THE FREEDOM OF SCIENTIFIC RESEARCH in INTERNATIONAL LAW:

Outer Space, the Antarctic and the Oceans

Ph. D. Thesis No. 332, Gerald GRAHAM, Canada

Université de Genève

FreedomofResearchThesis@outlook.com

La Commission mixte, compose des Doyens des Facultés de droit, des lettres, et des sciences économiques et sociales, et du Directeur de l'Institut universitaire de hautes études internationales, sur le préavis de MM. Georges ABI-SAAB, Lucius CAFLISCH, Philippe CAHIER et Christian DOMINICĒ, professeurs à l'Institut, autorise l'impression de la présente thèse sans entendre par là exprimer d'opinion sur les propositions qui y sont énoncées.

Genève, le 15 juillet 1980

Pour la Commission mixte:

Christian Dominicė

Directeur de l'Institut universitaire

Thèse Nº 332

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my Thesis Supervisor, Professor L. Caflisch, as well as to Professors G. Abi-Saab and P. Cahier, all of the Graduate Institute of International Studies, Geneva, for their assistance in the preparation of this doctoral dissertation.

At the same time, I am indebted to a very large number of people, impossible to name here, for their advice, assistance and understanding.

Table of Contents

ACRONYMS

Sources

ILM	International Legal Materials
UNCLOS I	First United Nations Conference on the Law of the Sea, 1958
UNCLOS III	Third United Nations Conference on the Law of the Sea, 1974-
SNT	Single Negotiating Text
RSNT	Revised Single Negotiating Text
ICNT	Informal Composite Negotiating Text
ICNT Rev. 1	Revised Informal Composite Negotiating Text (1)
ICNT Rev. 2	Revised Informal Composite Negotiating Text (2)
UNTS	United Nations Treaty Series
WARC	World Administrative Radio Conference

Organs

CCIR	International Radio Consultative Committee
CETEX	Committee on Contamination by Extraterritorial Exploration
COPOUS	Committee on the Peaceful Uses of Outer Space
COSPAR	Committee on Space Research
CSAGI	Comitė spécial de l'annėe géophysique internationale
EEC	European Economic Community
ELDO	European Organization for the Development and Construction of Space Launch Vehicles
ESA	European Space Agency
ESRO	European Space Research Organization
FAO	Food and Agriculture Organization
IAEA	International Atomic Energy Organization
ICES	International Council for the Exploration of the Sea

ICJ	International Court of Justice
ICSPRO	Inter-Secretariat Committee on Scientific Programs related to Oceanography
ICSU	International Council for Scientific Unions
IHO	International Hydrographic Organization
ILC	International Law Commission
IMCO	Intergovernmental Maritime Consultative Organization
IOC	Intergovernmental Oceanographic Commission
ISA	International Seabed Authority
ITU	International Telecommunications Union
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Ocean Research
SIPRI	Stockholm International Peace Research Institute
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WMO	World Meteorological Organization
<u>Programs</u>	
GARP	Global Atmospheric Research Program
IAGP	International Antarctic Glaciological Program
IDOE	International Decade of Ocean Exploration
IGY	International Geophysical Year
LEPOR	Long-term and Expanded Program of Oceanographic Exploration and research
<u>Miscellaneous</u>	
LDCs	Less-developed Countries
ODAs	Ocean Data Acquisition System

PART ONE: INTRODUCTION

1. General

The subject of this thesis is the legal régime for scientific research in outer space, the Antarctic and the oceans. The purpose of it is to uncover the various rules for the conduct of such research, analyse them in terms of their legal basis, scope, nature and content, compare them and contrast them for each of the three areas, and, finally, to draw certain conclusions from them.

The impetus for such a study is that notwithstanding certain fundamental differences between the three areas in question, both in terms of geography and of legal status, they are all to some extent or in varying degrees areas beyond national jurisdiction. Coupled with this, scientific research is an important activity in all three areas, and the conduct of this research is subject to a number of particular rules, the most widely recognised of which is the freedom of scientific research.

The thesis is original partly in the choice of subject, and partly in the way the subject is approached. It is the first comprehensive examination of the regime for scientific research in the three areas. To be sure, the areas themselves have often been

examined collectively,[1] and consequently it could not but be noticed that analogies exist, particularly as regards scientific research. Nevertheless, scientific research has never before been chosen as both starting point and focal point for a legal analysis of the three areas.

Where scientific research in one or more of the three areas has been examined by international lawyers, it has often been given cursory treatment. This is particularly true for outer space, where the focus has been on use in general or at least on non-scientific use. Thus, this thesis examines such basic questions as: what scientific research is; what it involves; who may undertake it and under what conditions and ensuing obligations. The emphasis is on practical legal problems, which have been given concrete expression. In this sense, a concerted effort has been made to ascertain the actual practice of States in respect of scientific research, and cull from that practice whatever broad principles and particular rules seem to present themselves; in other words, the approach is inductive.

Another feature of the thesis is the emphasis on treaty implementation, especially with respect to the 1959 Antarctic Treaty, but also with respect to international cooperation in outer space and practice in granting consent for marine scientific research in zones of national jurisdiction.

Finally, the thesis is original in its application of certain concepts such as accommodation of conflicting use- common in the analysis of international law relating

[1]CW Jenks, The Common Law of Mankind, London, Stevens and Sons, 1958; J. Kish, The Law of International Spaces, Leiden, Sitjhoff, 1973.

to rivers and lakes, to outer space, the Antarctic and the oceans, with special emphasis on scientific research.

Roughly twenty sets of rules which relate to scientific research are examined in the body of the thesis. Some apply to use generally, while others are specific to scientific research, e. g., publication of results. There is no entirely successful way of classifying these rules, in terms of, for instance, rules of cooperation versus rules of coexistence, or rights versus obligations. Nevertheless, there is a certain order and flow to the thesis, as well as a certain cohesion to the various parts. Thus, Part II comprises those general principles which are applicable to all use. Part III follows with treatment of the basic rules which lay the groundwork for scientific research. Part IV includes what might be loosely termed ‘rules of abstention‘ - those rules which proscribe a State from behaving in a certain way when conducting scientific research. By contrast, the rules contained in Part V are those tending towards obliging States to behave in a certain positive way when conducting scientific research. Finally, a number of specific rules which have importance for scientific research are also examined.

It should be pointed that the titles given to the various sections and parts are only labels, and are not to be confused with the rules contained therein. Moreover, while a serious attempt has been made to keep it to a minimum, a certain amount of overlap inevitably persists between the various sections.

Each chapter has its own internal structure, but the general format or procedure is to scan the various sources of international law in order to uncover the legal norms which

apply. In fact, conventional clauses and the practice of States as evidence of custom are accorded much attention, with the writings of publicists also contributing significantly. Owing to the nature of the subject itself, judicial decisions play a relatively minor role.

Each of the three areas is examined in turn within each chapter; more often than not each chapter will consist of several subsections in which particular aspects are examined for each area successively. In some cases these subsections end with a summary, and sometimes with a conclusion when this seems appropriate. Throughout, the emphasis is on comparison and contrast, with an attempt being made to explain how the rules are similar or different for each area, and why this is so.

Each section ends with a conclusion, and in the general conclusion at the end of this thesis an attempt is made to consolidate the various rules with a view towards extracting from them certain principles which apply to some degree or other to scientific research in all three areas.

As a prelude to the substantive part of the thesis, there will be a brief exposition of some general observations having to do with scientific research and international law. This in turn will be followed by a very elementary introduction to the three areas- outer space, the Antarctic and the oceans, in terms of their geography, the types of research undertaken in them, and the basic legal instruments applicable to them.

2. Science and International Law

Science both shapes international law and is in turn shaped by it. As Rousseau has noted,

> Scientific developments have influenced the development of international law mainly by extending the jurisdiction of the State, influencing the system by which such jurisdiction is exercised, and altering the conditions in which the law of war is applied.[2]

One example of the way science has shaped international law is the large body of rules which has developed since the discovery of nuclear fission. Science can also render obsolete certain rules: developments in submarine detection systems would, for instance, make redundant the rule in the law of the sea that such ships must surface and display their flags when traversing international straits.

Science, then, as Livingston puts it, buffets international law[3]. But, as he also observes,

> it is not generally recognized that at the same time, international law in its turn is exerting a continuing and deep influence on the advancement of science itself.[4]

For a long time a certain amount of preference has been accorded science; thus, during the Napoleonic Wars the British scientist Humphrey Davy was given a pass to enter France in order to give a lecture at the Académie Française.[5] In the century before that, the practice of granting immunity to scientific materials and works was also recognised in the Marquis de Somerueles case.[6] It is only really in the second half of the twentieth century that the freedom of movement of scientists has been checked; previously, as Soons says,

---

[2]C. Rousseau, "Scientific Progress and the Evolution of International Law", Impact of Science on Society, Vol. V, June 1954, pp. 71-92, at p.71-72.
[3]D. Livingston, "An International Law of Science: Orders on Man's Expanding Frontiers", Bulletin of the Atomic Scientists, December 1968, pp. 6-10, at p. 6.
[4]Ibid.
[5]J. -J. Salomon, "The Internationale of Science", Science Studies, Vol. 1, 1974, pp. 23-42, at p. 27.
[6]Court of Vice-Admiralty of Halifax, 1813. Cited in J. Scott, Cases on International Law, St. Paul, West Publishing Co., 1922, p.761.

scientists could more or less come and go as they pleased, traversing national frontiers at will in quest of knowledge.[7]

Now, however, there is no general freedom of access for scientists; no special treatment, as it were. Evidence of the position of scientists can be found in the work of the international Council of Scientific Unions' Standing Committee on the Free Circulation of Scientists.[8] States can and do, then, exercise their sovereignty in refusing entry to scientists. Part of this practice stems from a distrust if science. Developing countries, for example, notice that science is an overwhelmingly developed State preoccupation: ninety percent of all scientists who have ever lived are alive today, and the bulk of them are to be found in developed countries.[9] Coupled with this is the contemporary belief that "knowledge is power'',[10] something the deep involvement of the military in scientific research lends credence to. Corollaries of these notions are that science is not, contrary to popular belief, 'universal', but is instead a fiercely competitive activity which, consequently, must be treated like any other activity on the international plane.[11]

---

[7]A. Soons, "The International Régime of Marine Scientific Research", Netherlands International Law Review, Vol. XXIV, 1977, pp. 393-444, at p. 393.

[8]International Council of Scientific Unions: Year Book, 1977, Paris, ICSU Secretariat, 1977, p. 5.

[9]C. Norman, Knowledge and Power: The Global Research and Development Budget, Worldwatch Paper No. 31, Washington, Worldwatch Institute, July 1979, p. 5.

[10]See the remarks of the Brazilian delegate to the United Nations General Committee on the Peaceful Uses of the Sea-Bed and Ocean Floor beyond National Jurisdiction. Summary Records. U.N. Doc. A/AC.138/SR.54, 1971, at p. 109.

[11]See N. Calder, "National Versus International Responsibilities of Science and Scientists", Chapter 17, Pacem in Maribus, Vol. 5, Royal University of Malta Press, 1971, pp.200-209.

Nevertheless, there has come to be a rather impressive body of special rules relating to scientific research- rules which tend, as Livingston observes, to "promote and regulate the stimulation, protection and diffusion of pure and applied scientific knowledge".[12] These go beyond the numerous bilateral and other arrangements of international cooperation.[13] What are referred to here are instead the 'framework rules' for the conduct of all scientific research and the treatment to be accorded scientists.

The first of these rules to be enumerated is that whereby States, pursuant to Article 15 of the 1966 International Covenant on Economic, Social and Cultural Rights[14] "undertake to respect the freedom indispensable for scientific and creative activity".[15]

A number of these rules relate in one way or another to the question of access to information. Perhaps the most basic of these is contained in Article 19 of the Universal Declaration of Human Rights:

> Everyone has the right to freedom of option and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.[16]

---

[12]Op. cit., p. 6.

[13]See J. Touscoz, La Coopération Scientifique Internationale, Paris, Editions Techniques ET Economiques, 1973.

[14]Adopted at the 1496th Plenary Meeting of the United Nations General Assembly, 16 December 1966. Reprinted in I. Brownlie, Basic Documents in International Law, Oxford, The Clarendon Press, 1967, p. 139. Entered into force on 3 January 1976.

[15]For a listing of the ways in which this precept is violated, see the Statement submitted by the International Commission of Jurists to the United Nations Commission on Human Rights, entitled Scientific Freedom, Scientific and Technical Developments and Human Rights, dated 3 August 1978.

[16]Adopted 10 December 1948 by the United Nations General Assembly. as Resolution 217 (a). U.N. Doc. A/811. Reprinted in Brownlie, op. cit., p. 133.

Two conventions go some way to reducing barriers to international access to information: the 1949 Lake Success Agreement on Circulation of Scientific Audio Visual Equipment;[17] and the 1950 Florence Agreement on Importation of Educational, Scientific and Cultural Materials, which eliminates charges on "scientific instruments or apparatus for pure scientific research".[18]

As for the method of undertaking research, there appears to be little beyond this prohibition in Article 7 of the International Covenant on Civil and Political Rights:[19]

> [n]o one shall be subjected without his free consent to medical or scientific experimentation.

The protection of intellectual property is covered by Article 15 of the International Covenant on Economic, Social and Cultural Rights,[20] which accords the scientist

> The right to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

There are, of course, all the relevant World Intellectual Property Organisation Conventions as well.

---

[17]Agreement for Facilitating the International Circulation of Visual and Auditory Materials of an Educational, Scientific and Cultural Character, 15 July 1949. 197 United Nations Treaty Series (hereafter UNTS), p. 3.

[18]Agreement on the Importation of Educational, Scientific, and Cultural Materials, with amended Protocol, 22 November, 1950. 131 UNTS, p. 25.

[19]Adopted at the 146th Plenary Meeting of the United Nations General Assembly, 16 December 1966. Reprinted in Brownlie, op. cit., p. 150. Entered into force 23 March 1976.

[20]Op. cit.

Yet another rule has to do with the benefits of scientific progress: Article 15 (b) of the International Covenant on Civil and Political Rights gives "... the right to everyone to enjoy the benefits of scientific progress and its applications".

One of the consequences of all these rules may be the emergence of principle of not-unreasonable interference with scientific research.[21] The least one can say is that there is a significant collection of framework rules which lay down the basic rules that are to be applied with respect to scientific research. Together they constitute the skeleton for a firm body of rules touching virtually all aspects or stages of scientific activity. Their relevance to this study is that they are general, i.e. they apply everywhere, including in outer space, the Antarctic and the oceans equally.

3. Geographic Elements

(a) Outer Space

There is no one definition of what outer space is, either in simple geographic terms or in a legal sense, but for the purpose of this thesis outer space may be considered as constituting all the reaches of the universe beyond the sensible atmosphere of the earth. Likewise, there is no definitive boundary of the earth's atmosphere, but a figure which is commonly cited is one hundred miles. The universe includes, beyond the earth's atmosphere, outer space itself, the other planets, as well as stars and galaxies of stars.

[21]Livingston, op. cit., p.7.

(b) Antarctica

Antarctica is the world's fifth largest continent. The term, however, is commonly considered to also include all the waters of the so-called Southern Ocean surrounding the continent, up to the point of the Antarctic Convergence, i.e., that point at which the warm waters of the southern hemisphere meet the cold polar waters. This point extends for the most part well beyond 60° South Latitude.

Another common description of the Antarctic is that it is the coldest, driest, highest, windiest, least accessible and most unpleasant of all continents. The land area is almost wholly overlain with ice; roughly ninety percent of the world's ice is located there, with average thickness being 6,500 feet. Another characteristic is the presence of ice shelves around portions of the continent; these comprise ten percent of the region's ice. The largest of these shelves, the Ross Ice Shelf, is approximately the size of Spain. The surrounding waters of the continent are often ice-choked (in some cases yearround), and contain living resources such as krill, seals, and whales. The land areas are virtually bereft of animal life, and support relatively little plant life as a result of their barren condition. There are, by contrast, abundant mineral resources in the area, chiefly coal and hydrocarbons, though they are as yet highly inaccessible. Adding to these difficulties is the fact that Antarctica is some 950 kilometers from the nearest land at Cape Horn.

(c) Oceans

The oceans, or hydrosphere, cover seventy-one percent of the earth's surface, the rest being lithosphere. Oceanographers now speak of either one world ocean or of three-the Atlantic, Pacific and Indian (the Arctic and Southern Oceans not being distinct

ecosystems). Much of the world's coastal areas are characterised by relatively shallow, submerged platforms referred to as continental shelves, which gradually give way to the ocean floor. The average depth of the oceans is 3,790 meters, with the maximum being attained in the Mariana Trench (10,850 meters). Needless to say, the oceans are rich in biological and mineral resources. For the purposes of this thesis it will suffice to point out that the bulk of these resources are located within 200 miles of shore.

4. Scientific Activities in the Areas

(a) Outer Space

The simplest way to describe the categories of scientific research undertaken in outer space is to list the activities of the international scientific unions with membership in the Committee on Space Research (COSPAR), the principal non-governmental body interested in the area. The unions deal with astronomy, biochemistry, biological sciences, geophysics, geological sciences, theoretical and applied physics, geological sciences, mathematics, pure and applied biophysics, physiological sciences, theoretical and applied mechanics, pure and applied chemistry, pure and applied physics, and radio science. In addition, COSPAR consists of eight Working Groups, dealing respectively with: 1) tracking, telemetry and dynamics of satellites; 2) experiments in interplanetary space and in the magnetosphere; 3) space techniques as applied to astrophysical problems; 4) experiments in the upper atmosphere; 5) space biology; 6) application of space research

to metrology and earth surveys; 7) space-related studies of the moon and planets; and 8) materials science in space.[22]

(b) Antarctica

Scientific Committee on Antarctic Research (SCAR) unions are chiefly involved in biological sciences, geodesy and geophysics, as well as geological sciences. In addition , this international non-governmental organisation has working groups on 1) biology; 2) geodesy and cartography; 3) geology; 4) glaciology; 5) human biology and medicine; 6) logistics; 7) meteorology; 8) oceanography; 9) solid earth geophysics; and 10) upper atmosphere physics.[23]

(c) Oceans

Oceanography is actually a catchall phrase for a plethora of scientific disciplines involved in marine scientific research, as testified to by the fact that the Scientific Committee on Oceanic Research (SCOR), an international non-governmental organisation, comprises 16 international scientific unions and as many as 59 working groups. The greater part of oceanographic work takes place in coastal areas.[24]

As an overlap between some of the branches of science interested in the three areas might suggest, a certain degree of scientific research involves all three areas simultaneously, just one example being the International Geophysical Year (see Annex II).

---

[22]International Council of Scientific Unions: Year Book, 1977, op. cit., pp. 52 and 53.
[23]Ibid., pp. 49-51.
[24]Ibid., pp. 52-53.

5. Principal Legal Instruments

(a) Outer Space

The principal legal instrument for outer space is the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies,[25] a framework agreement for the use of outer space which has a number of provisions specifically relating to scientific research. The Treaty incorporates many of the Principles elaborated in the earlier Declaration, and was itself negotiated within the United Nations General Assembly Committee on the Peaceful Uses of Outer Space (COPUOS). It has no expiry date and is open to accession by all States, but not international organisations. As of 1980, a total of seventy-nine States had signed and ratified it. It has been followed by four multilateral agreements which deal with particular aspects of the use of outer space in a more comprehensive, elaborate manner.[26]

---

[25]Signed at London, Moscow and Washington, 27 January, 1967. 610 UNTS, p. 205. (Hereafter "Outer Space Treaty").

[26]Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, adopted at the 1640th Plenary Meeting of the United Nations General Assembly as Resolution 2345, 19 December 1967. UNTS, p. 119; Convention on International Liability for Damage Caused by Space Objects, adopted at the 1998th Plenary Meeting of the United Nations General Assembly on 29 November, 1971 as Res. 2777. Reprinted in Space Activities and Resources, United Nations, New York, 1977, p. 192; Convention on Registration of Objects Launched into Outer Space, adopted at the 2280th Plenary Meeting of the United Nations General Assembly on 12 November, 1974 as Res. 3235. Reprinted ibid., p. 201; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, adopted by the United Nations General Assembly on 5 December, 1979 as Res. 34/68, and opened for signature on 18 December, 1979. Reprinted in International Legal Materials, Vol. XVIII, November, 1979, p. 1434 (Hereafter ILM).

(b) Antarctica

In this area the principal legal instrument is the 1959 Antarctic Treaty,[27] negotiated by the twelve States which organised and took part in the 1957-58 International Geophysical Year (IGY). It deals mainly with the rules for scientific research, and has extensive provisions tending to 'non-militarise' the area. It also establishes a procedure for implementation and follow-up in the form of Consultative Meetings. It has no fixed expiry date but is subject to revision if at the end of an initial thirty-year period or at any period thereafter any Party to it expresses the desire to do so. Accession is restricted to States who are members of the United Nations; to 1980 nine States had availed themselves of this right. The Treaty also includes a clause relating to activities of third parties.

Other agreements are the 1972 Agreement on Seals[28] and the 1946 International Whaling Agreement,[29] neither of which is of much importance to the question of scientific research.

[27]Antarctic Treaty, signed at Washington on 1 December, 1959. 402 UNTS, p. 71.
[28]Convention for the Conservation of Antarctic Seals, opened for signature 1 June, 1972. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March, 1976, 3 Vols., Vol. II, p. II.6.1.
[29]International Convention for the Regulation of Whaling, signed at Washington on 2 December, 1946. 11 UNTS, p. 43.

(c) Oceans

De lege lata, the principal international legal instruments for our purposes are the 1958 High Seas[30] and Continental Shelf[31] Conventions. De lege ferenda, the Revised Informal Composite Negotiation Text (ICNT Rev. 1)[32] of the Third United Nations Conference on the Law of the Sea (UNCLOS III) is the most recent legal document with provisions on scientific research (Part XIII). It is, however, not a binding international agreement, but instead a negotiating text which can at any time be changed before a new, comprehensive law of the sea treaty is opened for signature. Nonetheless, it should give a fairly accurate picture of what direction the law is headed in.

[30]Convention on the High Seas, signed at Geneva on 29 April, 1958. Entered into force on 30 January, 1962. 450 UNTS, p. 11. To 1980 seventy-six States had become Parties to it.
[31]Convention on the Continental Shelf, done at Geneva on 29 April, 1958. Entered into force on 10 June, 1964. 499 UNTS, p. 311. To 1980 seventy-five States had become Parties to it.
[32]Third United Nations Conference of the Law of the Sea. Doc. A/Conf.62/WP.10/Rev.1, 28 April, 1979. For an analysis of the changes which appear with respect to scientific research in the latest negotiating text, the ICNT Rev. 2, see Post Scriptum, p. 334 ff.

PART TWO: GENERAL PRINCIPLES REGULATING THE USE OF THE THREE AREAS

CHAPTER I. FREEDOM OF ACCESS

1. General Conventional Clauses

(a) Outer Space

There is no explicit reference in the 1967 Outer Space Treaty to any 'general' freedom of access to outer space; Article 1(2) merely provides that "…there shall be free access to all areas of celestial bodies".[1]

[1]While it would be farfetched to interpret this phrase as comprising outer space in toto, it would be equally false to regard it as excluding the moon, for the ordinary meaning of the term "celestial bodies" includes the moon. Lack of express mention of the moon appears to stem from a drafting oversight: the American draft proposal at the twenty-first session of the Committee on the Peaceful Uses of Outer Space (hereafter COPUOS), 1966 (Doc. A/643, Annex 3, p.6), referred throughout to celestial bodies only, although the proposed title was "Treaty Governing the Exploration of the Moon and other Celestial Bodies". Cf. M. Lachs, The Law of Outer Space, Leiden, Sijthoff, 1972, p.112, ft.22; and J. E. S. Fawcett, Law and the Uses of Outer Space, Manchester, Manchester University Press, 1968, p.35.

The 1963 Principles contained no direct reference whatsoever to the freedom of access. Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space. United Nations General Assembly, Res.1962 (XVIII), adopted at the 1280th plenary meeting on 13 December 1963 (Hereafter "1963 Principles").

Such a general freedom of access can nonetheless be inferred from the principle that outer space "shall be free for exploration and use by all States…",[2] and complementarily from the principle that outer space "is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[3]

Freedom of movement within outer space, which is somewhat analogous to freedom of navigation as applied to the maritime domain, may also be inferred.

Article VIII of the 1979 Moon Resources Treaty gives State Parties the right to land on the moon and to move freely on it.[4] In addition, Article IX (2) would prohibit the installation of manned or unmanned stations in such a manner that they impede "free access to all areas of the Moon…".

(b) Antarctica

As with outer space, there is no express mention of a general freedom of access to Antarctica in the 1959 Treaty.[5] Article VII (2), however, accords observers who are charged with inspections of the area and activities therein "complete freedom of access at any time to any or all areas of Antarctica".[6]

Another similarity with outer space is that a general freedom of access may be

---

[2]Article 1(2) of the Outer Space Treaty.
[3]Article 2 of the Outer Space Treaty.
[4]Op. cit.
[5]Op. cit.
[6]Article II(3) lays down that

> "[a]11 areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspection…".

deemed to flow implicitly from the Treaty, considering its goal and object, though whether it is conditional upon anything will have to be considered in subsequent sections. Exceptions to the rule of freedom of access, which have to do mainly with freedom of navigation within Antarctica, will be treated in Part Four, Chapter Two, entitled "Non-Interference with Legitimate Use".

(c) Oceans

According to Article 2 of the 1958 Geneva Convention on the High Seas,[7] the high seas are open to all nations;[8] moreover, each State "has the right to sail ships under its flag on the high seas".[9] These rights also apply to land-locked States.[10]

2. Who Has a Right of Access?

(a) States Parties to the Relevant Conventions

(i) Outer Space

A right of access to space for States can be inferred from Articles I and VII of the 1967 Outer Space Treaty. The question of whether sponsorship is required for non-governmental activities is covered by Article VII of the same Treaty, which requires the

---

[7]Op. cit.

[8]The ICNT Rev.1 of the Third United Nations Conference on the Law of the Sea reads: "The high seas are open to all States…" Article 87(1).

[9]Article 4 of the High Seas Convention. The identical clause appears in the ICNT Rev. 1 as Article 90.

[10]In this regard, Article 3(1) of the High Seas Convention says only that "[I]n order to enjoy the freedom of the seas on equal terms with coastal States, States having no sea-coast should have free access to the sea" (Emphasis added). The same Article goes on to state that free transit shall be accorded land-locked States on a basis of reciprocity and by common agreement.

appropriate State to authorise and exercise continuing supervision over activities of non-governmental organs in outer space; this provision may be thought of as applying to governmental organs a fortiori. Criteria for establishing which is the 'appropriate' State may have to be established, as private ventures increase in the exploration and use of outer space.[11] In the event, inspiration may be drawn from the notion of 'effective link' between ships and the flag State in law of the sea.

(ii) Antarctica

The right of access to Antarctica undoubtedly extends to States and, in fact, most of the activities in the region have been, partly for reasons of economy, state-run. Still, a certain amount of independent or private activity has occurred. As to whether sponsorship is required, this does not appear to have caused any particular problems before 1958, but in that year the issue of sponsorship did arise in connection with activities which were occurring during the IGY, but which were not 'officially' a part of it.[12]

Since the coming into effect of the 1959 Treaty, the Consultative Parties have recognised the possibility of non-sponsored expeditions, whether by Contracting Parties or by third States. Thus, Consultative Meeting Recommendation I-VI-10 entitled "Exchange of Information on Operations" obliges, since its acceptance by all Consultative Parties, all Contracting Parties to give notice of any expedition not undertaken by them

[11]To now the only private or semi-private ventures in space have been in the area of communications satellites.

[12]See infra, Part Four, Chapter One.

but organised in or proceeding from their territories.[13] Similarly, Recommendation VI-7, entitled "Effects of Tourists and Non-governmental Expeditions to the Antarctic Treaty Area", requires advance notice of non-sponsored expeditions which pass through the territory of Contracting Parties.[14] On several occasions unsponsored teams have gained access to Antarctica.

(iii) Oceans

States undoubtedly have a right of access to the sea, and there is no question of sponsorship for maritime activities generally. The ICNT Rev. 1 does, however, raise some questions as to who may undertake scientific research. These matters will be examined in Part Three: Chapter I, entitled "Freedom of Scientific Research".

(b) International Organisations

(i) Outer Space

The 1967 Treaty is addressed to States, and only States have the right to become Parties to it. Nevertheless, Article XIII provides for activities carried on by "international intergovernmental organisations", though practical questions concerning their activities are to be resolved with State Parties to the Treaty.

Through Article 6 of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched in Outer Space,[15] the capacity or

---

[13]Text of Recommendations. First Antarctic Treaty Consultative Meetings, Canberra, 10th to 24th July 1961, reprinted in Documents Relating to Antarctica, op. cit., Vol. I, p. I. 3. 1.
[14]Recommendations, Sixth Antarctic Treaty Consultative Meeting, Tokyo, 19-31 October 1970, reprinted ibid.
[15]Op. cit.

competence, as it were, of international organisations to launch objects into space is explicitly recognised; this can also be inferred or deduced from the Preamble and Article XXII of the Convention on International Liability for Damage Caused by Space Objects,[16] and from Article VII of the Convention on Registration of Objects Launched into Outer Space.[17]

In practice, though most spatial activities are either national or bilateral in scope, a number of satellites have been launched by and for international organisations, including NATO and INTELSAT (an international joint venture), the European Space Agency (ESA), and INTERSPUTNIK in Eastern Europe.

(ii) Antarctica

The 1959 Treaty is addressed to States, and in point of fact makes no reference to international organisations. On the other hand, the Treaty is an outgrowth of the IGY, provides for a high degree of cooperation, and establishes a framework for it in the form of biennial Consultative Meetings. There is also an informal though patterned relationship between the Consultative Parties and SCAR, a non-governmental international organisation. The nature of this link will be treated in Annex I at the end of the dissertation.

There has been a deliberate attempt on the part of the Contracting Parties to avoid the creation of any form of international organisation which could prejudice the status quo in the region. Notwithstanding this attempt, there have been problems with

[16] Op. cit.
[17] Op. cit.

existing international organisations which have an interest in Antarctica but which were prevented from joining the Treaty. In 1971, for instance, the Council of Europe was reportedly planning a large-scale expedition.[18] More recently, the Food and Agriculture Organisation (FAO) and the European Economic Community (EEC) have shown active interest in the regime for marine living resources, but have not been accorded more than Consultative Status and will not likely be allowed to accede to the treaty to be eventually concluded on this matter.

(iii) Oceans

The High Seas Convention is addressed to States only, though without prejudice to the question of ships flying the flag of an intergovernmental organisation (Article 7), and it is as yet unclear whether international organisations will be able to accede to the convention presently being negotiated. Suffice it to say that this has in no way prevented international organisations from engaging in maritime activities, and even from time to time sailing ships under their own flag. A right of access can be inferred from Articles 239 and 293 of the ICNT Rev. 1, which refer to "competent international organisations" as having, respectively, the right to conduct, and the responsibility for, marine scientific research.

(c) Third Parties

The question arises as to whether the various areas, i.e. outer space, the Antarctic and the oceans, may be accessed by all States, or only by those which are Contracting

[18]F. Auburn, "Offshore Oil and Gas in Antarctica", German Yearbook of International Law, Vol. 20, 1977, pp.139-173, at p.162.

Parties to the relevant conventions. One way of answering this question is by reference to the customary status of the access rule, for the treaties are silent in this regard.

The High Seas Convention may be said to have entered into the body of customary international law, but the situation is more complicated with respect to the other two areas. On a practical plane, to the extent that the oceans and outer space have a 'non-exclusive' character, they are immediately accessible for most States without any legal complications, except in situations where innocent passage or rights of transit are required. On the other hand, access as described or envisaged in the relevant treaties may involve certain conditions or procedures, e.g. registration and/or notification, which would not otherwise be obligatory. In outer space, not all active States are signatories to the 1967 Treaty, even though by 1978 seventy-nine States had ratified it. In point of fact, fifteen of the forty-seven members of COPUOS are third parties to the Treaty, even though they are demonstrably interested in outer space.[19] At least one State, Colombia, has denied the existence of a freedom of exploration[20] and would deny access to the geostationary orbit.

In the case of the Antarctic, while most of the interested States have acceded to the 1959 Treaty,[21] there have nonetheless been activities in that region by at least a dozen other States. There does not appear to have been any problem inasmuch as individuals

[19]These are: Albania; Chad; Chile; India; Indonesia; Iran; Kenya; Sudan; and Colombia.
[20]See infra, Part Three, Chapter One.
[21]The original twelve Signatories are the Soviet Union, France, New Zealand, Australia, the United States, Chile, Argentina, South Africa, Belgium, Norway, the United Kingdom and Japan. Acceding States as of 1980 are Poland, the Federal Republic of Germany, the German Democratic Republic, Czechoslovakia, Denmark, the Netherlands, Romania and Brazil.

of third party States were integrated into sponsored expeditions of Contracting Parties, but independent expeditions, such as an Italian one in the mid-nineteen sentries, [22] create potentially serious problems due to the controversial status of the area and the 'frozen' nature of current claims.

The customary status of the access rule in outer space and the Antarctic can best be examined from the point of view of the freedom of scientific research; this will be done in Part Three: Chapter I.

3. Is There a Customary Right of 'Innocent Passage'?

The 'non-exclusive' character of the oceans and outer space, plus their geographic proximity or adjacency to State territory, means that in most cases there are in principle no *de jure* impediments to access to these regions. Antarctica's status makes the situation there more complicated, but in any case the right of innocent passage is not an issue. Access to the Antarctic is, on the other hand, predicated on there being access to the seas, freedom of movement thereupon, or overflight thereof.

In order to exercise the freedom of the seas, land-locked States require transit of neighboring States. In outer space access may be required to the airspace of adjacent or neighbouring States. Thus, there may be an analogy between the two situations; another one might be drawn between each of these and a right of innocent passage through the territorial sea.

---

[22]See Auburn, "Offshore Oil and Gas in Antarctica", op. cit., especially pp. 156-157 and 161-165. Earlier anxieties arose in connection with proposed Uruguayan and Brazilian expeditions to support claims.

A propos outer space, there are at least two situations for which innocent passage has either been claimed or proposed. As their existence is open to question, they, as opposed to their maritime 'analogues', warrant special treatment.

The first, alluded to as early as 1959 and referred to as a "freedom of innocent passage",[23] pertains to cases where a satellite which is already in orbit approaches the earth at a distance not exceeding one hundred miles. Goedhuis clearly sees this as a problem of overflight through national airspace; as such, one should probably best regard it as a problem of determining where airspace ends and outer space begins rather than one involving a right or freedom of access, which is not, stictu sensu, involved.

The second situation is one in which the space vehicle being launched by one State must pass through the airspace of a neighboring State in order to reach outer space. Opinion varies as to the existence here of a rule of innocent passage; Lachs finds that States have so far confined themselves to giving public notice (presumably of their launchings); they did not seek consent, and as there was no protest there is assent. Thus,

---

[23]D. Goedhuis, "The Question of Freedom of Innocent Passage of Space Vehicles through the Space above the Territory of One State which is not Outer Space", in A. Haley, (ed.), Proceedings, Second Colloquium on the Law of Outer Space, London, 1959, Vienna, Springer Verlag, 1960, pp. 42-43.

Though it did not employ the term 'freedom of innocent passage", the ad hoc COPUOUS did study the question of access in 1959 and came to the conclusion that during the IGY, as a result of the flight of space vehicles 'over' foreign States,

> "with this practice there may have been initiated the recognition of establishment of a generally accepted rule to the effect that, in principle, outer space is, on conditions of equality, freely available for exploration and use by all…"

Ad hoc Committee on the Peaceful Uses of Outer Space, Annual Report to the General Assembly, 1959, pp. 53-54, pp. 53-54. (Hereafter referred to as "ad hoc COPUOUS Annual Report").

he argues, an unwritten law has come into being.[24]

Marcoff, on the other hand, while sympathetic to a functional approach to the problem, asserts that passage is conditional upon express international agreement.[25] Meanwhile, according to him, the problem is regulated in practice by means of bilateral agreements between the launching States and the overflown States. Most of these agreements, he claims, concede the right of transit not only to peaceful space objects but also to strategic ones.[26]

To now the problem has been predominantly theoretical or doctrinal. McDougal, Lasswell and Burke wrote in 1964 that

> [t]he practice of equality in right of access, though only two States have as yet acquired the necessary technological capability, has not been questioned, much less protested.[27]

This applies even more so today, with several States having a space capability. In the

---

[24]Lachs, op. cit., pp. 59-60. Cf., also M. McDougal, H. Lasswell and I. Vlasic, Law and Public Order in Space, New Haven, Yale University Press, 1963, pp. 200-201. Lachs apparently includes both situations in his right of innocent passage.

[25]M. Marcoff, Traité de droit international public de l'espace, Fribourg, Editions Universitaires, 1973, p. 332. See further, W. Jenks, Space Law, London, Stevens and Sons, 1965, p. 232.

[26]Marcoff, op. cit., pp. 332-333. As an example, he cites the United States-United Kingdom Agreement for the Establishment of a Long-Range Proving Ground for Guided Missiles, signed at Washington on 21 July,, 1950. 97 UNTS, p. 193.

[27]Op. cit., p. 200. In the same year McDougal stated: "There has been hardly a suggestion since 1957 that there is not complete freedom of access to space in the same way as to the oceans". See McDougal, "The Prospects for a Régime in Outer Space, in M. Cohen, (ed.), Law and Politics in Space, Montreal, McGill University Press, 1964, pp. 104-123, at pp. 114-115.

In its annual review of space activities, (under the rubric "Astronautics"), the 1968 Britannica Book of the Year, Chicago, Encyclopaedia Britannica, 1968, p. 110, reported:

> "Communist Chinese plans to launch a 'medium-range' ballistic missile from Naghu Dzong over India into the Indian Ocean drew protest from the latter country, which viewed the flight as a violation of its aerospace".

future, however, the existence of a freedom of access and a concomitant right of innocent passage will take on more practical significance as more States, including small ones, develop a space capability.[28] This merely accentuates the fact that for the time being at least, the predominant impediment to access is a factual one, i.e. technological and/or economic, rather than a legal one.

4. Constraints upon the Exercise of a Freedom of Access

Any one of several elements may effectively prevent access to the three regions. To start off with, technological capacity is a prerequisite for enjoyment and use of the three areas, especially the Antarctic and outer space, where much infrastructure and large amounts of capital are normally required. In this connection, it is pertinent that while the Outer Space Treaty in Article I stipulates that

> [t]he exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development,…

this in no way affects the fact that a country's level of development plays a significant role in determining whether it is actually in a position to carry out these activities.

No doubt referring to this situation of factual inequality, Article 1(3) obliges States to "… facilitate and encourage international cooperation in such (scientific) investigation".

---

[28]See "Un ingénieur allemand veut construire des 'fusées populaires' au Zaïre", Le Monde, 5 July, 1978, p. 4; F. Hussain, "Volksraketen for the Third World", New Scientist, Vol. 77, 23 March 1978, pp. 802-803.

As Jenks, op. cit., p. 232, wrote in 1965:

> "We must not…overlook the possibility that the present law relating to passage through aerospace may prove to be a phase of development rather than definitive."

One of the ways this provision has been implemented is in making launching facilities accessible to all. Examples of this are the United States' announcement in 1972 that it would provide launching assistance to other countries on a non-discriminatory and reimbursable basis for any project consistent with international arrangements,[29] and Italy's offer of its San Marco platform.[30] Moreover, there are three United Nations-sponsored sounding rocket bases which are accessible to all States.[31]

Another impediment to access is lack of bases or support facilities in the region. This can be partly a technological problem, and partly an economic one. The lack of a capability to establish bases or to deploy installations independently can render crucial the existence of a right of access to the bases or installations of other States operating in the region. Such a right of access does not appear to exist in any of the three areas under scrutiny, though visits are, in accordance with Article XI of the Outer Space Treaty, possible in outer space, subject to notification. As for the Antarctic, as previously mentioned, observers have free access everywhere.

Access to the Antarctic is often dependent upon access to 'adjacent' jumping-off points; as Baldwin states:

> …without base facilities in New Zealand, the U. S. program would have been virtually impossible. New Zealand since 1928 has freely permitted American scientific expeditions to the Antarctic, but at the same time has

[29]COPUOS, Official Records of the General Assembly, Twenty-eight Session, Supplement No. 20. Doc. A/9020, and Corr., 1973, p. 8.

[30]At the 1962 Session of COPUOS, the Italian delegate, referring to the so-called San Marco platform, "…extended an open invitation to all interested Governments to use this platform for joint scientific programmes (Emphasis added). Doc. A/5181, Annex III, p. 1.

[31]See Space Activities and Resources, op. cit., pp.15-16. See also infra, Part Five, Chapter V, p. 213.

carefully reiterated its political claims.[32]

Also in the Antarctic, high costs and a shortage of equipment and facilities have led to a high degree of logistical cooperation, the effect of which is to facilitate access.

In respect of the oceans, effective denial of access can result from refusal of entry to ports,[33] though it has been argued that a presumptive right exists.[34]

5. Conclusion

One can assert with a reasonable degree of certainty that, at least for outer space and the oceans, there have been regimes of open access, and this access has been restricted neither to the Parties to the relevant treaties nor to States, though in space international organisations have but limited competence. In the Antarctic the Consultative Parties have attempted to control access by third parties but have not completely succeeded. The lack of any express treaty provision for activities of international organisations in the 1959 Treaty has not prevented them from gaining access to the area.

In none of the areas has access been limited to State organs, though in outer space sponsorship is required.

---

[32]G. Baldwin, "The Dependence of Science on Law and Government- The International Geophysical Year- A Case Study", Wisconsin Law Review, Vol. 1964, No. 1, pp. 78-118, at p. 113.

[33]According to E. D. Brown, "Freedom of Scientific Research and the Legal Regime of Hydrospace", Indian Journal of International Law, VOL 9, 1969, pp. 327-380, at p. 333, "…difficulties in connection with foreign port calls have been reported as creating impediments to research."

[34]L. Caflisch and J. Piccard, "The Legal Régime of Marine Scientific Research and the Third United Nations Conference on the Law of the Sea", Zeitschrift für ausländisches öffentliches Recht und Völkerrecht, Vol. 38, 1978, pp. 848-855, n. 21.

On the whole, at least for the Antarctic and outer space, there do not appear to be any cases where access has been successfully denied on legal grounds. In the oceans the problem is complicated by difficulties land-locked States have in their dealings with transit States. Other problems are caused by various zones of national jurisdiction such as the continental shelf. On a practical level, the greatest impediments to access appear to be non-legal, i. e. technological, financial and geographic.

CHAPTER II. PEACEFUL USE

1. Introduction

A fundamental rule or principle relating to use of the three regions is that they be used for peaceful purposes. At the same time, each of the regions is endowed with an elaborate set of rules which limit military activities; the result of these various prohibitions will be to both directly and indirectly place legal restraints on the conduct of scientific research.

2. General Conventional Clauses

(a) Outer Space

The Preamble to the 1967 Outer Space Treaty includes two references to peaceful purposes; the first refers to the common interest all mankind has in "the progress of the exploration and use of outer space for peaceful purposes"; the second conveys the implicit goal of the Treaty, which is to "contribute to broad International cooperation in the scientific as well as legal aspects of the exploration and use of outer space for peaceful purposes." The Preamble also refers to Resolution 1884 (XVIII) of the United nations General Assembly, which calls upon States to refrain from placing in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction or from installing such weapons on celestial bodies; the Preamble further recalls General Assembly Resolution 110(II) which condemns propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression, and which is applicable to space.

Article III of the Outer Space Treaty lays down a fundamental rule relating to the use of outer space- activities shall be carried on

> In accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

Article IV elucidates the precise ways in which military activities are to be curtailed. They are essentially of two sorts:

(1) No objects carrying nuclear weapons or any other kinds of weapons of mass destruction shall be placed in orbit of the earth, or installed on celestial bodies, or stationed in outer space in any other manner.[1] Three comments can be made about this provision: a) it applies not to weapons *grosso modo*, but only to nuclear and other weapons of mass destruction; b) even these weapons are only prohibited to the extent that they orbit the earth, or are either installed or stationed somewhere; and c) as explained earlier, the fact that the moon is not expressly mentioned cannot be interpreted as excluding it from these provisions ratione loci, since the ordinary meaning of 'celestial bodies' includes the moon by definition. In order for the moon to be excepted or made exempt, the clause would have to read "celestial bodies other than the moon".

[1]The 1979 Moon Resources Treaty envisages a more extensive prohibition: according to Article 3 (3),

> "States Parties shall not place in orbit around or other trajectory to or around the Moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the Moon."

(2) The moon and other celestial bodies shall be used exclusively for peaceful purposes.[2] Thus, whereas for outer space generally activities only have to be in accordance with international law and for peaceful purposes, certain areas must be used exclusively for peaceful purposes.

Certain publicists interpret the Treaty as prohibiting all military activities in space. Lachs, for instance, argues that if the intention was only to forbid aggressive use, mere reference to international law and the United nations Charter would have sufficed; the 'peaceful purposes' phrase must, he feels, be interpreted as going beyond mere prohibition of aggressive use, for otherwise it is redundant and devoid of meaning.[3] While it is beyond question that the term 'peaceful purposes' has meaning, logical consistency obliges one to also accord some meaning to the phrase 'exclusively for peaceful purposes' as applied only to the moon and other celestial bodies. Lachs also appears to err in holding that the extensive interpretation conforms to the intentions of the lawmakers;[4] the practices of States prior to, during and subsequent to the conclusion of the 1967 Treaty leads to the conclusion that only certain military activities, including all aggressive ones, in space are outlawed.

Other arguments have been put forward to sustain the extensive view of the 'peaceful purposes' clause. Marcoff, for example, holds that the lack of express prohibition of non-nuclear military activities in space does not signify that they are licit.[5] His principal argument in support

---

[2]The Moon Resources Treaty incorporates this same clause as Article 3(1); in addition, it prohibits "(a)ny threat or use of force or any other hostile act on the Moon…" in Article 3(2).
[3]Lachs, op. cit., p. 106.
[4]Ibid., p. 107.
[5]Op. cit., p. 360.

of this view is that according to Article 1(l) activities must be carried out for the benefit of all, a condition military activities can never achieve. The correctness of this view will be discussed in the following section.

Lachs and Marcoff, however, agree that the 'peaceful purposes' clause is a general norm or principle which has not led to the creation of a complete set of specific, substantive and detailed rules.[6]

While any interpretation is bound to be flawed, the best view is probably to consider "peaceful purposes" and "exclusively for peaceful purposes" in a relative sense. Looked at in this light, use of the term "exclusively" emphasises that the régime intended for the moon and other celestial bodies is stricter than that for outer space generally. This is in fact the impression one gets from the remainder of paragraph 2 of Article IV, where the phrase "exclusively peaceful purposes" is given definition. Three different types of activities are expressly and succinctly prohibited: (1) the establishment of military bases, installations and fortifications; (2) the testing of any type of weapons; and (3) the conduct of military manoeuvres on celestial bodies.

Such is the breadth and scope of these provisions that no military activity in these areas can be imagined that would not be included under this rubric. These same provisions are present in Article 3(4) of the 1979 Moon Resources Treaty. Only two exceptions to this prohibition of military activity are made in the Outer Space treaty: "[t]he use of military personnel for scientific research or for any other peaceful purpose shall not be prohibited", nor shall "[t]he use of any

[6]Lachs, op. cit., pp. 108-110; op. cit., p. 361.

equipment or facility necessary for peaceful exploration of the moon and other celestial bodies…".[7]

The only problem with this interpretation of the word "exclusively" and with a more lenient régime for outer space generally is that it is at odds with United Nations General Assembly Resolution 1148 (XII) of November 14, 1957, which set forth the "general principle" that the "sending of objects through outer space shall be exclusively for peaceful and scientific purposes." Such resolutions, however, are not binding ipso facto, and given the early stage in the history of space exploration at which it was formulated, it cannot realistically be considered declaratory.

The conclusion, then, is that only certain types of military use of outer space are prohibited, a deduction that will have significance as regards military research.

(b) Antarctica

In the Preamble to the Antarctic Treaty of 1959 the Contracting Parties purport to recognise that

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

The inference is that the region has always been used exclusively for peaceful purposes; as will be demonstrated later, this is somewhat inaccurate in that on several occasions the region has been the scene of military interest and activity, including sporadic conflict.

[7]Article 4 of the Outer Space Treaty; Article 3(4) of the Moon Resources Treaty. In the latter, the last section actually reads "or facility necessary for peaceful exploration and use of the moon…".

This being said, the interdiction of military activities in the Antarctic is, according to the Treaty, more thorough and complete than for outer space. Whereas, for instance, the Outer Space Treaty refers in the Preamble only to "peaceful purposes", the Preamble to the Antarctic Treaty contains the expression "exclusively for peaceful purposes". Consistent with this, Article I states that: "1. Antarctica shall be used for peaceful purposes only" (emphasis added). Among the activities expressly prohibited are: (1) the establishment of military bases and fortifications; (2) the carrying out of military manoeuvres; and (3) the testing of any type of weapons. In this sense, the régime for the Antarctic closely resembles the one for the moon and other celestial bodies. Another similarity is that paragraph 2 of Article I would "…not prevent the use of military personnel or equipment for scientific research or for any other peaceful purpose".

Complementarily, "any nuclear explosions in Antarctica and the disposal there of radioactive waste material shall be prohibited".[8] A system is established for inspection of compliance with these provisions on military activities; this procedure will be examined in a subsequent section, along with the practice in this domain.

Lastly, pursuant to Article IX(1), the Contracting Parties in their Consultative Meetings are to deal with, inter alia, "…the use of Antarctica for peaceful purposes only".

Perhaps the only matter which raises any question concerning military activity in the Antarctic is created by the disclaimer made in Article VI that nothing in the Treaty is to "prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law

[8]Article 5(1) of the Antarctic Treaty.

with regard to the high seas within that area". As naval activities are unquestionably a legitimate use of the seas, there is an apparent contradiction in the Treaty in this respect.

Some Contracting Parties have cited the "peaceful purposes" clause in support of their contention that economic exploitation is implicitly a legitimate use. This view will be treated in Part Four: Chapter II.

(c) Oceans

Article 88 of the ICNT Rev. 1 would reserve the high seas for peaceful purposes; there is no question of this challenging military use per se. Scientific research, on the other hand, must be conducted exclusively for peaceful purposes.[9]

3. Further Limitations on Military Use of the Three Areas Having a Bearing on Scientific Research

(a) The Nuclear Test Ban Treaty[10]

This Treaty seeks to achieve, according to its Preamble, "the discontinuance of all test explosions of nuclear weapons for all time…". To this end, Article I(1) states:

> Each of the Parties to this Treaty undertakes to prohibit, to prevent and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control: a) in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted.

[9]Article 240(a) of the ICNT Rev. 1.

[10]Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water, signed at Moscow on 5 August 1963. 480 UNTS, p. 43.

In the Nuclear Tests Cases Australia argued that this interdiction had become a part of customary international law.[11]

(b) The Seabed Weapons Treaty[12]

The Preamble to the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof recognises the common interest of mankind in the reservation of the sea-bed and ocean floor exclusively for peaceful purposes. The Contracting Parties also claim to be "[c]onvinced that this Treaty constitutes a step towards the exclusion of the sea-bed, the ocean floor and the subsoil thereof from the arms race". They further express their conviction that the Treaty will not infringe upon the freedom of the seas, which could be a sign they do not regard nuclear weapons tests as coming under the freedom of marine scientific research.

By virtue of Article 1(1),

> The States Parties to this Treaty undertake not to emplant or emplace on the sea-bed and the ocean floor and in the subsoil thereof beyond the outer limit of a sea-bed zone as defined in Article II any nuclear weapons or any other types of weapons of mass destruction as well as structures, launching installations or any other facilities specifically designed for storing, testing or using such weapons. (Emphasis added)

Article III gives each Contracting Party the right to verify compliance with the Treaty.

---

[11]Nuclear Tests Cases. Pleadings, Oral Arguments, Documents. International Court of Justice, 1978. Vol. 1 (Australia v. France), p. 182.

[12]Signed at London, Moscow and Washington, 11 February 1971. Reprinted in International Legal Materials (hereafter ILM), Vol. 10, 1971, pp. 145-151.

4. State Practice

(a) Outer Space

The various activities in outer space may be commercial, military or scientific. That a great deal of space activities is military is admitted even by those who consider them illicit.[13] Those that are largely military include the use of photo reconnaissance satellites, early warning satellites and nuclear detection satellites. Other military activities involve what the Stockholm International Peace Research Institute (SPRI) calls interceptor/destructors and Fractional Orbital Bombardment Systems (FOBS).[14] The latter are not considered to violate the 1967 Treaty as they do not complete one orbit. There have been isolated instances of tests of weapons systems other than the above, including nuclear bomb-dropping satellites under development by the Soviet Union.[15]

From the beginning, the bulk of activities in outer space have been military; as SPRI points out,

> [a]lthough most of the space programmes are conducted by civilian agencies and are ostensibly for 'peaceful purposes', in fact the far greater proportion of satellite programmes are in pursuit of military objectives and in preparation for carrying out military missions.[16]

---

[13]See, for example, Lachs, op. cit., p. 109.

[14]Stockholm International Peace Research Institute, Outer Space – Battleground of the Future? London, Taylor and Francis Ltd., 1978, Ch. 8.

[15]Britannica Book of the Year, op. cit., 1968, p. 117.

[16]Op. cit., p. 2. As early as 1959 the ad hoc COPUOS recognised that

> "the development of vehicles which make possible the scientific study of outer space has, to a large extent, been the outcome of military objectives and therefore problems of national security have prohibited the exchange of information."

Annual Report, 1959, p. 31.

The Soviet Union's Cosmos series, for example, contains, again according to SIPRI, virtually all the numerous military satellites as well as a number of experimental and scientific satellites.[17] As for the United States, the National Aeronautic and Space Administration (NASA) is civilian, but the Department of Defence has launched a large number of satellites.[18] As reported in 1974, "(m)ilitary satellites as usual accounted for the major portion of all launchings during the year".[19] SIPRI reports that in recent years about sixty percent of both United States and Soviet satellites have been military.[20]

There are also a number of activities which may have been for commercial, scientific or military purposes. Communications and/or navigation satellites, for instance, may be either commercial or military. Both civilian and military meteorological satellites exist, and yet their basic function may be regarded as essentially scientific in nature. Geodesic satellites, though they may be thought of as scientific in that they measure the shape of the earth, are important for the targeting of ballistic missiles.[21]

All these satellites, as SIPRI points out, "…have a potentially dual purpose; that is, they may be used both for peaceful purposes as well as for waging war".[22] Many space activities, then, are ambiguous in character; in spite of this, few if any of the above activities should be considered scientific, any more than naval intelligence activities on the high seas should be. Only meteorological satellites (especially those from which data is released to civilian agencies) and,

---

[17]Op. cit., p. 137.
[18]See Britannica Book of the Year, op. cit., Vols. 1958-1979.
[19]Britannica Book of the Year, op. cit., 1974.
[20]Op. cit., p. 2.
[21]K. Gatland, "A Thousand Cosmos Satellites", New Scientist, 13 April 1978, pp. 91-93.
[22]Op. cit., p. 167.

to a limited extent, geodesic satellites can be realistically thought of as having a primarily scientific component, and not just scientific spin-offs.

There is a third type of satellite which is essentially for scientific purposes. According to Lewis, one hundred and forty-one of three hundred and fifty-two space vehicles launched by the United States have been for space science, including

> [a] whole range of satellites launched to explore properties of near-Earth space, magnetic field and radiation environment. Studies in astronomy and geophysics.[23]

To add to this, there have been thirty-one manned launches in the Mercury, Gemini, Apollo and Skylab series, as well as Lunar, Martian and Venus probes.[24]

(b) Antarctica

Prior to 1959, the Antarctic had been the scene of military rivalry, first in the pre-war period, then later during the Cold War era. There have also been sporadic incidents of a military nature, particularly involving competing claims, such as those between Argentina and the United Kingdom in both 1943 and 1952.[25]

While one author sees the interests of the superpowers and other developed countries in the area as being predominantly strategic,[26] virtually all of the military presence in the area

---

[23]R. Lewis, "NASA's First 20 Years – and the Future", New Scientist, 5 October 1978, pp. 14-16, at p. 15.

[24]Ibid. See also COPUOS, Review of National and Cooperative International Space Activities for the Calendar Year, published periodically.

[25]M. Whiteman, Digest of International Law, Washington, D.C., Department of State, 1963, Vol. 2, pp. 1238-1239; J. Hanessian, "The Antarctic Treaty of 1959", International and Comparative Law Quarterly, Vol. 9, 1960, p. 447, n. 42; International Court of Justice. Antarctica Cases (United Kingdom v. Argentina; United Kingdom v. Chile), I.C.J. Reports, 1956, p. 28.

