The Transfer of Marine Science Technology - Quid Pro Quo for Freedom of Scientific Research?

Susan L. Waggener

Follow this and additional works at: https://digital.sandiego.edu/sdlr

Part of the Law Commons

Recommended Citation
Available at: https://digital.sandiego.edu/sdlr/vol12/iss3/12
THE TRANSFER OF MARINE SCIENCE TECHNOLOGY—
QUID PRO QUO FOR FREEDOM
OF SCIENTIFIC RESEARCH?

No one questioned the right of Darwin to leave the Beagle and to
go ashore when and where he wanted to collect what was neces-
sary.*

INTRODUCTION

As nations turn to the wealth of the world's oceans to satisfy
their ever-increasing demands for food, water, minerals and terri-
tory, the importance of marine science cannot be underestimated.
Man's growing awareness of the sea's potential is directly attributed
to intensified scientific inquiry. This inquiry has become the basis
for the rapid development of the type of technology which is re-
quired to utilize the ocean's resources. Marine scientific research
has led to numerous discoveries which have increased man's knowl-
edge of his planet, the role of the seas and the potential and actual
resources of the ocean which may be utilized to raise the standard
of living for all mankind. If further advances are to be made in
the exploration and exploitation of the sea's resources, the promo-

* Knauss, Development of the Freedom of Scientific Research Issue at
the Third Law of the Sea Conference, 1 OCEAN DEV. AND INT'L L.J. 93, 94
(1973).
tion and facilitation of scientific research is essential, so that we may learn to use, rather than abuse, the ocean’s riches.

THE DILEMMA

Until recently, marine scientists have enjoyed uninhibited freedom of access to all parts of ocean space, with the exception of the territorial seas, for the purpose of conducting research. However, freedom of scientific research began to be restricted by articles of the 1958 Geneva Convention on the Continental Shelf. While freedom of scientific research remains a fact on the high seas, a State may, of course, prohibit such research within the boundaries of its territorial sea. Article (5) of the Continental Shelf Convention gives a coastal State the right to restrict research activities within the area of the continental shelf:

The consent of the coastal State shall be obtained in respect of any research concerning the continental shelf and undertaken there. Nevertheless, the coastal State shall not normally withhold its consent if the request is submitted by a qualified institution with a view to purely scientific research into the physical or biological characteristics of the continental shelf, subject to the proviso that the coastal State shall have the right, if it so desires, to participate or to be represented in the research, and that in any event the results shall be published.

---

1. This comment deals only with “pure”, “bona fide” or “fundamental” scientific research as is distinguished from military or commercial research. These terms have not been defined because it is difficult, if not impossible, to reach a definition that would satisfy most nations. “The scientific research community based primarily in universities and private institutions, seeks only freedom for pure research . . . .” Knight, Special Domestic Interests and United States Oceans Policy, in INTERNATIONAL RELATIONS AND THE FUTURE OF OCEAN SPACE 10, 33 (R. Wirsing ed. 1974).

2. The high seas being open to all nations, no State may validly purport to subject any part of them to its sovereignty. . . . 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.

Convention on the High Seas, done at Geneva, Apr. 29, 1958, art. 2, 13 U.S.T. 2312 T.I.A.S. No. 5200, 450 U.N.T.S. 82. The article enumerates four freedoms, and although freedom of scientific research is not one of them, it may be considered a part of the freedom of the seas under the broad language of article 5 which recognizes “These freedoms, and others . . . .”


4. Convention on the Continental Shelf, done at Geneva, Apr. 29, 1958,
Under article 5, it seems that a coastal State should not restrict purely scientific research within its continental shelf, so long as the researchers of a qualified institution seek the consent of the coastal State, permit participation by the coastal State, and publish the results. However, actions by coastal States have increasingly curtailed or restricted such scientific research. Outright refusals have become more frequent.\(^5\) Obtaining consent is a time-consuming process and inconvenient conditions are often imposed. Administrative problems are sometimes so burdensome that it is futile to apply for a research permit.\(^6\) Such delays and refusals have resulted in a waste of time, resources and money. Not only has the consent requirement negatively influenced the nature, scope and methods of marine research, but it has also substantially deterred proposed research undertakings.\(^7\)

Fear has been expressed that marine research may become even further limited as coastal States extend their national jurisdictions over increasingly large regions of ocean space.\(^8\) By expanding their territorial seas, nations such as Chile, Peru and Ecuador have asserted sovereignty over ocean space seaward to the extent of 200 miles. Should the consent requirement be imposed to the full extent of such a 200-mile zone off the coasts of those nations and others that may follow their example, the future efficient conduct of scientific research will be severely threatened.

