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Thomas R. Lundquist

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THE ICEBERG COMETH?: INTERNATIONAL LAW RELATING TO ANTARCTIC ICEBERG EXPLOITATION

THOMAS R. LUNDQUIST*

The statement that the world's resources are limited is hardly revolutionary today. Yet, we often overlook the fact that man's capabilities impose binding resource use constraints within the natural limits of the global system. These man imposed resource use limitations include the status of resource exploitation technologies, their economic feasibility, the environmental acceptability of development impacts and the existence of legally defined resource rights. Whether any of these constraints is limiting in fact depends on the desired societal intensity of resource utilization during a particular period.

The availability of low cost fresh water is a case in point. Until recently, man's water sources were restricted to less than 1% of the available supply,¹ the fresh water found in lakes, streams and underground aquifers. Consequently, the development of potentially productive arid land, lacking familiar fresh water sources, has been retarded. However, with the increasing need for agricultural production in particular, and growth needs in general, have come proposals to tap new water sources. Desalination and long-range interbasin transfers are two of the more familiar, actualized suggestions. The third suggestion, and the subject of this article, concerns the utilization of Antarctic icebergs as a fresh water resource.

Two recent studies² have suggested the technological capability,

*B.S. Union College, 1974; Candidate for J.D., Harvard Law School, 1977.

1. R. Barry, *The World Hydrological Cycle*, Water, Earth & Man 11 (R. Chorley ed., 1969).

2. The first proposal has appeared in a number of forms. The most complete and technical is Weeks and Campbell, *Icebergs as a Fresh Water Source: An Appraisal*, 12 J. of Glaciology 207 (1973) [hereinafter cited as Weeks-Campbell]. The Weeks-Campbell proposal has also appeared under the same title as Cold Regions Research and Engineering Laboratory Research Report 200 (January 1973). A less technical version is found at 16 Polar Record 661 (1973).

The second proposal is found in two publications; J. Hult and N. Ostrander, *Antarctic Icebergs as a Global Fresh Water Resource*, R-1255-NSF (RAND Corporation grant under the National Science Foundation's Research Applied to National Needs program, October 1973) [hereinafter cited as Hult-Ostrander, *Icebergs*], and J. Hult and N. Ostrander, *Applicability of ERTS for Surveying Antarctic Iceberg Resources*, R-1354. NASA/NSF (RAND Corporation grants from the National Science Foundation and the National Aeronautics and Space Administration, November 1973) [hereinafter cited as Hult-Ostrander, *ERTS*].

The two proposals are compared in the informal conference publication Institute on Man and Science, *Transporting Icebergs as a Fresh Water Source* (1974).

economic feasibility and environmental acceptability of transporting icebergs to arid regions in both the Southern and Northern Hemispheres. This article seeks to complement these iceberg exploitation proposals by examining the international legal interface with iceberg harvesting and transit. First, given the novelty of the proposals, an introduction of the non-legal aspects of iceberg utilization is perhaps in order.

THE NON-LEGAL DIMENSIONS OF ICEBERG EXPLOITATION

Iceberg Dynamics

Snow precipitation is a convenient starting point in the polar hydrologic cycle. Continuing snowfall on glaciers and continental ice sheets compacts the underlying snow layers, until they become ice-like. Concurrently, the entire ice sheet moves plastically downhill towards the ocean. At the ocean terminus, icebergs regularly calve from the main ice shelf body and float out to sea. There, icebergs slowly melt into seawater and, following evaporation, the hydrologic cycle begins anew.³ Thus, fresh water icebergs are a continuous yield resource, potentially open for indefinite exploitation at a rate not exceeding the calving rate.⁴

Weeks-Campbell dismissed the possibility of utilizing Arctic icebergs on grounds of erratic production and insufficient harvesting access.⁵ In the Antarctic, the three principal iceberg sources and potential delivery sites are:

The Amery Ice Shelf, which could supply icebergs to Australia, and the Ross Ice Shelf, which could supply icebergs to arid areas along the west coast of South America [or the west coast of North America]. Another possibility is the Filchner Ice Shelf . . . [whose icebergs] could be transported to the Namib desert area on the southwest coast of Africa.⁶

Thus, a variety of locations could be serviced by Antarctic iceberg derived water.

Moreover, the magnitude of yearly Antarctic iceberg production is impressive. The total calving rate is estimated at 1.2×10^{15} kg/yr.⁷

3. See Robin, *Polar Ice Sheets: A Review*, 16 *Polar Record* 5 (1971).

4. Hult-Ostrander, *Icebergs*, *supra* note 2, at 5-7.

5. Weeks-Campbell, *supra* note 2, at 210. The Arctic iceberg source investigated was the Ward Hunt Ice Shelf.

6. *Id.*

7. Hult-Ostrander, *Icebergs*, *supra* note 2, at 31. A more precise breakdown of iceberg production is:

Ross Ice Shelf	1×10^{14} kg/yr
Ronne-Filchner Ice Shelves	1.2×10^{14} kg/yr
Other Antarctic Ice Shelves	9.8×10^{14} kg/yr

Exploiting just 10% of this resource could provide 1.2×10^{11} cubic meters usable fresh water each year, enough to irrigate 15 to 25 million acres of land.⁸ Since Antarctic icebergs offer a renewable fresh water resource of considerable magnitude, iceberg utilization schemes merit serious appraisal from the disciplines which may constrain resource use. We turn to the first potential constraint, the technological capability to harvest, transport and process Antarctic icebergs.

The Technological Proposals

The Weeks-Campbell study focuses on the application of first-generation technology to the transport of single tabular icebergs from the Amery Ice Shelf to Australia and from the Ross Ice Shelf to the South American Atacama Desert.⁹ A "Super-tub"¹⁰ would tow an uninsulated iceberg at speeds below one knot¹¹ to the Southern Hemisphere destinations. Owing to the iceberg's deep draft, terminal processing would take place on the open ocean. Two iceberg processing alternatives were proposed. The first utilizes a sea-fence baffling network, relying on ambient seawater heat for melting.¹² The slight seawater mixing inherent in this approach was not felt to be deleterious, if irrigation was the intended water use.¹³ The second processing alternative involves quarrying the ice, moving it by pipeline slurry to the coast.¹⁴ The pipeline could be integrated with a coastal power plant, using its waste heat for melting and moderating the thermal pollution threat of both operations.

The Hult-Ostrander study differs in both technological complexity and intended water users. This second-generation technology involves towing a tandem configuration of insulated icebergs from the Ross Ice Shelf to Southern California.¹⁵ Suitable icebergs would be herded into a single file pattern by escort ships, then shrouded propellers would be attached to the icebergs and connected to a

8. *Id.* at 8.

9. See Weeks-Campbell, *supra* note 2, at 210-214.

10. *Id.* at 215. The "super-try" would require a power plant of 1.56×10^8 W. While this is larger than currently operating tugs (1.3×10^7 W), the design is similar to icebreaking tanker power plants on the drawing boards.

11. *Id.* at 213. Since iceberg drag is proportional to velocity squared, physics and economic efficiency demand a slow towing velocity.

12. *Id.* at 229-30.

13. *Id.* at 230. Crops vary in their tolerance for water impurities, but are generally in the 400-1500 ppm range. Since iceberg water is extremely pure (less than 10 ppm impurities), some seawater mixing would not be detrimental, and would lessen the volumetric cost of iceberg water.

14. *Id.* at 229-30.

15. See Hult-Ostrander, *Icebergs*, *supra* note 2, at 10-20.

leeward nuclear powered ship.¹⁶ Meanwhile, the iceberg underside would be wrapped with a waffled plastic film to trap meltwater and inhibit further melting.¹⁷ This 20 km. iceberg train¹⁸ would make the nearly one year journey to Southern California, where processing would proceed similarly to Weeks-Campbell.

Additionally, the Earth Resources Technology Satellites (ERTS) could be integrated into the harvesting operation.¹⁹ ERTS imagery could locate desirable iceberg clusters, eliminating many on-site searching and herding costs. Moreover, ERTS could serve as a claiming service to secure iceberg property entitlement.

While both technical proposals allude generally to irrigation intensive agriculture as the desired end-use for iceberg water, Hult has specified methods of incorporating iceberg derived water into U.S. supply patterns.²⁰ The water could augment current aqueduct deliveries from Northern to Southern California. Alternatively, iceberg water could be pumped into the Colorado River basin area, both for United States use²¹ and to help meet treaty commitments with Mexico.²²

In sum, neither study found any insurmountable technological hurdles involved in iceberg exploitation. Though the harvesting, transporting and processing of Antarctic icebergs would require innovation, the implicit belief was that this innovation was attainable.

Economic Feasibility

Admittedly, calculating the economic feasibility of an iceberg utilization scheme is a difficult task involving a series of "guesstimates." There is uncertainty in forecasting the costs of undeveloped harvesting, transporting and processing technologies. Furthermore, iceberg technology costs must be compared with costs of alternative supply technologies within each user region to determine the least

16. *Id.* at 10-12.

17. *Id.* at 11. Due to the Northern Hemisphere delivery points and slow towing speeds, insulation became imperative. As solar radiation induced melting would be minimal, only the underside would be wrapped with the tension cord reinforced material.

18. *Id.* at viii.

19. Hult-Ostrander, *ERTS*, *supra* note 2, at 1.

20. J. Hult, *Water Rights and Assessments*, RAND Paper Series P-5271 (July 1974).

21. See C. Meyers and A. Tarlock, *Water Resource Management* 394-434 (1971) for a description of the oft-litigated Colorado River water rights.

See also D. Weatherford and G. Jacoby, *Impact of Energy Development on the Law of the Colorado River*, 15 Nat. Res. J. 171 (1975) for the water requirements for proposed western coal and oil shale development, which can only increase the clamor for additional water.

22. *Treaty with Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande*, February 3, 1944, 59 Stat. 1219, T.S. No. 944. Article III (c) of the Treaty guarantees Mexico 1.5 million acre feet per year from the Colorado River.

cost supply alternative. Finally, water demand must be forecasted at different supply costs to determine whether water users would be able to cover development and maintenance costs.²³ While realizing these limitations, the rudimentary economic feasibility studies are optimistic that icebergs may become an attractive fresh water resource in the near future.

Weeks-Campbell estimate a yearly amortized capital investment of \$15.5 million for their proposal.²⁴ With an iceberg delivery rate of 70-80% original volume,²⁵ they forecast the cost for water delivered as ice to Australia and the Atacama Desert at 1.3 and 1.9 mills/m³ respectively.²⁶ Of course, iceberg processing costs must be added to harvesting and transit costs to allow a meaningful comparison with alternative supply sources. Unfortunately, Weeks-Campbell did not forecast such costs, leaving the feasibility issue somewhat submerged.²⁷

Hult-Ostrander estimate a yearly amortized capital investment of \$85 million for their proposal.²⁸ With a 90% delivery factor,²⁹ the delivery cost as ice was approximately \$9.5/acre-ft.³⁰ Utilizing ERTS would cost an additional \$.10-1/acre-ft.,³¹ bringing the total delivery cost to around \$10/acre-ft.

Hult-Ostrander felt the rigor of forecasting processing costs, stylizing their figure of \$10/acre-ft. as "only a very rough estimate of conversion costs."³² This brings the total cost of iceberg fresh water delivery into the \$20 per acre foot range.

Using the Hult-Ostrander processing cost estimate of \$10/acre-ft., the total cost of the Weeks-Campbell proposal is in the \$26-33/acre-

23. This analysis assumes that iceberg water users will, over time, pay the full costs of iceberg water delivery. The "pay your own way" principle is adopted here for reasons of economic efficiency and presentation simplicity. The option of government subsidies to spur agricultural development, though recognized, will not be discussed.

24. Weeks-Campbell, *supra* note 2, at 226. This cost includes the amortized yearly cost of 1 "super tug" (\$5.4 million), 60 man crew, fuel, maintenance, port and shipyard time.

25. *Id.* at 222, fig. 11.

26. *Id.* at 227. This translates to approximately \$16 and \$23.4/acre-ft. respectively.

27. The author has sought to minimize the number of iceberg puns appearing in this article, though occasionally some slip in. References to the titanic undertaking of crystallizing a new field of law have been omitted. The reader interested in pursuing the lighter side of the iceberg proposals should consult R. Kraft, *The Solution of the Israeli Water Problem* 15 J. of Irreproducible Results 2 (1966) and O. Novick, *Comments on "The Solution to the Israeli Water Problem" by R. Kraft*, 15 J. of Irreproducible Results 4 (1966).