[26]S. Jain, "Antarctica: Geopolitics and International Law", Indian Yearbook of International Affairs, Vol. XVII, 1974, pp. 249-278.

since 1958 has been of the support variety. This support is crucial to scientific research logistically in terms of transport, facilities, equipment and communications. Much of the scientific work is organised, funded and undertaken by the military or on behalf of it. The presence of troops in the Antarctic fulfils another function: it provides an opportunity for the military to test and experiment with all manner of equipment short of weapons, with survival techniques and with human behaviour, all within a controlled, extremely harsh environment. An example of this is the experimental/operational nuclear power station which the United States operated at an Antarctic base for almost fifteen years.[27]

Article III of the 1959 Treaty requires that all scientific observations and results be exchanged and made freely available to the greatest extent feasible and possible. One characteristic of military research is that the results from it are seldom published.[28]

(c) Oceans

The oceans have for centuries, if not millennia, been employed for military purposes. Thus, it is not surprising that much of marine scientific research concerns and involves the military. It is difficult, however, to separate military from non-military research; even in the last century, oceanography was appreciated for its "good use, naval and philosophical".[29] An example of this was the 1872-1876 "Challenger" Expedition, financed by both the Royal Society and the British Admiralty. More recently, as much as one third of the United States ocean science effort

[27]See O. Wilkes, and R. Mann, "The Story of Nukey Poo", The Bulletin of the Atomic Scientists, Vol. 34, 1978, pp. 32-36.
[28]See infra, Part Five: Chapter Six.
[29]M. Deacon, Scientists and the Sea, 1650-1900: A Study of Marine Science, London, Academic Press, 1971, p. 88.

is said to have been financed by the United States Navy.[30] On the other hand, by no means all or even the greater part of this assistance was for applied research or even research of direct military application or significance.

The military often contribute equipment for use in marine scientific research; early examples of this were Darwin's "Beagle", a ten-ton brig, and the aforementioned "Challenger", which was an Admiralty vessel. In recent times, the French-American project FAMOUS, aside from being financed by civilian agencies, was supported by the United States Office of Naval Research, the United States Advanced Research Projects Agency and the United States Navy; some of the pilots taking part in the expedition were naval officers, and the Navy bathyscaph "Archimeda" was employed. Moreover, LIBEC (Light Behind Camera), the photographic camera used during the same project in 1974, was perfected by the United States Naval Research Laboratories.

One problem associated with marine scientific research is that it can be used as a camouflage for essentially non-scientific activities such as reconnaissance. This is not a new problem: in 1880, Francois Perron, on a Napoleonic expedition, took advantage of the hospitality granted a geographer and naturalist to spy out the land for French authorities and recommend

[30]H. Franssen, "Developing Country Views of Marine Science and Law", in W. Wooster, (ed.), op. cit., pp. 137-177, at p. 162. Cf. A. White, (ed.), The Ocean Science Program of the U.S. Navy: Accomplishments and Prospects, Washington, D.C., Department of the Navy, 1975. For a breakdown of military involvement in marine scientific research by country, see "Great Power Interest in Military Applications of Oceanology", Ch. 11, Appendix 1, in E. Young, and Lord Ritchie-Calder, (eds.), Quiet Enjoyment: Arms Control and Police Forces for the Ocean, Vol. 1, Pacem in Maribus, Royal University of Malta Press, 1971, pp. 154-168.

an attack on the British.[31] A more recent example of the misuse of the science is the "Pueblo" episode.[32]

Another problem associated with military involvement in oceanographic research is that while much of it is relatively 'pure', the military is also engaged in weapons tests, the most controversial of which are nuclear tests. Thus, bona fide research becomes confused with essentially competitive, secret pursuits. The question of whether any form of this military research should be considered scientific research will be analysed in Part Three: Chapter I.

5. Conclusion

What conclusions can be drawn from this examination of both the treaty clauses and State practice as regards peaceful use of the three areas, especially as it affects scientific research? Conventionally, there appears to be significance in the fact that outer space is to be used for peaceful purposes, whereas the moon and other celestial bodies are reserved "exclusively" for peaceful purposes; the prohibitions on military use of the latter area are much more concrete. In the Antarctic, the land area at least is reserved exclusively for peaceful purposes; this may or may not hold for the maritime areas. Moreover, in the Antarctic, military activities are not a peaceful purpose, whereas in many cases they can be considered as such in

---

[31]Deacon, op. cit., p. 193.

[32]See Caflisch and Piccard, op. cit., p. 850. During a meeting of the drafting group of the Legal Committee at the Sixth Session of the IOC in 1969, the United States delegate made the following statement:

"The U.S. Government, in the interest of promoting scientific research, is not designating any intelligence vessel as an oceanographic research vessel. This policy applies to all U. S. vessels, including those of the U. S. Navy. The Government of the United States calls upon all States to adopt a similar practice."

outer space and the oceans. As far as the oceans are concerned, the high seas are to be used for peaceful purposes, whereas scientific research is to be exclusively for peaceful purposes. This may rule out military intelligence as a type of scientific research, though not as a type of legitimate use of the oceans.

As regards practice, the three areas vary significantly. In outer space, use is divided roughly between the civilian and the military – most of the scientific research, however, seems to be civilian. In the Antarctic, much of the support and funding is from the military, but little of the research is of a military nature. In the oceans, on the other hand, much of the activity is military, and much of the scientific research is funded or undertaken by the military, sometimes as a cover for intelligence.

Thus, it is difficult to establish what constitutes "peaceful use". In the final analysis, the best solution might be to distinguish, as McDougal does for outer space, between permissible and non-permissible activities rather than peaceful and military.[33] Such an approach would, however, entail a detailed listing of licit activities, as was proposed by France at one point for outer space.[34] For the time being, however, one only has a partial listing of certain activities which cannot be considered licit.

[33]McDougal, in Cohen, (ed.), op. cit., p. 119.
[34]COPUOS Annual Report, 1969, Appendix V, p. 85.

CHAPTER III. BENEFIT OF MANKIND

1. Introduction

The use of an area or space for the "benefit of mankind", though not a new concept, has found expression in international legal instruments only recently, particularly with respect to law of the sea, but also vis-à-vis the resources of the moon. In this section the scope and significance of the concept will be assessed, especially in relation to scientific research. The task is complicated by the fact that 'mankind' is the sole common denominator in terms as varied in their meaning as 'benefit of mankind', 'interest of mankind', 'envoys of mankind', 'province of mankind' and 'common heritage of mankind'.

2. General Conventional Clauses

(a) Outer Space

The notion of 'mankind' is one which appears repeatedly in the 1967 Outer Space Treaty. In the Preamble it is stated that the Contracting Parties are "[i]nspired by the great prospects opening up before mankind"; they also recognize "the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purpose".[1]

---

[1]There are also two references to "peoples" in the Preamble: the first expresses the belief that "the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development" (emphasis added). The corresponding phrase in the 1962 Principles reads: "for the benefit of mankind and for the benefit of States". In the second reference to "peoples" in the Outer Space Treaty Preamble, the

When it comes to the substantive rules of the Treaty, mankind is alluded to twice: Article I states that

> [t]he exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, …and shall be the province of all mankind.[2]

It will be noted that it is the exploration and use of outer space, rather than space itself, which is the province of all mankind. These are concepts which are apparently unique, and it is unclear as to what they amount to. Equally vague is the assertion in Article V that "States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space";[3] The same clause goes on to prescribe that they be rendered all possible assistance.

Marcoff argues strongly that States are under an obligation to refrain from all activities which are not for the benefit and in the interest of all countries.[4] While he is correct in considering Article I normative and not simply a statement of some future goal, a strict or narrow interpretation of this clause rules out virtually all space activities, past and present, military or otherwise, for there will always be some countries which receive virtually no benefit from any particular space activity. Thus, as it now stands, States must take the interests of others into account, and further agreements may specify with more precision how this is to be done.

Contracting Parties express their belief that

> "cooperation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples".

[2]This same phrase is incorporated in Article 4(1) of the 1979 Moon Resources Treaty. Moreover, according to Article 11(1) of that Treaty, "[t]he Moon and its natural resources are the common heritage of mankind,…".

[3]Jenks, op. cit., p. 240.

[4]Op. cit., pp. 363-367.

(b) Antarctica

Reference to 'mankind' in the 1959 Treaty is limited to the Preamble: the Signatories express their recognition of the fact that

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

They are also convinced that a regime of cooperation "accords with the interests of science and the progress of all mankind. The linking of these two concepts, science and mankind, will be discussed shortly.

It remains to be seen whether in drawing up a convention for the exploitation of the marine living resources of the Antarctic, the thirteen Consultative Powers will also purport to be behaving "in the interest of mankind". When it comes to mineral resources, Recommendation IX-I stated that exploration and exploitation should not prejudice the interests of all mankind in the area.

(c) Oceans

The Revised Single Negotiating Text (RSNT) of UNCLOS III defined marine scientific research as "any study or related experimental work designed to increase mankind's knowledge of the marine environment".[5] In the ICNT Rev. 1 the only reference to scientific research in terms

[5]Article 48, Doc. A/Conf.62/WP.8/Rev.1/Part III. Third United Nations Conference on the Law of the Sea. Official Records, Vol. V., p. 125. The forerunner to the RSNT, the Single Negotiating Text, (SNT), would have defined scientific research as "any study or related experimental work designed to increase man's knowledge of the marine environment". Part III, Article 1, Doc.

of mankind is in connection with the Area: Article 143 obliges States to carry out scientific research exclusively for peaceful purposes and for the benefit of mankind as a whole. The Area and its resources, it will be recalled, are the "common heritage of mankind", according to Article 136 of the ICNT Rev. 1.

3. Science and Mankind in the Three Areas

The linking of scientific research with the notion of mankind is not a new phenomenon; partly it reflects the western conception of science as 'universal'. It is this reputed attribute of science, i.e. its being of interest and benefit to everybody, that has to some extent led to its being accorded special treatment. As early as 1779, for instance, the United States Secretary of State Benjamin Franklin proclaimed that the explorer James Cook and his friends should be treated on their scientific voyage of discovery as "common friends of mankind" owing to the nature of their mission.[6] In the 1813 Marquis de Somereules Case it was stated that the arts and sciences were considered "as the common property of mankind at large and as belonging to the common interests of the whole of the species".[7] In the twentieth century, the Statutes of the International Council of Scientific Unions make it one of the Council's principal objectives "a) to encourage international scientific activity for the benefit of mankind".[8]

A/Conf.62/WP.8/Part III. Third United Nations Conference on the Law of the Sea. Official Records, Vol. IV, p. 137. According to Winner, "[t]his change may indicate a trend toward discouraging classified military research". R. Winner, "Science, Sovereignty and the Third Law of the Sea Conference", Ocean Development and International Law, Vol. 4, 1977, pp. 297-342, at p. 305.

[6]W. Sullivan, "Ocean Researchers See a Threat in Law of the Sea Conference", The New York Times, 30 August, 1976, p. 2.

[7]Op. cit.

[8]Statute 3A, cited in International Council of Scientific Unions: Oganization and Activities, Paris,

There is also within the municipal law sphere some practice with respect to the concept. Thus, in 1958 the United States National Aeronautics and Space Administration Act stated that "it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of mankind".[9]

The res communis status of the oceans may be regarded as a precursor to the 'commons' concept; its effect is to prevent States from claiming sovereignty over the high seas, and thus, secondarily, to permit access for all and enjoyment of such freedoms as that of scientific investigation. As Christol points out, the common heritage of mankind concept entered into the law of the sea partly because of the success of the IGY; it provided the impetus for the formulation of legal rules assisting in maximising achievements of scientific and technical cooperation.[10] The concept as applied to the law of the sea has been relevant to outer space

> [f]or many of the same reasons which induced its entry and acceptance in the Law of the Sea and earlier by the forces and events that led to the Antarctic Treaty.

ICSU, 1976, p. vii.

As for marine scientific research on the international level, Article 2(1) of the IOC Statutes makes it one of the Commission's functions to "promote freedom of scientific investigation of the oceans for the benefits (sic) of all mankind, taking into account…" Reprinted in IOC Manual-Part I, Paris, Intergovernmental Oceanographic Commission, 1975.

[9]Section 102(a), Public Law 85-268, 85th Cong., 2d Sess., 29 July 1958, 72 Stat. 426; 42 United States Code 2451. A similar clause appears in the United States Oceanographic Act of 1962.

[10]C. Christol, "The Legal Common Heritage of Mankind: Capturing an Elusive Concept and Applying it to World Needs". In M. Schwartz, (ed.), Proceedings of the 18th Colloquium on the Law of Outer Space, International Institute of Space Law, 1976, pp. 42-57, at p. 45.

One of the first references to mankind in relation to outer space, was in 1952, when it was proposed that

> "outer space and the celestial bodies would be the common property of all mankind, over which no nation would be permitted to exercise dominion", and that "a legal order would be developed on the principle of free and equal use, with the object of furthering scientific research and investigation".

O. Schachter, "Who Owns the Universe?", in Space Law- A Symposium, pp. 8-17. Cited in Jenks, Space Law, op. cit., p. 97.

> From the historical point of view, it is clear that both the modern international Law of the Sea, the international law of the space environment, and the international law of Antarctica have taken into account very similar factual situations and identical policy considerations as they have found expression during the past twenty years.
>
> The major differences are that the CHM concept was first generally accepted as part of the Law of the Sea, while the international law of the space environment is still a few short steps and a few short years away from the formal acceptance in a treaty of the position which was developed in the international law of the sea.[11]

4. Conclusion

The concept of 'mankind' is an evolving one which, moreover, carries different weight for each area; terms such as "interest of mankind" and "benefit of mankind" reflect rather vague application of the concept. Over the past twenty years, however, and especially during the past decade, trends have emerged which extend the idea of common heritage of mankind to actual ownership of an area and its resources. This is the case for the seabed areas and, progressively, for the moon as well; isolated proposals in this direction have also been made with respect to the Antarctic.

On a parallel level, the concept is emerging in the law of the sea from an essentially 'negative' one whereby, for instance, certain acts deemed harmful to mankind are prohibited,[12] to one which is prescriptive, i.e. one which would oblige States to act in a certain way for the

[11]Christol, op. cit., p. 45.

[12]See, for instance, the remarks made in 1958 by the representative of India in connection with nuclear tests. First United Nations Conference on the Law of the Sea. Official Documents, Vol. 4, p. 42.

benefit of all. In outer space this obligation has been recognized at least since 1967, though it has been given little firm content.

Given the inherent link, recognized for centuries, between the idea of science and the notion of mankind, it is perhaps surprising that proposals have not gained impetus to proclaim scientific research itself as the common heritage of mankind, or part of it, for example in the general provisions on scientific research contained in Part XIIII of the ICNT Rev. 1.[13] In this connection it is relevant that attempts have been made by the Group of 77 to apply the notion, or at least a variation of it, to technology in the framework of the United Nations Conference on Trade and Development's (UNCTAD) Code of Conduct, as part of the "universal human heritage".[14] Opposition to the proposal was strong, mainly because it runs counter to almost all of the current rules governing intellectual property, a drawback which would not of course be relevant to scientific research, which is by definition universal and a res extra commercium.

Although the requirement that States act for the benefit of mankind may be regarded as a general principle, it is difficult to pinpoint which particular rules the principle has engendered.[15] The least that can be said about it is that in virtually all its forms it may be viewed as a general

---

[13]See, however, the statement of Allende: "Science and technology should be considered the common heritage of mankind; they should not serve any elite or particular nations". S. Allende, in Impact of Science on Society, Vol. XXIII, 1974, Nos. ½, p. 34.

[14]Preamble. Doc. TD/CODE/TOT/1/Add.1. TD/AC.1/18/Add.1. Annex I, p. 2, UNCTAD, 1978.

The failure of the Group of 77's initial plan to have technology considered as part of the common heritage of mankind is illustrated in the latest proposal on the Code of Conduct, the Preamble of which only expresses the belief that "[t]echnology is the key to the progress of mankind". TD/CODE/TOT/9, p. 1. UNCTAD, 1978.

[15]Christol, op. cit., pp. 49, 51, has associated it with as many as fourteen separate rules.

clause which has particular applications with respect to ‘pure’ research and the requirement that results of such research be made freely available.[16]

[16]As stated in the ad hoc COPUOS in 1959:

> "Because the effects of space developments concern all mankind, it is essential that opportunities for cooperation and extensive distribution of information be made available to all countries, irrespective of the state of their scientific and economic development." Annual Report, 1959, p. 56.

PART THREE: FUNDAMENTAL RULES RELATING SPECIFICALLY TO SCIENTIFIC RESEARCH

CHAPTER I: FREEDOM OF SCIENTIFIC RESEARCH

1. General Conventional Clauses

(a) Outer Space

Paragraph 3 of Article 1 of the 1967 Treaty stipulates: "There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies…". The fact that the freedom is linked to the phrase "… and States shall facilitate and encourage international cooperation in such investigation" could be interpreted as making the exercise of the freedom conditional upon such cooperation, but the purpose of such a clause is to give States lacking a space capability a means of utilising space and thereby benefiting from the freedom.

The same freedom is incorporated in Article 6(1) of the 1979 Moon Resources Treaty, where it is to be exercised "…without discrimination of any kind, on the basis of equality and in accordance with international law".

(b) Antarctica

Article II of the Antarctic Treaty states: "Freedom of scientific investigation in Antarctica and cooperation toward that end, as applied during the International Geophysical Year, shall continue, subject to the provisions of the present treaty". As with outer space, then, the freedom

is associated with cooperation, though this time of a specific type- that which took place during 1957-58 under the program of the IGY.

A further difference from outer space is that the freedom is subject to the provisions of the present Treaty, which suggests there are certain regulations attached to it, if not limitations placed on it. Possibly linked to the freedom are: the duty to refrain from certain military activities, including weapon tests (Article 1); to publish all results (Article III[1]{b}); to refrain from using scientific research as the basis for sovereign claims (Article IV[2]); and to notify in advance of expeditions (Article VII).

(c) Oceans

The freedom of marine scientific research has not yet found expression in any multilateral treaty.[1] On the other hand, Article 87(f) of the ICNT Rev.1 clearly refers to it as one of the freedoms of the seas which all States have the right to exercise. This implies that States are under a corresponding obligation to respect the freedom of others to engage in scientific research.

[1]Although the freedom of marine scientific research is not mentioned in the 1958 Convention, the list of freedoms is not exhaustive (Article 2). From the commentary in the International Law Commission's 1956 proposal it is clear that marine scientific research was meant to be included:

> "The list of freedoms of the high seas contained in this article is not restrictive. The Commission has merely specified four of the main freedoms, but it is aware that there are other freedoms, such as freedom to undertake scientific research on the high seas- a freedom limited only by the general principle stated in the third sentence of paragraph 1 of the commentary to the present article."

Yearbook of the International Law Commission, 1956, Vol. II, p. 278. Further reference to it occurs indirectly through the Commentary to Article 68 on the continental shelf, where it was stated à propos the water column above the shelf that the freedom to conduct research was in no way affected. Ibid., p. 298.

Finally, Article 2(1) of the Statutes of the IOC places the latter under an obligation to "promote" the freedom for the benefit of all mankind.

2. The Customary Status of the Freedom of Scientific Research

(a) Outer Space

The space era is widely considered to have been ushered in with the successful launching of Sputnik in October 1957. In fact, as McDougal, Lasswell and Vlasic point out, this event, historic as it was, had been preceded by a number of high-altitude rocket launchings, starting in 1949. These rockets penetrated space, even if they did not orbit as Sputnik did.[2]

The main thrust for launchings such as Sputnik may be military and national prestige, but a significant factor was the IGY. Early on it was decided to develop a space component for the eighteen-month exercise, and so many of the early space shots came to be an integral part of this 'international' or 'transnational' venture.

In 1960 U. S. President Dwight D. Eisenhower proposed the creation of a 'free' régime for outer space along the lines of the one just established for the Antarctic, but extraneous disputes in COPUOS delayed a Declaration of Principles for outer space until 1962. In the agreed text there was no direct reference to a freedom of scientific investigation, though one could consider it part and parcel of the 'free' régime for exploration and use. In any case, it is doubtful that it could have by then already achieved the status of a custom in international law, as but two States had demonstrated an operational space capacity, and United Nations Declarations, though they may

[2]Op. cit., p. 201.

either be evidence of a custom or may contribute to the development of a custom, are not in themselves binding.

By 1967, however, the situation had developed significantly: the freedom of scientific research was enshrined in a multilateral treaty signed by a majority of the world's States, and by now a significant number of States had begun to develop a potential for directly benefiting from this freedom. Since that time, the practice of conducting research has been consolidated, with roughly double the number of States either actually using the freedom directly or indirectly benefiting from it, and with no State on record as protesting the existence of it. To be sure, there are States, such as Colombia, which deny the existence of a customary freedom of exploration or use,[3] but insofar as their complaint is limited to the geostationary orbit, and inasmuch as they have not rejected the freedom of scientific investigation per se, even they may be said to have acquiesced.

De jure, then, a customary freedom may be said to have developed, although it cannot be denied that a gap continues to exist between that freedom and the de facto exercise of it, the majority of States still being dependent upon international cooperation in order to take advantage of it. This situation, however, is due to the very nature of space and the costliness of venturing into it rather than to any legal impediments to the effective enjoyment of it.

[3]At the 23 June 1977 meeting of COPUOS, Colombia said it had not ratified the 1967 Treaty, and that as the principles of freedom and non-appropriation of outer space did not constitute peremptory norms of international laws whose binding nature was independent of the formal conclusion of an international treaty, they could not be applied to Colombia. Cited in D. Goedhuis, "The Changing Legal Regime of Air and Outer Space", International and Comparative Law Quarterly, Vol. 27, No. 3, 1978, pp. 567-595, at p. 589.

As stated in the section on access, in outer space there is a connection between the freedom and cooperation: “States shall facilitate and encourage international co-operation in such investigation” (Article I[3] of the Outer Space Treaty). Both the United States and the Soviet Union have, it seems, implemented this corollary to the freedom in good faith, to the point where it, too, could in some way be viewed as part of custom.

(b) Antarctica

The question as to the present status of the freedom of scientific research is complicated by the fact that Article IV(2) of the Antarctic Treaty stipulates:

> No acts or activities taking place while the present treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica.

The validity or accuracy of this clause has been seriously questioned, but this is not the issue here. What counts is that it would not seem to prevent the development of a custom on scientific research, with the proviso that scientific research cannot be cited to assert, support or deny a claim to sovereignty. Such a custom would undoubtedly create rights (as well as obligations), but this eventuality is entirely consistent with the Treaty to the extent that the rights in question are not “rights of sovereignty“.

Thus, the freedom of scientific investigation, as incorporated in the Treaty, need not be relegated to the status of a mere conventional ‘right’, and one could evoke all of the practice since 1959 as proof that a custom has developed and emerged. It can be shown, however, that the ‘freedom’ clause was in fact declaratory. The Treaty itself hints at the existence of a customary freedom when it states that the freedom of scientific investigation “shall continue”

(Article II), though admittedly it refers as evidence only to the activities of the previous eighteen months. The freedom was contested during the 1959 negotiations,[4] but this in itself is not a negation of its customary status. It might only have been an attempt to derogate from custom.

Overwhelming evidence exists suggesting the emergence of a customary freedom in the Antarctic by 1959. The proof is culled from the conduct of scientific research by a large number of States, more or less on a continual basis over a long period of time,[5] unhindered even in the face of territorial disputes.

From the first recorded scientific work in 1820-21 to the first intentional wintering over on the continent in 1899, there was a substantial body of research conducted in the region,[6] with the following overall characteristics:

1) It was undertaken at least two dozen times, both in water and on land, by nationals of at least five countries: The United States, Great Britain, France, Germany and Belgium;
2) It was sporadic;
3) It was secondary to the interests in discovery, charting, sealing and whaling;
4) It occurred almost exclusively in either the waters surrounding the continent or on islands in the sub-Antarctic region;
5) With some notable exceptions, it was rarely engaged in by scientists; usually it was done for them, e.g. through sample taking.

---

[4]Chilean Report on the Antarctic Conference, p. 689.

[5]Much of the subsequent historical data has been gleaned from B. Roberts, "Chronological List of Antarctic Expeditions", Polar Record, Vol. 9, May 1958, pp. 97-134, and September 1958, pp. 191-239.

[6]Cf. T. Nagata, "The Advancement of Scientific Research as the Basis of Antarctic Development", in Orrego, and A. Salinas, (eds.), El Dessarollo de la Antarctica", Collecion Estudios Internacionales of the Instituto de Estudios Internacionales de la Universidad de Chile, Santiago, 1977, pp. 70-131.

The turn of the century ushered in the so-called 'heroic' period of Antarctic research- the era of the great explorers such as Byrd, Scott, Amundsen, Shackleton and Mawson. At the same time, they and their expeditions began to undertake serious scientific work, on an extensive and regular basis, all over the continent. From 1900 to 1957 hundreds of expeditions were made to the continent by a total of twelve States (the five from the nineteenth century plus Sweden, Australia, New Zealand, Japan, the Soviet Union, Chile and Argentina). Many of the voyages included comprehensive scientific programs, especially the British ones, which between 1925 and 1939 were organised by the Discovery Committee.

Between 1900 and 1957 nine major types of research were engaged in: Whaling research; meteorology; biology; geology; hydrography; oceanography; glaciology; ornithology; and geophysics. In contrast to the nineteenth century, scientific research was now the predominant form of activity in the region; it was undertaken continuously, everywhere, and by highly qualified scientists working generally from well-equipped permanent bases.

Reinforcing the evidence that a freedom existed by 1959 is the finding that all interested States appear to have accorded scientific research a special character, permitting it and occasionally fostering it, even where territorial disputes existed or where sovereignty might have been infringed upon. At least eight cases or precedents can be cited which lead to this conclusion:

1) In 1929 Norway, in reacting to the planned United States Byrd expedition which would have traversed her claimed territory, did not object to the voyage occurring per se;[7]
2) The British reaction to the same expedition was, according to the United States, even more acquiescent, for they

[7]Note from the Norwegian Minister to the Secretary of State concerning Norwegian Rights in Antarctica, of 15 April 1929. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. X.1.

> wished the expedition every success and, if desired, would issue instructions to appropriate authorities to afford Commander Byrd every assistance while the expedition was in the Ross Dependency and the Falkland Islands Dependencies.[8]

3) This was also the situation during the second Byrd expedition of 1934. The British (or the British on behalf of New Zealand) objected to Byrd's apparent intention to issue stamps and to use a wireless without permission or licence while in the Ross Dependency. Once again there was no apparent objection to the expedition itself.[9]
4) On 29 December, 1934, the British, in a letter to the United States concerning another expedition, stated that "His Majesty's Government in New Zealand have no objection to the proposed visit of Mr. Andersen".[10]
5) In a Note of 17 November, 1947 to Argentina pertaining to a planned Argentine expedition, Great Britain asserted that she would be happy to help Argentine visitors to the extent of her available resources. Nowhere in the Note was it stated that Argentina had no right to conduct scientific research. On the contrary, the Note continued:

> His Majesty's Government have hitherto refrained from communicating officially with the Argentinian Government . . . because they did not wish to seem to be impeding any scientific or survey work being carried out by Argentine expeditions in the Antarctic . . .
>
> . . .
>
> The establishment, however, of an apparently permanent Argentinian meteorological station on Gamma Island without any previous reference to or authorisation from His Majesty's Government has rendered it impossible to postpone action any longer.[11]

Great Britain did not call for the removal of the base. In fact, His Majesty's Government stated that "it is no part of their intention to exclude from British Antarctic territories scientific parties either from Argentina or from any other friendly country".[12] Rather, Argentina was urged to apply for a lease on the base, which would readily be granted, and which would, it was alleged, pave the way for more cooperation on future expeditions. The British went as far as to express:

---

[8]Cited in G. Hackworth, Digest of International Law, Washington, Department of State, 1940-44, Vol. 1, pp. 454-455.
[9]Ibid., p. 457.
[10]Ibid., p. 458.
[11]Note from the British Ambassador protesting at alleged Argentine acts of trespass, of 17 November 1947. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. III. 11.
[12]Ibid.

> His Majesty's Government desire to give the utmost practical encouragement to the exploration and scientific development of Antarctica by removing all possibility of friction between the expeditions of different nationalities.[13]

Once again, in a Note of 23 December, 1947, Great Britain stated that she could "no longer condone the unauthorised presence in this island of Argentinian parties" (emphasis added).[14] In saying this she again appeared not to object to the presence per se of Argentinian scientists.

6) Chile and Argentina also made it clear that they did not want their territorial conflict to inhibit scientific research; in a July, 1947 Joint Declaration it was stated that

> both governments favour the execution of a harmonious plan of action for the better scientific knowledge of the Antarctic zone by means of exploration and technical investigations;
>
> . . .
>
> . . . at the same time they consider desirable a joint study of matters relating to the exploitation of the wealth of this region.[15]

A Statement of 4 March 1948 reiterated these intentions:

> [t]hey are in agreement upon continuing their administrative action, consisting their administrative action, consisting of exploration, preservation of security and development in the undefined frontier region of their respective zones, in a spirit of reciprocal cooperation.[16]

7) Chile, in its response of 31 January, 1948 to a British Note, stated in connection with the Anglo-Chilean territorial dispute: "…that it is not our intention to hamper in any form the activities of any expedition with scientific or exploratory aims… ".[17] At the same time, it

---

[13]Ibid. Similar demands and assurances were made to Chile in a 17 December 1947 Note. Reprinted ibid., p. V.8.1.

[14]Note from the British Ambassador protesting at the establishment of an Argentine station on Deception Island, of 23 December 1947. Reprinted ibid., p. III. 13. 1.

[15]Joint Declaration by Chile and Argentina on the Antarctic, Buenos Aires, of 12 July 1947. Reprinted ibid., p. III. 10.

[16]Joint Declaration by Chile and Argentina on their claims to Antarctica, Santiago de Chile, on 4 March 1948. Reprinted ibid., p. III. 16.

[17]Note to the British Ambassador replying to a British note of protest, of 31 January, 1948. Reprinted ibid., pp. V. 9. 1-2.

was asserted that cooperation was needed in order to avoid unfriendliness, but no mention was made of authorisation. Chile further stated:

> [i]t is certain that the close collaboration with British scientific or exploratory expeditions which may be sent to Chilean Antarctic territory will make it possible and particularly agreeable that our two countries should meet in the future participating in mutual labours with evident benefit for that class of investigations of general interest.[18]

8) Lastly, this same idea of making allowances for science which is in the 'general interest' re-surfaced in connection with the Antarctica Cases, where Chile, rejecting the competence of the International Court of Justice to deal with the dispute, nonetheless stated, in connection with the preparation for the IGY, that she would bend "in the interests of science", and "for a the benefit of humanity", in the hope that this would prove valuable and "prevent friction and resentment between countries".[19]

As Honnold has written,

> [t]here is little history of efforts by early explorers to hinder the progress of others, and no political authority imposed restrictions of any kind upon their free mobility.[20]

It is necessary to explain why this policy of non-interference with science was implemented by claimant States such as Chile, Argentina and the United Kingdom, as well as by Australia, New Zealand and Norway. It is not sufficient to say or to observe that all these countries were acting purely, or even primarily out of concern for 'the interests of science'. In reality, as we shall see, scientific research and sovereign claims are interwoven in the Antarctic, and this has led countries to launch official protests at anything potentially prejudicial to these claims. The fact that scientific research itself was tolerated is for the most part a recognition or reflection of the fact that, faced with eventual incursions on or over their claimed territory, claimant States lacked the

---

[18]Ibid.

[19]Note from the Chilean Ministry of Foreign Affairs to the British Embassy, concerning the British proposal to submit the dispute over Antarctic claims to judicial settlement, of 4 May 1955. Reprinted ibid., p. V. 13. 1.

[20]E. Honnold, "Thaw in International Law? Rights in Antarctica under the Law of Common Spaces", Yale Law Journal, Vol. 87, No. 4, 1978, pp. 804-859, at p. 809.

capacity to physically prevent the research from taking place had they wanted to in the first place. To prohibit such scientific research or to demand its cessation would have been unenforceable, and as such would have pointed up the lack of effective control over the claimed territory, thereby imperiling the claims themselves. Thus, the minimum gesture was to insist on notification and to give one's consent to research actually taking place, thereby giving the illusion of consent.

Undoubtedly, a second reason imposed itself under the circumstances: to protect scientific interests, each nation found it beneficial to have a regime of open access. Thus, a form of reciprocity existed. This was a particularly strong feature of British policy, for more than any other country the breadth of Britain's scientific pursuits was continent-wide; were she to restrict access to her claimed territory, she could not expect to be granted access elsewhere. A fundamental characteristic of the freedom of scientific investigation, then, is that it is in everyone's interest to promote it and to minimise interference with it. The territorial disputes should, in any case, be put in proper perspective; as Hayton wrote,

> [e]xcept for the Palmer Peninsula area, these various political manifestations were affected with little direct friction with the activities or immediate interests of other states active in the Antarctic.[21]

It could be argued that in the absence of an opinio juris, there is only a usage concerning scientific investigation pre-l958. The fact if the matter is, however, that there is a consistent behaviour by States with conflicting claims over the thirty-year timespan which, if it does not by itself provide conclusive proof of the existence of freedom, at least is supplementary evidence to

[21]R. Hayton, "The Antarctic Settlement of 1959", American Journal of International Law, Vol. 54, 1960, pp. 349-371, at p. 352.

the definite practice which existed, without protest, over a period exceeding one hundred and fifty years. Taken together, then, the overwhelming evidence is that by the time of the IGY there existed a customary freedom of scientific investigation in the Antarctic. As Mallinson says,

> [c]ooperative carrying out of scientific activity in the Antarctic continent, as occurred before the IGY, on a basis of at least mutual tolerance and forbearance, amounts to a legal claim to be allowed to do this consistent with law.[22]

During the IGY this practice was added to, and this then served as the basis for the freedom as enshrined in the 1959 Treaty. Again, to quote Mallinson:

> Without the development of customary international law in Antarctica, there would not have been any Antarctic Treaty. In many respects, the treaty is not lawmaking, it is declaratory. It is declaratory of that which is already agreed to as a matter of custom.[23]

This may serve to explain why it is that the Treaty itself does not restrict the freedom to Signatories. Not even membership in SCAR is a prerequisite for conducting research: at the Fourteenth meeting of SCAR in 1976 non-SCAR countries were only urged to consult with "other countries with stations in the general area" before establishing a research station.[24]

As in outer space, there is a gap between the freedom of scientific investigation in the Antarctic and the ability of States to exercise it, but in the Antarctic most of those interested in exercising the freedom can and/or have done so.

---

[22]W. Mallison, Jr., "Legal Implications: International Law", Ch. 4 in G. Schatz, (ed.), Science, Technology and Sovereignty in the Polar Regions, Lexington, MA: Lexington Books, 1974, pp. 37-43, at p. 40.
[23]Ibid.
[24]SCAR Bulletin No. 56, Polar Record, Vol. 18, No. 116, 1977, pp. 531-555.

In conclusion, then, the freedom of scientific investigation as embodied in the 1959 Treaty is declaratory and exists independently of the life of the latter.

(c) Oceans

(i) Introduction

While the freedom of marine scientific research is generally regarded as having been recognised in the law of the sea by the late nineteen fifties, there is no apparent reference to it before that time in the literature. Thus, to determine its customary status one is obliged to revert directly to the practice of States. With marine scientific research it is difficult to select a starting point in time. Certainly, the seas have been studied as long as man has used them.[25] Aristotle's ideas, for instance, on seas and rivers, are said to have held sway until the seventeenth century, and the Greeks also knew of tides and saltwater. Much of early research was land-based; thus, in 703 the monk Venerable Bede made an original contribution to tidal theory. Although he did not make the observations himself, he used data that the Northumbrians had collected, and that had been widely circulated in Iceland and Italy.

Few observations appear to have been made during the middle ages, but in the fifteenth century Cardinal Nicholas proposed a system for measuring the depth of the sea, and in 1631 Luke Foxe put out a line thirty fathoms long to get a warning of approaching land. In 1661 the Earl of Sandwich made a trip to the Mediterranean, during which sophisticated experiments were planned.

---

[25]Much of the ensuing historical data has been gleaned from Deacon, op. cit.

It was in the eighteenth century that the groundwork was laid for what was to follow. In 1706 Count Marsigli wrote an Histoire Physique de la Mer, which included his observations on the Mediterranean. It was he who first discovered the continental shelf. Earlier, in 1650, he had examined the Bosporus and sent his findings to the Queen of Sweden, who printed them in Rome. Others continued to measure the depths, for instance off Africa and the West Indies, and in 1769 Chappe d'Auteroche made a trip to Mexico to measure the Transit of Venus.

On Cook's 1772-75 expedition around the world, the ships "Resolution" and "Adventure" each had one scientist on board, astronomers both, who also measured saltiness and temperature of the water. It was also between 1775 and 1800 that Benjamin Franklin worked on waves and currents.

Until the nineteenth century by far the bulk of scientific research was conducted from conventional vessels, as a largely secondary preoccupation; England and France both took advantage of long voyages to do marine scientific research. Things only really started to change in the mid-nineteenth century, with the voyage of the "Beagle", which included a full complement of scientists; one of them, Charles Darwin, studied, among other things, the structure and distribution of coral reefs, and took samples and biological specimens.

Full scale study of the seas coincided with the beginnings of scientific cooperation generally (Gauss's Magnetic Union, for instance, originated in the 1830s). Thus, in 1853, following a British suggestion to the United States, the Conference on Maritime Meteorology was held in

Brussels. There it was resolved that individual governments concerned be asked to issue standardised instruments and logbooks for records.[26]

The first cruise devoted exclusively to oceanographic research was that of the British Challenger Expedition of 1872-1875. This event coincided with the emergence of oceanography as a separate discipline, although it was not until 1927 that the Committee on Oceanography of the United States National Academy of Sciences was established.

Around the turn of the century Alexander Agassiz of Harvard University was to conduct a number of surveys all over the world, including several research cruises aboard the United States Fish Commission steamer 'Albatross'. These cruises mark the beginning of oceanographic research in the twentieth century, when marine scientific research came to be an activity or pursuit engaged by a large number of States, on a regular basis, and with seemingly no interference until the Continental Shelf Convention entered into force in 1963.

Not only was scientific research not interfered with, but over a period of more than one hundred- and fifty-years scientific vessels were accorded immunity during wartime.

(ii) Immunity of scientific vessels from seizure on the high seas in time of war

(A) Precedents

There are numerous recorded instances of scientific vessels being accorded safe conduct passes durante belli, and thereby being exempt from the hostilities. In 1766, according to

[26]W. Sullivan, "Ocean Researchers See a Threat in Law of the Sea Conference", op. cit.

Oppenheim, Bougainville, the French explorer, "was furnished by the British Government by safe conducts".[27] Ten years later Cook's vessels "were declared exempt from attack and seizure".[28] In 1765 Lapérouse likewise secured immunity from attack and seizure.[29]

In 1803 the English explorer Flinders had a ship seized by the French because it "was not the vessel to which a safe-conduct was given".[30] Around the same time Flinders, according to Salomon, gave help "to the French scientific expedition that Nicholas Baudin was leading in Australian waters".[31] In 1859 the Austrian cruiser "Novara" was accorded safe conduct,[32] as was the Swedish cruiser "Vega" in 1878.[33]

(B) To whom did immunity apply?

De Boeck wrote that "l'immunité s'étend même aux vaisseaux de guerre: il suffit que la mission qui leur incombe ait un caractère scientifique".[34] Colombos says that the exemption of a ship "is not affected by her character and she remains immune whether she is a public or private ship".[35] Judging from the 1907 Hague Conference negotiations, the exemption applies to vessels combining commercial and scientific missions.[36]

---

[27]L. Oppenheim, International Law: A Treatise, 7th ed. H. Lauterpacht (ed.), Vol. II: Disputes, War and Neutrality. London, Longmans, Green and Co., 1952, p. 370.
[28]Ibid.
[29]Ibid.
[30]Ibid.
[31]J. -J. Salomon, "The Internationale of Science, op. cit., at p. 28.
[32]Oppenheim, op. cit., p. 370.
[33]Ibid.
[34]C. de Boeck, De la Propriété Ennemie sous Pavillon Ennemi, Paris, A. Durand et Pedone-Luariel, 1882, p. 229.
[35]J. Colombos, The International Law of the Sea, 6th ed., London, Longmans, 1967, p. 371.
[36]See infra, p. 115.

It must be pointed out that the term 'scientific vessel' was employed in a very broad sense, and encompassed vessels of exploration and discovery.

(C) What were the conditions upon which immunity was granted?

The rationale for the practice is well circumscribed in the British Admiralty Instructions to Sir James Clarke Ross:

> In the event of Britain being involved in hostilities with any other power during your absence, you are clearly to understand that you are not to commit any hostile act whatever; the expedition under your command being fitted out for the sole purpose of scientific discoveries, and it being the established practice of all civilised nations to consider vessels so employed as exempt from the operations of war.[37]

De Boeck, beyond citing the obligation to "s'abstenir rigoureusement de tout acte se rapportant de près ou de loin aux hostilités", felt that the government to which the vessel belonged had to notify the belligerent as to 1) the character of the ship; 2) its name; 3) its "force"; 4) its weapons; 5) its goal, and 6) its itinerary.[38] Colombos says:

> It is…manifest that a Government will require full information on the objects of the expedition before granting a safe-conduct and that any departure from these specified objects will entail the forfeiture of the ship.[39]

[37]J. Ross, A Voyage of Discovery and Research in the Southern and Antarctic Regions during the Years 1839-43, London, John Murray, 1847, p. XXVII.
[38]Op. cit.
[39]Op. cit.

(D) The Second Hague Conference of 1907

The Hague Convention No. XI,[40] in its Article IV, granted immunity to ships engaged in scientific, religious or philanthropic missions. Convention No. XIII,[41] in its Article XIV, exempted vessels devoted to scientific, religious and charitable purposes from the limitations on their stay in neutral ports.

(E) National Legislation

The exemption from capture rule was included in the United States Naval War Code (Article 13), the French Instructions of 1934 (Article 30) and the Italian War Laws of 1938 (Article 145).[42]

As for the limitations on stay, Harvard Research says:

> The Netherlands in 1909, France, Denmark, Norway and Sweden in 1912, and Germany in 1913 passed legislation regarding warships which specifically exempted vessels on religious, scientific or benevolent missions from limitations on stay.
>
> …
>
> In the World War, exemptions for vessels in these categories were made by; Brazil, China, Netherlands, Uruguay and Venezuela…The rule seems well established.[43]

(F) The legal nature and significance of the immunity rule

---

[40]Convention Relative to Certain Restrictions with Regard to the Exercise of the Right of Capture in Naval Warfare. Reprinted in J. Scott, The Hague Peace Conferences of 1899 and 1907, Baltimore, the Johns Hopkins press, 1909, 2 Vols, Vol. II, p. 462.
[41]Convention on the Rights and Duties of Neutral Powers in Naval War, ibid., p. 506.
[42]Cited in Research in International Law, Harvard Law School, Cambridge, Mass., 1939, Vol. IV, p. 431. (Hereafter Harvard Research).
[43]Ibid., p. 432.

De Boeck referred to the immunity rule as a mere "usage",[44] and so did Oppenheim, when he asserted: "During the nineteenth century this usage became quite general, and had almost ripened into a custom".[45] Colombos, on the other hand, characterises it as a "rule of long-standing recognition";[46] elsewhere he refers to it as a "practice".[47]

In the Paquete Habana case, Justice Gray, delivering the opinion of the Court, stated:

> By the practice of all civilised nations, vessels employed only for the purpose of discovery or science are considered as exempt from the contingencies of war, and therefore not subject to capture. It has been usual for the government sending out such an expedition to give notice to other powers; but it is not essential.[48]

The accumulation of precedent, conventional reference, national legislation and doctrinal recognition of its existence between 1766 and 1938 points to the development of a custom by the time of the Second World War, but it is quite possible that since that time it has passed into desuetude. Tucker wrote in 1955 that the present significance of the Hague rules on exemption of scientific vessels is "practically negligible".[49] He found it "…difficult to conceive of a 'scientific' mission belligerents would now be able to accept and grant immunity to – except on the basis of a specific agreement".[50]

Notwithstanding this criticism, the practice vis-à-vis scientific vessels is interesting for several reasons. First, it shows that special treatment was accorded scientific vessels even in time

---

[44]Op. cit.
[45]Op. cit.
[46]Op. cit.
[47]Ibid., p. 607.
[48]United States Supreme Court, 1900. 175 U. S. 677, cited in Scott, op. cit., p. 700, n. 17.
[49]R. Tucker, The Law of War and Neutrality at Sea, Washington, U. S. Government Printing Office, 1957, p. 96.
[50]Ibid.

of war – this argument should hold a fortiori for peace time. Second, the immunity was not limited to government vessels or non-military vessels; the focus was on the object of the research rather than the type of vessel employed. Third, there was a system of notification and certification. Lastly, the practice itself is proof that scientific research in the widest sense of the term has been tolerated, even favoured, for over two hundred years, an observation which no doubt reinforces the view that the freedom of marine scientific research has attained customary status.

(iii) The Discussions in the International Law Commission

On 27 June 1955, the ILC was discussing Article 2(2) of François' proposals, which dealt specifically with the freedom of the seas.[51] Four freedoms were expressly mentioned in these proposals; scientific research was missing but the listing was not to be considered exhaustive, as was indicated by use of the expression inter alia. Zourek said he was unable to perceive what the other freedoms might be.[52] Scelle said that there were other freedoms, such as the right to scientific research and to the exploitation of the resources of the seabed; for this reason, he considered the expression inter alia important.[53]

A note verbale of 15 March 1956 to the United Nations from the United Kingdom stated:

> Regime of the High Seas
>
> A. Comments of substance

[51] Yearbook of the International Law Commission, 1956, Vol. I, p. 222.
[52] Ibid.
[53] Ibid.

> Art.2
>
> 2. The United Kingdom Government have received evidence that a number of learned and scientific bodies are concerned lest recent developments should impede the freedom of research, exploration and experiment. They would accordingly propose to add a fifth item to those listed in Article 2, reading:
>
> '5. Freedom of research, experiment and exploration'.[54]

Fitzmaurice reiterated this comment during the 1956 ILC discussion.[55] It is in this manner that the question of marine scientific research became linked with the question of atomic tests. Krylov, for instance, remarked that if the United Kingdom proposal concerning a fifth freedom were accepted, there should be a proviso that such a freedom of research, experiment and exploration should not be exercised to the detriment of humanity.[56] Sandström did not think the proposed fifth freedom was in the same category as those already listed, which were, so to speak, everyday freedoms, whereas freedom of research would not be exercised frequently and was of less importance.[57] Fitzmaurice refuted Pal's apparent belief that all scientific research was adequately covered n the three clauses of Article 3 and insisted on the Commentary explicitly mentioning the freedom of scientific research.[58] During the 1956 debate both Zourek,[59] and, ironically, Fitzmaurice,[60] tried to separate scientific research from nuclear tests and other harmful experiments.

---

[54]Yearbook of the International Law Commission, 1956, Vol. II, p. 80.
[55]Yearbook of the International Law Commission, 1956, Vol. I, p. 12.
[56]Ibid.
[57]Ibid., p. 30.
[58]Ibid.
[59]Ibid., pp. 31-32.
[60]Ibid., p. 29.

In the ILC Report to the General Assembly in 1956, there appeared a Commentary to Article 27, paragraph 2 of which stated:

> The list of freedoms of the high seas contained in this article is not restrictive; the Commission has merely specified four of the main freedoms. It is aware that there are other freedoms, such as the freedom to explore or exploit the subsoil of the high seas and freedom to engage in scientific research therein.[61]

Thus, one can conclude from the debate and the ILC documents that the general opinion was that a freedom of marine scientific research did exist by the mid-nineteen fifties and that it should be inscribed in an eventual convention.

(1V) UNCLOS I (1958)

In the Second Committee of UNCLOS, Portugal proposed the addition of a fifth freedom to draft Article 27. Its proposal read: "Freedom to undertake research, experiments and exploration".[62] As Brown writes, "(a)gain, it would seem, because of the concern of a number of States to prohibit the testing of atomic weapons, the proposal was rejected by 39 votes to 13 with 8 abstentions".[63] Nevertheless, the Commentary of the 1956 ILC proposals still stands. It is ironic, however, that at the same time the freedom of marine scientific research was recognised for the first time, it was simultaneously diminished by the Continental Shelf Convention. Also at the same time, however, the IGY was occurring; this was to that moment the largest cooperative scientific project ever launched, and it included a vast array of maritime data gathering activities, none of which was ever legally contested and which could in a sense be regarded as part of the

[61]Yearbook of the International Law Commission, 1956, Vol. II, p. 278.
[62]Doc. A/Conf..13/C.2/L.37. Official Records, Vol. IV, P. 117.
[63]Op. cit., p. 347.

process of crystallisation into custom of a practice which had been accumulating for well over a century.

(V) UNCLOS III

During the debates both leading up to and during the Conference itself, numerous delegations proposed omitting scientific research as one of the freedoms of the seas. This, however, cannot be judged as proof that they did not accept it as a customary freedom. In this connection, only two States, Kenya[64] and Yugoslavia,[65] are on record as claiming that the freedom is not a part of customary international law. This dissenting view, as it were, is shared by only two publicists, Dixit[66] and Menzel,[67] virtually all others concurring that it exists.

If there has been to now any doubt about its legal status, the ICNT Rev.1 clearly recognises the freedom of marine scientific research as one of the freedoms of the seas (Article 87[1]f).

3. The Scope and Portent of the Freedom of Scientific Research

(a) The Freedom of Scientific Research Ratione Loci

(i) Outer Space

According to Article I(3) of the 1967 Treaty, the freedom of scientific investigation applies in outer space, on the moon and on other celestial bodies. There is no generally accepted legal

[64]Official Records, Vol. II, p. 350.
[65]Ibid., p. 348.
[66]R. Dixit," Freedom of Scientific Research in and on the High Seas", Indian Journal of International Law", Vol. 11, January 1971, pp. 1-8, at p. 7.
[67]E. Menzel, "Scientific Research on the Sea-Bed and its Régime", in J. Sztucki, ed., Proceedings on the Symposium on the International Régime of the Sea-Bed, Rome, Academia Nazionale dei Lincei, 1970, pp. 619-647, at pp. 619 and 646.

definition of where outer space begins. On a practical level, however, this does not seem to have caused any insuperable problems in the exploration and use of outer space.

The question of whether the legal régime for scientific research in outer space exploration, when, as stated by the ad hoc Committee,

> [a] large part of scientific research in the field of extra-terrestrial space is done on the ground either at sea level or in high mountains or with the help of balloons up to the altitude of about thirty kilometres.
>
> …
>
> In the future, the prospering of space science will continue to depend heavily on work done in countries and by groups of scientists that do not require direct access to space vehicles.[68]

Nonetheless, land-based research retains some impact, particularly as regards the sharing of data. Although Article 2(3) states that "(t)here shall be freedom of scientific investigation in outer space…" (emphasis added), the concomitant duty to "…facilitate and encourage international cooperation in such investigation" undoubtedly extends to land-based and sea-based activities as well. This is where all satellites and rockets are launched from, this is where space flights are controlled from, and this is where data is usually monitored from. Certainly, a sizeable part of bilateral cooperation relating to launching, tracking, training, etc., is strictly land-based, as are a number of scientific experiments.[69]

---

[68] Ad hoc COPUOS, Annual Report, 1959, p. 43.
[69] See infra, Part Five, Chapter Three.

For practical purposes it may be difficult to ignore land-based activities; the ITU regulations for space research, for example, comprise both terrestrial and space-based research. What is more, the definition of a space radio station is

> [a] station in the space [radio] service located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.[70]

Another type of activity, involving sounding rockets, is on the border between outer space and airspace activities. The British, for instance, have launched over fourteen hundred and fifty rockets, either undertaking sounding or carrying experiments, between sixty and two hundred and fifty miles up.[71] The practice of both COPUOS and COSPAR has been to include at least sounding rockets in their activities.

(ii) Antarctica

The zone of application of the Antarctic Treaty is defined in its Article VI as being "…the area south of 60 South Latitude, including all ice shelves…". Prima facie, then, the freedom of scientific investigation alluded to in Article II would seem to apply to all maritime areas in the region, including all ice shelves. A conflict arises, however, between this view and the qualification in Article VI that "…nothing in the present treaty shall prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law with regard to the high seas in that area". Thus, a particular rule would seem to govern scientific research on the high seas below 60°South Latitude; as the freedom of scientific research on the high seas is one

---

[70]1963 Regulations, Section II, Doc. A. 84AE. Cited in G. Gal, Space Law, Leiden, Sitjhoff: Dobbs Ferry, N. Y., N. Y., Oceana Publications Inc., 1969, p. 261.

[71]K. Gatland, "British Spacemen: Short on Rockets, Long on Ideas", Christian Science Monitor (International Edition), June 26 1978, p. 88.

which every State may exercise under international law, it qualifies a fortiori as one of the "rights" in the language of Article VI. The distinction between the freedom of scientific investigation for the Antarctic generally and the freedom of marine scientific research is that, as the Antarctic Treaty itself says in Article II,"[f]reedom of scientific investigation… shall continue, subject to the provisions of the present treaty". The provisions of the Antarctic Treaty are much stricter in respect of the conduct of scientific research, for instance as regards notification and publication of results, than are those of the high seas régime. Logical as the interpretation may be, it clashes with the practice of the Consultative Powers in the implementation of the 1959 Treaty: Consultative Meeting Recommendation VI-3 clearly requires States to notify in advance of all oceanographic ships in the area. Related problems are the questions of where the high seas begin in the Antarctic, and of who owns the continental shelf; Roberts says that there have been problems with marine scientific research in territorial seas of the Antarctic claimed by certain States.[72]

(iii) Oceans

The freedom of marine scientific research applies on the high seas and in the airspace above the high seas, but not in zones of national jurisdiction such as inland waters or the territorial sea. Article 256 of the ICNT Rev.1 refers to a "right" to conduct marine scientific

[72]B. Roberts, "International Cooperation for Antarctic Development: The Test for the Antarctic Treaty", in F. Orrego and A. Salinas (eds.), op. cit., pp. 336-356, at p. 338. For treatment of problems involving the law of the sea in the Antarctic, see J. Marcoux, "National Resources Jurisdiction on the Antarctic Continental Margin", Virginia Journal of International Law, Vol. 11, May 1971, pp. 374-405; A. Van der Essen, "L'Antarctique et le Droit de la Mer", Revue Iranienne des Relations Internationales, no. 5-6, Winter 1975-76, pp. 89-98; G. Wilson, "Antarctica, the Southern Ocean and the Law of the Sea", The JAG Journal, Vol. 30, no. 1, 1978, pp. 47-85.

research in the international seabed area, which comprises the seabed, its resources and the subsoil thereof. This is probably inconclusive as to the existence of a 'freedom' there, however, since Article 257 likewise only cites a "right" to conduct such research in the column of water beyond the limits of the exclusive economic zone.[73] As for the customary status of the matter, as Winner says, "most observers agree that deep seabed research is, along with high seas research, a freedom of the seas under customary international law".[74]

Nowhere in the ICNT Rev.1 is there any reference to a freedom for other areas such as the contiguous zone, the exclusive economic zone, the continental shelf, etc. The legal régime for scientific research in these and other zones such as in straits used for international navigation will be outlined in the subsequent section.

As a general rule, the provisions of the ICNT Rev.1 for the conduct of scientific research apply to scientific research in situ, i.e. research which is actually undertaken in the region in question. While there do not appear to have been any proposals to include land-based research in the régime for marine scientific research,[75] there have been proposals to include both air- and land-based. This would have been effected by referring to either 'research of the marine

---

[73]In its 1956 Commentary on the proposed Article 27, the ILC stated that it had

> "not made specific mention of the freedom to explore or exploit the subsoil of the high seas. It considered that apart from the case of the exploration or exploitation of the soil or subsoil of Continental Shelf… such exploitation had not yet assumed sufficient practical importance to justify special regulation. Yearbook of the International Law Commission. 1956, Vol. 2, p. 278, paragraph 2, Commentary on Article 27.

[74]Winner, op. cit., p. 319.

[75]Interestingly, many of the cases in which research proposals were refused included some land-based research. See infra, Part Three, Chapter Two.

environment'[76] or simply 'scientific research'.[77] This would also have been achieved by specific reference in the means by which such research would be undertaken.[78] As it now stands, the ICNT Rev.1 is inconclusive in this regard; it states that deployment and use of scientific research installations and equipment in any area of the marine environment shall be subject to the same conditions as those for the conduct of marine scientific research in those areas, but 'marine environment' is left undefined[79] and it is not clear whether aircraft and/or spacecraft could be considered "scientific research installations or equipment" as stipulated in Article 258. Particular areas where the question is likely to arise are the economic zone, the continental shelf and the international seabed area. Also left unclear is whether one can undertake research in one zone under the rules of another, e.g. research of the economic zone from the high seas.