Several reasons exist for developing nations' unwillingness to authorize scientific research activities off their coasts. Incidents such

---

art. 5(8), 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 311. Article 1 defines the limits of the continental shelf: "... to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superadjacent waters admits of the exploitation of the natural resources of the said areas ...". Article 2 states that the coastal State has exclusive jurisdiction over the exploration and exploitation of the natural resources on the continental shelf and its subsoil.

5. Revelle, Scientific Research on the Sea-Bed: International Coopera-
   tion in Scientific Research and Exploration of the Sea-Bed, in Symposi-
   um on the International Regime of the Sea-Bed 649, 659 (J. Sztucki ed.
   1970).

6. Schaefer, Freedom of Scientific Research and Exploration in the Sea,
   4 Stan. J. Int'l Stud. 48, 64 (1969); W. Burke, International Legal

7. W. Burke, Marine Science Research and International Law 18

   Zones: Legal Aspects, 8 Int'l Law. 242, 245 (1974); W. Burke, Towards
   a Better Use of the Ocean 123 (1969); Schaefer, The Changing Law of
   the Sea—Effects on Freedom of Scientific Investigation, in The Law of the
   Sea: The Future of the Sea's Resources 113-14 (Proceedings of the Sec-
   ond Annual Conference of the Law of the Sea Institute, 1967).

---

702
as the Pueblo mission, where electronic surveillance was conducted under the guise of oceanographic research, have aroused national security suspicions on the part of the coastal State. Coastal States also fear that the developed countries which possess the capability to do research in foreign waters will explore and exploit the resources of their continental shelf for their own economic gain. The fact that developing States are rarely able to contribute to scientific research programs due to a lack of technology, also makes them inclined to refuse permission to foreigners on the basis of their national pride and sovereignty.

The position of marine scientists is clear. They wish maximum freedom of access to all areas of ocean space for the purposes of conducting fundamental research. The technologically-advanced countries have repeatedly urged that pure scientific research should be unrestricted. On the other hand, developing countries which lack technology in the ocean sciences have insisted that research in the waters off their coasts should be subject to rules which would safeguard their vital national interests.

---


The rules imposed by a developing State on offshore research arise not only because of national sovereignty and security interests, but also from a fear that unregulated scientific research can only widen the economic gap between developed and developing nations.\(^1\)

In view of the difficulties imposed by the consent requirement, certain proposals governing scientific research in a coastal State's continental shelf have been promulgated by representatives of developing nations.\(^4\) These proposals, which are patterned after the provisions of the Continental Shelf Convention, promote the conduct of scientific inquiry while respecting the interests of the coastal nation. Prior notification of a foreign State's intent to conduct research in a coastal State's waters, including a description of the project and its objectives, is required. Research is to be conducted by a qualified institution with a view to purely scientific research and results of the project are to be published with copies sent to the coastal States concerned. Compliance with international environmental standards in order to prevent pollution and injury to the marine environment is mandatory, and the coastal State or its representatives must be given the opportunity to participate in the project and to share all samples and data obtained.\(^16\)

While the above proposals appear to embody an equitable compromise between the freedom of scientific research and coastal States' national interests, under close analysis they prove to be unsatisfactory. Such requirements, in practice, are often unduly burdensome to the needs of scientists whose research projects may range across waters off the coasts of several States.\(^16\) Frequently, space upon the foreign State's research vessel is so severely limited that even one coastal State participant cannot be accommodated.

