovereignty over the sub-Antarctic islands of Heard, McDonald and Macquarie. Macquarie Island is legally a part of the Australian State of Tasmania.

74. In 1954 the Australian Parliament passed the Australian Antarctic Territory Act 1954 (see appendix 3) 3/ which provided for the application of Australian legislation to the AAT. In accordance with this Act, a significant body of Australian law has subsequently been applied to the AAT. The laws applied are those appropriate to the circumstances of the AAT and provide a general body of law to govern activities there. There is also provision for Ordinances to be made specifically for the AAT.

75. In 1953, in accordance with the general practice of states at that time, the Australian Goverment proclaimed its rights over the continental shelf of Australia and Australian Territories, including the AAT.

76. On 26 September 1979, waters to a distance of 200 nautical miles beyond the territorial limits of Australia and its territories were declared proclaimed waters, so that they became part of the Australian Fishing Zone (AFZ) with effect from 1 November 1979. This applied to waters adjacent to AAT. However, against the background at that time of the Antarctic Treaty and Australia's involvement with other Antarctic Treaty countries in negotiations towards the Convention on the

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15/ Maps of Antarctica are included in the materials accompanying this contribution [see footnote 3].

Conservation of Antarctic Marine Living Resources, a proclamation with effect on and from 2 November 1979 excepted AAT waters from the AFZ. This exception does not, however, affect the application of Australian fisheries legislation to any Australian fishing activities off the AAT.

77. Following signature of the Antarctic Treaty in 1959, Australia has also accepted other international agreements, arrangements or measures relating to Antarctica, most of them within the framework of the Antarctic Treaty. In order to give effect to the international obligations contained in these agreements, arrangements and measures (in particular, those relating to environment protection), Australia has created further domestic legislation applying to the AAT (see appendix 4). 3/ Australia's international obligations with respect to Antarctica are discussed in more detail below, in section V.

II. AUSTRALIA'S ANTARCTIC PROGRAMMES

A. Organization

78. Australia's Antarctic programme, which is carried out by Australian National Antarctic Research Expeditions (ANARE), 16/ was established early in 1947, and followed the successful Antarctic expeditions organized by Sir Douglas Mawson prior to the Second World War.

79. Contributions are made to ANARE progrmmes by a number of widely dispersed organizations, including: the Antarctic Division of the Department of Science and Technology; the Bureau of Meteorology, and the Ionospheric Prediction Service of the Department of Science and Technology; the Bureau of Mineral Resources, Geology and Geophysics, and the Division of National Mapping of the Department of Resources and Energy; several sections of the Department of Defence; the Department of Housing and Construction; the Commonwealth Scientific and Industrial Research Organization; universities from every Australian State; state government bodies such as the Tasmanian National Parks and Wildlife Service; and, from time-to-time, organizations from outside Australia.

80. To co-ordinate and provide logistic support for the annual ANARE programmes (including Australia's Antarctic stations), the Australian Government established a permanent agency in May 1948, the Antarctic Division, which is now part of the Department of Science and Technology. The Division also administers the Australian Antarctic Territory (AAT), the Territory of Heard Island and McDonald and Macquarie Islands. In addition, the Division advises the Minister for Science and Technology on Antarctic policy and supports the Department of Foreign Affairs in its handling of the international aspects of Australia's Antarctic policy.

81. Prior to its relocation to a new complex at Kingston, Tasmania, the Antarctic Division was based at Melbourne. The Kingston complex is known as the Australian

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16/ See ANARE Handbook, a copy of which is included in the materials accompanying this contribution [see footnote 3].

National Antarctic Research Headquarters. Parts of the Division are also located in Melbourne and Canberra. The permanent staff of the Divison numbers approximately 120, while temporary personnel, employed for the period of Antarctic expeditions, number between 80 and 150. Many of the permanent staff of theDivision have spent considerable time in Antarctica and are therefore familiar with the problems encountered by expeditions. They regularly visit stations during the summer period as leaders of relief and summer expeditions, to conduct research or to oversee engineering projects.

82. The Antarctic Division 17/ provides logistic support (ships, stations, land transportation, and general equipment) for all Australia's Antarctic programmes. It also has its own Science Branch which carries out research in the fields of upper atmosphere and cosmic ray physics, glaciology, terrestrial and marine biology, limnology, oceanography and polar medicine.

83. The work of the Science Branch is recognized internationally as being of high quality. Many research programmes that are undertaken are part of a continent-wide investigation co-ordinted between Antarctic Treaty nations by the Scientific Committee on Antarctic Research (SCAR), which is part of the International Council of Scientific Unions (ICSU).

84. The scientific results of ANARE research are published in scientific periodicals and in specialist reports. Since the Division's formation in 1948, more than 200 specialist reports have been printed, while contributions to scientific journals exceed 1,500. 18/

85. Apart from the Antarctic Division, there are a number of other bodies involved in the management and administration of the Australian Antarctic programme and the provision of policy advice on Antarctica.

86. The Antarctic Research Policy Advisory Committee (ARPAC) was established by the Government to review Australia's Antarctic research programme and to provide advice to the Minister for Science and Technology on the general direction Australian Antarctic research should take. 19/ This Committee includes representatives from government, universities, industry and the scientific community.

17/ Further details of the work of the Antarctic Division are included in the Division's annual report, a copy of which is included in the materials accompanying this contribution [see footnote 3].

18/ A list of publications resulting from Australian work in Antarctica during 1947-1984 is included in the materials accompanying this contribution [see footnote 3].

19/ Copies of the reports of ARPAC are included in the materials accompanying this contribution [see footnote 3].

87. The Australian National Committee on Antarctic Research (ANCAR) is a committee of the Australian Academy of Science with expert sub-committees. ANCAR advises the Academy of Science on Antarctic science matters and participates with the Antarctic Division in reviewing project proposals and in deciding on an overall scientific programme.

88. The Bureau of Mineral Resources, Geology and Geophysics (BMR) of the Department of Resources and Energy is the Government's prime geoscience research body with the role of conducting the bulk of Australia's Antarctic geoscience, both onshore and offshore.

89. The Division of National Mapping of the Department of Resources and Energy is responsible for mapping activities in the AAT. Detailed topographic, bathymetric and other maps are essential for exploration and operational safety.

90. The Bureau of Meteorology of the Department of Science and Technology conducts Australia's weather data programme in Antarctica, operating observatories at each station. The Bureau also provides support for scientific and logistic activities for the ANARE summer programme in the form of forecasting services, data and information services. Several other bodies such as the Ionospheric Prediction Service and the Commonwealth Scientific and Industrial Research Organization and many Australian universities play a part in conducting Antarctic research.

91. The Department of Science and Technology has legislative responsibilities for environmental protection and nature conservation which are specific to Australia's Antarctic operations. The Department of Home Affairs and Environment and the Australian National Parks and Wildlife Service have broader complimentary legislative responsibilities and provide advice on environmental and wildlife protection and nature conservation.

92. Foreign policy aspects of Australia's Antarctic activities, particularly its participation in meetings of Antarctic Treaty Consultative Parties, are co-ordinated by the Department of Foreign Affairs in consultation with the Antarctic Division of the Department of Science and Technology and other relevant Australian government departments.

B. The Australian scientific programme

93. Australia's Antarctic science programme 20/ includes a diverse range of scientific disciplines that take advantage of the special research opportunities offered by the region and frequently involves international collaboration.

Upper atmosphere physics

94. Because of great asymmetries in the upper atmosphere between the northern and southern hemisphere, Antarctica provides unique opportunities to study the physics

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20/ Further details of Australia's scientific programme are included in the Australian reports to the Scientific Committee on Antarctic Research, copies of which are included in the materials accompanying this contribution [see footnote 3].

of the upper atmosphere and its role in the solar-terrestrial interaction. In the early years, the dominant scientific activity at Australia's Heard Island and Macquarie Island stations was upper atmosphere physics.

95. The upper atmosphere above the mesopause (about 80 kilometres) is very sensitive to changes in solar activity on both short- and long-time scales. In the polar regions, the upper atmosphere-magnetosphere system descends to relatively lower altitudes than elsewhere on Earth. The polar regions thus provide unusually good opportunities for study of the upper atmosphere. Studies of the upper atmosphere are important because:

(a) The plasma in the upper atmosphere is cooler and less dense than can be produced on Earth. As a result, studies of the upper atmosphere plasma yield information which cannot be obtained in laboratories on wave-particle interactions in a magnetic field that has application to fusion research;

(b) Recent developments in communication via satellite, particularly the use of satellites for search and rescue, require a knowledge of the structure of the upper atmosphere and of the way in which this affects radio wave propagation;

(c) The upper atmosphere provides opportunities for monitoring some of the environmental effects of man's activities; recent investigation of ozone levels provides an example of this.

96. Australia has long been active in research into upper atmosphere physics and Australian physicists have made substantial contributions to this science. Because of the unique distribution of the present four stations, the Australian programme has been able to define accurately the southern auroral zone. Australian stations are situated inside, under and just outside the auroral zone, which makes them ideally placed for this research. Other contributions, either individually or in collaboration with overseas scientists, have been: the documentation of the phenomenon of conjugacy, that is, that events occurring in the southern hemisphere are occurring simultaneously in the northern; and the recognition that electric currents run along the magnetic lines of force of the Earth's magnetic field. Upper atmosphere physics was the focus of the International Geophysical Year (IGY), during which international scientific collaboration and co-operation established the spirit which eventually culminated in the Antarctic Treaty.

Cosmic ray physics

97. The Antarctic continent provides an opportunity to study cosmic rays of relatively low energy which are prevented by the Earth's magnetic field from reaching the surface in other regions. The extended energy ranges available for study give better information on the dynamics, origin and propagation of galactic cosmic rays and the behaviour of the Earth's magnetic field than can be obtained elsewhere.

98. Cosmic ray physics also was an important element of IGY. A neutron monitoring programme was initiated at Wilkes (now Casey) in 1962. Immediately following the establishment of Mawson station, cosmic ray physics was initiated and detectors

were installed. The Mawson cosmic ray observatory is one of only three in the southern hemisphere and is the only significant high latitude one anywhere in the world. Its present role is mainly in the study of anisotropies in the galactic cosmic rays.

Glaciology

99. The Antarctic region, in particular the polar ice-cap, is the principal heat sink of the global climate system and, thus, glaciology can contribute substantially to climate research. Studies of the changing extent of snow and ice-cover help in understanding short-term climatic variations. Sampling and analysis of shallow ice-cores, down to 200 metres, provide a record of atmospheric activity over the past 100 to 5,000 years. In particular, analyses of snow and ice samples can yield important data relating to the general tropospheric circulation and its long-term variations.

100. Older ice from well inside the ice-sheet contains a record of climatic changes over several hundred thousand years, though interpretation of this data is complex and involves modelling of the behaviour of the ice-sheet.

101. The interaction between Antarctic ice and the oceans is critical to the circulation of energy via the oceans and thus to the interaction between the oceans and the atmosphere.

102. The Australian glaciology programme can be said to have begun with the establishment of the continental stations but the effort has been concentrated at Mawson (until 1979) and Casey where, after 1960, Australia continued traverse programmes initially implemented by the United States of America. Since 1969, this programme has contributed substantially to the International Antarctic Glaciology Programme (IAGP) in this area, particularly in collaboration with scientists from France and the Union of Soviet Socialist Republics. IAGP grew out of the realization of the value of remote sensing following deployment of satellites. The programme at Casey has concentrated on drilling in the Law Dome, a small ice-cap east of Casey, which is a useful model for the whole Antarctic ice-cap, and measuring ice-flow rates. The data obtained have been integrated into modelling studies. Drilling so far has penetrated ice up to 30,000 years old and documented changes in oxygen isotopes reflecting variation in the extent of sea-ice and changes in climate over that time. The programme at Mawson included drilling through the Amery Ice Shelf and measuring ice movement, the latter by winter traverses and summer attachment to geoscience field programmes.

Biology

103. Biological research in the Antarctic is especially important for the following reasons:

(a) The region presents peculiar environmental features, such as the combination of high summer light intensity with low temperatures, an extreme photoperiod, and unique habitats such as ice-shelves, the sea floors beneath them and pack-ice zone; therefore, it offers unusual opportunities for the study of adaptations;

(b) The southern Ocean with its pack-ice zone is an unusual and highly specialized habitat, showing great seasonal fluctuations in the ratio of open to ice-covered sea. In this unique habitat, ice-associated algae, krill and other invertebrates, cryopelagic fish, birds, seals and whales form unique short food chains;

(c) The organisms urgently require study both for their intrinsic scientific interest and for their role in the ecosystem. A key question is: Why is the biomass of Antarctic pelagic shoaling fish so low in comparison with the Arctic?;

(d) The Antarctic and sub-Antarctic offer opportunities for the study of dispersal of pollen, spores, micro-organisms, and plant and invertebrate species across great expanses of ice and ocean, and for the analysis of species in relation to present and past climatic and geographical features;

(e) There are opportunities for the analysis of geologically relatively young, endemic, species-poor, terrestrial and inland water ecosystems, in which single species are often abundant and also for the study of the interrelationships between these and the species-rich, productive ecosystems of the surrounding oceans. The oceans are the food source for very large populations of sea-birds and seals, which transport essential nutrients from sea to land;

(f) Man's physical and biological impact on the environment, flora and fauna of the Antarctic inland water ecosystems is still slight, and the study of the present undisturbed situation is important as a background against which the consequences of increased human activity can be assessed;

(g) The relative simplicity of Antarctic communities and ecosystems provides a better chance of understanding fundamental principles that have wider application;

(h) The extreme conditions provide opportunities for studying biochemical, ecological, physiological and behavioural adaptation mechanisms.

104. Land-based biology (a rubric for the programmes, including terrestrial biology, limnology and marine biology close to stations) was an essential ingredient of the Macquarie and Heard Island programmes until the closure of the Heard Island station, when it was for many years restricted to Macquarie Island. Until 1969, there was no formal mainland biology programme. At this time, biology was introduced as an Antarctic Division programme on the mainland and has remained important ever since. It (with the glaciology and physics programmes) is an important element of the winter presence on the mainland. The main results of this programme have been documentation of animal and plant species and communities in the nearshore and onshore environments and studies of many of the factors that control that life. The limnology programme has documented the structure of the most diverse group of lakes in Antarctica situated in the Vestfold Hills.

105. Marine biological science, including oceanography, began as Australia assumed a role within BIOMASS (Biological Investigation of Marine Antarctic Systems and Stocks), a 10-year international programme designed to operate from 1976 to 1986. Australia has conducted three marine biological science cruises, one (FIBEX - First

International BIOMASS Experiment) as a contribution to BIOMASS and two of its own. These have been designed to help BIOMASS estimate the amount of krill in the Antarctic ecosystem and to determine the oceanographic factors controlling krill distribution. Major elements of this programme have been the maintenance in the laboratory for four years of living krill specimens taken in Antarctic waters and the raising, from eggs, of other specimens. The study of phytoplankton by culturing and electron microscopy is an important element in this programme.

Geoscience

106. Geological and palaenotological studies in Antarctica assume a special significance because that continent occupied a key position in the former super-continent of Gondwanaland. The major continental blocks of Australia, South America, Africa, and India are all likely to have been contiguous with Antarctica at some time. Thus, studies of the geology and palaeontology of the Antarctic are relevant to those areas as well as contributing to our understanding of the theory of continental drift. For example, the discovery in Antarctica of fossils of the dinosaur Lystrosaurus, previously known from Australia and South Africa, provided early evidence for the theory.

107. Antarctica also provides a rich source of meteorites which are concentrated in particular areas by the movement of the ice. Apart from the importance of being able to obtain relatively large numbers, Antarctic meteorites are especially valuable because they have been preserved in a more or less sterile condition with little oxidation or contamination. Investigation is yielding information on the evolution of the solar system and the origins of life on Earth.

108. The Bureau of Mineral Resources, Geology and Geophysics (BMR) has undertaken geological and geophysical research in Antarctica since 1947 as a contribution to the activities of ANARE. This research has built on the fundamental exploration activities of the 1911-1914 Australasian Antarctic Expedition and the 1929-1931 British Australian New Zealand Antarctic Research Expedition. It has included reconnaissance geological studies in mountainous outcrop areas within and along the coast of the Australian Antarctic Territory, and a more detailed regional research in the Prince Charles Mountains and Enderby Land areas.

109. The BMR Antarctic geophysical research effort comprises maintenance of magnetic and seismographic observatories at permanent stations (Mawson, Davis and Casey), ground magnetic and gravity surveys in outcrop areas, and limited aeromagnetic surveys made in conjunction with glaciological studies. In recent years, BMR has embarked on a programme of marine geophysical research, including marine magnetic and seismic techniques. The marine geophysical work of BMR was undertaken in Prydz Bay offshore from the Lambert Glacier and in the deep ocean basins between Australia and the AAT.

110. BMR has long-term plans to extend its regional geological studies to the Bunger Hills-Denman Glacier area near Mirny station and to King George V Land and Oates Land. Further research in the Prince Charles Mountains is also envisaged. These studies will be supported by programmes of gravity, magnetic and aeromagnetic research and probably will be accompanied by biological and glaciological programmes.

111. Offshore, BMR has developed plans to obtain reconnaissance marine geophysical coverage of the continental margin of the AAT. The intention is to study the structure, composition, and evolution of the continental margin. These studies will provide a scientific framework for future research and general resource assessment. The studies are not designed, nor sufficiently detailed, for exploration purposes. Geophysical observatory activities will also be continued.

112. Results of BMR work in Antarctica are released in BMR publications (including maps), in papers in scientific journals and in the volumes of the proceedings of the symposia on Antarctic earth sciences that are sponsored periodically by SCAR. In addition, observatory geophysical data are archived in the relevant world data centres, and other basic data are available through recognized international centres.