[76]A similar effect would have been obtained from the phrase "scientific investigation of the oceans", whose use the IOC favoured. Official Records, Vol. III, p. 380.

[77]The Iraqi proposal on behalf of the Group of 77, for instance, deleted "marine" from "marine scientific research". Doc. A/Conf.62/C.3/L.13/Rev.2, 21 April 1975. This was strongly rejected by France during the negotiations. Official Records, Vol. IV, p. 106.

[78]Item 2(6) of the Iraqi Group of 77 proposal, for instance, refer to "satellites". Op. cit. The previous year Spain cited three means of research: Oceanographic vessels; Ocean Data Acquisition Systems and artificial satellites. Official Records, Vol. III, p. 348. India objected to reference to satellites and remote sensing. Ibid., p. 378. The following year Poland likewise said reference to satellites was "inappropriate". Official Records, Vol. VI, p. 108.

[79]Morocco said the definition of the marine environment should not include airspace. Official Records, Vol. II, p. 367.

(b) The Freedom of Scientific Research Ratione Personae

(i) Outer Space

(A) General

The Preamble to the 1967 Treaty refers to "States and peoples"; moreover, "… the exploration and use of outer space should be carried on for the benefit of all peoples…"

Article I(2) lays down the important principle that "(o)uter space…shall be free for exploration and use by all States…". In this way the principle is held open for third parties, though it does not explicitly apply to either international organisations or individuals. When it comes to scientific investigation, the freedom is not even limited to States; one could infer from this that anyone can exercise it. However, it is incumbent upon States to facilitate and encourage international co-operation in such investigation.

(B) State and Non-governmental Activities

That the Treaty does not restrict the exploration and use of outer space to States is evident from Article VI: States parties to it are responsible for national activities, whether they "… are carried on by governmental agencies or by non-governmental entities…". Article VI goes on to state that "[t]he activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision". Thus, private activities are subject to government control, as are, of course, governmental activities themselves. In practice, more and more private firms are having their own satellites launched,

and one is actually studying the feasibility of doing its own launching of payloads on a commercial basis.[80]

(C) International Organisations

All the space treaties are open for signature and accession by States only; however, the participation of international organisations in the exploration and use of outer space is sanctioned by Article VI of the 1967 Treaty, but especially by Article XIII, which nonetheless accords them a status inferior to States, since practical questions arising from their activities are to be resolved by States Parties "…either with the appropriate international organisation or with one or more State members of that international organisation, which are parties to this Treaty". It does not say what these practical questions are or might be.

The Responsibility and Liability Convention, according to its Article XXII, applies to

"…any international inter-governmental organisation which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention…" and if a majority of its member States are parties to the Convention and the 1967 Treaty. Similar clauses appear in Article VII of the Convention on Registry and Article 6 of the Rescue Convention.

In practice the ESA is the only international organisation which has launched scientific satellites.

---

[80]"OTRAG: What Goes Up Must Come Down", The Economist, 19 May 1979, pp. 89=91.

(D) Third Parties

It is clear from the Preamble and Article I of the 1967 Treaty that the intention is to create a legal régime for exploration and use by "all States". It is noteworthy that of seventeen articles in the Treaty, all but the first two, which contain, as it were, the fundamental principles, expressly refer to States Parties.

As pointed out earlier, a number of States are involved in space activities even though, for one reason or another, they have yet to become parties to the 1967 Treaty.

(ii) Antarctica

(A) General

The 1959 Treaty is addressed to States, but scientists are the object of a number of its clauses. Moreover, the freedom of scientific investigation is not limited to State organs or even State Parties, and the interest of international organisations is also recognized.

(B) State and Non-governmental Activities

That individuals and legal persons have the right to engage in activities in Antarctica can be deduced from Articles II, IV and X of the 1959 Treaty. Article II states that the freedom of scientific investigation shall continue as applied during the IGY; that eighteen month-long program was a non-governmental project organized by scientists with the assistance and cooperation of governments. Article IV(1)(b) distinguishes between the activities of Contracting Parties and those of their nationals. Article X commits each Contracting Party to ensure that "…no one engages in any activity in Antarctica contrary to the principles or purposes of the present treaty" (emphasis added).

These various clauses lead to the conclusion that States are not accorded a monopoly over scientific research in the region, though they assume the obligation of promoting international cooperation. As Dupuy states:

> Certes le monopole de l'État dans l'organisation de la recherche scientifique n'est pas expressément prévu. Des initiatives privées émanant de ressortissants des pays signataires peuvent, en principe, profiter de cette liberté de circulation ; l'article 4,1b y fait par ailleurs une allusion.[81]

There is nothing in the 1959 Treaty directly covering the question as to whether expeditions have to be sponsored; however, the duties of States to notify of all expeditions in the area (Article VII[5]a) and to ensure that no one behaves contrary to the principles and purposes of the Treaty (Article X) suggest that there are strong links between governments and researchers. Dupuy felt in 1960 that

> [d]e toute manière, un droit de regard de l'État est en réalité inévitable sur toute expédition entreprise par certains de ses nationaux, aussi bien parce qu'ils sont amenés à demander son soutien, au moins en moyens matériels, que parce que le Traite fait une obligation aux parties contractuelles de coopérer dans le domaine scientifique.[82]

In practice, a number of purely private expeditions have occurred, including prior to the conclusion of the 1959 Treaty; an example is the United States Finn Ronne Expedition.[83] In fact, in earlier days of Antarctic exploration, according to Baldwin,

> Government was not regarded as an essential supporter of scientific expeditions, and the need was often filled by private donations. Byrd's Antarctic expeditions of this period were, for example largely financed by such businessmen as Watson of

---

[81]R. Dupuy, "Le Traité sur l'Antarctique", Annuaire français de droit international, Vol. VI, 1960, pp. 111-132, at p. 117.

[82]Ibid. See also G. Ringeard, "Scientific Research: From Freedom to Deontology", Ocean Development and International Law, Vol. 1, 1960, pp. 111-132, at p. 117; For a view of the "diplomats", see ibid., p. 127.

[83]Whiteman, op. cit., Vol. II, pp. 1254-1255.

> IBM, Horlick, the malted milk manufacturer, Walgreen of the drugstores and Ruppert, the New York brewer.[84]

Examples of purely private expeditions since 1959 abound.[85] The Consultative Parties have recognized such independent pursuits in Consultative Committee Recommendation I-VI-10 (Exchange of information on operations) which, since approved, obliges Contracting Parties to give notice of any expedition not organized by a Contracting Party but organized in/or proceeding from the party's territory. Similarly, Recommendation VI-7 (Effects on tourists and non-governmental expeditions to the Antarctic Treaty Area) requires Contracting Parties to give advance notice of non-sponsored expeditions passing through their territory.

(C) International Organisations

Article III of the 1959 Treaty, relating to international cooperation in Antarctica, encourages States to establish cooperative working relations with international organisations having a scientific or technical interest in the region.

In practice the emphasis has been on the 'cooperative' aspect, the more sensitive of the Consultative Parties being reluctant to have organisations such as the Food and Agricultural Organization undertake activities in the region independently. As early as 1961 Recommendation I-IV urged the Consultative Parties to individually encourage international organisations by adopting bilateral arrangements with them.

---

[84]Op. cit., p. 100.

[85]See "First Italian Expedition to Antarctica," 1975-76", Polar Record, Vol. 18, January 1977, pp. 379-380; "Private Research Expedition to Antarctica", 1977-78", Polar Record", Vol. 19, January 1978, pp. 378-379.

(D) Third Parties

At the Eighth Consultative Meeting in 1975, the matter of "Activities of States that are not Contracting Parties" was officially discussed, and a Recommendation passed (VIII-8). According to Ringeard, the view of "the Diplomats" is that "States not party to the Treaty, wishing to do scientific research in the Antarctic, must submit to the régime established by the Treaty".[86] If this is accurate, it falls short of requiring third parties to accede as a condition for conducting research. This interpretation seems to coincide with Article X, which seeks to ensure that "…no one engages in any activity in Antarctica contrary to the principles or purposes of the treaty" (emphasis added). This clause is repeated in Recommendation VIII-8.

The 1959 Treaty cannot in itself impose obligation upon third parties.[87] Thus, States operating in the region are not a priori bound to conform with either the principles, purposes or rules contained therein. Having said this, it is true that treaties can attempt to confer rights on third parties, and these rights may or may not be accepted by the destinee. The freedom of scientific investigation is a right which is not limited to either Consultative Parties or Contracting Parties; thus, third parties may exercise it. They may elect to do so in conformity with the provisions of the 1959 Treaty or they may, on the other hand, regard them as res inter alias acta, in which case the legitimacy of their actions will be judged against the customary status of the régime of the region, and particularly of the freedom of scientific research.

---

[86]Op. cit., p. 100.

[87]Cf. P. Cahier, "Le Problème des Effets des Traités à l'Égard des États Tiers", RCADI, Vol. 143, 1974-III, pp. 589-736., at p. 655.

Practically speaking, added to all the hurdles and inconveniences any expedition faces in heading for Antarctica, most interested third parties face the geographic disadvantage of having to use the territory of a Consultative Power, e.g., Argentina or New Zealand, as a jumping-off point. It is partly bearing this fact in mind that the aforementioned Consultative Meeting Recommendation I-VI-10 was passed requiring Contracting Parties to give notice of any expeditions organized in or proceeding from its territory.

(iii) Oceans

Marine scientific research in areas beyond national jurisdiction is open to anyone, subject to rules relating to jurisdiction over vessels by the 'flag State' or appropriate international organization as well as over installations and equipment. As Caflisch says,

> [u]nder the existing rules of international law, marine scientific research is open to foreign States and international organisations as well as to private institutions and individuals. In other words, there is no research monopoly in favour of States and international organisations.[88]

Brown likewise believes that the freedom is enjoyed by States, and through them, their nationals, be they scientific institutions or private researchers.[89]

As for ICNT Rev.1, Article 238 only says that "States…and competent international organisations have the right to conduct marine scientific research…". This cannot be interpreted as restricting the right to State enterprises or agencies any more than does Article 4 of the High Sea Convention in giving every State "…the right to sail ships under its flag on the high seas".[90]

---

[88]Caflisch and Piccard, op. cit., p. 890.
[89]Op. cit., pp. 358-359.
[90]Cf. Caflisch and Piccard, op. cit., pp. 892-893, n. 125.

The true scope of the marine scientific research rules ratione personae is shown in Article 263(2) of the ICNT Rev.1, which states that the coastal State is responsible for measures taken in contravention of the Convention in respect of marine scientific research activities conducted by other States, their natural or juridical persons or by competent international organisations.

(c)The Freedom of Scientific Research Ratione Materiae

(i) Definition of Scientific Research

(A) Introduction

A definition of scientific research is important because it is necessary to differentiate between scientific and other activities in the three regions. Scientific research is not necessarily the principal, let alone the sole activity engaged in, and the rules governing the conduct of such research often differ from those laid down for other activities. A definition is also helpful in determining the field of application of the freedom of scientific investigation, and in classifying the various types of research.

(B) General Definitional Aspects

1. Outer Space

There is no definition of scientific research in the law of outer space. It is obvious, however, that not all space activities are scientific, any more than all marine activities are. In this vein, one should not confuse 'scientific' with 'technological', the latter component being very pervasive in space activities. In reality, the bulk of space activities are non-scientific, i.e. military and/or commercial.

The 1967 Treaty refers to six different activities of States in outer space. The title of the Treaty itself suggests that all activities coming under the scope of it are either “exploration” or “use”; in addition, “scientific research” (Article IV[2]), “scientific investigation” (Article I[3]), "studies"(Article IX), and “experiments” (Article IX) are mentioned in the body of the Treaty. It is likely that no major difference was intended between “investigation” and “research”,[91] and that “studies” and “experiments” are simply sub-categories of research. "Use" is only broadly regulated in the Treaty, which explains the tendency to negotiate separate rules on such types of use as communication satellites, remote sensing, the use of the radio band for space research, etc. Nevertheless, the absence of an objective definition has not prevented such bodies as COPUOS, COSPAR, the ESA and the International Telecommunications Union (ITU), from drawing distinctions between scientific and other activities.

There are a number of space projects which are clearly identifiable as scientific. Examples are such unmanned ventures as those involving the Aerial satellites, ISIS, the Alouettes, GEOS, IUE, REAO-B, IRAS and the Martian, Venus and Jupiter probes. There are also the manned flights such as Apollo and Soyuz. On the other hand, there are ventures which are clearly non-scientific in nature, one example being communications satellites which operate on a commercial basis. It is, however, not always easy to distinguish between scientific and other activities; weather satellites, for instance, collect, store, process and disseminate data, often on a commercial basis. Then there are programs such as SPACELAB, which will be used simultaneously for industrial and scientific use. Yet another example of the ambiguity is LANDSAT, which is charting the Indian

[91]The same may be said for the Antarctic and the oceans.

Ocean, but on behalf of the Cousteau Society and the United States Defence Mapping Agency.[92] Similarly, there is SEASAT, which collects data for both scientific and commercial use.

2. Antarctica

There is no definition of scientific research in the 1967 Treaty. On a practical level this is not created any problems to now, other uses such as whaling[93] and sealing[94] being covered by separate convention, and fishing about to become so. The fact, however, that some other uses have not so far been regulated has led to there being assimilated to scientific research. Thus, tourist activities, for example, are being labeled "expeditions".[95] While reflecting a desire to bring such matters within the purview of the Treaty regime, the longer-term effect of such a practice is to debase the notion of scientific research.

3. Oceans

There is currently no conventional definition of marine scientific research. Nevertheless, several proposals have been put forward since 1958.

3.1 UNCLOS I

At the First United Nations Conference on the Law of the Sea Mr. Schaefer, called upon by the Conference in his capacity as Expert, defined oceanography as "the scientific study of ocean basins, the ocean and its contents".[96] Denmark expressed the view that oceanographic research is the study of the phenomena of the oceans, including the seabed and ocean floor, but,

---

[92]"Landsats Take to High Seas", New Scientist, 24 August 1978, p. 555.
[93]International Convention for the Regulation of Whaling, op. cit.
[94]Convention for the Conservation of Antarctic Seals, op. cit.
[95]SCAR Bulletin, Polar Record, Vol. 19, no. 120, 1978, p. 134.
[96]Official Records, Vol. VI, p. 89.

in contrast to Schaefer, excluding the subsoil.[97] The Netherlands preferred the broader term “scientific research" because marine scientific research often includes biological and meteorological as well as oceanographic elements.[98] In order to gain the support of Denmark, the Netherlands proposed to add the words “and other scientific research” to “oceanographic research”.[99] The amended Danish proposal was adopted 25-20-10, but it is unclear whether it was Denmark's definition of oceanographic research or Schaefer's that was accepted.

3.2 UNCLOS III

There have been numerous attempts or proposals to define marine scientific research, both in the United Nations General Assembly Special Committee on the Peaceful Uses of the Seabed and Ocean Floor beyond National Jurisdiction, and in the conference proper.[100]

3.2.1 Seabed Committee

(1) A Canadian Proposal of 25 July 1972 would have defined marine scientific research as “any study, whether fundamental or applied, and related experimental work the primary aim of which is to increase knowledge of the marine environment for peaceful purposes ”.[101]

(2) The Eastern European proposal of 15 March 1973 contained a similar objective component : “Scientific research means any fundamental or applied research and related experimental work”. But it also contained a confusing 'functional' clause: a scientific

---

[97]Cited in A. Soons, "The International Régime of Marine Scientific Research”, Netherlands International Law Review, Vol. XXIV, no. 3, pp. 393-444, at p. 419.
[98]Ibid., p. 420.
[99]Official Records, Vol. VI, p. 82.
[100]Established pursuant to Res. 2340, 18 December 1967 (XXII). (Hereafter "Seabed Committee").
[101]Doc. A/AC.138/SC.III/L.18.

research activity was defined as not “aimed directly at industrial exploitation but designed to obtain knowledge of all aspects of natural processes and phenomena occurring… which is necessary for… the further development of navigation… and also utilization of the airspace ”.[102]

(3) The Maltese proposal of 16 July 1973 stipulated that scientific research meant "any systematic investigation, whether fundamental or applied, and related experimental work the primary aim of which is to increase knowledge of the marine environment for peaceful purposes”.[103]

(4) According to the Italian proposal of 14 August 1973, “scientific research means all operations carried out by qualified persons or institutions for the purpose of obtaining data, which shall be made public and be made available to all”.[104]

3.2.2 UNCLOS III

The definition of marine scientific research which appeared in the RSNT read:

> For the purpose of this convention, marine scientific research means any study or related experimental work designed to increase mankind's knowledge of the marine environment.[105]

The question of whether hydrography and similar activities should be included in a definition has arisen during UNCLOS III. A 1973 Fiji proposal would have distinguished between marine research vessels and hydrographic survey ships,[106] as well as between hydrographic work

[102]Doc. A/AC.138/SC.III/L.3.
[103]Doc. A/AC.138/SC.III/L.34.
[104]Doc. A/AC.138/SC.III/L.26.
[105]Article 48.
[106]Doc. A/AC.138/SC.III/L.42.

and marine scientific research activities;[107] nevertheless, the rules for the conduct of scientific research would apparently have applied to both types of activities and ships. While there is a risk in making the scope of marine scientific research too broad, it is difficult to see what would be gained from excluding hydrography or charting. Granted, they involve little more than data gathering at the operational level, and may thus not be stricto sensu what the ICNT refers to as a "study", but is not gathering data a fundamental element of all scientific research?[108] If this were not reason enough to include them, then meteorology and the greater part of the activities of the IGY would likewise have been disqualified.[109] Perhaps the best reason for including these activities is that they are not normally undertaken for immediate commercial gain and ultimately increase mankind's knowledge of the marine environment, even if a large part of said activities are done by the military, and much of it has immediate military significance.

(C) Should Military Research Be Considered Part of Scientific Research?

(1) Introduction

There is nothing in principle which rules out scientific research as a process either conducted by the military, paid for by the military, or even of potentially military significance. But the question is whether certain types of activities which by their very nature are military, e. g. intelligence gathering and weapons tests, are scientific research. The question has already been

---

[107]Ibid.

[108]Dixit, op. cit., p. 3.

[109]R. Revelle, "Some Recent Lessons", "Bulletin of the Atomic Scientists", Vol. 18, no. 1, 1962, pp. 1-20.

treated to some extent by examining the rules with respect to peaceful use in Part Two: Chapter II; now the topic will be elaborated upon.

It is difficult to say whether weapons tests per se are a type of scientific research, though they can almost certainly be considered a type of experimental activity. If publication is the criterion for determining, then they seldom if ever are. Two questions arise: are such tests legal at all and, if so, are they scientific research? These two questions were in fact confused during the 1956 International Law Commission (ILC) debate on nuclear tests and the freedom of scientific research. Since that time nuclear tests in the water, the atmosphere and outer space have been outlawed by a convention.[110] As the arguments made in connection with weapons tests have tended to focus on the alleged unlawfulness of such tests and on their interference with legitimate uses, the question of whether they can be characterized as scientific research has somewhat receded into the background.[111]

(2) Outer Space

As discussed in Part Two: Chapter II, a large part, but by no means all, of military activities are outlawed in space. In practice, the bulk of activities in space to the present have been military in nature. Weapons tests have been conducted, though not on the moon or other celestial

[110]Op. cit.

[111]In the preliminary hearings of the Nuclear Tests Cases, Australia argued that the Treaty had become a part of custom. Op. cit., p. 182. Moreover, nuclear tests were decried not for their invalidity as scientific research but rather for their interference with legitimate use. This was an element central to the 1956 ILC debates as well. It has also been the rationale for the view that weapons tests in general are illicit.

bodies, where they are expressly prohibited. These tests have never been justified on the grounds that they constitute a form of scientific research.

The other principle form of military activity in space with a bearing on scientific research is military reconnaissance. Marcoff contends that this is an illicit activity ipso facto.[112] It is often argued, on the other hand, that military reconnaissance is lawful; its legitimacy would stem not from the 1967 Treaty, but rather from a separate agreement reached between the United States and the Soviet Union.[113] Certainly, if publication is any criterion, then reconnaissance does not qualify as bona fide scientific research, whatever its lawfulness.

(3) Antarctica

As shown in Part Two: Chapter II, virtually all military activities in the Antarctic are prohibited by the 1959 Treaty. This includes, pursuant to Article I(1), "the testing of any type of weapons". At least in this region then, it is impossible to argue that this type of activity is a valid

---

[112]Op. cit., p. 338, and pp. 525-526.

[113]Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems , done at Moscow 26 May 1972. Reprinted in SIPRI, 1973, pp. 20-24. Article XII(1) one states that "each party shall use national technical means of verification at its disposal in a manner consistent with generally recognised principles of international law". Additionally, "each Party undertakes not to interfere with the national technical means of verification of the other Party". Article V(1) of the Interim Agreement between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms, done at Moscow 26 May 1972, and reprinted in SIPRI, 1973, pp. 25-27, contains an identical clause.

According to ibid., p. XIX:

> "[i]t Is public knowledge that, for years now both sides have been using artificial earth satellites for intelligence gathering, although neither has admitted it. During the 10 years preceding the conclusion of the agreements about 40 percent of the several hundred satellites launched by the USA and the USSR were photographic reconnaissance satellites. This practice has now been promoted to the rank of an internationally sanctioned and mutually useful activity and the parties have undertaken not to interfere with or impede it."

form of scientific research. Reconnaissance and intelligence gathering are not expressly proscribed, but the list of prohibited activities is not exhaustive. Given the geography of the region and the near total absence of military activity, the question may seem of only marginal import. On the other hand, the fact that a large part of the personnel and equipment in the area is military may well lead to various forms of espionage, perhaps under the guise of scientific research.

(4) Oceans

Article 88 the ICNT refers to scientific research "exclusively for peaceful purposes". General Assembly Resolution 2560 of 13 December 1969 refers to research which is "exclusively scientific in nature". The 1970 Lima Declaration speaks of scientific research of "exclusively scientific character".[114] All of these expressions would seem to rule out military intelligence, though neither militarily-funded research nor research of possible military significance. The origin of the above-mentioned expressions may well be found in the second Hague Conference of 1907, for according to Harvard Research,

> [i]n connection with the Eleventh Convention the matter was raised by the delegate from Italy, who asked that vessels flying flags of a belligerent power which were engaged in purely scientific mission be exempt from capture.
>
> …
>
> The French, Dutch and Belgian delegates suggested various additions which led the Reporter to propose the form "charged with a purely scientific, religious, or philanthropic mission". Proceedings, p. 986. The

[114]Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Trinidad and Tobago, and Venezuela. 4-8 August 1970. Reprinted in S. Oda, The International Law of Ocean Development, Leiden, Sitjhoff, 1972, Vol. 1, pp. 349-355.

> word “purely” was stricken out because the Austrian delegate called attention to the case of the Novara charged with a scientific and a commercial mission, which obtained a safe-conduct from France and Sardinia.[115]

In 1958 Portugal proposed a freedom of “research, experimentation and exploration”, which was opposed on the grounds that it would sanction weapons tests and nuclear tests.[116] Similarly, in 1958 Thailand stated that it could not support the Netherlands proposal referring to oceanographic or other scientific research because this expression was extremely broad and might include research into the effects of underwater nuclear explosions; for this reason it proposed the word “peaceful” be inserted- otherwise consent should be required.[117]

The RSNT definition of marine scientific research, it will be recalled, referred to “any study or related experimental work designed to increase mankind's knowledge of the marine environment” (Article 48). It is unclear what such a work is supposed to be related to or how, but the fact that it must be designed to increase mankind's knowledge of the marine environment virtually rules out all military activities. “Mankind's knowledge” represented a change from the SNT, which referred simply to “man's knowledge” (Article 1). Winner considers that “this change may indicate a trend toward discouraging classified military research".[118]

The most convincing reason for excluding military intelligence operations may in fact be that the results are not published. This is not to say that such activities are illicit. On the contrary, as Caflisch points out, the irony of the “Pueblo” incident is that the ship had every right to conduct

---

[115]Harvard Research, op. cit., Vol. III, p. 431.
[116]Doc. A/Conf..13/C.2/L.7. Official Records, Vol. IV, p. 117.
[117]Official Records, Vol. VI, p. 84.
[118]Op. cit., p. 305.

intelligence operations on the high seas, even above the continental shelf. What it lacked was the right to carry out marine scientific research there.[119]

(5) Conclusion

In conclusion, it seems that there has been little tendency to include military research under the rubric 'scientific research'; On the contrary, the tendency is to restrict scientific research in all three areas, if not activities generally, to those undertaken exclusively for peaceful purposes, which, if it does not category rule out 'research' of a military nature, at least prevents it from falling into the category of scientific research. On the other hand, it is quite possible that the military fund or carry out legitimate scientific research.

(D) Does Scientific Research Include Both Pure and Applied Research?

(1) Outer Space

The 1967 Treaty gives no inkling as to whether the freedom of scientific research is restricted to pure research, although there is no doubt that applied research is a licit activity covered by the general provisions regarding exploration and use. The practice of various international agencies involved in space illustrates that a fairly firm distinction Is drawn between pure research and other activities. As early as 1959, for example, a distinction was made in the ad hoc COPUOS between pure and applied research.[120] As reported in the United Nations

[119]Caflisch and Piccard, op. cit., p. 850, n. 9.
[120]1959 Ad hoc COPUOS Report, p. 30.

publication, in the early days of space exploration the emphasis was on basic research.[121] In contrast with the early days, as reported in the COPUOS Annual Report of 1977,

> [w]hile some proportion of the budgets provided by governments for space research can still be spent on the acquisition of new knowledge about the solar system of which the earth is part, and to a more limited extent about the universe itself, the emphasis is now more on not only getting value for the money but also in making the still comparatively new science of space technology work for its living.[122]

A second illustration of the distinction is to be found in the activities of COSPAR, a semi-official, non-governmental scientific body. In its Statute, under the heading "purposes and objectives", it is stated:

> The purpose of COSPAR is to further on an international scale the progress of all kinds of scientific investigations which are carried out with the use of rockets or rocket propelled vehicles. COSPAR shall be concerned with fundamental research. It will not normally concern itself with such technological problems as propulsion, construction of rockets, guidance and control.[123]

In practice, however, many of the activities of COSPAR over the years have been applied in nature.

Yet a third example of the distinction comes from the activities of ESA, which include both pure and applied research.[124]

Many space activities, while loosely turned "applied", more closely resemble applications of space technology rather than applied research, while others are spinoffs of space research.

---

[121]Space Activities and Resources, op. cit., p. 8.
[122]Opening Statement of the Chairman, Annex III, p. 23.
[123]Charter of COSPAR, Paris, ICSU, 1977.
[124]Op. cit., p. 134. In September 1975 the Charter was extended to cover space research experiments with balloons.

Still others, such as lunar exploration, are laying the groundwork for exploitation of resources there in much the same way as the 19th century "Challenger" expedition preceded harvesting of manganese nodules. In the future, one can expect to see scientific research take on a more deliberately applied character as such activities as solar energy and materials testing become more attractive.

(2) Antarctica

The 1959 Treaty is silent as to whether commercial activities are a legitimate form of use and whether the freedom of scientific investigation extends to applied research. Certainly, economic activities have a long history in the Antarctic, from the early whaling days in the first half of the nineteenth century to the search for minerals in the early, mid- and now late twentieth century.

Much of this economic activity amounted to applied research. Examples of this are geological reconnaissance of economic minerals on Kerguelen Island conducted by a French expedition in 1930-31,[125] the Australian Mawson expedition,[126] the American Byrd expedition,[127] and the 1942 Charter of the Chilean Antarctic Committee.[128]

---

[125]B. Roberts, "Chronological list of Antarctic Expeditions", Polar Record, Vol. 9, September 1958, pp. 191-239, at p. 204.

[126]See Instructions Issued by the Prime Minister of Australia to the Leader of the Banzare Expedition, 1929-31. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. 1247.

[127]A Note from the United States Department of State of 8 August 1939 referred to the Byrd Expedition as "an investigation and survey of the natural resources of the land and sea areas of the Antarctic regions". Whiteman, op. cit., Vol. II, p. V. 4.

[128]One of the terms of reference of the Committee was "to encourage such studies, investigations, surveys and exploration as may be thought suitable to the further exploitation of the said territory". Decree No. 548 of 27 March 1942. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. V. 4.

Economic use was not, it seems elaborately dealt with at the 1959 Antarctic Conference in Washington. Nevertheless, certain arguments have been put forward since then both for and against commercial use. The Treaty Powers assembled informally in Norway at the Nansen Foundation in 1973 to discuss the issue of exploration and exploitation of the mineral resources of the Antarctic. Three principle views emerged during the discussion. The first view was that such activity is not licit. According to this view, 'exploration and exploitation' is to be differentiated from scientific research.[129] Another view was that the Treaty neither directly prohibits nor permits it, but that such activity would in any case be contrary to the purposes and objectives of the Treaty, and thus a violation of it. It was added that open publication requirements would be contrary to multinational corporations' rules and procedures.[130] The third view, held by several members of the working group studying the problem, was that the Treaty did not prohibit exploration and exploitation, but that such activities were only to be undertaken subject to the condition that they be for peaceful purposes, they conform to requirements concerning notification and publication, and, significantly, that there be no conflict with scientific investigation.[131]

Nowhere was it argued that applied research or exploration should come under the blanket of the freedom of scientific research. This is consistent with the practice of the Treaty Powers to conclude separate agreements on issues unconnected with scientific research per se- issues which might otherwise jeopardise the balance achieved in the 1959 Agreement.

---

[129]Antarctic Resources: Report from the Informal Meeting of Experts, 30 May- 9 June 1973. The Fridtjof Nansen foundation at Polhogda, pp. L8-L9.
[130]Ibid., p. L9.
[131]Ibid., p. L10.

(3) Oceans

A variety of terms are used to denote pure and applied research. Words which are more or less synonyms for 'pure' are 'fundamental', 'basic', 'disinterested', 'bona fide', etc. For applied, the terms 'resource-oriented', 'commercial', and 'industrial' are among the more often-cited.

The Continental Shelf Convention distinguishes between pure and applied research. Pure research is referred to in two quite distinct manners: 1) "fundamental oceanographic or other scientific research carried out with the intention of open publication" (Article 5[1]), and 2) "purely scientific research into the physical or biological characteristics of the continental shelf" (Article 5[8]). The actual reference to applied research will be discussed in subsection (E), which follows.

The ICNT Rev. 1 refers on the one hand to projects intended to "increase scientific knowledge of the marine environment for the benefit of mankind" (Article 247[3]0), and to projects "of direct significance for the exploration and exploitation of natural resources" (Article 247[4]{a}), on the other. These distinctions are applicable to economic zone and continental shelf research.

One area of maritime jurisdiction in which no distinction is drawn between pure and applied research, both being implicitly covered by the freedom of marine scientific research, is the high seas. This is evident from a reading of Article 87(1)[f] of the ICNT Rev. 1.[132] There is, however, a possible discrepancy between this interpretation and that which flows from the definition of marine scientific research which was contained in the RSNT, For it is difficult to see

[132]While this may well be regarded as declaratory, Brown, op. cit., curiously refers to the freedom of fundamental scientific research on the high seas, as if 'applied' was not a type of scientific research or as if the freedom did not cover it.

how applied research could be considered as "designed to increase mankind's knowledge…", though it is undoubtedly true that this maybe the ultimate effect of it. In contrast, both the 1972 Canadian proposal[133] and the 1973 proposal of Malta[134] provided definitions which expressly refer to both fundamental and applied research.

(4) Conclusion

In conclusion, it appears that in outer space the freedom of scientific research presently encompasses both pure and applied research. In the Antarctic, by contrast, even though most research pre-1959 was applied, currently the freedom is restricted to applied. Any change in the status quo would require either renegotiation of the 1959 Treaty or a separate agreement. Finally, in the oceans scientific research may be either pure or applied, and de lege lata the freedom of marine scientific research incorporates both, although there have been some proposals to alter this situation.

(E) The Meaning of the Term 'Exploration and Exploitation"

(1) Outer Space

The 1967 Treaty's title is "Treaty on Principles Governing the Activity of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies". One is tempted to argue that the term "exploration and use", which appears in the 1962 Principles

[133]Working Paper on Principles on Marine Scientific Research. Doc. A/AC.138/SC.III/L.18, of 25 July 1972.

[134]Preliminary draft articles on the delimitation of coastal state jurisdiction in ocean space and on the rights and obligations of coastal states in the area under their jurisdiction. Doc. A/AC.138/SC.II/L.28, of 16 July 1973 (Article 63[2]).

which preceded the 1967 Treaty as well as in the body of the latter, is an adaptation of the concept of exploration and exploitation included in the Continental Shelf Convention. But, as shall be shown below, in that Convention the concept may refer to applied research, something it is doubtful the Outer Space Treaty was meant to convey. An alternative, plausible interpretation is that the word 'exploration' alone has a very particular meaning- namely, the initial, exploratory phase of discovery which characterises early activity in any remote area.

(2) Antarctica

Neither do the terms 'exploration' or 'exploitation', nor that of 'exploration and exploitation' ever appear in the Antarctic Treaty. They do, however, occur together frequently in the Consultative Meeting Recommendations in connection with mineral as well as marine living resources. It is clear from the context in which the term is employed that 'exploration and exploitation' is not thought of as referring to any form of scientific research, which goes some way in explaining why the régimes for mineral and marine resources are being regulated separately.

(3) Oceans

There are several different notions of what the term 'exploration and exploitation' refers to; the only possibilities never cited, and which can thus be safely ignored, are that it denotes either pure research or exploitation per se. The task of establishing what it does mean is complicated by the fact that the two components of the term have, taken one-at-a-time, separate meanings from when they are joined. There is little or no difficulty with the term 'exploitation', which alone has nothing to do with research, but the term 'exploration' has variously been interpreted as connoting either pure and or applied research or something quite

distinct from scientific research altogether.[135] Understandably then, it is often unclear whether the term 'exploration and exploitation' is thought of as including a combination of both pure and applied research. As Wooster says,

> [a]though exploration has always been a key element in scientific investigations, 'exploration and exploitation' have been so inextricably intertwined by sea lawyers that the utility of the word has been destroyed.[136]

All things considered, however, the term seems to apply at least to so-called applied research, particularly in the context of the Continental Shelf Convention. In the ICNT Rev. 1, on the other hand, there are two senses in which the term is used, depending on the area: for the economic zone and continental shelf, projects "of direct significance for the exploration and exploitation of natural resources" are clearly considered a type of scientific research- namely applied research (Article 246[4]). In the International Seabed Area, however, exploration and exploitation are not forms of scientific research since they are, in contrast to marine scientific research, completely controlled by the Authority (Annex II, Article III). Exploration and exploitation are, moreover, distinguished from 'prospecting' (Annex II, Article 2), which in turn does not appear to be identical with scientific research.

---

[135]J. Knauss, in Scientific American, 1969, pp. 231-232, wrote: "True exploration, however, is a fundamental element of scientific research, and scientific exploration must not be excluded from the freedom of research ".

[136]W. Wooster, "Pollution-Scientific Research", Sixth Annual Law of the Sea Institute Conference, University of Rhode Island, 1971, pp. 130-134, at p. 132.

(4) Conclusion

The term 'exploration and exploitation' does not appear in either the 1967 Outer Space Treaty or the 1959 Antarctic Treaty. It does, on the other hand, occur in the Consultative Meeting Recommendations, and therein it is not associated with scientific research. In the oceans the practice is inconclusive, but it is almost always considered a form of scientific research and appears for all intents and purposes to be synonymous with applied research.

(F) What the Freedom of Scientific Research Includes

For all three areas it is obvious that the exercise of the freedom of scientific research is conditional or dependent upon a right of access and a freedom of movement. What is perhaps less recognised, but no less true, is that its effectiveness also hinges on some form of right to deploy installations and equipment from which or with which to affect such investigation.[137] There is as well a right to actually engage in research, a right which involves a number of corollaries, e. g., to explore, collect data, amass samples and experiment, all subject to the relevant treaties and their respective provisions.

Aside from the aforementioned reference in the 1967 Outer Space Treaty to scientific research, scientific investigation, studies, and experiments, the 1979 Moon Resources Treaty gives Contracting Parties the right to “place their personnel, space vehicles, equipment, facilities, stations and installations anywhere on or below the surface of the moon” (Article 8[b]), and similarly “establish manned and unmanned stations on the Moon” (Article 9[1]).

---

[137]Cf., vis-à-vis marine scientific research, Caflisch and Piccard, op. cit., pp. 866-887.

In the Antarctic the right to take samples exists even when all other activities are restricted or banned in the area.[138] Here the freedom of scientific research as incorporated in the 1959 Treaty also includes the right to establish bases (Article 7), a very important element related to participation in the Consultative Meetings (Article IX[2]).

In the oceans there is a customary right to establish artificial islands and installations. According to the ICNT, all marine scientific research activity must be conducted "with appropriate scientific methods and means" (Article 241[b]). There is, additionally, a substantial practice which has built up involving the use of floating ice islands for scientific research purposes.[139]

The freedom of scientific research is not conditional upon reciprocity in any of the three areas. Nor does it currently involve any form of immunity. Even during the mammoth IGY, the greatest global scientific venture on record, there was, as Baldwin states, no special exemption made for scientists as regards customs, visas, etc.[140]

4. General Conclusion

There is a conventional freedom of scientific research in all three areas which has attained customary status in all three as well, though it applies to only certain areas of the oceans and

[138]E. g., Article 4 of the Convention for the Conservation of Antarctic Seals, op. cit., allows for special permits to be issued when seals are to be killed or captured in limited quantities to either provide for scientific research or provide specimens for museums, educational or cultural institutions. The Regulations for the Conservation of Flora and Fauna contain a similar exemption in Article VI(b) and (c).

[139]See, for instance, "Soviet Drifting Stations, 1977-78", in Polar Record, Vol. 19, no. 120, 1978, p. 285.

[140]Op. cit., p. 111.

includes land-based research in outer space. In both outer space and the Antarctic, the freedom is linked to the duty to cooperate.

The freedom extends in all three areas to States, scientists and international organisations, though in different ways and subject to different conditions, e.g., sponsorship. In none of the areas does it appear that there was any intention to limit the enjoyment of the freedom to signatories of the relevant conventions.

There has been little tendency to include under the freedom activities with a military objective, and only in the oceans has that freedom really covered both pure and applied research to any significant extent.

CHAPTER II. THE RIGHT TO CONDUCT SCIENTIFIC RESEARCH IN CERTAIN AREAS OF JURISDICTION

1. Outer Space

There is no difference between the right to conduct scientific research in outer space, on the moon and other celestial bodies, and the freedom of scientific research. There are no areas of space where the right is conditional upon consent. The only matters in which issues of consent have arisen pertain to the use of the geostationary orbit, remote sensing and direct broadcasting from space, none of which concern this thesis.

2. Antarctica

The freedom of marine scientific research in the Antarctic appears to apply to the land areas, to coastal maritime areas as well as to all other maritime space situated below 60° South Latitude. Thus, there are no zones where the right to conduct research is conditional, although from the point of view of at least some of the claimants, territorial sea research is subject to consent.

3. Oceans

(a) Introduction

The freedom of scientific research applies to the high seas and, likelier than not, to the deep seabed. Thus, it remains to determine what, if any, rights States have to conduct research in other maritime zones, under what conditions, and according to what procedures.

(b) The Right to Conduct Marine Scientific Research in Certain Zones of Jurisdiction

(i) Internal Maritime Waters

As Brown puts it, the coastal State has, in the absence of treaty commitments to the contrary, absolute control over scientific research within national maritime waters.[1] This means that any proposal to conduct research must receive the explicit consent of the coastal State, and such approval can, as Caflisch[2] and Winner[3] hold, be made dependent on whatever conditions the coastal State wishes to impose, including that of compliance with the laws and regulations enacted by that State. As pointed out on earlier, however, a simple right of access to ports for research vessels not actually conducting research may be presumed.

(ii) Territorial Sea

The general rule here is, as Caflisch puts it, that "marine scientific research to be conducted by foreign States, institutions, or individuals, or by international organisations, requires the coastal State's consent".[4] This flows from the sovereignty the coastal State exercises over these waters. This rule may be thought of as reflecting customary law, although it has probably only recently crystallised,. As Soons says, in the past

> [o]cean scientists had little difficulty in collecting their data and samples and making their observations when and where they wished. Maritime boundaries did not constitute a barrier to their mobility. The geographical extent of coastal State jurisdiction was generally very limited, and when investigations were to be conducted in the territorial sea or internal waters of a foreign State permission

[1] Op. cit., p. 332.
[2] Op. cit., p. 854.
[3] Op. cit., p. 301.
[4] Op. cit., p. 855.

> was readily obtained. It was even not unusual for the scientists involved only to notify the government having jurisdiction informally; the notification often being made through scientific colleagues in the nation concerned.[5]

Several authors regard the rule of innocent passage through the territorial sea as allowing a certain amount of scientific research to be done en route,[6] and an IOC Summary Report considered, as a means of facilitating scientific research, the possibility of defining innocent passage so as to include the right to run continuous recording instruments.[7] Neither of these views accurately reflects the lex lata, for clearly passage is exercised only in a communications sense and excludes all other activities such as seismic profiles, whether or not they involve anchoring, maneuvering, etc. The right of innocent passage in no way affects the sovereignty of the coastal State in other respects, and that State this exercises complete jurisdiction over all forms of scientific research,[8] not just some.[9]

---

[5]Op. cit., p. 394. Cf. also M. Schaefer, "Freedom of Scientific Research and Exploration of the Sea", Stanford Journal of International Studies, Vol. 4, June 1969, pp. 46-70, at p. 69.

[6]Viz., W. Burger, "Threat Provisions Concerning Marine Scientific Research", Ocean Development and International Law, Vol. 1, Summer 1973, pp. 158-184, at p. 172; Menzel, op. cit., p.622; Revelle, op. cit., p. 660.

[7]Summary Report of the First Meeting of the Working Group on Legal Questions Related to Scientific Investigations of the Ocean. Doc. AVS/9/89/M(8), December 1968, p. 9.

[8]Cf. Caflisch and Piccard, op. cit., p. 856; M. Redfield, "The Legal Framework for Oceanic Research", in Wooster, (ed.), op. cit., pp. 41-95, at pp. 44-45; E. Ferraro, "The Latin American Position on Legal Aspects of Maritime Jurisdiction and Oceanic Research", in ibid., pp. 97-136, at p. 107; Brown, op. cit. pp. 338-340.

[9]Brown, op. cit., p. 339, says:

> "It is not even certain that ships exercising a right of innocent passage are entitled to use electronic gear for meteorological research though it seems that in practice such work is not interfered with."

Soons, op. cit., p. 443, finds that "(o)nly those measurements which are necessary for safe navigation are permitted".

The Bulgarian Decree of 10 October 1951 may be exemplary of national practice in this respect:

> Foreign ships may not engage, while in the territorial or internal waters or ports of the People's Republic, in sounding, research, study, photography… or make use of radio transmitter, radar, echo sounding or like devices other than those intended for purposes of navigation.[10]

This is probably the type of legislation the ICNT Rev. 1 is referring to in its Article 21(1), which states that

> [t]he coastal State may make laws and regulations, in conformity with the provisions of the present Convention and other rules of international law, relating to innocent passage through the territorial sea, in respect of all or any of the following: ... (g) Marine scientific research and hydrographical surveys….

Any doubt that in the absence of such laws and regulations such research may be engaged in during innocent passage is dispelled by Article 245 of the ICNT Rev. 1, which requires the express consent of the coastal State and gives that State the exclusive right to authorise and conduct, as well as regulate, all research in the territorial sea.

A surprising number of proposals in the Seabed Committee would have modified in one way or another the customary rule requiring coastal State consent. To cite but one example, Malta proposed, both in 1971[11] and 1973[12], what would have been in effect a qualified consent régime, with the coastal State required to cede if certain objective elements were present. The

[10]Cited in Brown, op. cit., p. 338, n. 32.
[11]Article 35 of the Draft Ocean Space Treaty. Doc. A/AC.138/53, 23 August 1971.
[12]Articles 2 and 3, Draft Articles on Scientific Research. Doc. A/SC.138/L.34, 23 March 1973.

highlight of the proposal was that foreign States actually had a right to undertake scientific research in national ocean space.

Most other Seabed Committee proposals recognised the need for consent, but one or two attempted to mitigate arbitrary dismissal of foreign research requests. Thus, a 1973 United States proposal would have obliged the coastal State to cooperate and facilitate marine scientific research in the territorial sea.[13]

In the SNT the coastal State was given "exclusive" rights over scientific research in the territorial sea. Explicit consent was required for foreigners to engage in such research and the coastal State could establish conditions for it. The requesting State was to submit its request well in advance, and the coastal State would have to respond without undue delay.[14]

In Article 57 of the RSNT the coastal State's right to conduct and regulate scientific research in the territorial sea was termed "sovereign" rather than "exclusive". There was no mention of the need for explicit consent, and there was no duty for the coastal State to reply to requests.

According to the ICNT Rev. 1, the coastal State, in the exercise of its sovereignty, has the exclusive right to regulate, authorise and conduct scientific research. Consent must be express, and the coastal State may set any conditions it wishes (Article 245).

---

[13]Article 6, Draft Articles for a Chapter on Marine Scientific Research. Doc. A/AC.138/SC.III/L.44, 19 July 1973.

[14]Doc. A/Conf.62/WP.8/Part III, Section II, Ch. III, Article 13.

(iii) Archipelagic Waters

By virtue of Article 49 of the ICNT Rev. 1, the sovereignty of an archipelagic State extends to archipelagic waters, subject to rights of innocent passage (Article 52) and archipelagic sealanes passage (Article 53). Once again, then, permission is required for scientific research. Article 40, cited below and having to do with research during passage, applies here mutatis mutandis.

(iv) Straits Used for International Navigation

As a strait's characterisation as 'international' does not in principle affect the status of its waters (they remain territorial seas), the coastal State retains sovereignty over these waters, subject to the right of innocent passage which, according to the 1958 Geneva Convention on the Territorial Sea, is non-suspendable (Article 16[4]). As in the case of 'ordinary' territorial waters, the right of innocent passage does not include that of undertaking scientific research.

The Draft Treaty creates a dual régime for straits, one in which innocent passage is provided for (Part III, Section 5). According to Article 40 of the ICNT Rev. 1,

> [d]uring their passage through straits, foreign ships, including marine research and hydrographic survey ships, may not carry out any research or survey activities without the prior authorization of the States bordering straits.

The proposal of various 'straits States" of 2 April 1973 would have required prior notification for passage as well.[15] Fiji would also have confined transit passage through straits to designated sealanes and, if scientific research were engaged in, allowed for the suspension of the right of

[15]Cyprus, Greece, Indonesia, Malaysia, Morocco, Philippines, Spain and Yemen. Draft Articles on Navigation through the Territorial Sea including Straits Used for International Navigation. Doc. A/AC.138/SC.II/L.18, Article 17(1).

innocent passage, and for a request that the ship leave the territorial sea. Finally, the coastal State would then have been able to prevent further passage.[16]

(v) Contiguous Zone

In a zone contiguous to the territorial sea, both the 1958 Geneva Convention (Article 24[1]) and the ICNT Rev. 1 (Article 33) recognise the right of the coastal State to exercise control necessary to prevent infringement of its territorial customs, fiscal, immigration or sanitary regulations and punish infringement of such regulations within the territorial sea. According to Soons,

> No instance is known of a claim by a coastal State to jurisdiction specifically over the conduct of marine scientific research in a contiguous zone.[17]

The breadth of the contiguous zone could not, in the 1958 Convention, extend more than twelve miles from the baselines from which the territorial sea is measured (Article 24[2]). Under the ICNT Rev. 1 the contiguous zone is extended a further twelve miles (Article 33[2]). Thus, the zone is overlapped by the coastal State.

(vi) Exclusive Fishing Zone

The 1958 Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas states that

---

[16]Article 6(4), Draft Articles Relating to Passage through the Territorial Sea. Doc. A/AC.138/SC.II/L.42, 19 July 1973 (Article 6[4]).
[17]Op. cit., p. 441.

> A coastal State is entitled to take part on an equal footing in any system of research and regulation for purposes of conservation of the living resources of the high seas…(Article 6 [2]).

These zones have been to some extent superseded by the Exclusive Economic Zone under the ICNT Rev. 1, but a number of States still claim such a zone of up to two hundred miles. According to Soons,

> [i]n 1974, the I. C. J. in the Fisheries Jurisdiction Case declared that the concept of the exclusive fishing zone, i. e. the area in which a State may claim exclusive fishery jurisdiction independently of its territorial sea, had become crystallised as customary international law. The Court declared that the extension of this zone up to a 12-mile limit from the baseline appeared to be generally accepted.[18]

The laws of States such as Brazil, Canada, Denmark, New Zealand, the United Kingdom, Australia and the United States require authorisation for scientific research relating to fish within these zones.[19]

(vii) Continental Shelf

Under the terms of the 1958 Continental Shelf Convention, coastal State consent is required "in respect of any research concerning the shelf and undertaken there" (Article 5[8]). This clause applies to both pure and applied research. Article 5(1) does state that exploration of the shelf and exploitation of its natural resources must not "result in any interference with fundamental oceanographic or other scientific research carried out with the intention of open publication", but the contradiction between these two provisions is more apparent than real, for Article5(1) in no way deals with the question pf permission for research, which is covered by

[18]Ibid., p. 438.
[19]Ibid., p. 439.

Article 5(8).[20] Thus, a plausible interpretation of Article 5 is that consent is required for both pure and applied research, but that once permission is granted pure research is given absolute priority over certain other activities in the area.

It remains to be determined, however, exactly what research is subject to the consent of the coastal State or, put another way, which research the researching State has the right to undertake without obtaining the consent of the coastal State. Part of the difficulty is that the limits of the shelf are not fixed but are tied to the exploitability criterion. In areas not yet exploitable, marine scientific research is still covered by the freedom of the seas and, as part of it, freedom of marine scientific research. The major problem, however, involves the expression "concerning the shelf and undertaken there" used in Article 5(8) of the 1958 Continental Shelf Convention. The first thing to be said is that there is no explicit mention of the resources of the shelf as distinct from the shelf itself. One may think that for all intents and purposes the distinction is academic, but in fact some research on the living resources can be conducted without any reference to the shelf itself. Nevertheless, resources can be deemed to be included, since Article 5(8), by referring to the "biological characteristics of the continental shelf", considers them to be part of the latter.

Aside from this, there are two major possibilities for interpreting the phrase "concerning the shelf and undertaken there". The first is that the two conditions are cumulative, and apply to research which fulfils two conditions simultaneously, i. e. research concerning the continental shelf and undertaken there. As Caflisch says, this seems to be the clear and natural meaning of

[20]Cf. Caflisch and Piccard, op. cit., p. 861.

the phrase.[21] It is also the sense resulting from the official French text: "recherches touchant la plateau continental, entreprises sur place". It is, however, necessary to analyse the implications of such an interpretation.

In the first place, consent would not, according to this interpretation, be needed for research concerning the continental shelf but carried out in superjacent waters. This, however, is not, as Caflisch points out, consistent with the objective of the Treaty, which is to give the coastal State exclusive jurisdiction over resources.[22] A second problem is that of research undertaken on the shelf but not concerning the shelf (or its resources). Granted, consent is required for "purely scientific research into the physical or biological characteristics of this continental shelf" (Article 5[8]), but what of what Caflisch,[23] Soons,[24] and Brown[25] refer to as research concerning the superjacent waters conducted from the continental shelf by devices resting on the seabed? Brown refers only to fundamental research of this order,[26] but the question might just as well be posed for applied research. Does the fact that the research is undertaken on the shelf necessarily mean that it "concerns" the shelf? The answer is unclear, but it would seem reasonable to confer upon the coastal State at least a 'droit de regard' before any such research is undertaken so as to avoid potential incidents and infringements of that State's rights.

---

[21] Ibid., p. 862.
[22] Ibid.
[23] Ibid.
[24] Op. cit., p. 428.
[25] Op. cit., p. 354.
[26] Ibid.

A third problem involves the interpretation one gives to the expression "and undertaken there". The question is whether direct contact such as is associated with dredging, coring and drilling[27] is required. An affirmative answer would seem to run up against the aforementioned objective of the treaty. Even ICSU pointed out in 1958 the scientific investigation of the seabed did not necessarily involve operational contact.[28] Seismic tests are a good example of this. As a way of circumventing this problem, Burke says, it may be contended that

> research is undertaken there if the investigative technique is aimed at the surface or the subsoil of the shelf even though the physical instrumentality employed is on the surface or in the water column.[29]

This is difficult to sustain, however, as it runs counter to the ordinary meaning of the term "undertaken there".

The second major possibility for interpreting the expression "concerning the shelf and undertaken there" is that that expression relates to two separate types of activities, i. e., activities which concern the shelf and activities which are undertaken there. This wider interpretation would cover research which pertains to the shelf but is undertaken elsewhere as well as all research which is undertaken there, whether or not it concerns the shelf. The effect of this interpretation is that the only research which would be beyond the jurisdiction of the coastal State would be that which is undertaken in the superjacent water column and which does not concern the shelf. Thus, all seismic work and all studies of the chemical composition of the

---

[27]Soons, op. cit., p. 425.

[28]U. N. Doc. A/Conf. 13/28, cited by Soons, op. cit., p. 418, as having been distributed at the Conference but as not having been included in the Official Documents.

[29]W. Burke, A Report on International Legal Problems of Scientific Research in the Oceans. Prepared for the U. S. National Council on Marine Resources and Engineering Development, Springfield, Virginia, 1967, p. 60. (Hereafter referred to as A Report).

superjacent waters in conjunction with the study of the living organisms of the shelf would require consent.

The second major interpretation is consonant with the objective of the Treaty, but suffers from an important drawback: it is difficult to reconcile with the ordinary meaning of the phrase "research concerning the shelf and undertaken" there. Under this interpretation the expression considered here would have to read either “any research concerning the shelf and any research undertaken there”, or “any research concerning the shelf or any research undertaken there”.

A good case can thus be made for the proposition that the ordinary meaning of the text of Article 5(8) leans toward the first interpretation, but given the lingering doubt one is led to the subsequent practice of States. Revelle states that most States will likely require consent for seismic and aircraft measurements.[30] In point of fact, the legislation or practice of few if any States confines the consent requirement to research undertaken in situ, though it is rarely clear precisely where the legislation is operative.[31]

---

[30] Op. cit., p. 10.

[31] American practice is a case in point. Officially, the United States appears to limit the requirement of consent to instances of direct contact. United States Interagency Committee on Oceanography, United States Oceanographic Research in Foreign Waters, I. C. O. Pamphlet No. 25, 1966, p. 7, cited in Soons, op. cit., p. 427. There is some doubt, though, as to this position: Burke, A Report, op. cit., p. 55, cites a U. S. Department of the Interior requirement that permits be sought for “exploration vessels even though the vessels' activities do not make contact with the bottom”.

The Soviet Union appears to limit the requirement of consent to research involving direct contact. Redfield, in Wooster, (ed.), op. cit., p. 55.

As for particular cases, Portugal reportedly insisted on permission for the R/V “Atlantis” when it was collecting samples above the Angolan shelf in 1971. Ibid. Greece, for its part, strongly protested what it considered to be a violation of its sovereignty by the seismic work of the Turkish vessel MTA Sismik I in 1976. According to J. Merrills, "Oil Exploration in the Aegean", Law

Turning to the negotiating history, there did not seem to be any agreement in the 1956 debates within the ILC as to where research should have to occur so as to require consent. The final Commentary of the Commission reflects this lack of agreement by stating on the one hand that fears of interference are unjustified as regards the water column- freedom to conduct research in these waters in no way being affected,[32] and by pointing out on the other hand that consent is required for research relating to the exploration or exploitation of the seabed or subsoil, which could well be interpreted as subjecting research undertaken elsewhere to the consent régime. As Soons explains, there is a contradiction between these two assertions.[33]

At the 1958 Conference itself, the views of certain countries as they evolved in the course of the negotiations appear contradictory. Indonesia, for instance, began by proposing a consent régime for any research "into" the soil or subsoil of the continental shelf, [34] but later changed this to "on".[35] The French position is even more significant: first employing the word “touchant”,[36] the final French proposal in English advocated a consent régime for any research into the soil or

---

Quarterly Review, Vol. 93, January 1977, pp. 29-33, at p. 30, the International Court of Justice, as regards that dispute, explained that since only sound waves were used by the MTA Sismik 1, it was not alleged that the research was interfering with the seabed physically. Argentina reacted in a similar way when the "Shackleton" a United Kingdom vessel, was doing seismic work off the disputed Falkland Islands in the same year. See infra, Part Six, Chapter Three, p. 244, n. 4.

For a survey of national legislation on the matter, see Soons, op. cit., pp. 425-427.

[32]Yearbook of the International Law Commission, 1956, Vol. II, p. 298.

[33]Op. cit., pp. 416-417.

[34]Doc. A/Conf. 13/C.4/L.40, Official Records, Vol. VI, p. 137.