Dissatisfaction has also been aired by the developing States, for they are unable to derive meaningful benefits from participation in the research projects.\(^17\) Because they lack the trained scientists

---


\(^{15}\) Supra note 14.

\(^{16}\) For a discussion of these burdensome requirements see Comment, The Future of Scientific Research in Contiguous Resource Zones: Legal Aspects, 8 Int'l Law. 242, 255-56 (1974).

\(^{17}\) Munier, The Politics of Marine Science: Crisis and Compromise in The Law of the Sea: Needs and Interests of Developing Countries 219,
required to interpret the data and samples obtained, such informa-
tion often is of little value to them. Even when an inter-
pretation of the obtained information and evaluated results of the pro-
ject is provided, they are of minimal benefit to a coastal State which
lacks the expertise and technology required to utilize such research
findings.18

UNRESOLVED ISSUES AND A POSSIBLE ANSWER

In view of the conflicting positions of the developing and de-
developed States, the obvious question arises: How can relatively un-
restricted freedom of research be guaranteed? What can the de-
developed States offer the developing nations to induce them to relin-
quish the restraints they have imposed upon fundamental marine
research? What price are the technologically-advanced nations
willing to pay for uninhibited scientific inquiry?

In recent years, suggestions have been made that the answer lies
in the transfer of ocean science technology to the developing
States.19 In order that all nations may partake of the ocean’s re-
sources, it must be recognized that all States share a common inter-
est in promoting international cooperation with respect to scientific
research. The vastness of the sea, the large gaps in understand-
ing of its resources, the scale of effort required for comprehensive
and intensive investigations, and the common expectation that great
benefits from the sea are available to all mankind dictate the mu-
tual cooperation of all nations in contributing to the study of our
oceans.20 Since only a few technologically-advanced nations are
presently able to explore and exploit the sea’s riches, efforts must
be made to increase the capabilities of developing countries so that
all nations may be competent to utilize and conserve the ocean’s
resources. Because of this technological gap, developing nations
have intensely expressed their desires to be given an opportunity

220-21 (Proceedings of the Seventh Annual Conference of the Law of the
Sea Institute, 1972).
18. Id. at 221.
19. See Statement of Donald L. McKernan before Subcommittee III of
16 (1973); Knight, United States Oceans Policy: Perspective 1974, 49 NOTRE
DAME LAW. 241, 267-68 (1973); Wooster, Pollution—Scientific Research in
THE LAW OF THE SEA: A NEW GENEVA CONFERENCE 130, 133-34 (Proceedings
of the Sixth Annual Conference of the Law of the Sea Institute, 1971).
to share the ocean's benefits and thereby commence to bridge the
gap between the "haves" and the "have-nots."21

THE CONCEPT OF THE TRANSFER OF TECHNOLOGY

What is meant by the transfer of marine technology from de-
developed to developing States? Although there are a variety of
descriptions, marine technology may be defined as the combination
of knowledge and hardware necessary for the research, develop-
ment and utilization of marine resources. It encompasses such com-
ponents as technical information, expertise, engineering, equipment
and management. Transfer of such knowledge and hardware to
technologically deficient countries would be specifically intended
to enhance those nations' capabilities to explore the ocean's uses
and to profit from its resources.22

History

The concept of transfer of marine technology was included in the
work program of Subcommittee III of the United Nations Seabed
Committee for the first time in March, 1972.23 At that time, a
working group was formed under Subcommittee III to study the
area of marine scientific research and the transfer of technology.
Although the work program made provisions for general debate and
the formulation of legal principles and draft treaty articles, time
limitations made it impossible for the working group to initiate a
consideration of the issue.24 However, the concept was discussed
by the successor to Subcommittee III, the third committee, at the
At the conference, although there were extensive debates concern-
ing technology transfer in addition to a few proposed draft articles,
the members of the committee failed to reach an acceptable agree-
ment, and thus no articles concerning the subject were adopted.25