Medical research

113. The conditions of isolation, intense cold and polar light in Antarctica provide opportunities for studying the effects of these on man's ability to live and work in such environments. Medical research appropriate to the the Antarctic has been undertaken in the following broad areas:

(a) Basic research, which uniquely can be undertaken in the polar environment, but may have little short-term significance to expeditionary operations;

(b) Basic research that has a direct bearing on expeditionary operations;

(c) Ad Hoc studies relevant to medical or para medical management.

114. The research strategy in recent years has been to pursue a multidisciplinary programme on the interaction of man with the polar environment. Particular emphasis has been placed on studies that facilitate human life in Antarctica, especially the emphasis on health over disease and prevention over treatment. Studies have been conducted in the fields of behavioural adaptation, acclimatization, epidemiology, microbiology and immunology, nutrition and public health.

Meteorology

115. Meteorological observations form an important element of the scientific data gathering effort. The availability and timely transmission of regular meteorological observations, together with information provided by meteorological satellites, enables the position, intensity and movement of large-scale atmospheric systems to the south of Australia to be accurately assessed. As well as station-based programmes a considerable data source is achieved by use of automatic weather stations which are deployed in several remote areas to transmit data to Malbourne via satellite.

116. Meteorological research in general is directed to improving weather forecasts, extending them to longer times, and understanding climate. Significant advance

towards any of these objectives for Australia is impossible without an understanding of the atmosphere of the whole southern hemisphere, on which Antarctica has a crucial effect. The Australian stations in Antarctica provide meteorological data without which much research undertaken in Australia and elsewhere would be seriously weakened.

117. In Australia, meteorological research which makes use of Antarctic data is conducted mainly in association with the Global Atmospheric Research Programme (GARP) and the World Climate Research Programme (WCRP), which are sponsored and co-ordinated by ICSU and the World Meteorological Organization (WMO). Both programmes have the objective of examining the predictability of weather and climate, especially by numerical modelling, for which Antarctic data is of crucial importance. GARP also has the objective of improving weather forecasting.

118. Other current research uses of data from the Australian Antarctic stations include studies of weather forecasting for operations on and near the Antarctic continent and studies on the possible uses of icebergs.

119. The availability of regular meteorological observations from Antarctica and the sub-Antarctic islands, together with information provided by meteorological satellites, now enables the position, intensity and movement of large-scale atmospheric systems to the south of Australia to be accurately assessed. This in turn provides the basis for warning of conditions which may lead to loss of life or property or for forecasting conditions which affect people's livelihood or pleasure.

III. AUSTRALIA'S CO-OPERATIVE SCIENTIFIC INVOLVEMENT IN ANTARCTICA

120. Many of the research opportunities associated with Antarctica and its surrounding sea and atmosphere are too large for any one nation to exploit alone. Organized scientific co-operation in Antarctica has developed from the First International Polar Year of 1882, which highlighted for early expeditions the advantges of conducting complementary investigations in different areas of Antarctica. For Australia's part, in 1886 a joint committee of the Royal Society of Victoria and the Royal Society of Australasia (Victoria Branch) was established to investigate the feasibility of an Australian scientific presence in Antarctica. The Committee was successful in arranging contributions to British expeditions, including Borchgrevink's 1899 Southern Cross Expedition and the 1911-1914 Australasian Antarctic Expedition led by Mawson.

121. The Second International Polar Year (1932-1933) encouraged the idea of more elaborate and comprehensive internationally co-ordinated programmes. In the early 1950s, the International Committee of Scientific Unions set up a special body to be responsible for the organization of the International Geophysical Year (IGY). The first meeting to plan the Year was held in Brussels in 1953-1954. The Australian Government agreed in 1955 to Australian participation. Scientifically, the Year proved an outstanding success. At its conclusion, the number of manned stations in the Antarctic region had grown to 51.

122. During the Year, Australia maintained three stations in the Antarctic region. The stations at Macquarie Island, Mawson and Davis between them facilitated

Australia's involvement in the central projects of the Year: geophysics, meteorology, geomagnetism, auroral studies, ionospheric physics, cosmic ray physics, glaciology, seismology and gravity.

123. The interest in, and advantages of, internationally co-ordinated Antarctic research were made widely evident by the Year and, in 1957, the IGY Antarctic Conference asked ICSU to establish a committee to investigate the merits of continued scientific activity in Antarctica. In 1958, the International Council of Scientific Unions (ICSU) established SCAR to co-ordinate and exchange information about scientific activity in Antarctica. SCAR, through its network of specialist working groups, suggests priorities to national bodies for research and co-ordinates research projects in a wide range of disciplines.

124. Australia has traditionally had strong representation in SCAR and its many working groups. Currently, Australians are members of the working groups on human biology and medicine (sub-committee on clinical medicine and epidemiology), biology (sub-committees on conservation and bird biology), logistics and telecommunications and the SCAR groups of specialists on Antarctic climate research and seals. The scope and level of involvement in SCAR reflects the range of research undertaken by Australia and the high priority given to collaborative work on an international scale. The results of this work are made freely available to the benefit of the international community.

Meteorology

125. In addition to benefiting national programmes, SCAR programmes contribute within their particular fields of expertise to a number of international organizations and more broadly based research programmes. One such area to benefit in this way is the World Climate Research Programme (WCRP) which is being jointly co-ordinated by WMO and ICSU. Other contributions are being made by the ICSU Committee on Climate Changes and the Ocean and the United Nations Educational, Scientific and Cultural Organization (UNESCO) Intergovernmental Oceanographic Commission. WCRP is a broadly-based international programme that contributes to our understanding of climate through direct physical measurement and modelling of specific atmospheric, glaciological, oceanic and land surface processes.

126. Australia continues to play an important role in the work of WMO and, in particular, in the activities recommended by the WMO Executive Council Working Group on Antarctic Meteorology. Building on the basis of the IGY Weather Centre at Little America, an International Antarctic Analysis Centre (IAAC) was set up in Melbourne in 1959 under the broad control of the Australian Academy of Science and the Bureau of Meteorology. At various times meteorologists from Argentina, France, Japan, the United States of America and the Union of Soviet Socialist Republics, as well as from Australia, worked in the Centre. IAAC continued until 1966 when it was reborn as the International Antarctic Meteorological Research Centre (IAMRC) following the Bureau of Meteorology's assumption of the task of hemispheric analysis as part of the World Weather Watch Programme. Within the Bureau, the work was carried out initially by the Southern Hemisphere Meteorological Analysis Centre.

127. Today, the Bureau of Meteorology maintains four observing stations that provide routine 3-hourly surface and 12-hourly upper atmosphere observations to the

global network. The data collected in east Antarctica is transmitted to Australia for distribution world wide through the WMO World Weather Programme and for recording on a computer archive.

Marine science

128. An illustration of the continuing interplay of nations and scientific unions in the evolution of research programmes is the international programme of Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS) which was developed by the SCAR/SCOR (Scientific Committee for Oceanic Research)/IABO (International Association for Biological Oceanography)/ACMRR (Advisory Committee on Marine Resources Research of the Food and Agriculture Organization of the United Nations) Group of Specialists on the Living Resources of the southern Ocean. The First International BIOMASS Experiment (FIBEX) in 1981 involved 12 nations in marine biological investigations of the southern Ocean. The Second International BIOMASS Experiment (SIBEX) is currently under way.

129. In 1980-1981 Australia participated in the FIBEX programme of the BIOMASS project. Other participating nations were Argentina, Chile, France, Germany, Federal Republic of, Japan, Poland, South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America. The broad objective of BIOMASS is to gain an understanding of the structure and dynamic functioning of the Antarctic marine ecosystem. This will contribute to the initial data base for the future conservation and management of living resources under the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

130. Because of the central role and quantitative importance of krill in the Antarctic marine ecosystem and the possibility that harvesting of this organism may increase in the near future, FIBEX concentrated on determining their distribution and abundance. Two regions, the Scotia Sea and the Indian Ocean section of the southern Ocean, were chosen for detailed study. Australia, Japan, South Africa and France worked co-operatively in adjacent parts of the Indian Ocean section. Information was documented in a standard format to enable direct comparison with data obtained by other participating nations. Australia's area of operation was between 60°E and 88°E and south of 62°S, along the Kerguelen-Gaussberg Ridge. The vessel "Nella Dan" was specially modified to support the Australian programme at a cost of $2 million. Investigations were made of the avian and mammalian predators of krill, and those chemical, physical and biological variables which may influence krill distribution, behaviour and life history.

131. In the first phase of SIBEX (SIBEX-1), conducted during the 1983-1984 summer, research concentrated on the relationship between animals and the physical structure of the ocean, including currents, water temperature and salinity. The second phase (SIBEX-2), to be conducted over the 1984-1985 summer, will look at detailed studies of the biology of krill and its food source, phytoplankton. Australia was forced to cancel its participation in SIBEX-1 owing to difficulties with shipping operations, but will participate in SIBEX-2.

Land-based biology

132. The Land-based Biology Programme contributes to the International Survey of

Antarctic Sea-birds (ISAS), which is closely linked to the marine BIOMASS programme. The objective is to use changes in the populations of krill-eating birds as an index of changes in the krill stock. Adelie penguins are the target species in Antarctica. Surveys of breeding numbers are carried out in the summer, using vertical aerial photography and associated ground counts. In addition, breeding colonies of other Antarctic birds are censused as the opportunity arises.

133. In 1985, Australia will participate in a multi-nation census of southern elephant seals organized through the SCAR group of specialists on seals. This will provide valuable data on the populations of this species which is recovering from past exploitation.

Glaciology

134. Australia's programme in glaciology aims to study the dynamic functioning of the Antarctic ice-cap and its contribution to weather and climate. A significant element of the programme is conducted under the aegis of the International Antarctic Glaciology Project (IAGP), which represents an operational grouping of six nations (Australia, France, Japan, Union of Soviet Socialist Republics, the United Kingdom and the United States of America, in the study of a large sector of the Antarctic ice-sheet, including the Australian Antarctic Territory. Each nation contributes through its own expeditions and co-ordinates its activities to meet in the best way the overall aims of the project. From time to time, co-operative programmes are undertaken by the interchange of personnel and equipment. An Antarctic Division scientist is currently serving as Secretary to the IAGP.

135. For each austral summer from 1975-1976 to 1979-1980 and in 1983-1984 Australian glaciologists have participated iun the Union of Soviet Socialist Republics glaciological traverses. Australian involvement has concentrated on mass balance studies using advanced electronic instrumentation not readily available to Soviet researchers. The work completed so far is a valuable contribution to IAGP. It is anticipated that similar collaborative glaciological research will continue to be undertaken.

136. In addition, the glaciology programme has close ties with the SCAR Group of Specialists on Antarctic Climate Research, as well as contributing to a programme on the role of sea-ice in weather, which has been developed jointly by WMO and the Committee for Atmospheric Sciences. The latter study contributes to the World Climate Research Programme.

Upper atmosphere physics

137. The Upper Atmosphere Physics (UAP) Programme is concerned with the identification of the manner in which particles, electric fields and currents, magnetic fields and magneto-hydrodynamic waves in the magnetosphere behave, with a view to contributing to the knowledge of the physics of the magnetosphere and of the interactions between the upper atmosphere and the meteorological atmosphere. UAP at high southern latitudes is undertaken by all Antarctic Treaty nations and considerable collaborative research is conducted within the Treaty framework.

138. Illustrations of this collaboration include a project on wideband, very low frequency (VLF) emissions, conducted jointly with New Zealand, and involvement at Australian Antarctic stations by physicists from the Union of Soviet Socialist Republics in studies on the continuous recording of magnetic micropulsations. This co-operation has generated a number of valuable publications.

Cosmic ray physics

139. The aim of the Cosmic Ray Research Programme is to contribute to the elucidation of cosmic ray modulation phenomena (periodicities, recurrencies, transient events and long-term changes), relating observations at moderately high energies at Mawson station both to a global pattern and to observations at higher and lower energy intervals in the cosmic ray spectrum. The programme involves observations of many kinds, which contribute to a global observatory network, and research flowing from observations takes place within a framework of international collaboration.

140. Research currently under way involves collaboration with the following organizations in other countries: the Cosmic Ray Laboratory (CRRL) Nagoya University; University of Tokyo; the Institute for Physical and Chemical Research, Tokyo; Sinshu University, Matsumoto, Japan; the Bartol Research Foundation of the Franklin Institute, University of Delaware, United States of America; and the Institute of Cosmic Ray Research, National Research Council, Torino, Italy.

Medical science

141. The aim of the Medical Research Programme is to study human interaction with the Antarctic environment. In doing so, collaborative research is being undertaken under the aegis of the SCAR Working Group on Human Biology and Medicine. The major research effort has been devoted to the International Biomedical Expedition to Antarctica (IBEA), which took place in the 1980-1981 austral summer. At the conclusion of IBEA in 1984, it is anticipated that further research will be generated through the SCAR Working Group.

Bilateral co-operation

142. Australia's bilateral programme of scientific co-operation is also worthy of note. Australia has regularly shared its Antarctic expertise with other interested countries, has advised on matters of scientific research and logistic support and has extended the opportunity for scientists from other countries to conduct research on the continent itself, thus gaining invaluable first hand experience of work and conditions there. Foreign scientists have regularly wintered over at Australian stations in Antarctica. Over the years of the operation of Australia's programme, scientists from a number of countries have taken advantage of invitations to winter at Australian stations 21/ and pursue their particular

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21/ Details of foreign scientists wintering at Australian Antarctic stations are included in appendix 5 in the materials accompanying this contribution [see footnote 3].

research projects. Many more foreign scientists have visited, lived and worked at Australia's Antarctic stations during the summer period. In addition, scientists and observers from Argentina, France, India, Japan, New Zealand, the Union of Soviet Socialist Republics and the United States of America have taken part in Australian expeditions.

143. In broad terms, co-operative scientific endeavours in Antarctic research to which Australia has contributed have furthered the understanding of the physical characteristics and dynamics of continental Antarctica, its surrounding seas and atmosphere, and assisted in assessing the contribution of Antarctica to global phenomena. Advantage has been taken of the unique qualities of the Antarctic environment to conduct scientific research or environmentl monitoring studies which cannot be conducted elsewhere. Collaboration exists in all scientific disciplines, as well as logistic and operational activities, concerned with Antarctica. Scientific collaboration is an outstanding feature of work in Antarctica and the results achieved demonstrate the value and benefits of co-operative effort in the continent.

IV. RESOURCES OF THE AUSTRALIAN ANTARCTIC TERRITORY

144. The term "resource" is taken here to mean "a stock that can be drawn on". Thus, a resource is not necessarily something for which there is a present or known need, but something having a conceivable use, for which there may be a present or future need.

145. Using such a definition, "natural resources" are not only those generally associated with the idea of exploitation, such as minerals and living resources. They also include such concepts as open space and biological diversity among animal populations, both stocks that can be drawn on: one for recreation or construction activities and the other for such purposes as the breeding of new varieties to provide some desired trait or the maintenance of functioning communities.

146. Resources may also include areas, species, biological communities or systems that are considered important to maintain, protect or conserve in as unaltered a state as possible to provide points of reference or natural buffers against activities undertaken elsewhere.

147. In this sense, the natural resources of the Australian Antarctic Territory are extremely varied. They include: minerals; hydrocarbons; marine living resources (krill, fin fish, seals, whales and other marine life); ice; wilderness; wildlife/ unique assemblage of species; scenery; biological or genetic diversity; and special and unusual research opportunities.

148. Such a listing of natural resources tends to shade into values of the region that, while not specifically "stocks that can be drawn on", are of significance to man. These values include such things as the role of the oceans and ice of the region in the determination and equilibration of climate.

A. Mineral (non-hydrocarbon) resources

149. Traces of many minerals have been located in the AAT. However, with the exception of coal and iron ore, none has been found in deposits sufficiently large to be of economic interest. A more detailed account of the mineral resources of the AAT is provided in an attached paper. 22/

150. Information on the uses of, and demands for, the various minerals is readily available. 23/ Current world supplies and known reserves are thought to be much in excess of projected demand well into the next century.

151. Two potentially economic mineral resources, coal and iron ore, have been identified onshore in the AAT. Other minerals have also been discovered, which, if found in high grade ore bodies, could have potential economic significance. The potential of the offshore areas is unknown. It has been suggested that manganese nodules, a source of copper, nickel, manganese and cobalt, may have economic potential, though these are most likely to be exploited first in tropical waters where they are richer and geographically more accessible (see appendices 7 and 8). 3/

152. Mineral activity in the AAT (exploration or exploitation) would be constrained by a number of factors (see appendices 7, 8, 9 and paras. 126-134 of appendix 12), 3/ including:

(a) The high cost of logistic support;

(b) The harsh environment;

(c) The thickness of the ice-sheet (averaging 2.5 kilometres);

(d) The scarcity of ice-free areas where exploration or extraction could occur and the undesirability of disturbing the few that do exist;

(e) The limited working season;

(f) The lack of a source of energy for power generation;

(g) The shortage of ice-free coasts accessible to vessels;

(h) The conflict between the use of ice-free land areas (particularly near the coast), which are important biologically, particularly as bird-breeding sites, as native reserves and as bases for mineral activity, tailings disposal, stockpiling, runways, port facilities, accommodation and the like;

22/ See Mineral Resources of the Australian Antarctic Territory, a paper prepared by the Australian Department of Resources and Energy, a copy of which is included in the materials accompanying this contribution [see footnote 3].

23/ For example: US Bureau of Mines, Minerals Year Book, vol. I, Metals and Minerals, 1982, United States Department of the Interior; and US Bureau of Mines, Bulletin 671, Mineral Facts and Problems, United States Department of the Interior.