[35]Doc. A/Conf. 13/C.4/L.53, ibid., p. 40.

[36]Doc. A/Conf. 13/C.4/L.7, ibid., p. 147.

subsoil.[37] It was this latter proposition which was voted on and adopted, but the drafting committee changed the wording when incorporating it into Article 5(8).[38]

The continental shelf is maintained under the ICNT Rev .1 (Part VI), though it is newly defined: it can extend beyond the edge of the economic zone, and in this area the régime for scientific research is the same as that for the economic zone, mutatis mutandis, i. e. consent is required. It is now clearly stated that consent is needed for research on the continental shelf (Article 246[1]).

(viii) Exclusive Economic Zone

At the first substantive session of UNCLOS III, four major positions emerged.[39] Three of these positions favoring, respectively, a notification régime, a régime of qualified consent and an absolute consent régime, stemmed from concrete 'informal' proposals made at that session while the fourth, which also favoured a system of notification, had been carried over from the Seabed Committee.

The major event during the 1975 Geneva Session was the formulation of a comprehensive proposal which was intended to bridge the gap between the system of notification and that of explicit consent.[40] At the end of the Session there appeared the SNT, which incorporated a number of features of the compromise proposal.[41]

---

[37]Doc. A/Conf. 13/C.4/L.7, ibid., p. 140.
[38]Cf. Soons, op. cit., pp. 424-425.
[39]Doc. A/Conf.62/C.3/L.17, 23 August 1974. Official Records, Vol. III, p. 263.
[40]Draft Articles on Marine Scientific Research proposed by Colombia, El Salvador, Mexico and Nigeria. Doc. A/Conf.62/C.3/L.29, 6 May 1975. Official Records, Vol. IV, p. 216.
[41]Doc. A/Conf.62/WP.8, Official Records, Vol. IV, p. 171.

Article 45 of Part 2 of the SNT gave the coastal State exclusive jurisdiction with respect to scientific research in the Exclusive Economic Zone, while providing that that State must at the same time have "due regard" for the rights and duties of other States. Article 49 required consent for any research concerning the Exclusive Economic Zone and undertaken there; nevertheless, consent could not normally be withheld for purely scientific research. Thus, a distinction was drawn between pure and applied research.

These rules were elaborated upon in Articles 14 to 22 of Part II: the rights of the coastal State had to be respected; a full description of the research proposal was to be communicated to the coastal State; the participation of the latter in the research was to be ensured, and the research State was to proceed to a prima facie characterisation of the research as being either fundamental or applied. For fundamental research, the coastal State could indicate within a certain time period that it wished to participate; if it chose not to do so, consent would be implied. If the research States said the proposed research was fundamental whereas the coastal State considered it was applied, then the latter could object, but only if the project would infringe on its rights over resources. Research characterised as resource-oriented by the research State would require explicit consent. The coastal State would have to acknowledge receipt of all requests immediately. All these provisions were to apply mutatis mutandis to the continental shelf. Parts II and III of the SNT were confusing, however, in that the former held out for an absolute consent régime while the latter could be viewed as advocating only a partial one, establishing as it did a system of implied consent for pure research.[42]

[42]Winner, op. cit., p. 310.

The RSNT emerged from the Fourth Session of the Conference. Except for minor changes with respect to, for instance, the time limit within which a description of the research project had to be submitted (Article 58), there were numerous substantive alterations to the régime set up by the SNT. While now consent was clearly required for all research, pure or applied, consent could not be withheld unless the research was resource-oriented, involved drilling or explosions, unduly interfered with other economic uses by the coastal State, or involved artificial islands, installations or structures (Article 60). Other additions were that communications were to pass through appropriate official channels unless otherwise agreed (Article 63), and under a system of presumed consent the research State could proceed with its project after four months unless within two months of submitting its request it had received any one of three types of notices, i. e. an outright refusal, a statement to the effect that the information provided was false, or a request for further information from the coastal State (Article 64). On the other hand, the coastal State now had the right to terminate a project in progress if it deviated substantially from the description (Article 65) and to refuse a new permit if a previous one had not been complied with.

On the whole, then, the RSNT tried to accommodate the interests of both the coastal State and the research State by incorporating some demands of the former and balancing them off with concessions to the latter, leaving the middle ground vague here and there, but providing an obligatory dispute settlement procedure (Article 76).

In his report on the progress of the negotiations on marine scientific research at the Fifth Session, the Chairman of the Third Committee, Ambassador Yankov, expressed the view that the areas of agreement were much larger than those of disagreement, since

> There is a generally shared understanding that the consent of the coastal State should constitute the fundamental principle for regulating the conduct of marine scientific research in the exclusive zone and the continental shelf.[43]

He noted that there had been three trends in the negotiations: there were those who wanted an unqualified consent régime; those who continued to have reservations about consent; and those who favoured a system of qualified consent.[44] In an attempt to bridge the gap between these stances, Ambassador Yankov suggested a number of modifications to the RSNT.

On the core provision (Article 60), Yankov himself submitted a "test proposal". And although there was, he said, “no agreement on a compromise formula at this session”,[45] the majority of delegations accepted that proposal as a basis for negotiations. It gave coastal States the right, in the exercise of their jurisdiction, to regulate, authorize and conduct scientific research in the Exclusive Economic Zone. The fact that this jurisdiction was no longer exclusive implied that that right might belong to other States as well. Moreover, the coastal State was placed under the positive obligation to “normally” grant consent for pure research, whereas the RSNT had limited that duty to that of not withholding consent unless certain objective circumstances were present. Furthermore, the coastal State would now have to establish rules and procedures ensuring that such consent would not be delayed or denied unreasonably. And whereas marine scientific research was still not permitted to interfere with activities performed by the coastal State in the exercise of its jurisdiction, this was no longer a ground for the coastal

[43]Doc. A/Conf.62/WP.8, Official Records, Vol. IV, p. 171.
[44]Ibid.
[45]Ibid., p. 143.

State to refuse a request. Finally, Yankov submitted a new Article 64 allowing a system of tacit consent for all types of research.

At the 1977 New York Session the Soviet Union announced that it had reversed its position and was not supporting the proposals of the developing countries for the establishment of a consent régime for the conduct of all forms of marine scientific research in the Exclusive Economic Zone and on the continental shelf.[46] The ICNT which emanated from the negotiations contain several refinements and new elements for the consent régime. As in the “test proposal ”, jurisdiction was no longer exclusive to the coastal State (Article 56). This and all other changes to the ICNT have also been incorporated into the ICNT Rev. 1. The coastal State now has to grant consent for a project which is exclusively for peaceful purposes and intended to increase scientific knowledge for the benefit of mankind (Article 246[3]). On the other hand, consent is mandatory only in “normal circumstances”, which, as Caflisch says, virtually robs the provision of any normative value.[47] Furthermore, whereas under the RSNT it was stated that the coastal State “shall not withhold consent unless…” (Article 60), under the ICNT Rev. 1 that State has the “discretion” to withhold consent if one or more conditions prevail (Article 246[4]). Now, for instance, consent can be denied if the research is "of direct significance for the exploration and exploitation of natural resources, whether living or non-living" (Article 246[4]), rather than bearing “substantially upon” these same resources. What is more, it can refuse permission if information is false (Article 246[4]{a}), or if there exists outstanding obligations from a previous

[46]Caflisch and Piccard, op. cit., p. 877.
[47]Ibid., p. 877.

research project, whereas originally these were only valid reasons for terminating projects already underway.

There are, moreover, a number of other changes, many of which are minor. These have to do, for example, with the time period for notification (Article 248), the coastal State's right to establish any conditions where its consent is granted for activities not falling under the category of pure research (Article 249[2]), the time period for presuming consent (Article 252), and the right of the coastal State to participate in the project (Article 249[1]{a}). What is more, the coastal State shall adopt "reasonable and uniformly-applied rules, regulations and administrative procedures" in the field (Article 255), and a preferential system for obtaining consent for certain types of research undertaken by international organisations is also created (Article 247). There are also major changes in the dispute settlement procedures for marine scientific research.[48] Finally, requests for permission to do research in the Exclusive Economic Zone or on the continental shelf of another State must come from the state itself (Article 248) on behalf of the sponsoring institution, through "appropriate official channels unless otherwise agreed" (Article 250).

(ix) Deep Seabed

While many Seabed Committee proposals would have given an international seabed organisation the power to undertake research on the ocean floor and subsoil beyond the limits of national jurisdiction, and while several of these proposals would have given it regulatory powers over such research, only one proposal clearly called for the authorisation of scientific

[48]See infra, Part Six: Chapter Three.

research in that area.[49] As mentioned previously, some States would, however, have distinguished between scientific research and exploration activities, the latter requiring licensing before it could be undertaken. Italy proposed a regime of notification for research activities on the deep seabed,[50] and several other proposals specified that the future seabed agency was to promote marine scientific research.

At the 1975 Session the Soviet Union and others proposed a regime of freedom with explicit reference to the deep seabed.[51] The SNT fell short of expressly instituting such a freedom, but it did say that all States as well as the appropriate international organisations were entitled to undertake research on the deep seabed, provided they informed the International Seabed Authority of their activities (Article 2).

Article 6 of Part II of the SNT implied that marine scientific research would be subject to the regulation and supervision of the Authority, because such research was to fall within the definition of "Activities in the Area", and because Article 21 of Part III laid down that the Authority was to control activities. Article 10 of Part II, on the other hand, provided only that the Authority was to be the center for harmonizing and coordinating scientific research. It was also at liberty to conduct its own research.[52]

---

[49]Chile, Colombia, Ecuador, El Salvador, Guatemala, Guyana, Jamaica, Mexico, Panama, Peru, Trinidad and Tobago, Uruguay, and Venezuela. Working Paper on the Régime for the Sea Bed and Ocean Floor and its Subsoil Beyond the Limits of National Jurisdiction. Doc. A/AC.138/49, 4 August 1971. According to Article 32(1), the powers and duties of the Council would have included “the authorisation of scientific research in the area”.

[50]See Article 2(2) of the Italian proposal. Doc. A/AC.138/SC.I/L.26, 14 August 1973.

[51]Article 5 of Doc. A/Conf.62/C.3/L.26, 3 April 1975.

[52]Contra Winner, op. cit., p. 30, who asserts that Article 10(1) embodied an “absolute consent régime”.

Under Article 10 in Part II of the RSNT the ISA was to promote and encourage scientific research rather than harmonies and coordinate it. "Activities in the Area" as defined by Article 1 no longer included marine scientific research, though the Authority did retain licensing powers over exploration activities and prospecting.[53]

Article 257 of the ICNT mentioned the right of States to conduct marine scientific research in the Area subject to the provisions of Part XI. Article 155 made it one of the functions of the Authority to conduct such research in addition to promoting and encouraging it. Some countries interpreted this as giving control over research to the Authority.

Under the ICNT Rev. 1 the Authority shall now also "coordinate and disseminate" the results of research and analysis done in the Area "when available" (Article 143). The right of States to conduct research in the Area is now incorporated in Part XI (Article 143) as well as Part XIII.

(x) High Seas

In contrast to the 1958 Geneva Convention on the High Seas, Article 87[1]{f} of the ICNT Rev .1 explicitly accords States the freedom of scientific research on the high seas. Moreover, Article 257 of the ICNT Rev .1 gives States and international organisations the right "to conduct marine scientific research in the water column beyond the limits of the Exclusive Economic Zone."

[53]Contra Winner, ibid., who says that a partial consent régime is indicated.

(c) Case Data with Respect to Permission and Refusal for Marine Scientific Research in Zones of National Jurisdiction

What has been the practice of coastal States in granting or refusing consent for marine scientific research in zones of national jurisdiction? The data is woefully incomplete in this area. What data does exist is predominantly American and second hand. Nevertheless, it is possible to piece together information from a variety of sources so as to give an outline of the treatment accorded marine scientific research by a number of States since the Continental Shelf Convention entered into force in 1964.

Data as to requests for which consent has been granted is understandably harder to come by than that which relates to refusals, which by their very nature attract attention and comment. The least one can say, however, is that at least half of the planned foreign water cruises, and probably a much higher percentage, actually occur. In March 1972, for instance, the United States Government conducted a survey of the attitudes of United States oceanographers to twenty-four different types of restrictions imposed by coastal States.[54] The survey results reveal that a total of 407 clearance requests had been submitted by these oceanographers for foreign research. The survey applied only to 'open' research which was to be unclassified. It was not broken down into categories of maritime zones for which the requests were made, although it was pointed out that fifty percent of the requests related to research on or above the continental shelf, thirty percent

[54]See C. Cheek, "Law of the Sea: Effects of Varying Coastal State Controls on Marine Research (A Survey of the U. S. Ocean Science Community)", Ocean Development and International Law, Vol. I, 1973, pp. 209-219.

to research beyond the shelf but landward of 200 nautical miles, and twenty percent to research beyond 200 nautical miles from land.

Of these 407 clearance requests, 357 (88%) were accepted, 28 (7%) rejected, while 22 (5%) requests were abandoned because of either long delays, discouraging statements or actions encountered during the clearance process. For most of the 28 refusals either no reason was given, or diplomatic difficulties were encountered which were not necessarily related to marine scientific research.

It is not known over what period this survey applied, but in 1973 Kildow wrote that from 60 to 100 requests were made each year by the United States.[55] Thus, the survey figures might well go back to 1964. The situation appears to have deteriorated, however, in recent years, coincident with the establishment of 200 mile Exclusive Economic Zones. Thus, in 1977 it was asserted that, for the United States,

> [i]n the past year the records of the University National Oceanographic Laboratory System, which coordinates the activities of the University oceanographic fleet, indicate that about half of the scheduled cruises for work in waters over which other nations claimed control have had requests denied or have had hindrances sufficient to prevent the cruise. At least 18 nations were involved in inhibiting science in this major way.[56]

As for the coastal State view, the data is virtually nonexistent, though the real situation is likely to vary widely from country to country. For instance, in 1974 Ecuador claimed that in 1972 it had

> received 15 requests to carry out scientific research in zones under its national jurisdiction or sovereignty. After having been brought into line with Ecuadorean law, all had been approved.[57]

---

[55]Kildow, in Wooster, (ed.), op. cit., p. 23.
[56]P. Fye, The Oceans: Common Heritage of Mankind? Woods Hole Oceanographic Institution, Woods Hole, Mass., April 1977.
[57]Official Records, Vol. II, p. 379.

One year later Ecuador said that it had exercised sovereignty over 200 miles of territorial sea for 20 years and had never refused a request for permission to conduct scientific research in that area.[58]

There are twenty-nine cases in which requests to conduct marine scientific research in zones of national jurisdiction have been reportedly denied between 1965 and 1980.[59] Twenty-three of these cases involved American vessels,[60] to which a total of thirteen countries have allegedly, at one time or another, denied access, with the following frequency: Haiti (2); Brazil (3); Portugal (1); Soviet Union (7); Turkey (3); Romania (1); France (3); Gabon (1); South Africa (1); Bahamas (1); Burma (2); Iraq (2); Mexico (1); and India (1).

These figures do not include denial of access to ports, of which there are several alleged cases involving both India[61] and the United States.[62] Nor do they include: a) the three cases in

---

[58]Official Records, Vol. II, p. 108.

[59]Other incidents have been reported, but as they are only very sketchily documented, they have to be omitted.

[60]The frequency with which certain vessels have been refused permission is as follows: “Atlantis II” (4); “Pillsbury” (4); “Thomson” (4); "Melville” (2); “Undaunted” (2); “Alaminos” (1); “Oceanographer” (1); “Northwind” (1); “ Joie de Vivre” (1); “Shoup” (1). The only non-United States vessels cited as having been refused permission are the Federal Republic of Germany's “Meteor” (1) and the Soviet Union's “Naneatkin” (1).

[61] According to Kildow, “(i)n 1968, permission was asked for R/V Argo to do bottom sampling on the Indian shelf and to make a port call at Visakhapatnam. Due to delays in the U.S. Department of State and the Embassy in New Delhi , the port call was denied because of inadequate advance notice.” Moreover, “(i)n 1971 permission requested for R/V Melville of SIO to work off the coast of India for geological and geophysical work, in addition to wanting to make a port call at Visakhapatnam. The request was denied for military reasons. Later it was discovered that only the port call had been turned down and then because Soviet ships were in the harbour at the time. That same port is set to house an important Soviet submarine base.” In Wooster, (ed.) op. cit., pp. 16, 15.

[62]Kildow claims that while requests for port calls in the United States are few in number, permission is usually granted, with research vessels of the Soviet Union, Japan and the Federal

which it is uncertain whether consent was given;[63] b) the three cases where coastal States fell short of refusing permission but are said to have attached conditions which effectively scuttled the project;[64] c) the one case in which vessels appear to have operated though the deployment of certain equipment was prohibited;[65] and d) a case in which a rite of passage was denied, and

---

Republic of Germany being among the countries whose ships were admitted to 1973. Of "several recent requests" which she reports were discouraged, two were given express mention as having been denied outright: "In 1970, R/V Vernadsky was refused permission to make a port call in Miami and R/V Kurchatov was refused a port call in Boston." Ibid., p. 19.

[63]From the account of the aforementioned "Argo" case (see supra, n. 61), It is not clear whether the research part of the cruise was approved. In the "Melville" case, ibid., there was an apparent misunderstanding between the parties as to whether permission to undertake research was granted or not. As regards the case of the "Pillsbury", Kildow reports: "In 1969 permission was requested for the University of Miami's R/V Pillsbury to do seismic work offshore with a shore party recording off the Cape Verde islands. The research involved explosives. Portugal expressed concern over danger to the fisheries in the vicinity and wavered over the clearance. After several misinterpretations and misunderstandings as to whether clearance had been granted, the research was done on the understanding that permission had been granted. Near the completion of the work, the ship was informed that the notice was in error. While the case actually involved concern over resources, part of the problem involved bureaucratic confusion, which actually resulted in research getting done that probably wouldn't have been done otherwise." Ibid., p. 16.

[64] Fye alleges that between 1976 and mid-1977 "(t)he Maldives granted permission for research but set such rigid conditions that the objectives of the cruise were not accomplished." Op. cit., p. 9. R. Wolfrum, "Der Schutz der Meeresforschung im Völkerrecht", German Yearbook of International Law, Vol. 19, 1976, pp. 99-127, at p. 110, n. 35, reports that in 1975 the Soviet Union gave its permission to the ship "Meteor" of the Federal Republic of Germany to conduct shelf research, but because seismic work and the taking of samples were forbidden, the project was not actually carried out.

Finally, Kildow, in Wooster, (ed.), op. cit., p. 16, informs us that "in 1967 permission was asked from the French government for R/V Horizon to make some rock collections off the coast of Fortuna. Paris granted permission contingent upon what the United States felt were 'unreasonable' participation demands." The fact that "[p]ermission was asked and granted, and the work was done anyway" raises the question of what the appropriate channels are for making such a request.

[65]Fye claims that "[o]ff Somalia the placing of current meters, sponsored by the Global Atmospheric Research Program and endorsed by the Intergovernmental Oceanographic Commission, was denied both to Woods hole and United Kingdom research ships." Op. cit., p. 9.

it is unclear whether permission was being requested to undertake research during the passage.[66]

Of these twenty-nine cases, however, seventeen of the refusals were for projects in the territorial sea. In refusing permission, the coastal States involved were merely exercising their full sovereign rights within this zone.[67] In four other cases it is unclear for which zone the request

---

[66]The case involved the "Edistow" and the "Eastwind", two United States Coast Guard icebreakers that, according to the United States Department of State, were in 1967 undertaking "an 8000 mile circumnavigation of the Arctic Ocean, conducting scientific research enroute ." The original itinerary had to be altered because of ice conditions, and the Soviet Union was therefore notified by the United States that it was "necessary for the two vessels to pass through the Vilkitsky Straits south of Severnaya Zemlya in order to complete their journey." The communique of the Department of State went on to say: "Clearly, the Soviet government, by denying to U. S. vessels their rights under international law, has acted to frustrate a useful scientific endeavor and thus to deprive the international scientific community of research data of considerable significance." "Soviet Union Bars Completion of U. S. Scientific Voyage", Department of State Bulletin, Vol. 57, 1967, p. 362. The data which is being referred to here could be either that which would have been gathered after completion of the passage or that which would have been gathered during it, since it is not clear whether the United States considered the waters as high seas or, alternatively, as an international strait. According to Butler, however the icebreakers "[i]ntended to conduct hydrographic and other research in the strait." W. Butler, "The Legal Régime of Russian Territorial Waters", American Journal of international Law, Vol. 62, No. 1, 1968, pp. 51-77, at p. 64, n. 71. If this were the case, the Soviet Union would have every right to block passage.

[67]These cases will be outlined on a country by country basis:

Bahamas (U. K.): " In 1970 permission was requested for R/V Joie de Vivre of the Florida Institute of Oceanography to do physical, chemical and biological work in the waters of the Bahamas. Because the ship was a diesel shrimper and because the Government of the Bahamas suspected that the request was connected with efforts of the Florida commercial fishing industry to obtain local information that could be used in fisheries talks, the request was refused." Kildow, in Wooster, (ed.), op. cit., p. 17.

Brazil: "In 1963 the University of Miami applied for R/V Pillsbury to do bottom sampling in mid-water trawling and, dip netting and shore sampling in Brazilian waters. Although the Department of State submitted the request two months in advance, a Brazilian decree, issued that same year, required six months' notice. Thus, the request was refused on the basis of short notice." Ibid., p. 16.

Burma: "In 1967 and 1971 the Burmese government refused requests for R/V Oceanographer and R/V Melville, respectively, to carry out Oceanic research in its waters." Ibid., p. 18. As to the

former vessel, see also Letter from the Office of the United States Permanent Representative to UNESCO to the Secretary of the I. O. C. , UNESCO Doc. AVS/9/89M, 15 December 1967.

France: “In 1971 the French government was requested to permit R/V Melville of SIO to carry out research, including collections, on the 'living fossil' Coelacenth in the waters off the Comoro Islands. Permission was refused. It is likely that the French government is trying to protect the rare Coelacenth , found only in that small area of the world.” Kildow, in Wooster, (ed.), op. cit. p. 17. In 1972 the Soviet Union asked permission to do the same thing and was also refused. Ibid.

Gabon and South Africa: “In 1968 R/V Undaunted of the Bureau of Commercial Fisheries (now Marine Fisheries Service) was to carry out a fisheries biology program and make shore collections in the waters of South Africa, South West Africa and Gabon. Permission was refused by all three nations due to sensitivity over fishing in their territorial waters." Ibid.

Haiti: "In 1969 the University of Miami requested permission from the Haitian government for R/V Pillsbury to carry out a marine biology program in Haitian waters and on their shelf. Clearance was at first granted but later withdrawn owing to Haitian fears of invasion. Again in 1970, the University of Miami proposed the biological program and was refused, allegedly for the same reasons.” Ibid., p. 15.

Mexico: "In 1970 R/V Alaminos of Texas A&M University was refused access to Mexican waters to carry out physical oceanography due to insufficient advance notice (about one month).” Ibid., p. 17.

Romania: "Romania refused permission to the R/V Atlantis II of Woods Hole to carry out a geoscience and biological program” in its waters, out of “concern over the availability of data to other countries.” Ibid.

Turkey: Kildow reports that Turkey denied permission to the "Atlantis II" for the same reasons as Romania gave in the same year: “In 1967 permission was asked for the Navy's R/V Shoup to carry out gravimetry and bathymetry studies in the Aegean and Marmara Seas in Turkish territorial waters. Although Turkish participation was invited, Turkey refused, citing security and political reasons.” Ibid., p. 15; "[i]n 1969 University of Washington asked that R/V Thompson be permitted to carry out geological and geophysical work in Turkey's territorial waters in the Black Sea, but was refused for military security reasons. The ship consequently worked outside territorial waters.” Ibid.

Soviet Union: According to Kildow, "Atlantis II was denied access to Soviet waters in the Black Sea for the same reasons as those given by Romania and Turkey. Ibid., pp. 14-15. Kildow adds that in 1970 permission for the same United States Coast Guard vessel was requested “to carry out physical and chemical work within three miles of the Soviet coast. In attempting to arrange an exchange program for the study, the US found no interest among the Soviets and their request was refused." Ibid., p. 15.

was made,[68] and one case involved a nuclear test zone.[69] This leaves only six reported, documented cases of denial of access, all to the continental shelf (excluding the Haitian case which was mixed in with territorial sea research); one Brazilian refusal, allegedly because of insufficient notice;[70] one Portuguese refusal for the same reason;[71] and four refusals by the Soviet Union, three of these ostensibly because of the military character of the research vessel.[72] While

---

[68]According to Fye, a Woods Hole request to conduct research "in the vicinity of" Iraq sometime between 1976 and mid-1977 was refused without explanation. Op. cit., p. 9. O. Freymond, Le Statut de la recherche scientifique marine en droit international, Eysins, 1978, p. 66, reports that in 1965 Iraq denied authorization to the Federal Republic of Germany's "Meteor" in the Persian Gulf. Fye further informs us that sometime between 1976 and mid-1977, "[e]ven though advanced talks had been held with Indian scientists who were enthusiastic about jointly sponsored work, the request for permission to study the chemistry of bottom sediments and of the water column resulted in an abrupt "NO". Op. cit., p. 9. Fye does not say where these bottom sediments lay. Finally, Fye stated that "an Iranian ship on which Woods Hole planned cooperative research was not welcome even though in preliminary discussions everything had seemed favorable." Ibid.

[69]This case involved the R/V "Thomas Washington". See infra, Part Four: Chapter Two.

[70]Kildow, in Wooster, (ed.), op. cit., p. 16, reports: "In 1967 The University of Miami asked permission from Brazil for R/V Pillsbury to do some shelf research near Saint Paul's Rocks, plus some geological and biological collecting ashore. Clearance was denied because insufficient time was allowed (one month). Due to bad communications, the research was done anyway and samples later confiscated in a Brazilian port where the vessel was detained for one day."

[71]According to Kildow, ibid., "In 1967 WHOI applied for permission for the R/V Atlantis II to do bottom sampling off the coast of Angola. Portugal denied permission owing to insufficient time (about one month) to arrange Portuguese participation."

[72]The four cases are thus described by Kildow and Redfield: "In 1967, permission was requested from the Soviet Union for the University of Washington's R/V Thompson to do geological/geophysical work on the Soviet continental shelf outside of territorial waters. The Russians refused permission on the basis that the vessel was a Navy vessel and therefore violated the provisions of Article 5(8) of the Geneva Convention on the Continental Shelf, e. g., the research vessel did not really represent a 'qualified institution with a view to purely scientific research'." Kildow, in Wooster, (ed.), op. cit., p. 14. "In 1969 permission was again requested for R/V Thompson to perform research on the Soviet continental shelf off Siberia in the Bering and Chukchi Seas. Extensive joint arrangements were made for both sides to participate in the program. At the last minute the Russians refused the clearance and cancelled the project, giving no reason." Ibid., p. 15. "In 1970, a similar program was proposed and the Soviets indicated no interest, again giving no reasons." Ibid. The United Kingdom's R/V "Ernest Holt" was refused

the evidence is extremely sketchy, it can be confidently asserted that each one of these grounds for refusal is a legitimate one.

(d) Conclusion

An absolute right to conduct marine scientific research exists only for the high seas and the seabed, the two maritime zones beyond national jurisdiction and within which the freedom of scientific research applies. In economic zone and on the continental shelf the right exists only for pure research. In the exclusive fishing zones which still exist it applies only to non-fisheries research. In no other maritime areas is there a right to undertake any form of research in the absence of coastal State consent. As for the practice of States in granting or refusing consent in certain zones where consent is required, it can be tentatively concluded, in spite of repeated assertions that the scientific research has been hampered or impeded, that only half of the roughly forty 'incidents' involved zones where the coastal State was under any obligation to grant its consent in the face of certain objective situations. Thus, there are actually very few cases where international legal norms could have been potentially transgressed. Moreover, in the few substantiated cases which are reported, administrative/bureaucratic problems have played a definite role, with distrust over the military or economic intentions of the researching State also weighing heavily.

---

permission by the Soviet Union to carry out shelf research in 1969. Redfield, in Wooster, (ed.), op. cit., p. 57.

4. General Conclusions

Whereas there exists a right to conduct scientific research in all areas of outer space and the Antarctic, in the oceans this right is limited to certain areas to certain types of research.

CHAPTER III. JURISDICTION

1. Outer Space

The basic rule for jurisdiction in space is contained in Article VIII of the 1967 Treaty, which incorporates Principle 7 of the 1962 Declaration:

> A State Party to the Treaty on whose registry an object is launched in outer space shall retain jurisdiction over such object, and over any personnel thereof, while in outer space or on a celestial body.

The Treaty is silent as to who exercises jurisdiction over objects in foreign airspace or on foreign territory upon re-entry; accordingly, the customary rules giving the State exclusive jurisdiction over anything occurring within its boundaries prevail. As to the scope of the jurisdiction that can be exercised in space and on celestial bodies, Gal says it extends only to the control necessary to the continued operation of the facility,[1] while Tennen believes that it would include both civil and criminal jurisdiction. In certain countries, such as the United States, special legislation is required in order to implement this Treaty clause on jurisdiction.[2]

The matter of registry is covered in detail by a separate Convention which requires the launching State or international organisation to maintain a registry of all space objects (Article 2) and to furnish the Secretary-General of the United Nations with information regarding all inclusions in that registry as well as information regarding objects which are no longer functioning (Article 4).[3] The definition given to the term "launching State" is too ambiguous to decide which

---

[1] Op. cit., p. 215.
[2] Op. cit., p. 465.
[3] This renders obligatory a usage which was developed with the establishment of a public registry by the Secretary-General of the United Nations in March 1962, pursuant to Resolution 1721 (XVI).

State is the State of registry when more than one country is involved, although presumably this is to be determined on a bilateral or, as the case may be, multilateral basis, as is currently the usage where foreign scientific packages are carried on board.

The 1967 Treaty stipulates that

> [o]wnership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.

This begs the question as to who actually owns the object, what is meant by ownership and whether jurisdiction automatically flows from it. It equally leaves aside the question of whether or not, as Jenks says, ownership of space objects can be transferred in outer space[4]. It may also be that a State which does not "retain jurisdiction and control" over objects it has launched and registered can forfeit ownership. In this sense an analogy might well exist between derelict spacecraft and abandoned ships on the high seas. According to Tennen,

> [s]ince the launching State retains ownership over objects launched into earth orbit or beyond, a State may reuse a craft under its own national registry. However, a State may desire to remove and reuse crafts launched and registered by another State. Since derelict crafts could pose significant dangers to future space activities, the removal and reuse of spent crafts may be consistent with the 'peaceful purposes' and 'benefit of mankind' provisions of the Outer Space Treaty. The question, therefore, is whether disuse of a craft will render the launching State's claim of sovereignty ineffective and, if so, whether a State may claim right of national sovereignty over these reused crafts and components, either before or after the craft or components are assimilated into a structure composed of the crafts and space resources[5].

[4]Jenks, Space Law, op. cit., p. 461.
[5]Op. cit., p. 461.

2. Antarctica

(a) The 1959 Treaty

The matter of jurisdiction in the Antarctic is left largely untouched by the 1959 Treaty. Article VIII deals only with three types of persons: a) officially designated observers; b) scientific personnel exchanged under Article III; and c) members of the staffs accompanying either of those two types of persons. These categories of persons shall be subject only to the jurisdiction of the Contracting Party of which they are nationals in respect of "all acts or emissions occurring while they are in Antarctica for the purpose of exercising their functions", and the stated purpose of this procedure is "to facilitate the exercising of their functions under the present treaty". More importantly, these measures are "without prejudice to the respective positions of the Contracting Parties relating to jurisdiction over all other persons in Antarctica".

Clearly, the twelve countries meeting in 1959 were not able to reach agreement on one of the fundamental legal issues. To quote Geyer:

> Article VIII takes into consideration problems of jurisdiction. Here we see that no agreement was reached and therefore the exceptional was the rule. This is another example of the pragmatism of the lawmakers of Washington. As they could not reach a solution, they simply legislated on three major exceptions.[6]

According to Bilder,

> there is a reason to believe that certain countries at the Antarctic Conference, including the United States, were prepared to support a provision establishing exclusive jurisdiction by each State over all of its own nationals. However, certain

[6]Op. cit., p. 183.

> claimant countries were concerned that such a provision might impair the status of their territorial claims, and the more limited provision resulted.[7]

According to a Chilean text of a British statement regarding Articles VII, the United Kingdom submitted a general plan at the 1959 Conference which did not get overall support. Nevertheless, the British considered that what was finally agreed upon would in practice cover in all probability the most difficult cases. However, the general problem, if not resolved as soon as possible, could, in the view of the British, well have provoked the kind of international controversies which the Treaty was intended to avoid. For this reason, the United Kingdom hoped that in conformity with Article IX the Consultative Parties would consider the question and present recommendations to their Governments at the first opportunity.[8]

The Treaty makes "questions relating to the exercise of jurisdiction in Antarctica" (Article IX[1]{e}) one of the subjects for discussion at the Consultative Meetings, but so far these questions have not been broached. Another clause stipulates that pending adoption of measures in this field, countries involved in any jurisdictional dispute "shall immediately consult together with a view to reaching a mutually acceptable solution" (Article VIII[2]). There is no official public record of any such consultation having yet taken place.

As the persons for whom jurisdiction is covered in the 1959 Treaty represent only a small percentage of the persons in the Antarctic at any given time, one must look to national legislation to see how the general problem of jurisdiction in the Antarctic has been dealt with.

---

[7]Op. cit., p. 238, n. 21.
[8]Chilean Report on the 1959 Antarctic Conference, pp. 701-702.

(i) United States of America

For well over a decade the possibility of introducing special legislation on jurisdiction in the Antarctic has been examined by the United States. The underlying need for such legislation has been pinpointed by Meyers: the Antarctic Treaty

> presumes the contracting nation has jurisdiction over certain of its nationals, but the mere presumption of such jurisdiction does not automatically give that nation jurisdiction to apply its laws unless that nation has so legislated that its laws specifically apply extraterritorially.[9]

Although the Treaty prevents the United States from exercising jurisdiction on the basis of territoriality, something she would be unlikely to do in any case as she neither makes any nor recognises any territorial claims, the United States believes that

> United States legislation could, consistent with international law, prescribe law for crimes committed by United States citizens or by non-US citizens in Antarctica who are either accompanying a United States expedition or committing crimes against United States citizens or United States government property[10].

Not only would such legislation have a constitutional basis, but the exercise of jurisdiction over non-United States citizens is sanctioned under international law by the generally recognised 'protective principle'.

---

[9]In Schatz, op. cit., p. 26.

[10]Statement, Robert C. Brewster, Deputy Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs. United States Congress, Hearings before the Subcommittee of Immigration, Citizenship and International Law of the Committee on the Judiciary, House of Representatives, Ninety Fifth Congress, First Session on H. R. 6148 and H. R. 7847, Extraterritorial Jurisdiction, 24 July 1977, Serial No. 16, U. S. Government Printing Office, Washington, 1977 (Hereafter referred to as 1977 U. S. Congressional Antarctic Hearings).

Currently, United States domestic law covers thoroughly or comprehensively only military personnel in the Antarctic. The majority of United States citizens in the area are still military, but the percentage of civilians has increased steadily. For the latter, as a witness testified in 1977 at Congressional Hearings, there is a definite gap in criminal legislation.[11] The United States Government is of the opinion that under the lex lata, if a serious crime were to be committed in Antarctica by such persons, its authorities could do nothing about it.[12] The only exceptions are for those crimes which are "directed at the safety and security of the State".[13] Moreover, there are several Statutes whose extra territorial effect is specified or which do not require any such specification;[14] Bilder sites Statutes dealing with treason, espionage, fraud, counterfeiting, perjury, and draft and income tax evasion.[15] Apparently,

> personal crimes committed against individuals are the types that do not have extraterritorial jurisdiction specified. If they were, then action could be taken. But in the vast majority of these crimes there would not be jurisdiction.[16]

---

[11] Ibid., P. 31.

[12] Ibid., p. 36.

[13] Ibid.

[14] See ibid., p. 37.

[15] Op. cit., p. 255. There is some evidence to suggest that certain United States Government departments consider the Antarctic as foreign territory. Doumani reports that

> "U. S. scientists who wintered there and spent over 18 months out of the continental U. S. were able to claim total tax exemption and have their withheld taxes refunded. Similarly, an alien U. S. resident who spent more than 12 months in Antarctica with the U. S. team and under the U. S. flag, was denied U. S. citizenship when it became due, because his Antarctic sabbatical broke the continuity of his five-year residency requirement."

G. Doumani, "Science Policy for Antarctica", Bulletin of the Atomic Scientists, Vol. XXIV, No. 4, 1968, pp. 39-45, at p. 45.

[16] 1977 U. S. Congressional Antarctic Hearings, p. 36.

Thus, under current law, "…it is possible that somebody could shoot somebody and walk away from it…", for "[i]f a U. S. national committed a serious crime in Antarctica, the United States would have no clear authority to apprehend, indict, or prosecute the perpetrator". [17] Without specific legislation, problems would also arise in instances of crime by Americans in a claimed sector:

> The United States could guarantee neither to protect nor to prosecute the perpetrator. However, the claimant State might insist on its jurisdiction, noting the fact that the status of claims existing at the time of the treaty was in no way affected by it.[18]

The United States apparently believes that other States welcome United States legislation, since otherwise "…if a crime was committed they would be in the embarrassing situation of having to try an American citizen under their laws and would not want to do this "[19]. The planned legislation, it was argued further, would "…serve to ameliorate possibly serious incidents in Antarctica by assuring other States of United States interest concerning enforcement of its own standards of behaviour ".[20]

There is also, however, a strong foreign policy motivation or impetus:

> From the foreign affairs standpoint, such legislation will give assurance to the other parties that prosecution can and will take place in cases where their nationals are the victims of criminal conduct by our citizens. This in turn will strengthen the United States position in resisting possible attempts by other Antarctic States to exercise jurisdiction over United States citizens committing a crime within the territory claimed by that

[17] Ibid., p. 41.
[18] Ibid., p. 57.
[19] Ibid., p. 41.
[20] Ibid., p. 57.

> State. Such an attempt could undermine our position with respect to non-recognition of territorial claims.[21]

The proposed legislation took the form of Bills 6148 and 7842, which were both presented to the 95th United States Congress. They were very similar, the difference being largely stylistic. As Bill 6148 seems to have received the most comment and support, it is the one which will be examined forthwith. The Bill was intended to amend Article 16, Section 2, Chapter 1, and Article 3062, Section 3, Chapter 203 of Title 18 of the United States Code.

Ratione loci, Bill 6148 would apply to all of the Antarctic Treaty Area, with the exception of the high seas but including ice shelves (Article 16 [c]{2}). The reason for excluding the high seas is that the latter is already subjected to the special maritime and territorial jurisdiction of the United States, which Bill 6148 is designed to extend to the Antarctic continent.

Ratione personae, the legislation, which has not yet been adopted, would apply, according to Article 16(a), to members of United States expeditions, be they: 1) United States nationals; 2) foreign nationals who are members of United States expeditions; 3) foreign nationals with respect to crimes directed against a) the person or property of United States nationals; b) the person or property of a foreign member of a United States expedition; or c) any United States property.

The term "expedition" is defined in Article 16[c]{5}, and would comprise: 1) scientific expeditions: 2) any other expeditions or trips (whether or not they are sponsored) which are

[21]Ibid., p. 63.

organised or originate in the United States or are conducted by individuals who are United States nationals, or by businesses organized and doing business in the United States.

The legislation would not apply to 1) those persons described under Article VIII(1) of the Antarctic Treaty, i. e. observers and exchange scientists (Article 16[b][1]); and 2) any act by a foreign national over whom jurisdiction is asserted by his national State before commencement of trial by a court of the United States (Article 16[b]{2}).

Ratione materiae, the bill extends to "[a]ny act or omission which would be punishable as a criminal offence if committed within the special maritime and territorial jurisdiction of the United States" (Article 16[a]). In the testimony before the House of Representatives it was stated that the crimes covered would include: 1) arson; 2) assault; 3) maiming; 4) larceny; 5) receiving stolen property; 6) murder; 7) manslaughter; 8) kidnapping; 9) malicious mischief; 10) rape; 11) carnal knowledge; and 12) robbery.[22] These violent crimes against the person were described elsewhere in the hearing as the most serious.[23] There would be an exemption for petty offenses.

The Bill would empower any member of the United States expedition who is so authorised by the President to apprehend (Article 3068[a]{1}), restrain (Article 3068[a]{2}), search (Article 3068[a][3]), or seize (Article 3068[a]{3]) anyone suspected of contravening American laws (Article 3062). Apprehension may also take place for the purpose of "assisting foreign governments in the case of offenses committed against their laws in Antarctica" (Article 3062[a][2]).

[22]Ibid., p. 31.
[23]Ibid., p. 35.

There is nothing in the legislation on the venue for prosecution, but in the testimony it became evident that such venue would likely be somewhere in the United States.[24] The President would be empowered to promulgate regulations to carry out provisions of the Act (Article 16[e]).

As noted in the testimony, "[t]he bill will not resolve all jurisdictional or claim issues in Antarctica".[25] In particular, it could cause problems in some cases where foreign States exercise jurisdiction, for the United States believes "…that no state may assert criminal jurisdiction over persons committing crimes in Antarctica on the basis of territorial sovereignty"[26]. The United States is thus unlikely to waive jurisdiction in instances where this could be interpreted as prejudicing her position on claims, and a claimant State might, for its part, refuse extradition.[27] Nevertheless, the legislation is a big step towards filling a legal void.

(ii) New Zealand

The Antarctic Act of 196028 explicitly confers New Zealand jurisdiction over: a) anyone within the Ross dependency (Article 3[a]); b) any New Zealand citizen in any part of Antarctica not under the jurisdiction of anyone else (Article 3[B]); c) New Zealanders, outside of the Ross Dependency and in an area under the jurisdiction of another country, who qualify under Article VIII of the 1959 Antarctic Treaty, i. e., observers or exchanged scientists and their staff (Article 4). At the

[24]Ibid., p. 36.
[25]Ibid., p. 57.
[26]Ibid., p. 63.
[27]R. Bilder, "Control of Criminal Conduct in Antarctica", Virginia Law Review, Vol. 52, 1966, pp. 231-261, at p. 257.
[28]No. 47 of 21 October, 1960. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. IX, 11. 1.

same time, observers and exchanged scientists who are from other countries are exempted from New Zealand jurisdiction (Article 5).

Consent of the Attorney General is required for the trial of persons: 1) who are not New Zealand citizens and who are charged with Ross Dependency crimes (Article 3[3]{a}); 2) who are New Zealanders and are charged with crimes on ships or aircraft which are not of New Zealand registry (Article 3[b]); or 3) who are New Zealand citizens charged with crimes elsewhere in Antarctica (Article 3[3]{c}).

It is lastly stated that "[n]othing shall limit, affect or extend New Zealand jurisdiction in respect of acts done or omitted on the high seas within Antarctica" (Article 6[2]).

(iii) Australia

By virtue of the Australian Antarctic Territory Act, 1954-1973,29 the laws in force in the Australian Capital Territory are applicable to its Antarctic Territory (Article 5). The Antarctic Treaty Act of 196030 exempts observers and foreign exchange scientists from Australian jurisdiction and incorporates the 1959 Treaty provision with respect to high seas rights (Article VI) as well (Article 4[4].

(iv) United Kingdom

The 1962 British territory Order-in-Council[31] is the legal basis for administrative and judicial competence in the area claimed by the United Kingdom. It turns the Territory into a

[29]Reprinted ibid., Vol. II, p. IV.19.1.
[30]No. 48 of 2 November, 1960. Reprinted ibid., Vol. II, p. IV. 22. 1.
[31]No. 400 of 26 February, 1962. Reprinted ibid., Vol. III, P. XIII. 15. 1.

colony (Article 3), creates the office of a High Commissioner (Article 4) , and gives him the power to make regulations (Article 2) and establish courts of justice (Article 14).

The 1962 Antarctic Treaty Order-in-Council[32] incorporates into municipal law the 1959 Treaty exceptions with respect to jurisdiction over foreign observers, exchange scientists and their staff (Article 3). The United Kingdom appears to exercise jurisdiction over its own nationals who fit into this category anywhere in Antarctica, except in the Australian and New Zealand sectors (Article 4).

(v) Soviet Union

According to Bilder, the Soviet Union is among those countries which generally consider at least certain of their criminal laws as applicable to extraterritorial conduct of their own nationals wherever they may be.33 According to a Chilean account of a Soviet declaration in respect of Article VIII of the 1959 Treaty, that declaration emphasized that Soviet citizens are the subject of the exclusive jurisdiction of the Soviet Union.[34]

(vi) Japan

According to Bilder, Japan also considers that some of her criminal laws apply to her nationals anywhere.35 According to Chile, Japan made a declaration with respect to Article VIII to the effect that everybody in the Antarctic must be subject exclusively to the jurisdiction of the

[32]No. 401 26 February, 1962. Reprinted ibid., Vol. III, p. XIII. 16. 1.
[33]Op. cit., p. 262.
[34]Chilean Report on the 1959 Antarctic Conference, p. 703.
[35]Op. cit., p. 262.

country of which he or she is a national. Japan was sincerely confident that this same principle would be respected in the formulation of future rules.[36]

(VII) BELGIUM

According to a Chilean account, Belgium sided with Japan on Article VIII at the 1959 Conference, believing that only the State of which a person was a national could exercise jurisdiction over that person.[37]

(VIII) ARGENTINA

Territorial jurisdiction is included in the Law of 28 February 195738 which declares Ushuaia the capital of the Argentine Antarctic (Article 4). According to Chile, Argentina, in a declaration relating to Article VIII, supported the French view that, while becoming a party to the Antarctic Treaty, it did not renounce any rights of sovereignty over the territory, especially the general right or power of jurisdiction over territory.[39]

(ix) Chile

Jurisdiction is covered by Statute of the Chilean Antarctic Territory of 21 June 1955,40 which placed that Territory under the administrative purview of the Governor of Magallanes (Article 1). Article 2 states that the Territory shall be administered under a special régime, which is contained in the Decree of 17 July 1956.41 Article 14 of that decree grants a court the competence "to try

[36]Chilean Report on the Antarctic Conference, p. 709.
[37]Ibid., p. 703.
[38]Decree Law No. 2191. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. III. 27.
[39]Chilean Report on the 1959 Antarctic Conference, p. 702.
[40]Law No. 11.846 of 21 June, 1955. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. V. 14.
[41]Decree No. 298. Reprinted ibid., Vol. II, p. V. 15. 1.

and pass sentence upon all civil or criminal cases, whether voluntary or disputed, which may occur in the Chilean Antarctic".

In a declaration relating to article eight of the 1959 Treaty, Chile agreed with France in not accepting any limitations on the exercise of her sovereignty over her territory.[42]

(X) FRANCE

Law No. 55-1052 of 6 August 1955[43] confers administrative and financial autonomy upon the French Southern and Antarctic Lands, though there is nothing specifically on jurisdiction. Nevertheless, as Bilder notes, French law is "apparently applicable to conduct by anyone within the areas it claim(s)"[44]. According to the Chilean account, with regard to Article 8 of the 1959 Treaty, France declared that she did not renounce any of the privileges of her sovereignty in Terre Adélie, especially as concerned the general power of jurisdiction exercised by her on this territory.[45]

(XI) NORWAY

In its 1939 Decree relating to sovereignty over the continental portion of Norway's claimed territory (Bouvet Island, lying above 60° South Latitude), the Ministry of Justice was "empowered to draw up regulations for the exercise of police authority within this region" [46]. It

---

[42]Chilean Report on the 1959 Antarctic Conference, p. 702.
[43]Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. V. 1. 6. 1. A 1956 Decree gives an official representative of the State judicial competence over all civil acts in the territory. Décret No. 56-935, du 18 septembre 1956, portant organisation administrative des terres australes et antarctiques françaises. Reprinted ibid., Vol. II, p. VI. 8. 1. (Article 4).
[44]Op. cit., p. 261.
[45]Chilean Report on the 1959 Antarctic Conference, p. 702.
[46]Proclamation of 14 January 1939. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. X. 4. 1.

is not known whether such rules were ever drafted. According to Chile, Norway made a declaration in respect of Article VIII of the Treaty, in which it proposed that a smaller group of experts should formulate rules at a later date, and that persons in Antarctica should be subject to the personal jurisdiction of the State of which they are nationals. This system had also been put forward in the British and Japanese proposals, but it did not obtain the support of everyone. Norway hoped for a quick solution, the present agreement not prejudicing the outcome.[47]

(XII) South Africa

Article 2 of the South African Citizens in Antarctica Act of 1962[48] reads as follows:

(1) The laws from time to time in force in the Republic shall apply to any South African citizen while he is in Antarctica.
(2) for the purpose of the administration of justice, and in general for the application of the laws of the Republic, Antarctica shall be deemed to be situated within the magisterial district of Pretoria.

The Act also incorporates Article VI of the 1959 Treaty- the high seas exemption clause.

(XIII) Conclusion

The seven Antarctic claimant States- France, Argentina, Chile, the United Kingdom, Australia, New Zealand and Norway all claim, in one form or another, jurisdictional competence on the basis of territory, with at least three of them- the United Kingdom, Australia and New Zealand explicitly exempting observers, exchange scientists and their staff. None of these States makes it clear, however, who exercises jurisdiction elsewhere in the Antarctic, including on the high seas.

---

[47]Chilean Report on the 1959 Antarctic Conference, p. 702.
[48]Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. XI. 3.

The five other original Signatories to the 1959 Treaty- South Africa, Japan, the United States, the Soviet Union and Belgium, appear to base jurisdiction on nationality. In the case of three of them this seems to be part of their domestic law generally; for South Africa, such personal jurisdiction results from special legislation, and for the United States such legislation is only proposed. That legislation would also allow jurisdiction to be exercised on the basis of the protective principle.

The problems of jurisdiction are by no means eliminated simply because States have legislated. Protecting the various claims could still lead to controversies and conflicts. To avoid this, two proposals have surfaced. One would employ a sort of universal code of criminal conduct,[49] and it, as well as the other proposal,[50] would resort to a three-tiered system of jurisdiction. First, the State of nationality would have the right to exercise jurisdiction. If it chose not to do so, the State of which the injured party is a national would then have that right. If this country did not avail itself of this right, the latter could be exercised by any other State.

While interesting, both proposals suffer from the same defect: because they would include a disclaimer clause they would fail to come to grips with the basic territorial problem. Anything which diminishes the jurisdiction of the claimants could be seen as proof that they lack sovereignty. Thus any such scheme is bound to be unacceptable to most claimants.

---

[49]E. Johnson, "Quick Before It Melts: Toward a Resolution of the Jurisdictional Morass in Antarctica", Cornell International Law Journal, Vol. 10, No. 1, 1976, pp. 173-198.

[50]E. Hook, "Criminal Jurisdiction in in Antarctica", University of Miami Law Review, Vol. 33, 1978, pp. 489-514.

There is very little precedent in the Antarctic in matters of jurisdiction. It has been asserted that in the early years of southern exploration sealers and whalers had problems of criminal jurisdiction, but they were apparently only of domestic concern.[51] Meyers reports that controversies in large measure have cured themselves on an ad hoc basis:

> with instances of petty crime, the issues have been resolved by resorting to kangaroo courts in some cases. Problems have been solved ad hoc without resort to any form of legal regime.[52]

According to the United States Government, that country has not experienced any crimes of violence or other criminal acts on its bases in the Antarctic.[53] Moreover, to their knowledge there has been no prosecution in foreign countries under special laws enacted subsequent the signature of the Antarctic Treaty.[54]

3. Oceans

(a) General

The question of the powers exercised by coastal States in connection with scientific research in certain zones under their national jurisdiction or, in fact, in certain zones such as the high seas, which are beyond national jurisdiction, has been examined in connection with the right to conduct research in those zones. It remains to establish the jurisdictional rules with respect to vessels and crew, installations and equipment, first in a general sense and then according to zones were special rules exist.

---

[51]K. Bertrand, "Operational Considerations: The Historical Background". Chapter 2 in Schatz (ed.), op. cit., pp. 15-23, at p. 16.
[52]N. Meyers, "Operational Considerations: New Legal Issues", ibid., pp. 25-36, at p. 25.
[53]1977 U. S. Congressional Antarctic Hearings, pp. 36 and 56.
[54]Ibid., p. 66.

The 'flag State' rule in the law of the sea, whereby exclusive jurisdiction is exercised by the State of registry over vessels and crew, may be said to apply equally to marine scientific research vessels and crew. It may not always be clear, however, whether such ships are private, government non-commercial vessels, or warships. This distinction is important because warships enjoy immunity and are exempt from some rights such as those of visit and search. Several United States oceanographic vessels are owned by the Navy but leased to private institutions. According to Kildow, the United States has a special category of vessels (public/private research vessels, or R/Vs), that are operated privately but owned by the Navy; this arrangement is intended to facilitate access to foreign waters.[55] There are also Coast Guard vessels which conduct scientific research. In 1967, two such vessels, one with five men in control of oceanographic work on a proposed 8000-mile circumnavigation of the Arctic Ocean, were not permitted by the Soviet Union to traverse the Vilkitsky Straits, considered by that country to form part of its territorial sea, the legal justification given being that warships have no right of innocent passage.[56] As for the legal situation vis-à-vis installations and equipment for marine scientific research, the solution to the question of jurisdiction is not entirely clear. It is first necessary to appreciate the vast assortment of installations and equipment which exist. A distinction which is commonly made is that between Ocean Data Stations, i. e., the geographic position at which data is

[55]Kildow, in Wooster, (ed.), op. cit., p. 12.
[56]See "Soviet Union Bars Completion of U. S. Scientific Voyage", Department of State Bulletin, Vol. 57, 1967, p. 362. See also D. Pharand, Law of the Sea in the Arctic, with Special Reference to Canada. Ottawa, Ottawa University Press, 1973, p. 21 and pp. 39-40.

gathered, and Ocean Data Acquisition Systems (ODAS), i. e. the devices used for gathering the data.[57]

There appear to be four basic types of stations,[58] although there are undoubtedly other ways of categorizing them:

1) Nearshore manned stations, which are occupied by such things as light vessels and oil rigs;
2) Offshore manned stations, occupied by, for instance, ocean weather ships;
3) Unmanned stations occupied by automatic buoys, etc.;
4) Repetitive drifting stations, which as the name implies, change location, but which may be occupied by such things as ice islands and drifting buoys.

The systems themselves may be either manned or unmanned. Those coming under the former category include:

1) Conventional vessels, both of the surface and submersible variety;
2) Fixed structures which may be either attached to the seabed or anchored, and may or may not penetrate the surface;
3) Buoys and conventional vessels, both either surface or subsurface.

Of the unmanned systems, there may be either fixed structures or buoys; in other respects they are similar to their manned counterparts. Yet another way of categorising both manned and unmanned stations and systems is according to whether they are moored or free-floating.

As for the general question of jurisdiction over installations and equipment, Article 262 of the ICNT Rev. 1 would require the State of registry or the international organisation to which they belong to put identification markings on their installations and equipment, to equip them with

[57]UNESCO and IMCO. Legal Problems Associated with Ocean Data Acquisition Systems. Doc. I. O. C./Inf.=108 (revised), Paris, January 1969, p. 1.
[58]Brown, op. cit., p. 330.

warning signals and to ensure safety. However, nowhere is it indicated on what basis the registry is to be established, nor what form it should take procedurally. In principle there should be no major problem when research is being undertaken by the State, but there could be complications for private research; as Caflisch says,

> it may…become necessary to look for other connecting factors such as the nationality of the owners of the facility or of the personnel involved, as the case may be[59].

The other areas in which there exist separate rules are as follows:

(b) Internal Waters and Territorial Sea

Here the coastal State exercises full jurisdiction over equipment and installations, unless otherwise agreed.

(c) Exclusive Economic Zone

The coastal State exercises exclusive jurisdiction over scientific research within this zone, but, as Caflisch points out, there are no specific provisions in the ICNT Rev. 1 in respect of jurisdiction over research installations and equipment:

> [t]he matter is therefore governed by Article 60 of the ICNT which deals with the status of artificial islands, installations and structures in the economic zone in general.[60]

Article 60 accords the coastal State "exclusive jurisdiction" in this matter as well.

[59]Op. cit., p. 887.
[60]Op. cit., p. 888.

(d) Continental Shelf

The shelf State exercises jurisdiction over scientific research generally. Furthermore, there are clauses in the 1958 Continental Shelf Convention which deal with installations and other devices necessary for the exploration of the shelf and the exploitation of its natural resources. The shelf State is "…entitled to construct and maintain or operate on the continental shelf" such equipment (Article 5[2]), which is "under the jurisdiction of the coastal State" (Article 5[4]).