21. Franssen, Remarks, supra note 10, at 14-15; 27 U.N. GAOR, Supp. 21,
22. Report on the Problems of Acquisition and Transfer of Marine Tech-
nology prepared by the Secretariat of the Third United Nations Conference
24. Id. at 102.
25. For the debates concerning the transfer of technology at the Third
C.3/SR.7-15 (1974). For proposed draft articles on the development and
to which reference is made in this comment, see the text accompanying
notes 58-62, infra.
Quid Pro Quo

Technology transfer has been suggested as an attractive bargaining tool in negotiations concerning freedom of scientific research. In July, 1973, before Subcommittee III of the Seabed Committee, the United States supported a regime imposing few restrictions on marine science research. To induce the acceptance of such a proposal by the developing States, the United States offered an ill-defined program of technical assistance as a quid pro quo for such a regime. This program included

... multilateral efforts by all appropriate international agencies to create and enlarge the ability of developing States to interpret and use data for their economic benefit and other purposes; to augment their expertise in the field of research; and to obtain scientific research equipment.

Thus, the idea of transferring marine technology to developing coastal States emerged as a possible means of securing a right to unrestricted access to coastal areas for purposes of conducting scientific research.

NATURE OF THE TRANSFER OF TECHNOLOGY

Types of Marine Technology Involved

Because the interests of the developing nations are diversified, and the activities connected with technology transfer concern all ocean space, a broad, general approach should be preferred. It is generally accepted that the development of training and education, along with the supplying of equipment, are the primary means of achieving a technological transfer. Education in the marine sciences is essential for an understanding of onshore and offshore structures subject to wave and current forces, the comprehension

of underwater acoustics in order to locate and identify mineral deposits and fisheries, forecasting the movements of the oceans, and coastal development of offshore terminals. Education is also required to learn how to protect the marine environment, to preserve the oceans for recreational purposes, to guard against the hazards of pollutants, and to acquire additional fresh water supplies for domestic, industrial and agricultural uses. Training is necessary, especially in the field of engineering, for the design, construction, operation and maintenance of oceanic structures including harbors, quays and drilling towers. Not only are properly trained technicians and scientists needed for a successful operation of marine activities, but local facilities for the education and training of supporting personnel are also vital. Expertise and equipment are indispensable to the exploration, exploitation and production of marine resources in such areas as mining and fishing, as well as the success of activities such as shipbuilding.

The types of marine technology to be transferred vary with the individual needs and interests of each developing State. In those marine science assistance programs which have included the provision of scientific supplies and equipment, the equipment required precise operator training, was very expensive to operate, and was often too elaborate and impracticable for the State's needs. Some nations may not be sufficiently advanced to utilize sophisticated scientific research equipment. Their needs might be better fulfilled through the modest education of their coastal population on how to best utilize the sea's living resources. For example, most of the Latin American countries have abundant living resources off their coasts, yet their inhabitants are unaccustomed to eating seafood. Informing such nations how to use such resources for their own benefit or for export purposes might be more immediately beneficial. Fishing and shipping may be the primary interest of some coastal States, while others might be more interested in such uses as waste disposal, desalinization, or offshore drilling. In addition,

30. Artuz, What Has and Hasn't Been Successful in Past and Present Efforts to Increase Marine Science Capabilities in Developing Countries, in MARINE SCIENCE WORKSHOP 37, 39 (A conference held by the Johns Hopkins University in Bologna, Italy, October 15, 19, 1973).
32. Wooster, Marine Science and the Developing Countries in MARINE SCIENCE WORKSHOP 1, 3 (A conference held by the Johns Hopkins University in Bologna, Italy, October 15–19, 1973).
equipment developed for one area may be ineffective for use in another area without adjustment, because of the divergent physical environments of the coastal zones. The existence of such factors as a nation's economic, social, technical and physical conditions will determine the types of marine technology appropriate to its individual needs.\textsuperscript{34} Indeed,

\ldots it would be disastrous—and in the past it has proved to be so—to decide from outside what is good or bad for a nation or part thereof; it would be disastrous—and it has been so—to transfer directly policies, programs, cultures and technologies from developed to developing nations without the appropriate adaptation, different in each case. Programs and policies cannot be parachuted from abroad in exchange for financial aid. What can be done is to help developing nations to help themselves, to identify their needs, define their priorities and manage their own countries and people.\textsuperscript{35}