28. Hult-Ostrander, *Icebergs*, *supra* note 2, at 38. This cost includes the amortized yearly cost of 1 nuclear ship (\$37 million), 100 man crew, fuel, insurance, harnessing, insultation and preparation equipment.

29. *Id.*

30. *Id.*

31. Hult-Ostrander, *ERTS*, *supra* note 2, at 47.

32. Hult-Ostrander, *Icebergs*, *supra* note 2, at 22.

ft. range.³³ This processing cost transference is appropriate, since the processing techniques of both studies were similar. Moreover, the total cost figure permits a meaningful cost comparison with alternative supply technologies, as well as a feeling for iceberg derived water agricultural demand.

The iceberg water cost figures compare quite favorably with alternative technologies. How and Easter estimate long-range interbasin transfer costs in the \$50-60/acre-ft. range,³⁴ while desalination costs may edge towards \$100/acre-ft.³⁵ Consequently, iceberg derived fresh water may be a least cost alternative for some locations.

More importantly, if the iceberg water cost projections of \$20-33/acre-ft. are accurate, large scale agricultural development in some arid regions could cover these costs. Clawson estimates irrigation water value up to \$30/acre-ft.,³⁶ while How and Easter found total agricultural development benefits in the American Southwest "to range from \$14 to \$120/acre-ft."³⁷ In sum, it appears that iceberg water is a viable, least cost alternative in many situations.

Anticipated Environmental Impacts

Due to the primary technological focus of the studies, neither group purported to identify all significant environmental impacts resulting from iceberg exploitation. Both stressed the need for further environmental analysis before large scale operations are initiated. The identified environmental impacts can be spatially divided into three categories: harvesting-relating impacts to the Antarctic region, transit-related impacts on the ocean and processing site-related impacts.

Both studies predicted minimal environmental impacts in the Antarctic region. While at first glance it might seem that iceberg removal would cause a general warming trend in Antarctica, culminating in a rising sea level and attendant coastal destruction, Hult-Ostrander dispute the amount of Antarctic cooling attributable to icebergs. In their opinion, the vast area of sea and continental ice are the predominant cooling factors.³⁸ Thus, the harvesting of calved

33. See note 26 *supra*.

34. C. How & K. Easter, *Interbasin Transfers of Water* 169 (1971) [hereinafter cited as How and Easter].

35. Hult-Ostrander, *Icebergs*, *supra* note 2, at 4.

36. Clawson, Tandsberg & Alexander, *Desalted Seawater for Agriculture: Is it Economic?*, 169 *Sci.* 1141, 1148 (1969).

37. How and Easter, *supra* note 34, at 169.

38. The total quantity of precipitation [i.e. nonseawater] ice that is melted each year in the Antarctic is approximately equal to the total accumulation (2.4×10^{15} kg.). However, the sea ice that is frozen and melted each year in the Southern Ocean is about 10 times this quantity and thousands of times the area [25]. So sea ice in the Antarctic is a much more

icebergs is not expected to damage the Antarctic climate or impair the capacity of iceshelves to continually produce icebergs.

In-transit environmental effects were dismissed as "minimal"³⁹ by Weeks-Campbell, without elaboration. One conceivable impact concerns fish response to the thermal/salinity gradient produced by the slow moving towing operation. Fish are sensitive to such gradients, but vary in gradient response.⁴⁰ Hence, it is difficult to state whether iceberg towing might become a Pied Piper for fish or an area that fish would avoid, if there would be any geographical dislocation at all.

Several environmental impacts were expected at the processing site. Potential temperature induced effects include increased local fogging and rain from iceberg thermal plume condensation, as well as localized ocean thermal pollution.⁴¹ Continued processing operations in a particular locale might produce a new ecosystem adapted to the new water temperature and salinity.⁴² The large number of offshore icebergs under the Hult-Ostrander scheme could create a significant breakwater, to the bane of surfers.⁴³

The aesthetics of both in-sea operations and related land developments can be expected to influence the acceptability of iceberg processing. Finally, the obvious secondary impact of induced regional growth at water use location should be examined, though this is the *raison d'être* for iceberg water in the first instance.

In conclusion, both preliminary studies were optimistic about the technological, economic and environmental feasibility of utilizing Antarctic icebergs as a fresh water resource. The non-legal aspects do not appear to be constraining in the sense of an absolute limit, though the desirability of alternative technologies is best assessed on a case-by-case basis.

THE LEGAL DIMENSIONS OF ICEBERG EXPLOITATION

The Uncertain Legal Status of Antarctica

A. Background

As Jessup has noted, "a claim with . . . reference to waters ad-

important moderator of the annual fluctuation in the earth's surface temperature than precipitation ice is. Hult-Ostrander, *Icebergs, supra* note 2, at 8. Bracketed reference 25 in original is to T. Hatherton, *Antarctica* (1965).

39. Weeks-Campbell, *supra* note 2, at 230.

40. See R. Love, *The Chemical Biology of Fishes* 187, 209 (1970) for a description of the lateral line chemoreceptors in fish.

41. Weeks-Campbell, *supra* note 2, at 230.

42. *Id.*

43. Hult-Ostrander, *Icebergs, supra* note 2, at 24.

jacent to the Antarctic continent must find basic support in the maintenance of a claim to sovereignty over the land itself."⁴⁴ In other words, the legitimacy of claims to Antarctic Ocean basin icebergs is inextricably intertwined with the legal status of *glacia firma* Antarctica.⁴⁵ Unfortunately, the legal status of Antarctica is very much an unresolved question. Consequently, no inquiry can culminate in a precise legal definition of iceberg property rights. What can be done is to sketch competing historical trends in Antarctica, examine the present Antarctic situation and delineate the impacts of proposed solutions to the Antarctic sovereignty issue on iceberg exploitation.

The history of Antarctica reveals an intriguing array of national sovereignty claims, reserved rights, supernational group efforts and calls for internationalization.⁴⁶ Seven nations, Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom, have asserted territorial claims to Antarctic sectors.⁴⁷ These sector claims are pie-shaped wedges following longitudinal coordination from the South Pole out beyond *glacia firma* Antarctica, generally terminating at 60° South Latitude. Some Antarctic areas remain unclaimed, while other areas are subject to overlapping, conflicting claims. One potential avenue for resolving the status of the sector claims failed in 1956, when the *Antarctic Cases*,⁴⁸ brought by the United Kingdom against the conflicting Argentinian and Chilean claims, were dismissed by the International Court of Justice (ICJ), because the latter two countries declined the court's jurisdiction.

Five other nations, Belgium, Japan, South Africa, the Soviet Union and the United States, have historic interests in Antarctica.⁴⁹ While not formally pressing territorial claims, these nations have reserved their rights to do so in the future, and have protested the legitimacy of the sector claims.

Following an unsuccessful 1948 United States proposal to place

44. P. Jessup, *Sovereignty in Antarctica*, 41 A.J.I.L. 117, 118 (1947).

45. Thus, in order to answer the question posed in a recent *New York Times* editorial—"Who owns the icebergs floating in . . . the Antarctic?"—one must be concerned with who owns Antarctica. For the editorial, see *Iceberg Shortage Ahead*, *New York Times*, November 11, 1976, at 42.

46. See generally, R. Hayton, *The Antarctic Settlement of 1959*, 54 Am. J. of Int. Law 348 (1960) [hereinafter cited as Hayton] and J. Hanessian, *The Antarctic Treaty—1959*, 9 Int. and Comp. L. Quart. 436 (1960) [hereinafter cited as Hanessian].

47. See map in Hayton, *supra* note 46, at 348.

48. *Antarctic Cases*, [1956] I.C.J. 8.

49. See generally sources cited at note 45 *supra* and Marcoux, *Natural Resource Jurisdiction on the Antarctic Continental Margin*, 11 Va. J. of Int'l L. 374 (1971) [hereinafter cited as Marcoux].

Antarctica under United Nations trusteeship⁵⁰ and a successful series of Antarctic scientific investigations during the 1957-8 International Geophysical Year (IGY),⁵¹ President Eisenhower proposed a conference to discuss conflicting interests in Antarctica. The conference invitation, sent to the twelve nations cooperating in IGY research, stressed that Antarctica should "be open to all nations to conduct scientific or other peaceful activities there."⁵² Following secret preparatory meetings, the Washington Conference resulted in the 1959 Antarctic Treaty.⁵³

B. *The Antarctic Treaty*

The Antarctic Treaty is today the principal instrument governing Antarctica. Originally signed by the twelve nations with sector claims or historic interests in Antarctica, the Treaty has been acceded by six states, Brazil, Czechoslovakia, Denmark, German Democratic Republic, Netherlands and Poland.⁵⁴ This group of 18 nations will be collectively referred to as the Antarctic Treaty Group (ATG). The remaining 137 states participating in the on-going Law of the Sea Conference are not parties to Antarctic Treaty. By the principle *res inter alios acta nec nocent nec prosunt*,⁵⁵ no obligations or rights springing from the Treaty apply to non-Treaty states, a problem we shall return to.⁵⁶

The Antarctic Treaty is a multi-purpose document consisting of 13 Articles. Article I reserves Antarctica for peaceful purposes.⁵⁷ Articles II and III guarantee scientific research freedom and provide for information exchange.⁵⁸

50. Hanessian, *supra* note 46, at 438. According to Hanessian, the trusteeship proposal failed for two reasons. First, it was felt that as Antarctica had little strategic importance and the U.N. was primarily a security organization, it had little reason to administer the continent. Second, trusteeship under U.N. Charter Article 76(b) was designed "to promote the advancement of the inhabitants of the trust territories" and Antarctica has no indigenous population to be protected.

51. Marcoux, *supra* note 49, at 376. In fact, IGY developed out of a proposed Third International Polar Year. See Hayton, *supra* note 46, at 353-4, for the important role that IGY cooperation played in the development of the Antarctic Treaty.

52. 38 Dep't State Bull. 910 (1958).

53. 12 U.S.T. 794, T.I.A.S. No. 4780, 402 U.N.T.S. 72 (signed December 1, 1958; entered into force June 23, 1961).

54. Marcoux, *supra* note 49, at 400 and *Opening Statement by the United States Representative Eighth Antarctic Treaty Consultative Meeting 5* (Oslo, 1975).

55. This principle is embodied in the Vienna Convention on the Law of Treaties, not yet in force. Article 34 states: "A treaty does not create either obligations or rights for a third State without its consent." See I. Brownlie, *Basic Documents in International Law* 246 (2d ed. 1972).

56. See text which accompanies note 147 *infra*.

57. Article I provides that "Antarctica shall be used for peaceful purposes only."

58. Article III provides that "Freedom of scientific investigation in Antarctica . . . shall continue."

Article IV purports to freeze the *status quo*⁵⁹ of the territorial claims during the thirty year⁶⁰ treaty life, with the following language:

1. Nothing contained in the present Treaty shall be interpreted as:
 - a. a renunciation by any Contracting Party of previously asserted rights of or claims to territorial sovereignty in Antarctica;
 - b. a renunciation or diminution by any Contracting Party of any basis of claim to territorial sovereignty in Antarctica which it may have whether as a result of its activities or those of its nationals in Antarctica, or otherwise;
 - c. prejudicing the position of any Contracting Party as regards its recognition or non-recognition of any other State's right of claim or basis of claim to territorial sovereignty in Antarctica.
2. No acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim to territorial sovereignty shall be asserted while the present Treaty is in force.

Article VI defines Antarctica for treaty purposes:

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

Articles VIII and IX provide for dispute resolution, including regular consultative meetings to reach mutually acceptable solutions to Treaty problems.⁶¹ Additionally, Article IX calls for the presentation of living resources in Antarctica.⁶²

Conspicuous by its absence is any provision regarding resource exploitation in Antarctica. While most preparatory treaty sessions remain unpublished, Hambro logically theorizes that the resource issue was too politically explosive to handle during treaty negotiations.⁶³ It is difficult to imagine a resource exploitation scheme

Article III provides that "scientific observations and results from Antarctica shall be exchanged and made freely available."

59. See Hayton, *supra* note 46, at 359 and Hanessian, *supra* note 46, at 470, for the *status quo* intent of the Antarctic Treaty.

60. Article XII 2(a).

61. Article IX provides that "Representatives . . . shall meet . . . at suitable intervals . . . consulting together on matters of common interest pertaining to Antarctica."

62. Article IX lists Treaty objectives, including "preservation and conservation of living resources in Antarctica."

63. Hambro, *Some Notes on the Future of the Antarctic Treaty Collaboration*, 68 Am. J. of Int'l L. 217, 221 (1974).

consonant with the *status quo* maintenance objective, since vesting resource jurisdiction in the ATG would certainly take the economic incentive, if not the substance, out of national territorial claims. As Antarctic resource exploitation was not imminent at the time, the entire issue was avoided.