As for the ICNT Rev. 1, Article 60, which accords the coastal State "exclusive jurisdiction" in the economic zone, applies mutatis mutandis to the shelf (Article 80). In other words, as Caflisch puts it, "to those devices relating to applied research and implanted on, or connected with, the continental shelf". [61]

(e) Conclusion

Beyond the question of consent there are a number of lacunae regarding jurisdiction in maritime areas. Thus, nowhere is it expressly stated that States have a right to deploy installations and equipment. Article 253 of the ICNT Rev. 1 states only that their deployment and use shall be subject to the same conditions as those for the conduct of research in the area under question. Once these conditions are met, it is not clear who exercises jurisdiction, nor what type. In this sense the SNT contained an interesting clause: the right to operate and manage equipment and installations would have rested with the deploying State (Article 28).

---

[61] Op. cit., p. 889.

The question might arise as to whether state research vessels, installations or equipment benefit from immunity while in certain zones of jurisdiction, e. g. the territorial sea. In this connection, one could expect the coastal State to require the research State to waive its sovereign immunity as a condition for permission to undertake research.

4. General Conclusion

Jurisdiction in outer space and the oceans is similar in that in both areas it is based, for vessels and spacecraft and their crews, and for research installations and equipment, on nationality and registry. Nevertheless, it appears that the rules regarding jurisdiction over maritime research installations and equipment are less than adequate. The question has been treated by various United Nations organs in the past,[62] and a convention conference was envisaged but cancelled when UNCLOS III was convened.[63] Given UNCLOS III's short treatment of the subject, a separate convention may still be required.

As for the Antarctic, in the maritime portions law of the sea rules apply, whereas for other parts of the Antarctic there is no uniform practice other than for observers and the like. The 1959 Treaty is silent about other persons as well as about installations and equipment.

---

[62]See M. Voelckel, "Le statut juridique des systèmes d'acquisitions de données océaniques", Annuaire français de droit international", Vol. 7, 1971, pp. 833-854, at pp. 836-837.

[63]See Preliminary Draft Convention on Ocean Data Acquisition Systems, Aids and Devices. Annex III of Summary Report of UNESCO/IMCO Preliminary Conference of Governmental Experts to Formulate a Draft Convention on the Legal Status of Ocean Data Acquisition Systems (ODAS), 31 January- 11 February 1972. Doc. SC-72/Conf. 85/8. 30 March 1972.

CHAPTER IV: THE RIGHT TO VISIT, OBSERVE AND INSPECT

1. Outer Space

Article 12 of the 1967 Outer Space Treaty stipulates that all "stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open… on a basis of reciprocity", subject to advance notice and consultation. This is a very limited right since it depends first of all on a space capability, exists not in space generally, and is based on reciprocity. It is not entirely clear what these facilities are to be open for, although the article does employ the term "visit"; the ordinary meaning of this term would appear to rule out inspection. Article 15(1) of the 1979 Moon Resources Treaty, by contrast, allows states to assure themselves of compliance with the Treaty; they can avail themselves of this right of inspection unilaterally.

President Eisenhower argued as early as 1964 for an appropriate procedure for verifying compliance with an eventual non-militarisation clause.[1] The only verification procedure to date has been that of land-based arms control agreements.

The Outer Space Treaty postulates a right to observe the flight of objects which have been launched into space (Article XI); this concerns the establishment of tracking stations and the like on foreign territory. The same article goes on to state that this right is to be exercised on the basis of equality and under conditions to be determined by agreement. Marcoff thinks that this means that the power to refuse a request to establish such a base is not discretionary- all requests must be reviewed on the same basis, each country has the right to ask permission, and

[1] Brittanica Book of the Year, 1960, p. 651.

such permission must be granted if the State is to act in good faith, particularly in view of Article 1(3) on international cooperation.[2]

In a separate vein, there is no general right to visit launchpads or installations on the ground, though such a right may arise in situations of reciprocity. Thus, in 1965

> [t]he Soviets rejected the United States President Lyndon B. Johnson's invitation to witness the launching of Gemini 6 in October. The refusal was made because they felt an acceptance would have obligated them to invite the U. S. observers to a Soviet manned spacecraft launching.[3]

2. Antarctica

The right of tourists and others to visit Antarctic bases appears to be recognised in Rec. VI-7 (Effect of Tourists and Non-government Expeditions in the Antarctic Treaty Area), albeit under certain conditions and restrictions set by the base operators. As regards inspections, Article VII of the 1959 Treaty provides for each Consultative Party to designate its nationals as observers to carry them out "in order to promote the objectives and ensure the observance of the provisions of the present treaty".

The right of tourists and others to visit Antarctic bases appears to be recognised in Rec. VI-7 (Effect of Tourists and Non-government Expeditions in the Antarctic Treaty Area), albeit under certain conditions and restrictions set by the base operators. As regards inspections, Article VII of the 1959 Treaty provides for each Consultative Party to designate its nationals as observers to carry them out "[i]n order to promote the objectives and ensure the observance of the provisions of the present treaty". Upon notification of all other Consultative Parties, each observer has

---

[2]Marcoff, op. cit., pp. 476-477.
[3]Brittanica Book of the Year, 1960, p. 696.

"complete freedom of access to all areas of Antarctica" (Article VII[2]). The following clause elaborates:

> [a]ll areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspection by any observers (Article VII [3]).

While this accords extensive powers to observers, it does not give them the right to board, search or inspect vessels in progress within the region, though presumably such vessels are susceptible to aerial observation, since such observation "may be carried out at any time over any or all areas of Antarctica" (Article VII[4]). Hanevold says flatly that the inspection mechanism does not apply to maritime areas,[4] while Auburn will only go as far as to state that it does not apply to commercial vessels.[5]

To permit observers to exercise their functions, each Contracting Party (not just any Consultative Party) must notify all other Contracting Parties of all expeditions to Antarctica, all stations in Antarctica, and any military personnel intended to be introduced (Article VII[5]). Finally, observers are subject only to the jurisdiction of the Contracting Party of which they are nationals in respect of "all acts or omissions occurring while they are in Antarctica for the purpose of exercising their functions" (Article VIII[1]).

---

[4]T. Hanevold, "Inspections in Antarctica", Cooperation and Conflict, Vol. 6, No. 2, 1971, pp. 103-114, at p. 108.

[5]"Oil and Gas in Antarctica", op. cit., pp. 170-171.

At the 1959 Antarctic Conference the United States reportedly insisted on inspections. While this was agreed to early on in the proceedings, there was considerable disagreement on how the scheme would operate, principally on whether inspections should be unilateral or multilateral. The United States was undoubtedly interested in the precedent value of unilateral inspections,[6] whereas the British felt that a multilateral procedure would allow more Parties to affectively exercise the right.[7]

This body of practice built up over the years is substantial.[8] Six of the current thirteen Consultative Parties have exercised the right to inspection in the area,[9] and a total of seven States have had their facilities inspected.[10] The inspections have been carried out for the most part on land, although an aerial observation[11] as well as a ship-based inspection have occurred.[12] The objects of the inspections have been compliance with the peaceful purposes clauses as well as

---

[6]Hanevold, op. cit., p. 105.
[7]Ibid., p. 106.
[8]The data which follows has been culled principally from the following sources: Department of State Bulletin (U. S.); Hanevold, op.cit.; J. Simsarian, "Inspection Experience under the Antarctic Treaty and the IAEA", American Journal of International Law, Vol. 60, 1966, pp. 502-510; M. Voelckel, "L'inspection en Antarctique", in L'Inspection Internationale", Brussels, 1976, pp. 223-246; R. Yoder, "United States Inspects Four Peninsula Stations", Antarctic Journal of the United States, Vol. 10, 1975, pp. 92-93.
[9]United States (January 1964; 1966-67; 1970-71; 1975; 1978; New Zealand (December 1963); Argentina (February 1965); United Kingdom (December 1963); Australia (December 1963); Japan (1968).
[10]United States (by New Zealand, the United Kingdom, Australia, Argentina and Japan); New Zealand (by Australia, the United Kingdom, the United States); Chile (by the United States); France (by the United States).
[11]In January 1964, United States observers conducted an aerial observation of a French station owing to the lack of landing facilities. Simsarian, op. cit., p. 508.
[12]In February 1965, two Argentine observers inspected the United States Palmer base, then under construction, by icebreaker. Ibid., p. 508.

with environmental standards.[13] No illicit activities have been uncovered so far. There is a possibility that future commercial operations could be inspected.[14]

3. Oceans

Aside from the customary high seas right to board and inspect vessels (other than warships) which are suspected of violating certain norms, e. g. of engaging in the slave trade, Article III of the Seabed Weapons Treaty, which, inter alia, outlaws certain weapons tests, gives each country the right to verify compliance through observation, provided that observation does not interfere with such activities. Following this, if doubt persists and is not removed, the Parties concerned shall cooperate

> on such further procedures as may be agreed, including appropriate inspection of objects, structures, installations or other facilities that reasonably may be inspected…[15]

The ICNT Rev. 1 would give the coastal State the right, in its territorial sea, to "take necessary steps to prevent passage which is not innocent" (Article 25) , and the right to require the cessation of any research activities in progress in its economic zone or on its continental shelf, if certain requirements have been breached (Article 253), but the text is silent as regards the measures the coastal State may employ to establish whether there is compliance. The SNT

---

[13]E. g., Yoder says that the 1975 United States inspections covered the peaceful purposes provisions as well as environmental conservation clauses. Op. cit., p. 93.

[14]Auburn reports that the United States threatened one of its oil companies with inspection if it carried out Antarctic exploration. "United States Antarctic Policy", Marine Technology Society Journal, Vol. 12, 1978, pp. 31-36, at p. 36. Cf. B. Mitchell and L. Kimball, "Conflict over the Cold Continent", Foreign Policy, No. 35, 1979, pp. 124-141, at p. 139.

[15]Op. cit.

contained an interesting proposal which would have given the coastal State the right to inspect equipment and installations in areas where consent was required, as well as to "take all appropriate judicial and administrative measures" against errant equipment (Article 29), but this was absent from subsequent negotiating texts.

4. Conclusions

The right to visit, observe and inspect actually consists of three separate things. The right of visit is a limited one in both outer space and the Antarctic. In outer space there is a spatial right to track space objects. The right to inspect exists in all three areas; in the Antarctic it is a mechanism which has often been employed.

PART FOUR: LIMITATIONS ON THE FREEDOM OR RIGHT TO CONDUCT SCIENTIFIC RESEARCH

CHAPTER 1. SCIENTIFIC RESEARCH AND SOVEREIGNTY

1. Outer Space

Principal No. 3 In the 1963 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space stated that

> [o]uter space and celestial bodies are not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

The 1967 Outer Space Treaty repeats this principle, but also alludes to the moon and now specifies that the moon and other celestial bodies are part of outer space (Article II). This 'no sovereignty' provision is a corollary of the rule of freedom of space, which gives substance to that rule and prevents exclusive use. It has probably entered into custom, and is therefore binding on third parties or those who withdraw from the Convention.[1] Thus, while it is still not certain what the precise legal status of outer space is, it is clear that scientific research could never be advanced in support of, as a basis of, any national claim to it.

Somewhat of a difficulty is caused by the lack of agreement or consensus as to where outer space begins. This has induced certain states to claim the geostationary orbit as part of their national sovereignty, even though it is situated some 34,000 kilometers above the equator. However, none of these claims appears to be in any way founded on scientific activity in the

[1]Marcoff, op.cit., p. 330.

region, nor to have affected to any appreciable degree the conduct of scientific research, e. g. radio astronomy, in the area.

2. Antarctica

(a) Introduction

It has been shown in an earlier section that the territorial claims in the Antarctic have seldom interfered with the progress of scientific research. Two further subjects will now be examined- the role of scientific research in the formulation of such claims, and the effect of scientific research and scientific cooperation on the various positions.

(b) The Role of Scientific Research in the Formulation of Claims

(i) Introduction

Article IV(2) of the 1959 Treaty states:

> No acts or activities taking place while the present treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica.

The difficulty posed by this clause is that States have on the whole acted and reacted, both before and, to a lesser extent, after 1959, as if scientific research did influence claims. In fact, as we shall now see on a country-by-country basis, scientific research provides the basis for a number of sovereign claims in the region.

(ii) Argentina

A 1939 Decree[2] referred to Argentina's interest in the Antarctic on "scientific and political grounds" and cited its permanent meteorological observatory, which over a thirty-year period had attained "an inestimable value in the field of universal science". In 1951 the same station was cited as proof that Argentina had effectively occupied the region for fifty years and had conducted "scientific activities of world-wide importance."[3] Scientific research is, however, only one of many elements making up Argentina's Antarctic claim, and in fact usually appears well down the list.

(iii) United Kingdom

In a 1947 Note to Argentina,[4] the British Ambassador gave as proof of sovereignty over Deception Island, inter alia, "surveying, marine research and scientific work" undertaken between 1927 and 1938, as well as the establishment of a permanently-occupied meteorological station in 1944. Also, in a letter to Chile of 17 December 1947,[5] the British Ambassador claimed sovereignty on the basis of discovery, administration, whaling, "the accumulation of scientific and meteorological data, and… the dispatch of numerous expeditions in the Antarctic over a period of years."

---

[2]Decree No. 35,821 Establishing A Committee of Enquiry relating to Antarctica. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. III. 4. 1.

[3]Note to the British Ambassador replying to the British Note of Protest, of 1 June 1951. Reprinted ibid., Vol. II, p. III, 1-2.

[4]Note from the British Ambassador Protesting at the Establishment of an Argentine Station on Deception Island, of 23 December 1947. Reprinted ibid., Vol. II, p. III. 13. 1-2.

[5]Note from the British Ambassador Protesting at the Establishment of a Chilean Station at Discovery Bay on Greenwich Island in the South Shetlands, of 17 December 1947. Reprinted ibid., Vol. II, p. V. 8. 1-2.

Further reference to scientific activities, including especially those of the Discovery Committee, was made in the Pleadings of the Antarctica Cases.[6]

(iv) Australia

The scientific work of Mawson contributes to the Antarctic claim of Australia, which was consolidated in 1929. British scientific research is also cited in support: in 1933 an Australian Government official proclaimed that "[a]s a result of the voyage of the Discovery, the area had been so thoroughly visited and British sovereignty so completely established".[7]

(v) Chile

In a 17 May, 1951 Note of Protest to the British Ambassador, Chile asserted the following:

> In fact discovery and the scientific expeditions carried out in the Antarctic do not and cannot constitute any title over this region. Such acts do not confer of themselves any right of sovereignty and it cannot be seen how they could create such a right in a region which forms part of the national territory of another State and over which Chile exercises, and has exercised, full sovereignty.[8]

This may well be the first instance in which scientific research is claimed to be an inadequate basis for a sovereign claim.

---

[6]International Court of Justice. Pleadings, Antarctica Cases (United Kingdom v. Argentina); United Kingdom v. Chile). See especially pp. 13, 17.

[7]Statement in Parliament by the Attorney-General, Mr. Latham, concerning the Australian Antarctic Territory Acceptance Bill, of 26 May 1933. Reprinted in Documents Relating to Antarctica, op. cit., Vol. II, p. IV. 10.

[8]Note to the British Ambassador replying to the British Note of Protest, of 17 May 1951. Reprinted ibid., p. V. 12. 1-2.

(vi) Norway

Norway's 1939 claim to a portion of the Antarctic mainland was made on the basis of Norwegian exploration of the area.[9]

(vii) France

France's claim to Terre Adélie is founded on the exploration of the coastline from the sea done by Count d'Urville.

(viii) New Zealand

This is an interesting case, because the British advised New Zealand to base her claim in the region on discovery rather than occupation, the territory in question “never having been at any time inhabited except for a few months by scientific expeditions".[10]

(ix) Union of Soviet Socialist Republics

In 1958 the Soviet Union reserved her rights based on discovery and exploration by Russian navigators and scientists.[11]

---

[9]Proclamation Defining Norwegian Sovereignty in Antarctica with Approved Recommendations on the Subject by the Ministry of Foreign Affairs, of 14 January 1939. Reprinted ibid., Vol. II, pp. X. 4. 1-3.

[10]Request from the Colonial Office for an Opinion from the Law Officers of the Crown concerning British Control over the Ross Sea Coast and their Hinterland, of 27 November 1922. Reprinted ibid., Vol. II, pp. LX. 1. 1-2.

[11]Note from the Soviet Embassy in Washington to the Department of State Accepting an Invitation of the United States to Participate in a Conference on Antarctica (Extract), of 2 June 1958. Reprinted ibid., Vol. II, p. XII, at p. 1.

(x) United States of America

In 1958 the United States, in a letter to each of the eleven other countries participating in the IGY, made the following assertions:

> Throughout a period of many years, commencing in the early eighteen-hundreds, many areas of the Antarctic region have been discovered, sighted, explored and claimed on behalf of the United States by nationals of the United States and by expeditions carrying the flag of the United States.[12]

The United States "…reserves all of the rights with respect to the Antarctic region, including the right to assert a territorial claim or claims."[13]

(xi) Conclusion

In summary, then, motivation for undertaking research is often political; as Auburn states, "…scientific activities on the continent are supported for a political purpose: to maintain interests, rights and claims."[14] This is valid, for example, in the region claimed by Argentina, Chile and the United Kingdom. Hayton is correct when he writes:

> Competition has already driven these three claimants to maintain continuous occupation of a number of bases with military and some scientific personnel. In the absence of the political purpose it is doubtful whether so much energy and money would have been budgeted for permanent meteorological observations and geographic and oceanographic investigations in Antarctica.[15]

---

[12]Statement by President Eisenhower and American Note proposing a Conference on Antarctica, of 3 May 1958. Reprinted ibid., Vol. II, pp. XIV. 3. 1-2, at p. 1.
[13]Ibid.
[14]"Offshore Oil and Gas in Antarctica", op. cit., p. 139.
[15]Op. cit., p. 352.

If Baldwin is right, this motivation goes back to the early days of polar exploration:

> The nature of the observations undertaken during the first polar year appealed to nineteenth century governments not simply because of their contribution to science, but also because the explorations could be used as a basis for territorial claims to new lands discovered and because the observations might be useful in developing better techniques for navigation.[16]

The least that can be said is that science and sovereignty were directly linked. Thus, in 1946 United States Secretary of State Dean Acheson proposed that scientific research be undertaken in areas in which the United States had the best chance of a claim and the most interest.[17]

It has been shown that much research in the past has been applied; a further reason, though, for conducting pure research, is that this may well entitle the State to a share of the resources if and when exploitation begins. This fact is illustrated by the following passage concerning an expedition of Norwegian researchers and scientists:

> Organised by the Norwegian Polar Institute, the team, in addition to scientific investigators at land and sea, will also reemphasize Norway's territorial rights on the Antarctic continent. Resources in Antarctica may be of vital importance in the future and thus Norway's participation in scientific research is paramount.[18]

Economic prospects are also a prime consideration in nations such as Poland, and currently West Germany, conducting scientific expeditions, establishing bases and thereby becoming Consultative Parties; they are primarily interested in a slice of the marine living resources of the

---

[16]Op. cit., p. 100.
[17]Cited in Whiteman, op. cit., Vol. 2, p. 1248.
[18]"Polar Team in Antarctica", Polar Times, No. 84, June 1977, p. 20.

region, since they have lately been excluded from maritime exclusive economic zones and are forced to find distant water substitutes.

No doubt there has been a strategic interest in the Antarctic as well, particularly during the Second World War and subsequent Cold War period, though at the present time it is difficult to accept the view that strategic interests are more important than the scientific.[19]

As Schatz recalls, the Antarctic Treaty itself is a political agreement:

> Although the treaty emphasizes science as one of its principal purposes and although effect has been the maintenance of Antarctica as a scientific preserve, the treaty must be recognized for what it is. It is not a scientific charter. It is the embodiment of a political relationship that the signatories found mutually acceptable (that is, preferable to the alternatives then foreseen) for the South Polar region. The political relationship and its benefits could, but need not, give way- perhaps to heedless and possibly vain greed.[20]

(c) Effect of Scientific Research on the Status of the Area

A prime feature of the Antarctic Treaty regime is that all claims are 'frozen' for the life of the Treaty and no acts undertaken while the Treaty is in force in any way affect these claims and positions (Article IV[2]). There is a precedent for this procedure in the Antarctic: in the Chilean Escudero Declaration in 1948 it was proposed:

> that the establishment of new bases, the carrying out of expeditions or the exercise of analogous activities would not prejudice their respective rights of sovereignty; and that none of those new bases, expeditions or activities could be invoked as an antecedent of dominion.[21]

---

[19]Jain, op. cit., p. 252.
[20]G. Schatz, "A Sea of Sensitivities", Oceanus, Vol. 18, No. 4, 1975, pp. 50-55, at pp. 50-51.
[21]Hanessian, op. cit., p. 441.

The proposal was not accepted, but this was more or less the system adopted by the IGY in its Gentlemen's Agreement, which was in force between 1953 and 1958. The fact that it was accorded credibility is illustrated by the British decision to draw attention to her sovereignty when faced with what seemed to her to be non-IGY activities:

> Where, however, there has been some doubt as to whether the activities of other countries in British territories are connected with the IGY and no prior notification has been received, Her Majesty's Government have felt obliged to make their attitude on the question of sovereignty clear to the Government concerned. This has been done in the cases of the Soviet landing on Zavadovsky Island and the visit of the Argentine ship 'Les Eclaireurs' to Deception Island on its Antarctic cruise. (Emphasis added)[22]

One reason the 'frozen' clause is suspect is that if and when the 1959 Treaty expires, all the scientific research undertaken during the life of the Treaty will undoubtedly be advanced in support of the respective claims and non-claims. Another reason is a possible discrepancy between what the Treaty purports to do and what it actually does or leads to. The question is, as Hanevold put it:

> Will a number of small concessions from the claimant States in the long run undermine their territorial rights and the treaty principle of status quo on the claim question?[23]

In this respect a possible analogy exists between the Antarctic and Spitzbergen. In the latter case, Norway's "full and absolute" sovereignty was recognized in the 1920 Treaty, but without the control over military and economic affairs this sovereignty is seriously compromised.[24]

---

[22]Cited in Whiteman, op. cit., Vol. II, p. 1243.

[23]Op. cit., p. 196.

[24]Treaty concerning the Archipelago of Spitzbergen, signed at Paris on 9 February 1920. UNTS, Vol. 2, p. 7. The Treaty is analogous to the Antarctic in two ways: Article 9 obliges Norway neither "to create nor to allow the establishment of any naval base" nor "to construct any fortification in the said territories"; in Article 5, "[t]he High Contracting Parties recognise the utility of

The prospective de facto internationalisation of the Antarctic and the dubious nature of the 'no-effect' clause have been noted by several publicists, including Simmonds:

> [i]f the terms of the new Treaty, in particular the provisions of articles III, IV(2) and VII are faithfully carried out by the signatories, then the majority of State activity in the next 30 years will be international rather than national in character and objective.
>
> …
>
> (t)he mere signing of the treaty itself makes a significant diminution in the sovereign rights at present claimed by the interested parties. The effective working of the Treaty will make further inroads upon national sovereignty in the region and will surely encourage that body of opinion, both political and juristic, which would favor the complete internationalisation of the Antarctic.[25.]

One must be cautious, however, for the claimant States scrupulously avoided taking any action which they thought could jeopardise their respective claims and pave the way towards internationalisation. For instance, they would not set up any permanent secretariat. Jurisdiction and licensing of exploration are also thorny issues because of their association with the exercise of sovereignty. Moreover, in implementing the Treaty, real cooperation on an operational level has been minimal, most expeditions being strictly national, rather than joint, and virtually all bases being so.

---

establishing an international meteorological station, the organization of which shall form the subject of a subsequent Convention. Conventions shall also be concluded laying down the conditions under which scientific investigations may be conducted in the said territories."

[25]K. Simmonds, "The Antarctic Treaty 1959", Journal du Droit International, 1960, pp. 668-700, at pp. 696, 698.

In theory, the freedom of scientific research should not be affected by the status of the region, it being a freedom which is not merely conventional but rooted in customary international law.

3. Oceans

There are only two references in law of the sea texts which pertain to the relationship between scientific research and the status of the sea. The 1958 Continental Shelf Convention contains a clause (Article 2[3]) which provides that “the rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation”. Article 241 of the ICNT Rev .1 reads: “marine scientific research activities shall not form the legal basis for any claim to any part of the marine environment or its resources". It may or may not be significant that it is not expressly prohibited to use scientific research to support a claim the legal basis of which consists of other elements. In any case, it is doubtful that the ICNT clause reflects customary international law, for one need look no further than the Antarctic to discover that marine scientific research is linked with claims to sovereignty over both the land and the adjacent waters.

4. Conclusions

Conventionally there is a prohibition on the invocation of scientific research in connection with sovereignty in the three areas. This runs counter to the practice prior to the conclusion of the relevant treaties on the Antarctic and the oceans. Outer space, on the other hand, may be, by its very nature, unoccupiable. In the Antarctic, the ostensible purpose of the clause is to freeze old claims, whereas in the oceans it is to prevent new claims.

CHAPTER II: NON-INTERFERENCE WITH LEGITIMATE USE

1. Introduction

In this section the body of rules which govern conflicting uses in the three regions will be examined. There are basically two types of rules of this order: those which regulate the conduct of scientific research vis-à-vis other forms of legitimate activity; and those which coordinate scientific activities themselves in such a way as to minimise interference and injury amongst them.

2. Outer Space

(a) General

Article 9 of the 1967 Treaty obliges states to conduct themselves in outer space "with due respect to the corresponding interests of all other State Parties to the Treaty". This is linked in the same Article to the 'principle' of "cooperation and mutual assistance". The 1979 Moon Resources Treaty requires "due regard" to be paid to interests of present and future generations (Article IV[1]).

Under the 1967 Treaty there is a duty to consult prior to the undertaking of potentially harmful activities which cause interference with the activities of other States (Article IX[1]).[1] This applies to either an "activity" or an "experiment". For the State conducting the potentially injurious activity the duty is to "undertake appropriate international consultations" (Article IX),

[1]During the negotiations leading up to the treaty, Canada would have extended this to activities dangerous to human or other interests. COPUOS, Annual Report, 1963, Annex, p. 10.

but it falls short of requiring cancellation of the proposed activity.[2] The potentially injured State, on the other hand, may only request "consultation", which of course it can do in any case, whether the Treaty exists or not. It is in instances such as this where the duty to cooperate must take on significance, over and above mere "due regard"; the same may be said of the duty to carry out space activities "for the benefit and interest of all countries" (Article 1).

Schacter claims that COSPAR

> has the function of determining whether activities in outer space would be injurious. Under the Outer Space Treaty, international consultation is required in respect of proposed experiments or other potentially harmful activities in space. Although COSPAR does not have the authority to prohibit such activities, the scientific weight of its pronouncements would undoubtedly have considerable influence.[3]

Apart from the use of the radio band, which will be examined forthwith, practice on interference is scarce. There is no known instance in which a scientific experiment is alleged to have interfered with other scientific research, though Project West Ford in 1961 in 1963 was feared for its potential effect.[4] As for interference of scientific research with other activities, problems have

---

[2]This is what a Soviet draft of the outer space principles would have done. It would have given States the power of veto for questionable experiments. Doc. A/AC.105/C.2, L.6. COPUOS Annual Report, 1963, p. 48.

[3]O. Schachter, Sharing the World's Resources, New York, Columbia University Press, 1977, pp. 80-81.

[4]See. M. Ryle, "The Effects on Astronomy of Tests in the Earth's Environment", in Report of Conference on Law and Science, held at Nisbett Hall, July 1964, London, David Davies Memorial Institute and the British Institute of Comparative and International Law, 1964, pp. 17-24. See also the Soviet protest of 28 May 1963. U. N. Doc. A/AC. 105/13, and the American response of 6 June 1963, U. N. Doc. A/AC.105/15, which refuted any "adverse effect on any other activity."

While apparently no damage was caused by the experiment, M. Vazquez, Cosmic International Law, Detroit, Wayne State University Press, 1965, pp. 181-188, argues the project was "illegitimate".

for the most part been related to such things as the interference of space vehicles with aircraft on take-off and re-entry, and, to a growing extent, to the creation of space clutter through disused spacecraft and other garbage. Interference of other activities with scientific research appears to now to have been limited to theoretical possibilities, examples being the American plan during the Viet Nam War to use solar reflecting panels as a source of nightlight,[5] and potential interference of solar power sets with radioastronomy.[6] In 1962 Project Starfish, however, which involved the explosion of a hydrogen bomb over the Pacific, apparently damaged several satellites.[7]

With respect to the moon, the 1979 Moon Resources Treaty contains numerous clauses of a 'legitimate use' nature, beyond the already cited one of "due regard". These include: the duty of a State to inform other States planning to operate simultaneously of the timing and plans of one's operations (Article 5[2]); the possibility of creating areas of the moon “having special scientific interest" within which special protective measures may be agreed (Article 7[3]); the duty not to interfere with the activities of other States on the moon (Article 8[3]); and the duty to install stations in such a way that “they do not impede the free access to all areas of the moon…” (Article 9[2]). Thus, the rules for the use of the moon are elaborate and more advanced than those for space generally.

---

[5]P. Dembling and S. Kalsi, 'Pollution of Man's Last Frontier- Adequacy of Present Space Environmental Law in Preserving the Resources of Outer Space", Netherlands International Law Review, Vol. 20, 1978, pp. 125-146, at p. 133.

[6]"Solar Threat to Radioastronomy", New Scientist, 23 November, 1978, p. 590.

[7]According to Dembling and Kalsi, op. cit., pp. 129-130, Starfish "has jeopardised scientific research on the origins of the Van Allen belts, making the study of the natural environment of the earth more difficult.”

(b) The Use of the Radio Band for Space Research

(i) Introduction

There is a sizeable body of rules governing the use of the radio spectrum for space research. In one way or another these rules involve the regulation of various types of scientific use as well as the accommodation of scientific use with other uses. This particular form of space activity has a relatively long history: radio waves were received from the moon as early as 1946.

Allocation of the radio band for space research has been regulated three times- in 1959, again in 1963, and Lastly in 1971.

(ii) The 1959 Regulations

In 1959, the International Radio Consultative Committee (COIR) of the ITU passed temporary regulations which reserved frequencies for space communications, although this practical form of activity counted for no more than one percent of the entire wave spectrum.[8] At the same time, Resolution No. 7 adopted by the Committee entrusted the CCIR with the study of problems related to space radio communications, and invited space powers to communicate their experiences.

(iii) The 1963 Regulations

In 1963 the Extraordinary Radio Conference was convened, inter alia, to determine which frequency bands would be suitable for radio communications with space and should therefore be allocated and added to the frequency table in the Radio Communications Regulations.

[8]Gal, op. cit., p. 260. According to the ad hoc COPUOS Annual Report of 1959, pp. 23-24, the ITU allocated bands for radioastronomy.

According to Lieve, the task of the Conference was to "allocate frequency bands essential for various categories of space communications and for radio astronomy".[9] Such allocation was required in order that programs involving communications, meteorology and navigation satellites as well as space research could proceed with the assurance that adequate frequencies would be available.[10]

According to Gal, the Radio Regulations laid down a new system of frequency allocations, allotting fifteen percent of the available spectrum for space telecommunications, a certain amount being consecrated to communications satellites.[11] COPUOS stated that

> [t]he Extraordinary Administrative Radio Conference in October of 1963 allocated radio frequency bands for the purpose of communication satellites, meteorological satellites, telemetry and tracking, navigation satellites, radio astronomy, space research, and space vehicles in distress and for aeronautical purposes.[12]

Lastly, the Regulations reportedly contain recommendations concerning elimination of harmful interference; for instance, the location or sighting of the transmitting or receiving stations was to be selected with special care, broadcasts under an unnecessary angle were to be avoided by using directional aerials, and the space stations were to be provided with suitable, fast cut-off equipment for when the satellite was no longer functional.[13] In a letter addressed to COPUOS in

---

[9]D. Leive, International Telecommunications and International Law, Leiden, Sitjhoff, 1970, p. 209, n. 1.
[10]Ibid.
[11]Op. cit., p. 261.
[12]COPUOS, Annual Report, 1964, Annex 1, p. 3.
[13]Gal, op. cit., p. 261. L. Tennen, "International Law and the Use of Outer Space for the Production of Solar Power", in Proceedings of the 20th Colloquium on the Law of Outer Space, Prague, 1977,

1968, the ITU warned of dangers to spacecraft which would result from non-compliance with the rules for frequency use.[14]

(iv) The 1971 Regulations

The Extraordinary Administrative Radio Conference of 1963 recommended an annual review of progress and the convening of an administrative conference to work out further agreements for the international use of frequency bands allocated by the 1963 Conference. Accordingly, a World Administrative Radio Conference (WARC) for space communications was held in Geneva in 1971, at which time there was a partial revision of the Radio Regulations. In order for the revised regulations to become binding, member States had to notify of their approval; reservations were permitted, in which case the regulations concerned were not opposable. From the point of view of space research, resolutions were passed establishing equal rights for each State within a system of prior use in which harmful interference was also prohibited.

Resolution No. Spa D (Relating to the Use by All Countries, with Equal Rights, of Frequency Bands for Space Radiocommunication Service), recognises that all countries have equal rights in the use of both the radio frequencies allocated to various services and the geostationary orbit for these services. It adds that

---

M. Schachter, (ed.), Institute of Space Law of the International Astronautical Federation, University of California School of Law, Davis, 1978, p. 461, says that harmful interference by derelict spacecraft which continue to emit radio signals is a big problem.

[14]COPUOS, Annual Report, 1968.

> a country should not provide any permanent authority and should not create an obstacle to establishment of space systems by other countries.[15]

It further provides that

> a country registered should take all practicable measures to realize the possibility of the use of new space systems by other countries or groups of countries.[16]

In practical terms, this system is one based on prior use, rather than one in which specific segments of the radio bands are blocked off for countries which may want to use them in the future but which do not presently do so. That the system adopted is not permanent is a concession to developing countries such as Israel, which as early as 1963 felt that monopolisation of frequencies on a first-come-first-serve basis would freeze out those countries not yet in a position to use them.[17]

There is one area in which absolute priority is accorded to a certain type of research over any other use of the radio band. Judging from Resolution No. Spa JJ (Relating to the Protection of Radio Astronomy Observations on the Shielded Area of the Moon), this area is used by the radio astronomy service and for so-called passive space research and consequently must be kept as free as possible from harmful interference from other transmissions. To this end, the Resolution recommended that the CCIR study frequency bands most suitable for radio astronomical observations and work out recommendations concerning these bands as well as

---

[15]Final Acts of the World Administrative Radio Conference for Space Communications, ITU, Geneva, 1971. (Hereafter referred to as Final Acts of the WARC, 1971).
[16]Ibid.
[17]Cited in Leive, op. cit., p. 210.

criteria for their application and protection. In the meantime, administrations were to take all practicable steps to ensure that there would be no interference to radio astronomy observations.[18]

Two further Resolutions were passed in 1971 relating to harmful interference. Resolution No. Spa A (Relating to the Experimental Use of Radio Waves by Ionospheric Research Satellites) concerns satellites such as Alouettes I and II, and ISIS I and II. Because of the scientific importance of the research that such satellites undertake, the Conference resolved that

> administrations may continue to permit… transmission… provided that suitable measures are available… to prevent harmful interference to other services.[19]

Resolution No. Spa MM (Relating to Technical Standards for the Assessment of Harmful Interference in the Frequency Bands above 28 MHZ) stipulates that "harmful interference" implies a considerable degree of probability of interference.[20] Elsewhere in the Final Acts, a Board is provided to determine if there has been a case of harmful interference.

Three incidents involving the radio spectrum are cited in the literature: 1) in the latter part of the 1950s there was a minor international dispute between the United States and the Soviet Union over coordination of frequency use;[21] 2) in the mid-nineteen sixties a potentially

---

[18]Final Acts of the WARC, 1971.
[19]Ibid.
[20]Ibid.
[21]At the CSAGI Barcelona Meeting in September 1956 it was recommended that the radio systems for tracking and telemetering all IGY satellites be compatible. The Soviet decision to use the 20 and 40 megacycle frequencies, however, led to the accusation that they were violating an international agreement. Hearings on the Second Supplemental Appropriations Bill, 1958 , Before

dangerous situation was avoided when Hungary complied with an American request;[22] 3) In 1979 a mix up in the use of a Soviet transmitter led to the loss of a certain amount of United States Saturn data.[23]

(v) Conclusion

The rules concerning the use of the radio spectrum for space research are at an advanced level, no doubt because of the practical considerations involved, and the fact that the system lends itself to regulation and monitoring. On the other hand, partly because of the vested interests involved, in terms of content the rules are not the most innovative, prior use and notification being the cornerstones of the system.

3. Antarctica

The 1959 Treaty is silent as regards the duty not to interfere with legitimate uses. In the Antarctic the problem would not seem to present itself, particularly since the region is vast and the activities are almost purely scientific. Still, the value of the Antarctic currently lies in its position as the world's largest, least-contaminated scientific laboratory; any degradation of its pristine nature is a potential threat to this unique attribute. What is more, while the continent is indeed vast, many of the scientific bases are concentrated in the same region, which creates a

---

Subcommittees of the House Committee on Appropriations, 85th Congress, Second Session (1958). Cited in Baldwin, op. cit. , pp. 110-111. See infra, Annex 1, p. 327.

[22]Gal, op. cit., p. 258, n. 23, reports: "At the occasion of the Gemini-4 test (McDivitt and White) the USA State Department briefly informed the Hungarian Embassy that a shortwave station broadcasting from Budapest was causing interference with the stations guiding the spacecraft's return and asked to interrupt the operation of the station for three hours. The Hungarian authorities immediately complied with the request."

[23]"Soviets Accidentally Blocked Space Data", The Gazette (Montreal), 5 September, 1979, p. 10.

need for coordination of activities. Additionally, commercial ventures are posing increasing threats to the undisturbed nature of the area, and thus, indirectly, to scientific research.

All of these considerations have led the Consultative Parties to make recommendations regulating conflicting uses. As a general rule, scientific research is accorded priority over other uses, actual or potential; various treaty clauses, such as the prohibition of nuclear explosions (Article 5[1]), are reflections of this preeminence. The Consultative Meetings have passed a number of Recommendations tending to buttress this primacy in the face of such competing uses as tourism and commercial exploration, while others, such as those relating to man's impact on the environment and the creation of sites of special scientific interest, have a similar goal or purpose. There are also the odd recommendations relating to the regulation of scientific research which could interfere with other scientific projects. These will now be examined in turn.

Taking into account the possible prejudicial effects of tourists on the conduct of scientific research, as well as the conservation of flora and fauna in the operation of Antarctic stations, Consultative Meeting Recommendation IV-27 (Effects of Tourism) requires notification of intended visits to bases, for which permission may be denied. The same problem has been further dealt with in Recommendations VI-7, VII-4 and VIII-1, 2, 6 and 9.

In Recommendation IX-1 (Antarctic Mineral Resources), the Consultative Parties stated their awareness of their special responsibility

> to ensure that any activities in Antarctica, including commercial exploration and exploitation in the future, should they occur, should not become the cause of international discord, of danger to the unique Antarctic environment, of <u>disruption to scientific investigation</u>, or to be otherwise contrary to the principles or purposes of the Antarctic Treaty. (Emphasis added).

In so expressing themselves, the Consultative Parties were merely reiterating collectively and formally what several delegations had already voiced alarm about in the 1973 Nansen Foundation meeting.

Recommendation VIII-3 invited SCAR to select sites for designation as Sites of Special Scientific Interest (SSSI), and to establish interim guidelines for areas where scientific investigations may be jeopardised by accidental or willful interference. In Recommendation VIII-4, interim guidelines were adopted for an initial seven sites in which activities would be restricted. These guidelines have already been implemented by the United States for the first four of these sites, and have led that country to refuse access to site number three on one occasion.[24]

SCAR dealt with SSSIs at its 1973 Meeting. Member countries were warned that if not recommended for extension, current sites would lapse on 30 June 1981.[25] Chile proposed two marine SSSIs, the first of their kind, to be located near Greenwich and Deception Islands. The Argentine representative pointed out that

> in order to consider marine areas as SSSIs they must be those which, from the physical and biological points of view, could be scientifically controlled and monitored and which would not interfere with marine circulation. It was pointed out that the proposed location in Port Foster was considered a natural anchoring ground. The Chilean member of the working group agreed that the site could be moved elsewhere. (Emphasis added)[26]

---

[24]Final Report of the 9th Antarctic Treaty Consultative Meeting, 1977, p. 9.
[25]SCAR Bulletin, in Polar Record, Vol. 19, No. 120, 1978, pp. 307-308.
[26]Ibid.

On the basis of this assertion a working group recommended that governments accept one of the proposals and that the other be referred back to Chile for revision and re-submission. SCAR had reviewed the marine proposals and found that

> [s]ince tourists and operational ships made regular visits to both localities, the group considered that the restraints suggested in both proposals would be difficult if not impossible to implement and proposed some amendments to the management plans.[27]

It was also felt that a United States proposal for a conventional SSSI could interfere with the Polish station's activities. Because of this, a joint meeting was arranged which resulted in a recommendation, according to which the Polish and United States Committees were to jointly draw up and submit a management plan for an SSSI to safeguard research in progress and limit tourist impact. All these discussions on SSSIs reveal that whereas scientific research is usually given priority over other forms of use, this is seldom absolute. In maritime areas, on the other hand, non-scientific activities prevail, consonant with Article VI's stipulation that nothing is to affect high seas rights below 60° South Latitude.

When it comes to reconciling conflicting scientific projects, prior use seems to be a decisive factor, but as manifested in Recommendation Vi-5 on the Use of Radio Isotopes in the Antarctic, this is not always absolute. The Consultative Parties, recognising that "the uncontrolled use of radio-isotopes in the course of scientific investigations may jeopardise the conduct of scientific investigations", asked SCAR to undertake a study of the problem. At the Sixth Consultative Meeting, in Recommendation VI-6, coordination of such scientific investigations was called for, with notification being prescribed months in advance if possible.

---

[27]Ibid., p. 315.

Finally, a proposal has been accepted as a guideline which gives absolute priority on Antarctic airwaves to emergency broadcasts over the transfer of meteorological data.[28]

In conclusion, then, the Consultative Powers have adopted a pragmatic, flexible approach to the question of legitimate use in Antarctica, balancing the various uses though generally according scientific research a privileged position, a big exception to this being in maritime areas, where the normal régime of high seas rights prevails.

4. Oceans

(a) Introduction

Considering the multiple uses to which any parts of the ocean are put, there is surprisingly little 'hard law' on the regulation of competing and conflicting use. The question has, nevertheless, been dealt with by the ILC, in the Continental Shelf and High Seas Conventions, and in the ICNT Rev. 1.

(b) The International Law Commission

At the eighth session of the ILC in 1956, the question of scientific research outside the continental shelf was considered. The François report reads:

> The Commission also pointed out that it had not studied the problem of scientific research in detail at its seventh session. It accordingly expresses no opinion on the question whether the freedom of the seas includes the freedom of each state to engage in any form scientific research at desires,

[28]Proposal 8, adopted in Recommendation VI-1, reads: “Distress traffic shall have absolute priority over all other traffic.”

> even if, as a consequence thereof, large sea areas used by others for purposes of navigation or shipping become closed to shipping.[29]

Citing McDougal's idea of 'reasonableness', recognising its soundness and recalling that the ILC frequently used the concept, François proposed the following statement of principles as a basis for discussion:

> The freedom of the high seas does not include the right to utilize the high seas in a manner which unreasonably prevents other states from enjoying that freedom. Scientific research and tests of new weapons on the high seas are only permitted subject to this qualification.[30]

Thus, research and weapons tests which block off portions of the high seas were considered permissible in principle. The ensuing debate, however, reveals a high degree of discord and controversy as to the meaning and acceptability of the principle. Pal argued that the statement of principle did not cover the real issue, which was not whether one State was entitled to use the high seas to the exclusion of another State on any ground, but rather whether a particular kind of use was permissible per se, and if so, to what extent.[31] He seemed to feel the tests of nuclear weapons were illicit ipso facto, i. e., that they were not, by their very nature, legitimate use. By implication then, they did not amount to scientific research. Pal thus proposed the following statement of principle:

---

[29]Report BY J. P. A. François, Special Rapporteur, Yearbook of the International Law Commission, 1956, Vol. II, pp. 1-2.
[30]Ibid., p. 10.
[31]Ibid., p. 11.

> Freedom of the high seas does not extend to any such utilization of the high seas as is likely to be harmful to any part of mankind. Scientific research and tests of new weapons are permissible only subject to this qualification, as also to the qualification that they do not interfere with the equal freedom of other states.[32]

It is difficult to see how this proposal would circumvent Pal's objection to the Rapporteur's proposal, namely that the issue was whether a particular kind of use was permissible per se, for Pal's proposal in fact makes them permissible, albeit subject to one more qualification- that the utilisation is not likely to be harmful to mankind. Krylov, noticing the flaw, called for the deletion of any reference to new weapons,[33] an amendment which Pal accepted.[34] Krylov seemed to hold that tests of new weapons were not permissible a priori.

Fitzmaurice argued that a strict interpretation of Pal's wording would mean that such scientific experiments might be prohibited altogether,[35] while Sandström was prepared to support the first sentence of Pal's proposal if it could be proven that such experiments were dangerous.[36] Zourek held that the principle stated in Article 2 of François' proposal, to the effect that states are bound to refrain from any acts which might adversely affect the use of the high seas by nationals of other states", was the generally accepted corollary of the freedom of the seas, but that François was going back on it by reverting to the notion of reasonableness.[37] Zourek would have drawn a distinction between scientific experiments and tests of weapons of mass

---

[32]Ibid., pp. 11-12.
[33]Ibid., p. 12.
[34]Ibid.
[35]Ibid.
[36]Ibid.
[37]Ibid.

destruction: “Experiments on the high seas with atomic or hydrogen bombs must be considered as a violation of the principle of the freedom of the seas".[38] If account were to be taken of all the interests involved, his argument went, such tests were outlawed according to international law. He appears to have interpreted Pal's amendment in this sense, for he supported it.

Fitzmaurice believed that François had emphasised the implicit corollary to the freedom of the seas, namely that it could not be exercised in a way which prevented other States from doing the same.[39] Pal, he felt, had on the other hand proposed what was virtually a new rule of law prohibiting the use of the high seas for certain purposes.[40] François said that the real difference between him and Pal was that his own proposal prohibited activities which unreasonably prevented other States from exercising their rights, whereas Pal's ruled out altogether any use of the high seas which might be harmful to mankind. It was his opinion that Pal went too far because certain activities, though they might adversely affect other States, might nonetheless be justifiable.[41]

In its Report to the General Assembly in 1956, the ILC made the following commentary on Article 27:

> 1)…States are bound to refrain from any acts which might adversely affect the use of the high seas by nationals of other States.[42]

[38] Ibid.
[39] Ibid., p. 33.
[40] Ibid.
[41] Ibid.
[42] Yearbook of the International Law Commission, 1956, Vol. 2, page 257.

This is a definite compromise; it does not rule out any type of activity in particular, but only acts which could produce certain effects. On the other hand, it refrains from employing the notion of reasonableness, and is prohibitive rather than permissive in nature.

(c) The Continental Shelf Convention

Article 3(1) of the Continental Shelf Convention stipulates that:

> [t]he exploration of the continental shelf and the exploitation of its natural resources must not result in any unjustifiable interference with navigation, fishing or the conservation of the living resources of the sea, nor result in any interference with fundamental oceanographic or other scientific research carried out with the intention of ocean open publication.

Strictly speaking this means that applied research may be justifiably interfered with whereas pure research may never be interfered with. This amounts to giving absolute priority to pure research over other uses. The first clause emanates from the ILC proposal; the second emanates from a Danish proposal during the 1958 negotiations. At that time Denmark made the point that interference with scientific research could not be justified under any circumstances.[43] The Federal Republic of Germany agreed, and this proposal was also supported by Cuba, the United Kingdom, Portugal, Romania and Belgium.[44]

[43]Official Records, Vol. VI, p. 82.
[44]Ibid., pp. 82, 83, 85 and 88, respectively.

(d) The High Seas Convention

Article 2 limits itself to stating that the freedoms of the seas are to be exercised with reasonable regard for the interests of other States. Thus, the idea of reasonableness applies, though it is not elucidated. There is no hierarchy among the various freedoms.

(e) The ICNT Rev. 1

This document contains several clauses, some dealing with scientific use generally, others with the use of specific areas.

(i) General

The rules for scientific research itself are stricter than for use generally: Article 240(c) lays down that scientific research "shall not unjustifiably interfere with other legitimate uses of the sea." Presumably as an example of 'unjustifiable interference', the ICNT Rev. 1 provides that "the deployment and use of any type of scientific research installations or equipment shall not constitute an obstacle to established shipping routes" (Article 261). Safety zones, however, can be established around such installations (Article 260). Perhaps significantly, in the ICNT Rev. 1 it is only scientific research which must not unjustifiably interfere with other legitimate uses of the sea; there is nothing concerning the interference of other legitimate uses with scientific research. Of course, it is not entirely certain what legitimate uses of the sea are, nor what constitutes unjustifiable interference. Both of these questions were highlighted in 1970 when the United States research vessel "Thomas Washington" was denied access to a French nuclear test zone in the South Pacific.[45] Judging from another incident, the United States itself appears to believe that

[45]Redfield, in Wooster, (ed.), op. cit., pp. 51-52.

a certain amount of interference by scientific research is permissible, subject to advance notification of the interested States.[46]

(ii) High Seas

In Article 87 of the ICNT Rev. 1 the notion of "due consideration" is substituted for that of "reasonable regard" which is contained in the 1958 High Seas Convention. It is difficult to ascribe any concrete or substantive differences to the two expressions.

(iii) Exclusive Economic Zone and Continental Shelf

Article 250(1}[g] of the ICNT Rev.1 would require the researching State to remove scientific installations or equipment from the economic zone or continental shelf, as the case may be, upon completion of the research.

(iv) Deep Seabed

There have been at least two proposals to create special areas of the deep seabed where stricter rules regarding use and activities could prevail. Thus, the United States' Draft United Nations Convention on the International Seabed Area contained the following proposal:

> E. International Marine Parks and Preserves
>
> Article 25:
>
> In consultation with the appropriate international organisations or agencies, the International Seabed Resources Authority may designate as international marine parks and preserves specific portions of the International Seabed Area that have unusual educational, scientific or recreational value.[47]

[46]See, e.g., "U. S. Protests Failure to Give Notice of Scientific Tests", Department of State Bulletin, Vol. LVIII, No. 1488, January 1, 1968, p. 16.
[47]Doc. A/AC.138/25, 3 August 1970.

In a similar vein, the Maltese proposal of 23 August 1971 would have given the International Seabed Authority the power to approve nature parks approved by the Council.[48] There is, however, nothing of this nature in the ICNT Rev. 1.

(f) Conclusion

Provisions on legitimate use and scientific research in the oceans are sketchy and for the most part inconclusive. The issue will have to be resolved in future as conflicting uses increase, and some hierarchical system may be required.

5. General Conclusion

A wide variety of means are resorted to for regulating conflicting uses in the three areas, ranging from absolute priority for scientific research to the proscription of unjustified interference of scientific research with other legitimate uses, and with a number of intermediate régimes, e. g., those emphasising prior use or reasonableness.

The most sophisticated code pertains to the realm of outer space, and concerns both the moon and the radio spectrum. Here, scientific research is given an important position and is protected from other activities and from competing scientific research activities. Here there is also a working definition of harmful interference, something which could usefully be applied, mutatis mutandis, in the Antarctic and the oceans. In the Antarctic a very flexible, pragmatic approach has been employed vis-à-vis legitimate use, with scientific research being accorded a

[48]Doc. A/A.138/53 (Article 136[a]).

privileged place. Paradoxically, it is in the sphere of ocean activities, where the uses are the most varied and extensive, that the rules regarding legitimate use are in the earliest stage of development.

CHAPTER III: PRESERVATION OF THE ENVIRONMENT

1. OUTER SPACE

According to Article IX of the 1967 Treaty, States Parties must pursue studies and conduct exploration so as to avoid the harmful contamination of space[1] and adverse changes in the environment of the earth as a result of introduction of extra-terrestrial matter. They must furthermore adopt appropriate measures to this end where such measures are necessary.

As States have certain rights and obligations in respect of harmful interference as well, these rights and duties may be said to carry over to such interference that is caused by pollution. An example of this overlap would be Project Starfish, which involved the explosion of a hydrogen bomb 250 miles above the Pacific, with consequent damage to several satellites.[2]

There are several lacunae in the 1967 Convention. Thus, adverse changes in the environment of the earth resulting from the introduction of extra-terrestrial matter is prohibited, but not, for instance, changes to the ozone layer which result from the introduction of terrestrial matter. Nor are there adequate standards for nuclear-powered satellites, although COPUOS did set up a special working group to examine the matter in 1978.

---

[1]The problem of contamination was early on entrusted to ICSU's Committee on Contamination by Extraterritorial Exploration (CETEX). The Committee is reported to have held two meetings in 1958 and to have formulated certain “general principles” in a March 1959 report. COPUOS acknowledged ICSU's work and encouraged further study, eventually taking over the function itself. J. Johnson, "Pollution and Contamination in Space” in Cohen, (ed.), op. cit., pp. 37-50, at pp. 39-41.

[2]Livingston, op. cit., p. 9.

Space garbage is another problem. Hosenball[3] and Doyle[4] both assert that a total of 10,791 objects have either been in earth's orbit or are there now. This includes satellites, rockets, shards and other non-functional debris. Surprisingly, only 2,100 of the total number of 10,791 objects were original space payloads rather than debris; 4,601 of these objects are still there, the remainder- 6,190, having decayed.[5]

Perhaps the main drawback of the present rules regarding preservation of the space environment is that the concept of illicit damage to the environment per se and as a whole has not yet gained recognition- only damage to activities in space. One can agree with Livingston that

> the next step, apparently too radical for the present, will be for some international organization to be granted the power to order the prohibition of any large scale activity deemed potentially harmful to scientific research, or to the ecology in general.[6]

In the 1979 Moon Resources Treaty, States are obliged to "take measures to prevent the disruption of the existing balance of its environment" (Article 7[1]). (Emphasis added).

2. Antarctica

(a) Introduction

The 1959 Treaty contains only two references to environmental matters: Article V prohibits nuclear explosions and the disposal of nuclear waste, subject to the conclusion of new

---

[3]S. Hosenball, "Nuclear Power Sources in Outer Space", Journal of Space Law", Vol. 6, No. 2, 1978, pp. 119-128, at p. 119.
[4]S. Doyle, "Reentering Space Objects: Facts and Fiction", Journal of Space Law, Vol. 2, 1978, pp. 107-118, at p. 107.
[5]See also "What Goes Up…", The Economist, 28 April 1979, pp. 113-114.
[6]Op. cit., p. 9. Meanwhile, this role is assumed by ICSU, but the effectiveness of its pronouncements depends almost solely on their scientific weight.

international agreements to which all Consultative Parties are parties, and Article IX(1)[f} calls for the biennial Consultative Meetings to recommend, inter alia, measures regarding "preservation and conservation of living resources in Antarctica". Each of these rubrics will now be examined in turn to the extent that they affect scientific research; following this, other measures will be briefly analysed.

(b) Disposal of Nuclear Waste

The use of the Antarctic as a dumping ground for nuclear waste has been discussed both within and outside the context of the Consultative Meetings and SCAR. One project for the region was nicknamed 'Hot Mole', and would have involved burying sealed radioactive containers by sinking them into one of the ice shelves skirting the continent. There was also the possibility of leaving in the Antarctic contaminated ground resulting from a leak in the American nuclear generator at the Mcmurdo base.[7] The risks of such ventures, however, both to scientific experiments and to the environment in general, have been considered too great. Accordingly, the Consultative Parties pledge to continue their efforts to the end that no one disposes of such material in the Antarctic.

(c) Conservation of Living Resources

Very early on, the Consultative Parties hastened to establish rules and procedures for the protection of Antarctic flora and fauna from harmful interference by man. However, given the slowness in the lawmaking process of the Antarctic system, interim measures, which included

[7]See Wilke and Mann, op. cit.

agreed rules of conduct formulated by SCAR, were proposed. It was recommended that they be internationally agreed and scrupulously observed.

The Agreed Measures adopted at the Third Consultative Meeting prohibit harmful interference with any native mammal or bird (Article VII). An exception is made for specimens used for scientific research purposes (Article 6[2]). Furthermore, interference to the minimum extent necessary for the establishment, supply and operations of stations is tolerated (Article VII[2]).

'Specially Protected Areas' may also be created (Article VIII), access to which requires a permit from the 'appropriate authority'; such access is to be granted only for compelling reasons, i. e., for research which cannot be done elsewhere. The Agreed Measures are meant to apply, as far as feasible, to third parties as well and to ships flying the flag of third parties and operating within the Treaty zone (Article XI). The Parties are to take effective measures to prevent access by their own nationals; this is probably intended to avoid problems of enforcement in areas claimed by more than one State. Similarly, in areas where more than one country is operating, the Parties are to cooperate in issuing permits so that interference with the flora and fauna is minimised (Rec. IV-18). Sixteen areas have been designated as “specially protected” by the Ninth Meeting.

