

**Arvid Pardo**  
**Retrospect and Prospect**

I.

Let me begin with a personal statement.

As a senior fellow of the Center for the Study of Democratic Institutions in Santa Barbara, California, I was working, since 1964 (the year of Malta's independence) on world order studies, including such issues as human rights, disarmament, development, international social justice, regional organization. etc. The Founder and President of the Center was Robert Hutchins, formerly President of the University of Chicago. It was during his Chicago years and under his guidance that a Committee to Frame a World Constitution was established at the University, which in 1948 published a Preliminary Draft of a World Constitution. The main author of that Constitution had been my husband, G.A. Borgese, very actively assisted by myself. The motto of that Constitution had been *Pax opus iustitiae* -- Peace is the result of justice, or, in other words peace must be founded on international social justice, including the end of colonialism and of economic inequity. Economic equity, however could not be attained on the basis of the present economic systems, whether Marxist or capitalist. These systems had to be transcended by one which declared "the four elements of life" -- *water*, which included both the oceans and fresh water; *land*, which included the minerals below the surface; *air*, which included the atmosphere and outer space; and *fire*, which included energy -- to be the common property of all mankind.

In the fall of 1967 my attention was drawn by an unknown gentleman in Connecticut, to the growing importance of the issues involved in the Law of the Sea, including various proposals to declare the oceans to be the Common Heritage of Mankind. I easily convinced Hutchins that the prospect of seeing at least one of the "four elements of life" declared to be a common

heritage of mankind was indeed exciting and that a three-year project on the emerging new Law of the Sea would be a worthwhile undertaking, enabling us to bring the utopian ideals of the World Constitution into the arena of real politics.

With the help of the great international law expert Wolfgang Friedmann, author of a classic, *The Changing Structure of International Law*, I was in the process of developing a project proposal -- when, on November 1, 1967, Arvid Pardo, then Permanent Representative of Malta at the United Nations, among other things, delivered his historic address on the oceans at the United Nations. That struck like lightening, or I should say, like enlightening. I contacted him immediately and invited him to come to the Center, which he did early in 1968. Together we built the three-year project which was to culminate in the first Pacem in Maribus conference in Malta in 1970. I was captivated by his combination of prophetic vision and practical attention to detail, as well as by his encyclopaedic knowledge.

The following year, as we were celebrating Pacem in Maribus II in Malta, he was dismissed by the newly elected Prime Minister Dom Mintoff and forced into exile. I called Robert Hutchins in Santa Barbara and told him that Pardo was "without a job," and Hutchins immediately invited him to come to the Center as a visiting fellow for a year, which Pardo was happy to accept.

Thus we developed a working relationship that was to last for over twenty years. We discussed everything, from philosophy and religion to politics and law, to science and technology. I learned an infinity of things from him. He made a profound impact on my life, comparable only to that of my father and my husband, and I shall be for ever grateful to him for that.

Our collaboration resulted in the building of the International Ocean Institute and the development of the Pacem in Maribus conferences, and in three publications, two on the Law of

the Sea and the New International Economic Order, and the collection and editing of his speeches in a volume *The Common Heritage: Selected Papers on Oceans and World Order, 1967-1974*. This latter book, published in 1974 in a very limited edition for distribution to the Delegates of the “Sea-bed Committee” and a few libraries, really should be reissued now. It is amazing for its depth and foresight

From the very beginning -- 1967! -- there is a trans-sectoral, interdisciplinary *vision of the whole*, no matter from what angle one approached the ocean issue, be it scientific, legal, or economic.. Pardo was fully aware of the increasingly interdisciplinary and international character of marine scientific research. He considered scientific research in ocean space as a “public interest of the international community” which should “enjoy special protection throughout ocean space, “whether within or outside national jurisdiction, subject only to essential safeguards to protect truly vital interests of coastal states in marine areas under their jurisdiction.”<sup>1</sup>

He was well 20 years ahead in his understanding of the requirements of “integrated coastal management” NS “sustainable development.” In 1973 he wrote:

The diversity, magnitude and significance of activities, actual or potential, in the coastal zone require interdisciplinary, not sectoral, investigation followed by steps toward a comprehensive management approach if balanced intensive multiple use is to be assured and serious environmental and urban degradation avoided . The objective could be broadly formulated as follows: *to manage the coastal zone so as to permit optimum balanced use by recognizing and accommodating diverse, competing interests and activities while, at the same time, preserving the quality of the environment and conserving the resource* (emphasis is Pardo’s)<sup>2</sup>