(i) Environmental impacts associated with the mining operation, such as dust that could lead to ice-melting, fine tailings and leachates entering fresh-water lakes and coastal seas, accumulation of wastes (including sewage) because of the absence of bacteria, and recreational activities of personnel;

(j) The costs of rehabilitation (where possible).

153. While there would be some technical problems to be overcome because of the extremes of climate, the main restraints on exploitation would be economic and environmental. Because of the costs associated with the remoteness of the location and the extremes of the environment (and of overcoming environmental impacts), any ore body exploited would have to be both high grade and extensive. At present, it seems unlikely that any extractive industry operating on the basis of market forces would be likely to take place until well into the next century.

B. Hydrocarbon resources

154. The resources may consist of deposits of oil or gas, either onshore or, more likely, offshore.

155. Information on the uses of and demands for hydrocarbons is readily available. At present, no Antarctic hydrocarbon reserves are known or exploited. Future demand for Antarctic hydrocarbons will depend on how the pattern of world supply and demand develops over the next 10 to 20 years, as well as the impact of alternative fuels and government policies and programmes.

156. The extent of Antarctic hydrocarbon resources (if any) is unknown (see appendix 6). 3/ By inference, it is expected that there are hydrocarbon reserves offshore, under the continental shelf of the AAT. Geological evidence indicates that on-shore sedimentary basins exist and that there may be potential for the occurrence of hydrocarbons offshore of Casey station and in the region of Prydz Bay.

157. The constraints on hydrocarbon exploration or exploitation in the AAT would be broadly the same as those on mineral activity (see appendices 9-12 and 14): 3/

(a) The cost of logistic operations;

(b) The harsh environment;

(c) The limited working season;

(d) The danger to drilling and transport vessels, and well-head installations from sea-ice and particularly icebergs;

(e) The conflict between the use of ice-free land areas on the coast which are biologically important, particularly as bird-breeding sites, as nature reserves and any use as bases for support activities during the production phase;

(f) Environmental impacts associated with exploratory and production drilling and transport (see appendices 11 and 12); 3/ (g) The risk and consequences of a blowout or oilspill (see appendices 10-12 and 13). 3/

158. Technological difficulties for hydrocarbon exploration and exploitation remain (see appendix 14). 3/ Nevertheless, it is commonly accepted that, if sufficient incentive existed, exploitation of any Antarctic oil field could occur by sometime after the turn of the century. At present, the technology exists to allow prospecting in most, if not all, interesting offshore areas, and exploration in some limited areas.

159. The Antarctic Treaty Consultative Parties are currently negotiating a régime for Antarctic minerals that would control mineral activities in Antarctica, excluding the deep sea-bed. This will impose restraints, particularly of an environmental nature.

C. Marine living resources

160. The waters of the southern Ocean have long been known to contain concentrations of marine life suitable for human consumption and other uses. Historically, it was the whales, seals and penguins which were of economic interest for their meat and oil. Recent attention has focused on the fish and krill resources which promise high yields of protein. Fish, krill and whales are the only Antarctic marine living resources currently exploited.

161. Australia does not participate directly in the harvest. However, whales, fish and krill are taken by other countries in the waters adjacent to the AAT and there are prospective fish resources around Heard and McDonald Islands.

162. The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), of which Australia is a member and for which it provides the headquarters in Hobart, has moved quickly since its establishment in 1982 towards the introduction of assessment methods in support of its primary function of managing these resources in the southern Ocean south of the Antarctic convergence (see sect. V below).

163. Appendix 15 3/ is an assessment of the potential marine living resources of the AAT. The following covers only those of present or potential interest as targets for harvesting.

Krill

164. The term "krill" is applied in many parts of the world to whatever species of small shrimp-like crustacean that is particularly abundant in the local marine waters. The Antarctic krill, primarily the species Euphausia superba, concentrate in huge "swarms" and are therefore most easily harvested. Antarctic krill are found all around the Antarctic continent. They are generally abundant south of approximately 63°S, but in the Scotia Sea they extend north to around South Georgia (54°S). They are the principal food of the Baleen whales and many Antarctic seals and sea-birds, including penguins. It has been postulated that the massive reduction in whale numbers during this century has led to a krill "surplus" of some 50 to 200 million tons per annum.

165. The harvesting of krill commenced in 1964. By 1981/1982, the catch had reached over 500,000 tons per year. The greater bulk of the catch is taken by the Union of Soviet Socialist Republics. Japan is the only other country taking commercial quantities, although a number of countries, including the Republic of Korea, Poland, the German Democratic Republic and Bulgaria, have undertaken exploratory fishing for krill. The harvest is conducted during the southern summer with a fleet of trawlers servicing large factory ships. Krill must be processed within a few hours of catch to prevent spoilage. A number of countries are experimenting with krill products for human consumption, although at present it is believed that most of the catch is used for stock food.

166. Despite the present significant level of catch, the krill fishery is still regarded as experimental, even by the Union of Soviet Socialist Republics. It has been suggested that the present level of activity is owing, in part, to the surplus of long-distance fishing fleets available to some countries after the closure of other, formerly international, waters as a result of the declarations of 200-mile fishing zones.

167. Bearing in mind the technical, economic and management considerations discussed below, the demand for krill seems likely to grow significantly in the medium to long term.

168. Reliable estimates of sustainable yield are difficult to obtain. However, the international research programme, BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) described in section III, was initiated in 1977 and should result in a basis for estimation.

169. Recent data from Australian research has cast doubt on some of the previous estimates of krill productivity. Australian scientists have discovered that krill life span are of the order of 5-7 years rather than the 2-3 years previously believed. This means that productivity estimates based on life span would have to be revised downwards. Similarly, the discovery that individual krill actually become smaller in winter means that previous age estimates (and productivity figures based on these) are questionable.

170. Recent estimates of yield vary widely but it is generally agreed that Antarctic krill represents a potential resource equal to any existing world fishery. Some published estimates of potential yield suggest that the krill fishery, if fully utilized, would be larger than the present total world fishery (approximately 70 million tonnes per annum) but most scientists would be cautious about this estimate. Impressive catch rates have been achieved by recent experimental fishing operations using purpose-built trawling gear. Researchers from the Federal Republic of Germany reported catch rates of up to 35 tons in 8 minutes, and commercial catches by the Soviet Union have been quoted at 139 to 292 tons per day. Under favourable conditions, catches of up to 500 tons per day are thought to be possible. Commercial krill fisheries may in the future exploit concentrations of krill which are also the focus of Baleen whale-feeding activity, with potential impacts on whale-feeding efficiency and population dynamics.

171. In the short term, technological and economic constraints, in particular the processing and marketing of krill for human consumption, are likely to limit the

fishery. Activities by a number of nations seeking to overcome these problems indicate longer-term prospects for increased harvesting. If this is the case, it will be up to the CCAMLR to provide leadership in responsible management of the krill fishery. In particular, the CCAMLR must strive to ensure that:

(a) The resource itself is not over exploited;

(b) Populations dependent on krill (for example, whales, seals, birds and fish) are not reduced below optimum levels or put at risk and, in the case of whales, are not limited by fishing activity in achieving population recovery;

(c) Irreversible changes to the ecosystem do not occur as a result of fishing activity;

(d) The interests of non-fishing nations are not prejudiced with regard to possible future entry into the fishery.

172. At present, lack of scientific knowledge prevents the formulation of detailed management procedures for the future.

Fin fish

173. Approximately 100 species of fish are found south of the Antarctic convergence, of which some 20 have been caught in commercially reportable numbers. Most of the commercial species are bottom-dwelling and are associated with the continental shelf and the relatively shallow waters surrounding the Antarctic and sub-Antarctic islands. The dominant groups, from a commercial viewpoint, belong to the families Nototheniidae (Antarctic Cod) and Channichthyidae (Ice-fish). Southern Blue Whiting (Micromesistus australis) also make extensive summer migrations into Antarctic waters in the south Atlantic region.

174. Interest in Antarctic fisheries has been shown by a number of long-distance fishing countries, for example Japan, the German Democratic Republic and Poland, but only the Union of Soviet Socialist Republics has exploited them on a large scale. Notothenids in particular are a highly prized food fish. The fishery has been in existence for nearly two decades and overfishing is apparent in the major exploited area in the south Atlantic. Demand and fishing capacity exist in a number of countries. However, natural and self-imposed management constraints are likely to limit increased activity to the few unexplored areas still left. The Australian Territories of Heard Island and the McDonald Islands are probably the most promising of those areas.

175. The generally narrow Antarctic continental shelf and the lack of other extensive shallow waters make the southern Ocean a relatively poor fishing ground. The large fisheries at equivalent northern latitudes cannot be expected in the south. In addition, Antarctic fish are generally slow growing, with high age at first maturity and low fecundity, further reducing productivity. Total fish catch since 1969/1970 has varied greatly in the main fishing area of the south Atlantic. From initial high catches of around 430,000 tonnes, only 13,500 tonnes were caught in 1972/1973. Since then, the catch seems to have stabilized at around 100,000 tonnes per year, but this cannot be regarded as a long-term sustainable catch.

176. Estimates of sustainable yield vary widely and the severe reduction of some species in the two major fisheries around South Georgia and Iles Kerguelen is cause for immediate concern. As a matter of priority, the CCAMLR will investigate Antarctic fish stock assessment over the next few years with a view to introducing active management of the resource. The Kerguelen fishery has, since 1979/1980, been closely controlled and monitored by France.

177. Of particular interest to Australia is the fishery potential of the area around Heard Island and the McDonald Islands. The fish stocks of the territory are yet to be assessed but circumstantial evidence, such as the results of recent limited work by the Antarctic Division, suggests that the area has a fish fauna similar to that of the nearby French Territory of Iles Kerguelen. Soviet trawlers are believed to have taken up to 30,000 tonnes of fish per annum from the Kerguelen region under an agreement with the French Government. However, it is believed that recent catches have been substantially less than this, suggesting that the earlier high figures may not be sustainable.

178. The Antarctic fin fish industry has already proven economical for a number of countries traditionally involved in long-distance fishing. Until such time as a management régime is in force, the main restraint on exploitation will be the overfishing of the resource.

Seals

179. Seals are harvested in a number of countries both for meat and pelts (for example, Canada and Greenland). Markets for seal products appear to be depressed.

180. The following seals occur in the Antarctic, although none is presently harvested:

Southern elephant seal (Mirounga leonina);

Leopard seal (Hydrurga leptonyx);

Weddell seal (Leptonychotes weddelli);

Crabeater seal (Lobodon cascinophagus);

Ross seal (Ommatophoca rossi);

Antarctic and sub-antarctic fur seals (Arctocephalus gazella and A. tropicalis) (breeding and major concentrations occur on sub-Antarctic islands).

181. Until early this century sealers operated in Antarctic waters, concentrating on southern fur seals and elephant seals. Many island populations of fur seals were almost exterminated and recovery to their former abundance is still in progress. Elephant seals were severely reduced, but losses were rapidly made good after sealing stopped. However, there is recent evidence that population numbers of fur and elephant seals are unstable, increasing and decreasing respectively.

182. By far the most abundant Antarctic seal is the crabeater seal, which comprises more than 90 per cent of the total seal biomass of Antarctica. On several occasions in the last decade, announcements have been made by different countries of their intention to commence harvesting of this species. No such plans have come to fruition. However, the Antarctic Treaty parties, recognizing the vulnerability of Antarctic seals to commercial exploitation, negotiated the Convention for the Conservation of Antarctic Seals to regulate possible harvesting (see sect. V below).

183. Seals are found around the Antarctic continent and on the sub-Antarctic islands. On estimates of stock size, the species most likely to come under pressure for their resource value are the crabeater, weddell and leopard seals. With the demise of the major whale stocks, seals are now thought to be the major consumer of Antarctic krill.

184. The Convention for the Conservation of Antarctic Seals provides a management régime for the region south of 60°S which:

(a) Totally protects Ross, southern elephant and fur seals;

(b) Sets catch limits for other species;

(c) Regulates catch by season, area and age of seals; sets aside certain seal-breeding areas as reserves; makes provision for the regulation of sealing methods;

(d) Provides for the gathering of information and the conduct of research relevant to the management of seals.

185. The technological and economic restraints on Antarctic sealing are not known. Long-term prospects are unknown. It is Australian government policy not to permit sealing.

Whales

186. Many whale species spend the summer months feeding in Antarctic waters. Principal among these are:

Minke (Balaenoptera acutorostrata);

Sei (B. borealis);

Fin (B. physalus);

Blue (B. musculus);

Humpback (Megaptera novaeangliae);

Sperm (Physeter macrocephalus).

187. Southern right whales do not migrate as far to the south but are known to feed in the southern Ocean. Several smaller cetaceans, notably the killer whale, inhabit Antarctic waters.

188. Historically, whales were taken for oil, meat, bone and ambergris. While the market for most of these products has vanished, whale meat is still considered a delicacy in some countries.

189. The history of the Antarctic whaling industry shows a pattern of high catches and subsequent decline as each species was over-exploited. The progression from the largest (blue) to the smallest (minke) was almost complete before effective international management imposed more conservative catch limits.

190. The Union of Soviet Socialist Republics and Japan share the International Whaling Commission (IWC) quota for Antarctic minke whales. Provisions established by IWC restrict pelagic whaling operations in the southern Ocean to those for minke whales only. Catch limits established by IWC for southern minke whales are observed by the Soviet Union and Japan which reach agreement on national quotas. Harvesting of killer whales by the Soviet Union has not been continued. A catch limit of 4,224 per year for minke whales for the 1984/1985 pelagic season was agreed by IWC in 1984. The proposed IWC world-wide ban on commercial whaling which is to come into effect in 1985/1986 will establish catch limits for all commercially exploited large whales. Despite the strong stance by Japan and the Soviet Union in favour of continued whaling, mounting pressure for a world-wide moratorium, and the uncertain economics of even the present levels of catch, make it unlikely that whaling will be a significant Antarctic-based industry in the foreseeable future.

191. If whaling is again permitted after the moratorium, it is likely to be at such low levels as to inhibit the reactivation or reconstruction of long-distance fleets. Australians cannot, by law, participate in whaling operations. Australian policy to continue to seek an end to all whaling and to continue to be an active member of IWC and its scientific committee research programmes on species of whales migrating from the southern Ocean through waters off the Australian mainland will provide a means of monitoring population trends.

192. Current estimates of the decline in whale stocks since commercial whaling began in Antarctica earlier this century are included in appendix 16. 3/ The current total biomass of whales in the southern Ocean is believed to be about one sixth of the initial stock, or about 7 million tonnes.

193. The impact of such a major decline in the ecosystem's top consumer has yet to be fully assessed, although some researchers believe that it has resulted in a net excess of Antarctic krill, the principal food of the Baleen whales, of the order of 50-200 million tonnes per year. Changes in the consumption patterns of other major consumers, notably seals, have also been reported by some researchers. Others believe that compensatory changes in krill population structure and in their predators may bring into question the existence of such a surplus. These factors will need to be considered by CCAMLR in devising effective measures for management of the ecosystem. Responsibility for management of whales will continue to lie with IWC.

Other marine life

194. Several other species of Antarctic marine life have been identified as being

potentially exploitable. Should the economic conditions arise and technological problems be overcome, the following potential resources may be considered.

Squid

195. Several species are found in the southern Ocean, but as yet only small catches have been reported by commercial trawlers (approximately 400 tonnes by Japan in 1977/1978). There is very little information available on the extent of the resource but indirect evidence suggests the existence of large stocks. Squid are believed to be major predators of krill and an important food source for whales, seals and birds. If the antarctic krill and fin fish industry expands, it is likely that an effort will be made to harvest squid as an offshoot of that industry.

Seaweeds

196. Kelp and other seaweeds are numerous, especially around the sub-Antarctic islands. An industry based on exploiting this resource for its chemical and food value could develop in the future. The development of new pharmaceutical products may spur this exploitation.

Sea-birds

197. Penguins have been exploited, in the past, for their oil. This activity was centred principally on the sub-Antarctic islands, such as Macquarie and South Georgia. Following the reduction in whale stocks, sea-birds, like seals, have risen in relative importance as major consumers of krill. No immediate industrial uses for penguins or other sea-birds can be foreseen.

D. Ice

198. Approximately 30 million cubic kilometres of ice exists in Antarctica covering all but a small proportion of the continent. Approximately half of this ice is contained within the AAT. In places, the continental ice-sheet is up to 4.8 kilometres thick. The Antarctic ice-sheet contains as much as 89 per cent of the fresh water on Earth and plays a major role in world climate and heat exchange. The ice-sheet continually moves outward and, at the margin, cleaves into icebergs. Ice-shelves and glaciers also produce icebergs. Average temperature of the ice-sheet is -201°C near the coast and -451°C in central East Antarctica (see appendices 17, 18 and 19). 3/

199. Ice is currently used at stations as a source of freshwater, for storage of perishables and as a construction material. Because of the long-time scale for deposition and compaction of ice, cores are an important source of information on past climate. In the future, Antarctic icebergs may be towed to suitable northern sites (for example, southern Australia) as a source of freshwater or to serve as a heat sink for energy generation. Theoretical studies have shown that such uses are possible and that towing techniques could be developed. Annual production of Antarctic icebergs has been estimated to be equivalent to one thousand billion tonnes of water. Even a small iceberg could yield up to 0.1 km^3 of water (10 billion litres).

200. Several studies have suggested that the utilization of icebergs for freshwater and energy production could be both possible and economic. Technology would need to be developed and feasibility studies conducted to make it practicable. As the demand for freshwater and new energy sources increases, it is likely that Antarctic iceberg utilization will be seriously considered by a number of countries.