Finally, the Consultative Parties have concluded a separate Agreement for the Protection of Pelagic Seals[8], and are close to reaching agreement on a regime for marine living resources.

[8]Convention for the Conservation of Antarctic Seals, op. cit.

(d) Other Environmental Measures

Although nothing in the Treaty authorises the Consultative Powers to do so, they have seen fit to draft a number of recommendations touching on the environment in general- the ecosystem as a whole. These cover two broad topics- "Man's Impact on the Antarctic Environment" and "The Antarctic Environment".

(i) Man's Impact on the Antarctic Environment

In Rec. VI-4 it is recognized that “The Antarctic derives much of its scientific importance from its uncontaminated and undisturbed condition”. This being so, SCAR was requested to draw up proposals; these proposals were duly considered, recommended as guidelines and eventually transformed into a code of conduct for operations in the region.[9]

(ii) The Antarctic Environment

As a first step toward a macro approach to the problem of environmental preservation, the Consultative Powers agreed that

> no act or activity having an inherent tendency to modify the environment over wide areas within the Antarctic Treaty should be undertaken unless appropriate steps have been taken to foresee the probable modifications and to exercise appropriate controls with respect to the harmful environmental effects such uses of the Antarctic Treaty may have. (Rec. VIII-13).

[9]Code of Conduct for Antarctic Expeditions and Station Activities. 8th Antarctic Treaty Consultative Meeting, Final Report, Annex.

3. Oceans

(a) Introduction

There are provisions in the High Seas Convention, the Continental Shelf Convention and the ICNT Rev. 1 which regulate pollution from various sources. In addition, the ICNT Rev. 1 contains a clause specifically related to pollution from marine scientific research activities. Finally, there are all the Intergovernmental Maritime Consultative Organisation (IMCO) and other conventions, which it is beyond the scope of this thesis to examine.

(b) High Seas Convention

According to Article 24 of the High Seas Convention, States shall draw up regulations to prevent pollution from discharge of oil from ships, pipelines, or "the exploitation and exploration of the seabed". Article 25, along lines similar to those of the Antarctic Treaty, requires States to take measures to prevent pollution through the dumping of radioactive waste, though it stops short of prohibiting any and all dumping of such material. There is a concomitant obligation to cooperate with the competent international organisations (likely IMCO and the International Atomic Energy Agency [IAEA]) in respect of such pollution, and that from " other harmful agents".

(c) ICNT Rev. 1

The pollution prevention clauses of the ICNT Rev. 1 are numerous: they comprise all of Part XII of the proposed Treaty. The provisions range from a general obligation to protect and preserve the marine environment (Article 192) to a duty to take all measures necessary to prevent, reduce and control pollution (Article 194), as well as a duty to notify other States of cases in which the marine environment is in imminent danger or has already been damaged (Article 198).

In Part XIII on marine scientific research, compliance of such activities with all the relevant rules of Part XII is described as a “principle” (Article 24C[d]). Lastly, there is the duty to remove disused or abandoned installations, unless otherwise agreed, in the exclusive economic zone or on the continental shelf (Article 249[1]{g}).

4. Conclusions

The rules relating to the conduct of scientific research are integrated with the rules for the protection of the environment for all forms of use in the three areas. There is, complimentarily, the odd special rule for scientific research, such as the duty to remove installations from the ocean subsequent to their use. It so happens that in the Antarctic most of the rules regarding the environment relate specifically to scientific activities, this being the principle preoccupation in the area; here, the Consultative Parties have in fact gone beyond their mandate and have regulated environmental matters not envisaged by the Treaty.

The various conventions demonstrate that progress has been made in the way ecological questions are treated internationally, starting from the relatively primitive concept of damage to human activities inherent in the 1967 Outer Space Treaty to the notion of existing balance incorporated in the 1979 Moon Resources Treaty, and in the Antarctic marine resources convention proposals.

PART FIVE. SPECIFIC OBLIGATIONS AS THEY PERTAIN TO SCIENTIFIC RESEARCH ACTIVITIES

CHAPTER I. THE DUTY TO NOTIFY

1. Outer Space

There is a duty to notify the Secretary-General of the United Nations, as well as, interestingly, the public and the international scientific community, "to the greatest extent possible and practicable of the nature, conduct, locations and results of" their activities (Article XI). States must also inform the Secretary-General of "any phenomena they discover which could constitute a danger to the life or health of the astronauts" (Article V[3]). Bing states that India and Mexico wanted to impose a binding obligation on States to release information on all space activities.[1] According to Marcoff, an American proposal would have made that obligation applicable to all activities, but only with regard to the moon and other celestial bodies.[2]

As Bing observes,

> [i]nasmuch as there is no obligation to supply information in advance, promptly or fully, Article XI can no longer be seriously considered as serving the first function. The reporting of certain military activities which could be prejudicial to space exploration would be "impractical".[3]

---

[1]R. Bing, The Role of the Developing Nations in the Formulation of International Controls for Unoccupied Regions: Outer Space, the Ocean Floor and Antarctica, Ann Arbor, Michigan, Xerox University Microfilms, 1973, page 135.
[2]Op. cit., p. 479.
[3]Op. cit., p. 137.

As for practice with regard to dangerous phenomena, Marcoff cites the Soviet assurance to the Americans that the flight path of Luna 15 would in no way jeopardise the landing of Apollo 11 on the moon.[4] The duty to register space objects is also a form of notification, though the fact that registry is required "when a space object is launched into earth orbit or beyond" falls short of requiring advance notification (Article II). The same may be said of the report to the Secretary-General on activities generally. As Moore writes,

> The drafting history of Article 11 of the 1967 Treaty clearly shows that the wording was not intended to impose an obligation to report activities either immediately or without exception. More recently, a Soviet space vehicle was reported to have been in orbit for over a month with the Soviet space authorities having "disclosed virtually nothing about it". No one has claimed by this action the USSR was in violation of the Outer Space Treaty.[5]

Moore omits to mention, however, that under the separate Registry Convention of 1974 all launched objects must be registered with the Secretary-General of the United Nations, whether they be military or civilian (Article IV[1]). They must also be accompanied by a description of their "general function" (Article IV[1]{e}). There is "full and open access to the information in this Register" (Article III).

---

[4]Op. cit., p. 482.

[5]A. Moore, "Information from Space: An Ethereal Resource for all Mankind?", in M. Schwartz, (ed.), Proceedings of the Twentieth Colloquium on the Law of Outer Space, International Astronautical Federation, University of California School of Law, Davis, California, 1978, pp. 368-373, at p. 370.

2. Antarctica

Notification plays an important role in the Antarctic, and the Consultative Meetings treated the question immediately. The 1959 Treaty requires the Contracting Parties, once again "to the greatest extent feasible and practicable", to exchange information regarding plans for scientific programs in Antarctica (Article 3[1]{a}). The stated goals of this procedure are to promote international cooperation in scientific investigation as well as to permit maximum economy and efficiency of operations. In addition, Article 7[5]{a}) requires advance notification for all expeditions, stations and military personnel. This is clearly intended to permit observers to carry out their mission.

There have been six Recommendations dealing with the regular exchange of information on activities, to which another nine relating to occasional or supplementary exchanges must be added. Basically, two types of exchanges are called for: those within the SCAR/ICSU system, and the diplomatic exchange of information and plans for expeditions which must occur before November of each year (Rec. I-1). The most recent Recommendation on the subject consolidates all others which were in any way related to exchange of information: Rec. VIII-6, as did its predecessor, I-VI, prescribes a standard format for the annually-exchanged report, which must include such elements as:

> -a full description of all ships, aircraft and other vehicles, including armaments and military equipment;
>
> -schedules for expeditions, as well as routes followed;
>
> -detailed information on bases, crew (their military or civilian status), and the armaments they carry;

-the program of work;

-the principal scientific equipment used, as well as the transport equipment used in the Antarctic;

-facilities for rendering assistance;

-notes of any expeditions not organised by but in or from a party's territory.

Additionally, new elements such as species killed, airbases, radio-isotopes, rockets and oceanographic ships used, and their activities below 60° South Latitude must be included in the report by virtue of Rec. VIII-6. There is also a requirement that reports on extensions, reductions and modifications in plans should be made by 30 June of each year.

The 1959 Treaty only alludes to notification for scientific expeditions; Rec. VIII-6 is more flexible, referring as it does to 'expeditions'. Nowhere are such things as commercial activities mentioned, be they related to oil, minerals or tourists. SCAR, however, has recommended that tourist expeditions at least be considered as expeditions and, hence, reported.[6] This may not always prove to be practicable, however: according to Schatz, the United States makes efforts to report tourist expeditions, but the United States Government does not require sailing plans from ships and may in fact be constitutionally prevented from so doing.[7] The same problem appears to have already risen in connection with offshore oil exploration; Schatz gives the example of an oil exploration workboat bound for the Weddell Sea of country A, registered in country B and leased to Country A, which did not inform anyone of its voyage.[8] In fact, it is doubtful whether any whaling or fishing vessels inform anyone of their entry into the maritime zone below 60° South Latitude. This also brings to mind the problem of third parties; in practice they do not

[6]SCAR Bulletin, Polar Record, Vol. 19, No. 120, 1978, pp. 295-326, at p. 314.
[7]"A Sea of Sensitivities", op. cit., p. 54.
[8]Ibid.

appear to have complied with the notification requirement, and as far as is known there has been no case of the rules being enforced upon them, although SCAR has urged non-SCAR countries to consult before establishing scientific stations.[9]

It is indisputable that the exchange of advanced information promotes international cooperation in scientific investigation in Antarctica, tends to allow maximum economy and efficiency of operations, and permits observers to carry out their tasks. The exchange also serves another important function, however, which is to protect the claims and non-claims in the region. Notification represents, in the eyes of the claimants, an elementary form of recognition of their respective claims. Non-claimants tolerate the practice now because they can point to the fact that it is for reasons of efficiency. In support of their contention, they can draw attention to the fact that notification extends to all Parties, not just to the activities of non-claimants on claimants' territory. Thus, if one country sends an expedition to the area it must first notify officially all the other Parties and not just the one on whose claimed territory it is being conducted.

3. Oceans

There have been numerous attempts to introduce notification régimes for scientific research in virtually all maritime zones, save the high seas. Additionally, notification might be viewed as a stage in the process of gaining consent where the latter is required. However, there do not appear to be any areas where in order to conduct scientific research a State has but to notify another State, or indeed an international organisation, in order to conform to the law. The ICNT Rev. 1 only requires States and international organisations to “make available information

[9]SCAR Bulletin, Polar Record, Vol. 18, No. 116, 1977, pp. 531-555, at p. 533.

on proposed major programs and their objectives…" (Article 244), which falls short of notification.

There probably is, however a duty under customary international law to notify interested States in the event of potentially harmful activities being undertaken. Thus, when the Soviet Union was conducting marine scientific research off the coast of Alaska in the late 1960s, the United States strongly protested the fact that it had not been notified in advance so as to ward off any danger to its ships.[10]

4. Conclusion

The duty placed upon States conducting or wishing to conduct scientific research to notify either other States or the international community at large of their plans or the results of their research varies significantly from area to area, especially as between outer space and the Antarctic. In outer space the duty is by and large restricted to the post-research phase, while in the Antarctic notification must be given an advance; thus, there is a temporal difference. Procedurally, in outer space the notification must be addressed, depending on the case, either to other States or to the Secretary-General of the United Nations: in the Antarctic, notification is always given to other States. In both areas notification shall be given "to the greatest extent feasible". In outer space this absolves States from reporting military activities. In Antarctica, however, military activities are a priori illicit; therefore, there could not even be any question of reporting them.

[10]"U. S. Protests Soviet Failure to Give Notice of Scientific Tests", op. cit.

In the oceans, finally, notification is insignificant, except as a part of the obtention of consent or as applied to the International Seabed Area.

CHAPTER II. THE DUTY TO CONSULT

1. Outer Space

The 1967 Treaty prescribes consultation in several situations: when potentially harmful activities are about to commence (Article IX) and whenever there is question concerning either the activities of international organisations (Article XIII), visits in space (Article XII) or observations (Article X). The Parties are of course under an obligation to negotiate in good faith, but there is no pactum de contrahendo.

2. Antarctica

The consultative procedures laid down in the 1959 Treaty are highly refined:

(a) The Antarctic Treaty Consultative Meetings

(i) Purpose and Subject Matter

Article IX of the 1959 Treaty called for a meeting of the original twelve Contracting Parties to take place in Canberra

> within two months of entry into force of the treaty, for the purpose of exchanging information, consulting together on matters of common interest pertaining to Antarctica, and formulating and considering, and recommending to their governments, measures in furtherance of the principles and objectives of the treaty, including measures regarding:
>
> a) use of Antarctica for peaceful purposes only;
> b) facilitation of scientific research in Antarctica;
> c) facilitation of international scientific cooperation in Antarctica;
> d) facilitation of the exercise of the rights of inspection provided for in Article VII of the Treaty;
> e) questions relating to the exercise of jurisdiction;
> f) preservation and conservation of living resources in Antarctica.

(ii) Frequency and Location

The Treaty stipulates that after the initial meeting mentioned above, the reunions should occur at "suitable intervals and places"(Article IX[1}). There have been a total of ten Consultative Meetings to date. The second was held one year after the first. At one point, Chile expressed the hope that a Recommendation would regularize them at two-year intervals,[1] but no such action has been taken. Nevertheless, a steady usage has developed of meetings every two or two and a half years. As for venue, the usage was, beginning at the 1962 meeting, to follow the alphabetical order of the names of the Consultative Parties in English, but this was broken when South Africa's turn came up. Only South Africa and the Soviet Union have not yet hosted a Meeting, in addition to Poland, which only joined in 1977.

(iii) Participants

All the original Signatories, as well as any Contracting Party which "demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition" (Article IX[2]) have the right to take part in Consultative Meetings. As Roberts notes, however, it is unclear whether the Consultative Parties are to invite a country to participate, or whether it is to be decided by a vote.[2] Membership in SCAR is not a prerequisite, though in practice all the countries with national scientific bodies represented on SCAR are Consultative Parties, and vice-versa. In 1977 SCAR ruled that a wintering station in the region was not required for membership in SCAR;[3] otherwise,

---

[1]Statement by the Chilean Delegation, Second Consultative Meeting, reprinted in Documents Relating to Antarctica, op. cit., Vol. I, p. I. 4. 4.
[2]Ibid., pp. 116-117.
[3]SCAR Bulletin, Polar Record, Vol. 18, No. 116, 1977, pp. 531-555, at p. 533.

countries such as Belgium would have been forced to drop out. Thus, there is a two-tiered eligibility system for the Consultative Meetings: one which is for the original Signatories , whether or not they conduct scientific research, and one for any other Contracting Party conducting scientific research.

(iv) Organisation and Rules of Procedure

The Rules of Procedure adopted on 10 July 1961,[4] which were originally considered as interim measures, have never been altered. They provide for the host country to issue the final report with all documents, to comply with any additional request and to answer any questions from participating States. Prior to the next meeting, the perspective host consults all other governments regarding the agenda and re-scheduling, and everyone consults each other on possible proposals. In Recommendation I-XVI it was also decided that in normal circumstances all reports, draft proposals or draft recommendations should reach all other participants at least one month before the Meeting. Thus, there is a screening process which can, in effect, eliminate discussion of questions which are too controversial for some or are considered unlikely to be resolved.

According to the Rules of Procedure, the list of delegations to participate in the Meeting is to be communicated to the host government, and there is a Secretariat headed by a Secretary who is proposed by the Chairman. The opening session is public, and all others in camera unless otherwise agreed. Committees and working groups may be established during the course of the Meeting. As for the conduct of business, a quorum of two thirds is required, and all decisions on

[4]Reprinted in Documents Relating to Antarctica, op. cit., p. I. 1. 1.

matters of procedure are taken by a simple majority. Rules of Procedure may be changed by a two-thirds majority unless these rules concern the adoption of Recommendations themselves, in which case unanimity is required.

(v) Adoption and Approval of Recommendations

More important than anything else, for a Recommendation to be adopted the agreement of all delegations present at the Consultative Meeting is necessary. It must then appear in the final report approved by simple majority and transmitted by the Secretary to all participating Governments. Once a Recommendation is adopted at a Consultative Meeting it becomes effective, under the terms of the 1959 Treaty, "when approved by all the Contracting Parties whose representatives were entitled to participate in the meetings held to consider them" (Article IX[4]). The procedure laid down for approval is that the depository Government (the United States) must inform everyone when a Recommendation has been approved by all Contracting Parties. The question arises as to whether a Recommendation takes effect when the depository has been notified by all or when all have been notified by the depository. In fact, the relevant date appears to be that on which the last approval was notified to the United States or, in some cases, when the last Government actually approved the Recommendation internally if in its notification such a date is stipulated.[5]

Each Consultative Meeting adopts several Recommendations. The fact that not all Recommendations of any one Consultative Meeting have to be approved by all States before any one of those specific Recommendations takes effect is evidenced by Recommendation II-IX,

[5]See ibid., p. I. 3. 8.

which instructs States to signify approval of the individual Recommendations they can agree upon. Lack of approval from one State, however, can in effect veto a recommendation initially adopted by all and approved by everyone else. In other words, unanimous approval is necessary if the measures are to take any effect at all, the measure having no effect inter se, i. e., among those who did approve. This state of affairs makes Recommendation II-IX, which urged the Parties to speedily approve measures, highly understandable.

(vi) Interim Measures

A procedure has been adopted which obviates this cumbersome mechanism: some Recommendations urge Governments to adopt certain measures as interim guidelines or standards of acceptable conduct pending more formal acceptance of the measures. An example of this is Recommendation III-IX (Interim Guidelines for the Conservation of Fauna and Flora). Existence of this procedure and reliance on it from time to time is a realistic reflection of the fact that often domestic legislation is required to render effective international law, and that this can sometimes take a number of years.

(vii) The Legal Nature of the Recommendations

The question arises as to the precise nature of the Recommendations in relation to the Treaty. The importance of this is that it has been suggested that all existing Recommendations be made binding upon those States which accede to the Treaty,[6] a wish which is also given expression in Recommendation VIII-8. While it seems obvious that the Consultative Meetings and the Recommendations which issue therefrom provide a structure for the implementation of the

[6]Roberts, "International Cooperation for Antarctic Development: the Test for the Antarctic Treaty", op. cit., p. 350.

Treaty and for the furtherance of its goals and objectives, it is equally clear that they have a legal character of their own, quite apart from the 1959 Treaty. This fact is illustrated by the requirement that a Recommendation be approved by a State before it becomes binding upon it. It might, on the other hand, be argued that once a certain Recommendation is approved by all it becomes an integral part of the Treaty. This view would be incorrect, however, as Recommendations, in order to be binding, require the approval only of those having taken part in the Consultative Meetings, and not of Contracting Parties which have not. This explains why Recommendation VIII-8 refers cautiously to the Recommendations as forming an integral part of the Treaty régime.

Thus, the Recommendations may be said to constitute contractual agreements between the Consultative Parties. To make them binding on all Contracting Parties would impose an unnecessary burden on those States which, while Parties to the 1959 Treaty, have no particular interest in conducting scientific research. On the other hand, it would not seem unreasonable to expect that a country wishing to have a seat at the Consultative Meetings take steps to adopt the Recommendations already in force.

It goes without saying that if States which accede to the Treaty are not automatically bound by the Recommendations, the latter, a fortiori, are not binding upon States which are not Parties to the Treaty itself.

(viii) Status of the Recommendations

For the first seven Consultative Meetings, a total of fifty-eight out of eighty-eight Recommendations had been approved by all Parties by 2 June 1975.[7] Recommendations VIII-6 to 8 and 10 to 14 entered into force on 16 December 1978.[8] Almost all of the unapproved Recommendations involve the conservation measures for flora and fauna, the only exception being Chile's non-approval of two Recommendations adopted by the Seventh Meeting, pertaining to tourists and non-government expeditions (VII-4), and to historic monuments (VII-9) respectively.[9] All Parties have , nonetheless, accepted the conservation measures as interim guidelines pending their full adoption and incorporation into domestic legislation. Certain countries such as Australia and New Zealand have, when notifying the Depository Government of approvals, stipulated that although they had not yet approved the Agreed Measures for the Conservation of Flora and Fauna, the measures were nonetheless in effect and being implemented in the Antarctic.[10]

(ix) Reservations

Although there is nothing explicitly providing for them, there have been a number of reservations to the approved Recommendations. Three countries- Belgium, Great Britain and the United States, experienced difficulties with the French versions of certain Recommendations adopted at the Fourth Consultative Meeting. Belgium, meanwhile, approved the English language text of Recs. IV-21 and IV-27, but refused to accept the French versions of paragraph 2 of Rec. IV-

---

[7]See Documents Relating to Antarctica, op. cit., Vol. 1, p. I. 0. 12.
[8]Department of State Bulletin, Vol. 79, No. 2024, March 1979, p. 67.
[9]See Documents Relating to Antarctica, op. cit., Vol. I, pp. I. 11. 10-11.
[10]Ibid., Vol. I, p. I. 7. 32.

27.[11] The United Kingdom approved the English version of the Recommendations,[12] whereas the United States approved Recs. IV-20 through IV-28 “except as presently set forth in the French language version”.[13]

In addition, several statements have been made at the Consultative Meetings and recorded under the Recommendations in the Final Report. At the First Meeting, France made a statement on historic monuments, the United Kingdom put forward a proposal on postal services, Chile drew attention to nuclear equipment, and New Zealand hoped future Meetings would be held in places where it had diplomatic representation. At the Second Meeting Chile made its statement about the interval between future Meetings, and at the Eighth Australia reiterated its position on the question of the disposal of nuclear waste. At the most, these statements serve to clarify a country's position on particular matters but are of no real legal significance, especially since they occur at the adoption rather than at the approval phase. They have, in any case, touched on only incidental matters**.**

(x) The Content of the Recommendations Adopted by the Consultative Meetings

(A) Subject Matter of the Recommendations

1. Introduction

A total of 118 recommendations emanated from the first nine Consultative Meetings. They may be grouped very broadly into five categories: scientific activities, non-scientific

[11] Ibid.
[12] Ibid.
[13] Ibid.

activities, infrastructural, administrative and environmental. There is, of course, a high degree of overlap between these areas; all, for instance, have at least an indirect, and usually a direct, impact on the conduct of scientific research. Each category will be briefly outlined in turn.

2. Scientific

Actually, only a very small number of Recommendations have dealt directly with scientific research, and even then on a disparate number of topics. Two create special protective measures for certain sites; one calls for coordination and notification when radio isotopes are used, so as to protect scientific research underway; one calls for cooperation in exchange of personnel during the International Year of the Quiet Sun (1964); one deals with the sharing of meteorological data generally; there is one concerning expediting the shipment of scientific materials, one on coordinating scientific research rockets and including information on such rockets in the annual exchange of plans. Lastly, one recommendation deals with the exchange of oceanographic information and results.

3. Non-Scientific

Non-scientific Recommendations have had to do with regulating sealing, tourist activities, mineral exploration and exploitation, and marine resources. They have all been mentioned elsewhere; suffice it to say that all of them, but least of all sealing, can affect the conduct of scientific research to some extent, e. g., environmentally, but they are especially delicate for legal and political reasons. The tendency has been, except in the case of tourists, to negotiate these questions in flora other than the Consultative Meetings, though under the aegis of the Consultative Powers.

4. Infrastructure

Here the focus has been on coordinating and, when necessary, standardising telecommunications, logistics and transport, and postal services.

5. Administrative

First there are the Recommendations involving internal matters; these include such subjects as the meeting of experts, the Consultative Meetings themselves, their Recommendations, as well as the exchange of information on scientific programs, scientific personnel and operations generally. Then there are the Recommendations regarding external matters such as cooperation with international organisations, SCAR, and problems with third parties.

6. Environmental

This category comprises more than one third of the total number of Recommendations-forty-one of one hundred and eighteen. This figure is somewhat misleading in that the designation of each specially-protected area constitutes a separate recommendation, and twenty-five areas have been inaugurated. A further eight Recommendations deal with the conservation of the flora and fauna generally, and four more with man's impact on the environment, the disposal of nuclear waste, oil contamination and the Antarctic environment as a whole.

(B) An Assessment of the Recommendations

The Consultative Parties can only recommend to their respective Governments that they behave pursuant to a Recommendation. Once approved, however, a Recommendation becomes

a measure, i. e., States are under a binding obligation to implement it if need be or at the very least to abide by it if it is self-executing. The problem is, however, that while a number of the Recommendations are straightforward and of the 'shall' variety, others are optional in one way or another. First, the Recommendation may limit itself to providing that a certain course of action "should" be taken. While this falls short of being mandatory, it nonetheless is an exhortation, and given the fact that the State has collaborated in its being negotiated and approved, it cannot be taken lightly; at the very least it involves a duty to act in good faith. Second, the Recommendation's normative character may be mitigated by requiring that the action prescribed be taken 'as much as feasible' or 'as far as possible'. These qualifications, however, are to be expected in a system operating on unanimity, where the need for accommodation often leads to intentional vagueness.

While some of the measures prescribed may be self-executing, others may either call for further steps to be taken or require implementation and follow-up action. Many Recommendations are of the coordinating variety, involving elementary procedures such as the exchange of information and plans or, at a more advanced level, the exchange of personnel and/or results. As such, these latter measures are one step beyond the rules of coexistence. It is often difficult, though, to draw a distinction between laws of coexistence and laws of cooperation on a practical as opposed to a theoretical plane. For example, cooperation on logistics is primarily intended to permit individual States to carry out their national programs more effectively. The rules of non-interference with legitimate use are, however, a good example of rules of coexistence.

Aside from scrupulously avoiding any joint scientific projects or joint scientific bases, the Antarctic Treaty Consultative Meetings have kept clear of controversial topics such as jurisdiction. As Auburn says, in the Antarctic it is forbidden to walk upon the mosses but not to commit murder.[14] Thus, the scope for Recommendations is significantly limited or narrowed by non-scientific considerations. This has an effect both on what is discussed and how the subjects discussed are treated, an example being the extensive conservation measures on flora and fauna, which require permits and enforcement, aspects which have not yet been adequately resolved.

Experience seems to suggest that the Recommendations most likely to be adopted are those which have next to nothing to do with claims, i. e, those which are neutral, like ecology, or those which reduce operating costs. Scientific cooperation per se is well down the list of priorities, and tends to be effected on a bilateral basis. Having said this, there appears to be a rather successful record of implementation, though the procedure for getting a topic on the agenda, discussing it, weighing proposals on it, formulating Recommendations on it and getting approval for it can be painstakingly slow, and tends to limit the scope of Recommendations and to water down their content.

(C) Meetings of Experts

Early on the Consultative Parties recognised the value in meeting separately to discuss certain practical problems at length; thus, in 1963 they met to discuss telecommunications (see Recs. III-V, III-Vi). These meetings were given a legal basis in Recommendation IV-24 (Meeting of Experts), which states that they may be organised either within the framework of the Consultative

[14]"Offshore Oil and Gas in Antarctica", op. cit., p. 165.

Meetings or through separate diplomatic channels. In either case, the host Government submits a report to the subsequent Consultative Meeting. There have been two such meetings since the adoption of Recommendation IV-24 , namely the Meeting on Logistics of 1968 (Recommendation IV-25) And the Meeting on Telecommunications in 1969 (Recommendation V-2).

(D) Other Meetings

In addition to the Meetings of Experts there have been a number of informal outside meetings, sanctioned by Consultative Meeting Recommendations, to conclude the Agreement on sealing and, currently, that on marine living resources. In this way the Consultative Parties have, in effect, as Roberts says, accorded themselves the competence "to initiate and draft formal conventions open to accession by a larger group of nations."[15]

(E) Settlement of Disputes

There is yet another consultation requirement in the 1959 Treaty: without prejudice to the provisions on observers, and pending adoption of measures at the Consultative Meetings, Article VIII(2) obliges the Contracting Parties "concerned in any case of dispute with regard to the exercise of jurisdiction in Antarctica" to "immediately consult together with a view to reaching a mutually acceptable solution".

3. Oceans

There are no particular provisions regarding consultation which are applicable to marine scientific research.

[15] Op. cit., p. 119.

4. Conclusion

The duty to consult is a procedural rule of certain import in outer space, but only in the Antarctic is there an established, 'institutionalised' mechanism for it which can, and does, lead to the creation of 'hard' law.

CHAPTER III. THE DUTY TO FACILITATE THE CONDUCT OF SCIENTIFIC RESEARCH

1. Outer Space

There is nothing in the 1967 Treaty specifically requiring States to facilitate the conduct of scientific research per se, evidently because space research does not involve zones of national jurisdiction. Nevertheless, the duty to facilitate international cooperation in scientific investigation (Article 1[3]) has the same effect.

2. Antarctica

The Consultative Parties are mandated to deal with "the facilitation of scientific research in Antarctica" (Article IX[1]{b}). In the first category there has been only one Recommendation-II-VII (Shipment of Scientific Materials) which, since its adoption, compels the Consultative Parties to expedite the execution of their domestic administrative procedures and to provide proper care in the handling of shipments of samples, specimens, records and scientific instruments related to Antarctic scientific research. They are not required to adjust their laws and regulations; on the contrary, these are expressly recognised in the Recommendation, as are whatever "binding international agreements" exist. The latter references is to accords such as the 1950 Florence Agreement on Importation of Educational, Scientific and Cultural Materials.[1]

[1]See supra, p. 7, n. 17.

3. Oceans

The ICNT Rev. 1 requires States and international organisations unilaterally to: a) promote and facilitate the development and conduct of scientific research in accordance with the eventual convention (Article 239); b) adopt “reasonable and uniformly applied rules, regulations and administrative procedures” for research in the economic zone or the continental shelf; as well as c) adopt measures to facilitate access to harbors (Article 255). Article 255 would also require that assistance be promoted for marine scientific research vessels carrying out their activities.

4. Conclusions

There is a duty to facilitate the conduct of scientific research in all three areas, but the form this duty is to take differs in each of them. In outer space, given the geographic nature and legal status of space itself, as well as the relatively small number of States with a space capability, the duty is linked to that of cooperation with other States.

In the Antarctic, while many of the recommendations tend to facilitate scientific research, the only apparent obligation upon States to do so lies in the area of shipment of scientific materials.

In certain areas of the oceans the coastal State must facilitate foreign scientific research by adopting certain rules or measures. Here the duty is seemingly most concrete, but there is as yet no definition of what rules are 'reasonable', nor of what constitutes 'uniform application' of them, within the meaning of Article 239(b) of the ICNT Rev. 1.

CHAPTER IV: THE DUTY TO PROVIDE MUTUAL ASSISTANCE

1. Outer Space

Under the 1967 Outer Space Treaty, an obligation exists to render all possible assistance on land and on the high seas in the event of an accident or distress, emergency or landing, and to return astronauts safely and promptly (Article V). In outer space and on celestial bodies, moreover, all possible assistance is to be rendered while carrying on activities.

Article IX specifies that cooperation and mutual assistance, taken together, form a "principle" which is to guide States. The 1967 Rescue Convention is to "develop and give further concrete expression to" these duties (Preamble). That Convention applies to astronauts as well as to objects. It requires that the State within whose territory an object is found notify the launching authority (Article 5[1]), a condition which Canada complied with when Cosmos 954 landed on her territory.[1] If the object is dangerous, the State on whose territory it has landed may notify the launching authority, which shall take effective steps to eliminate possible danger or harm (Article 5[4]). In the case of Cosmos 954, the Soviet Union (the launching State), reportedly offered assistance, but Canada refused it;[2] on the other hand, Canada apparently accepted a similar offer from the United States in the same case.[3] Contracting Parties upon whose territory an object falls are to take steps to recover the object upon request of the launching territory (Article 5[3]). As there is no evidence that the Soviet Union requested either

---

[1]P. Dembling, "Cosmos 954 and the Space Treaties", Journal of Space Law, Vol. 6, No. 2, 1978, pp. 129-136, at p. 131.
[2]Ibid., p. 132.
[3]Ibid., p. 134.

the recovery or the return of Cosmos 954 or any of its component parts,[4] Canada's attempts to gain reparation are not likely to be successful.

The Rescue Convention was given effect on at least one other occasion: in 1970 the Soviet Union helped in the rescue of United States Apollo 13 astronauts.[5]

2. Antarctica

Recommendation I-IX reaffirms "the traditional Antarctic principle" that expeditions render all assistance feasible in the event of an emergency request for help, and further calls for consultation on the matter. In Proposal 9 of the Second Meeting on Telecommunications, approved as a guideline when Rec. VI-1 was adopted, the Contracting Parties agreed on radio search and rescue procedures.

3. Oceans

Article 12 of the 1958 High Seas Convention and Article 98 of the ICNT Rev. 1 deal with the duty to render assistance to ships and persons at sea, a duty which is no doubt customary as well. All these can be deemed to apply to marine scientific research activities as well as to personnel conducting such activities.

4. Conclusions

The duty to provide mutual assistance exists in all three areas. In outer space and in the Antarctic this duty is tantamount to a "principle".

---

[4]Ibid., p. 132.
[5]COPUOS, Annual Report, 1971, p. 111.

CHAPTER V. THE DUTY TO PROMOTE INTERNATIONAL COOPERATION

1. General Conventional Clauses

(a) Outer Space

Article I(3) of the 1967 Treaty obliges States to encourage international cooperation in scientific investigation. It is significant that this duty is linked with the freedom of scientific investigation, for without cooperation that freedom would be illusory for most States. Article III exhort States to carry on their space activities in the interest of promoting international cooperation and understanding.

Two of the particular rules in the 1967 Agreement are explicitly linked with the promotion of international cooperation: the aforementioned right to observe launched objects (Article X) and the duty to inform the Secretary-General of the United Nations (Article XI).

(b) Antarctica

Cooperation and freedom of scientific investigation are also linked in the 1959 Treaty (Article II). Moreover, exchanges of plans, personnel and results are all intended "to promote international cooperation in scientific investigation" (Article III[1]). Article IX(c) goes one step further in giving the Consultative Meetings the mandate to facilitate scientific cooperation in Antarctica. The Contracting Parties also agree to encourage cooperation with the United Nations organs and others having an interest in Antarctica (Article 3[2]).

(c) Oceans

As previously mentioned, Article 239 of the ICNT Rev. 1 require States and competent international organisations to promote and facilitate the development of marine scientific research in accordance with the Convention. This can be taken to include international cooperation. The purpose of the principle international organisation in the field- UNESCO (IOC), is "to promote scientific investigation with a view to learning more about the nature and resources of the oceans through the concerted action of its members" (Statutes of the IOC, Article 1[2]), and many of its specific functions have a similar promotional character.

2. Practice

(a) Outer Space

(i) Introduction

Practice on international cooperation in outer space in the domain of scientific research is essentially beyond the scope of the thesis, it being so vast as to warrant separate study. Instead of offering an exhaustive study, an outline of the various forms cooperation has taken, as well as relevant examples, will be supplied.

a. The Types of Agreements

(A) Multilateral

Apart from the various multilateral conventions on space, there have been a few global efforts at space research, the first being the IGY, a non-governmental effort, and another being the International Year of the Quiet Sun, which was a United Nations-sponsored program occurring during 1964-65. A current program is the International Magnetospheric Study, a three-

year venture involving observations from spacecraft, ground-based facilities, aircraft, balloons and research rockets- coordinated by ICSU and COSPAR and involving scientists from forty countries.[1] Yet another international scientific project with a space component is the Global Atmospheric Research Program (GARP), sponsored by the World Meteorological Organisation (WMO).[2]

(B) Regional

Aside from the 1975 Convention for the Establishment of a European Space Agency (see Annex One) which is, in effect, the constitutive instrument for a new international organisation, the most important regional framework agreement is the Eastern European Agreement on Cooperation in Exploration and Use of Outer Space for Peaceful Purposes.[3] Under this scheme, a number of scientific satellites (over a dozen) in the Intercosmos series have been launched from the Soviet Union, often with foreign experiments aboard, and on some occasions with foreign cosmonauts.

(C) Bilateral

Here the cooperation takes several different forms, i. e. cooperation between States and between States and international organisations. Agreements of cooperation may also be categorised according to whether they are framework agreements or are devoted to specific

---

[1]Collier's, 1978, p. 494.

[2]According to Collier's, 1978, page 497, "[a] total of five geostationary meteorological satellites- two from the United States and one each from Japan, the Soviet Union, and the ESA- are to be placed in orbit in this International Weather Satellite Program, which is a major part of the Global Atmospheric Research Program (GARP)."

[3]Bulgaria, Cuba, German Democratic Republic, Hungary, Mongolia, Poland, Romania, Union of Soviet Socialist Republics, done at Moscow on 3 July 1976. Reprinted in ILM, Vol. 16, 1977, p. 1.

projects or purposes. Examples of this latter type will be treated in subsection (iii); The former would include both the 1962[4] and 1972[5] United States-Soviet Union Agreements.

The form these agreements may take may vary from exchanges of notes or memoranda of understanding to full-fledged treaties. Some of these agreements are concluded by governments themselves and are subject to ratification procedures , while others are concluded between certain branches or agencies of government. This latter type of 'agreement' does not constitute a treaty, although it may form an annex to an interstate treaty, with the signatories assuming the obligation to do everything in their power to ensure that it is implemented by the competent authorities.[6]

(D) Private International Contracts

Yet another type of cooperative arrangement is the so-called joint venture between a State and a private, foreign firm. An example of this type is the agreement between the German-based company Otrag and the Government of Zaïre, under the terms of which the former agreed to launch satellites for the latter in return for the leasing of large tracts of land in Zaïre itself. While this agreement does not fall within the domain of public international law, it is nevertheless of significance since by virtue of the agreement Otrag binds itself to conform to the provisions of the 1967 Outer Space Treaty.[7] Thus, the case provides an interesting example of

---

[4]Cited in Marcoff, op. cit., p. 490.

[5]Agreement between the United States of America and the Union of Soviet Socialist Republics concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, done at Moscow on 24 May 1972. Reprinted in ILM, Vol. XI, 1972, p. 766.

[6]Cf., the Agreement of 22 February 1974 between the United States and the Soviet Union, with three Annexes. Cited in Touscoz, op. cit., p. 77, n. 18.

[7]See G. Fahl, Note sur le contrat du 20 octobre 1978 entre le Zaïre et l'O. T. R. A. G.", Annuaire français de droit international, Vol. 24, 1978, pp. 920-926.

the incorporation of international law into a sphere of municipal law- in the event that of the law of contracts.

b. The Substance of the Cooperation

i. Ground-based Cooperation

That type of cooperation which takes place purely on the ground would include the joint construction of spacecraft, e. g. the NASA-ESA Spacelab, or tracking. An example of the several dozen agreements enabling the United States to observe the flight of its space objects is the 1968 Agreement it concluded with Japan.[8] Another example is the 1967 Franco-Brazilian Agreement permitting France to establish a tracking station at Fortaleza, Brazil, so as to track vehicles launched from French Guinea.[9]

ii. Overflight

To permit access to space for its rockets, the United States concluded an Agreement with the United Kingdom in 1950 covering an area in the Bahamas.[10] When the latter became independent in 1973, the arrangement was continued.[11]

---

[8]Exchange of Notes constituting an Agreement regarding the Establishment and Operation of a Satellite Tracking Station in Okinawa, done at Tokyo on 2 September 1968. Entered into force on 2 September 1978.

[9]Cited in Britannica Book of the Year, 1968, p. 10.

[10]Agreement for the Establishment of a Long-Range Proving Ground for Guided Missiles, op. cit.

[11]Exchange of Notes Constituting an Agreement relating to Continuance of United States Military Rights and Maritime Practices in the Bahamas, Nassau, 10 and 20 July 1973. Entered into force on 20 July 1973; retroactive to 10 July 1973, the date of Bahamian independence.

iii. Joint or Reimbursable Launchings

There are many scientific satellites which have been launched by one country for another or for an international organisation- for instance the numerous satellites launched by NASA for ESA and its predecessor, the European Space Research Organisation (ESRO).[12] With respect to State-to-State cooperation, the bulk of the practice involves the United States, which has launched scientific satellites for such countries as Canada,[13] Great Britain,[14] and Spain.[15] Italy has also from time to time performed similar tasks- for Great Britain,[16] for instance, as has the Soviet Union for India.[17]

The United States pursues a policy of making available United States launching facilities "on a cost reimbursable basis".[18] The Soviet Union, however, appears to adopt a different policy: it has been reported that

---

[12]In Britannica Book of the Year, 1968, it was reported that in early January 1967

> "the first major implementation of U. S. and European space exploration became a reality. An agreement was signed between NASA and ESRO under which the former would launch satellites for the latter with vehicles to be purchased by the latter. This was the first such agreement signed by NASA. The first satellite to be so launched was to be HEOS-A, a West German-made scientific satellite scheduled to be launched in late 1968 by a thrust-augmented Thor-Delta."

A total of seven satellites were launched for ESRO by NASA. U. N. Space Activities and Resources, op. cit., p. 123. A number have since been launched for ESA, the first being COS-B in August 1975. See ibid.

[13]E. g., Alouette II on 29 September 1962. Britannica Book of the Year, 1963, p. 751.

[14]E. g., Ariel I on 26 April 1962. Ibid.

[15]In 1975. Britannica Book of the Year, 1976, p. 62.

[16]The Britannica Book of the Year, 1975, p. 631, reported that in 1974 "a truly international space effort took place on October 14 when the Italians launched a British satellite using a U. S. rocket. U. K. 5, a small scientific satellite, was launched by a Scout from the San Marco facility in Ngwana Bay off the coast of Kenya."

[17]An Indian "domestic scientific satellite" was orbited by a Soviet launch vehicle on 19 April 1975. Britannica Book of the Year, 1976, p. 627.

[18]Britannica Book of the Year, 1974, p. 102.

> the Soviet Union proposed to ESRO that it launch, at no cost, that organisation's HEOS satellite in 1974. In exchange, it asked for greater participation in future ESRO programs. The offer also took some of the magnanimity out of President Nixon's earlier offer to provide launching services to other countries at cost.[19]

A satellite was launched by the Soviet Union for India at no cost to the latter.[20]

Finally, there is the new type of arrangement already alluded to- the international joint venture.

iv. Piggybacking

Some international launchings have included satellites which are released in space from the mother ship, examples being the United States-Australian venture of 1970 involving a radio satellite,[21] a similar venture which was undertaken by the Soviet Union for France in 1975,[22] and, within a regional context, the German "Feuerrad" project of sub-satellites which at the end of 1979 was carried out from French Guinea with the help ESA's Ariane launcher.[23]

v. Cooperation in Scientific Experiments

There are a large number of projects by which experimental packages may be included in a foreign spacecraft. Ventures of this type have been undertaken between the United States and

---

[19]Ibid., p. 105.
[20]"Hitchhiking a Ride into Space", The Economist, 16 June 1979, pp. 50-51, at p. 51.
[21]Britannica Book of the Year, 1971, p. 115.
[22]Britannica Book of the Year, 1976, p. 627.
[23]"Space Launch Promises Fireworks", New Scientist, 17 August 1978, p. 474.

the Soviet Union,[24] ESA and the Soviet Union,[25] Italy and the United States,[26] and by the United States[27] and the Soviet Union on behalf of many countries.[28]

vi. Exchange of Information, Publications and Sample

Scientific results are made available on an exchange basis. For instance, it was reported that in October 1965

> Members of the Soviet Academy of Science and NASA reached agreement to exchange information from weather satellites and published jointly a review of space biology and research in space medicine.[29]

In 1967 it was reported that whereas some progress had been made, much remained to be done to implement these agreements fully.[30] In 1978 the Americans and the Soviets appear to "have agreed to exchange data collected by the Venera and Pioneer Venus probes".[31]

---

[24]Op. cit.

[25]According to the 1977 ESA Annual Report, p. 176, "[t]he Agency provided some scientific experiments as part of the payload of the USSR Magik satellite."

[26]According to Colliers, 1975, p. 475, "Italy launched San Marco 4 on February 18 1974 from its Equatorial range off the coast of Kenya. It carries Italian and U. S. experiments to measure atmospheric density, temperature and composition in the lower equatorial thermosphere."

[27]According to the United States Annual Report to the United Nations on its space activities in 1975, p. 117, a total of 45 experiments had to 1976 been contributed by foreign scientists for utilisation on NASA spacecraft; they had been selected on the basis of their scientific merits in competition with U.S. proposals.

[28]According to Britannica Book of the Year, 1978, p. 640, on 3 August 1977 "Cosmos 936 was launched from Plesetsk in the Soviet Union. The U. S. had seven experiments aboard it, four of which had Soviet investigators. Additionally, experiments from France, Czechoslovakia, Poland, Romania, Bulgaria, Hungary, and East Germany were in the satellite."

[29]Britannica Book of the Year, 1966, p. 696.

[30]COPUOS, Annual Report, 1967, p. 114.

[31]Collier's, 1979, p. 486.

A similar situation exists with respect to samples: in 1971 the United States and the Soviet Union exchanged lunar samples;[32] on six March 1973, rock and soil samples from Apollos 16 and 17 were given to the Soviet Union in exchange for lunar samples earlier received from Lunar 16 and 20 probes.[33]

vii. Educational and Training Programs

Limited information is available in this respect, but for 1966 it was reported that 36 countries took advantage of personnel exchange programs embracing residence research fellowships, international fellowships and technical training at NASA centres.[34]

viii. Sounding Rocket Programs

Perhaps the most truly 'international' ongoing scientific research effort in outer space is the United Nations-sponsored sounding rocket program which involves two launching facilities- one in India and another in Argentina.[35] Apart from this arrangement, several countries, including for instance Canada[36], Japan,[37] and the Federal Republic of Germany,[38] have launched sounding rockets in collaboration with the United States.

(b) Antarctica

It is difficult to separate national from international ventures in the Antarctic, but the latter seem to consist largely of three different types: special participation in a national scientific

---

[32]Britannica Book of the Year, 1972, p. 99.
[33]Britannica Book of the Year, 1974, p. 106.
[34]Britannica Book of the Year, 1967, p. 104.
[35]See U. N. Space Activities and Resources, op. cit., pp. 15-16.
[36]Britannica Book of the Year, 1968, p. 121.
[37]Ibid.
[38]Ibid.

program or project by one or more foreign scientists; regular exchanges of scientists, such as that annually undertaken by the United States and the Soviet Union since the IGY; and full-fledged international programs. The international programs may be bilateral, as is the case with the Japanese-United States meteorite analysis project,[39] or multilateral, in which case the project may be part of a global venture (as Polex-South is a component of GARP[40]) or independent, such as the Dry Valley Drilling Project, which is a combined United States-Soviet-Japan operation[41], or the International Antarctic Glaciological Program (IAGP).[42] Another type of program is Biomass, a study of Antarctic marine resources which involves various United Nations agencies as well as SCAR. Rarely are any of these arrangements consecrated in a treaty.

(c) Oceans

(A) Multilateral

In the early days of international cooperation in marine scientific research, projects (such as Norpac, El Niño and Eastropac) were organized on an informal, ad hoc, non-governmental basis.[43] One of the largest, earliest and most successful intergovernmental projects was the International Indian Ocean Expedition (IIOE) which took place between 1959-65 and involved twenty-three countries and over forty ships.[44]

---

[39]"A Score of Meteorites on Ice", New Scientist, 19 January 1978, p. 140.
[40]Nagata, op. cit., p. 129.
[41]Britannica Book of the Year, 1978, p. 127.
[42]The IAGP involves France, the Soviet Union, the United States, the United Kingdom, and Australia. See Nagata, op. cit., p. 129.
[43]Wooster, (ed.), op. cit., pp. 211-212.
[44]E. Skolnikoff, "National and International Organizations for the Seas", Chapter 3 in E. Gullion, (eds.), Uses of the Seas, Englewood Cliffs, N. J., Prentice-Hall, Inc., 1968, pp. 98-112, at p. 101.

In the 1960s, the IOC devised the Long-term and Expanded Program of Oceanographic Exploration and Research (LEPOR) as an overall strategy or framework for oceanographic research.[45] Other types of arrangements are the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), which brings together both government and private research institutes and has been responsible for the Deep Sea Drilling Project,[46] and the marine components of global ventures such as GARP.[47]

A significant portion of multilateral oceanographic cooperation has occurred and continues to occur in the Antarctic region.[48]

(B) Bilateral

An example of an agreement for bilateral long-term cooperation on a wide range of issues is the 1973 United States-Soviet Union Agreement.[49] A less ambitious arrangement, which

---

[45]Endorsed by the United Nations General Assembly in Resolution 2414 (XXIII) of 17 December 1968.

[46]See J. Heirtzler and A. Maxwell," The Future of Deep-Ocean Drilling", Oceanus, Vol. 21, No. 3, 1978, pp. 2-12.

[47]The first of these projects was the Barbados Oceanographic and Meteorological Experiment (BOMEX), conducted east of Barbados in May, June and July 1967, and which involved 24 planes, 10 ships, and 12 buoys. The project involved scientists from the United States, Canada and Barbados, and was apparently continued in 1968. See Exchange of Notes constituting an Agreement for the Establishment of a Programme of Cooperation Known as the Barbados Oceanographic Meteorological Experiment (BOMEX), done at Bridgetown on 12 June and 19 July 1968.

A more recent GARP project is GATE (Garp Atlantic Tropical Experiment) which, according to Collier's, 1977, p. 407, involved vessels of ten countries “collecting an unprecedented set of data from the equatorial Atlantic.”

[48]To choose but one example aside from Biomass, there is the ongoing International Southern Ocean Studies Project (ISOS). See V. Neal, "International Southern Ocean studies”, in Orrego and Salinas (eds.), op. cit., pp. 307-318.

[49]Agreement with the USSR on Cooperation and Studies of the World Ocean, 19 June 1973. 2 United States Treaty Series, TIAS No. 7651.

authorises, inter alia, each Party to undertake studies and investigations of an exclusively scientific character in a two-hundred mile fishing zone commonly managed by the two Parties, is provided by the Treaty on the Rio de la Plata and its Maritime Front concluded between Argentina and Uruguay in 1973.[50]

Examples of bilateral projects with limited objectives include POLYMODE,[51] the Indian Ocean Experiment (INDEX),[52] and the Labrador Sea Experiment.[53] Finally, in innumerable cases foreign scientists take part in certain national projects, often as a condition upon which permission is accorded to undertake research in certain zones of national jurisdiction.

4. Conclusion

In all three areas There is a duty to promote international cooperation, though this rule assumes different forms in each area. It is not without reason, however, that in both outer space and the Antarctic such cooperation is linked with the freedom of scientific research.

There is now a large body of practice regarding international cooperation in all three areas, of all types in between a large number of States and international organisations. Much but by no means all of this practice is covered by international treaties. Part of it remains outside the

---

[50]Article 79. Reprinted in S. Oda, The International Law of Ocean Development, Basic Documents, Leiden, Sijthoff, 1975, Vol. 2, p. 72.

[51]POLYMODE Is a United States-Soviet Union program involving extensive field work in the western North Atlantic over a three-year period. Collier's, 1977, P 407.

[52]INDEX, According to Collier's, 1979, p. 398, is a large scale investigation of ocean atmosphere interaction: “This project has investigated the influence of the Somali Current and its variability on the Arabian Sea; scientists from the Woods Hole Oceanographic Institution and the University of Miami participated.”

[53]Collier's, 1977, p. 407. The project apparently involves French and Canadian oceanographers aboard the Canadian research vessel "Hudson".

domain of public international law, involving as it does international contracts or working relationships between international institutions, be they public or private, and their foreign counterparts.

Of the multilateral scientific cooperation, most is in the field of marine scientific research. Regional cooperation is limited to outer space and the oceans. The bulk of space cooperation is, by contrast, bilateral in character and covers a wide spectrum of forms and types. In fact, there is such a large amount of international cooperation in outer space that one is led to the conclusion that there is a customary duty to cooperate- a custom which is of course inscribed in the 1967 Treaty and which is closely linked to the freedom of scientific research. This is not just a procedural rule: there is an obligation to achieve certain results as well.

CHAPTER VI. THE DUTY TO PUBLISH

1. General

(a) Outer Space

By virtue of article 11 of the 1967 Outer Space Treaty, the States Parties

> agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of (their) activities (Emphasis added).

In effect, each year COPUOS has collected and disseminated the information various countries with space programs have forwarded it. In this sense it has been acting as a clearinghouse. The 1967 Treaty gave a firm legal basis to this procedure, which had started in the early nineteen-sixties. As Article 11 goes on to state,

> [o]n receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.[1]

The information submitted usually excludes military information. Until 1962 the United States regularly gave publicity to military launchings, if not to the actual results of such activities.[2]

---

[1]Such information is issued annually in the Review of National and Co-operative International Space Programmes.

[2]According to the Britannica Book of the Year, 1963,

> "[m]ilitary space interest remained in 1962 within the province of the department of defense, which instituted a new policy of not revealing details of the physical characteristics or experimental objective of its satellites. However, all U. S. satellites were announced, registered with the U. N. and given Greek-letter designations." (p. 751)

Now, however, military launchings are rarely reported, this area being, as Moore terms it, a "closed system".[3]

The same may be said for information on commercial activities. As Lay and Taubenfeld note:

> [b]asic scientific information, when not in a security-suffused field, tends to be widely shared by most nations, but there is no equivalent sharing of strategically or economically valuable information.[4]

As for commercially and economically valuable information, such as that distilled from remote sensing data, Lay and Taubenfeld feel that

> [l]acking formal international undertakings, it might be argued that a moral, rather than a legal, obligation exists to make such information equally available.[5]

In reporting activities to the United Nations, the practice has been to refer to land-based as well as space-based space activities. Results of research, however, or at least the dissemination of them, tend for the most part to be relegated to scientific journals. The Moon Resources Treaty requires a more detailed account of activities "concerned with the exploration and use of the moon" (Article V[1]). In addition, samples do not belong to the State which has collected them, and that State "shall have regard to the desirability of making a portion of such samples available for scientific investigation" (Article VI[2]). In practice, the United States has shown a marked

[3]Op. cit., p. 187.
[4]Ibid.
[5]Ibid., p. 158.

willingness to share moon samples it has collected; with the Soviet Union this has tended to be on an exchange basis.[6]

There is a great deal of other information which is only readily available on an exchange basis, and in this area the practice has been less noteworthy. For instance, Markoff notes that as of 1973 even pure research findings on such subject matters as decontamination and sterilisation were not readily exchanged at all between the United States and the Soviet Union.[7] Needless to say, countries lacking a space capability are not in a position to exchange much.

The Convention for the Establishment of a European Space Agency[8] has extensive and sometimes unique provisions on the subject of publication. Member States and the Agency are under an obligation to facilitate the exchange of scientific information, except as regards information the communication of which would be inconsistent with "the interests of (Member States') own security… " (Article III[1]). The Agency is responsible for collecting and disseminating relevant information to Member States (Article V); at the same time, it must

> ensure that any scientific results shall be published or otherwise made available after prior use by the scientists responsible for the experiments. The resulting data shall be the property of the agency. (Article III[2])

---

[6]See supra, Part Five, Chapter Three.

[7]Op. cit., pp. 489-490. There is, however, some precedent for such exchanges. See supra, Part Five, Chapter Three.

[8]Done at Paris, 30 May 1975. Reprinted in ILM, Vol. XIV, 1975, p. 864. This is believed to be the first recognition, in an international agreement relating to scientific research in either outer space, the Antarctic or the oceans, of the rights of scientists with respect to data, results and publication. For an analysis of the manner in which existing intellectual property conventions cover the situation in certain areas beyond national jurisdiction, see D. Stauder, "Patent Protection in Extraterritorial Areas (Continental Shelf, High Seas, Air Space and Outer Space)", in International Review of Industrial Property and Copyright Law, Vol. 7, No. 4, 1976, pp. 470-479.

(b) Antarctica

Article III of the 1959 Treaty commits the Contracting Parties to exchange and make freely available scientific observations and results from Antarctica; as in the 1967 Outer Space Treaty, this is to be done to the greatest extent feasible and practicable.

To date there have been only two Consultative Meeting Recommendations relating to publication of results. In recommendation I-III (Exchange of Scientific Data), the Consultative Parties recommended that

> they (the Consultative Parties) should promote the exchange and making available of observations and results from Antarctica through the recognized international data gathering centres and by other means as may be appropriate to ensure the exchange and free availability of this information.

The centres referred to are the World Data Centers which were established subsequent to the IGY. Recommendation II-1 is more detailed: Consultative Parties must take measures contributing to full transmission of IGY and post-IGY observations to international data centres, as well as further the free availability and exchange of all results and published results- past and future, within a prescribed time period. Jain remarks that the IGY resulted in the shipment of twenty-seven tons of data from the Antarctic.[9] Information is lacking on whether and how the results are in fact exchanged, but certainly there are a number of sources in which they are 'freely' available.[10]

---

[9]Op. cit.