---

<sup>1</sup> *The Common Heritage*, p. 180

<sup>2</sup> *Ibid.*, p.309

He foresaw the communication revolution and its impact on the emerging ocean regime, which, he wrote in 1970, “cannot be confined merely to dealing with exploration and exploitation of resources, but must establish norms, however general, covering all activities.”<sup>3</sup>

These activities included new uses of ocean space, many of which he predicted while realizing that most could not be predicted; it also included military activities, and he repeatedly stressed the need -- as early as 1970! -- for the treaty establishing a new ocean space regime “to make provision for the international machinery created to undertake such functions as may be agreed upon with regard to policing any arms control agreement that may be concluded for ocean space.”<sup>4</sup> This, in fact, is implicit in the common heritage concept itself, which is “reserved for peaceful purposes” and thus integrates sustainable development (economic development + conservation of the environment) with peace and security -- a concept that is yet to be operationalized.

He drew attention to the gaps and overlaps in the functions of the Specialized Agencies dealing with the oceans and called for integration -- starting with a merger of FAO’s fisheries division, UNESCO’s Intergovernmental Oceanographic Commission and the International [Consultative] Maritime Organization and their integration into the new, emerging ocean regime<sup>5</sup>. As early as 1970, he knew that a “forum” was needed where the closely interrelated problems of ocean space could be considered as a whole.

...The need for a review such as that envisaged by my delegation arises from the increasing and vital importance that the ocean in all its dimensions and aspects is

---

<sup>3</sup>*Ibid.*, p. 156

<sup>4</sup>*Ibid.*, p. 181

<sup>5</sup> *ibid.*

assuming for many countries. We must insure that existing U.N. system machinery can provide a forum for the discussion of basic problems of international concern in an appropriate perspective, a forum where the international aspects of necessary policies can be elaborated, and a forum where action priorities can be elaborated in a framework which is not sectoral. If such a forum is found not to exist, it must be created...<sup>6</sup>

It has taken thirty years for the U.N. to create such a forum, but at long last, the establishment, in 2000, of the "Open-ended Informal Consultative Process" (UNICPO) is an initial response to Pardo's challenge -- which now must be further developed.

In agreement with Wolfgang Friedmann, he saw in the new, emerging Law of the Sea an example of the ongoing evolution from an international law of co-existence to an international law of cooperation<sup>7</sup>, from a law dealing with relations between States to a law enhancing human common interests<sup>8</sup>

I have just gone through book again, not without emotion. For financial reasons the book was photo-offset from my own typing -- 541 pages! -- and I remember that, besides my introduction, there are at least a couple of pages in Pardo's texts, that were written by me: For his desk was not as orderly as his mind, and in a couple of his speeches, there were missing pages, which I freely rewrote the way I thought he would have written them -- and he approved them the way I wrote them! After all our discussions, it often is not easy to distinguish what was his and what was mine.

All I can do to repay my indebtedness to him so to try to continue and interpret his

---

<sup>6</sup> *Ibid.*, p. 134

<sup>7</sup> *Ibid.*, p. 167

<sup>8</sup> *Ibid.*, p. 176

thoughts in the light of a rapidly changing reality and to contribute, as best I can, to the realization of his dream, which he fully well knew, could not be realized in the short term..

## II.

In these pages I am going to focus on the economic implications of the concept of the Common Heritage of Mankind, or, one might say, “the economics of the common heritage,” and its first and extremely problematic embodiment in the International Sea-bed Authority. This takes us back to the issues we studied in dealing with the Law of the Sea and the New International Economic Order, but the situation has changed rather drastically in the meantime, and a lot of new thinking in economics is going on in many parts of the world.

When we look at what the ocean environment does to mainstream economics, we come up with some extraordinary challenges. I will mention only three of them. All of them are really challenges to the economic system as a whole, but in the oceans they are so overwhelming that we simply cannot ignore them

The first one is absence of sovereignty and ownership in large areas.