However, recent indications that the Antarctic region may contain commercially valuable resources, such as the water tied up in icebergs and continental shelf oil,⁶⁴ appears to have forced the resource exploration and exploitation issue back on the ATG. Saudi Arabian plans to harvest in Antarctic icebergs,⁶⁵ the Federal Republic of Germany's intent to fish within the Antarctic Treaty Area⁶⁶ and the general clamor for oil only add to the immediacy of the Antarctic resource exploitation issue.

ATG efforts to find a solution to the sensitive resource issue began at the Seventh Consultation Meeting held in Wellington (1972), when a recommendation urged that the issue be placed on the agenda for the next meeting.⁶⁷ This Eighth Consultative Meeting held in Oslo (1975) provided no substantive resolution of the issue, but implicated that the entire Treaty regime might be at stake.⁶⁸ Consequent-

64. *Mineral Resources of Antarctica* 15-16, Geological Survey Circular 705 (N. Wright and P. Williams eds. 1974).

65. Saudia Arabia, under the direction of Prince Faisal, is embarking on a major water resource development program, which includes the utilization of Antarctic icebergs.

Saudi Arabia . . . is planning along with French scientists, to use the icebergs to provide a source of fresh water and to help change some of its arid climate. Schmidt, *Can You Lead an Iceberg to the Desert*, *Christian Science Monitor*, Nov. 21, 1975, at 1. See *Saudi Arabia Commissions Iceberg Study*, *New York Times*, Nov. 3, 1976, at 2, for a more recent indicia of Saudi interest in Antarctic icebergs.

66. S. Z. El-Sayed, *Living Resources of the Southern Ocean*, 11 *Antarctic J. of the U.S.* 8 (1976).

67. Recommendation VII-6 Antarctic Resources-Effects of Mineral Exploration: Noting the technological developments in polar mineral exploration and the increasing interest in the possibility of there being exploitable minerals in the Antarctic Treaty Area. . . . Recognizing that mineral exploitation is likely to raise problems of an environmental nature and that the Consultative Parties should assume responsibility for the protection of the environment and the wise use of resources.

Conscious of the special situation in the Antarctic Treaty and the Recommendations adopted under it;

Recommended to their Governments that the subject "Antarctic Resources-Effects of Mineral Exploration" be carefully studied and included on the Agenda of the Eighth Consultative Meeting.

Ministry of Foreign Affairs, Wellington, *Report of Seventh Consultative Meeting*, 22 (1973).

68. *E.g.*

The distinguished delegate of Belgium was correct when he said that the resources question could either destroy the treaty or put it on a stronger footing.

Statement by Dr. Robert E. Hughes, U.S. Representative [hereinafter cited as Hughes' Oslo Statement].

ly, the parties unanimously urged restraint⁶⁹ from commercial exploitation in the interim, while a long-term solution could be ironed out.

The Wellington recommendation on mineral exploration was adopted again, with a provision calling for a special preparatory meeting in Paris to discuss both the environmental impacts and political ramifications of Antarctic resource exploitation.⁷⁰ Additionally, a recommendation was adopted urging that States which are not Consultative Parties obey the Antarctic Treaty, to prevent discord and conflict in the area.⁷¹

Despite the seeming urgency of the resource issue, the special preparatory Paris session, held during June, 1976, also did not offer any substantive resolution. The sessions, which were private,⁷² apparently consisted of an exchange of divergent national views among the Consultative Group parties. Perhaps the Ninth Consultative Meeting to be held in the United Kingdom at an as yet unannounced date will offer some consensus, though the four year history of ATG efforts in the area does not impart a flavor of decisive action.

Still, the ATG should not be overly faulted for their lack of demonstrable progress on the resource exploitation question, for the problem is exceedingly complex. In Beeby's summation, the resource exploitation issue:

Could lead the parties to the Treaty straight back to the central

69.

The Meeting noted that all Governments represented at the Eighth Consultative Meeting urge states and persons to refrain from actions of commercial exploration and exploitation while, acting as Consultative Parties, they seek timely solutions to the problems raised by the possible presence of valuable mineral resources in the Antarctic Treaty Area.

Final Report of the Eighth Antarctic Treaty Consultative Meeting 5 (1975).

70. VIII-14 Antarctic Resources-Effects of Mineral Exploration . . .

Recommend to their Government that:

1. The subject "Antarctic Resources-The Question of Mineral Exploration and Exploitation" be fully studied in all its aspects in relation to the Treaty and be the subject of consultation among them with a view to convening a special preparatory meeting to report to the Ninth Consultative Meeting.
2. They undertake to study the environmental implications of mineral resource activities in the Antarctic Treaty area . . .

Id.

71. VII-8 Activities [sic] of States That Are Not Consultative Parties . . .

Recognizing that the Antarctic Treaty places a special responsibility on the Contracting Parties to exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in the Antarctic Treaty Area contrary to the principles or purposes of the Treaty . . .

Id.

72. Letter from Theodore Sellin, Polar Affairs Officer, Bureau of Oceans and International Environmental and Scientific Affairs, to U.S. Dep't of State (Aug. 2, 1976) [hereinafter cited as Sellin letter].

problem of sovereignty and conflicting territorial claims. Who is to authorize the exploitation of the resources in the Antarctic and for what area?⁷³

With the possible exception of the United States position,⁷⁴ which attempts to gloss over the underlying sovereignty dispute; it is truly the right to manage and profit from territory that is at stake. For the licensing of resource ventures under any one regime certainly takes the economic incentive, if not the legal legitimacy, away from competing resource regimes. And as the interests of the sector claiming nations, the reserved rights nations and the remainder of the world's nations point in different directions on the resolution of the Antarctic sovereignty dispute; it is no wonder that the Consultative Group is having difficulty grappling with the resource issue.

We now turn to discuss and evaluate the four regimes most commonly mentioned as solutions to the resource issue. They are, in the order presented; operation under the current Antarctic Treaty (the U.S. position), a national approach, a condominium approach and an international approach.

*Potential Solutions to the Resource Issue:
Resolving the Status of Glacia Firma Antarctica*

A. Operation under the Current Antarctic Treaty

From somewhat conflicting reports,⁷⁵ it appears that the United States has been cautiously urging a solution within the four corners of the Antarctic Treaty in the ongoing ATG negotiations. The United States urges interpretation of two Treaty provisions which would allow resource exploitation under the Treaty by common agreement. No new Treaty would need to be negotiated, nor would the underlying sovereignty issue have to be resolved at this time. The first element of the U.S. position is that resource exploitation is currently allowed as an Article I "peaceful use" of Antarctica.⁷⁶ "Peaceful

73. C. Beeby, *The Antarctic Treaty*, 18 (1972).

74. See text which accompanies notes 75-83 *infra*.

75. Shapely reports that, due to infighting among energy, environmental and policy agencies, the United States may have "no position on the question of Antarctic resources." D. Shapely, *Antarctica's Future: Will Oslo Talks on Resources Mean that Scientists Have to Move Over* 187 *Sci.* 820 (1975).

However, the Sellin letter, *supra* note 72, indicates the continued vitality of the positions announced in *Hearings on U.S. Policy with Respect to Mineral Exploration and Exploitation in the Antarctic, Before Subcomm. on Oceans and International Environment of the Senate Comm. on Foreign Relations, 94th Cong., 1st Sess. (1975)* [hereinafter cited as *U.S. Antarctic Policy*]. The public statements of U.S. officials at the Oslo and Paris meetings, discussed *infra* in the text, generally support the U.S. Antarctic Policy positions.

76. This statement is found in *U.S. Antarctic Policy, supra* note 75, at 19. It is re-iterated both in the Sellin letter, *supra* note 72 and the Hughes' Oslo Statement, *supra* note 68, at 1.

use," it is contended, should be interpreted broadly to include all non-belligerent uses consistent with other provisions of the Treaty. Thus, resource exploitation would be allowable if it could meet the environmental preservation provisions of the Treaty, which iceberg harvesting apparently could.

But, it may be argued, allowing resource exploitation under the Treaty regime certainly must take away something from the sector claimants. The United States response is that:

[b]y virtue of Article IV, paragraph 2, mineral resources activities in Antarctica while the Treaty is in force will not constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica and will not create any rights of sovereignty in Antarctica. Such activities would, however, be within the "peaceful purposes" . . .⁷⁷

It should be noted that both the peaceful use and nonassertion of claim elements of the U.S. position must be accepted to grant resource rights on the Antarctic mainland.

The U.S. has also advanced an independent rationale for allowing resource exploitation of the Antarctic water column and continental margin, where development is most imminent. The United States argues, with a great deal of supporting authority,⁷⁸ that there is no present sovereignty in Antarctica.⁷⁹ Owing to the absence of a coastal sovereign, which is a prerequisite for a territorial sea,⁸⁰ the high seas extend up to the Antarctic coastline.⁸¹ And as "high seas rights are excluded from the application of the Treaty,"⁸² the water column resources are outside the Antarctic Treaty area.⁸³ Thus, Antarctic icebergs may be currently appropriable by Treaty and non-Treaty nations alike, under the U.S. position.

77. *U.S. Antarctic Policy*, *supra* note 75, at 19.

78. See text which accompanies notes 93-106 *infra*, discounting the possibility of a current national or condominium Antarctic sovereign.

79. We, as well as several other states, do not consider that any part of Antarctica is subject to the sovereignty of any state. Hughes' Oslo Statement, *supra* note 68, at 2.

80. See text which accompanies notes 145 & 146 *infra*.

81. For the sake of argument it is conceivable that because no state *per se* exists on the Antarctic continent, then there can be no territorial seas and thus the high seas come right up to the land or ice mass. This is precisely the position of the United States Government; that is, that all of the Southern Ocean is considered as high seas. G. Wilson, *Antarctica, The Southern Ocean, and the Law of the Sea*, 29-30, April, 1976 (Unpublished thesis in Harvard Law School Library) [hereinafter cited as Wilson]. See also by implication, the discussion of the status of the Antarctic continental shelf in *U.S. Antarctic Policy*, *supra* note 75, at 19-20.

82. Letter from Donald L. McKernan, Coordinator of Ocean Affairs and Special Assistant to the Secretary of State, to Richard A. Frank, Center for Law and Social Policy, May 15, 1972. Quoted from Wilson, *supra* note 81, at 30.

83. See text which accompanies notes 125-34 *infra*, where it is suggested that reasonable iceberg appropriation on the high seas are currently allowable.

In sum, the U.S. position is that resource exploitation is allowed under the Antarctic Treaty and even if it is not allowed, as in the case of water column resources, the Treaty does not apply at all. While the latter point is most probably correct as a matter of international law, the first point of the U.S. position does raise political difficulties within the ATG community. It is the ATG which must resolve the meaning of the peaceful use and no claims language of the Treaty, and despite the internal logic of the U.S. position, the end result reached will probably prove unsatisfactory to the other nations. It will be difficult for the sector claiming nations to get beyond the logic that the resource riches that would be theirs under a national regime now must be shared with the ATG group, and that this new layer of ATG control over Antarctic would further undermine their individual claims of sovereignty, despite the sterilizing Article IV language. Thus, the U.S. position is at most a stop gap or interim measure; it is felt that the underlying Antarctic sovereignty issue must be resolved to clear the political, ecological and economic implications of resource rights.

B. *The National Approach*

The national approach would grant sovereignty to the individual nations claiming historic interests in Antarctic sectors, resulting in a segmented Antarctica. The benefits of this approach include the sound resource management that supposedly follows from individual owner control and rewarding those nations who have expended funds in Antarctic scientific exploration. The detriments of a national regime revolve around the equities of allowing largely developed nations to profit from rather insubstantial settlement in Antarctica, at the expense of the resource needs of developing nations.

While the abstract benefits and detriments can be debated, much of the concern has focused on the legitimacy of the national sovereignty claims in Antarctica. For the validity of claims to previously uninhabited territory, while initially a matter of unilateral declaration, is ultimately determined by international law.

From Roman property law roots concerning *Terra nullius*, international law has developed the notion of effective occupation or *occupatio* as a means of acquiring previously uninhabited territory.⁸⁴ The rationale for the rule, as stated by Vatte and Blunt-schli,⁸⁵ is political and economic efficiency; restricting land claims

84. For an excellent summary of the effective occupation concept and its application to Antarctica, see Bernhardt, *Sovereignty in Antarctica*, 5 Cal. West. Int'l L. J. 297 (1975) [hereinafter cited as Bernhardt].