E. Wilderness values

201. It is difficult to arrive at a definition of wilderness that would be generally acceptable. Some authors on this subject distinguish between true wilderness, that is, areas totally unaffected by man's activities, and recreational wilderness, which is an area that is accessible to humans and yet apparently unaffected by them. There is virtually no part of the Earth that meets the strict definition of wilderness. For instance, even in Antarctica there is evidence of pollution from radioactive fallout and agricultural pesticides. Others consider that wilderness can be defined as large tracts of land that are substantially unaltered by human activities.

202. Outside station areas, the continent, and the majority of the AAT, would meet most definitions of wilderness. It is remote from the obvious influence of humans and is in an apparently natural condition.

203. The number of visitors/users able to be accommodated by a region while maintaining its wilderness values varies with the nature of the region (topography, vegetation, ability to recover from visitor impacts, total area, etc.) and the activities pursued.

204. Apart from the use by personnel working at or from scientific stations, little active use is currently being made of the wilderness values of the AAT.

205. A significant element of the enjoyment of wilderness lies in the adventure ot be had there, the potential and real risks and dangers, and the possibility of unexpected events that test the participant's abilities. The adventure associated with Antarctic activities attracts private expeditions to Antarctica (as well as providing some of the attraction for ANARE personnel). There are increasing numbers of private expeditions to Antarctica, most of which have at least an element of exploitation of the wilderness values. To some extent tourist cruises also exploit this resource. It can be expected that this use will increase, though probably only gradually, in the future.

206. It is also necessary to take into account the passive utilization of wilderness. There are two aspects to this. Wilderness has value to many people simply because they know it is there. It represents a real place to which they can mentally escape from the pressures of life. The second aspect of passive utilization of Antarctic wilderness relates to the production and enjoyment of documentary material (books, articles, photographs, films) about the continent. Many of these rely on the wilderness characteristics of the area for their appeal. Much of the public support for the concept of the Antarctic as a wilderness reserve may stem from this passive appreciation of wilderness and active concern that its attributes are maintained.

207. In the same way as ecosystems, landforms, etc. are preserved by setting aside representative examples, it may be necessary and possible to set aside representative wilderness areas of different types. This would require studies to determine the areas that should be set aside, their extent, and management criteria for them.

208. The restraints on the exploitation of the wilderness values of the AAT at present are the extreme difficulties of access to the region and the problems associated with surviving in the environment of the region. It can be expected that these difficulties will gradually be reduced.

F. Wildlife: unique assemblage of species

209. The Antarctic continent and its surrounding waters, including the AAT, contain species and assemblages of species not found elsewhere. These range from the invertebrate fauna of the meltwater moss beds to the whales of the southern Ocean.

210. While some of the species found in the Antarctic region may also be found outside the region, they are not found there in association with the other Antarctic species. Though an exhaustive listing of Antarctic species would be out of place here, the list would contain a wide range of life forms from the lowest plant life through terrestrial and marine invertebrate species, to sea-birds and marine mammals. The majority of the terrestrial species would share the characteristic of adaptation to one of the coldest and driest environments on Earth, experiencing extreme annual ranges of conditions of light and temperature.

211. There are two major categories of use of the naturally occuring species in the AAT. First, there is the research that can be carried out, both on individual species and on groups of species. This is dealt with below under the heading "Research opportunities".

212. Secondly, there is the exploitation of the wildlife resource as a tourist attraction. Frequently, the species in Antarctica are unlike those of other regions, in appearance, lifestyle and physical setting. For this reason they are a source of interest to visitors.

213. Until now most tourists who have visited Antarctica have done so on either the "Lindblad Explorer" or the "World Discoverer". These cruise ships, carrying around 180 and 150 passengers respectively, have each operated three or four summer cruises every year from South America. Participation in these cruises is expensive and is, therefore, limited to those who can afford it and have a particular fascination with Antarctica.

214. The extent of the wildlife resource as a tourist attraction is limited by the accessibility of sites where wildlife can be viewed. While ships travelling through the region provide ideal viewing platforms for whales, birds, and seals and penguins on pack-ice, the major wildlife concentrations are at coastal breeding-sites generally on areas of exposed rock. Such sites themselves are limited because of the extensive snow and ice-cover, with the result that virtually every locality with exposed rock provides breeding-sites for one or more species.

215. The restraints on the exploitation of Antarctic species as a tourist attraction includes problems of access and legal prohibitions. Difficulties of access to the continent have been mentioned under the heading "Wilderness values". For tourists willing to undertake long and costly voyages, there remain the problems of access to particular sites. Factors such as dense-pack and fast ice, and scarcity of safe landing sites mean that sites vary greatly in accessibility. With increasing tourism this could have the effect of concentrating impacts on the most accessible sites to an undesirable degree. This is not at present a problem in the AAT because of the small number of visits by tour ships.

216. The legal prohibitions relate to the declaration of some wildlife sites as either specially protected areas (SPAs) under the Agreed Measures for the Conservation of Antarctic Fauna and Flora (see sect. V below), or as sites of special scientific interest (SSSIs). SPAs are designed to protect:

(a) Representative examples of the major Antarctic land and freshwater ecological systems;

(b) Areas with unique complexes of species;

(c) Areas which are the type locality or only known habitat of any plant or invertebrate species;

(d) Areas which contain specially interesting breeding colonies of birds or mammals;

(e) Areas which should be kept inviolate, so that in the future they may be used for purposes of comparison with localities that have been disturbed by man.

217. They can only be entered with a permit issued for a compelling scientific reason and are, therefore, not accessible to tourists. SPAs in the AAT are located at:

(a) Taylor Rookery, west of Mawson: this is the site of a colony of emperor penguins and is one of the few, and probably the largest, of the known colonies of this species located wholly on land;

(b) Rookery Islands, Holme Bay, west of Mawson: the Islands contain breeding colonies of six bird species resident in the Mawson area, two of which (the southern Giant-Petrel and the Cape Petrel) occur nowhere else in the region. It is of scientific importance to safeguard this unusual association of six species and to preserve a sample of their habitat;

(c) Ardery Island and Odbert Island off the Budd Coast west of Casey: these islands support several breeding species of petrel and provide a sample of their habitat.

218. Sites of special scientific interest are designed to protect areas of scientific study from accidental or wilful interference that would be detrimental to the studies being carried out. Conditions of entry are laid down in management plans and it would be unlikely that tourists would be allowed access to such areas. At present the only SSSI in the AAT is at Haswell Island near Mirny Station.

G. Scenery

219. A commonly acceptable definition of scenery is perhaps more difficult than that of wilderness. To some extent it frequently amounts to "landscape which is not commonplace". It also relates to land-form, natural processes and vegetation.

220. The scenic resource can also be considered from the point of view of the inhabitants of an area or of those visiting an area. To the inhabitants of an area, it is important that the scenic resource not be violated by unnatural modifications. Visitors to an area (tourists) are primarily concerned with the type of scenery (for example, how does it differ from what they are accustomed to), though this is closely allied with the lack of unnatural modifications.

221. Scenery can be a significant resource, earning considerable tourist revenue for a region and providing considerable non-material benefits to mankind. Much Antarctic scenery has the potential to provide these benefits. The joint attractions of scenery, wildlife and wilderness values together account for the appeal of Antarctica to tourists.

222. The restraints on exploitation of the scenic resource of the AAT are mainly the difficulties of access to and existence in the Territory. As with wilderness values and wildlife, this resource has the potential for destruction or devaluation by exploitation of other resources.

H. Biological or genetic diversity

223. The many populations of animal and plant species unique to Antarctica constitute a genetic resource capable of exploitation. The maintenance of the diversity of organisms and functioning biological systems may also be of direct and indirect benefit.

224. There are many examples of exploitation of the genetic resource that have made significant contributions to today's world. For example, the cross-breeding of wild strains of cereals with cultivated varieties in order to produce further varieties with desirable characteristics. Antarctic organisms differ from those of most other regions in that they have evolved mechanisms to deal with the extreme climate. Research into these mechanisms may yield information of use in a wide range of fields (see appendix 20). 3/

225. The uses of the genetic resource in Antarctic species and the extent of the resource are limited only by the amount of research able to be undertaken. This is not to say that funding of all such research would be likely to be either cost effective or of higher priority than funding of other research. However, it does indicate the potential for benefit from pure science in Antarctica.

226. While restraints on the exploitation of the genetic resource in Antarctica are at present mainly economic, there is the possibility that future exploitation of other resources may eliminate opportunities, for example by causing the extinction of species.

I. Research Opportunities

227. Antarctica offers a wealth of opportunities for research in many scientific fields (see appendix 21). 3/ Some of these are unique in that they are not available elsewhere such as, aspects of research in the fields of glaciology, meteorology, and geology. Unique opportunities exist for environmental baseline measurements to enable monitoring of pollution. Such measurements have several purposes. First, they provide reference data from a "pristine" environment to help in understanding processes on a global scale and, secondly, to provide baseline measurements to monitor any adverse local effects of resource exploitation.

228. Other opportunities occur in fields of research that are particularly well suited to study in Antarctica. For example, physiological adaptation to cold and low temperature engineering. The study of the simple ecosystems in Antarctic moss beds provides insights into ecological principles that are applicable to more complex systems elsewhere.

229. Some indication of the uses of Antarctic research is given in the preceding sections. The demand for such research opportunities is difficult to measure. Some indication is provided by the fact that there are always far more research proposals for the ANARE programme than can be accommodated by the limited logistic capability available.

230. Currently, the restraints on exploitation of research opportunities in the AAT are of a logistic, and therefore, economic, nature. The major expense in carrying out Antarctic research is the provision of logistic facilities - transport, accommodation and survival.

231. It is likely that future resource-use decisions could impose constraints on the research opportunities available. For example, a decision to allow offshore oil exploitation in a part of the AAT could lead to onshore storage facilities that would destroy particular research targets. The same might apply to tourist visits to penguin rookeries leading to changes which affect research.

V. AUSTRALIA'S INVOLVEMENT IN THE ANTARCTIC TREATY SYSTEM

A. The Antarctic Treaty

232. Arising out of the successful co-operation of the International Geophysical Year (IGY) proposals were advanced for a more permanent instrument to esure international co-operation in the Antarctic. The 12 nations 24/ which had maintained stations in the Antarctic during the IGY participated in the Conference on Antarctica, held at Washington, D.C., between 15 October and 1 December 1959. Australia took an active role in that Conference which negotiated the Antarctic Treaty and, with the other participating States, signed the Treaty on

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24/ Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America.

1 December 1959. Following the enactment of legislation 25/ by the Australian Parliament to give effect to the Treaty's provisions, Australia ratified the Antarctic Treaty on 23 June 1961. On this date the Treaty also entered into force for the original 12 signatory States and one subsequent acceding State. 26/

233. In the period since 1961, a further 18 States 27/ have acceded to the Antarctic Treaty, making a total of 31 States which have agreed to be bound by its provisions. The bulk of acceding States have joined the Treaty in the last 10 years, indicating a steadily growing interest in, and acceptance of, its principles and objectives.

234. It is remarkable that a treaty negotiated 25 years ago should have continued to serve such a broad range of important objectives so effectively. In large measure this has been due to the flexible approach taken by the original signatories, who laid down a number of general principles of lasting relevance and, in the context of these principles, allowed for the setting up of appropriate mechanisms to handle the more detailed management of Antarctic affairs. While the subsequent development and operation of these mechanisms is dealt with elsewhere in this contribution, it may be helpful to look in some detail, from an Australian perspective, at the principles and provisions of the Antarctic Treaty itself.

Science

235. As one of the small number of States which pioneered exploration and scientific investigation in Antarctica, Australia attached great importance to those provisions of the Antarctic Treaty 28/ guaranteeing freedom of scientific investigation and co-operation in Antarctica and encouraging the exchange of information, personnel and the results of scientific research. The Treaty provision encouraging co-operative working relations with specialized agencies of the United Nations system, and other international organizations having a scientific or technical interest in Antarctica (art. III, para. 2), was also significant. This anticipated a broader international interest in the continent and provided a method of sharing the results of Antarctic co-operation with the world community, including those States which lack the means to become actively involved in Antarctic research.

25/ Antarctic Treaty Act 1960, a copy of which is included in appendix 22 [see footnote 3].

26/ Poland.

27/ As at 15 June 1984: Czechoslovakia, Denmark, Netherlands, Romania, German Democratic Republic, Brazil, Bulgaria, Germany, Federal Republic of, Uruguay, Papua New Guinea, Italy, Peru, Spain, China, India, Hungary, Sweden and Finland.

28/ See United Nations, Treaty Series, vol. 402, No. 5778, arts. II and III.

Demilitarization

236. As a State which has consistently opposed the use of force in the settlement of disputes and has repeatedly expressed its concern at the spread of armaments, Australia considered those provisions of the Antarctic Treaty (arts. I and IV) prohibiting military use and nuclear explosions as of particular significance.

237. It is a misconception to believe that the Antarctic continent has always been free from political and even military tensions - before the IGY and the Antarctic Treaty established a tradition of co-operation, minor clashes, mainly over territorial sovereignty between the nationals of different States did occur, notably on the Antarctic peninsula. Although minor, these clashes always had the potential to escalate into serious conflict, particularly as military technology developed and the numbers of personnel engaged in Antarctica increased. The decision of the signatory States to agree to prohibit all measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military manoeuvres and the testing of any type of weapons, must therefore be viewed as especially valuable and prescient. The agreement to prohibit all military uses, without distinction between offensive or defensive uses, removed the very real potential which otherwise existed for armed clashes or military build-ups which would have endangered peace and impeded scientific research. 29/ As a country geographically proximate to Antarctica and interested in the peaceful pursuit of scientific research there, this achievement of the Antarctic Treaty remains of the greatest importance to Australia.

238. Similarly, the decision to prohibit nuclear explosions and the disposal of radioactive wastes was a landmark, establishing the first effective, functioning nuclear-weapons-free zone. The value and importance of the Antarctic Treaty, as the first major disarmament treaty including both super-Powers (and subsequently all nuclear-weapons States) which has worked effectively for over 20 years, should be strongly emphasized. With the advantage of hindsight, and the knowledge of the extreme difficulty of negotiating measures to limit conventional or nuclear weapons today, the achievement of the Antarctic Treaty in this area is impressive and of the greatest value to States like Australia which are in the immediate geographic region of Antarctica.

Territorial sovereignty

239. As one of seven States which claim territorial sovereignty over parts of Antarctica, Australia had a prime interest in ensuring that its claim to the AAT was not denied or diminished. Activities in Antarctica during the IGY had been successfully conducted on the basis of an understanding that existing claims to territorial sovereignty would neither be directly challenged nor directly asserted

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29/ However, under article 1, paragraph 2, the Antarctic Treaty allowed the use of military personnel and equipment for scientific research or other peaceful purposes, a provision that was of considerable practical benefit since many countries have found it more convenient and effective to support and organize their Antarctic activities in this way.

and would not give rise to disputes. The Antarctic Treaty (art. IV) formalized this understanding, ensuring that the legal position of all parties with respect to sovereignty (claimants, those with a basis of claim and non-claimants) would not be affected by the Treaty or by acts or activities taking place during the period it remained in force. The Treaty thus provided a mechanism for setting to one side disputes involving territorial claims on the continent, without prejudice to the position of any country. A major achievement of the drafters of the Antarctic Treaty was their success in reaching a formula which removed the very real and persistent potential for disputes over sovereignty claims by allowing for the coexistence of different attitudes to territorial sovereignty, while promoting the interests of all.

Inspection

240. The Antarctic Treaty was also a landmark in post-war international relations by virtue of its establishment of a system of inspections by observers (art. VII). All Antarctic Treaty Consultative Parties are entitled to designate observers to carry out inspections with complete freedom of access at any time to any part of Antarctica, including all stations operated by States. The system provides an effective means of verifying that the obligations, objectives and principles of the Antarctic Treaty are being complied with at all times. In addition, the Treaty 30/ requires advance notification of expeditions, stations and military personnel or equipment, thus, among other things, allowing for easier and more effective operation of the inspection régime. Inspection of activities and installations in Antarctica have been carried out on a regular basis.

241. Contracting Parties also undertook to exert appropriate efforts consistent with the Charter of the United Nations, in order to ensure that no one engages in any activity in Antarctica contrary to the principles or purposes of the Antarctic Treaty (art. X), a provision which encourages the wider observance of the measures agreed to by the parties to the Treaty.

Environment protection

242. When the Antarctic Treaty was negotiated in 1959, the development of concepts and standards of environmental protection was not well advanced and resource issues were not a priority. The negotiating parties were, however, clearly mindful of the damage caused by the earlier era of private whaling and sealing and had the foresight to provide a mechanism for the preservation and conservation of living resources in Antarctica (art. IX, para. 1 (f)) and for further consideration and recommendation on broader resources management and environment protection matters. As a country geographically proximate to Antarctica, where weather and ocean currents are directly affected by it, and with an interest in scientific observation and investigation of the region's fauna and flora, Australia viewed the inclusion of this provision in the Treaty as of considerable importance, an importance which has increased with the growing interest in living and mineral

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30/ See art. VII, para. 5. Copies of the most recent Australian exchanges of information under the Antarctic Treaty are included in the materials accompanying this contribution [see footnote 3].

resources. In its broadest sense, Australia has always recognized that scientific research in Antarctica also required the protection and conservation of the objects of that research. Subsequently, growing awareness of environmental matters, coupled with a sense of responsibility for the region, has led to an even greater realization of the importance of this element of the Treaty.