In view of the widely varying requirements and disparate levels of coastal nations' development in the marine sciences, technology must be adapted to meet the peculiar needs and special conditions of each State.\textsuperscript{36}

\textbf{Mechanisms for the Transfer}

The transfer of marine technology to a developing nation may be viewed as a two-stage process comprising the acquisition of technology and its application by the recipient.\textsuperscript{37} The principal methods of transfer are bilateral and multilateral agreements. While a comprehensive multilateral treaty governing transfer of marine technology has yet to be achieved, bilateral agreements have both advantages and disadvantages for the developing States. In the case of joint ventures, for example, some developing coastal nations assert that they have received few benefits. Their major complaint seems to be that the attitude of the advanced countries has often been selfish and neo-colonial in nature, lacking in consideration to the interests of all of the participant countries.\textsuperscript{38} Also,

\begin{itemize}
\item \textsuperscript{35} Vanucci, \textit{What Has and Hasn't Been Successful in Past and Present Efforts to Increase Marine Science Capabilities in Latin American Countries}, in \textit{MARINE SCIENCE WORKSHOP} 31, 32 (A conference held by the Johns Hopkins University in Bologna, Italy, October 15-19, 1973).
\item \textsuperscript{37} Id. at 9; U.N. Doc. A/AC.138/SC.III/SR.42, at 16 (1973).
\item \textsuperscript{38} Ayala-Castanares, \textit{The Enhancement of Marine Science Capabilities: Future Directions}, in \textit{MARINE SCIENCE WORKSHOP} 61, 67-8 (A conference
\end{itemize}
specific bilateral projects are usually formulated in an ad hoc manner, and do not fit together in a comprehensive fashion so as to prove advantageous to developing nations.\textsuperscript{59}

On the other hand, joint research activities have proven very valuable to some developing States. For example, Peru has gained valuable knowledge and experience in the development of its technology through participation with such advanced nations as the United States, the Soviet Union and Japan. As a result, Peru has adapted existing technology to its own special circumstances, which has contributed to its rapid rise to a position to leadership in the fishing industry.\textsuperscript{40} Other bilateral arrangements, such as the exchange of doctoral candidates between universities and allowing students to work in foreign countries with local scientists, are an excellent mechanism for the education of scientists and technicians.\textsuperscript{41}

As noted above, the purpose of marine technology transfer is to enhance the capabilities of developing States so that international cooperation in the marine sciences may be achieved. To this end, advances must be made through multilateral rather than bilateral agreements. International agreements, through United Nations agencies, for example, are more welcomed by developing States because the States are a part of the agency itself. Because the level of trust is higher in a multilateral cooperation program, such a program is favored by developing nations over bilateral agreements in which there may be a degree of mistrust regarding the motives of the more advanced country.\textsuperscript{42}

For this reason, the establishment of an international organization to govern technology transfer, perhaps within the framework of the United Nations, is highly desirable. Most importantly, an international body would serve to aid each developing country to formulate a national science policy. Scientific and technological resources could then be directed and applied to achieve specific national objectives which comprise each State's overall development.\textsuperscript{42}

\begin{itemize}
\item[39.] Miles, Remarks, in \textsc{The Law of the Sea: Needs and Interests of Developing Countries} 18, 19 (Proceedings of the Seventh Annual Conference of the Law of the Sea Institute, 1972).
\item[41.] Ayala-Castanares, supra note 38, at 66.
\item[42.] Stewart, Bologna Workshop on Marine Science: Concluding Observations, in \textsc{Marine Science Workshop} 73, 75 (A conference held by the Johns Hopkins University in Bologna, Italy, October 15-19, 1973).
\end{itemize}
plan. A well-defined science policy is imperative in order to achieve national goals and to obviate the haphazard growth of the developing nation's capabilities.\textsuperscript{43} Funding necessary to carry out the aims of the international organization would have to be contributed by both developed and developing countries, perhaps through the creation of an international trust fund, such as the proposed United Nations Funds in Trust, which was first suggested at a marine science workshop held by the Johns Hopkins University in 1973.\textsuperscript{44}