A very large portion of economic activities take place, or depend on, areas beyond national jurisdiction, where the closely interrelated concepts of “sovereignty” and “property” or “ownership” are not applicable. Our traditional economic systems, however, whether market-based or centrally planned, are based on the concept of “property” or “ownership,” in the Roman-law sense. The 1982 United Nations Convention on the Law of the Sea declares these resources to be the Common Heritage of Mankind, which means -- as spelled out in Articles 137, 140, 141, 145. of that Convention, they cannot be appropriated, they must be managed by an international Authority *for the benefit of humankind as a whole*, including future generations, and they are reserved exclusively for peaceful purposes This concept, as defined by Pardo and

introduced by him as a norm of international law, thus establishes the basis for an economic system of *non-ownership*, including an ethical dimension (*equity: benefit for humanity as a whole with particular consideration for the needs of the poor*); an environmental dimension (*conservation; rights of future generations*) and a peace-building dimension (*reservation for peaceful purposes*). Such a system, replacing the Roman-Law concept of “ownership” with that of “non-ownership,” based on “stewardship,” more familiar to non-Western cultures, could be important for the building of bridges between Western and non-Western cultures, now that the domination of Western cultural values is coming to its end. These cultural, ethical as well as institutional implications of the concept of the Common Heritage of Mankind need much further study.

The second challenge is that the oceans have not only a “resource value” that can be quantified in monetary terms; they have much more important values of a different kind, very difficult or impossible to quantify. The oceans are part of our life support system and ocean economics will have to recognize *the vast preponderance of the non-quantifiable components* of the system. There thus is a need to integrate quantifiable factors with an overwhelming majority of non-quantifiable factors. Classical economics comprises only what can be *quantified* and expressed in terms of dollars and cents or, as Orio Giarini, the Italian economist and my colleague at the Club of Rome, put it, what can be “monetarized.” This gives a limited and distorted view of the real wealth of people, of nations, of the world. For real wealth consists of far more than what can be quantified and expressed in monetary terms. It includes environmental resources (air, water, solar energy, *inter alia*); it includes unpaid work (e.g., household and child rearing work); as well as cultural and ethical values: the sum, in other words of natural and man-made goods and services monetarized or not monetarized, in what Giarini calls “Dowry and Patrimony” - a concept closely related to that of the Common Heritage of

Mankind.

At the same time, real wealth consists of *less* than indicated by money-making. Very destructive activities are making heaps of money: Money is made by polluting industries, or by industries that repair pollution damage, but really do not add anything to real wealth creation. Huge amounts of money is made by the drug industry -- illegally -- or the weapons industry -- legally -- both of which have the same effect of destroying people. Instead of being added to the money value of real wealth, they obviously should be deducted from it ("deducted value.").

Economics thus is faced with the problem of summing quantifiable and nonquantifiable factors -- factors preceded by \$signs +/- factors without \$signs, and it should be noted that the proportion between these two categories, which may affect also the way of dealing with them, has been changing throughout history. In pre-modern times, and still today in low-income strata as well as in so-called "primitive" economies, the non-monetarized sector, outside the "market" tends to be too much larger. Mutual aid in services, unpaid care for the old, unpaid food production for the household; home building, are all outside the "market." During the last 300 years, in conjunction with the rise of the nation state, money has assumed an unprecedented importance, and has become the only measure of economic value. This historical linkage may have interesting implications. It may lead us to consider modern economics, historically and ideologically, as an "economics of war." Historically, because the development of Western capitalism and market theory coincides with the history of European expansionism, conquest and the establishment of colonial empires. Ideologically, because it is based on conflict and competition rather than on equity and cooperation. The question to be studied is: What would be an economic theory that could be part of a Culture of Peace and enhance such a culture?

If, leading us into the next century, a development is in course to restore to economics the ethical, philosophical, and social dimensions it once had, then it is likely that "ocean



economics” will be a lead sector. Hopefully, this will also enhance the development of a new “economics of peace.” or, as Arvid Pardo, the father of the new Law of the Sea, put it as early as 1974,

...governments must show awareness of the need to move from a law of the sea that encourages destructive competition between states, wasteful resource exploitation, and environmental abuse, to an international order for ocean space based on principles of international cooperation, resources management and conservation, environmental protection and equitable sharing of benefits...<sup>9</sup>

The third challenge we are facing in the oceans is that of *uncertainty*. Uncertainty now is a key word in science in general as it tries to cope with ever more complex systems and determinism and predictability give way to chaos and unpredictability. In the marine sciences, the margin of uncertainty and unpredictability is huge.. We know how little we know Even subsystems, as for instance, fish stocks and their sustainability, are so complex that they defy our models; the interactions between the ocean floor, the water column, the coasts, the atmosphere are beyond the comprehension of our computers; nor are we able to unravel relations between anthropogenic and natural impacts on biodiversity or climate change.