Consultative meetings

243. The key element in the flexible approach to Antarctic management adopted by the original signatories to the Antarctic Treaty is the provision (see art. IX) which allows for regular consultations on matters of common interest pertaining to Antarctica by those active there, in order to exchange information, and formulate, consider and recommend to Governments measures in furtherance of the principles and objectives of the Treaty. The Treaty specified a number of matters where it was felt consultation might be desirable, but these were non-exclusive, leaving room for recommendations on other matters of interest. The original signatories took a flexible approach, recognizing that there were likely to be many developments in the Antarctic during the life of the Treaty which could conceivably require regulation and management or guidance in future. The original purpose of consultative meetings was to enable those countries which had assumed practical, legal and scientific responsibilities in relation to Antarctica to consult regularly and to co-operate in order to discharge their responsibilities more effectively. As explained below, this arrangement has come to be of particular importance in the management of Antarctic resources and in the protection of the Antarctic environment.

244. The terms "Consultative Party" or "Consultative Meeting" do not appear in the text of the Antarctic Treaty. The Treaty specifies that the original 12 signatory States, plus those acceding States which demonstrate interest in Antarctica by conducting substantial scientific research there, such as the establishment of a scientific station or the dispatch of a scientific expedition, are entitled to attend what came to be known as consultative meetings. Thus the Treaty placed a requirement of demonstrated interest on active involvement in Antarctic management. In 1959 and for many years subsequently, this appeared a sensible and reasonable requirement, as few States had the presence in Antarctica or the scientific interests to undertake the obligations which the detailed management of Antarctic affairs entailed. In time, however, the work of the original signatories, plus those States which subsequently demonstrated their interest in Antarctica by conducting substantial scientific research activity there, 31/ generated growing interest in Antarctica among a wider section of the world community. In recognition of this, in an important decision taken by Consultative Parties in 1983, it was decided that all States which had acceded to the Antarctic Treaty, but which were not Consultative Parties, should be invited to attend consultative meetings as observers. 32/

31/ Poland was invited to attend consultative meetings from 1977, the Federal Republic of Germany from 1981, and India and Brazil from 1983.

32/ Acceding States were first invited to attend the Twelfth Antarctic Treaty Consultative Meeting at Canberra in September 1983.

B. Australia's role as an Antarctic Treaty Consultative Party

The First Antarctic Treaty Consultative Meeting

245. At the Washington conference which negotiated the Antarctic Treaty in 1959, Australia's offer to host the first meeting of the Antarctic Treaty Consultative Parties was accepted and provision for this first meeting was written into the Treaty itself. The First Antarctic Treaty Consultative Meeting was accordingly held at Canberra, from 10 to 24 July 1961, and was attended by representatives of the 12 States which had signed the Antarctic Treaty.

246. The work of the meeting was necessarily exploratory and needed to establish a general modus operandi. The meeting adopted rules of procedure, which were to guide all subsequent Antarctic Treaty consultative meetings until the twelfth. It also began the development of a consensus approach to decision-making, an approach which has been followed at all subsequent Antarctic Treaty meetings and is especially significant. Consensus was considered to be in keeping with the spirit of Antarctic co-operation which had been evident during the IGY, in the negotiation of the Antarctic Treaty and in the conduct of scientific activities on the continent itself. It also ensures that recommendations adopted by Consultative Parties are likely to be accepted by Governments and given consistent effect. Through consensus, divisive positions have been avoided and Consultative Parties have been able to concentrate on the formulation of joint approaches to the common problems of Antarctic management and to achieve a remarkable degree of co-operation in their activities in Antarctica.

247. The meeting also considered a number of specific agenda items. These dealt, inter alia, with the exchange of scientific personnel, observations and results, relations with SCAR and with other international organizations having a scientific or technical interest in Antarctica, the exchange of information concerning expeditions and stations, logistic support, the preservation and conservation of living resources, the preservation of historic sites, reciprocal assistance among expeditions, radio communications and co-operation in mail services. The meeting agreed unanimously to the adoption of a number of recommendations on these and other topics. Such recommendations become effective when approved by all Consultative Party Governments. The recommendations adopted at the First Antarctic Treaty Consultative Meeting are contained in the Final Report of the meeting which is reproduced here as appendix 23. 3/ In general terms, the majority of recommendations dealt with facilitation of the information exchanges required or encouraged by the Antarctic Treaty and with co-operation in the conduct of States' activities in Antarctica. The meeting also established a precedent for co-operation with the United Nations system and its specialized agencies. Consultative Parties welcomed the offer made by WMO of co-operation in meteorology and of the collection and relaying of meteorological data in the Antarctic, and recommended that their Governments establish co-operation in these matters through their representatives in WMO (see recommendation I-V).

248. Another recommendation of the First Antarctic Treaty Consultative Meeting was of great importance for the future development of Antarctic management. The Consultative Parties took the first step in a constantly evolving and improving

scheme of environment protection for the Antarctic by recommending to Governments general rules of conduct for the preservation and conservation of living resources in Antarctica (see recommendation I-VIII). Consultative Parties agreed, however, that these general rules were an interim measure only and that there was a need to develop a set of internationally agreed measures for the preservation and conservation of the living resources of the Antarctic. This task was pursued further at subsequent Antarctic Treaty consultative meetings.

The second to the eleventh Antarctic Treaty consultative meetings

249. The Antarctic Treaty Consultative Parties have not seen a need to establish a permanent standing organization or secretariat. While this cannot be excluded in the future, Consultative Parties have found it sufficient, and cost effective, to share among themselves the burden of hosting Antarctic Treaty consultative meetings and administering the now very considerable amount of documentation associated with such meetings. Thus while Australia, as host to the First Antarctic Treaty Consultative Meeting, undertook the responsibility of organizing and servicing that meeting and producing and distributing the final report of the meeting, these tasks have been performed by other individual Consultative Parties in respect of subsequent meetings which they have hosted:

> The Second Antarctic Treaty Consultative Meeting, Buenos Aires, 18-28 July 1962; the Third Antarctic Treaty Consultative Meeting, Brussels, 2-13 June 1964; the Fourth Antarctic Treaty Consultative Meeting, Santiago, 3-18 November 1966; the Fifth Antarctic Treaty Consultative Meeting, Paris, 18-29 November 1968; the Sixth Antarctic Treaty Consultative Meeting, Tokyo, 19-31 October 1970; the Seventh Antarctic Treaty Consultative Meeting, Wellington, 30 October-10 November 1972; the Eighth Antarctic Treaty Consultative Meeting, Oslo, 9-20 June 1975; the Ninth Antarctic Treaty Consultative Meeting, London, 19 September-7 October 1977; the Tenth Antarctic Treaty Consultative Meeting, Washington, 17 September-5 October 1979; the Eleventh Antarctic Treaty Consultative Meeting, Buenos Aires, 23 June-7 July 1981.

250. It is worth drawing attention to some of the more significant of the recommendations of the second to eleventh Antarctica Treaty consultative meetings, 33/ including those of particular importance to Australia. These meetings adopted 114 recommendations on a wide variety of topics. A number of them developed the practice of co-operation, established at the First Antarctic Treaty Consultative Meeting, concentrating on exchanges of scientific data and information on operations and co-operation in telecommunications, meteorology and logistics.

33/ The recommendations of the second to the eleventh Antarctic Treaty consultative meetings are included in the Handbook of Measures in Furtherance of the Principles and Objectives of the Antarctic Treaty, a copy of which was forwarded with the Australian Government's interim reply to the Secretary-General, dated 29 May 1984 [see footnote 3].

251. Many recommendations also reflected an awareness on the part of the Consultative Parties of the need to provide in more detailed ways for the protection of the Antarctic environment from the increased scale of human activity on the continent. These recommendations ranged from those aimed at preserving and protecting sites of historic or special scientific interest to others more directly aimed at limiting the harmful effects of man's impact on the Antarctic environment. Thus, a series of recommendations (IV-27, VI-7, VII-4, VIII-9 and X-8) dealt with the expanding phenomenon of Antarctic tourism and proposed guidelines to ensure observance of conservation and environmental measures adopted by the Consultative Parties; another series of recommendations (VI-4, VII-1, VIII-11, VIII-13, IX-5, IX-6 and X-7) proposed measures to limit environmental impacts arising generally from man's activities on the continent. In this context, an important development was the recommendation of a code of conduct to cover national Antarctic expeditions and station activities (see recommendation VIII-11). Australia has consistently attached great importance to the protection of the Antarctic environment from the possibly harmful effects of any Antarctic activities and has therefore been prompt in approving all such recommendations. (Australia has thus far approved in full all recommendations adopted by the first through eleventh Antarctic Treaty consultative meetings, inclusive.)

252. Australia attached particular importance to the adoption at the Third Antarctic Treaty Consultative Meeting of a set of Agreed Measures for the Conservation of Antarctic Fauna and Flora (see recommendation III-VIII), which built on the general rules of conduct for the preservation and conservation of Antarctic living resources adopted at Canberra in 1961. Although the Agreed Measures were adopted as a recommendation of the Consultative Parties, they were drafted in the form of a treaty and most Antarctic Treaty Consultative Parties have enacted domestic legislation to enforce them. The Agreed Measures provide overall protection for the native mammal and bird populations of Antarctica and for its native plants. Individual birds or mammals may not be killed or taken, except within strict limits as indispensable food, or as scientific or museum specimens, and only then in accordance with a permit, so that the variety of species and balance of the natural ecological systems is maintained (see "agreed measures", art. VI): Parties are to take steps to minimize harmful interference with the normal living conditions of native mammals and birds (idem, art. VII). In particular, the Agreed Measures provide the certain areas of outstanding scientific and ecological interest within Antarctica may be set aside as Specially Protected Areas (SPAs), entry to which is prohibited except on the grounds of a "compelling scientific purpose" (idem, art. VIII). Fourteen such areas have been established to date. Parties are also required to take measures to control the introduction of non-indigenous species, parasites and diseases into Antarctica (idem, art. IX). Australia has approved the Agreed Measures and implemented them through the adoption of the Antarctic Treaty (Environment Protection) Act 1980 (see appendix 24). 3/

253. Australia has consistently supported efforts within the Antarctic Treaty system and elsewhere to protect whales and seals. Within the International Whaling Commission, Australia supports a world-wide ban on commercial whaling and a total moratorium on commercial whaling is scheduled to come into effect from the 1985/1986 season. Australia has also actively participated in the efforts of the Antarctic Treaty Consultative Parties to provide for the regulation of sealing,

should commercial sealing ever be resumed in Antarctica. A Convention for the Conservation of Antarctic Seals 34/ was negotiated by a special conference of Antarctic Treaty Consultative Parties in London in June 1972. Australia signed the Convention on 5 October 1972 and is completing the necessary procedures for ratification. The Australian Government decided in 1978 that although the Convention allows for regulated commercial sealing, no Australian nationals would be permitted to undertake commercial sealing in Antarctica. The Convention entered into force on 11 March 1978.

The conservation of Antarctic marine living resources

254. Following the gradual reduction in commercial whaling in the Antarctic, commercial fishing has emerged in recent years as an important activity in Antarctic waters. There are fears that fishing for krill, a crustacean which occupies a central position in the marine food system, might pose a threat to the entire marine ecosystem. Figures from FAO indicate that the total of fish produce (excluding whales) caught in Antarctic waters was 647,742 tonnes in 1981/1982. Of this, krill represented 529,505 tonnes. Approximately one third of the total (of both fin fish and krill) is taken in the waters adjacent to the Australian Antarctic Territory. Estimates of the total stock of krill vary from less than 200 million tonnes to more than 800 million tonnes. It has been suggested that sustainable yields could range up to 100 million tonnes per annum, which is greater than the total present world fish catch. However, high levels of catch could affect other species which feed on krill.

255. Concern over unregulated fishing activity in the Antarctic led the Antarctic Treaty Consultative Parties to consider the question of the protection, scientific study and rational use of Antarctic marine living resources in 1975 (see recommendation VIII-10). Further and more detailed consideration was given to the matter at the Ninth Antarctic Treaty Consultative Meeting in London in 1977 where Consultative Parties recommended an intensification of scientific research related to Antarctic marine living resources, interim guidelines for their conservation, and the establishment of a definitive conservation régime (see recommendation IX-2).

256. In keeping with its deep concern to protect and conserve Antarctica's marine living resources, Australia offered to host a special consultative meeting to elaborate a draft Convention on the Conservation of Antarctic Marine Living Resources. The meeting was held at Canberra from 27 February to 16 March 1978. A second session of the meeting was held at Buenos Aires, from 17 to 28 July 1978, and the third and final session was held again at Canberra on 5 and 6 May 1980. The reports of the first and final sessions of the meeting (known as the Second Special Consultative Meeting) 35/ are included as appendices 25 and 26. 3/

34/ See Handbook of Measures in Furtherance of the Principles and Objectives of the Antarctic Treaty, p. 9301 [see footnote 3].

35/ The First Special Consultative Meeting had been held in London on 25, 27 and 29 July 1977 to consider the question of procedures to be followed for the admission of Antarctic Treaty Contracting Parties to Consultative Party status and to welcome Poland as a participant in the Antarctic Treaty consultative meetings.

Immediately following the final session of the Special Consultative Meeting, Australia hosted an international diplomatic conference from 7 to 20 May 1980. This conference formally adopted the text of the Convention on the Conservation of Antarctic Marine Living Resources (the CAMLR Convention). The Final Act of the Conference, including the text of the Convention, is included as appendix 27. 3/

257. It was significant that the CAMLR Convention was agreed to by an international diplomatic conference rather than an Antarctic Treaty Consultative Meeting. Two Antarctic Treaty Contracting Parties with an interest in Antarctic marine living resources, the Federal Republic of Germany and the German Democratic Republic, were thus enabled to participate in the conference and become original signatories to the Convention. The international diplomatic conference was also attended by delegations from the Commission of the European Communities and a number of other international organizations as observers (FAO, the Intergovernmental Oceanographic Commission, the International Union for the Conservation of Nature and Natural Resources, IWC, SCAR and SCOR), thus further developing co-operation between the Antarctic Treaty Consultative Parties and the wider international community.

258. The CAMLR Convention establishes an independent and broadly based conservation régime open to all States interested in research in, or harvesting of, Antarctic marine living resources. It has now been ratified by all 15 original signatories. 36/ There have also been three accessions to the Convention. 37/ The Convention entered into force on 7 April 1982.

259. Australia signed the Convention on 11 September 1980 and ratified it on 6 May 1981. Australia gave effect to the provisions of the Convention through the Antarctic Marine Living Resources Conservation Act, 1981 (see appendix 28). 3/

260. It is important to note that the objective of the Convention is the conservation of Antarctic marine living resources. For the purposes of the Convention, "conservation" is taken to include "rational use". Thus, harvesting and associated activities in the area of the Convention are required to be conducted in accordance with internationally accepted principles of conservation, notably: the prevention of decreases in the size of any harvested population to levels below those which ensure its stable recruitment; the maintenance of ecological relationships between harvested, dependent and related populations of marine living resources; and the prevention of, or the minimization of the risk of, potentially irreversible changes in the marine ecosystem (see appendix 27, CAMLR Convention, art. II). 3/ Antarctic marine living resources are defined in the Convention as fin fish, molluscs, crustaceans and all other species of living organisms, including birds, found south of the Antarctic Convergence, all of which

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36/ As at 15 June 1984, the following States had ratified the Convention: Argentina, Australia, Belgium, Chile, France, German Democratic Republic, Germany, Federal Republic of, Japan, New Zealand, Norway, Poland, South Africa, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and United States of America.

37/ Spain, Sweden and the European Communities.

are part of the one Antarctic ecosystem. The conservation measures under the Convention may include the designation of quantities of any species which may be harvested, of regions or subregions in which it may be harvested, of open and closed seasons, of methods of harvesting, and, if necessary, the designation of protected species (idem, art. IX.2). 3/ The Antarctic Convergence, used to define the area of application of the Convention, is a shifting, but distinct, biological boundary to the south of which the Antarctic ecosystem is found, and to the north of which the ecosystems of warm temperate zones exist. This novel form of defining the area of application of the Convention underlines the "ecosystem" approach that is a special feature of the Convention.

261. The functions of the Commission established under the Convention (idem, art. IX.1) 3/ include the facilitation of research into Antarctic marine living resources and the Antarctic marine ecosystem; the compilation of data on the status and development of Antarctic marine living resources; the acquisition of catch and effort statistics on harvested populations; the analysis, dissemination and publication of data; the identification of conservation needs and analysis of the effectiveness of conservation measures; the formulation and adoption of conservation measures on the basis of the best scientific evidence available; and the implementationof a system of observation and inspection (idem, art. XXIV), 3/ an important verification mechanism paralleling that contained in the Antarctic Treaty. The Convention also establishes a Scientific Committee to give expert advice to the Commission and to provide a forum for consultation and co-operation concerning the collection, study and exchange of information on Antarctic marine living resources (idem, arts. XIV and XV). 3/

262. It is important to note that the Consultative Parties deliberately determined that the Convention should not be concerned with the economic aspects of fishing activities in the Antarctic region. The Convention does not confer any fisheries rights. It is a conservation and management régime and should not be seen in any sense as an attempt to appropriate to the use of Consultative Parties the living resources of Antarctica.

263. The Convention was carefully framed so as to be consistent with the provisions of the Antarctic Treaty and to ensure the promotion of the principles and objectives of the Treaty. In particular, the Convention confirmed the prohibition on military use and nuclear explosions (idem, art. III) 3/ and took an approach, almost identical to article IV of the Antarctic Treaty, in handling the sovereignty issue (idem, art. IV). 3/ However, the Convention is an independent treaty with a different membership and institutional structure.