Transfer of technology could be fostered through the use of universities, and introductory training courses could be offered in the developing countries. Students could be sent abroad to developed countries for advanced study, or foreign professors might be invited to educate students at universities within developing nations. Experts might also be invited to train local scientists while conducting research on specific problems of a coastal State.\textsuperscript{45}

Regional training and research centers could be established in order to concentrate efforts in a few large centers in each coastal region rather than spreading available resources over a number of small coastal States.\textsuperscript{46} Such centers could concentrate on specialized projects of interest within the region by drawing graduate students and researchers from the territory.\textsuperscript{47} In this manner, a number of States would be able to pool their efforts and capabilities in order to collaborate on common problems and conduct research essential for the long-term development of ocean use.\textsuperscript{48} A pooling of resources would permit the purchase of expensive equipment and laboratory facilities that could be shared, and the concentration of expertise could be used for teaching as well as research. Conse-


\textsuperscript{44} \textit{Marine Science Workshop 7} (A conference held by the Johns Hopkins University in Bologna, Italy, October 15-19, 1973).

\textsuperscript{45} Wooster, \textit{Marine Science and the Developing Countries}, in \textit{Marine Science Workshop 1}, 2-3 (A conference held by the Johns Hopkins University in Bologna, Italy, October 15-19, 1973).

\textsuperscript{46} It should be noted that intense disputes between developing nations might be expected to arise over the geographical placement of the regional centers.

\textsuperscript{47} Franssen, \textit{Commentary}, supra note 43, at 97.

sequently, a regional center would make it possible for participants from even a very small country in the territory to be trained and to participate in research activities.\(^49\) Such centers would not necessarily replace national activities, but would complement the efforts of national institutions and universities.\(^50\)

**Problems**

Although the multilateral transfer of marine technology may appear to be a viable method of implanting a marine science industry in developing nations, complex problems remain unresolved. In the past, international organizations have unfortunately proven to be inefficient.\(^51\) Adequate funding is also a crucial obstacle, because the promotion of marine science transfer is impossible without the availability of realistic sums. Funds allocated to the international marine science assistance programs under the direction of the United Nations in past years have been entirely insufficient to deal with the size of the problem. For example, it has been estimated that funds supporting international marine science, as opposed to national, programs are presently close to one-half to one million dollars per year, which is equivalent to the operating cost of a single medium-sized research vessel in the United States.\(^52\)

In addition, a strong national commitment by coastal States to the development of a national marine industry plan is mandatory for the successful transfer of marine technology. Because marine science is often given a low priority by developing nations, the creation of a significant marine science program is substantially impaired.\(^53\)

The educating of students from developing countries at foreign universities also poses the “brain drain” problem. Oftentimes, if students become experts in a certain field, they accept permanent positions in foreign countries. If they do return home, they are frequently placed in positions not directly related to their field of expertise.\(^54\)

---


51. Ayala-Castaner, supra note 38, at 68.


53. Id. at 6.

Because the transfer of marine technology is to deal with fundamental scientific research on a government-to-government basis, as opposed to a commercial basis, many additional difficulties arise. Many of the major sources of modern technology for the exploitation of marine resources belong to the multinational corporations of developed countries. The more modern and sophisticated the technology, the more likely it is that the devices and processes are patented by private individuals or corporations. Such technology can usually be obtained only through foreign investments, where the profits flow to the foreigners, with the developing country receiving little or no benefit. Developing countries have asked for the blueprints and patents of machinery used in the exploration and exploitation of the ocean's resources, but it is unlikely that such information will be released unless it remains under the control of foreign corporations.