Uncertainty begets risk, and risk is a far greater factor when we deal with the oceans than it is on land. Risk management and risk reduction ought to be an essential part of “integrated ocean and coastal management, but it is not, or not yet.

Risk necessitates cooperation. Cooperative spreading of risk reduces risk; competition increases risk. The overwhelming presence of uncertainty and risk in dealing with the oceans thus may contribute, in another perspective, from another angle, to the emergence, in the next century, of the kind of cooperative economics or economics of peace, envisaged by Arvid Pardo

---

<sup>9</sup> *Ibid.*, p.348

### III.

The first institution to apply the economics of the Common Heritage in the No-man's land of the deep ocean floor was to be the International Sea-bed Authority. Arvid Pardo's concept of the Authority was comprehensive and integrated. In his seminal speech of November 1, 1967, he said

Hence our long-term objective is the creation of a special agency with adequate powers to administer in the interests of mankind in the oceans and the ocean floor beyond national jurisdiction. We envisage such an agency as assuming jurisdiction, not as a sovereign, but as a trustee for all countries over the oceans and the ocean floor. The agency should be endowed with wide powers to regulate, supervise and control all activities on and under the oceans and the ocean floor....In our view the agency should have the power effectively to regulate the commercial exploitation of the ocean floor. We would envisage exploration rights and leases being granted in the area within its jurisdiction...<sup>10</sup>

In his monumental Maltese Ocean Space Draft Treaty of 1971<sup>11</sup> he spelled his concept out in some detail, although he was careful not to go over board with details. "It was thought preferable," he wrote in his introduction, "to lay down only general guidelines (articles 138 e seq) on the manner in which the management powers of the Institutions should be exercised rather than to attempt a detailed regulation of exploitation without knowledge of the conditions under which exploitation will be undertaken in practice." This, the over-burdening of the Convention with administrative and even fiscal detail, was one of the mistakes committed by

---

<sup>10</sup> *Ibid.*, p. 39

<sup>11</sup> A/AC.138/53. In 1981, shortly before his untimely death, Shirly Amerasinghe, President of UNCLOS III, said to me: "had we paid attention to Arvid's draft in 1971, we might have spared ourselves ten years of work!"

UNCLOS III, which made Part XI of The Convention practically inapplicable, and it was repeated by the Sea-bed Authority, with the detailed elaboration of the “mining code.”

Pardo had some fairly precise ideas about the economic value of the resources of international ocean space. In 1967 he wrote:

On the assumption that an agency would be created in the year 1970, that technology will continue to advance, that exploitation will be commensurate with the presently known resources of the ocean floor, that exploration rights and leases will be granted at rates comparable to those existing at present under national jurisdiction, and that the continental shelf under national jurisdiction will be defined approximately at the two-hundred-metre isobath or at twelve miles from the nearest coast, we believe that by 1975, that is, five years after an agency is established, gross annual income will reach a level which we conservatively estimate at around six billion dollars.<sup>12</sup>

This estimate has been widely criticized as it became increasingly clear that the exploitation of manganese nodules was uneconomical for the foreseeable future. But if one takes the trouble to examine his premises, his estimate was totally realistic. He was not talking about manganese nodules, to which UNCLOS III and the International Sea-bed Authority erroneously limited their attention. He was speaking of all known resources of the ocean floor, including hydrocarbons beyond a 12-mile limit of national ocean space. Prophetically, he also included the genetic resources -- “phytozoa of International Ocean Space (Article 141). He also included a tax to be paid by States on the exploitation of natural resources within national ocean space.

.During his later years, Pardo avidly followed every discovery, and every new technological development, all of which corroborated his earlier vision.

In the light of new scientific evidence and technological capacity, the deep ocean floor today is infinitely more important for the determination of the world’s climate, for the

---

<sup>12</sup> *Ibid.*, p.39.

conservation of biodiversity, for economic development including the production of resources, energy, and services, and for the maintenance of international, regional and national security, than it was thought to be in the 'seventies, when Part XI of the Convention was drafted.

I shall now try to indicate quite briefly the most important of these newly discovered resources and newly established services, which would form the basis of the new economics of the common heritage.

As far as resources are concerned, the commercial exploitation of the Sea-floor Massive Sulphides appears to be closer at hand than that of the manganese nodules.