85. the base Act of taking possession . . . gives no nation a right to appropriate to

to a size the sovereign can effectively and beneficially manage. While the elements of a successful claim are difficult to predict, the more familiar statements of the effective occupation test stress settlement and uncontested territorial administration.⁸⁶

As we have seen, Article IV of the Antarctic Treaty excludes post-Treaty acts from entering into the sovereignty calculus. The question for the Antarctic claimants necessarily becomes one of degree—were their pre-Treaty acts sufficient to confer recognized title?

Bernhardt concludes his study of the Antarctic sovereignty issue with the opinion that no nation had satisfied the international law test:

[C]an any single state claim to have perfected title before entry into force of the treaty regime? The answer would clearly be in the negative. Until the treaty regime, no state was able to assert a continuous display of authority throughout the year, and by the time effective year-long occupation was achieved, its concomitant peaceful and uncontested display had been ruled out by the competing claims of other States.⁸⁷

While other scholars are less emphatic in discounting the validity of the Antarctic sector claims, there is a thread of pessimism running through their discussion.⁸⁸ Much of this pessimism stems from the dubious legal basis for the sector theory which underlies the Antarctic claims.

As originally advanced by Canada and the Soviet Union in the

itself a country except for the purpose of making use of it, and not of hindering others from deriving advantage from it.

Vattel, *Le Droit des Gens* 98 (Pitty trans.).

no state has the right to incorporate with itself more territory . . . than it can organize politically. The sovereignty of a State exists only if it is exercised as a fact.

Bluntschli, *Le Droit International Codifie* (Landy trans.). Both selections are quoted from Bernhardt, *supra* note 84, at 318-9.

86. Theory and practice agree nowadays upon the rule that occupation is effected through taking possession of, and establishing administration over, the territory in the name of, and for, the acquiring State . . . Possession and administration are the two essential facts that constitute an effective occupation.

L. Oppenheim, *Int'l Law* 509-10 (7th ed., 1948).

the discovery of land unknown to civilization, even when coupled with a formal taking of possession does not support a valid claim of sovereignty unless discovery is followed by an actual settlement of the discovered country.

G. Hackworth, *Digest of Int'l Law* 399 (1940).

87. Bernhardt, *supra* note 84, at 330.

88. New Zealand's claim to the Ross Dependency in international law is shaky—as are all other Antarctic claims.

Auburn, *The Ross Dependency—An Undeclared Condominium*, 1 *Auckland U. L. Rev.* 89, 102 (1972) [hereinafter cited as Auburn article].

Arctic, the sector principle was tied to notions of contiguity to the continental land mass.⁸⁹ Contiguity is a missing element in most Antarctic claims.⁹⁰ Thus, due to the misapplication of a dubious international law theory, the greater weight of authority discredits the national sector claims in Antarctica.⁹¹

In conclusion, the international acceptability of a segmented national approach to Antarctic sovereignty is highly questionable. Though the author concurs in Bernhardt's judgment that the nationalistic sector claims are invalid, the possibility remains that these claims could be found credible. For this reason, the article will discuss iceberg harvesting rights and duties under a national regime for *glacia firma* Antarctica. The questions of the validity of the seaward extent of the sector claims and adopting *glacia firma* status for the ice shelves will be deferred until that discussion.⁹²

C. The Condominium Approach

Given the probable inability of individual sector claimants to meet the effective occupation test, there remains the possibility that concurrent actions of claiming states might satisfy the test. This situation of joint territorial sovereignty is termed a condominium.⁹³ Two distinct condominium arrangements should be distinguished; the historic actions of two or more countries within a sector could be pooled to create a condominium only within that sector, or all the claiming nations could pool their Antarctic claims to create a multiple condominium over the entire continent.

Augurn argues that the historic actions of the United States and New Zealand in the Ross Dependency have created a condominium of the first type.⁹⁴ The historic acts of the two countries within the

89. The principle, based on contiguity, has no standing in the law of nations as a means of territorial acquisition.

F. Auburn, *The Ross Dependency* 24-5 (1972) [hereinafter cited as Auburn book].

90. The possible exceptions are Argentina and Chile, which claim on the basis of contiguity. However, as the Auburn book quote, *supra* note 88 indicates, even contiguous sectors are not thought to create valid territorial rights.

91. From all we have said so far the conclusion must be that there exists no legal foundation in support of the "sector principle" in either the Arctic or the Antarctic.

O. Svarlien, *The Sector Principle in Law and Practice*, 10 *Polar Record* 248, 260 (1960).

Accord, Bernhardt, *supra* note 84, at 338: "Thus, it can be concluded that the sector principle has not achieved the status of a legal principle in international law."

92. See text which accompanies notes 135-47 *infra*.

93. The conjoint exercise of sovereignty over a region by two or more states is denominated "condominium."

G. Hackworth, *Digest of Int'l Law* 56 (1940).

Accord, D. O'Connell, *Int'l Law* 360 (1975): "Where sovereignty is exercised jointly the situation is described as condominium."

94. The present situation in the Dependency constitutes an undeclared United

Ross Sector, if consentually pooled, might well satisfy the effective occupation test as applied in the *Status of Eastern Greenland*⁹⁵ case.

Eastern Greenland involved the conflicting claims of Denmark and Norway to a polar territory. The ICV, citing the effective occupation test as "the intention and will to exercise such sovereignty and the manifestation of State activity,"⁹⁶ accepted the minimal Danish control as sufficient to confer sovereignty. Given the historic dominance of New Zealand and the United States in the Ross Dependency, their joint assertion of sovereignty might well meet the low threshold for polar territory control.

As the Ross Ice Shelf area is one of the more attractive iceberg harvesting sites and the U.S. is, in the first instance, among the nations whose technology and economic structure may allow iceberg exploitation, the multiple condominium concept for the Ross Dependency deserves some consideration. If the urging of Professor Auburn is any indication,⁹⁷ the New Zealand government does not appear antithetical to the condominium concept.

Still, the U.S. appears committed to finding a peaceful solution to the resource issue which would be acceptable to all the ATG.⁹⁸ It is submitted that the sector condominium would not accomplish that objective, since a shift in the historic posture of the U.S. towards asserting a territorial claim could well upset the fragile Treaty regime.

Turning to the second condominium concept, there is the view that the Antarctic Treaty pooled the interests of the ATG nations, resulting in a *de facto* multiple condominium over all Antarctica.⁹⁹

States/New Zealand condominium. An agreement between the United States and New Zealand could well commence as an informal unwritten arrangement for which a precedent might be found in the two States' Antarctic cooperation between 1955 and 1958. Mineral exploration, for instance, could be performed by a United States-New Zealand company registered in New Zealand. Such an informal arrangement has many drawbacks, but is better than no regime at all. It would also appear to be the only workable regime consistent with the Antarctic Treaty.

Auburn book, *supra* note 88, at 105.

95. *The Status of Eastern Greenland*, 1933 P.C.I.U. SerA/B No. 53, at 22.

96. *Id.* at 63.

97. Auburn, a New Zealand law professor, argues for a reevaluation of New Zealand's Ross Dependency claim and for the condominium solution in both his book, *supra* note 88 and his article, *supra* note 88.

98. *E.g.*, the unanimous call for restraint at the Oslo meeting and the Hughes' Oslo statement, *supra* note 68, 3 states: "all of our governments prefer to strengthen the Antarctic Treaty and not destroy it."

99. "It may well be that the practical effect of the treaty, as opposed to its wording will . . . create a multiple condominium." Auburn book, *supra* note 88, at 36.

Accord, Hambro who speaks of Antarctica as a "condominium sui generis."

Hambro, Some Notes on the Future of the Antarctic Treaty Collaboration, 68 Am. J. Int'l L. 217 (1974).

The proposition that Antarctica is currently a multiple condominium with natural resource jurisdiction controlled by the ATG, is doubtful owing to the nature in which a condominium is created. According to O'Connell, the extent of a condominium is defined by its organizing treaty.¹⁰⁰ As the Antarctic Treaty does not speak to resource jurisdiction at all and purports not to alter the pre-Treaty status of Antarctica, it is difficult to conclude that multiple condominium sovereignty exists in Antarctica. This conclusion is shared by Marcoux, that condominial resource rights have not yet been created in the ATG.¹⁰¹

This current assessment would not preclude the ATG nations from enlarging the Treaty to provide for natural resource jurisdiction. However, this option, which has been discussed at recent Consultative Meetings, would presumably require negotiating a new Treaty.¹⁰² Though the length of time necessary to negotiate a new Antarctic Treaty is indeterminate at this point, Bernhardt suggests that the evolving LOS philosophy may provide a significant impetus for cooperative action by the ATG, to avoid being upstaged by the international community in the Antarctic arena.¹⁰³ In other words,

100. Almost all authors have sought to define condominium, failing to recognize that if the term is used merely as a summation of the characteristics of a regime laid down specifically by treaty, it comprehends the conclusions drawn from analysis, and is not the major premise from which the analysis proceeds; in such a case condominium defies definition.

D. O'Connell, *The Condominium of the New Hebrides*, 43 Brit. Y. B. Int'l Law 71, 78-9 (1966) [hereinafter cited as O'Connell].

101. "In international law, the better case is that Antarctica today is merely the scientific preserve of the developed countries; resource jurisdiction has not vested in these nations via the 1959 Treaty." Marcoux, *supra* note 49, at 401.

102. The eventual need for some sort of leasing or property right system among these cooperating Antarctic Treaty nations . . . granting development rights in the Antarctic margin would necessitate a new treaty because Article IV of the 1959 Treaty clearly forbids the type of "enlargement of an existing claim" which any extension . . . would entail.

Id.

See also text which accompanies notes 78-83 *supra*, for the pragmatic political reasons why it would be unacceptable to allow resource rights under the current Treaty. It should be noted that proceeding by way of Treaty amendment entails the same effort as renegotiating a new Treaty, since under Article XII 1.(a) unanimous consent of signatory parties is required for amendments.

103. The 1975 session of the Third United Nations Conference in the Law of the Sea shall give added impetus to the treaty partners to find a practicable interim, if not long range, solution to the resources problem. . . . Given the fact that it would in all probability be more advantageous for the treaty partners to preserve the treaty regime and find a solution to the issue within its confines rather than risk the chance of opening a heretofore virtually closed frontier to the law of the sea arena and to possible eventual administration and control under the auspices of the United Nations, the partners will find themselves in accord. . . . Failure to reach such an agreement might well lead to the eclipse of a viable treaty regime, the demise of the status quo

the *status quo* oriented ATG may be forced into cementing a permanent regime for Antarctica, to forestall efforts to secure Antarctica as the "common heritage of mankind."¹⁰⁴

The success of any future ATG efforts to declare a multiple condominium over Antarctica will ultimately depend on the application of the effective occupation test to the Antarctic situation. Due to the exclusive control the ATG has exercised over Antarctica *vis-à-vis* non-Treaty nations, a strong case could be made for the validity of consensually pooled Antarctic claims.

Thus, the multiple condominium approach to Antarctic sovereignty appears to be a viable, if not the most viable,¹⁰⁵ long range alternative. Consequently, iceberg acquisition rights under a condominium Antarctica will be addressed later in this article.¹⁰⁶

D. *The International Approach*

If Antarctica is not subject to valid sector claims and has not yet been reduced to condominium status, under a *terra nullius* acquisition theory the continent is potentially open for international management. Should the ATG nations consent to International Court of Justice jurisdiction, residual international control over Antarctica could follow from the hypothetical invalidity of national or condominium claims.

Alternatively, and more likely, the ATG nations could voluntarily agree to a United Nations trusteeship¹⁰⁷ for Antarctica. Such agreement would give credence to the equitable considerations concerning who should profit from Antarctic natural resources. An Antarctic trusteeship would appear to meet the U.N. Charter objective of "further[ing] international peace and security,"¹⁰⁸ since an international repository would end dangerous squabbling over Antarctic resources. The trusteeship could be administered either by the U.N. or the ATG.¹⁰⁹

The other route to an international Antarctica rejects the premise that Antarctica is *res nullius* and subject to national appropriation.

and the application of the nascent "common heritage of mankind" concept to all of the last frontier on earth.

Bernardt, *supra* note 84, at 348-9.

104. See Wilson, *supra* note 81, at 23-7.

105. For an endorsement of the condominium arrangement, see Rose, *Antarctic Condominium: Building a New Legal Order for Commercial Interests*, 11 MTS J. 19 (1976).

106. See text which accompanies notes 151-56 *infra*.

107. Charter of the United Nations and Statute of the International Court of Justice entered into force October 24, 1945, 59 Stat. 1031, T.S. No. 993. Chapter XII, Articles 75-85 establish the International Trusteeship System.