[10]For the United States, for instance,

SCAR studied the matter of data availability at its 1978 meeting in Chamonix, at which time

> [i]t was brought to the attention of the working group that an inadequate amount of Antarctic data for research was available from the World Data Centres. The group agreed that the objectives of SCAR are prejudiced thereby and requested SCAR to recommend that its members and the World Data Centres make every effort to improve this situation.[11]

There is evidence to prove that in some cases results have been deliberately and systematically withheld. Touscoz only suggests this when he says that certain observers feel that not all scientific results are communicated,[12] but others actually cite cases. Two examples are the withholding of oceanographic information from the Antarctic region[13] and the deletion or censoring of reports concerning the poor performance of nuclear generators at Mcmurdo Base.[14] It could be argued, however, that such practices are permissible in view of the Antarctic Treaty requirement that results be made available "to the greatest extent feasible and practicable " (Article III[1]).

One of the points put forward in support of the creation of a separate régime for exploration and exploitation of the mineral resources of the region has been that it is contrary to

---

> "[r]esearch activities and progress are reported bi-monthly in the Antarctic Journal of the United States. While the majority of research papers appear in standard scientific journals, selections from current studies are published in the expeditionary series of the USARP, the 'Antarctic Research Series' (ARS) and the 'Antarctic Map Folio Series."

G. Llano, "A Survey of Antarctic Biology: Life Below Freezing", Bulletin of the Atomic Scientists, Vol. XXVI, No. 10, 1970, pp. 67-74, at p. 68.

[11]SCAR Bulletin, Polar Record, Vol. 19, No. 120, 1978, pp. 293-326, at pp. 318-319.

[12]Op. cit., p. 54.

[13]Roberts, "International Cooperation for Antarctic Development: The Test for the Antarctic Treaty", op. cit., p. 338.

[14]Wilkes and Mann, op. cit., pp. 34-35.

business practice to release information of either a proprietary or commercial nature. Until now, it must be said that a problem in this regard has not arisen, for, as Schatz says,

> [t]here is nothing secretive about this (information). The records of United States geology in Antarctica are in the international scientific community's world data centers.[15]

(c) Oceans

The first reference to publication of the results of marine scientific research in an international instrument is found in the 1958 Continental Shelf Convention, where publication of results is apparently a condition for the consent required for the conduct of pure research (Article 5[8]).

Part XIII of the ICNT Rev. 1 contains a provision under which States are to make available "knowledge resulting from marine scientific research by publication and dissemination through appropriate channels" (Article 244). This is an oblique reference to both scholarly periodicals and the World Data Centres. Article 244 then obliges States to take active steps to transfer knowledge to developing States and to give them the means to interpret data, information and knowledge.

Within the exclusive economic zone and the continental shelf, the research State must ensure that results are made internationally available as soon as feasible through appropriate national or international channels, unless the coastal State has, in granting consent, attached a condition, consonant with its own laws, that publication would be limited to situations involving resource-oriented research. Scientists strongly object to this clause, which they see as limiting their freedom to decide whether to publish or not.

---

[15]Schatz, "A Sea of Sensitivities", op. cit., p. 35.

The ICNT Rev. 1 further provides for a duty to give access to data and samples and, if requested, to "assist the coastal State in assessing such data and samples and the results thereof" (Article 249 [c and d]).

A coastal State may turn down a request for consent if

> "outstanding obligations exist with respect to a prior research project carried out by that State or organization with regard to conditions established in article 249" (Article 252 [d]),

e. g., failure to publish. There is precedent for this: Redfield cites a letter from an American official which asserts that

> there have been several cases where neglect to deliver cruise reports and associated data promptly have limited the flexibility of subsequent activities conducted by the same or another oceanographic laboratory.[16]

2. Publication as a Criterion for Distinguishing between Pure and Applied Research

(a) Outer Space

Here, no criteria have been developed for drawing a distinction, primarily because there are no zones of national jurisdiction within which space research takes place. It is possible, however, the criteria could prove useful for such activities as remote sensing of natural resources, which might be differentiated from, say, geodetic surveys of the earth's surface. The former are applied and normally commercial, whereas the latter are sometimes pure (and sometimes military).

[16]In Wooster, (ed.), op. cit., p. 58.

(b) Antarctica

Under the 1959 Treaty the results of all scientific studies must be published (Article III [1] {c}). This may be one reason why 'exploration and exploitation' has been distinguished from scientific research. This did not, however, deter the Antarctic Treaty Powers who gathered at the Nansen Foundation in 1973 from studying inter alia the problem of distinguishing between scientific research and commercial exploitation. According to Auburn, "[t]he Nansen Conference generally accepted that it would be possible to make the distinction in almost every case".[17] Auburn himself is less optimistic: "There may be little difference between certain scientific results and mineral prospecting information".[18] In fact, preliminary resource studies have already been undertaken, and "accurate resource appraisal has now become one fundamental justification for the continuation of basic earth-science research".[19] Auburn concludes that "exploration surveys under the guise of scientific research are well within the bounds of the Treaty", and that "[t]o attempt to draw the line between pure and applied science would be futile and is not warranted by the Treaty".[20] It remains to be seen whether the Consultative Parties do establish criteria for differentiating between the two; this will depend partly on whether a separate agreement on mineral resources is possible.

(c) Oceans

Some scientists argue that from a scientific point of view it is tenuous to distinguish between pure and applied marine research. Wooster, for instance, has asserted:

---

[17]"Offshore Oil and Gas in Antarctica", op. cit., p. 169.
[18]Ibid.
[19]Ibid., p. 146.
[20]Ibid., p. 169.

> The need to distinguish fundamental scientific research from other kinds of research is largely political. Scientists recognise that such a distinction has little real meaning and is extremely difficult to make in practice. At the same time, they sense a practical need to dissociate science from its military and commercial applications.[21]

Many countries, particularly developing ones, feel that even the 'purest' research will have a bearing on resources. In reality, much pure research that is intended to benefit mankind may, in the process, uncover practical benefit, whether actual or potential. Sometimes this is part of the reason for undertaking it: physical oceanography, for instance, has significance for weather prediction. Other times the benefit is incidental, as when the nineteenth-century "Challenger" expedition discovered manganese nodules. Conversely, much applied research generates pure research: studying the feasibility of disposing of nuclear waste, for example,

> "entails a number of investigations involving the spectrum of oceanographic disciplines. Studies range from determining the structure and composition of the basalt of the mid-plate region to water column dynamics, etc…".[22]

This is not an isolated example: as Ross and Smith point out, "most resource studies require a substantial amount of basic scientific material as foundation".[23]

---

[21]W. Wooster, "Conditions for Oceanic Research", in E. Borgese and D. Krieger, (eds.), The Tides of Change, New York, Mason Charter, 1975, pp. 310-317, at p. 313.

[22]"Scientists Study Possibilities for Nuclear Waste Disposal in Deep Seabed", W. H. O. I. Notes, Vol. 8, No. 1, 1976, pp. 1-3 at p. 1.

[23]D. Ross and L. Smith, "Training and Technical Assistance in Marine Science- a Viable Transfer Product ", Ocean Development and International Law Journal, Vol. 1, 1973, pp. 93-120, at p. 106.

In many cases the motivation of the researching State is ambiguous. To study an oil spill, for instance, may be considered applied research, while the study of the effect of oil on water is called pure research. In a good number of cases the motivation is mixed. What it comes down to is that the further away from application, the purer the research. Pure does not mean no application- it may even mean general application, but basically it does imply that the application is not immediate, or that at least the intention is not to create immediate benefits of an exclusive nature. Still, pure research may be spurred by immediate needs. As Franssen notes,

> [s]cientific research on the geological, physical, chemical and biological phenomenon (sic) in the oceans adds to our general knowledge of resource exploitation. However, only in a few instances does scientific research appear to have an immediate impact on exploration.[24]

'Intent' is the general basis upon which a distinction is drawn in law of the sea between pure and applied research. One way of establishing the intent of the researching State is, obviously, to require a statement of what that intent is. Many less developed countries, however, consider this inadequate because history has shown that much military and commercial activity has been undertaken under the guise of 'pure' research.

Another way consists in examining the equipment and/or methods to be employed in a project. For example, Knauss confidently asserts: “To scientists, the difference is obvious between bona fide scientific programs and those directed to oil exploration”.[25] With respect to seismic profiles, for instance, the grid patterns are said to differ markedly between resource-

[24]M. Franssen, "Oceanic Research and the Developing Nation Perspective”, in Wooster, (ed.), op. cit., pp. 179-200, at p. 188.
[25]J. Knauss, "Development of the Freedom of Scientific Research Issue of the Third Law of the Sea Conference”, Ocean Development and International Law, Vol. 1, 1973, pp. 93-120, at p. 106.

oriented and pure research.[26] Objective criteria for distinguishing might have helped in the Shackleton Incident where, according to Auburn,

> the British view was that conventional geophysical techniques were being employed on a plate tectonics project. Argentina was concerned that research was being conducted on its continental shelf which would lead to the exploitation of hydrocarbons.[27]

This was not really the core of the problem, for the case involved a longstanding territorial dispute.

Whether or not the techniques for pure and applied research differ discernibly (equipment seldom does), there may still be knowledge gained by pure research which could be of practical benefit. It will never be possible to stop this; one can only try to ensure that everyone, or, out of deference to the coastal State, no one, has access to the information. Thus, the objective criterion becomes whether or not the results of the research are to be published.

Such a system for distinguishing between pure and applied research is not new: the 1958 Continental Shelf Convention links pure research with that which is published (Article 5[8]). In the same year, Schaefer, the United Nations expert consulted by the 1958 Conference, defined fundamental research as “any study intended to add to the sum of human knowledge about the

[26] Ibid.
[27] "Offshore Oil and Gas in Antarctica”, op. cit., p. 141.

world, regardless of its application".[28] One could argue that "fundamental research" with no intent of publication is a contradiction in terms.[29]

While at UNCLOS III a number of States are on record as holding that one cannot adequately distinguish between pure and applied research,[30] and Ireland criticised a particular proposal because it contained no guidelines on how to make such a distinction,[31] the independent Pacem in Maribus proposal of July 1971,[32] which gained wide circulation, drew a distinction between open research and limited exploration. Open research was defined as being intended for mankind's benefit and being characterised by prompt availability and full publication of the results. There would also be the possibility of coastal State participation in projects for which consent was required. In contrast, limited exploration is that which is intended for the benefit of a select group, as evidenced by restrictions on publication and by the lack of availability of data and samples.

This and other systems employing the criterion of publication are not without their problems. First, the coastal State has no guarantee that the research State will actually publish. This may well be a problem of enforcement, but it is one with very real significance. As Franssen says,

> [h]ow can a developing country make sure that the scientist, under the guise of pure research, is not at the same time also collecting material and information for resource development that may one day be of great value

[28]Official Records, Vol. VI, p. 89.
[29]Cf. Brown, op. cit., p. 360.
[30]E. g., Official Records, Vol. VI. Canada, p. 94; Yugoslavia, p. 96.
[31]Ibid., p. 96.
[32]Cited in Wooster, (ed.), op. cit., p. 204

> for some international oil or fishing company that wishes to negotiate for the right to exploit such resources off the coast of the developing state?[33]
>
> …
>
> The fact remains that oil geologists still continue to frequent the labs of most oceanographic institutes to examine the data collected by marine scientists.[34]

Second, one never knows in advance in what detail the results will be published, and when. As Auburn notes in connection with the Antarctic, to propose open publication does not take into account the difficulty that some scientific results are only made known after many years, and some are never published at all.[35]

If and when results are published, not everyone can interpret them, and therefore the research State may well be in an advantageous position vis-à-vis the coastal State as regards, say, drilling rights. Scientists do not deny this; in fact, as Winner notes,

> they acknowledge that the results of basic research may, in the short run, incidentally benefit one political or industrial faction over another. But it is virtually an article of faith among marine scientists that in the long run, the benefits from this knowledge will spread to the entire international community.[36]

Unfortunately for marine scientists, many less developed countries are not satisfied or reassured by this, for they want direct benefits now.

---

[33]Op. cit., p. 182.
[34]Ibid.
[35]Auburn, "Offshore Oil and Gas in Antarctica", op. cit., p. 169.
[36]Winner, op. cit.

The ICNT Rev. 1 distinguishes broadly between pure research (Article 246[3]) and applied research (Article 246[4]); and while intention to publish is not explicitly employed as an objective criterion for determining whether the research is pure or applied, it is difficult to conceive of pure research which would not be intended for publication, since the characteristic of that research is that it is being undertaken "in order to increase scientific knowledge of the marine environment for the benefit of all mankind" (Article 246 [3])). Moreover, there is a tacit distinction between pure and applied research in Article 249, which requires States to make available research results internationally unless the coastal State objects.

Article 251 of the ICNT Rev. 1 obliges States, through appropriate international organisations, to develop criteria for distinguishing between various types of research. In the meantime, it appears that publication is not an explicit criterion: the real distinction between pure and applied research is that the latter

> (a) is of direct significance for the exploration and exploitation of natural resources, whether living or non-living;
> (b) involves drilling into the continental shelf, the use of explosives or the introduction of harmful substances into the marine environment;
> (c) involves the construction, operation or use of artificial islands, installations and structures as referred to an Articles 60 and 80 (Article 246[4], ICNT Rev. 1.)

3. General Conclusions

There is a general obligation to publish results of scientific research in all three areas. As military research is not included in the definition given to scientific research, there is no question of it being an exception to the rule. The question is, however, whether the 'as far as feasible' or 'to the greatest extent possible' clauses rob the obligation of its normative value. It would seem

plausible to view the obligation to publish as a real one, which is the counterpart of the freedom of scientific research. The meaning of the term “as far as feasible” is probably that in exceptional cases, i. e., where the security of the State would be jeopardised, the State can refrain from publishing results. This is merely recognition on the fact that even much pure research can have vital military significance. Another problem is that if the State must publish, it may not be in a position to force scientists working independently to actually publish.

This general duty to publish, when it comes to economic zone or shelf research, applies only to pure research.

While there is a general duty to publish and make freely research results available , such things as data and samples are normally acquired only on an exchange basis, or, as in the case of moon samples- where exchanges are hardly possible, on a voluntary basis and unilaterally.

In outer space and in the Antarctic there is no criterion for distinguishing between pure and applied research, largely because all the research being conducted has been pure. In the oceans, however, there has long been a distinction between pure and applied, and while it is often a tenuous one, publication has served as the criterion upon which such a differentiation is made: research is considered pure if it can be established that the intention is to publish the results. This criterion, however, is not the only one employed in the ICNT Rev. 1.

Although this system is by no means perfect, it does offer a concrete basis for deciding either way. Unless a better method is devised, this may in the future serve in outer space and in the Antarctic as well, as more and more applied research is undertaken in those areas.

PART SIX. MISCELLANEOUS RULES

CHAPTER I. TRANSFER OF SCIENCE AND TECHNOLOGY

1. Outer Space

There is nothing in any multilateral space convention on the topic of the transfer of space technology, though the clauses on publication and especially those on the exchange of results could be considered a type of transfer of scientific knowledge. COPUOS, the Outer Space Division of the United Nations and COSPAR have, however, all been active in the field, but almost exclusively in terms of applications of space technology rather than actual transfer.[1]

2. Antarctica

Here again there is nothing in the 1959 Treaty on this subject, and SCAR has not interested itself in the topic. On the other hand, two developing countries are Consultative Parties (Chile and Argentina). Ironically, these two countries are amongst the more vociferous of the 'territorialists' and have deliberately sought to keep the Group of 77 and international organisations from 'meddling' in the Antarctic.

Most countries lack the scientific infrastructure to engage in Antarctic research, and others are disinterested in either undertaking such research or using the results which are available to all. A curious argument has been advanced for excluding most less-developed-countries (LDCs) from resource-oriented activities: Oxman has written that

---

[1]See U. N. Space Activities and Resources, op. cit.

> [t]he number of persons, natural or juridical, willing and able to engage in living or mineral resource activities in Antarctica is severely limited by factors such as training as well as cultural and climatic background. Even the most ardent advocates of a new economic order may be skeptical about the value of transferring Arctic technology to tropical developing countries- except, of course, from the perspective of one or two tropical proto-industrial states.[2]

3. Oceans

Development and transfer of marine science and technology take up all of Part XIV of the ICNT Rev. 1. There is a duty for States to cooperate, either directly or through international organisations, within their capacity, to promote the development and transfer of marine science and technology on fair and reasonable terms and conditions (Article 266[1]), as well as to promote that development and transfer in respect of States which need and request technical assistance "with a view to accelerating the social and economic development of the developing States" (Article 266[2]).

Additionally, States are to try to foster favourable economic and legal conditions for the transfer of marine science and technology for the benefit of all parties concerned on an equitable basis (Article 266[3]), though in promoting such cooperation proper regard is to be accorded all legitimate interests (Article 267).

According to Article 268, the basic objectives to be promoted are:

> (a) the acquisition, evaluation and dissemination of marine technological knowledge and the facilitation of access to it;
> (b) the development of appropriate marine technology;
> (c) the development of the necessary technological infrastructure to facilitate the transfer;

---

[2]B. Oxman, "The Antarctic Régime: An Introduction", University of Miami Law Review, Vol. 33, No. 2, 1978, pp. 285-297, at p. 295.

(d) the development of human resources through training and education, particularly of nationals of LDCs;
(e) international cooperation at all levels.

To achieve these basic objectives, states must, inter alia, endeavour to

(a) establish programs of technical cooperation;
(b) promote favorable conditions for the conclusion of agreements under equitable and reasonable conditions;
(c) hold conferences and the like;
(d) promote exchanges of experts, including scientists and technologists;
(e) undertake bilateral and multilateral projects, as well as joint ventures (Article 269).

There are also several clauses on international cooperation which are to be implemented where possible through existing programs (Article 270). On a more specific level, there is an obligation to develop guidelines, criteria and standards to be adopted for the transfer of technology, taking into special account the needs of LDCS (Article 271), a duty to coordinate international programs (Article 272), and an obligation to actively cooperate with international organisations and the Authority to encourage and facilitate the transfer of skills and technology (Article 273).

Certain States are obliged, in coordination with international organisations, to promote the establishment, especially in LDCs, of national and regional scientific and technological centres for research so as to stimulate the conduct of marine scientific research by LDCs and so as to foster the transfer of technology (Article 275). Finally, the authority has certain duties of its own: it must ensure, for instance, preferential training for nationals of LDCs (Article 274).

As for current activities, the IOC is the principle organ in marine affairs dealing with the subject of transfer of technology. UNESCO's Division of Marine Affairs participates in these

activities as well by building up national capabilities, partly under its Training and Education in Marine Affairs Program (TEMA).[3]

There has also been a substantial amount of bilateral cooperation, just one example being a program involving the University of Rhode Island (United States) and Tanzania.[4]

4. Conclusions

There is nothing in either the Outer Space or the Antarctic treaties relating to transfer of technology, although compliance with the duty to publish is in effect a transfer of such knowledge, and mechanisms do exist to facilitate this transfer. In outer space there is also an attempt to bring some of the other benefits of scientific research to LDCs.

It is in the oceans that the question is the most important. This is owing partly to the current debate going on in UNCTAD, partly because of the influence of the Group of 77 at UNCLOS III, and partly because of the contribution the transfer of technology can make to alleviating certain immediate needs, e. g., food. Perhaps as a result of this situation, nowhere is the gap between developed and less-developed countries greater than in outer space and the Antarctic.

---

[3]IOC Manual, Part I, op. cit., Section 5, pp. 1-2.

[4]G. Bello, "Present State of Marine Science and Oceanography in the Less Developed Countries", International Lawyer, Vol. 8, 1974, pp. 231-241, at p. 233.

CHAPTER II: RESPONSIBILITY AND LIABILITY

1. Outer Space

According to Article VI of the 1967 Treaty, State Parties bear international responsibility for national space activities, regardless of whether these activities are undertaken by government agencies. They must also ensure that national activities are carried out in conformity with the Treaty. Responsibility for activities of an international organisation, on the other hand, is borne by both the organisation and States Parties participating in it. Finally, a launching State is, pursuant to Article VII, internationally liable to another State Party or to its natural or juridical persons if damage is caused by the objects launched by it or by its component parts, when the damage occurs on land, in air space or in outer space.

The 1971 Liability Convention expands these rules significantly. First, it makes the launching State absolutely liable to pay compensation for damage caused by its space objects on the surface of the earth or to aircraft in flight (Article II), though the launching State is exonerated in cases of gross negligence or of willful acts of omission by a claimant State (Article VI). In contrast, where damage has been inflicted in space by a space object on the space object of another State or persons or property on board, the offending State is liable only if damage is attributable to its "fault" (Article III), i. e., a delict is required. Marcoff reasons that this dual system is due to the special situation encountered in space where, for instance, it is difficult to ascertain facts.[1]

[1]Op. cit., pp. 545-548.

The Liability Convention also covers a number of other situations. When two States cause damage to another, the first two States are jointly and severally liable to the third State, the liability being absolute if the damage is caused on the surface of the earth; elsewhere, liability is based upon the "fault" of either of the first two States (Article IV). For joint and several liability, the burden of compensation is apportioned in accordance with the extent to which they were at fault; if this cannot be established, the compensation is to be divided equally (Article IV).

As for joint launchings, the launching States are jointly and severally liable, though it is unclear who shall pay the third State in the absence of a special agreement among the launching States; the Liability Convention only says that a State which is paid may present a claim for indemnification to others.

The Liability Convention institutes elaborate procedures for obtaining compensation, including especially the recourse to a Claims Commission if no settlement is reached within a year (Article XIV). In either case, the amount of compensation is to be determined "in accordance with international law and the principles of justice and equity" (Articles XIV, XIX), and the claimant is entitled to restitutio in integrum, i. e., reparation which will restore it to the condition which had existed prior to damage being caused (Articles XII, XIX).

The last point to note is that damage means loss of life, personal injury or other impairment to health, and loss or damage of property belonging to other States, persons or international intergovernmental organisations (Article 1[1]). Marcoff asserts that damage must be direct,[2] but it is probably more exact to say that it must be "real" and effective in the sense

[2]Ibid., p. 550.

that one cannot, for example base a claim merely on the fact that one's sovereignty has been violated.

There appears to be nothing in the 1967 and 1971 Conventions to cover other situations which have in fact already presented themselves- namely, situations where attempted joint launchings cause damage to one or more of the parties involved, e. g., ESA-NASA's GEOS and OTS failures in 1977. The only potentially relevant clause appears to be Article VII of the Liability Convention, which excludes foreign nationals participating in a project from receiving damages. Presumably, then, the situation must be covered by special agreement between the parties concerned. Nor is the situation which existed in the Cosmos 954 affair covered: in that incident no damage was caused by the fall of the Soviet spacecraft on Canadian territory in January 1978. The real question is whether Canada can recover costs incurred in attempting to prevent damage[3] and in using scientific and other personnel to scout for radioactive contamination.[4] Haanappel reports that Canada made an estimated three million dollar claim in April 1978.[5]

2. Antarctica

As the 1959 Treaty is silent on the subject of responsibility and liability, one must resort to the customary rules. The rules outlined below in connection with the oceans may be said to apply mutatis mutandis to the Antarctic.

---

[3]P. Haanappel, "Some Observations on the Crash of Cosmos 954", Journal of Space Law, Vol. 6, No. 2, 1978, pp. 147-149, at p. 148.
[4]S. Gorove, "Cosmos 954: Issues of Law and Policy", Journal of Space Law, Vol. 6, No. 2, 1978, pp. 137-146, at p. 138.
[5]Op. cit., p. 148.

3. Oceans

There is only one article in the ICNT Rev. 1 relating to responsibility and liability for marine scientific research activities. According to Article 263, States and competent international organisations are responsible for ensuring that research, whether undertaken by them or merely on their behalf, is conducted in accordance with the ICNT Rev. 1. They are responsible and liable for any measures which they have taken towards foreign research when these measures are in contravention of the provisions of the ICNT Rev. 1, "and shall provide compensation for damage resulting from such measures." They must also provide recourse to domestic courts and agree to cooperate in the development of international law relating to criteria and procedures for the determination of liability, assessment of damage, the payment of compensation and the settlement of related disputes.

Thus, this was one of the areas left largely untouched by the ICNT Rev. 1, and as such is ripe for a separate convention. In the meantime, customary international law prevails. According to Caflisch, international responsibility

> can arise for the researching State only in the following three situations: i) The research is being undertaken by the researching State itself, and the injury has been inflicted directly on the coastal State; ii) although the research is being carried out by private persons, the injury is due to the lack of diligence shown by the State with which they are connected; iii) a private institution or an individual seeking reparation for injuries resulting from research activities have suffered a denial of justice in the courts of the researching state.[6]

[6]Op. cit., pp. 890-891.

As for injuries caused by a coastal State to foreign states, individuals or institutions carrying out research, liability for injuries, Caflisch believes, will be with whoever has behaved unlawfully. The coastal State's international responsibility may arise where: a) an injury imputable to the coastal State itself directly affects the right of the research State; b) an injury is imputable to the coastal State itself because it lacked due diligence over its private citizens or institutions; or c) foreigners seeking reparation are denied justice in coastal States.[7] Thus, these rules are similar to the ones involving responsibility and liability of the researching State.

4. Conclusion

Conventional rules on responsibility and liability vary greatly from area to area. In outer space they are well developed, although it appears that they weigh somewhat in favour of States with a space capability as opposed to those who may suffer damages.

In the Antarctic and also to a large extent in the oceans one is left with the customary rules generally applicable in respective responsibility and liability.

[7] Ibid., p. 891.

CHAPTER III. SETTLEMENT OF DISPUTES

1. General Conventional Clauses

(a) Outer Space

As the preamble to the 1967 Treaty makes a general reference to the United Nations charter, the dispute settlement procedures contained therein may be deemed to apply to outer space as well. The only other dispute settlement clauses are those which appear in the Liability Convention in relation to the settlement of claims.[1]

(b) Antarctica

According to the 1959 Antarctic Treaty, aside from the duty to consult over jurisdictional disputes (Article VIII[2]), in the event of any dispute concerning interpretation of the Treaty, or the application of it, Parties must consult with a view to having it resolved by any one of several procedures mentioned by Article 33 of the United Nations Charter (negotiation, inquiry, mediation, conciliation, arbitration or judicial settlement, or other peaceful means of their choice) (Article XI[1}). Failing that, if all Parties involved agree, the dispute can go to the International Court of Justice; if they are unable to do so, they must still try to resolve the dispute by any one of the means listed earlier (Article XI[2]). As the Treaty 'freezes' the various claims to the region (Article IV[2]), it is implicit that the claims themselves are not subject to the dispute settlement procedures of the Treaty.

---

[1]See supra, Part Six, Chapter 2.

(c) Oceans

For marine scientific research generally, the ordinary dispute settlement procedures of the ICNT Rev. 1 will apply. In other words, unless it is otherwise agreed by the parties to them, disputes involving interpretation or application of the proposed convention are, as a basic rule, subject to the procedures laid out in Section 2 of Part XV (Article 264). In that section State Parties are given a choice of fora to be selected by means of a written declaration: the Law of the Sea Tribunal; the International Court of Justice, and the arbitration tribunal for the convention.

There are, however, important exceptions to this basic rule. The coastal State is not obliged to submit to adjudication any dispute arising out of a) the exercise by the coastal State of a right or discretion in accordance with Article 246, or b) a decision by that coastal State to terminate a research project in accordance with Article 253. The right mentioned in article 246 is that of regulating, authorising and conducting research in the economic zone and on the shelf. The discretion mentioned in article 246 is that of withholding consent in certain circumstances- if the project is directly resource related, involves drilling, explosives or harmful substances, or artificial islands and structures, or if the plans were inaccurate or if the researching State has outstanding obligations from a prior research project. According to Article 253, the coastal State has the right to require cessation of research in progress if it does not conform to the plans or if the participation of the coastal State is not being complied with.

This does not mean that no dispute involving research in the economic zone or on the shelf is justiciable, however. Article 296(a) infers this when it states that

> when it is alleged that there has been a failure to comply with the provision of Articles 264 and 253, in no case shall the exercise of a

> right or discretion in accordance with Article 246 be called into question.

The apparent reason for distinguishing between “right” and “discretion” is that whereas the latter can be exercised without any accounting and at all times, the former is counterbalanced by an obligation to grant access for pure research as well as to ensure that the consent will not be “delayed or denied unreasonably". Presumably, then, it is disputes involving this obligation which are justiciable. However, the normative character of this obligation is mitigated by the fact that consent is required only “in normal circumstances”. Thus, a State could argue that it was under no obligation to grant consent for a specific proposal owing to the fact that “normal circumstances” did not prevail. On the other hand, if there is a basic obligation to settle the dispute, it may be for a court or tribunal to decide what “normal circumstances” are, in the same way as it might determine if delays were unreasonable.

2. Practice

(a) Outer Space

The only known dispute in outer space involved Cosmos 954. This, however, did not concern the question of scientific research in any way, as Cosmos 954 was a reconnaissance satellite.

(b) Antarctica

The Antarctica Cases of the 1950s, involving disputes between the United Kingdom and Argentina, and the United Kingdom and Chile, respectively, involved scientific research only in

that it was a scientific base which was the scene of occasional scuffles between Argentina and the United Kingdom.[2]

(c) Oceans

There have been several incidents involving marine scientific research; these have involved seizure,[3] attempted seizure,[4] threat of seizure,[5] charges of harassment,[6] or looting and kidnapping.[7] The Aegean Continental Shelf Case (Greece v. Turkey), which was brought before

---

[2]Antarctica Cases (U. K. v. Argentina; U. K. v. Chile). I. C. J. Reports, 1956, pp. 12, 15.

[3]According to Kildow, "[i]n a letter sent on 10 April 1978 to John Knauss of the University of Rhode Island, William Sullivan of the Department of State reported that the Brazilian Navy had seized two ships in its waters operating without permission (R/V Pillsbury of the University of Miami and the USSR's Noaneatkin) and complained of 'eight other incursions'." In Wooster, (ed.), op. cit., p. 22.

[4]On 4 February 1976 the Argentine destroyer 'Almirante Storni' intercepted the British vessel 'Shackleton' eighty-seven miles south of the Falklands, ordered it to stop for 'inspection' and when it refused, fired salvos over the bow. On 6 February 1976 the United Kingdom protested in the United Nations Security Council against what it termed an illicit act against a research vessel, unarmed, conducting pure research on the high seas as part of an international program. Doc. S/11972, 6 February 1976, p. 95.

Argentina, for her part, replied in a letter to the President of the Security Council of 10 February 1976, charging a serious violation of the rules concerning Argentinian maritime jurisdiction by the "Shackleton" which, it claimed, was conducting geophysical and geological research clearly destined for geological prospecting with a view toward the eventual exploitation of hydrocarbons. Doc. S/11973, 10 February 1976, p. 96.

[5]In December 1973 the "Atlantis II" was on a cruise to the Carioca Trench. According to W. H. O. I. Notes, Vol. 2, No. 4, December 1975, p. 51, "[t]he Trench lies outside the 12-mile coastal limit declared by Venezuela but close to some islands she claims. Procedures for obtaining permission to conduct research in the territorial waters of a country claiming more than the United States' present three-mile limit have never been altogether established and resulting confusion included the ship's being warned off the site by a gunboat."

[6]In the Security Council debate of 11 August 1976 Turkey claimed "that since Aug 6, 1976, the vessel (MTA SISMIK I) was under the harassment of vessels and aircraft belonging to the Greek Navy and Air Force". Doc. S/12172, 11 August 1976, Annex II, at p. 2.

[7]In February 1979, it was reported that a group of Maldive Islanders looted an American-owned oceanographic survey ship, the "Alysse Maru", in the Indian Ocean and kidnapped crewmen of the ship. The ship apparently had sailed into some atolls without clearance. The dispute was

the International Court of Justice, related essentially to the delimitation of the continental shelf and only secondarily to the right to conduct scientific research on that shelf.[8]

3. Conclusions

In outer space, aside from the special settlement of claims procedure, United Nations Charter provisions apply in respect of dispute settlement. In the Antarctic, the Charter dispute settlement procedures are incorporated into the 1959 Treaty. In the oceans, the same procedures apply to scientific research as to other activities, a major exception being research in the exclusive economic zone and on the continental shelf, where in some instances the coastal State is under no obligation to settle disputes involving the exercise of its discretion.

settled when the United States and the Maldive Islands signed a joint statement to the effect that the affair was the result of a misunderstanding and agreed to drop legal action. The New York Times, 20 February 1979, p. 4; 21 February 1979, p. 11; 26 March 1979, p. 7.

[8]Aegean Continental Shelf Case, (Greece v. Turkey). Judgment, I. C. J. Reports, 1978, p. 3.

PART SEVEN. CONCLUSIONS

1. Introduction

In this concluding part the various intermediate conclusions reached in the course of the thesis will be presented in comprehensive fashion. This will be achieved first through a synthesis of the conclusions reached in each chapter for the three areas. Following this there will be a résumé of the rules governing each area, an attempt here being made to compare the three regions and their regime for scientific research as a whole. Finally, in the general conclusion a number of principles will be extracted from the multitude of particular rules which have been found to exist and which have been previously examined.

2. Synthesis of Conclusions Pertaining to Subject Matters

(a) Right of Access

At least for outer space and the oceans, there have been régimes of open access, and this access has been restricted neither to the Parties to the relevant treaties nor to States, though in space international organisations have but limited competence. In the Antarctic the Consultative Parties have attempted to control access by third parties but have not completely succeeded. The lack of any express treaty provision for activities of international organisations in the 1959 Treaty has not prevented them from gaining access to the area. None of the areas has access been limited to state organs, though in outer space sponsorship is required.

On the whole, at least for the Antarctic in outer space, there do not appear to be any cases where access has been successfully denied on legal grounds. In the oceans the problem is

complicated by difficulties land-locked States have in their dealings with transit States; other problems are caused by various zones of national jurisdiction such as the continental shelf and economic zone. In the final analysis, on a practical level the greatest impediments to access in all three areas appear to be non-legal, i. e., technological, financial and geographic.

(b) Peaceful Use

Conventionally, there appears to be some significance in the fact that outer space is to be used for peaceful purposes, whereas the moon and other celestial bodies are reserved exclusively for peaceful purposes, for the prohibition of military use of the latter areas have a much higher degree of concreteness. In the Antarctic the land area at least is reserved exclusively for peaceful purposes; this may or may not hold for the maritime areas. Moreover, in the Antarctic Treaty military activities are not characterised as peaceful use, whereas in many cases they can be considered as such in outer space and the oceans. As far as the oceans are concerned, the high seas are to be used for peaceful purposes, whereas scientific research is to be exclusively for peaceful purposes. This may rule out military intelligence as a type of scientific research, though not as a type of legitimate use of the oceans.

As regards practice, the three areas vary significantly. In outer space, use is divided roughly between the civilian and the military- most of the scientific research, however, seems to be civilian. In the Antarctic, much of the support and funding is from the military, but little of the research is of a military nature. In the oceans, on the other hand, much of the activity is military and much of the scientific research is funded or undertaken by the military, sometimes as a cover for intelligence.

Thus, it is difficult to establish what constitutes “peaceful use”. In the final analysis the best solution might be to distinguish between licit and non-licit activities rather than to rely on a simple distinction between peaceful and military use.

(c) Benefit of Mankind

The concept of 'mankind' carries different weight for each of the three areas. Terms such as “interest of mankind” and “benefit of mankind” have a rather vague meaning. Over the past twenty years, however, and especially during the past decade, trends have emerged which extend the idea of 'common heritage of mankind' to actual ownership of an area and its resources. This is the case for the deep-seabed and, progressively, for the moon as well; isolated proposals have also been made in this direction with respect to the Antarctic.

On a parallel level, the concept is emerging in the law of the sea from an essentially 'negative' one whereby, for instance, certain acts deemed harmful to mankind are prohibited, to one which is prescriptive, i. e., one which would oblige States to act in a certain way for the benefit of all. In outer space this obligation has been recognized at least since 1967, though it has not as yet been given much firm consent.

Given the inherent link, recognised for centuries, between the idea of science and the notion of mankind, it is perhaps surprising that proposals have not gained impetus to proclaim scientific research itself the common heritage of mankind, or part of it, for example in the law of the sea.

Although the requirement that States act for the benefit of mankind may be regarded as a general principle, it is difficult to pinpoint what particular rules it has engendered. It may be

stated, however, that that requirement is undoubtedly linked to the duty to publish and to refrain from citing scientific research in support of sovereign claims.

(d) Freedom of Scientific Research

There is a conventional freedom of scientific research in all three areas which has attained customary status in all three areas as well, though it applies only to certain areas of the oceans and includes land-based research into outer space. In both outer space and the Antarctic the freedom is linked to the duty to cooperate. In none of the areas is the freedom conditional upon reciprocity; nor does it involve any form of immunity currently.

The freedom extends in all three areas to States, scientists and international organisations, though in different ways and subject to different conditions, e. g., sponsorship. In none of the areas does it appear that there was any intention to limit the enjoyment of the freedom to Parties to the relevant Conventions.

There has been little tendency to include under the freedom activities with a military objective, and only in the oceans has it really covered both pure and applied research to any significant extent.

(e) The Right to Conduct Scientific Research

Whereas there exists a right to conduct scientific research in all areas of outer space in the Antarctic, in the oceans this right is limited in certain areas. An absolute right, i. e., a freedom to conduct marine scientific research, exists only for the high seas and the seabed, the two maritime zones beyond national jurisdiction. In the economic zone and on the continental shelf the régime is one of coastal State consent, which must, however, be granted under “normal” circumstances.

In the exclusive fishing zones which still exist the right applies only to non-fisheries research. In other maritime areas there is no right to undertake any type of research in the absence of coastal State consent, and the latter is under no obligation to grant such consent.

As for the practice of States in granting or refusing consent in zones where consent is required, it can be tentatively concluded that, in spite of repeated assertions that scientific research has been hampered or impeded, only half of the roughly forty reported incidents involved zones where the coastal State was under the any obligation to grant its consent in the face of certain objective situations. Thus, there are actually very few cases where rules of international law could have been transgressed. Moreover, in the few substantiated cases which are reported, administrative and bureaucratic problems have played a definite role, with distrust over the military or economic motivations of the researching State also weighing heavily. Nevertheless, the situation may deteriorate in years to come if the coastal State's jurisdiction over scientific research is not subject to review.

(f) Jurisdiction

Jurisdiction in outer space in the oceans is similar in that in both areas it is based, for vessels and spacecraft, as well as their crews, installations and equipment, on nationality and registry. In the maritime portions of the Antarctic, law of the sea rules apply equally, whereas for other parts of the Antarctic there is no uniform practice, other than for observers and the like. The 1959 treaty is silent about other persons as well as about installations and equipment.

The rules regarding jurisdiction over maritime research installations and equipment are also less than adequate. Given UNCLOS III's cursory treatment of the subject, a separate convention may still be required.

(g) The Right to Visit, Observe and Inspect

The right to visit is limited in both outer space in the Antarctic. In outer space there is a special right to track space objects. The right to inspect exists in all three areas; in the Antarctic it is a mechanism which has often been employed.

(h) Non-interference with Legitimate Use

A wide variety of means are resorted to for regulating conflicting uses in the three areas, ranging from absolute priority for scientific research to the proscription of unjustified interference by scientific research with other legitimate uses, and with a number of regimes in between, e. g., prior use and reasonableness.

The most sophisticated code is in the realm of outer space, as regards both the moon and the use of the radio spectrum. Here scientific research is given an important position and is protected both from other activities and from other scientific research. Here there is also a working definition of 'harmful interference', something which could usefully be applied, mutatis mutandis, in the Antarctic and the oceans. In the Antarctic a very flexible, pragmatic approach vis-à-vis legitimate use has been employed, with scientific research being accorded a privileged place. Paradoxically, it is in the sphere of ocean activities, where use is the most varied and extensive, that the rules regarding legitimate use are in the earliest stage of development.

(i) Scientific Research and Sovereignty

Conventionally there is a prohibition on the invocation of scientific research in connection with sovereignty in the three areas. This runs counter to the practice prior to the conclusion of the relevant treaties on the Antarctic and the oceans; outer space, on the other hand, may be by its very nature unoccupiable. In the Antarctic, the ostensible purpose of the conventional regime is to freeze old claims, whereas in the oceans it is to prevent new claims.

(j) Protection of the Environment

The rules relating to the conduct of scientific research are integrated with the rules for the protection of the environment for all forms of use in the three areas. There is, complimentarily, the odd special rule for scientific research, such as the duty to remove installations and equipment in the ocean subsequent to their use. It so happens that in the Antarctic most of the rules regarding the environment relate specifically to scientific research, this being the principle activity in the area; here, the Consultative Parties have in fact gone beyond their mandate and have regulated environmental matters not envisaged by the Treaty.

The various existing conventions demonstrate that progress has been made in the way ecological questions are treated internationally, starting from the relatively primitive concept of 'damage to human activities' inherent in the 1967 Outer Space Treaty to the notion of 'existing balance' incorporated in the 1979 Moon Resources Treaty and in the Antarctic marine resources convention proposals.

(k) The Duty to Notify

The duty placed upon States conducting or wishing to conduct scientific research to notify either other States or the international community at large of the plans or the results of their research varies significantly from area to area, especially as regards outer space and the Antarctic. In outer space that duty is by and large restricted to the post-research phase, while in the Antarctic notification must be given in advance; thus, there is a temporal difference. Procedurally, in outer space the notification must be, depending on the case, addressed either to other States or to the Secretary-General of the United Nations; in the Antarctic it is always directed towards other States. The difference between the two régimes is largely explained by their disparate status: outer space is not res nullius, whereas seven States lay claim to portions of Antarctica and all thirteen Consultative Powers have interests which are somewhat protected by the régime of notification. In both areas the notification must be given "to the greatest extent feasible". In outer space this absolves States from reporting military activities. In Antarctica, however, military activities are a priori illicit; therefore, there is no question of reporting them. In the oceans, notification, except as part of the seeking of consent or as applied to the International Seabed Area, is insignificant.

(l) The Duty to Consult

The duty to consult is a procedural rule of certain import in outer space, but only in the Antarctic is there an established, 'institutionalised' consultation mechanism which can, and does, lead to the creation of 'hard law'.

(m) The Duty to Provide Mutual Assistance

There is a duty to provide mutual assistance in all three areas. In outer space and in the Antarctic this duty is tantamount to a "principle", according to the relevant treaties.

(n) The Duty to Facilitate Scientific Research

There is a duty to facilitate the conduct of scientific research in all three areas, but the form that duty is to take differs in each. In outer space, given the geographic nature and legal status of space itself, as well as the relatively small number of States with a space capability, the duty is linked to that of cooperation with other States.

In the Antarctic, while many of the Recommendations made at the Consultative Meetings tend to facilitate scientific research, the only apparent obligation upon States to do so lies in the area of shipment of scientific materials.

In certain areas of the oceans the coastal State must facilitate foreign scientific research by adopting certain rules, etc. Here the duty is seemingly more concrete, but there is as yet no definition of what rules adopted by the coastal State are 'reasonable', or what constitutes 'uniform application' of these rules.

(o) The Duty to Promote International Cooperation

In all three areas there is a duty to promote international cooperation, though this rule assumes different forms in each area. It is not without reason, however, that in both outer space and the Antarctic it is linked with the freedom of scientific research, for without this link such freedom is illusory for most States.

There is now a very large body of practice regarding international cooperation in all three areas, of all types and between a large number of States and international organisations. Much but by no means all of this practice is covered by international treaties, and part of it falls outside the domain of public international law. A small part of that practice is in the form of international contracts, and some of it involves working relationships between national institutions, be they public or private, and their foreign counterparts.

A major part of the multilateral scientific cooperation occurs in the field of marine scientific research. Regional cooperation is limited to outer space and the oceans. The bulk of space cooperation is bilateral in character and covers a wide spectrum of types. In fact, there is such a large amount of regional and bilateral international cooperation in outer space that one is led to the conclusion that the duty to cooperate has become customary- a custom which is of course inscribed in the 1967 Treaty and which is closely linked to the freedom of scientific research. This is not just a procedural rule; there is an obligation to achieve a certain amount of substantive cooperation as well.

(p) The Duty to Publish

There is a general obligation to publish the results of scientific research in all three areas. As military research is not included in the definition given to scientific research, there is no question of it being an exception to the rule. The question is, however, whether the “as far as feasible” or “to as great an extent possible” clauses rob the obligation of its normative value. It would seem plausible to view the obligation to publish as a real one- a counterpart of the freedom of scientific research. The meaning of the term “as far as feasible” is probably that in exceptional cases, i. e., where the security of the State would be jeopardised, the State can refrain

from publishing results. This is merely recognition of the fact that even much pure research can have vital military significance. Another problem is that if the State must publish, it may not be in a position to force scientists working independently to actually publish. This general duty to publish, when it comes to economic zone or shelf research, applies only to pure research.

While there is a general duty to publish and make freely available information, such things as data and samples are normally acquired only on an exchange basis, or, as in the case of moon samples- where exchanges are hardly possible, on a voluntary basis and unilaterally.

In outer space and the Antarctic there is no criterion for distinguishing between pure and applied research, largely because all the research being conducted has been pure. In the oceans, however, there has long been a distinction between pure and applied, and while it is often a tenuous one, publication has served as the criterion upon which such a differentiation is made- the characterization of research as pure can be established if the intention is to publish the results. Although this system is by no means perfect, it does offer a concrete basis for deciding either way. Unless a better method is devised, this may in the future serve in outer space and the Antarctic as well, as more and more applied research is undertaken in those area.

(q) Transfer of Technology

There is nothing in the outer space or the Antarctic treaties relating to the transfer of technology, although the duty to publish is in effect a transfer of scientific knowledge, and mechanisms do exist to facilitate this transfer. In outer space there are also attempts to bring some of the other benefits of scientific research to developing countries.

It is in the oceans that the question of transfer of technology is the most important. This is so at least partly owing to the contribution that transfer of technology can make to alleviating certain immediate needs, e. g., food. Perhaps as a result of this situation, nowhere is the gap between developed and less-developed countries greater than in outer space and the Antarctic.

(r) Responsibility and Liability

The conventional rules on responsibility and liability vary greatly from area to area. In outer space they are very extensive, although it appears that they weigh heavily in favor of States with a space capability as opposed to those who suffered damages. In the Antarctic and the oceans one is left with the customary rules generally applicable in respect of responsibility and liability.

(s) Settlement of Disputes

In outer space, aside from the special settlement of claims procedure, only the United Nations Charter provisions apply in respect of dispute settlement. In the Antarctic, the Charter provisions apply as well. In the oceans the same procedures apply to scientific research as to other maritime activities, a major exception being for research in the economic zone and on the continental shelf.

3. Synthesis of Conclusions by Area

(a) Outer Space

The rules for scientific research are more or less integrated with those for the use of outer space generally. While the benefit of mankind concept is- the moon aside, not highly-developed, the notification régime, which can be seen as an offshoot of it, is. The rules are relatively

uncomplicated because of the lack of a jurisdictional problem. Cooperation plays a crucial role for many States. Rules on non-interference are sophisticated for one type of activity- namely, space radio research, which is already regulated terrestrially and which not only needs protection itself, but could interfere with other use as well. Non-military results of scientific research are released, but the emphasis is on exchange and special agreement. Transfer of technology is minimal, and the rules of responsibility and liability are highly developed, if still somewhat inadequate. All told, then, there is a fairly comprehensive regime for scientific research in outer space.

(b) Antarctica

The rules for scientific research constitute the bulk of the rules in the Antarctic, this being at present the predominant activity in the area. The freedom of scientific research is the cornerstone of the system, which is highly developed and reflects the particular socio-political and geographic situation the area finds itself in. The Consultative Powers have elaborated a régime for the conduct of research both in spite of and because of the area's controversial status; the elaborate notification régime and the lack of an agreed system for jurisdiction are reflections of this. The Consultative Meetings are the standard arena for the production of legal rules, many relating to scientific research, and the functioning of the system is unique. The freedom, however, is for all and has in fact been exercised by third parties. The importance and amount of scientific research in the area, and the compact number of interested parties, have favoured the establishment and functioning of this system; so has the virtual lack of competing activities, something which is in the process of changing and could jeopardize scientific research and the rules pertaining to it.

(c) Oceans

Though oceanic research has a long history, it has played a role secondary to other uses of the sea. Its emergence as a controversial issue coincides with two factors- nuclear tests and the extension of national maritime claims. The first issue has more or less been settled, but the second has caused difficulties, as the States claiming an extension of their national jurisdiction wish to exclude the freedom of scientific research from applying therein and to replace it by a régime of consent. Consent would, however, have to be granted for pure marine scientific research under normal circumstances. The existence of such a qualified right is justified by the benefit of mankind concept and the latter entails the duty to publish. It is also in the oceans that the transfer of technology question has been most discussed, one reason being no doubt the organization in that forum of the Group of 77.

4. General Conclusion

Notwithstanding some of the more obvious differences in their régimes for the three areas, and in spite of the fact that the rules have developed in scattered fashion, there are underlying similarities which could crystallise into certain principles of general application.

First there are some principles of a global character but which apply to scientific research in particular. In the first instance, all States have a right of access to the three areas. The second principle is that of use for peaceful purposes, which entails a duty to conduct scientific research exclusively for peaceful purposes. A further principle is the obligation to use the areas for the benefit of mankind, which means for scientific research that it must be open and that there must be cooperation.

Second, there are the principles which specifically pertain to scientific research. The foremost among them is the principle of the freedom of scientific research, which applies to parts of all three areas, which is customary in character and which encompasses States and international organisations as well as individuals. This principle is linked with the emerging view that scientific research should not, in the future at least, serve as the basis for any claim of sovereignty; to do otherwise would be to abuse the freedom and the notion of benefit of mankind. Another principle which is by now accepted is the proposition that at the very least, scientific research must not unduly interfere with other legitimate activities. Scientific research is, in turn, protected from other activities. A further principle is that scientific activities must conform with the relevant environmental regulations. These two principles, and that relating to sovereignty, have the character of rules of abstention.

As for the principles relating to the actual conduct of research, a first rule is that States and international organisations must notify other States of their research activities and should consult them whenever appropriate. Consonant with the notion of benefit of mankind, they should make research data and samples available to the international community. They must cooperate by facilitating and promoting the conduct of research, whether through international programs or by facilitating access to zones of national jurisdiction and by providing mutual assistance wherever is required. A further principle is that States and international organisations are liable for research activities carried out by themselves or persons under their jurisdiction to the extent provided for by the general rules on international responsibility. Finally, states must solve their disputes with respect to scientific research peacefully in areas where the freedom of scientific research applies. These, then, are the generally applicable principles which emerge. To

be sure, there are other rules, but the latter apply only to specific areas and not to all three. In terms of their legal value, however, there is no hierarchy amongst the principles and rules mentioned: they are all equally binding upon any State or international organisation conducting scientific research in outer space, the Antarctic and the oceans.

ANNEX I. INSTITUTIONAL MECHANISMS FOR INTERNATIONAL COOPERATION

1. Outer Space

(a) The United Nations Committee for the Peaceful Uses of Outer Space

The Committee for the Peaceful Uses of Outer Space is an organ of the United Nations General Assembly which was established in 1959 and whose principle function is to review international cooperation in space and to study practical and feasible means of promoting and extending such cooperation. The Committee, which is currently composed of forty-seven Member States, meets annually and adopts reports and recommendations which are submitted to the General Assembly. It has two Standing Committees, one on scientific and technical questions and the other on legal matters. COPUOS works by consensus and has produced a number of multilateral agreements open for signature by States at large, although it has no operational activities of its own. It is, however, backed up by the Outer Space Division of the United Nations Secretariat which, in addition to providing assistance to COPUOS, deals with other matters such as applications of space technology and the sounding rocket program. COPUOS itself recognises that its predominant concern has shifted over the years from purely scientific research matters to the practical benefits of space activities.[1]

[1]U. N. Space Activities and Resources, op. cit., pp. 8-9.

(b)The Committee on Space Research

Officially, the Committee on Space Research (COSPAR) is nothing more than a private non-profit organisation incorporated under French law and forming part of the International Council of Scientific Unions (ICSU) chain. Founded in 1958 at the end of the IGY, its membership includes twelve international scientific unions and thirty-four national scientific institutions. Its purpose, according to Article one of its Charter, is to further on an international scale the progress of all kinds of scientific investigations carried out with the use of balloons, rockets, or rocket-propelled devices:

> COSPAR shall be concerned with fundamental research. It will not normally concern itself with such technological problems as propulsion, construction of rockets, guidance and control.

COSPAR has an annual plenary meeting and is composed of an Executive Council and Working Groups. The Working Groups include participants from countries which do not have national organisations adhering to COSPAR, as well as representatives of WHO and WMO. Thus, while COSPAR itself has no international personality, some of its organs include entities which do. The activities of COSPAR are largely coordination and exchanges of information and views. The Committee has consultative status with COPUOS and is generally regarded as an independent body of experts.

(c) European Space Agency

According to the Convention establishing the European Space Agency (ESA), concluded on 30 May 1975,

> the purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems.[2]

This full-fledged international organisation came into being with the merger of two previous intergovernmental organisations- the European Space Research Organisation (ESRO) and the European Organisation for the Development and Construction of Space Vehicle Launchers (ELDO). Its goal is to harmonise Europe's space effort, and it does this by coordinating research, building spacecraft and sharing the use of joint applications satellites. It has eleven Member States which sit on the Agency's Council. The ESA Convention provides that the Council meet at ministerial level from time to time, addressing declarations and recommendations to the executive branch which is charged with the implementation of the Convention.

Of the several programs the Agency conducts, the most important for our purposes is the Scientific Program, which currently includes the International Sun Earth Explorer (ISEE) and International Ultraviolet Explorer (IUE) projects, to name but two. Until 1979 all ESA craft were launched by NASA under a Memorandum of Understanding of 1966[3] and a 1973 Memorandum pertaining to Spacelab.[4]

---

[2]Convention for the Establishment of European Space Agency, op. cit.
[3]Cited in U. N. Space Activities and Resources, op. cit., p. 138.
[4]R. Lewis, "Europe's Ambitious Plans for Spacelab", New Scientist, 28 September 1978, p. 832.

The ESA has the capacity to conclude international agreements with unanimous approval of its Council (Article XIV of the 1975 Convention). Examples of such agreements with non-Member states are those concluded with India, Brazil, Canada and Australia.[5]

2. Antarctica

(a) The Scientific Committee on Antarctic Research

The Scientific Committee on Antarctic Research (SCAR) is officially a non-governmental organisation. It was founded in March 1958 and consists of an Executive committee, ten Working Groups and several Groups of Specialists. It has, however, scientific associations from thirteen nations represented on it- all those countries participating in the Antarctic Treaty Consultative Meetings. It also includes representations from six international scientific unions. Virtually all of the scientific associations are national academies of science.

The purpose of the Committee is to coordinate and promote Antarctic research and to recommend projects and programs to be undertaken. It also acts as a clearinghouse for scientific data and information on activities in the region. Perhaps the most significant aspect of scar is the working relationship with the Antarctic Treaty Consultative Meetings. No less than twenty-four Consultative Meeting Recommendations mention SCAR. Some invite or encourage SCAR to make reports, to conduct studies or to collect data, while others acknowledge and welcome SCAR reports, which are often acted upon. The first few of the Recommendations called for direct action to be taken by national governments vis-à-vis SCAR, but by the Fifth Consultative Meeting a new approach was adopted which continues to the present: the Consultative Powers are

[5]U. N. Space Activities and Resources, op. cit., p. 138.

advised to get SCAR to cooperate through their respective national committees. This is a logical way to influence events, since the national committees are all heavily dependent upon government funds.

Thus, SCAR acts as a form of unofficial secretariat for the Antarctic Treaty régime; it is, technically speaking, independent, but in practice it has conducted all the studies requested of it, many of them of crucial importance.

3. Oceans

First, the institutions will be examined; this will be followed by an outline of the provisions of the ICNT Rev. 1 relating to scientific research and international organisations.

(a) The Intergovernmental Oceanographic Commission

The Intergovernmental Oceanographic Commission (IOC), founded in 1960, is a semi-autonomous branch of UNESCO which possesses its own Statutes, an Assembly, an Executive Council and a Secretariat. Membership is open to any Member State of the United Nations or of one of its organs; it currently stands at over ninety. The purpose of the IOC is

> to promote scientific investigation with a view to learning more about the nature and resources of the oceans through the concerted action of its members. (Article I[2] of the Statutes)

Its functions are enumerated in Article 2 of the Statutes and may be summarized as follows:

- to define problems requiring international cooperation in scientific investigation;
- to review the results of scientific investigations;
- to develop, recommend and coordinate with interested international organisations, international programs or simply those programs which require the concerted action of its members;

- to make recommendations to international organisations concerning activities related to oceanography;
- to make recommendations in order to strengthen education and training programs;
- to develop and make recommendations for assistance programs;
- to make recommendations concerning, and give technical guidance to, the marine scientific program of UNESCO;
- to promote the freedom of scientific investigation.

In performing these functions, the IOC must take into account the special needs of LDCs (Article II), something it has been criticised for neglecting in the past.