Two Exploration Licences, covering more than 5000 square km of sea floor off the coast of Papua New Guinea are the first licences ever to have been issued for the exploration and development of sea floor massive sulphide deposits. The grant was made to the PNG-registered, Australian-led company Nautilus Minerals Corporation Ltd. Application was made following a series of discoveries in the Bismarck Sea by Australia's state-owned scientific research body, the Commonwealth Scientific and Industrial Research Organisation, CSIRO. Nautilus also announced that a research partnership has been signed with CSIRO Exploration and Mining for cooperation in developing techniques for exploring these deposits over the next two years. Two areas in the Manus Basin. have been identified, the SuSu and Vienna Woods fields. It appears that they constitute the richest volcanic deposits ever found at sea, with a value estimated at billions of dollars. Sample ores contain up to 26 percent zinc, 15 percent copper, and a record average of 15 g of gold and 200 g of silver per tonne. New discoveries are being made in continuity.

The Government of Papua New Guinea is presently elaborating a mining code for the exploration and exploitation of these resources, and the International Sea-bed Authority is in the process of drafting rules and regulations for the prospecting and exploration of the sulphides in

the international Area where they also abound. In accordance with the Convention, these rules and regulations have to be completed in 2001, three years after a Delegation, in this case, the Russian Federation, made the request. Thus a process of expansion and evolution of the Authority's scope of activities has started. In fact, if the Sea-bed has become more important, the importance of the Sea-bed Authority must grow commensurably.

Another mineral resource that recently has been attracting much attention are the methane hydrates which abound in the Arctic and Antarctic permafrost zones as well as on the deep sea-bed.

Gas hydrates are ice-like crystalline compounds of gas (mainly methane and water) which are stable both at very low temperatures in permafrost regions, and in the low-temperature-high pressure-regimes present in the deep ocean. A consensus has developed that the amount of methane held in the form of gas hydrates worldwide is  $10^{15}$  to  $10^{17}$  cubic metres, and this contains a mass of organic carbon that is perhaps a factor of two larger than that in all known fossil-fuel deposits (coal, oil, and natural gas.) The methane is contained in the hydrate itself and even more methane is trapped beneath the Hydrate Stability Zone, at water depths between 500 and 4,000 metres and temperatures between  $2.5^{\circ}\text{C}$  and  $25^{\circ}\text{C}$ . Methane hydrates are widespread both on continental margins and in the international Area.

Methane hydrates are now universally considered as perhaps one of the most important energy resources for the next century.

Methane, however, is a "greenhouse gas." Although there is a lot less in the atmosphere than there is carbon dioxide, each molecule has a much larger heating effect. For example, the global warming potential of methane is calculated to be 56 times by weight greater than carbon dioxide over a 20 year period...

Collapse of gas hydrate-bearing sedimentary deposits on the sea floor may be the primary

process that releases methane from the hydrate reservoir to the atmosphere. On the continental slopes and rises this release is likely to be associated with landslides which may break cables and cause oil platforms to collapse.. Thus methane hydrates influence the stability of the sea floor and may bring about changes in the global climate.

The methane hydrates in the international Area undoubtedly are part of the Common Heritage of Mankind for which the International Sea-bed Authority is responsible. The Authority is also responsible for harmonizing its own activities with the activities of States in the Area.

A great deal of international cooperation, between Governments, industry, and academia is already going on in hydrate research and development. In the U.S., a Senate Report encouraged Congress to

ensure that data and information developed through the program are accessible and widely disseminated... Working with the Natural Gas Supply Association and the International Centre for Gas Technology Information, we are proposing to develop a methane hydrates Internet site that will be used to enhance information dissemination among the world's community of hydrate researchers and technology users, as well as to obtain stakeholder input.

The problem is: all this is going on without any reference to the Law of the Sea Convention or the Authority. Considering the enormous abundance of the resource and its widespread availability on the continental margins, under national jurisdiction, it will not be easy for the Authority to attract attention to the international Area -- unless it can offer unique advantages and services through public-private cooperation in the international Area. These might be created through cooperation between the Sea-bed Authority and the Climate Convention organization which is responsible for studying the impact of the hydrates on climate change.. We envisage a regime of rules and regulations for the exploration, the Research and Development, and the safe, efficient, and economic recovery of methane from oceanic gas

hydrates, the coordination and harmonization of this new use of the deep sea-bed with other uses, including the safeguarding of cables from breakage. At this stage, the focus of the regime would be on joint R&D and joint technology development including developing countries which otherwise would have no chance to participate in this new phase of the industrial revolution.