108. Article 76a.

109. Article 81.

The competing premise would state that Antarctica is *res communes*, to be enjoyed by all. While this concept would be revolutionary in application to a considerable land mass, it finds support in the *Minquiers and Ecrehos*¹¹⁰ case, the current Law of the Sea negotiations¹¹¹ and the Antarctic Treaty itself.¹¹²

Thus, through a variety of avenues, an international regime is another viable long range alternative for *glacia firma* Antarctica. The implications for iceberg harvesting under this regime will be discussed later in this article.¹¹³

Iceberg Exploitation and the Law of the Sea

A. Background

The conventional law of the sea is in a state of flux. While the 1958 Convention on the High Seas¹¹⁴ and the 1958 Convention on the Territorial Sea and the Contiguous Zone¹¹⁵ are presently the major codifications, the Third United Nations Conference on the Law of the Sea is currently negotiating a new governing text. The Conference has thus far produced an Informal Single Negotiating Text¹¹⁶ and a Revised Informal Single Negotiating Text.¹¹⁷ The Negotiating Texts are just that, the subject of deliberation and amendment,¹¹⁸ with a final Convention not realistically expected

110. It has been suggested that the International Court of Justice, in the *Minquiers and Ecrehos* case, by referring to the Special Agreement which mentioned "islets and rocks capable of physical appropriation" implicitly endorsed a rule that certain kinds of territory are not capable of appropriation at all.

Auburn book, *supra* note 88, at 50.

111. The entire deep-seabed would be acknowledged to be the "common heritage of mankind" and thus not subject to national appropriation. See text which accompanies note 159 *infra*. See also Note *The Polar Regions and the Law of the Sea*, 8 Case West. J. of Int. L. 204, 215-17 (1976) which argues for an Antarctic "common heritage" management.

112. The Treaty Preamble notes "it is in the interest of all mankind that Antarctica shall be used exclusively for peaceful purposes and shall not become the scene or object of international discord." This principle has been reaffirmed in Recommendation VIII-14 of the Eighth Antarctic Treaty Consultative Meeting.

113. See text which accompanies notes 157-58 *infra*.

114. Convention on the High Seas, *in force* September 30, 1962, 450 U.N.T.S. 82, 13 U.S.T. 2312, T.I.A.S. No. 5200.

115. Convention on the Territorial Sea and the Contiguous Zone *in force* September 10, 1964, 516 U.N.T.S. 205, 15 U.S.T. 1606, T.I.A.S. No. 5639.

116. Informal Single Negotiating Text A/CONF. 62/W P. 8/Parts I, II & III/May 7, 1975.

117. Revised Informal Single Negotiating Text (A/CONF. 62/WP. 8/Rev. 1/Parts I, II & III/May 5, 1976) [hereinafter cited as *Text*].

118. These texts have . . . no other status than that of serving as a basis for continued negotiation without prejudice to the right of any delegation to move any amendments or to introduce any new proposals.

Note by the President of the Conference Text, supra note 117, at 1.

until at least January 1977.¹¹⁹ Ratification to put the new Convention into force could take several years.

This dynamic situation poses analytical problems. When, and if, the deliberations come to fruition, then something similar to the Texts would be determinative of most iceberg law questions. On the other hand, if no consensus is reached, or in the interim period, the two earlier conventions would be the appropriate field of inquiry. Recognizing the inherent uncertainty, this article will examine both paths. The implications for iceberg exploitation under the 1958 Conventions will be dealt with under the "existing" law sections, while the "changes" sections will explore potential policy shifts as generally evidenced in the more recent Text. Moreover, iceberg exploitation issues can be conveniently divided into acquisition-related (harvesting) and transit-related issues. Therefore, we embark on a four-fold analysis.

B. Iceberg Acquisition under Existing Law of the Sea

Existing conventional international law divides the oceans into two principal zones, the territorial sea and the high seas. Since iceberg acquisition would be more efficient in areas directly off the ice shelves where iceberg clusters are found, both Weeks-Campbell¹²⁰ and Hult-Ostrander¹²¹ based their projections on coastal region iceberg harvesting. Thus, it becomes important to define iceberg entitlement rights in both territorial sea and high seas regimes, as well as to define the extent of both zones in the Antarctic Ocean.

1. Territorial Sea Regime

Article 1 of the Territorial Sea Convention states the general concept of the territorial sea:

The sovereignty of a state extends, beyond its land territory and its

119. *E.g.*

As the conference's 157 delegations coalesced into three blocs—coastal states, landlocked countries and maritime and industrial powers—the general feeling was that the seven weeks allotted to this [fifth] session would not be enough to draw up the text of a sea-law treaty, and that at least one more session would be needed next year. This was recognized by [Conference President] Amerasinghe in his opening remarks today, and by the chairman of the American delegation, T. Vincent Larsen, who spoke of at least two more sessions after this one, one for negotiating and one to open the treaty to signatures.

"U.N. Sea-Law Parley Opens to Bitter Dispute," *Washington Post*, August 3, 1976.

120. Weeks-Campbell would harvest "from the edge of the Amery and Ross Ice Shelves," Weeks-Campbell, *supra* note 2, at 228.

121. Hult-Ostrander would harvest from "70° S latitude and 170° W longitude in the Ross Sea," Hult-Ostrander, *Icebergs*, *supra* note 2, at 16.

internal waters, to a *belt of sea adjacent to its coast* described as the territorial sea (Emphasis added).

The key questions here concern the existence of an Antarctic sovereign state, the baseline for measuring the territorial sea and the breadth of the territorial sea belt. Since the answers to these questions depend on the regime that applies or will apply to the Antarctic, they will be discussed individually in subsection 3, the delimitation of Antarctic zones.^{1 2 2}

Within the territorial sea, however delimited, the coastal state has sovereign rights to all water column resources, including iceberg harvesting rights. The coastal state's rights would be exclusive, unless licensing arrangements could be negotiated by foreign nationals.

2. High Seas Regime

Article 1 of the High Seas Convention defines the high seas by exclusion:

The term "high seas" means all parts of the sea that are not included in the territorial sea or in the internal waters of a State.

Thus, by definition, the high seas regime would apply to the area beyond the territorial sea, if one applies in Antarctica, or to the entire Antarctic Ocean area if no territorial sea applies.

Despite the Hult-Ostrander assertion that a right to appropriate icebergs on the high seas follows as a matter of course from the freedom of the high seas doctrine,^{1 2 3} the situation merits closer scrutiny. It may be argued that icebergs are inherently incapable of appropriation. Icebergs normally float out to sea, melt and become part of the oceans. Since Article 2 of the High Seas Convention states that "no State may validly purport to subject any part of the [the high seas] to sovereignty," it would appear that the framers intended to foreclose the harvesting of icebergs on the high seas.

The fallacy with this argument, however, lies in the fact that icebergs are frozen and discrete at the harvesting stage. Due to their discrete nature, icebergs, like fish, are subject to seizure and reduction to private possession. Since the origin of the high seas doctrine with Grotius, it has been recognized that these water column resources can become privately owned.^{1 2 4} Iceberg property rights

122. See text which accompanies notes 135-58 *infra*.

123. The Antarctic icebergs . . . are part of the international waters and should be available to anyone as an extension of the freedom-of-the-seas doctrine.

Hult-Ostrander, *ERTS*, *supra* note 2, at 456.

124. Nevertheless, although those things are with reason said to be *res nullius*, so far as private ownership is concerned, still they differ very much from those

would encompass the fee interest of title and usage rights, that is *proprietas plenas*, as opposed to the usufructory rights applicable to liquid water. While icebergs may be privately owned in the academic sense, iceberg appropriation must still be proven to be a recognized freedom of the high seas.

Article 2 of the High Seas Convention contains an *inter alia* list of the more familiar freedoms of the sea.¹²⁵ Not surprisingly iceberg harvesting is omitted. While the 1956 International Law Commission commentary on the draft article erases any doubt that the list was meant to be all-inclusive,¹²⁶ they do not explain the "general principles of international law"¹²⁷ which determine the existence of a new freedom on the high seas, such as iceberg harvesting. Two standards; the "any reasonable use" and "specific custom" views, predominate as to when a new high seas freedom becomes internationally accepted.

The first and favored view is that general principles permit any "reasonable"¹²⁸ use of the oceans. McDougal and Burke argue persuasively for this rule, both on the basis of policy and precedent. First, the policy rationale:

The overriding requirement of a rational community policy with respect to access to the sea, in this contemporary era of rapid scientific and technological development, is that of protecting states in a freedom to undertake activities for virtually any imaginable purpose. The principal factors in support of such a policy include, most importantly, the conditions under which the productivity of the oceans may be expanded and increased.¹²⁹

things which, though also *res nullius* have not been marked out for common use, such for example as wild animals, fish and birds. For if any one seizes those things and assumes possession of them, they can become objects of private ownership.

H. Grotius, *Mare Liberum*, quoted from H. G. Knight, *The Law of the Sea: Cases, Documents and Readings* 20 (1975) [hereinafter cited as Knight].

125. Freedom of the high seas . . . comprises, *inter alia* . . .

- (1) Freedom of navigation;
- (2) Freedom of fishing;
- (3) Freedom to lay submarine cables and pipelines;
- (4) Freedom to fly over the high seas.

These freedoms, and others which are recognized by the *general principles of international law*, shall be exercised by all States with *reasonable regard* to the interests of other States in their exercise of the freedom of the high seas. (Emphasis added)

126. The list of freedoms of the high seas . . . is not restrictive. The Commission has merely specified four of the main freedoms, but it is aware that there are other freedoms. . . .

Quoted from Knight, *supra* note 124, at 370.

127. See note 125, *supra*.

128. See note 125, *supra*.

129. M. McDougal & W. Burne, *The Public Order of the Oceans* 751 (1962).

In support of the policy argument, it should be noted that icebergs, unless appropriated as a fresh water resource, melt back into seawater without performing any productive purposes. The affirmance of a right to harvest icebergs on the high seas would permit a productive end use to an otherwise wasted commodity.

Still, the existence of good policy arguments does not suffice for a principle of international law. McDougal and Burke find the evidence for open access to water column resources, limited only by the reasonableness standard, in the work of the International Law Commission and the expectations of the representatives to the 1958 High Seas Convention:

The principal evidence of established consensus about the permissible purposes of access under customary international law consists both of certain accepted patterns in the case of the oceans and of accompanying expression of expectations about the lawfulness of such patterns. . . . In sum, the Commission seems to have affirmed, implicitly and awkwardly, that the sea is open to use for every purpose, subject to the limitations of the requirement of reasonableness in relation to other uses. At the 1958 conference, states succeeded in making it clearer than had the commission that the principle of free access to the sea is a flexible one, permitting expansion of types of use as long as an accommodation may be made in accord with the standard of reasonableness.¹³⁰

This reasonableness standard would be applied in two ways. First, iceberg transport must be reasonable in relation to other established freedoms of the seas, principally navigation and fishing. The potential interference with these sea uses will be explored in the iceberg transit section, *infra*.¹³¹ Second, iceberg harvesting by one country must be reasonable in relation to the harvesting needs and capabilities of other countries. With the large magnitude of Antarctic icebergs and infant harvesting technology, the reasonableness standard is not expected to be a serious constraint in the near future.

While the author agrees with the above interpretation of the freedom of the high seas doctrine, the other view posits that new ocean uses must be proven individually under principles of international law. Under this view, custom and authoritative texts¹³² provide the only avenues for proving the existence of a right to presently harvest icebergs on the high seas. The authoritative text argument has already been presented; if one accepts the McDougal and Burke text as

130. *Id.* at 753.

131. See text which accompanies notes 177-92 *infra*.

132. C. J. Colombos, *International Law of the Sea* 7, 8 (6th ed. 1967).

authoritative, then there is a current right to make reasonable iceberg harvests on the high seas.

A specific customary right to appropriate icebergs hinges on the extent of usage and acquiescence necessary to effect a customary rule of international law. While the proposed iceberg harvesting is not wholly without precedent,^{1 3 3} it would be stretching the fabric of custom to conclude that these isolated acts resulted in a customary rule of international law allowing iceberg harvesting. The threshold of recurring multi-national action stressed in most custom definitions does not appear to have been met in this case.^{1 3 4}

The probable inability to formulate a customary principle of international law specifically allowing iceberg harvesting on the basis of past state action need not thoroughly debilitate iceberg harvesting proposals. For the sloth-like growth of specific custom proves its undesirability in dynamic situations such as ocean resource use. The inherent problems of adherence to specific custom in ocean sea usage adds to the McDougal-Burke position favoring all reasonable ocean uses.