It has been suggested that modern science cannot exist in a country whose economy is not based on modern technology. If this is true, the problem of establishing science as a live and vital force in a developing nation is inseparable from that of transforming its economy to an industrialized order based on modern technology. Indeed, another author suggests that the issue of transfer of technology goes far beyond the issue of marine science, because it involves complex political, social and economic policies. Consequently, he believes that if technology transfer is to play an important role in resolving controversies regarding the oceans, it will have to be redirected toward the commercial as well as to the scientific needs of the developing countries because the needs of developing countries are far greater than what developed nations would be willing to exchange for the freedom to conduct offshore scientific re-

VALIDITY OF THE PROPOSAL

Is the offer of marine technology transfer as a quid pro quo for the freedom of scientific research a viable proposal? Will the developing and developed countries be willing to bargain for such an exchange within an international framework? In light of the trends and attitudes reflected in international meetings on the law of the sea, and especially in the Third Conference of the Law of the Sea in Caracas, one can reasonably conclude that the proposal is not feasible.

First of all, the successful transfer of technology necessarily anticipates that the developed country would phase out its activities so that the developing country would become autonomous in marine affairs, thus assuring the developing nation's control over its national interests. Assuming that such a transfer and phase-out could be accomplished, what guarantees would be available to developed States that prior consent requirements would not be revived? If the coastal States did become technologically autonomous, developed nations would no longer possess a bargaining tool to insure the continued unrestricted freedom of scientific research. The danger exists that the coastal States might still be suspicious of foreign research vessels and might want to reimpose prior restraints.

Secondly, developed nations may be reluctant to transfer marine technology in order to protect their own interests. For example, the United States economy has been dominant in international affairs in past years, and the United States still maintains its lead in overall technology. Accordingly, many economists believe that the United States must protect rather than donate its technology in order to maintain a stable economy. In addition, much of the sophisticated marine technology has military applications. The United States would obviously not want to transfer such technology to another nation that might use it for purposes inimical to United States national security interests.


63. Id. at 61.
Thirdly, a reading of the debates of the third committee at the Third Conference on the Law of the Sea indicates that the issues of technology transfer and freedom of scientific research have been treated as separate and distinct. While the developing nations are generally unwilling to relinquish the consent requirement, they nevertheless want marine technology from advanced nations. The concept of a quid pro quo exchange is rarely mentioned in the debates or the draft articles by the developing countries. On the contrary, the developing nations apparently assume that they are entitled to marine technology as a matter of right so that they may partake of the ocean's wealth, under the "common heritage of mankind" concept. Indeed a spokesman for the developing nations has stated that advanced nations have a moral obligation and duty to transfer technology to developing States:

... the demands of the developing countries for the transfer of technology on non-commercial terms were justified since the wealth and the technological superiority of many developed countries derived in part from imperialistic, colonialistic and neo-colonialistic policies of exploitation of the developing countries.

Another delegation expressed the view that the coastal States would "probably provide for very free scientific research, once trust was established through the sincere efforts of the developed nations to transfer their technology." But what if such trust is never established?

In summary, the intense nationalism of the developing countries implies a double standard that they have a right to demand what is best for them, but the developed countries have a duty to subordinate their interests to that of the group. This position will probably remain steadfast as the Law of the Sea Conference unfolds.

Developing countries can be expected to rely on numerical strength by creating a voting bloc to satisfy their perceived needs.69

CONCLUSION

As the freedom to conduct fundamental oceanic research has become seriously impeded by regulations imposed by developing coastal States, developed countries have searched for methods to insure uninhibited access to coastal waters for marine science researchers. Turning to the law of the sea negotiations to solve their dilemma, advanced nations have sought attractive bargaining points to offer developing States concerning ocean policy issues. While the transfer of marine technology to developing States has been offered as a quid pro quo for relatively unrestricted freedom of scientific research, a close analysis of the proposal discloses its unfeasibility. Developed nations will be reluctant to transfer their technology in order to protect their own economy and national security interests. If a successful transfer could be accomplished, technologically-advanced countries would want guarantees from developing States that prior restraints upon research would not be reimposed. Most importantly, developing nations appear to disregard a quid pro quo exchange and assert that advanced nations have a moral duty to transfer marine technology because developing States are entitled to the technology as a matter of right. Unfortunately, in the present climate of events, developed nations will most likely be forced to look elsewhere than to the transfer of marine technology in order to satisfy their demands for unrestricted marine science research.

SUSAN L. WAGGENER

69. Pinto, supra note 12, at 5.