264. Particularly important was the encouragement in the Convention of co-operation with other intergovernmental and non-governmental organizations and with FAO and other specialized agencies (idem, art. XXIII). 3/ Those six international organizations and intergovernmental organizations which participated in the diplomatic conference which adopted the CAMLR Convention have subsequently been invited to participate as observers in all meetings of the Commission and the Scientific Committee. It is noteworthy that a close and co-operative working relationship has already been established between CCAMLR and FAO. The two bodies are co-operating in jointly publishing scientific material, and the CAMLR

Commission has been invited to participate in FAO meetings as an observer. The advice of outside scientists and experts may be sought. The Convention has thus established a further framework for consultation and co-operative effort between those States active and interested in Antarctica and the broader world community.

265. Consistent with Australia's key role in the negotiation of the Convention, it was decided that the Commission for the Conservation of Antarctic Marine Living Resources should be permanently based in Hobart, in the Australian State of Tasmania (which is also the administrative base for the support of Australia's Antarctic operations). Australia also serves as the depositary State for the Convention. Following a Preparatory Meeting in September 1981, the first meetings of the Commission and the Scientific Committee took place at the headquarters at Hobart, from 25 May-11 June 1982. An Australian Executive Secretary was appointed to head the secretariat at Hobart. Australia was also elected as the inaugural Chairman of the Commission.

266. Australia has not yet engaged in any commercial exploitation of the marine living resources of the Australian Antarctic Territory or of the adjacent waters. It has a substantial interest in ensuring that any exploitation of these resources by others is regulated in a way and at a level which does not threaten either the balance of the ecosystem or the maintenance of the resources for future utilization.

267. Australia recognizes that it is not a practical option to seek unilaterally and directly to manage and control the marine living resources of the AAT and its adjacent waters outside the ambit of an effective, internationally acceptable régime involving those countries active in the research or harvesting of those resources. Australia therefore supports the consolidation and development of CCAMLR as an effective conservation and management régime for Antarctic marine living resources, and as a separate but vital link in the system of management of Antarctic affairs established by the Antarctic Treaty.

The Twelfth Antarctic Treaty Consultative Meeting

268. Last year, Australia again hosted an Antarctic Treaty Consultative Meeting. The twelfth such meeting was held at Canberra from 13-27 September 1983. Immediately before the Twelfth Antarctic Treaty Consultative Meeting, on 12 September, the Fifth Special Consultative Meeting was held 38/ to accept Brazil and India as Consultative Parties to the Antarctic Treaty, bringing the total number of Consultative Parties to 16. Together with the accession to the Antarctic Treaty of China earlier in the year, this indicated a steady expansion of international support for the Treaty and interest in Antarctica, including the interest on the part of the developing countries.

269. The Twelfth Antarctic Treaty Consultative Meeting was also the first meeting at which delegations from countries which are parties to the Antarctic Treaty but which are not Consultative Parties were present as observers. This was the result

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38/ Copies of the final reports of the Twelfth Antarctic Treaty Consultative Meeting and the Fifth Special Consultative Meeting are included in the materials accompanying this contribution [see footnote 3].

of a decision by the Consultative Parties to open up the Treaty system and to improve understanding of it. Rules of procedure were adopted to facilitate their involvement in consultative meetings and they made a constructive contribution to the meeting.

270. The Twelfth Antarctic Treaty Consultative Meeting took place against the background of moves to have Antarctica inscribed on the agenda of the thirty-eighth session of the General Assembly. Delegations at the Twelfth Consultative Meeting reaffirmed their commitment to the Antarctic Treaty and expressed their concern that any attempts to modify or replace the Treaty would be likely to introduce contention and instability into a region of hitherto unparalleled peace and international co-operation.

271. A wide range of scientific, environmental and operational questions concerned with improving co-operation in Antarctica were also discussed. Eight recommendations to Governments containing concrete proposals for improving and expanding that co-operation were adopted.

272. A number of proposals (see recommendation XII-6) were considered relating to the preparation and dissemination of the documents of the Treaty system and of consultative meetings. For example, it was agreed that the Handbook of Measures in Furtherance of the Principles and Objectives of the Antarctic Treaty 34/ would be expanded and more widely distributed, including distribution to the Secretary-General of the United Nations. It was also agreed that the United States of America, as the Depository Government of the Antarctic Treaty, would study the question of identifying and cataloguing publicly available information about the Treaty system. As part of this general effort to disseminate information, Australia has given wide distribution to the report of the Twelfth Antarctic Treaty Consultative Meeting. In the absence of any secretariat for the Consultative Parties, Australia agreed to continue to act as co-ordinator for matters of common interest until the next preparatory meeting in 1985. The question of improving access to information for those States and organizations outside the Treaty system will, however, need to be further addressed and the topic is already on the agenda for the next consultative meeting.

273. Special emphasis was placed on protecting Antarctica's vulnerable environment. A number of practical proposals (see recommendations XII-3 and XII-4) 38/ dealing with the impact of man's activities on the Antarctic were adopted, such as for the development of procedures for the evaluation of the impact of scientific work and of its related logistic support, and an examination in the light of increasing activity and technological improvements of the Code of Conduct for stations in Antarctica. These would enhance the already effective system of environmental protection that has been built up by conventions and the recommendations of consultative meetings.

274. The meeting also adopted a recommendation (XII-2) 38/ aimed at developing the telecommunications network in Antarctica to take account of increasing air and shipping activity in the region and developments in satellite communications. Another recommendation (XII-1) 38/ was directed towards improving the system for the collection and distribution of meteorological data through the World Weather Watch system of WMO. This would not only benefit Antarctic regional forecasting but also routine weather forecasting throughout the world.

Antarctic minerals

275. The nature and extent of the known mineral resources of Antarctica and of the AAT have been dealt with in section IV above. Suggestions that Antarctica may contain large and valuable mineral deposits are at this stage speculative. Certainly there is little specific knowledge about Antarctica's mineral resource potential; no significant economically exploitable deposit has yet been found, nor has any comprehensive survey been undertaken. The remote and hostile environment, the difficulties and expense of extraction, the costs of necessary environment protection and transport, and the availability of lower cost alternative sources suggest that exploitation of Antarctic minerals is unlikely to be technically feasible or economically rational until the next century, if ever.

276. Why then have the Consultative Parties considered it necessary to begin negotiations now aimed at reaching an agreement to govern Antarctic minerals activity? Although mineral exploitation is unlikely in the foreseeable future, there is pressure to begin minerals prospecting. The problem of the possible effects of mineral exploration was first addressed by the Consultative Parties as early as 1972 (see recommendation VII-6) 33/ when they reaffirmed that Antarctica should not become the scene or object of international discord, noted the technological developments in polar mineral exploration and the increasing interest in the possibility of there being exploitable minerals in Antarctica, and recognized that mineral exploration is likely to raise problems of an environmental nature and that Consultative Parties should assume responsibility for the protection of the environment and the wise use of resources. Accordngly, Consultative Parties recommended further study of the subject. Consultative Parties examined the matter again in 1975 (see recommendation VIII-14), 33/ expressing in particular their concern that mineral resource exploration and exploitation could adversely affect the unique environment of the Antarctic and other ecosystems dependent on the Antarctic environment. The Consultative Parties urged restraint while further study of such problems was undertaken, and recommended that a special meeting of Consultative Parties be held to consider the question.

277. A special meeting of Consultative Parties held in Paris in 1976 (Special Preparatory Meeting, 28 June-10 July 1976) elaborated the following principles:

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

(b) The Antarctic Treaty must be maintained in its entirety;

(c) Protection of the unique Antarctic environment and of its dependent ecosystems should be a basic consideration;

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

278. In 1977, Consultative Parties at the Ninth Antarctic Treaty Consultative Meeting recommended (see recommendation IX-1) 33/ that Governments endorse those

principles. Consultative Parties had before them a report from SCAR 39/ and a report from an expert group drawn from Consultative Parties proposing guidelines on appropriate methods for mineral exploration in the Antarctic and for the protection of the environment. 40/ Both these environmental studies were noted by Consultative Parties who recognized the need for more adequate scientific data and expressed the concern that unregulated activities related to exploration and exploitation of mineral resources could adversely affect the unique environment of the Antarctic and its dependent ecosystems. Consultative Parties pointed out that, on the basis of their experience accumulated from scientific research in Antarctica, they were in a position to contribute substantially to the protection of the environment and the rational use of Antarctic resources, should exploration or exploitation occur. In particular, Consultative Parties were aware of their responsibility to ensure that commercial mineral exploration or exploitation should not become the cause of international discord, environmental danger, disruption to scientific investigation or be otherwise contrary to the principles or purposes of the Antarctic Treaty.

279. Accordingly, Consultative Parties recommended (see recommendation IX-1.6) 33/ that Governments study the content of a future minerals régime based on the principles elaborated at the 1976 Paris meeting referred to above (see para. 277 above). Consultative Parties further recommended that Governments 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 minerals régime, thus instituting an effective moratorium on exploration and exploitation while negotiations proceeded (see recommendation IX-1.8). 33/

280. The Consultative Parties took their consideration of matters pertaining to Antarctic minerals further in 1979 with a meeting of ecological, technological and other experts who examined ways of improving predictions of the impact of possible technologies for Antarctic mineral exploration and exploitation and developing measures for the prevention of damage to the environment or for its rehabilitation. 41/ In 1979, Consultative Parties also began consideration of legal and political aspects of mineral resource exploration and exploitation, 42/ recommended further necessary scientific research and made some tentative

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39/ Scientific Committee on Antarctic Research, A Preliminary Assessment of the Environmental Impact of Mineral Exploration/Exploitation in Antarctica (SCAR, August 1977).

40/ The report of the Group of Experts on Mineral Exploration and Exploitation is included in the Final Report of the Ninth Antarctic Treaty Consultative Meeting (annex 5), and reprinted in the Handbook of Measures in Furtherance of the Principles and Objectives of the Antarctic Treaty, pp. 9601-9818 [see footnote 3].

41/ Their report is included in the Final Report of the Tenth Antarctic Treaty Consultative Meeting (annex 6), and reprinted in the Handbook of Measures in Furtherance of the Principles and Objectives of the Antarctic Treaty [see footnote 3].

42/ Idem, annex 5.

suggestions as to what a minerals régime should comprise (see recommendation X-1). 33/ In particular, Consultative Parties recommended that an agreed régime should contain means for assessing the possible impact of mineral resource activities on the Antarctic environment, determining whether mineral resource activities will be acceptable and establishing rules for the protection of the environment.

281. In other words, as early as 1979 Consultative Parties accepted that the régime would need to contain mechanisms to assess whether minerals activities could safely be undertaken. Finally, at the Eleventh Antarctic Treaty Consultative Meeting, Consultative Parties recommended (recommendation XI-1) 33/ that a special consultative meeting be convened to elaborate a régime which should be based on those principles identified in 1976 and consistently reaffirmed since then; in particular, the protection of the environment, the requirement that any such régime should maintain and safeguard the provisions of the Antarctic Treaty, and the necessity that the interests of all mankind in Antarctica should not be prejudiced. Consultative Parties also specifically recommended that the régime should be open to all States which commit themselves to the principles and objectives of the Antarctic Treaty, should make provision for co-operative arrangements between the régime and other relevant international organizations and should not encroach on the deep sea-bed. These guiding principles and objectives have been observed by Consultative Parties in their subsequent discussions on a minerals régime. 43/

282. Australia has taken an active role in the discussion between Consultative Parties on Antarctic minerals, and supports the negotiation of an agreement as the best means of ensuring that any future minerals activity in Antarctica does not damage the environment and is responsibly managed.

283. It should be clear that what motivated Consultative Parties to begin negotiations on an Antarctic minerals régime was not, as has sometimes been alleged, the vision of a minerals cornucopia in Antarctica, or a desire to undertake exploitation of minerals while excluding the rest of the world community from participation. On the contrary, Consultative Parties were motivated principally by a concern to ensure protection of the Antarctic environment. They recognized that, unless guidelines were established, mineral exploration and exploitation, if it occurred, could have harmful environmental impacts and adversely affect other uses of Antarctica; they also realized that it would be easier to negotiate an agreement before mineral deposits were found. Reliable information on the nature and extent of Antarctic mineral resources and on the likely or possible environmental impacts of exploration and exploitation was not available. Further research was required to provide the basis for informed decisions before the pace of technological change or demand for scarce resources overtook Consultative Parties and presented them with immediate and serious pressures for minerals exploitation in Antarctica.

43/ The first session of the Special Consultative Meeting was held at Wellington, from 14 to 25 June 1982; subsequent meetings have been held at Wellington, from 17 to 28 January 1983; Bonn, from 11 to 22 July 1983; Washington, D.C., from 18 to 27 January 1984; and most recently at Tokyo, from 22 to 31 May 1984.

284. The Antarctic Treaty neither prohibits nor provides for minerals activity in Antarctica. Although the Consultative Parties have agreed on certain principles of a minerals régime, many practical matters remain to be negotiated. These include such aspects as the area over which the régime should apply, the activities which should be covered, the principles of environmental safeguards to apply, the question of participation in a régime, the institutional mechanisms and decision-making procedures which would need to be established, the terms and conditions for resource activities, the relationship between the régime and the Antarctic Treaty, and the relationship of the régime with other international bodies.

285. The Consultative Parties do not underestimate the difficulties involved in attempting to reconcile the differing interests of countries concerned about Antarctica. Accommodations need to be made between the interests of claimant and non-claimant States, between the Consultative Parties as a whole and other States, between pro-conservation and pro-development interest groups, and between industrialized countries and developing States. The divergent economic and management perceptions of Eastern European and Western Consultative Parties will also need to be bridged.

286. It is thus clear that issues of mineral resource exploitation pose questions of a different order from those covered in the Antarctic Treaty of 1959, since the right to exploit resources is traditionally an integral part of the concept of national sovereignty. Mineral resources are non-renewable; and the intrinsic nature of mineral exploration and extraction activity brings to the forefront the issue of jurisdiction. The type of complex political and legal questions that were involved in Antarctic marine living resource discussions arise therefore even more acutely in the context of Antarctic mineral issues.

287. In moving towards a minerals régime for Antarctica, Consultative Parties have not acted precipitately as has also occasionally been alleged. Even if a régime is concluded in the next few years, it will have taken 15 or more years since the issue was first considered in 1972. The Consultative Parties' approach has been thorough, careful and deliberate. Regular meetings have been held at approximately six monthly intervals. Increased international interest in Antarctica has not caused Consultative Parties either to accelerate or slow down their discussions on a mineral agreement. They have maintained a moratorium on all minerals activity and will continue to do so pending the completion of the negotiations. Protection of the Antarctic environment, the maintenance of the Antarctic Treaty and the safeguarding of its purposes and objectives, and a determination not to prejudice the interests of mankind have remained as guiding principles throughout the negotiations and will form the basis of any future minerals agreement, which will be open to all nations. In an important decision taken by Antarctic Treaty Consultative Parties at Tokyo in May this year, reflecting a recognition of a growing international interest in the negotiations taking place on an Antarctic minerals régime, non-Consultative Parties of the Antarctic Treaty have been invited to observe the next round of the negotiations to be held at Rio de Janeiro in February/March 1985.

VI. THE ANTARCTIC TREATY SYSTEM

A. The value of the Antarctic Treaty system

288. Australia was one of the original 12 signatories to the Antarctic Treaty when it was concluded in 1959. During the period since, the Antarctic Treaty has proven a remarkably successful instrument of international co-operation. It has preserved peace and harmony in the Antarctic region, while at the same time enabling important scientific research and co-operation to take place in a manner which has benefited all mankind.

289. Thirty-one countries have now acceded to the Treaty. They include all those countries actively involved in Antarctica, the five most populous nations in the world, all five permanent members of the Security Council, all nuclear-weapons States and the countries proximate to Antarctica.

290. In Australia's view, the Treaty offers a number of important advantages to the international community:

(a) It is open to accession by any Member State of the United Nations, or any country which may be invited to accede with the consent of the Consultative Parties - it is thus as universal as the interest of States in Antarctica;

(b) It is of unlimited duration and establishes Antarctica as a region of unparalleled international co-operation in the interests of all mankind;

(c) It is based on the Charter of the United Nations, promotes its purposes and principles and confirms Antarctica as a zone of peace; it is, in fact, the only effective, functioning nuclear-weapons-free zone in the world today;

(d) It excludes Antarctica from the arms race by prohibiting any measures of a military nature, such as the establishment of military bases and installations, the carrying out of military manoeuvres or the testing of any types of weapons, including nuclear weapons, and forbids the dumping of nuclear waste;

(e) It encourages and facilitates scientific co-operation and the exchange of scientific information, which is made available for the benefit of all States;

(f) It protects the natural environment of Antarctica, including the Antarctic ecosystem;

(g) It provides for a comprehensive system of on-site inspection by observers to promote the objectives and to ensure compliance with the provisions of the Treaty;

(h) It has averted international strife and conflict over Antarctica, inter alia, including by putting aside the question of claims to sovereignty in Antarctica, thereby removing the potential for dispute.

291. These are not merely worthy objectives. They have been successfully implemented in practice during the period since the Treaty came into force and have

been supplemented by a range of other detailed measures and arrangements (described in section V of this contribution) which now form an integral part of the Antarctic Treaty system.

292. The Antarctic Treaty has served a number of important Australian interests:

(a) It has furthered Australian security interests by ensuring that the Antarctic region, which is geographically proximate to Australia, remains free from conflict and military activity and from political contention;

(b) It has provided a satisfactory means of preserving the position of those States with claims to sovereignty in Antarctica, such as Australia, and those with a basis of claim, without prejudicing the position of those parties to the Treaty which do not recognize territorial claims in Antarctica;

(c) It has provided unique and valuable opportunities for scientific research and co-operation through expeditions and through Australia's three stations in Antarctica;

(d) It has protected the vulnerable Antarctic environment, which has an important bearing on Australia's weather and ocean currents;

(e) It has afforded Australia an influence commensurate with its interests in the management of Antarctic affairs and with its desire to ensure the rational use of Antarctic resources.