3. Delimitation of Antarctic Ocean Zones

(a) Common Issues Under Any Regime

The issue of defining the extent of ocean zones within the Antarctic region is potentially an explosive one. While as a historic matter the *status quo* oriented ATG nations have been able to ward off attempts by the international community to establish a foothold in the region, this situation appears to be breaking down.^{1 3 5} The

133. The thesis of this paper—that icebergs can be towed to locations remote from the Polar Regions and used there as sources of fresh water—is an intriguing idea which is not new. It may date from the winter of 1853-54, when a ship supplying San Francisco with Alaskan lake ice was forced, by lack of satisfactory lake ice at Sitka, to load glacier ice from the Baird Glacier north of Petersburg (Keithahm, 1967). The direct towing of icebergs is merely an extension of this operation; and indeed, between 1890 and 1900, small icebergs were both towed by ship and sailed from Laguna San Rafael, Chile (c. 45° S.) to Valparaiso and even to Callao, Peru (c. 12° S.), a distance of 3900 km.

Weeks-Campbell, *supra* note 2, at 210.

134. *E.g.*

The elements necessary are the concordant and recurring action of numerous States in the dominion of international relations, the conception in each case that such action was enjoined by law, and the failure of other States to challenge that conception at that time.

¹ Whiteman, *Digest of Int'l Law* 75 (1973).

135. The ATG group successfully kept the United Nations Environment Program (UNEP) from studying the Antarctic environmental preservation/resource exploitation issue, only to implicitly accept a UNEP role in monitoring Antarctic "cold deserts." See Wilson, *supra* note 81, at 23-27.

existence of valuable resources within the Antarctic area can only accelerate the process of defining and delimiting Antarctic Ocean zones, as it becomes more efficient to do so.¹³⁶ This matter of delimitation is strictly a matter of international law.

As we have seen, the sector claims extend beyond *glacia firma* Antarctica.¹³⁷ The seaward extent of these claims is clearly contrary to the normal rule of international law.¹³⁸ Both conventional and customary international law point unswervingly to measuring the breadth of any territorial sea from a coastal low tide baseline.¹³⁹ Moreover, arguments dating back to Grotius concerning the impossibility of reducing a body of water to possession, thereby effecting *occupatio*, support the invalidity of the seaward extent of the sector claims.¹⁴⁰

Additionally, despite Article IV's attempt to freeze the Antarctic *status quo*, it appears that the Article VI definition of the Treaty area may have unconsciously shrunk the sector claims to the Antarctic *glacia firma*. Article VI's use of the terms "area" and "ice-shelves" suggest a preoccupation with land and land surrogates. Hayton is in accord that objects not attached to the mainland, not to mention the open seas, are not within the Treaty purview by implication.¹⁴¹

A complimentary argument, and the position taken by the U.S. government against the seaward extent of the Treaty area, relies on the Article VI statement that the Treaty does not prejudice rights on the high seas recognized by international law. This affirmance of international law as the relevant field of inquiry for determining the

136. See note 63 *supra* for evidence of commercially valuable Antarctic resources.

See also R. Posner, *Economic Analysis of Law* (1972), H. Demsetz, *Toward a Theory of Property Rights*, 57 *Am. Econ. Rev.* 347 (1967) for the interrelationship between economics and law in developing property rights.

137. See text which accompanies notes 46-48 *supra*.

138. Although there have been strenuous disclaimers, it is clear that Antarctic sectors in general, and the Ross Dependency claim in particular, encroach upon the High Seas.
Auburn book, *supra* note 89, at 28.

139. Knight, *supra* note 124, at 133-145.

140. that which cannot be occupied . . . cannot be the property of anyone, because all property has arisen from occupation. . . . For the same reasons the sea is common to all, because it is so limitless that it cannot become a possession of anyone, and because it is adapted for the use of all. . . . It has therefore been demonstrated that neither a nation nor an individual can establish any right of private ownership over the sea itself.

Grotius quoted from Knight, *supra* note 124, at 19-22.

141. By implication pack-ice, fast ice and floating ice "islands" separated from mainland attachment are not assimilated to the status of territory, no matter how impressive their dimensions.

Hayton, *supra* note 46, at 360.

extent of the high seas, coupled with international law of the sea's traditional land mass baseline, further undermines any seaward purview by the ATG. Therefore, we conclude that the extent of any territorial sea and the high seas would be determined from a coastal baseline.

The large ice sheets extending beyond the Antarctic continent present the baseline issue: should they be assimilated to the land regime and become the point of coastal measurement? The weight of authority suggests that the ice shelves should be so assimilated.

Article VI of the Antarctic Treaty evidences an intent to incorporate the ice shelves into the land regime.¹⁴² Pharand¹⁴³ advances two reasons for including ice shelves in the Antarctic land regime. First, since they are formed by inland ice sheets, "ice shelves are, therefore, the product of land, as well as sea"¹⁴⁴ and deserving of land status for accretion-related reasons. Second, the ice shelves appear as a permanent continuation of land, pointing to the ice shelf as a convenient baseline measure.

In conclusion, the suggested resolution of common problems of delimiting Antarctic ocean zones rejects the seaward extent of Antarctic territorial claims, embracing instead an ice shelf baseline for determining territorial and high seas. We now turn to address the application of these two zones under different jurisdictional approaches to the Antarctic *glacia firma*.

(b) *Iceberg Acquisition under the Current Antarctic Treaty*

Under the Antarctic Treaty, nothing creates "any rights of sovereignty in Antarctica," presumably including the Treaty itself. Therefore, the U.S. interpretation¹⁴⁵ that there is no Antarctic "state" to which a territorial sea would append, has much compelling force. There was no recognized sovereign state before the Treaty and, supposedly, nothing was changed by the Treaty. The U.S. view is shared by Kish; "[i]n the absence of territorial sovereignty over Antarctica, the continent and the islands have no territorial sea."¹⁴⁶

Since the high seas by definition comprise the residuum of oceans

142. See text which accompanies notes 141 *supra*.

143. D. Pharand, *The Law of the Sea of the Arctic* 184 (1973).

144. *Id.* Accord Waldock, "Disputed Sovereignty in the Falkland Islands Dependencies," XXV *Brit Y. B. Int'l L.* 318 (1948). "On the legal issue, the opinion may be hazarded that, even if the Court were to reject the possibility of occupying the landless frozen seas of the Arctic, it might well recognize sovereignty over Antarctic lands as including the shelf-ice. This ice is a mere projection of the land and, indeed, it is not clear how much of the ice is purely frozen sea and how much rests upon a land base. . . ."

145. See text which accompanies notes 75-83 *supra*.

146. J. Kish, *The Law of International Spaces* 33 (1973).

that are not internal or territorial waters, the high seas would presently extend up to the ice shelf baseline. As the previous discussion suggests, a current right to make reasonable iceberg acquisitions on the high seas could include immediate iceberg harvesting in the Antarctic Ocean basin. However, given the U.S. position urging caution to prevent international discord, U.S. licensing of iceberg harvesting vessels may have to wait for ATG resolution of the resource exploitation issue. Iceberg harvesting by another nation, such as Saudi Arabia,¹⁴⁷ would appear to be legally legitimate, though politically unwise in terms of potential repercussions for the Antarctic Treaty regime.

(c) *Iceberg Acquisition under a National Approach*

Under a nationalistic Antarctic approach, a territorial sea would append, owing to the presence of sovereign Antarctic states. The territorial sovereign would have exclusive iceberg harvesting rights within the territorial sea, or could license harvesting by foreign nationals. The problem becomes one of applying international legal principles in territorial sea breadth.

The territorial sea breadth asserted by the Antarctic sector claimants for their own nations vary from 3 miles to Chile's 200 mile limit. Previous discussion suggests that the breadth would be measured from a coastal-ice shelf baseline. While the 1958 Territorial Sea conferees were unable to set a maximum breadth for the territorial sea,¹⁴⁸ there exists good evidence that the maximum permissible width is 12 miles.¹⁴⁹

However, some members of the Group of 77 maintain that their interests were under represented at the Convention, and economic and equitable considerations should allow them a wider territorial sea. The exclusive economic zone of the current LOS negotiations¹⁵⁰ certainly gives support for a wider zone of water column resource control. Thus, it is difficult to predict the result of a conflict over the breadth of an Antarctic territorial sea under the national approach.

Outside the territorial sea belt, however claimed or delimited, the high seas regime would apply. Again, international law points toward open access for reasonable iceberg harvesting for all nations on the high seas.

147. See note 65, *supra*.

148. See Knight, *supra* note 124, at 313-28.

149. E.g., the 1956 International Law Commission Commentary on draft articles states "The Commission considers that international law does not permit an extension of the territorial sea beyond twelve miles." Quoted from Knight, *supra* note 123, at 313.

150. See text which accompanies notes 165-71 *infra*.

(d) *Iceberg Acquisition under the Multiple Condominium Approach*

The application of a territorial sea to an officially declared Antarctic condominium is a close question. The territorial sea is defined by notions of appurtenance to a coastal sovereign state,¹⁵¹ and it is doubtful whether a condominium rises to the status of a state.¹⁵²

While existing conventional law may deny a territorial sea to condominiums, customary international law as evidenced through state practice supports a territorial sea for protective and economic reasons. The United States-United Kingdom agreement concerning the Canton and Enderbury Islands condominium asserts territorial water rights; fishing permits have been issued within that claimed territorial sea.¹⁵³ Similarly, the Kuwait-Saudi Arabia agreement over the "neutral zone" asserts territorial sea rights.¹⁵⁴ O'Connell implies that a territorial sea has been applied to the New Hebrides condominium.¹⁵⁵ Finally, the Spitsbergen Treaty, most nearly a condominium, claims jurisdiction in the territorial waters.¹⁵⁶ Thus, while precedents are slim, we conclude that an Antarctic condominium would be accorded a territorial sea under customary international law.

The territorial sea breadth under a condominium approach is too speculative to discuss, since none has been proposed, nor are there any dispositive ICV opinions. Within the territorial sea, the Antarctic condominium administrators could divide resource rights among themselves by internal agreement, or could license foreign iceberg appropriators. Beyond the territorial sea, iceberg harvesting would be open to all nations on the high seas.

(e) *Iceberg Acquisition under an International Approach*

The application of a territorial sea to an Antarctic trusteeship also poses a difficult question. Conventional international law would

151. See text which accompanies note 122 *supra*.

152. A condominium is not a State, and it is neither dependent nor independent. O'Connell, *supra* note 99 at 79.

Accord, G. Von Glahn, *Law Among Nations* 79 (1965). "Condominium do not possess any vestige of national sovereignty."

153. 2 Whiteman, *Digest of Int'l Law* 1330 (1973) and 196 L.N.T.S. 343 (1939).

154. S. Hosni, *The Partition of the Neutral Zone*, 60 Am. J. of Int'l Law 735, 743-6 (1966).

155. O'Connell *supra* note 100 at 82 mentions "Condominial waters."

156. Article 3, of the 1920 *Treaty Concerning the Archipelago of Spitzbergen*; 43 Stat. 1892, 2 L.N.T.S. 7, T.S. 686. On the uncertainty of the territorial sea claim see Bernhardt, *Spitsbergen: Jurisdictional Friction Over Unexploited Oil Reserves*, 4 Calif. W. Int'l L. J. 61 (1973).

apparently deny a territorial sea creating beneficial resource rights in the administering nations, since they would not be the sovereigns.¹⁵⁷ The customary territorial seas sometimes asserted for the benefit of the trust territory inhabitants,¹⁵⁸ are not applicable to Antarctica, which lacks an indigenous population.

From these precedents, we conclude that an international Antarctica would not be accorded a territorial sea, in the normal sense of an ocean belt wherein the managing entity has the exclusive rights to its resources. Any "territorial sea" accorded to an international Antarctica for customary reasons or to help preserve the Antarctic ecosystem is not expected to alter iceberg harvesting rights. Iceberg harvesting would be open to all nations, ATG and non-ATG, on a non-discriminatory basis; therefore this "territorial sea" regime would approximate that of the high seas regime. The previous discussion indicates that under this *de facto* high seas regime for the entire Antarctic Basin, there would be a right to make reasonable iceberg harvests.

C. Iceberg Acquisition Changes Offered by the Text

The Articles comprising the Revised Single Negotiating Text vary from offering a sense of continuity with the past Conventions to imparting completely new ocean regimes. The Revised Text is comprised of three parts, which will be described separately.