The Executive Council is responsible to the IOC Assembly, which meets every two years and issues directives which were adopted by a simple majority, though the Chairman is to strive to obtain acceptance of a given proposal by all Members. The main subsidiary bodies of the Commission are the working committees, which are intergovernmental, and the international coordinating groups, which are not.

As for the activities of the IOC, it is principally a coordinating and advisory unit which has played a leading role in planning programs such as the Long-term and Expanded Program of Oceanographic Exploration and Research (LEPOR), and the International Decade of Ocean Exploration (IDOE). It also cooperates with other agencies of the United Nations having an interest in marine scientific research -namely FAO, UNESCO itself, WMO & IMCO, as well as with the United Nations Secretariat in the Inter-Secretariat Committee on Scientific Programs relating to Oceanography (ICSPRO), a body created in 1969.

(b) The International Hydrographic Organization

While in existence for a long period of time, the International Hydrographic Organization (IHO) was only brought under a Treaty in 1967.[6] Located in Monaco, the forty-seven Member body, which is an international organisation in the full sense of the term, concerns itself mainly with coordination of hydrographic and other scientific activities, and is purely technical in nature.

(c) The International Council for the Exploration of the Sea

Established in 1902, the International Council for the Exploration of the Sea (ICES) is the oldest body dealing with marine cooperation. It is now governed by a Treaty,[7] Article 1 of which lays down the aims and objectives of this full-fledged international organisation which has a Secretariat in Copenhagen. These are: 1) to promote and encourage scientific research and investigation; 2) to draw up programs and organized research; and 3) to publish results of research activities. ICES has eighteen Member States and is regional in scope and activities, limiting itself to the North Atlantic. For our purposes, the most interesting element of ICES's activities has been the agreement to facilitate scientific research on the continental shelf.[8] This system, which was proposed at its annual meeting in 1964, was to include the drawing up of a list of member country research vessels and the annual exchange of cruise programs. It also provided for a list of impingements upon continental shelf and floor research. Members were to

[6]Convention of the International Hydrographic Organization, 3 May 1967, as amended to 1976. Reprinted in A. Peaslee, International Governmental Organizations, Constitutional Documents, Revised Third Edition, The Hague, Noordhoff, 1979, Part Three and Four, p. 306.
[7]Convention for the International Council for the Exploration of the Sea, 24 September 1964, as amended in 1970. Reprinted in ibid., p. 287.
[8]Arrangements to Facilitate Scientific Research on the Continental Shelf. Doc. M. 1970/Del. 9, Annex I. ICES.

grant general permission for routine scientific research sampling and probing of the seabed. So far the plan has been implemented by only two countries.

(d) The Scientific Committee on Oceanic Research

The Scientific Committee on Oceanic Research (SCOR), an international non-governmental body, was founded in July 1957 for the purpose of "furthering international scientific activity in all branches of scientific research". Membership consists of

> 84 marine scientists nominated by scientific institutions, and 11 scientists nominated by ICSU and by interested international scientific unions. Many other scientists are associated with SCOR through membership in the various working groups.[9]

These eighty-four marine scientists come from a total of thirty-four countries.

SCOR consists of a General Meeting which convenes every two years, as well as a number of working groups. It has also sponsored scientific projects, the most important being the International Indian Ocean Expedition (IIOE) During the early nineteen-sixties. In recent years, however, its principle activities have been of three types: convening scientific meetings; organising working groups; and acting as a "scientific advisory body" to the IOC.[10] In 1973 it set up an ad hoc Committee on the Freedom of the Seas.

(e) International Bodies, Marine Scientific Research and the ICNT Rev .1

The ICNT Rev. 1 provides for extensive activities on the part of international organisations in respect of scientific research, specifically concerning the right to conduct such research (Article 238) and the duty to promote and facilitate it (Article 239); but it also gives these organisations

---

[9]ICSU: Organization and Activities, op. cit., p. 94.
[10]Ibid., p. 95.

a role in the exchange of information and data (Article 245). In addition, States shall promote, through competent international organisations, the establishment of general criteria and guidelines to assist States in ascertaining the nature and implications of marine scientific research (Article 251). Finally, international organisations are to take appropriate measures to ensure the effective discharge of their functions and responsibilities as regards the transfer of technology (Article 278).

The clauses thus described refer variously to sub-regional, regional and global organisations, as well as to 'international bodies', which expression can be taken to include non-governmental organs such as SCOR. Portugal has compiled a chart of all the inter-governmental organs referred to by each clause.[11]

Thus, the ICNT Rev .1 confers heavy duties upon international organisations, even though they are third parties to the negotiations and to the future a law of the sea convention itself. As such they would be under no legal obligation to carry out these duties unless their respective assemblies so decide.

4. Conclusions

The types of institutional mechanisms available for international cooperation in the fields of outer space, the Antarctic and the oceans may be looked at, from the point of view of their character, as multilateral or regional organisations, and secondly, as to their status, as inter-governmental or non-governmental organisations. With no institution having a membership of

[11]Annotated Table on References to Institutional Mechanisms contained in the Informal Composite Negotiating Text, prepared by the Delegation of Portugal to the Third United Nations Conference on the Law of the Sea, Lisbon, March 1978, Rev .2.

over 100 states, it would be inaccurate or inappropriate to classify anyone as being universal. Moreover, two of the full-fledged international organisations which exist- ESA and ICES, are purely regional in character. Two other institutions are part of the United Nations system; these are the IOC and COPUOS, the former being a semi-autonomous unit of UNESCO, while the latter is a subsidiary organ of the General Assembly. These two institutions differ significantly regarding there functions or purpose, the IOC being largely scientific, with a tendency toward coordination and sponsoring, and COPUOS being a review body with legal drafting functions, engaging in little sponsoring, and with more emphasis on applied activities. The area with the least developed institutional mechanisms is the Antarctic, or reflection of the areas controversial status.

The non-governmental organisations involved in scientific research in the three areas- COSPAR, SCAR and SCOR, of course lack international personality, but, owing to the interplay between scientists and government and to the fact that government officials very often take part in their deliberations, the distinction between 'official' and 'non-official' decisions and pronouncements tends to become blurred. In the late fifties it was argued that Soviet representatives had made statements in ICSU, the parent non-governmental body to COSPAR, SCAR and SCOR, which amounted to binding international agreements.[12] While this is a dubious claim, since the statements in question did not take place in the context of international negotiations, it does point to the somewhat nebulous character of these organisations which fulfill many of the functions of intergovernmental organisations even if they are presently deprived of international personality.

[12]Baldwin, op. cit., p. 110.

ANNEX II- THE INTERNATIONAL GEOPHYSICAL YEAR

Some of the earliest international cooperation in scientific research involved outer space, the Antarctic and the oceans. The first of these ventures was the International Polar Year of 1882-83, which involved ships going to the Antarctic so as to observe a phenomenon of rare occurrence- the Transit of Venus. In 1932-33 the Second International Polar Year was held, fifty years after the first. By the mid-nineteenth century it was thought desirable and practical to organise the next one after only a twenty-five-year interval, and to make it world-wide rather than just polar-oriented.

To understand the organisation of the International Geophysical Year (IGY) planned for 1957-58, it is necessary to know something about the organization of the International Council of Scientific Unions (ICSU). As Baldwin sates, ICSU "is an international organization defying precise classification because of its mixed membership of governmental and nongovernmental scientific organisations".[1] It was founded in 1931 with the objective of encouraging international scientific activity for the benefit of mankind. It does this by initiating and designing, as well as coordinating, scientific research projects. The IGY is the biggest project ICSU ever organised. In 1953 a special committee- the Comité spécial pour l'annèe physique internationale (CSAGI) was set up to plan the IGY.[2] The Comité consisted of representatives of non-governmental

[1]Op. cit., p. 11.
[2]W. Sullivan, "The International Geophysical Year", International Conciliation, No. 521, January 1959, pp. 259-326.

international scientific unions as well as of WMO. In addition, at the Paris meeting leading up to the IGY, two countries were represented at the ambassadorial level.[3] Nevertheless, ICSU has always seen its role as non-political, and its character as non-governmental, and it impressed CSAGI with similar attributes.

In the course of the CSAGI meetings it was agreed that the discussions would stick to scientific matters only, and a gentlemen's agreement was reached that, for the Antarctic at least, scientific research would be completely separated from the question of sovereign claims. By this time, it had already been determined that aside from an ocean-based and Antarctic-based data gathering effort, there would be an ambitious space component as well.

Though it would be stretching it to say that politics was completely left aside in the preparations, or even that the project was global in scope (excluding as it did mainland China), sixty-seven nations and thirty thousand scientists did eventually take part. According to Baldwin,

> [t]he thousands of scientists engaged in the IGY program were enabled to make their observations and collect data by the willingness of many nations to lower the barriers to movement and communications which their law would otherwise impose[4].

The output of the IGY was twenty-seven tons of data for the Antarctic alone, and the creation of a system of three World Data Centres to store and disseminate this and other data. The IGY also led to the creation of COSPAR, SCAR and SCOR. While it is easy to downgrade the scientific aspect of this essentially data-gathering exercise, on an organisational level the undertaking was indeed successful, and from a legal point of view it has contributed significantly

---

[3]Baldwin, op. cit., p. 86.
[4]Ibid., p. 80.

to the development of a customary freedom of scientific research, as well as to conventional rules in each of the three areas under consideration.

POST SCRIPTUM. THE ICNT REV. 2

1. Introduction

Following the Ninth Session of UNCLOS III,, which was held in New York from 3 March to April 1980, the ICNT Rev. 2[1] was distributed. Although the régime for the conduct of marine scientific research remains essentially intact, there are a number of changes from its predecessor, the ICNT Rev. 1. As noted by the Chairman of the Third Committee in his report on the progress of the Ninth Session, the main problems tackled in those negotiations were the regime for research on the continental shelf beyond 200 miles, the conditions for the suspension or cessation of marine scientific research, the question of dispute settlement, and the rights of landlocked and geographically disadvantaged States.[2] Each of these matters will be examined in turn, to be followed by a summary of other changes which appear in the text.

2. The Continental Shelf Beyond 200 Miles

The main change in Article 246 is that outside the 200 mile economic zone, on the continental shelf, coastal States may not exercise their discretion in withholding consent for research of direct significance for the exploration and exploitation of natural resources. Beyond the 200 miles the coastal State may designate certain areas in which "exploitation or detailed exploratory operations" are occurring or will shortly occur (246[6]).

Another important change is that it is now stipulated that "normal circumstances" may exist even though the coastal State and researching State do not entertain diplomatic relations

[1]Doc. A/Conf.62/WP.10/Rev.2, 11 April 1980.
[2]Doc. A/Conf.62/L.50, 28 March, 1980, p. 1.

(246[4]). It will be recalled that the coastal State is under an obligation to grant its consent "in normal circumstances" for pure research.

3. The Suspension or Cessation of Research Activities

There are numerous alterations to Article 253, which concerns the conditions under which research in progress may be suspended or terminated. The ICNT Rev. 1 provided only for the eventual cessation of research activities which were not being conducted according to the agreed plans. The first major change which appears in the ICNT Rev. 2 is that suspension of the project is now stipulated for minor transgressions and the researching State is accorded the opportunity to rectify the situation. Once it accomplishes this, the suspension is lifted in the project may continue; if, however, it does not accomplish this within a reasonable period of time, the coastal State may then require the cessation of the project. The second major change is that if there is a discrepancy between the planned project and the actual activities being undertaken, and this amounts to a major change in the project, the coastal State may require its cessation, presumably without first suspending it.

4. The Peaceful Settlement of Disputes

The major change in the dispute settlement procedures of the eventual convention is that now disputes concerning decisions by the coastal State to withhold consent, to terminate or to suspend a research project are subject to the conciliation procedure of Annex IV, provided the conciliation commission refrains from questioning those cases in which the coastal State has exercised its discretion pursuant to Article 246.

5. Rights of Neighboring Landlocked and Geographically Disadvantage States

Under Article 254 of the ICNT Rev .1 research States were required to notify neighbouring landlocked and geographically disadvantaged States of a proposed research project and provide information and assistance upon completion. Now, the research State must also notify the coastal State of such notice as is given to a landlocked or geographically disadvantaged State. Furthermore, whereas those States still have the right to participate in the project and to appoint experts to that end, the coastal State can veto the choice of those experts, and it is clear that the landlocked or geographically disadvantage State cannot demand changes in the project, which is itself to be agreed upon by the coastal State and the research State.

6. Other Provisions

In connection with the procedure for granting consent to projects either under the auspices of, or undertaken by international organisations, the coastal State can now object within four months of receiving notification of the intended project; if it does not object within that time period, its consent is presumed (Article 247).

There is now a new clause within Article 242 on the promotion of international cooperation, whereby a State is obliged to provide other States with a reasonable opportunity to get from it "information necessary to prevent and control damage to the health and safety of persons and the environment."

Article 255, relating to measures to be taken to facilitate marine scientific research and to assist research vessels, has been streamlined. States must "endeavour" to adopt such

measures beyond their territorial sea as well as to foster access of research vessels to their harbours.

7. Summary and Appraisal

The ICNT Rev. 2 appears to go some way towards removing the objections of certain research States to the régime for scientific research, principally in respect of the exclusive economic zone and the continental shelf. Thus, the régime for the latter beyond 200 miles is now more liberal, and the rules concerning suspension and termination of research in both areas are now more flexible, better reflecting the interests of the research States. The same may be said for the dispute settlement procedures for both of these zones, and other clauses as well, e. g., the absence of diplomatic relations.

The overall tenor of the ICNT Rev. 2 régime is to keep intact the system previously negotiated, but to improve it so as to promote and protect all the interests concerned, thereby increasing the chances of achieving final, overall agreement on Part XIII.

BIBLIOGRAPHY

1. Documents

A. Treaties

(i) Bilateral

Agreement for the Establishment in the Bahamas Islands of a Long-Range Proving Ground for Guided Missiles (United States – United Kingdom), Washington, 21 July 1950. 97 UNTS, p.193.

Exchange of Notes constituting an Agreement for the Establishment of a Programme of Co-operation known as the Barbados Oceanographic Meteorological Experiment (BOMEX) (United States – Barbados). Bridgetown, 12 June and 9 July 1968.

Exchange of Notes constituting an Agreement regarding the Establishment and Operation of a Satellite Tracking Station in Okinawa (United States – Japan), Tokyo, 2 September 1968.

Agreement between the United States of America and the Union of Soviet Socialist Republics concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, Moscow, 24 May 1972. Reprinted in ILM, Vol. XI, No. 4, 1972, p. 766.

Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of anti-Ballistic Missile Systems, Moscow, 26 May 1972. Reprinted in Stockholm International Peace Research Institute Yearbook, Stockholm, 1975, p. 25.

Agreement with the Union of Soviet Socialist Republics on Cooperation in Studies of the World Ocean (United States – Union of Soviet Socialist Republics), 19 June 1973. 2 United Sates Treaty Series 1452, TIAS No. 7651,

Exchange of Notes constituting an Agreement relating to Continuance of United States Military Rights and Maritime Practices in the Bahamas (United States – Bahamas), 10 July and 20 July 1973.

Agreement amending the Memorandum of Understanding of September 29, 1975, on the Participation by the United Kingdom in the International Phase of Ocean Drilling and Extension of the Deep Sea Drilling Project (United States – United Kingdom), Washington and London, 2 December 1977 and 31 January 1978.

Agreement amending the Memorandum of Understanding on the Participation of the FRG in the International Phase of Ocean Drilling of the Deep Sea Drilling Project (United States – Federal Republic of Germany), Bonn and Washington, 14 February and 24 February 1978.

Agreement concerning Atmospheric Research Sounding Rockets and Balloons Cooperation Effected by Exchange of Notes (United States – Brazil), Brasilia, 14 November 1978 and 24 January 1979.

Agreement amending and Extending the Agreement of June 19, 1973, as Extended, on cooperation in Studies of the World Ocean, effected by Exchange of Notes (United States – Union of Soviet Socialist Republics), Moscow, 15 December 1979.

(ii) Multilateral

Convention on the Rights and Duties of Neutral Powers in Naval War, The Hague, 1907. Reprinted in J. Scott, The Hague Peace Conferences of 1899 and 1907, Baltimore, The Johns Hopkins Press, 1909, Vol. II, p. 506.

Convention relative to Certain Restrictions with Regard to the Exercise of the Right of Capture in Naval Warfare, The Hague, 1907. Reprinted in J. Scott, The Hague Peace Conferences of 1899 and 1907, Baltimore, The Johns Hopkins Press, 1909, Vol. II, p. 462.

Treaty concerning the Archipelago of Spitsbergen, Paris, 9 February 1920. 2 League of Nations Treaty Series, 1920, No. 1.

International Convention for the Regulation of Whaling, Washington, 2 December 1946. 11 UNTS, p. 43.

Agreement for facilitating the International Circulation of Visual and Auditory Materials of an Educational, Scientific and Cultural Character, Lake Success, 15 July 1949. 197 UNTS, p. 3.

Agreement on the Importation of Educational, Scientific and Cultural Materials, with Amended Protocol, Florence, 22 November 1950. 131 UNTS, p. 25.

Convention on the High Seas, Geneva, 29 April 1958. 450 UNTS, p. 11.

Convention on the Continental Shelf, Geneva, 29 April 1958. 499 UNTS, p. 311.

The Antarctic Treaty, Washington, 1 December 1959. 402 UNTS, p. 71.

Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water, Moscow, 5 August 1963. 480 UNTS, p. 43.

Convention for the International Council for the Exploration of the Sea, 24 September 1964, as amended in 1970. Reprinted in A. Peaslee, International Governmental Organizations, Constitutional Documents, Revised Third Edition, Part Three and Four, The Hague, Noordhoff, 1979, p. 287.

International Covenant on Economic, Social and Cultural Rights, adopted at the 1496th Plenary Meeting of the United Nations General Assembly, 16 December 1966. Reprinted in I. Brownlie, Basic Documents in International Law, Oxford, The Clarendon Press, 1967, p. 139.

International Covenant on Civil and Political Rights, adopted at the 1406th Plenary Meeting of the United Nations General Assembly, 16 December 1966. Reprinted in I. Brownlie, Basic Documents in International Law, Oxford, the Clarendon Press, 1967, p. 150.

Treaty on Principles governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, London, Moscow, and Washington, 27 January 1967. 610 UNTS, p. 205.

Convention of the International Hydrographic Organization, 3 May 1967, as amended to 1976. Reprinted in A. Peaslee, International Governmental Organizations, Constitutional Documents, Revised Third Edition, Part Three and Four, The Hague, Noordhoff, 1979, p. 306.

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, London, Moscow, and Washington, 22 April 1968. 672 UNTS, p. 119.

Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and Ocean Floor and in the Subsoil thereof, London, Moscow, and Washington, 11 February 1971. Reprinted in ILM, Vol. 10, 1971, p. 145.

Convention on International Liability for Damage Caused by Space Objects, adopted at the 1998th Plenary Meeting of the United Nations General Assembly on 29 November 1971. Reprinted in Space Activities and Resources, New York, United Nations, 1977, p. 192.

Convention for the Conservation of Antarctic Seals, 1 June 1972. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. I, p. II. 6. 1.

Convention on Registration of Objects Launched into Outer Space, adopted at the 2280th Plenary Meeting of the United Nations General Assembly on 12 November 1974. Reprinted in Space Activities and Resources, New York United Nations, 1977, p. 201.

Convention for the Establishment of a European Space Agency, Paris, 30 May 1975. Reprinted in ILM, Vol. XIV, No. 4, 1975, p. 864.

Convention concerning the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972. Reprinted in ILM, XI, 1972, p. 1358.

Agreement on Co-operation in Exploration and Use of Outer Space for Peaceful Purposes, Moscow, 13 July 1976. Reprinted in ILM, Vol. XVI, No. 1, 1977.

Agreement governing the Activities of States on the Moon and Other Celestial Bodies, adopted by the United Nations General Assembly on 5 December 1979 as Resolution 34/68. Reprinted in ILM, Vol. XVIII, No. 6, 1979, p. 1434.

B. Cases

The Marquis de Somerueles. Court of Vice Admiralty of Halifax, 1813.

The Paquete Habana. United States Supreme Court, 1900.

Antarctica Case. (United Kingdom v. Argentina). International Court of Justice. Order of March 16th, 1956. I. C. J. Reports, 1956, p. 12.

Antarctica Case. (United Kingdom v. Chile). International Court of Justice. Order of March 16th, 1956. I. C. J. Reports, 1956, p. 15.

Nuclear Tests Case. (Australia v. France). International Court of Justice. Judgment of 20 December 1974. I. C .J. Reports, 1974, p. 253.

Nuclear Tests Case. (New Zealand v. France). International Court of Justice. Judgment of 20 December 1974, I. C. J. Reports, 1974, p. 457.

Aegean Sea Continental Shelf Case. International Court of Justice. Judgment, I.C.J. Reports, 1978, p. 3.

C. United Nations

(i) United Nations Charter

(ii) Security Council

Doc. S/12172, 11 August 1976, Annex II, p. 2.

Doc. S/11973, 10 February 1976, p. 96.

Doc. S/ 11972, 6 February 1976, p. 95.

(iii) General Assembly

1. Resolutions

217 (a), 10 December 1948 (III).

1148, 14 November 1957 (XII).

1721, 12 December 1961 (XVI).

1948, 13 December 1973 (XVIII).

2340, 18 December 1967 (XXII).

2414, 17 December 1968 (XXIII).

2560, 13 December 1969 (XXIII).

2. Reports of the ad hoc Committee and of the Committee on the Peaceful Uses of Outer Space to the General Assembly

Ad hoc Committee on the Peaceful Uses of Outer Space. Official Records of the General Assembly.

Doc. A/4141, 1959 (XIV).

Committee on the Peaceful Uses of Outer Space. Official Records of the General Assembly.

Docs. A/4987, 1961 (XVI).

A/5181, 1962 (XVII).

A/5549 and Add.1, 1963 (XVIII).

A/5785, 1964 (XIX).

A/6042, 1965 (XX).

A/6431, 1966 (XXI).

A/6804, 1967 (XXII).

A/7285, 1968 (XXIII).

A/7621 and Add.1, 1969 (XXIV).

A/8020, 1970 (XXV).

A/8420, 1971 (XXVI).

A/8720, 1972 (XXVII).

A/9020 and Corr., 1973 (XXVII).

A/9620, 1974 (XXIX).

A/10020, 1975 (XXX).

A/31/20, 1976 (XXXI)

A/32/20, 1977 (XXXII).

A/33/20, 1978 (XXXIII)

(iv) International Law Commission

Yearbook of the International Law Commission, 1955, Vols. 1, 2.

Yearbook of the International Law Commission, 1956, Vol. 1.

(v) Specialized Agencies

Letter from the Office of the United States Permanent Representative to UNESCO to the Secretary of I.O.C. UNESCO Doc. AVS/9/89n, 15 December 1967.

IOC Manual – Part I, Paris, IOC, 1975.

UNESCO Doc. AVS/9/89 m(2), 1965.

1962 Report on the Legal Status of Unmanned Fixed Oceanographic Stations. Doc. NS/10C/INF/34, 1962.

Preliminary Draft Convention on Ocean Data Acquisition Systems, Aids and Devices. Annex III of Summary Report of UNESCO/IMCO Preliminary Conference of Governmental Experts to Formulate a Draft Convention on the Legal Status of Ocean Data Acquisition Systems (ODAS). 31 January – 11 February 1972. Doc. SC-72/CONF.85/8, 30 March 1972.

Legal Problems Associated with Ocean Data Acquisition Systems. Paris, UNESCO, 1969.

Draft International Code of Conduct on the Transfer of Technology, as of 11 November, 1978. Geneva, UNCTAD, 1978.

Final Acts of the World Administrative Radio Conference for Space Communications. Geneva, ITU, 1971.

(vi) First United Nations Conference on the Law of the Sea, 1958

Official Documents. Vols. IV, V, VI, 1958.

(vii) Committee on the Peaceful Uses of the Sea-Bed and the Ocean Floor Beyond the Limits of National Jurisdiction

Official Records. Vols. 3-36, 1969-1973.

(viii) Third United Nations Conference on the Law of the Sea, 1974-

Official Records. Vols. I-I0, 1975-1979.

(ix) Secretariat

United Nations Space Activities and Resources. New York, 1977.

D. Other International Organisations

(i) European Space Agency

Annual Report, 1977. Paris, ESA, 1977.

(ii) International Council for the Exploration of the Sea

Arrangements to Facilitate Scientific Research on the Continental Shelf. Doc. M.1970/Del9.

E. Antarctic Treaty Consultative Meetings

Rules of Procedure of Antarctic Treaty Consultative Meetings, 10 July 1961.

Recommendations of the First Antarctic Treaty Consultative Meeting, Canberra, 10-24 July 1961.

Recommendations of the Second Antarctic Treaty Consultative Meeting, Buenos Aires, 18-28 July 1962.

Recommendations of the Third Antarctic Treaty Consultative Meeting, Brussels, 2-13 June 1964.

Agreed Measures for the Conservation of Antarctic Fauna and Flora, 2-13 June 1964.

Recommendations of the Fourth Antarctic Treaty Consultative Meeting, Santiago, 18 November 1966.

Recommendations of the Fifth Antarctic Treaty Consultative Meeting, Paris, 18-29 November 1968.

Proposals Made at the Second Antarctic Treaty Meeting on Telecommunications, Buenos Aires, 1-12 September 1969.

Recommendations of the Sixth Antarctic Treaty Consultative Meeting, Tokyo, 19-31 October 1970.

Recommendations of the Seventh Antarctic Treaty Consultative Meeting, Wellington, 30 October – 10 November 1972.

Report from the Meeting of Experts at the Fridtjof Nansen Foundation, 30 May – 10 June 1973.

Recommendations of the Eighth Antarctic Treaty Consultative Meeting, Oslo, 9-20 June 1975.

Recommendations of the Ninth Antarctic Treaty Consultative Meeting, London, 19 September – 7 October 1977.

Recommendations of the Tenth Antarctic Treaty Consultative Meeting, Washington, 17 September – 5 October 1979.

F. National Legislation, Official Documents

Argentina. Decree No. 35, 821 Establishing a Committee of Enquiry relating to Antarctica, 1939. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 4. 1.

. Decree Law No.2191, of 28 February 1957. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australis, March 1976, Vol. II, p. III. 27.

Australia. Instructions Issued by the Prime Minister of Australia to the Leader of the Banzare Expedition, 1929-1931. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. IV. 4.

. Statement in Parliament by the Attorney-General, Mr. Latham, concerning the Australian Antarctic Territory Acceptance Bill, of 26 May 1933. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. IV. 10.

. Antarctic Territory Act, 1954-1973. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976. Vol. II, p. IV. 19. 1.

. Antarctic Treaty Act, 2 November 1960. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. IV. 22. 1.

Chile. Charter of the Chilean Antarctic Committee. Decree No. 548, of 27 March 1942. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. 4.

. Law No.11,846 of 21 June 1955. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. 14.

. Antarctic Statute. Decree No. 298, of 17 July 1956. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. l5. 1.

. Chilean Report on the 1959 Antarctic Conference. N. d., n. p.

France. Law No. 55-1052, of 6 August 1955, conferring Administrative and Financial Autonomy on the Terres Australes et Antarctiques Françaises. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. VI. 6. 1.

. Décret n° 56-935 du 18 septembre 1956 portant organisation administrative des terres australes et antarctiques françaises. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. VI. 8. 1.

New Zealand. Antarctic Act, 21 October 1960. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976. Vol. II, p. IX. 11. 1.

Norway. Proclamation defining Norwegian Sovereignty in Antarctica with Approved Recommendations on the Subject by the Ministry of Foreign Affairs, of 14 January 1939. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. X. 4. 1.

South Africa, Citizens in Antarctica Act, 1962. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. XI. 3.

United Kingdom. Request from the Colonial Office for an Opinion from the Law Officers of the Crown concerning British Control over the Ross Sea Coasts and their Hinterland, of 27 November 1922. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. LX. 1. 1.

. British Antarctic Territory Order in Council, of 26 February 1962. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. III, p. XIII. 15. 1.

Antarctic Treaty Order in Council, of 26 February 1962. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. III, p. XIII. 16. 1.

United States of America. Statement by President Eisenhower and American Note Proposing a Conference on Antarctica, of 3 May 1958. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. XIV. 3. 1.

. National Aeronautics and Space Administration Act. Section 102 (a), Public Law 85-268, 85th Cong., 2nd Sess., 29 July 1958, 72 Stat. 426; 42 United States Code.

. Hearing before the Subcommittee on Immigration, Citizenship, and International Law of the Committee on the Judiciary. House of Representatives, Ninety-Fifth Congress, First Session on H.R. 763, H.R. 6148, and H.R. 7842, Extraterritorial Criminal Jurisdiction, July 21, 1977, Serial NO.16. U. S. Government Printing Office, Washington, 1977.

. United States Antarctic Policy. Hearing before the Subcommittee on Oceans and International Environment of the Committee on Foreign Relations, U. S. Senate, 94th Congress, 1st Session, 15 May 1975.

. "Soviet Union Bars Completion of U.S. Scientific Voyage", Department of State Bulletin, Vol. 57, 1967, p. 362.

. "U.S. Protests Soviet Failure to Give Notice of Scientific Tests", Department of State Bulletin, Vol. 58, 1968, p. 16.

G. Diplomatic Correspondence

Argentina. Note to the British Ambassador Replying to the British Note of Protest, of 1 June 1951. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 22.

Chile. Note from the Chilean Ministry of Foreign Affairs to the British Embassy, concerning the British Proposal to Submit the Dispute over Antarctic Claims to Judicial Settlement, of 4 May 1955. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. 13. 1.

. Note to the British Ambassador Replying to a British Note of Protest, of 31 January 1948. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. 9. 1.

. Note to the British Ambassador Replying to the British Note of Protest, of 17 May 1951. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. V. 12. 1.

Chile-Argentina. Joint Declaration by Chile and Argentina on the Antarctic, Buenos Aires, of 12 July 1947. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 10.

. Joint Declaration by Chile and Argentina on their Claims to Antarctica, Santiago de Chile, of 4 March 1948. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 16.

Norway. Note from the Norwegian Minister to the Secretary of State concerning Norwegian Rights in Antarctica, of 15 April 1929. Reprinted in Documents Relating to Antarctica,, Vol. II, p. X. 1.

United Kingdom. Note from the British Ambassador Protesting at Alleged Argentine Acts of Trespass, of 17 November 1947. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 11.

. Note from the British Ambassador Protesting at the Establishment of a Chilean Station at Discovery Bay on Greenwich Island in the South Shetlands, of 17 December 1947. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976., Vol. II, p. V. 8. 1.

. Note from the British Ambassador Protesting at the Establishment of an Argentine Station on Deception Island, of 23 December 1947. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. III. 13. 1.

Soviet Union. Note from the Soviet Embassy at Washington to the Department of State Accepting the Invitation of the United States to Participate in a Conference on Antarctica (Extract), of 2 June 1958. Reprinted in Documents Relating to Antarctica, Canberra, Department of Foreign Affairs, Commonwealth of Australia, March 1976, Vol. II, p. XII. 5.

H. Non-Governmental Organisations, Private Bodies

International Commission of Jurists. Scientific Freedom, Scientific and Technical Developments and Human Rights. Statement Submitted by the International Commission of Jurists to the United Nations Commission on Human Rights, of 3 August 1978.

Committee on Space Research. Charter. Paris: International Council of Scientific Unions, 1977.

International Council of Scientific Unions. Organisation and Activities. Paris: 1976.

. Year Book, 1977. Paris: 1977

Harvard Law School. Research in International Law. Vol.4. Cambridge, Mass., 1939.

1. Collections of Documents

Brownlie, I. Basic Documents in International Law. Oxford: The Clarendon Press, 1967.

Hackworth, G. Digest of International Law. Washington: Department of State, 1940-1944. Vol. I.

Scott, J. The Hague Peace Conferences of 1899 and 1907. Baltimore: The Johns Hopkins Press, 1909. Vols. 1 and 2.

. Cases on International Law. St. Paul: West Publishing Co., 1922.

Oda, S. The International Law of the Ocean Development: Basic Documents. Leiden: Sijthoff, 1972-1979. Vols. 1-4.

Whiteman, M. Digest of International Law. Washington: Department of State, 1963. Vol. 2.

Commonwealth of Australia. Department of Foreign Affairs. Documents Relating to Antarctica. Canberra, March 1976. Vols. 1-3.

2. Writings

A. Science and International Law – General Aspects

(i) Books

Scholarly Freedom and Human Rights. London: Council for Science and Society, 1977.

Touscoz, J. La coopération scientifique internationale. Paris: Editions techniques et économiques, 1973.

(ii) Scholarly Articles

Baldwin, G. "The Dependence of Science on Law and Government - International Geophysical Year- A Case Study." Wisconsin Law Review, Vol. 1964, (1964), pp. 78-118.

Bernard, H. and Killworth, P. “Scientists as Others See Them.” Ocean Development and International Law, Vol. 4, No.3 (1977), pp. 261-268.

Frame, J.; Narin, F.; and Carpenter, M. “The Distribution of World Science.” Social Studies of Science, Vol. 7 (1977), pp. 501-516.

Jenks, C. “The New Science and the Law of Nations.” International and Comparative Law Quarterly, Vol. 17, No. 2 (1968), pp. 327-345.

Rousseau, C. “Scientific Progress and the Evolution of International Law.” Impact of Science on Society, Vol. V, June (1954), pp. 71-92.

Salomon, J.-J. “The Internationale of Science.” Science Studies, Vol. 1 (1973), pp. 23-42.

(iii) Miscellaneous

Calder, N. “National Versus International Responsibilities of Science and Scientists.” Ch. 17 in Pacem in Maribus, Vol. 5, Royal University of Malta Press, 1971, pp. 200-209.

Livingston, D. “An International Law of Science: Orders on Man’s Expanding Frontiers.” Bulletin of the Atomic Scientists, December (1968), pp. 6-10.

Norman, C. "Knowledge and Power: The Global Research and Development Budget". Worldwatch Paper No.31. Washington: Worldwatch Institute, July 1979.

Sullivan, W. “The International Geophysical Year.” International Conciliation, No. 521, January (1959), pp. 284-294, and p. 320.

B. Comparative Legal Studies of Outer Space, the Antarctic and the Oceans

(i) Books

Bing, R. The Role of the Developing Nations in the Formulation of International Controls for Unoccupied Regions: Outer Space, the Ocean Floor and Antarctica. Ann Arbor, Michigan: Xerox University Microfilms, 1973.

Brown, S.; Cornell, N.; Fabian, Ll.; Weiss, E. Regimes for the Ocean, Outer Space and the Weather. Washington, D.C.: The Brookings Institution, 1977.

Jenks, C. The Common Law of Mankind. London: Stevens and Sons, 1958.

Jessup, P., and Taubenfeld, H. Controls for Outer Space and the Antarctic Analogy. New York: Columbia University Press, 1959.

Kish, J. The Law of International Spaces. Leiden: Sijthoff, 1973

Schachter, O. Sharing the World’s Resources. New York: Columbia University Press, 1977.

(II) Scholarly Articles

Christol, C. “The Legal Common Heritage of Mankind: Capturing an Elusive Concept and Applying it to World Needs.” In M. Schwartz, (ed.), Proceedings of the 18th Colloquium on the Law of Outer Space. International Institute of Space Law of the International Astronautical Federation, 1976, pp. 42-57.

Katzenbach, N. “Shareable and Strategic Resources: Outer Space, Polar Areas, and the Oceans.” Proceedings, American Society of International Law, Vol. 53 (1959), pp. 206-216.

Miles, E. “Transnationalism in Space: Inner and Outer.” International Organization, Vol. XXV, No. 3 (1971), pp. 602-605.

Ringeard, G. “Scientific Research: From Freedom to Deontology.” Ocean Development and International Law, Vol. 1 (1973), pp. 121-136.

Stauder, D. “Patent Protection in Extraterritorial Areas (Continental Shelf, High Seas, Air Space and Outer Space).” International Review of Industrial Property and Copyright Law, Vol. 7, No. 4 (1976), pp. 470-479.

C. Outer Space

(i) Books

Bloomfield, L. (ed.). Outer Space: Prospects for Man and Society. Revised Edition. New York: Praeger, 1968

Cohen, M. (ed.) Law and Politics in Space. Montreal: McGill University Press, 1964.

Fawcett, J. International Law and the Uses of Outer Space. Manchester: Manchester University Press, 1968.

Gal, G. Space Law. Leiden: Sijthoff, 1969.

Jenks, C. Space Law. London: Stevens and Sons, 1965.

Lachs, M. The Law of Outer Space: An Experience in Contemporary Law-Making. Leiden: Sijthoff, 1972.

Lay, S., and Taubenfeld, H. The Law Relating to Activities of Man in Space. Chicago and London: University of Chicago Press, 1970.

Marcoff, “M. Traité de droit international public de l’espace. Fribourg : Editions universitaires, 1973.

McDougal, M.; Lasswell, H.; and Vlasic, I. Law and Public Order in Space. New Haven : Yale University Press, 1963.

Vazquez, M. Cosmic International Law. Detroit : Wayne State University Press, 1965.

Stockholm International Peace Research Institute. Outer Space – Battlefield of the Future ? London, Taylor and Francis Ltd., 1978.

(ii) Scholarly Articles

Adams, T. "The Outer Space Treaty : An Interpretation in Light of the No-Sovereignty Provision." Harvard Journal of International Law, Vol. 9, No.1 (1968), pp.140-157.

Bockstiegel, K.-H. "Arbitration and Adjudication Regarding Activities in Outer Space." Journal of Space Law, Vol. 6, No. 1 (1978), pp. 3-18.

Christol, C. "Innocent Passage in the International Law of Outer Space." USAF JAG Law Review, Vol. 7, September-October (1965), pp. 22-29.

Darwin, H. "The Outer Space Treaty." British Yearbook of International Law, Vol. XLII (1967), pp. 278-289.

Dembling, P. "Cosmos 954 and the Space Treaties." Journal of Space Law, Vol. 6, No. 2 (1978), pp. 129-136.

Dembling, P., and Kalsi, S. "Pollution of Man's Last Frontier – Adequacy of Present Space

Environmental Law in Preserving the Resources of Outer Space." Netherlands International Law Review, Vol. 20 (1973), pp. 125- 146.

Doyle, S. "Reentering Space Objects: Fact and Fiction." Journal of Space Law, Vol. 6, No. 2 (1978), pp. 107-118.

Fahl, G. "Note sure le contrat du 20 octobre 1978 entre le Zaïre et l'O.T.R.A.G." Annuaire français de droit international, Vol. 24 (1978), pp.920-926.

Finch, E. and Moore, A. "Ecospace and Some of its Legal Implications." Journal of Space Law. Vol. 5. No. 2 (1976), pp. 117-133.

. "Outer Space and the Global Community." International Lawyer, Vol. 8, No. 4 (1974), pp. 752-771

Foster, W.F. "The Convention on International Liability for Damage Caused by Space Objects." Canadian Yearbook of International Law (1977), pp. 137-185.

Goedhuis, D. "The Changing Legal Régime of Air and Outer Space." International and Comparative Law Quarterly, Vol. 27 (1978), pp. 576-595.

. "The Question of Freedom of Innocent Passage of Space Vehicles of One State through the Space above the Territory of another State which is not Outer Space.: in A. Haley, (ed.),

Proceedings, Second Colloquium on the Law of Outer Space, London, 1959. Vienna: springer-Verlag, 1960, pp. 42-43.

Gorove, S. "Cosmos 954: Issues of Law and Policy." Journal of Space Law, Vol. 6, No. 2 (1978), pp. 137-146.

Haanappel, P. "Some Observations on the Crash of Cosmos 954." Journal of Space Law, Vol. 6, No.2 (1978), pp. 147-149.

Hosenball, S. "Nuclear Power Sources in Outer Space." Journal of Space Law, Vol. 6, No. 2 (1978), pp. 119-128.

Moore, A. "Information from Space: An Ethereal Resource for All Mankind?" in M. Schwartz, (ed.), Proceedings of the Twentieth Colloquium on the Law of Outer Space, Prague, 1977. Davis, California: University of California School of Law. 1978, pp. 368-373.

Ryle, M. "The Effects on Astronomy of Tests in Earth's Atmosphere." In Report of Conference on Law and Science, held at Niblett Hall, July 1964. London: David Davies Memorial Institute and British Institute of Comparative and International Law, 1964, pp. 17-24.

Schauer, W. "Outer Space: The Boundless Commons?" Journal of International Affairs, Vol. 31, No. 1 (1977), pp. 67-80.

(iii) Miscellaneous

Gatland, K. "A Thousand Cosmos Satellites." New Scientist, 13 April (1978), pp. 91-93.

. "British Spacemen: Short on Rockets, Long on Ideas." Christian Science Monitor (International Edition). Monday, 26 June 1978, p.B8.

Hussain, F. "Volksraketen for the Third World." New Scientist, 23 March (1978), pp. 802-803.

Lewis, R. "Europe's Ambitious Plans for Spacelab." New Scientist, 21 September (1978), p. 832.

Lewin, R. "NASA's First Twenty Years – and the Future." New Scientist, 5 October (1978), pp. 14-16.

The Economist. "Hitching a Ride into Space." 16 June (1979), pp. 50-51.

. "What Goes Up…" 28 April (1979), pp. 113-114.

. "Otrag: What Goes Up Must Come Down." 19 May (1979), pp. 88, 91.

The Gazette (Montreal). "Soviets Accidentally Blocked Space Data." 5 September (1979), p. 10.

Le Monde. "Un ingénieur allemand veut construire des 'fusées populaires' au Zaïre." 5 July (1978), p.4.

New Scientist. "A Score of Meteorites on Ice." 19 January (1978), p. 140.

. "Space Launch Promises fireworks." 17 August (1978), p. 474.

. "Landsats Take to the High Seas." 24 August (1978), p. 555.

. "Solar Threat to Radioastronomy." 23 November (1978), p. 598.

D. Antarctica

(i) Books

Battaglini, G. La Condizione dell'Antartide Nel Diritto Internazionale. Padova: Cedam, 1971.

da Costa, J. Souveraineté sur Antarctique. Paris: Librairie générale de droit et de jurisprudence, 1958.

Mitchell, B., and Sandbrook, R. The Management of the Southern Ocean. London: International Institute for Environment and Development. 1980.

Orrego, F., and Salinas, A. (eds.). El Desarollo de la Antarctica. Coleccion 'Estudios Internacionales' of the Institute de Estudios Internacionales de la Universidad de Chile. Santiago: Editorial Universitaria, 1977.

Ross, J. A Voyage of Discovery and Research in the Southern Regions during the Years 1839-1843. London: John Murray, 1847.

Schatz, G. (ed.). Science, Technology and Sovereignty in the Polar Regions. Lexington, Ma.: Lexington Books, 1974.

(ii) Scholarly Articles

Auburn, F. "Offshore Oil and Gas in Antarctica." German Yearbook of International Law, Vol.20 (1977), pp. 139-173.

. "United States Antarctic Policy." Marine Technology Society Journal, Vol. 12, No. 1 (1978), pp. 31-36.

Bernhardt, J. "Sovereignty in Antarctica." California Western International Law Journal, Vol. 5, Spring (1975), pp. 297-349.

Bilder, R. "Control of Criminal Conduct in Antarctica." Virginia Law Review, Vol. 52 (1966), pp. 231-261.

Butler, S. "Owning Antarctica: Cooperation and Jurisdiction at the South Pole." Journal of International Affairs, Vol. 31, No.1 (1977), pp. 35-51.

Drewry, D. “Deep-Sea Drilling from Glomar Challenger in the Southern Ocean.” Polar Record, Vol. 18, No. 112, (1976), pp. 47-77.

Dupuy, R. “Le traité sur l’Antarctique.” Annuaire français de droit international, Vol. VI (1960), pp. 11-132.

Guyer, R. “The Antarctic System.” Receuil des Cours de l’Académie de Droit International, Vol. II, 1973, pp. 149-226.

Hambro, E. “Some Notes on the Future of the Antarctic Treaty Collaboration.” American Journal of International Law, Vol. 68 (1974), pp. 217-226.

Hanessian, J. “The Antarctic Treaty 1959.” International and Comparative Law Quarterly, Vol. 9 (1960), pp. 436-480.

Hanevold, T. “Antarctic Treaty Consultative Meetings – Form and Procedure.” Cooperation and Conflict, Vol. 6, Nos. 3/4 (1971) pp. 183-199.

Hanevold, T. “Inspections in Antarctica.” Cooperation and Conflict, Vol. 6, No. 2 (1971), pp. 103-114.

Hayton, R. “The Antarctic Settlement of 1959.” American Journal of International Law, Vol. 54 (1960), pp. 349-371.

Hook, E. “Criminal Jurisdiction in Antarctica.” University of Miami Law Review, Vol. 33, No. 2 (1978), pp. 489-514.

Honnold, E. “Thaw in International Law? Rights in Antarctica under the Law of Common Spaces.” Yale Law Journal, Vol. 87, No. 4 (1978), pp. 804-859.

Jain, S. “Antarctica: Geopolitics and International Law.” Indian Yearbook of International Affairs, (1974), pp. 249-278.

Johnson, E. “Quick, Before it Melts: Toward a Resolution of the Jurisdictional Morass in Antarctica.” Cornell International Law Journal, Vol. 10 (1976) pp. 173-198.

Lagoni, R. “Antarctica’s Mineral Resources in International Law.” Zeitschrift für ausländisches öffentliches Recht und Völkerrecht. Vol. 17, January (1977), pp. 1-41.

Lundquist, T. “The Iceberg Cometh? International Law Relating to Antarctic Iceberg Exploitation.“ Natural Resources Journal, Vol. 17, January (1977), pp. 1-41.

Mackechnie, J. “Sovereignty in Antarctica. “The Anglo-Argentinian Dispute.“ Syracuse Journal of International Law and Commerce, Vol. 5, No. 1 (1977), pp. 119-148.

Marcoux, J. “National Resource Jurisdiction in the Antarctic Continental Margin.“ Virginia Journal of International Law, Vol. 11, No. 3 (1971), pp. 374-405.

Mitchell, B., and Kimball, L., “Conflict over the Cold Continent.” Foreign Policy, No. 35, Summer (1979), pp. 124-141.

Mouton, M. The International Régime of the Polar Regions. Recueil des Cours de l'Académie de Droit International, 1962, Vol. III, pp. 168-284.

Oxman, B. "The Antarctic Regime: An Introduction." University of Miami Law Review, Vol. 33, No. 2 (1978), pp. 285-297.

Pinto, M. "The International Community and Antarctica." University of Miami Law Review, Vol. 33, No. 2 (1978), pp. 475-487.

Roberts, B. "International Co-operation for Antarctic Development: the Test for the Antarctic Treaty." Polar Record, Vol. 19, No. 119 (1978), pp. 107-120.

. "Chronological List of Antarctic Expeditions." Polar Record, Vol 9, May and September (1958), pp. 97-134, and pp. 191-239.

Rose, J. "Antarctic Condominium: Building a New Legal Order for Commercial Interest." Marine Technology Society Journal, Vol. 10, January (1976), pp. 19-27.

Schatz, G. "A Sea of Sensitivities." Oceanus, Vol. 18, No. 4 (1975), pp. 50-55.

Simmonds, K. "The Antarctic Treaty 1959." Journal du droit international, (1960), pp. 668-700.

Simsarian, J. "Inspection Experience under the Antarctic Treaty and the International Atomic Energy Agency." American Journal of International Law, Vol. 60 (1966), pp. 502-510.

Skagestad, G. "The Frozen Frontier: Models for International Cooperation." Cooperation and Conflict, Vol. 10 (1975), pp. 167-187.

Van der Essen, A. "L'Antarctique et le droit de la mer." Revue iranienne des relations internationales, Nos. 5-6, (1975-76), pp. 89-98.

Wilson, G. "Antarctica, the Southern Ocean, and the Law of the Sea." The JAG Journal, Vol. 30, No. 1 (1978), pp. 47-85.

Yoder, R. "United States Inspects Four Peninsula Stations." Antarctic Journal of the United States, Vol. 10, No. 3 (1975), pp. 92-93.

(iii) Miscellaneous

Doumani, G. "Science Policy for Antarctica." Bulletin of the Atomic Scientists, Vol. XXIV, No. 4 (1968), pp. 39-45.

Llano, G. "A Survey of Antarctic Biology: Life Below Freezing." Bulletin of the Atomic Scientists, Vol. XXVI, No. 10 (1970), pp. 67-74.

Mink, P. "Oceans: Antarctic Resources and Environmental Concerns." Department of State Bulletin, Vol. 78, No. 2013, April (1978), pp. 51-54.

Voelckel, M. “L’inspection en Antarctique.” L’inspection international. Brussels, 1976, pp. 223-246.

Wilkes, O., and Mann, R. “The Story of Nukey Poo.” The Bulletin of the Atomic Scientists, Vol. 34 (1978), pp. 32-36.

Polar Record. “Soviet Drifting Stations, 1977-78.” Vol. 19, No. 120 (1978), p. 285.

. “Private Research Expedition to Antarctica, 1977-78.” Vol. 19, No. 121 (1979), pp. 378-379.

. “First Italian Expedition to Antarctica, 1975-76.” Vol. 18, January (1977), pp. 379-380.

Polar Times. “Polar Team in Antarctica.” No. 84, June (1977), p. 20.

E. Oceans

(i) Books

De Boeck, C. De la propriété privée ennemie sous pavillon ennemi, Paris: a. Durand et Pedone-Lauriel, 1882.

Borgese, E., and Krieger, D. The Tides of Change. New York: Mason Charter, 1975.

Colombos, J. The International Law of the Sea. Sixth Edition. London: Longmans, 1967.

Deacon, M. Scientists and the Sea, 1650-1900: A Study of Marine Science. London: Academic Press, 1971.

Freymond, O. Le statut de la recherche scientifique marin en droit international. Eysins, 1978.

Gullion, E. (ed.). Uses of the Seas. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1968.

Pharand, D. Law of the Sea in the Arctic, with Special Reference to Canada. Ottawa: Ottawa University Press, 1973.

Sztucki, J. (ed.). Symposium on the International Régime of the Seabed. Rome: Academia Nazionale dei Lincei, 1970.

Treves, T. La Ricerca Scientifica nell’ Evoluzione del Diritto Del Mare. Milano: Dott. A. Giuffrè Editore, 1978.

Tucker, R. The Law of War and Neutrality at Sea. Washington, D.C. U. S. Government Printing Office, 1957.

White, A. (ed.). The Ocean Science Program of the U.S. Navy: Accomplishments and Prospects. Washington, D.C. Department of the Navy, 1975.

Wooster, W. Freedom of Oceanic Research. New York: Crane and Russak, 1973.

Young, E., and Lord Ritchie-Calder (eds.). Quiet Enjoyment: Arms Control and Police Forces for the Ocean. Vol. 1, Pacem in Maribus, Royal University of Malta Press, 1971.

(ii) Scholarly Articles

Baxter, R. "The International Law of Scientific Research in the Oceans." Georgia Journal of International and Comparative Law, Vol. 6, No.1 (1976), pp. 27-39.

Bello, G. "Present Status of Marine Science and Oceanography in the Less Developed Countries." International Lawyer, Vol. 8, April (1974), pp. 231-241.

Brown, E. "Freedom of Scientific Research and the Legal Régime of Hydrospace." Indian Journal of International Law, Vol. 9 (1969), pp. 327-380.

Burger, W. "Treaty Provisions concerning Marine Scientific Research." Ocean Development and International Law, Vol. 1, Summer (1973), pp. 158-184.

Butler, W. "The Legal Régime of Russian Territorial Waters." American Journal of International Law, Vol. 62, No. 1 (1968), pp. 51-77.

Caflisch, L., and Piccard, J. "The Legal Regime of Marine Scientific Research and the Third United Nations Conference on the Law of the Sea." Zeitschrift für ausländisches öffentliches Recht und Völkerrecht, Vol. 38 (1978), pp. 848-901.

Cheek, C. "Law of the Sea: Effects of Varying coastal State Controls on Marine Scientific Research. A Survey of the U. S. Ocean Science Community." Ocean Development and International Law, Vol. I, No. 2 (1973), pp. 209-219.

Dixit, R. "Freedom of Scientific Research in and on the High Seas." Indian Journal of International Law, Vol. 11, January (1971), pp. 1-8.

Ganz, D. "The United Nations and the Law of the Sea." International and Comparative Law Quarterly, Vol. 26, Part 1 (1977), pp. 1-53.

Gross, L. "The Dispute between Greece and Turkey concerning the Continental Shelf in the Aegean." American Journal of International Law, Vol. 71, No. 1 (1977), pp. 31-59.

Heirtzler, J., and Maxwell, A. "The Future of Deep-Ocean Drilling." Oceanus, Vol. 21, No. 3 (1978), pp. 2-12.

Knauss, J. "Development of the Freedom of Scientific Research Issue of the Third Law of the Sea Conference." Ocean Development and International Law, Vol. 1 (1973), pp. 93-120.

Maechling, C. "Freedom of Scientific Research: Stepchild of the Oceans." Virginia Journal of International Law, Vol. 15, Spring (1975), pp. 539-559.

Martray, J. “La recherche scientifique et le transfert des technologies océaniques dans le cadre du nouveau droit de la mer.” Annuaire de droit maritime et aérien. Vol. 3 (1976), pp. 17-31.

Merrills, J. “Oil Exploration in the Aegean.” Law Quarterly Review, Vol. 93, January (1977), pp. 29-33.

Scott, D. “International Marine Science – Shaping the Future.” Marine Policy, vol. 2, No. 2 (1978), pp. 158-159.

Shaefer, M. “Freedom of Scientific Research and Exploration in the Sea.” Stanford Journal of International Studies, Vol. 4, June (1969), pp. 46-70.

Soons, A. “The International Legal Regime of Marine Scientific Research.” Netherlands International Law Review, Vol. XXIV (1977), pp. 393-444.

Treves, T. “Le transfert de technologie et la Conférence sur le droit de la mer.” Journal du droit international, Vol. 104, No. 1 (1977), pp. 43-65.

Voelckel, M. “Le statut juridique des ‘systèmes d’acquisition de données océaniques’.” Annuaire français de droit international, Vol. 17 (1971), pp. 833-854.

Vysotsky, A. “Freedom of Scientific Research in the World Ocean.” Georgia Journal of International and Comparative Law, Vol. 6 (1976), pp. 7-25.

Waggener, S. “Transfer of Marine Science Technology – Quid Pro Quo for Freedom of Scientific Research?” San Diego Law Review, Vol. 12, April (1975), pp. 700-716.

Winner, R. “Science, Sovereignty, and the Third Law of the Sea Conference.” Ocean Development and International Law, Vol. 4, No. 3 (1977), pp. 297-342.

Wolfrum, R. “Der Schutz der Meeresforschung in Völkerrecht.” German Yearbook of International Law, Vol. 19 (1976), pp. 99-127.

Wooster, W. “Interaction between Intergovernmental and Scientific Organizations in Marine Affairs.” International Organization, Vol. 27, Winter (1973), pp. 103-113.

(iii) Miscellaneous

Burke, W. Marine Science Research and International Law. Occasional Paper No. 8, Law of the Sea Institute, Kingston, R.I., 1970.

. Scientific Research Articles in the Law of the Sea Informal Negotiating Text. Occasional Paper No. 25, Law of the Sea Institute, Kingston, R.I., 1975.

Fye, P. The Oceans: Common Heritage of Mankind? (pamphlet) Woods Hold Oceanographic Institution, Woods Hole, Mass., April 1977.

Menzel, E. “Scientific Research on the Sea-Bed and its Regime.” in J. Sztucki, (ed.), Proceedings of the Symposium on the International Regime of the Sea-Bed. Rome: Academia Nazionale dei Lincei, 1970, pp. 619-647.

Revelle, R. “Scientific Research on the Sea-Bed. International Cooperation in Scientific Research and Exploitation of the Sea-Bed.” in J. Sztucki (ed.), Proceedings of the Symposium on the International Regime of the Sea-Bed. Rome: Academia Nazionale dei Lincei, 1970, pp. 649-663.

Sullivan, W. “Ocean Researchers See a Threat in Law of the Sea Conference.” The New York Times, 30 August (1976), p.32.

Wooster, W. “Pollution – Scientific Research.” Sixth Annual Conference of the Law of the Sea Institute. Kingston, R.I.: University of Rhode Island, 1971, pp. 130-134.

WHOI Notes. “Scientists Study Possibilities for Nuclear Waste Disposal in Deep Seabed.” Vol. 8, No. 1, March (1976), pp. 1-3.

F. Miscellaneous Writings

Cahier, P. “Le problème des effets des Traites à l’égard des États tiers.” Recueil des Cours de l’Académie de Droit International, 1974, Vol. II, pp. 589-736.

Leive, D. International Telecommunications and International Law. Leiden: Sijthoff, 1970.

Oppenheim L. International Law. A Treatise. Seventh Edition. Edited by H. Lauterpacht. Vol. II, Disputes, War and Neutrality. London: Longmans, Green and Co., 1952.