293. In short, Australia believes that the Antarctic Treaty system has been a highly successful, practical and flexible instrument which has served both its own interests and those of the international community very well indeed. For these reasons, we consider that every effort must be made to preserve the Treaty and to strengthen and develop the system of management and environmental protection established by it.

B. Criticism of the Antarctic Treaty system

294. At the thirty-eighth session of the General Assembly, a number of countries suggested that it might be appropriate to revise or replace the Antarctic Treaty. 44/ The main arguments for change appear to be that the Treaty system is anachronistic and discriminatory, that claims to sovereignty should be put to one side as a form of colonialism, that the system is secretive, that it is exclusive and controlled by developed countries, that it should be replaced by a universal régime, and that the benefits derived from the exploitation of Antarctic resources should be shared as the "common heritage of mankind". Australia regards these views as misrepresenting the Treaty system and as being based on a number of misconceptions.

44/ See Official Records of the General Assembly, Thirty-eighth Session, First Committee, 42nd to 46th meetings.

Anachronistic

295. First, Australia does not agree that the Treaty system is anachronistic. The principles and objectives of the Treaty, as described in section V above, as are valid and effective today as they were 25 years ago. The Treaty is open to all; decisions are made by all those directly involved. The system has evolved to meet expanding requirements and continues to do so; this is a notable achievement. The success of the Treaty over a long period is quite remarkable. It is difficult to conceive of any other formula which would work as well.

Sovereignty

296. Australia does not regard the description of claims to sovereignty in anti-colonial terms as appropriate. Antarctica lies immediately to Australia's south and, because of its geographical proximity, Australia has legitimate and important security, scientific, environmental and other interests in relation to it. These interests were not imposed on any indigenous inhabitants. Our claim to sovereignty in the Australian Antarctic Territory is, we consider, valid in international law. Australia's claim is based on early heroic acts of discovery and expedtions to an uninhabitated land mass, as well as on the maintenance of a substantial and continuing presence there. As demonstrated in sections I and II of this contribution, Australia has maintained permanent manned stations in the Australian Antarctic Territory, has provided for its orderly management through the application of relevant Australian laws and has conducted significant geographical and scientific investigation there.

297. In contemporary terms, Australia's claim to territorial sovereignty is a reflection of our commitment to Antarctica. It underlies our desire to ensure an influential role for Australia in the evolution of Antarctica and in the management of its affairs. Australia's participation in the Antarctic Treaty system of management is a sovereign act for the purpose of achieving international harmony and co-operation in Antarctica.

298. The term colonialism also evokes emotional connotations of exploitation which have simply not been relevant in Antarctica. There are no inhabitants there (other than scientists working on a temporary basis) and, hitherto, there have been no financial benefits - indeed only costs - for countries active in Antarctica. Scientific investigation in Antarctica has been carried out at very high financial cost to the countries concerned. Despite this, the results of that research have been made freely available to the international community.

299. Australia recognizes that claims to territory in Antarctica are not universally accepted. None the less, there is no indication that claimants are likely to resile from their claims and attempts to challenge them would provoke international tension. In Australia's view, one of the most important advantages of the Antarctic Treaty has been that, through article IV, the differing positions of claimants, those with a basis of claim and those who do not recognize such claims, have been put to one side, in order to enable international co-operation in Antarctica to take place. Thirty-one States, including all States actively involved in the continent, have seen fit to accept the Treaty's solution to the

problem posed by sovereign claims. We see no better means of resolving this problem in today's international environment, and see inherent dangers in trying to tamper with it.

Information and decision-making

300. Australia disagrees with accusations that the Antarctic Treaty system is secretive. Until very recent times, there has been little international interest in what has been taking place in Antarctica, except among scientists and those States undertaking scientific activities there. Treaty partners over the years have conducted regular exchanges of information on activities taking place in Antarctica. With growing international interest in the continent, efforts have been made to make this information available to a wider international audience, including through the United Nations. For example, as described in section V above, a close and co-operative working relationship was established at a very early stage with international scientific organizations and WMO. The Commission for the Conservation of Antarctic Marine Living Resources, as well as international and intergovernmental organizations (including FAO), already co-operate in scientific studies directed at the conservation and responsible management of the marine living resources of Antarctica. Further, Consultative Parties at the Twelfth Antarctic Treaty Consultative Meeting in 1983 considered the question of improvements to their system of information distribution and made a number of recommendations to this end, which were described in section V. In the absence of a permanent secretariat structure, the distribution of information on Antarctica by Consultative Parties has not always been as effective as it might have been. It is in recognition of this and of the increased interest in the continent being shown by the world community that Consultative Parties are taking early steps to enable wider international dissemination of information on Antarctica. The Secretary-General's study should make a positive contribution to this process.

301. The Antarctic Treaty system is simply not exclusive or controlled by developed countries. The Treaty is open to accession by all States Members of the United Nations, and the number of parties continues to grow (in the last year, China, India, Hungary, Finland and Sweden have acceded to the Treaty). Its membership is diverse in political, geographic, social and economic terms. Furthermore, the Consultative Parties to the Treaty, who are responsible for the management of Antarctic affairs, comprise not only the original 12 signatories to the Treaty but also those nations which have conducted substantial scientific research activity in Antarctica, such as the establishment of a scientific station or the dispatch of a scientific expedition. Late last year, following expeditions to Antarctica, Brazil and India became Consultative Parties. The main point at issue here is not exclusivity, but rather the widely observed principle in international relations whereby those countries primarily engaged in a particular activity are responsible for management and decision-taking. This is sensible and workable. In the management of Antarctic affairs, it is natural that those engaged in scientific research and co-operation in the continent should wish to consult and make recommendations about their activities to their Governments. It is also sensible that those countries which have undertaken major practical commitments in Antarctica should be responsible for the co-ordination of their activities within the Treaty system. This principle is not unique to the Antarctic Treaty, since it

is found in a number of other international agreements and in the practice of a number of other international organizations, including within the United Nations system. It should be emphasized in this context that Consultative Parties share important obligations and responsibilities; what benefits there are, mainly in the scientific field, are made freely available to the international community.

302. It has been argued by some critics of the Treaty system that the Treaty is discriminatory, in that it establishes a two-tiered structure of membership. Decision-making is vested in the Consultative Parties who comprise only those States undertaking substantial scientific reseearch activity in Antarctica. They also argue that, in order to undertake such activity, States must be able to devote considerable financial resources to an Antarctic programme and must have an adequate base of relevant scientific expertise. It is said that such requirements unfairly discriminate against poorer developing countries who can ill afford the commitments necessary to be accorded Consultative Party status. Australia, and other Consultative Parties, fully recognize the difficulties confronting developing countries which may wish to become active in Antarctica. As outlined in section III above, which dealt with Australia's co-operative scientific programme, Australia, like many other Consultative Parties, has sought to assist scientists from other countries who wish to become involved in Antarctic research. In keeping with the provisions of the Antarctic Treaty which encourage scientific co-operation, Australia and other Consultative Parties have been willing and able to share their accumulated expertise in Antarctica with scientists from other countries, to advise on matters of scientific research and logistic support and to extend the opportunity, within the financial and physical limits of their own national programmes, for scientists from other countries to conduct research on the continent itself and thus gain valuable firsthand experience of work and conditions there. For its part, Australia intends to continue and expand such co-operative efforts.

303. Furthermore, it is not accurate to suggest that countries other than Consultative Parties have no role in influencing decision-making at Consultative Meetings. In response to the wider international interest demonstrated in activities in Antarctica and in recognition of the obligations accepted by the growing number of countries acceding to the Antarctic Treaty, all Consultative Parties took the important step of inviting non-Consultative Parties of the Treaty to participate as observers at the Twelfth Antarctic Treaty Consultative Meeting held at Canberra in September 1983. They will also participate at the Thirteenth Antarctic Treaty Consultative Meeting to be held at Brussels in 1985 and in the preparatory meeting for it. In addition, because of growing interest in the negotiations towards an agreement governing minerals activities in Antarctica, it has been decided to invite non-Consultative Parties of the Antarctic Treaty to attend as observers future sessions of the negotiations, including that to be held at Rio de Janeiro in February/March 1985.

304. It should be noted further that in a forum such as consultative meetings, where decisions are taken by consensus and there is no voting, the distinctions between participants and observers are not great. Although non-Consultative Parties do not take part in final decision-making, they have the right of participation up to that stage; they may speak, submit documents and discussion

papers and attend working group meetings. In other words, if countries really desire to be kept informed of and involved in developments relating to Antarctica and to have the opportunity to influence decisions affecting the continent, there are advantages in their acceding to the Antarctic Treaty.

"The common heritage of mankind"

305. Australia does not accept the argument that Antarctica should be treated as "the common heritage of mankind", like those areas such as outer space and the deep sea-bed beyond national jurisdiction. Australia supports the concept in the law of the sea context, but does not regard it as relevant or appropriate in Antarctica.

306. Australia and six other countries maintain national territorial claims as well as permanent stations in Antarctica. Except for the unclaimed sector, Antarctica is, therefore, not beyond national jurisdiction. Antarctica has been explored and settled and there are claims for sovereignty there. These claims are long-standing and pre-date not only the emergence of the concept of the common heritage of mankind, but, in most cases, also the United Nations system itself, by many years. Furthermore, Antarctica has already been effectively managed under an existing international agreement, the Antarctic Treaty, for nearly a quarter of a century.

307. In addition, the "common heritage" concept embraces a strong developmental purpose, which we would not regard as appropriate for Antarctica, where the environment is vulnerable and must be stringently safeguarded. The negotiations towards an Antarctic minerals régime are predicated on the vital need to ensure the protection of the Antarctic environment. Furthermore, as explained in section IV, the resource potential of Antarctica is largely speculative at this stage. It is not the treasure trove of resources that some commentators at times seem to suggest. Exploitation, if it occurs, will be a long way off.

308. There is no basis for suggesting that the resources of Antarctica will, in effect, be reserved only for the few. Access to the marine living resources of Antarctica is open to all nations, subject to the conservation mechanisms laid down in the Convention on the Conservation of Antarctic Marine Living Resources. Likewise, the complex and protracted negotiations under way for a régime to govern possible minerals activities are proceeding on the basis of a recognition of the need not to prejudice the interests of all mankind in Antarctica, including the right of all countries to participate in future minerals activities.

309. There are those who argue that there should be no minerals exploitation in Antarctica at all either because of the environmental risks or because of the potential conflict with other uses of Antarctica, such as the unique scientific opportunities and wilderness values. For a country like Australia, with a strong interest in environment protection in Antarctica, this idea has some prima facie attractions: it would, if universally observed, remove risks to the environment from minerals development and avoid international disputes over Antarctic resources. However, it is unrealistic to expect Governments to rule out for all time the development of resources which may become economically practicable and environmentally safe and which are needed by the world community. There is already interest in commencing prospecting for minerals resources in Antarctica. It is for

this reason that Australia considers it necessary to negotiate a minerals régime to protect and regulate such activities and to protect the environment. Unregulated activity could be both environmentally damaging and lead to renewed contention. It is important to negotiate such a régime now, while free from immediate pressures to exploit and to ensure that a framework is in place against the possibility that resource activity might take place in the future in some part of Antarctica.

C. The future

310. In responding to criticism of the Antarctic Treaty system, it is not intended to suggest that the system is static and that it cannot be improved. In fact, one of the Antarctic Treaty system's major strengths has been its flexibility and its capacity to evolve over time to cope with new requirements. This has happened already through the negotiation of a Convention dealing with marine living resources, as well as the negotiations under way over minerals. It is also evident in the opening up of Consultative Party meetings and meetings of the Antarctic minerals negotiations to non-Consultative Party observers, as well as in the wider dissemination of information on Antarctic affairs. Further evolution of the Treaty system may be required to meet newly perceived needs in the future and would be possible.

311. Nevertheless, the principal aspects of the Antarctic Treaty - demilitarization, denuclearization, sharing of scientific information, environmental protection, the putting aside of disputes over territorial claims and practical co-operation are all worthy of preservation. In Australia's view, it is extremely doubtful in the present international climate - subject as it is to uncertainty and mistrust in many areas - that it would be possible to achieve all of these beneficial elements in any new régime, let alone replace it with something more satisfactory. Moves to revise or replace the Treaty would in our view run the very real risk of reopening competition between States active in Antarctica, as well as reviving contention over claims to sovereignty. Such moves would thereby heighten international tension in a way which the Treaty has successfully avoided.

312. In conclusion, Australia strongly supports the Antarctic Treaty system as the best means of ensuring continued peace and international harmony in Antarctica. Australia, nevertheless, stands ready to consider carefully constructive suggestions for further improving the operation of the Antarctic Treaty system.

4. BANGLADESH

[Original: English]

[17 July 1984]

1. We affirm the conviction that, in the interest of all mankind, Antarctica should continue forever to be used exclusively for peaceful purposes and that it should not become the scene or object of international discord.

2. We support the Economic Declaration 45/ adopted by the Seventh Conference of Heads of State or Government of the Non-Aligned Countries held in New Delhi from March 7 to 12 1983.

3. In view of the absence of indigenous population in Antarctica and the prospects of tremendous mineral and fossil resources in the area, a global régime for Antarctica should be established on the principle of the common heritage of mankind.

4. Membership of the Consultative Council should be made open to other developing countries desirous of joining it. Alternately, instead of single-country membership, participation by a recognized and established regional or sub-regional group might also be considered. As an immediate measure, affiliation of a developing country with one or more countries of the Treaty should be adopted.

5. A mechanism should be established to ensure that the international community is aware of the activities carried out in the Antarctica, particularly in the context of the environment and its resources.

6. We reiterate that exploration of the area and exploitation of its resources should be carried out for the benefit of all mankind and in a manner consistent with the protection of environment of Antarctica.

7. South Africa must be excluded from the 1959 Antarctic Treaty because of its apartheid policies.

8. The subject should be included as an item in the provisional agenda of the thirty-ninth session of the General Assembly entitled "Question of Antarctica".

45/ A/38/132-S/15675 and Corr.1 and 2, annex, sect. III.

5. BELGIUM

[Original: French]

[27 August 1984]

BELGIUM AND THE ANTARCTIC

A. Belgian expeditions

1. Belgium has had a long-standing interest in Antarctic research, dating back to 1897, the year that the Belgica set sail. This three-master, under the command of Adrien de Gerlache de Gomery, reached Antarctica via South America; it was the first vessel to winter there (in the winter of 1898) and carried the first truly scientific expedition into that region. The Gerlache Strait, Anvers, Brabant and Liège islands and Danco Land recall to this day the adventure of this small vessel, 30 metres in length and 35 horsepower, which allowed itself to become icebound without a radio for 380 days, freeing herself only in March 1899 after her crew had spent 20 days sawing a channel 700 metres long in the frozen sea out to open water.

2. Two features which were to characterize subsequent expeditions organized by Belgium date from this time: the employment of foreign experts and a disinterested objective of pure scientific research. Of the crew of 19, nine were Belgians, six Norwegians, two Poles, one Romanian and one American; among them was Roald Amundsen, the future conqueror of the South Pole, for whom, as a second lieutenant, this was his first contact with the polar continent. Their programme included, in addition to map-making, astronomical, magnetic and gravitational observations, the study of the aurora australis, glaciers, sea water, flora and fauna, as well as the collection of geological specimens. The data obtained were systematically analysed, and from 1910 to 1936 the scientific commission formed to study them published more than 60 monographs.

3. The most noteworthy of the expedition's discoveries and achievements were the preparation of the first accurate charts of the region explored (those used today are not significantly different); the proof of the existence of a continental shelf and hence of a polar continent; the first reliable tracings of terrestrial magnetism in the Antarctic (which hitherto had been hypothetical); the first daily meteorological observations of the Antarctic winter; the classification of several different species of animals, as well as 55 species of lichen and 27 mosses (only three were previously known).

4. Belgium returned to the Antarctic at the end of 1957. The credit for this belongs to Baron Gaston de Gerlache de Gomery, son of the explorer of 1898, who, 60 years after his father, organized, on the occasion of the International Geophysical Year a new expedition to the region situated to the south of Africa, on Princess Ragnhild Coast, where at latitude 70°25'5" South and longitude 24°18'38" East, he established the King Baudouin Base which since then has formed the nerve center of all investigations undertaken by Belgium.

5. This research, extending over 10 years, falls into two periods. The first, from the end of 1957 to the beginning of 1961, comprised the following expeditions:

(a) The expedition of 1958, led by Commander Gaston de Gerlache de Gomery; this had 17 members, including one Italian. The expedition's scientific programme included synoptic and upper air meteorology, solar radiation, geomagnetism, the ionosphere, the aurora australis, atmospheric radioactivity, geology, glaciology and geodesy; it has been the subject of important publications. The expedition discovered and explored a mountain range, the Belgica Mountains, at latitude 72°30'South and longitude 31° East.

(b) The overwintering expedition of 1959, led by Squadron Leader F. Bastin. It had 22 members, including one United Kingdom national and one Frenchman. In addition to the previous year's programme, the expedition studied atmospheric electricity, seismology, gravimetry and animal biology.

(c) The 1959/60 summer campaign. This consisted of 13 people, all Belgians; their activities were focused on photogrammetry and Antarctic oceanography (echosoundings, the study of marine temperatures, salinity, plankton, and currents; collection of specimens of fish and other marine organisms).

(d) The overwintering expedition of 1960, led by Air Force Major G. Derom. It had 20 members (including one United Kingdom national) who, in addition to the 1958 programme, studied nuclear radiation and gravimetry, as well as human and animal biology. This expedition discovered and photographed from the air a mountain chain, the Fabiola Mountains, situated between latitude 71° and 72° South and longitude 36° East.