Part I of the Text, the Convention on the Sea-Bed and the Ocean Floor and Sub-Soil Thereof Beyond the Limits of National Jurisdiction, would be inapplicable to iceberg harvesting on its face. Icebergs are a water column resource and Part I's "common heritage of mankind" concept¹⁵⁹ inheres only to sea bed resources in the near future.

Part II of the Text would collapse the Territorial Sea, High Seas and Continental Shelf Conventions into a single document, as well as

157. In spite of the unresolved question of exactly where sovereignty over mandated territories and over trust territories rests, there is general agreement . . . that wherever sovereignty does rest it is not with the administering power. This view has been reinforced by statements of the United States, the United Kingdom and Australia as administering authorities of trust territories.

1 Whiteman, Digest of Int'l Law 867 (1963).

158. *E.g.*

Territorial sea rights have been asserted for the Pacific Trust Territory in order that the welfare of the native inhabitants can be safeguarded and the harvesting of the resources can be undertaken along adequate conservation lines.

4 Whiteman, Digest of Int'l Law 943 (1963).

159. Article 3 provides: "The Area [the deep sea-bed] and its resources are the common heritage of mankind." On the legal significance of the "common heritage" in terms of international management and development, see *International Seabed Resources: The U.S. Position*, 15 Va. J. of Int'l L. 903 (1975).

create a new ocean regime. Article 1 retains coastal land mass sovereignty as a prerequisite for a territorial sea;¹⁶⁰ so the previous arguments suggesting that a territorial sea would append only to a national or condominium Antarctica apply with the same force here.¹⁶¹ The maximum territorial sea breadth would be set at 12 miles,¹⁶² a task that previous Conventions were unable to meet. If the ice shelves can be justifiably assimilated to the Antarctic land regime, as our earlier discussion suggests,¹⁶³ then Article 8 provides a baseline rule for determining territorial sea extent that can be analogized to the cyclical ice shelves.¹⁶⁴

Articles 44-63 of Part II would create a new regime known as the exclusive economic zone (EEZ). In this zone extending 200 miles¹⁶⁵ from the baseline, the coastal State has sovereign rights to exploit and conserve the resources of the water column,¹⁶⁶ creating paramount iceberg harvesting rights in the most lucrative areas for the coastal State. However, as the EEZ is defined in conjunction with appurtenance to a coastal State, it would appear that the zone would only inhere to a national or condominium Antarctica.

While the Text spells out the extent of the coastal State's power over the living resources of the EEZ, no such specificity is accorded non-living resources, like icebergs. Briefly, with regard to living resources, the Text provides that the coastal State shall determine the point of "optimum utilization of the living resources in the exclusive economic zone"¹⁶⁷ granting "other States [licensed] access to the surplus"¹⁶⁸ when the coastal State cannot harvest up to the optimum point. Thus, optimum utilization is the touchstone for the living resources of the EEZ, a concept that should be transferred to

160. Article 1 provides: "The sovereignty of a coastal State extends . . . [over] the territorial sea."

161. See text which accompanies notes 148-56 *supra*.

162. Every State shall have the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from the baselines.

163. See text which accompanies notes 142-44 *supra*.

164. Where because of the presence of a delta or other natural conditions the coastline is highly unstable, the appropriate points may be selected along the furthest seaward extent of the low-water line and, notwithstanding subsequent regression of the low-water line, such baseline shall remain effective until changed by the coastal state. . . .

165. Article 45 provides: "The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured."

166. Article 44 provides: "the coastal State has: (a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether renewable or nonrenewable, of the bed and subsoil and superjacent waters. . . ."

167. Article 51(1).

168. Article 51(2).

guide iceberg exploitation. Article 47¹⁶⁹ points toward optimum utilization of icebergs and licensed iceberg access for desiring nations, as it is submitted that the economic interests of the coastal State and the resource interests of the desiring nations would be best served by putting available icebergs to a productive purpose.

The licensing of iceberg harvests would presumably follow the general licensing provisions.¹⁷⁰ Due to the large magnitude of iceberg resources, licensing fees are not expected to be large in the foreseeable future, if the coastal sovereign follows natural supply and demand in determining iceberg economic rent.¹⁷¹

The high seas regime would remain fundamentally intact under the Text. Article 75 retains the high seas definition by exclusion.¹⁷² The previous analysis indicates that the high seas regime would apply to the ocean area more than 200 miles beyond the ice shelves in the case of a national or condominium Antarctica, or to the entire ocean basin up to the ice shelves in the case of an international or indeterminate Antarctica.

The residual high seas zone is seemingly open for duly considerate iceberg harvesting. While Article 76's¹⁷³ *inter alia* list of high seas freedoms does not explicitly mention iceberg harvesting, the argu-

169. In cases where the present Convention does not attribute rights or jurisdiction to the coastal State or to other States within the exclusive economic zone, and a conflict arises between the interests of the coastal State and any other State or States, the conflict should be resolved on the basis of equity and in the light of all the relevant circumstances taking into account the respective importance of the interests involved to the parties as well as to the international community as a whole.

170. See Article 51(4), which provides for "payment of fees for licensed access."

171. Economic rent is used here in the sense of a factor return above its opportunity cost. As there is no opportunity cost for icebergs until they become scarce, there being no alternative uses for icebergs, the economic rent on icebergs is nil. For an application of the economic rent concept to deep sea-bed mining, see Cornell, *Manganese Nodule Mining and Economic Rent*, 14 Nat. Res. J. 519 (1974).

172. The term "high seas" as used in the present Convention means all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State.

173. 1. The high seas are open to all States, whether coastal or land-locked.

Accordingly, no State may validly purport to subject any part of them to its sovereignty. Freedom of the high seas is exercised under the conditions laid down by the present Convention and by other rules of international law. It comprises, *inter alia*, both for coastal and land-locked States:

(a) Freedom of navigation;

(b) Freedom of overflight;

(c) Freedom to lay submarine cables and pipelines, subject to Chapter IV;

(d) Freedom to construct artificial islands and other installations permitted under international law, subject to Chapter IV;

(e) Freedom of fishing, subject to the conditions laid down in section 2;

(f) Freedom of scientific research, subject to Chapters IV and . . . (Marine scientific research).

ments suggesting an implicit rule of open access for any reasonable ocean use apply here in denominating a *de facto* right to harvest high seas icebergs. These iceberg harvesting rights would be correlative under the Text, governed by a due consideration standard.¹⁷⁴

Finally, Part II's Transitional Provision¹⁷⁵ could potentially alter the Antarctic status. If applied, the Provision would seemingly hold ATG resource rights in abeyance while the U.N. ponders the Antarctic issue, probably leading in the direction of a trusteeship administered by the U.N. Yet, the most reasonable construction of the provision would find it inapplicable to Antarctic resource exploitation. Paragraph 1, which lays down conditions precedent to the article's operation, restricts its application to territories whose people have not attained some self-governing status. Antarctica, having no native population in which resource rights would vest, fails the condition precedent and the provision would not be activated.

Moreover, neither the drafts which led to the Transitional Provision nor the discussion on the Provision at the LOS Conference make any reference to Antarctica,¹⁷⁶ so it is likely that the Provision would be found inapplicable to the Antarctic situation.

D. Iceberg Transit-Related Issues under the Existing Law of the Sea

As the transportation of icebergs on the high seas appears to fall

174. Article 76 provides: "These freedoms shall be exercised by all States, with due consideration for the interests of other States in their exercise of the freedom of the high seas, and also with due consideration for the rights under the present Convention with respect to activities in the International Area.

175.

1. The rights recognized or established by the present Convention to the resources of a territory whose people have not attained either full independence or some other self-governing status recognized by the United Nations, or a territory under foreign occupation or colonial domination, or a United Nations Trust Territory, or a territory administered by the United Nations, shall be vested in the inhabitants of that territory, to be exercised by them for their own benefit and in accordance with their own needs and requirements.
2. Where a dispute over the sovereignty of a territory under foreign occupation or colonial domination exists, in respect of which the United Nations has recommended specific means of solution, rights referred to in paragraph 1 shall not be exercised until such dispute is settled in accordance with the purposes and principles of the Charter of the United Nations.
3. A metropolitan or foreign power administering, occupying or purporting to administer or occupy a territory may not in any case exercise, profit, or benefit from or in any way infringe the rights referred to in paragraph 1.
4. References in this article to a territory include continental territories and islands.

176. Wilson, *supra* note 81, at 59-62.

under the penumbra of freedom of navigation,¹⁷⁷ the principal iceberg transit issue on the high seas is the reasonableness¹⁷⁸ of its use of ocean space, in relation to other established uses such as conventional navigation and fishing. The Hult-Ostrander 20 km. iceberg train towing scheme moving at less than 1 knot per hour may potentially interfere with shipping and fishing along its transit path. Whether this interference would ever rise to the threshold of unreasonableness depends in part on the extent of future iceberg exploitation and in part on the success of future negotiations to reach consensus on the means of mitigating deleterious iceberg transit impacts.

Articles 5 and 10¹⁷⁹ of the 1958 Convention on the High Seas grant the flag State rights to fix conditions for the granting of ship nationality, including safety regulations. These regulations have been codified by Conventions sponsored by the Intergovernmental Maritime Consultative Organization (IMCO). IMCO, a specialized United Nations agency dealing with maritime safety and navigation efficiency,¹⁸⁰ would appear to be the appropriate agency for resolving the potential navigation problems created by large scale iceberg towing. The present IMCO convention, the 1960 International Convention for the Safety of Life At Sea (SOLAS)¹⁸¹ under which the 1972 International Regulations for Preventing Collisions at Sea¹⁸² have been promulgated, required safety equipment, navigation aids and crew training. Neither document appears to create insurmountable barriers for iceberg transit.

However, regulation 8,¹⁸³ Chapter V of the SOLAS Convention recommends that certain classes of ships avoid specified areas to prevent hazardous navigation conditions. This regulation could conceivably encompass iceberg towing and prevent these ships from using certain shipping lanes, in the interest of maritime safety. Still,

177. Broadly speaking, one may say that the freedom of navigation is to serve maritime traffic in the widest sense. . . .

Butler, *The Freedom of Navigation under International Law*, 6 Ga. J. of Int'l & Comp. L. 107, 108 (1976).

178. See text which accompanies notes 127-31 and note 124 *supra*.

179. Article 10 provides: "Every State shall take such measures for ships under its flag as are necessary to ensure safety at sea. . . ."

180. See, IMCO, *The Activities of the Inter-Governmental Maritime Consultative Organization in Relation to Shipping and Related Matters* (1974).

181. Entered into force for the United States May 26, 1965, 16 U.S.T. 185, T.I.A.S. 5780, 536 U.N.T.S. 27.

182. The 1972 Convention on the International Regulations for Preventing Collisions at Sea, London, October 20, 1972, is not officially reported, but appears in IV *New Directions in the Law of the Sea* 245 (R. Churchill & M. Nordquist eds. 1975).

183. Regulation 8 is also not officially reported. It appears in II *New Directions in the Law of the Sea* 505 (S. Fay, R. Churchill & M. Nordquist eds. 1973).

shipping lane accommodations have been made for every means of ocean conveyance up to the present time, so it is reasonable to expect that similar accommodations could be made to allow future iceberg transit on the high seas.

While preventive action would rightly be the major concern in iceberg transit, there remains the issue of liability for maritime accidents. Three types of high seas accidents can be envisioned; an iceberg could break away from the tug or train and strike another ship, there could be a direct collision between an iceberg train and another ocean vessel or an accident involving nuclear material under the Hult-Ostrander scheme. The two earlier accidents would be governed by the proportional fault rule¹⁸⁴ in assessing damage liability among the colliding vessels. On the other hand, an absolute liability¹⁸⁵ standard would be imposed on the iceberg train operator for a nuclear materials accident.

Additionally, there is the issue of iceberg transit compliance with current international environmental law. The 1972 Stockholm Conference on the Environment¹⁸⁶ provides a frame of reference for the maintenance of environmental quality through international law. Though the commentators¹⁸⁷ differ on the binding nature of the 26 principles of the Draft Declaration on the Human Environment, potential iceberg transporters would be well advised to anticipate and mitigate environmental adversities. Moreover, as far as United States development of iceberg resources is concerned, the National Environmental Policy Act¹⁸⁸ would almost certainly require the preparation of an environmental impact statement on proposed iceberg utilization, providing an action-forcing mechanism for considering con-

184. The proportional fault rule gained prominence in Article 4 of the Brussels Convention of 1910 on Collision Damage. The U.S. was the sole holdout among major seafaring nations by applying the divided damages rule, until the case of *United States v. Reliable Transfer Co., Inc.* 421 U.S. 397 (1975) which adopted the proportional fault rule for damage liability. See Note *Maritime Collision—The Demise of the Divided Damages Rule*, 21 *Loyola L. Rev.* 790 (1975).