(e) The 1960/61 summer campaign. The Libotte expedition had 19 members, including five Italians and one Swede, and carried out a programme of activities in oceanography, biology and glaciological soundings (in co-operation with the Italian National Committee for Nuclear Energy and the Nuclear Geology Laboratory of the University of Pisa).

6. The King Baudouin Base was temporarily closed in February 1961. During the following years individual Belgians participated in research programmes at United States antarctic stations.

7. Towards the end of 1963, Belgium, together with the Netherlands, organized a new expedition. A new period of systematic activity thus began, falling into the following stages:

(a) The 1963/64 summer campaign. The participants numbered 10, including two nationals of the Netherlands and one Italian, and carried out a programme of activities in geodesy, gravimetry, glaciology, marine meteorology and hydrography.

(b) The overwintering expedition of 1964, under the leadership of Engineer Luc Cabes. The participants numbered 14 (10 Belgians and 4 nationals of the Netherlands) and studied atmospheric electricity in addition to the basic 1958 programme.

(c) The 1964/65 summer campaign. It involved 20 people (16 Belgians, 3 nationals of the Netherlands and 1 United Kingdom national) and was devoted to geology, geodesy, photogrammetry, oceanography, animal biology and zoology.

(d) The 1965 overwintering expedition, led by Engineer W. Bogaerts. Sixteen people participated (10 Belgians and 6 nationals of the Netherlands). The study of the ozone layer was added to the programme of 1958 and following years.

(e) The 1965/66 summer campaign. Sixteen people took part, 12 Belgians and 4 nationals of the Netherlands, who carried out activities in photogrammetry, geodesy, oceanography and a programme for SPARMO (Solar Particles and Radiation Monitoring Organization).

(f) The overwintering expedition of 1966, under the leadership of the geologist T. Van Autenboer, had 18 members (12 Belgians and 6 nationals of the Netherlands), and its programme covered all the scientific disciplines investigated by Belgian expeditions since 1958.

(g) The 1966/67 summer campaign. Twenty-four people took part, 19 Belgians, 2 nationals of the Netherlands, 2 Spaniards and 1 Italian. It conducted activities in the fields of geology, geodesy, topography, photogrammetry, oceanography, zoology, atmospheric electricity, glaciology, geomagnetism, gravimetry and meteorology. The value of the observations made by the above-mentioned expeditions was much appreciated, both nationally and internationally, and the data gathered (on meteorology, magnetism, the ionosphere, the aurora phenomenon, radiation, atmospheric electricity, geodesy, geology, glaciology and oceanography) gave rise to numerous publications. More than 200 Belgians have spent periods of time in the Antarctic. In February 1967 the King Baudouin Base was closed once again. While awaiting its reopening, Belgium made arrangements to participate in a research programme at the South African Sanae Base, situated at latitude 70°18'32" South and longitude 20°21'30" East, on the Princess Martha Coast.

(h) The Belgian team of nine was placed under the command of the geologist T. Van Autenboer. It carried out a programme of activities in geology, glaciology, geodesy, photogrammetry and cartography, not only along the coast but also in the Sverdrup Mountains, Gjelsvik Mountains, the Kirwan Escarpment and the Jule Peaks, more than 300 kilometres inland on the Antarctic continent. The expedition set out from Cape Town on 29 December 1967 and returned in March 1968; it was carried out in co-operation with South Africa.

(i) A second summer expedition, under the command of T. Van Autenboer, took place under the same conditions in 1969. It carried out a programme of activities in geology, glaciology, gravimetry, ionospheric studies and meteorological observations.

(j) A third summer expedition, under the same command and conditions, took place in 1970. Its programme covered glaciology, gravimetry and geology.

B. Continuation of the Belgian presence in Antarctica after 1969

8. The Belgian-South African summer campaign of January/March 1970 was the last Belgian expedition in Antarctica. The appropriation for scientific policy were no longer allowed sufficient to finance a new series of Antarctic campaigns.

9. Nevertheless, closing the accounts of the last campaigns left the Belgian Antarctic Committee with a positive balance of approximately 1 million francs. For a few years to come, this sum would enable Belgium to send "exchange scientists" to participate in Antarctic expeditions of the United States and other countries.

10. Thus, some Belgians still participated in the Antarctic, on an individual basis, in foreign scientific research programmes or on simple observer missions.

(a) 1970: In November 1970 Professor Frans Gullentops, a geologist on the science faculty of the Katholieke Universiteit Leuven, participated in a United States expedition at the invitation of the Department of State. At that time Mr. E. Paulissen, Professor Gullentops, assistant, was carrying out scientific research in the vicinity of the United States McMurdo Base, as part of an exchange of scientists with the National Science Foundation in Washington.

(b) 1971-1972: At the invitation of the National Science Foundation, Mr. Hugo Decleir, of the University of Ghent, participated in the 1971/1972 United States Antarctic Research Programme (USARP) from December 1971 onwards. He carried out radio-glaciological research under a joint United States/United Kingdom programme.

(c) 1973: At the invitation of the Head of the United States Navy, Ensign Bernard de Gerlache de Gomery (Reserve), grandson of Adrien, and son of Gaston (see paras. 1-5 above), participated in January/February, as an official observer on board a United States Navy vessel, in relief operations for American expeditions.

(d) 1977: At the invitation of the Headquarters of the Japanese Antarctic Research Expedition, Mr. Stanislas Wartel, Doctor of Geology and First Assistant in the Mineralogy, Petrography and Sedimentology Department of the Belgian Royal Institute of Natural Sciences, joined the personnel of the eighteenth Japanese expedition from December 1976 to March 1977. He thus carried out research on sedimentology at Lützow-Holm Bay in January and February 1977.

(e) 1979: At the invitation of the Argentine authorities, Baron Alain Guillaume of the Belgian Embassy in Buenos Aires, took part in December in the maiden voyage of a new icebreaker, launched in connection with the Argentine summer campaign.

(f) 1980: Mr. Georges Feller, assistant to Professor Hamoir, of the Muscular Biochemistry Laboratory of the Chemistry Institute of the University of Liège, carried out a study on the Kerguelen Island in February/March, on the differentiation of sarcoplasmic proteins in various species of sub-Antarctic fish.

(g) 1982: Mr. Claude de Broyer, research officer in the Department of Recent Invertebrates of the Belgian Royal Institute of Natural Sciences, carried out on Kerguelen Island, from January to March 1982, a study on the biology of macrobenthic peracaridic crustaceans.

C. The pioneering work of the Belgica expedition

(a) Economic interest and present-day relevance of the Antarctic regions

11. Modern technology has considerably expanded our knowledge of the Antarctic region. Yet there are still many problems to be resolved concerning these vast frozen expanses, the surrounding oceans and superjacent atmospheric zones.

12. Almost 90 years ago, the sensational Belgica expedition, under the command of our countryman A. de Gerlache, drew attention to the scientific and economic interest of the Antarctic land mass, seas and atmosphere.

13. The marine animal resources, rich in fats, have long been known and exploited.

14. It is highly likely that the rich fauna of the Antarctic seas is equalled by its mineral resources. The exploitation of such resources, should it take place in the future, would need to take account of the constraints imposed by the complex environment from which they would have to be extracted.

(b) Later Antarctic exploration

15. The question of why exploration and penetration took place later in the case of the Antarctic than the Arctic may be explained by the region's geographic features and the technology available to explorers.

16. The location and geographical structure of the Antarctic are extremely unfavourable to human penetration: vast distances separate it from any inhabited or habitable area, continental bases offering adequate support are very distant, the "closest" being Tierra del Fuego and New Zealand, some 3,600 and 4,700 kilometres from the South Pole respectively. Further, climatic conditions are very severe for man: storms are frequent and fierce, there is persistent frost smoke, a threat is posed by icebergs drifting away from the land mass, and the limit of pack ice extends beyond the Antarctic Circle.

17. A number of incentives of a sports, utilitarian, and scientific or patriotic nature were needed to harness human energy and intelligence in a bold assault on the mysterious Antarctic.

18. Such realities should be borne in mind in making any judgments on the pioneering explorers - such as those at the Belgica - of those distant and particularly inhospitable regions.

(c) The Belgica's scientific research

19. The Belgica's main aim was scientific research, as evidenced by the many publications detailing the expedition's findings, a list of which is appended hereto.

20. Particular mention should be made of the imposing collection of scientific reports published under the aegis of the Belgica Commission, the contents of which are unfortunately too little known in the intellectual and political world.

21. It should not be overlooked that the Belgica was the first expedition to winter in the Antarctic region. That fact alone bestows extraordinary merit on those involved: moral merit for having spent a winter in extremely harsh conditions, and scientific merit, since during the long stay countless specimens were collected and scientific observations made. Reference should also be made to the merit of the experience gained of the Antarctic environment where no one before the Belgica explorers had faced the mystery of the redoubtable winter.

22. It should be added that spending the winter, by lifting, for the first time in the history of mankind, the veil which covered the Antarctic for most of the year, inevitably acted as a powerful stimulus to subsequent Antarctic undertakings.

23. To the above should be added the fact that the Belgica's crew included scientists who were to become "polar" authorities, such as Roald Amundsen, J. B. Charcot, and F. A. Cook, who, through their participation in the work and discussions which took place on the Belgica, had an opportunity to considerably expand their knowledge of the polar environment in its most varied aspects. That could not fail to have a profound influence on the Belgica's crew and their subsequent polar activities and discoveries.

24. The Antarctic expedition commanded by de Gerlache was thus an enterprise of global significance, the results of which were placed at the service of mankind and which some countries were able immediately to take considerable advantage of.

25. The Belgica's achievements, in addition to providing a rich harvest for science, provided valuable information concerning the human organism's adaptability, the exploitation of the Antarctic region for fishing, hunting large marine animals (seals, cetaceans, etc.), navigation and the atmosphere.

26. Belgium itself, although it made major sacrifices, gained no economic or political advantage from its major achievements in the Antarctic.

(d) The pioneering work of the Belgian Antarctic expedition

27. In the last chapter of Quinze mois dans l'Antarctique by de Gerlache, appears this sentence: "Did our work correspond to expectations? It is not for me to say. Our resources were so modest compared with those of the powerful expeditions which were soon to penetrate the southern polar zone that our mission should be considered only as a preliminary scouting". We might accept the word "preliminary", but only on the strict condition that it is equated with "pioneering".

28. It is in fact impossible to conceive of the mission carried out by the Belgica as anything less than a pioneer expedition which, like an ice-breaker, ploughed its way through numerous obstacles and forged a trail for those who followed after. The pioneer ship steered its course bravely through all kinds of obstacles, in regions about which far less was known than it is today.

29. Above all, the Belgica expedition can claim credit for having discovered and explored systematically the Gerlache Strait and the islands in and bordering the

Strait, as well as part of the Danco Coast which, together with Graham Land, Palmer Land and Louis-Philippe Land is now known to form a peninsula which juts out from the Antarctic in the direction of the Patagonian peninsula and islands, where the southern tip of the Cordillera de los Andes disappears into the sea.

30. The area of the Gerlache Strait, where numerous disembarkations were carried out, was carefully studied by the Belgica's scientific and technical staff. Numerous islands, peninsulas, capes, gulfs, bays, channels, etc., were discovered and given Belgian or related names. Among these we might mention Anvers Island with its Osterrieth Range, Brabant Island with its Solvay Mountains, Liège Island with its Brugmann Mountains, Wiencke Island with its Sierra Du Fief, Lemaire Island, Gand Island, Cuverville Island and Rongé Island, and islets such as Auguste Island, Emma Island, Louise Island, the Gaston Islands, the Wauwermans Islands. Several bays were also explored, among them Wilhelmina Bay, Brialmont Cove and Flandres Bay, as well as the Schollaert and Errera Channels and capes such as Cape Renard, Cape Reclus, Beneden Head, Cape Anna, Georges Point, Duthiers Point, Cape Willems, Rahir Point, Cape Lancaster, Cape Errera, Cape Laure, Ryswyck Point, Cape Lagrange and D'Ursel Point.

31. In addition, numerous observations were made in connection with existing and fossilized glacial phenomena. The Belgica not only carried out a very thorough study of current Antarctic glaciation but also proved the earlier existence of a far more extensive glacial area, undeniable morphological traces of which were discovered on Tierra del Fuego and the surrounding islands.

32. The soundings carried out by the Belgica also established that a deep ocean trough over 4,000 metres in depth, located on the site of Drake Passage, separates the southern tip of the American continent from the Antarctic Peninsula. We now know that these two continental offshoots have a similar structure but were separated and dislodged by massive tectonic deformation during a fairly recent geological period.

33. Through its bathymetric and other surveys, the Belgica not only contributed to a more detailed knowledge of the Antarctic ocean environment but also from its area of observation, demonstrated the very close proximity of the Antarctic continent at a time when, and in a region where, virtually nothing was known about just how far Antarctica extended.

34. The Belgica also brought back innumerable data on fauna and flora which were of the greatest scientific interest and from which important economic conclusions could be drawn regarding, for instance, ecological conditions and the abundance of whales, (cetacea) and seals (Pinnipedia).

35. Numerous meteorological observations were made, principally by Messrs. Arctowski and Dobrowolski, relating, inter alia, to the nature and volume of precipitation, to winds, temperature changes, atmospheric pressure phenomena and the aurora australis.

36. The Belgica did more than just open up new horizons; not only did it take advantage of its prolonged stay in the pack-ice to amass a tremendous amount of

data, but it also translated that data into a first-rate body of research, putting forward explanations which subsequently served as a basis for everything that was written on the same subjects.

37. Let us conclude this reminder of the importance of the Belgica expedition by quoting one of its members, who later became Director of the Warsaw Meteorological Institute: "The voyage of the Belgica was truly a historic event".

D. Belgium and international co-operation concerning the Antarctic

38. A signatory of the Washington Treaty in 1959, Belgium participates not only in consultative meetings of the Treaty but also in all its special and/or informal meetings, notably meetings relating to Antarctic mineral resources.

39. Belgium is a founder-member of the Special Committee on Antarctic Research (SCAR), established in 1956 to make recommendations regarding research to be undertaken in the context of the International Geophysical Year (1958).

40. In implementation of recommendation III-VIII of the Third Meeting of the Consultative Parties to the Antarctic Treaty, a Belgian law relating to the protection of the fauna and flora of the Antarctic was promulgated on 12 January 1978.

41. On 9 February 1978, Belgium ratified the Convention for the Conservation of Antarctic Seals, done at London on 1 June 1972.

42. In 1978 and 1980, Belgium participated with the other Consultative Parties to the Antarctic Treaty in the elaboration of the Convention on the Conservation of Antarctic Marine Living Resources. That Convention, signed at Canberra in 1980, was ratified by Belgium on 22 February 1984.

43. Lastly, in accordance with recommendations I-14 and I-16 of the First Meeting of the Consultative Parties to the Treaty, Belgium will be the venue in 1985 of the Thirteenth Consultative Meeting; in 1964 it was the venue of the Third Consultative Meeting.

E. Belgium's point of view on the Antarctic Treaty

44. This paper would not be complete if it did not include, as do those submitted by the Governments of the other Consultative Parties, a section devoted to the Belgian Government's assessment of the Antarctic Treaty.

45. Belgian's views on the Treaty are not, on the whole, very different from those of the other Consultative Parties, except in so far as several of them put forward claims to sovereignty over certain parts of the Antarctic Territory, whereas others do not. Belgium falls within the latter category and, from the international point of view, intends to adhere strictly to each and every provision of article 4 of the Treaty.

46. That is one of the reasons why Belgium cannot and will not consider the Antarctic as a res communis or a res nullius.

47. Furthermore, desiring not to distract unduly the attention of readers of this report, Belgium refers to the relevant parts of the documents on the same subject submitted by the Governments of certain Consultative Parties, such as Brazil, the Federal Republic of Germany, Japan, and Norway.

Annex. Bibliography on Belgian Antarctic expeditions [see note 3].

6. BOLIVIA

[Original: Spanish]

[22 June 1984]

1. The Republic of Bolivia feels that in view of the amount of effort which will be required for the exploration and exploitation of Antarctica's resources, as well as its enormous potential, the development of this continent shall be the responsibility of the entire international community.

2. As the Antarctic Treaty already recognizes the universal dimension of this continent and its potential economic importance to the world, the Government of Bolivia feels that, given the complexity of the subject, the report of the Secretary-General to the thirty-ninth session of the General Assembly should be the first of a series of studies designed to help Governments to understand and analyse the various facets of this question.

3. The series of studies on the Antarctic region could be carried out over a period of five years and include analyses of such topics as:

(a) The Antarctic as a zone of international peace and security;

(b) Economic resources and potential and their possible contribution to both developing and developed countries;

(c) Environmental aspects;

(d) Scientific research;

(e) The legal status of Antarctica. Studies of the legal dimension could include:

(i) Role of States parties and non-parties to the Treaty in the evolution of the Antarctic question, and the concept of Antarctica as the common heritage of mankind;

(ii) Analysis of territorial claims and their significance and validity in the framework of contemporary international law; also, views on the areas which have not been the subject of territorial claims, or designated as areas of interest;

(iii) The role of the international community, especially the United Nations, in the light of the implicit recognition of its participation in Antarctica by the provisions of the Treaty;

(iv) The possibility of patterning arrangements for the exploitation of Antarctic mineral and sea resources on other legal régimes, such as the United Nations Convention on the Law of the Sea. 46/

46/ Official Records of the Third United Nations Conference on the Law of the Sea, vol. XVII (United Nations publication, Sales No. E.84.V.2), document A/CONF.62/122.