185. See P. Szaz, *The Convention on the Liability of Operators of Nuclear Ships*, 2 *J. Maritime L. & Commerce* 54 (1971).

186. Report of the U.N. Conference on the Human Environment, U.N. Doc A/Conf. 48/14, at 2-65. The Report is reprinted and analyzed in Sohn, *The Stockholm Declaration on the Human Environment*, 14 *Harv. Int'l L. J.* 423 (1973) [hereinafter cited as Sohn].

187. Sohn *supra* note 186, at 513 notes that "only few principles are stated in the usual obligatory 'States shall' form [appearing only in principles 7, 22 and 25] . . . draftsmen were reluctant to couch all principles in the form of clear duties of States." Nevertheless, Sohn feels that the future may bring a more "enlightened" strengthened view of the Stockholm principles.

Smith, on the other hand, opines that the Stockholm Declaration has no binding force. Smith, *Toward an International Standard of Environment*, 2 *Pepperdine L. Rev.* 28, 33 (1974).

188. 42 U.S.C. 4331 *et seq.* (Supp. 1973).

formity with the Stockholm principles and other evidence of international environmental law.

Offhand, iceberg transit through international waters does not appear to be antithetical to the Stockholm principles. Principles 2 and 3,¹⁸⁹ protecting the maintenance of Earth's capacity to produce renewable resources, would be met, as iceberg harvesting would utilize a continuous yield resource at a level which should not interfere with its renewability.

Similarly, the principle 6¹⁹⁰ restriction on the release of dangerous quantities of heat in the high seas could be satisfied, as neither technical study predicted significant thermal pollution in-transit. Moreover, Hult and Ostrander argue that the small amount of iceberg reverse thermal pollution would counteract the positive thermal pollution currently inflicted on the oceans as a result of man's energy production.¹⁹¹

Principles 8, 9 and 12¹⁹² can be viewed as an impetus for iceberg exploitation, if the developed countries are willing to provide technical assistance to the developing nations, in the form of iceberg harvesting and delivery expertise. Principle 12 provides that "resources should be made available to . . . improve the environment," and the introduction of iceberg fresh water into potentially productive arid lands can be seen as an environmental improvement.

Thus, it appears that current international law offers no serious impediment to reasonable iceberg transit on the high seas. This potential use of ocean space, though allowable as an extension of the freedom of navigation doctrine, would be regulated along with other uses. Given the rather novel nature of iceberg transit, special maritime precautions would be justified.

E. Iceberg Transit-Related Changes Offered by the Text

As the high seas articles of the Text retain the fundamental regime of the 1958 Convention, the right to transport icebergs on the high seas is maintained as an application of the freedom of navigation. The quality of this transit right would be determined by a "due consideration" standard under the Text, as opposed to the current

189. Principle 2 provides: "[t]he natural resources of the earth . . . must be safeguarded for the benefit of present and future generations . . ."

Principle 3 provides: "[t]he capacity of the earth to produce vital renewable resources must be maintained . . ."

190. Principle 6 provides "[t]he discharge of heat . . . [exceeding] the capacity of the environment to render them harmless, must be halted . . ."

191. Hult-Ostrander, *Icebergs*, *supra* note 2, at 22.

192. Principle 8 provides "[e]nvironmental deficiencies generated by conditions of underdevelopment . . . can best be remedied by . . . technological assistance . . ."

reasonableness standard. However, the lexicographic transformation is not expected to effect a great change in the manner that accommodations are made in exercising the high seas freedoms.

Articles 79 and 82 of the Text continue placing the onus of developing ship safety regulations on the flag state. Part III of the Text, the Protection and Preservation of the Marine Environment, would place additional environmental assessment and regulation duties on the flag state. Article 1 of Part III defines pollution to potentially include the thermal pollution and ocean salinity reduction threats of iceberg transit.¹⁹³ The primary issue is whether the quantum of negative heat energy and fresh water released by iceberg towing would rise to the threshold of "deleterious effects" needed to be labeled pollution.

While this issue is presently open, Article 16 provides a mechanism for resolving the severity of the pollution issue; an environmental assessment of the iceberg towing scheme.¹⁹⁴ In the United States, the environmental assessment could be prepared in conjunction with environmental impact statement duties, avoiding duplication in the preparation of environmental documents.

In the event that the environmental assessment uncovers a substantial pollution threat resulting from iceberg exploitation, such activity would not be completely banned by international law. Article 21¹⁹⁵ of Part III suggests the use of conventions and other international means to agree on measures that would minimize the adverse environmental impacts of iceberg utilization.

The flag state and the coastal delivery state share these significant environmental protection powers. The flag state, as we have seen, can condition the grant of registry on meeting its own pollution and safety regulations; Article 27¹⁹⁶ adds that the insurance of com-

193. "Pollution of the marine environment" means the introduction by man directly or indirectly, of substances or energy in the marine environment (including estuaries) which results or is likely to result in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing and other legitimate uses of the sea, impairment of seawater and reduction of amenities.

194. When States have reasonable grounds for expecting that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments . . .

195. States . . . shall establish international rules and standards for . . . control of pollution of the marine environment from vessels.

196. Flag States shall, in particular, ensure that vessels flying their flag or of their registry are not allowed to leave their ports if the vessels do not comply with the requirements of international rules . . . for the prevention . . . of pollution from vessels . . .

pliance with international pollution standards is the responsibility of the flag state. As the coastal delivery state has sovereignty over its territorial sea, where the processing would occur, it can set environmental safeguards for iceberg delivery within that area.

In addition to the environmental regulations enforced by the flag state on the high seas and the coastal delivery state within its territorial sea, there is the issue of environmental controls in the proposed exclusive economic zone. This is a relevant issue, since the Hult-Ostrander iceberg train paths appear to bring the iceberg trains within the exclusive economic zones of continental and insular Pacific territories.¹⁹⁷ Moreover, there is the possible Pied Piper effect of iceberg trains on EEZ fish.¹⁹⁸

The coastal state's jurisdiction over pollution within its EEZ is left somewhat murky by the Text. While Article 46¹⁹⁹ of Part II purports to grant freedom of navigation through the EEZ, Article 44²⁰⁰ grants the coastal state jurisdiction with regard to pollution and preservation of the marine environment. This is but one manifestation of the LOS debates over whether the EEZ is an area of the high seas carved out for exclusive resource use or whether it is truly an area *sui generis*.

It appears that coastal state control over EEZ navigation must be predicated on a showing of substantial pollution danger or significant threat to its biotic resources. In other words, something similar to the "deleterious effect" provision of Part III, Article 1, must be proven to allow coastal state control. Article 21 of Part III reinforces this view that the pollution or conservation threat must be demonstrable before the coastal state could exercise control over iceberg trains moving through its EEZ.²⁰¹ As the intransit impacts

197. Hult-Ostrander, *Icebergs*, *supra* note 2, at 17.

198. See text which accompanies note 40 *supra* for hypothetical Pied Piper effect of iceberg trains.

199. In the exclusive economic zone, all States . . . enjoy, subject to the relevant provisions of the present Convention, the freedoms of navigation . . .

200. the coastal State has . . . (d) Jurisdiction with regard to the preservation of the marine environment, including pollution control and abatement.

201. 5. Where international rules and standards are inadequate to meet special circumstances and where coastal States have reasonable grounds for believing that a particular, clearly defined area of its economic zone is an area where, for recognized technical reasons in relation to its oceanographical and ecological conditions, as well as its utilization or the protection of its resources, and the particular character of its traffic, the adoption of special mandatory methods for the prevention of pollution from vessels is required, coastal States may for that special area, after appropriate consultations with any other countries concerned, establish laws and regulations for the prevention, reduction and control of pollution from vessels, implementing such rules and standards or navigational practices as have been made applicable by the competent international organization for special areas. Coastal States shall

of iceberg towing are expected to be minimal on the basis of current information, this would foreclose coastal state EEZ based control.

The Development and Transfer of Technology provisions²⁰² of the Text provide an interesting opportunity for the developed world to share sophisticated iceberg harvesting, transport and processing technology with the less developed world. Article 78²⁰³ sets the general tone for technology transfer.

While the provisions are creatively ambiguous in the degree of commitment to technology transfer, there are strong policy reasons favoring a liberal U.S. commitment to iceberg technology transfer. First, the foreign use of iceberg derived water for irrigation purposes would decrease dependence on U.S. food aid.²⁰⁴ Second, since surplus icebergs would otherwise go to waste, iceberg technology transfer presents somewhat of a zero cost aid option, since the foregone U.S. profits on those icebergs are nil. Finally, as a result of these two rationales, the development and transference of iceberg technology offers a relatively painless avenue for the U.S. to satisfy its moral commitments under the Development and Transfer of Technology provisions.

CONCLUDING REMARKS

In summary, the somewhat tortuous path we have followed has revealed that the legal definition of the quality of iceberg appropriation rights within a given Antarctic area suffers from a number of deficiencies. The unresolved legal status of Antarctica casts the largest cloud over entitlement certainty, since different Antarctic regimes would entail attendant differences in the extent of ocean zones and conditions for harvesting icebergs. Other property rights uncertainty springs from the Antarctic Treaty, baseline demarcation, the breadth of the territorial sea (if one applies at all), the custom

publish the limits of any such particular, clearly defined area, and shall notify the competent international organization of its laws and regulations, submitting scientific and technical evidence in support, and information on such necessary land-based reception facilities which have been established. Such laws and regulations shall not become applicable in relation to foreign vessels until twelve months after notification to the competent international organization, and provided that the organization does not within that period determine that the conditions in that area do not correspond to the requirements set out above.

202. *Text*, Part III, Chapter III, Articles 78-89.

203. States, directly or through appropriate international organizations, shall cooperate within their capabilities to actively promote the development and transfer of marine science and marine technology at fair and reasonable terms, equitable conditions and prices.

204. It would have the countervailing effect of decreasing the possibility of food aid as a diplomatic weapon, if this is felt to be morally justifiable.

doctrine, the status of condominium and trusteeships, construction problems with the Text and the dynamic quality of the Law of the Sea itself. In short, the utilization of Antarctic icebergs as a fresh water resource is currently hindered by a great deal of legal uncertainty, primarily of the rule uncertainty variety.²⁰⁵

While this situation may have been acceptable in the past,²⁰⁶ the inarticulate legal definition of iceberg property rights appears to be a significant retarding force in the development of a U.S. trial iceberg harvesting program. Funding of a trial program by an ATG nation appears tenuous in the near future, since iceberg exploitation might upset the fragile Treaty regime. Any serious national program by the U.S. for assessing the practicability of Antarctic iceberg derived water must probably await the outcome of the Antarctic Treaty negotiations.

This set of ATG policies may not impede a non-Treaty nation, such as Saudi Arabia, from embarking on a trial iceberg utilization program. Such a program could do much to resolve the non-legal uncertainties of the economic feasibility and environmental acceptability of Antarctic iceberg derived water. It is difficult to assess whether any Saudi Arabian venture would upset the Antarctic Treaty regime, leading to nationalistic tensions over resource rights, or whether it might strengthen the resolve of the ATG nations to expeditiously discover a long-term solution to the Antarctic resources problem.

In any event, trial programs in the near future should determine whether icebergs will become a new natural resource.²⁰⁷ If icebergs do become an object of value, legal institutions must evolve to meet the challenge of managing a new resource. Economic considerations would suggest the entitlement certainty of an ERTS-like claiming service, perhaps co-ordinated by an "Iceberg Authority" which also addresses environmental and distributional considerations.

205. To the economist, "security of water rights" . . . is always subject to the two major categories of "legal uncertainty," that is, to "rule uncertainty" and to "fact uncertainty." Legal uncertainty, in this sense, is a characteristic of judicial decisions. Like other types of uncertainty, it also affects economic decisions.

Ciriacy-Wantrup, *Water Economics: Relations to Law and Policy*, 1 Waters & Water Rights 414-5 (Clark ed. 1967).

206. The old concept of freedom of the seas was fine as long as the ocean was considered nearly worthless, except for cheap transportation or national defense. Management of the oceans for the exploitation of the natural resources that it contains, or that could be produced demands a clarification of ownership.

Frye, Maxwell, Emery & Ketchum, *Ocean Science and Marine Resources*, Uses of the Seas 67 (Gullian ed. 1968).

207. See Becht & Belzung, *World Resources Management* 24-25, 41-42 (1975) for the tripartite interaction between nature, man and culture which creates "natural resources."