Another newly discovered resource of very great potential, anticipated by the vision of the prophetic Arvid Pardo, are the genetic resources of the deep sea-bed. Recent discoveries of myriads of bacteria on and under the deep sea-bed are rather mind-boggling. Geologists studying deep-sea volcanic events have found rock walls, only months after an event, covered with thick mats of bacteria feeding on minerals, archaic creatures restaging the origin of life. Intensive bio-prospecting is being carried out, and many of these genetic resources, with their unique heat and pressure tolerance, are already commercially exploited to the tune of billions of dollars a year.

The industries utilizing these genetic resources are quite diversified. They include the pharmaceutical industry, the waste treatment, food processing, oil-well services, paper processing industries, as well as mining applications. The potential market for industrial uses of hyperthermophilic bacteria has been estimated at \$3 billion per year.

Clearly, the International Sea-bed Authority has some responsibility for the conservation and orderly utilization of these newly found resources, even if the Convention limits exploitation rights to the mineral resources of the Area. Article 145 of the Law of the Sea Convention establishes that "necessary measures shall be taken with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities". Subparagraph (b) establishes that such measures must include "the protection and conservation of the natural resources [biodiversity] of the Area and the prevention

of damage to the flora and fauna of the marine environment” This flora and fauna includes the genetic resources..

This responsibility, however, is now shared with the Secretariats of the Biodiversity and Climate Conventions. Article 5 of the Biodiversity Convention provides that “each contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties, directly or, where appropriate, *through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity.* Clearly, “the competent international organisation”, in this case, is the International Sea-bed Authority; clearly, also, the “area beyond national jurisdiction” is the international sea-bed area. *Nothing at all has been undertaken as yet to implement the Convention and protect biodiversity in international waters, including the sea-bed beyond the limits of national jurisdiction.* This is a lacuna which must be filled, through a regime of rules and regulations which should enhance

- the conservation of biological diversity in the Area;
- the sustainable use of its components;
- the precautionary approach and intergenerational equity
- the fair and equitable sharing of benefits arising from the use of genetic resources;
- participation of developing countries in the bio-industries; and.
- international cooperation in technology development in a sector likely to be of primary economic importance in the Twenty-First Century.

It is essential that this regime, to be jointly elaborated by the Sea-bed Authority and the Biodiversity *Convention* institutions, must be compatible with the regimes that are emerging, at the national and, especially, at the regional level, for the protection of biodiversity under



national jurisdiction. This applies to genetic resources just as it applies to the oceans' fisheries resources, where compatibility between regulations within EEZs and regulations in international waters, especially within regional seas, has been assured by the Straddling Stocks Agreement of 1995.

I would anticipate that the rules and regulations for bioprospecting and the protection of biodiversity on the deep sea-bed would have to take the form of a Protocol to be adopted by the States Parties to the LoS Convention.

Let me now come to the Services being developed within the international se-bed area.. Considering the time constraint, I will mention only the two most important ones. The emergence of an overwhelmingly important "service sector" on the deep sea-bed, incidentally, is another fascinating phenomenon as it reflects what is going on in the world in general: the ongoing transformation of our economies from one based on industrial production to one based on services. Services now are responsible for 60 to even eighty percent of the global GNP.

As far as the sea-bed is concerned, by far the most important is the development of a gigantic telecommunications system through the laying of fibre-optic cables passing through the international sea-bed area.

The first undersea fibre-optic cable was installed in 1988.. Today there are 228,958 miles of fibre-optic cable on the sea-bed, enough to encircle the Earth almost 10 times (*Herald Tribune*, March 10, 1998). This figure does not include Project Oxygen, a \$14 billion Super Internet, adding another 200,000 miles of cable with 96 landing points in 75 countries It is estimated that by 2003 more than US\$ 56 billion will be invested in the fibre-optic undersea market, with about one million route kilometres in place. And while the transmission capacity of these hair-thin fibre-glass cables has increased by orders of millions — the newest trans-Atlantic cable can handle 2.4 million voice conversations at one time, thanks to a laser process

called “wave division multiplexing” — the cost of fibre optic cable is decreasing almost as dramatically.. In 1987 each voice circuit in a trans-Atlantic cable cost about \$40,000 to build and maintain. Today the cost is approximately \$100-200 per circuit. As the *Herald Tribune* states it, “Under-sea fiber-optic cables have become one of the most crucial components of today’s communication-based global economy...”

The value of business transacted through this network -- phone, e-mail, Internet, e-commerce — is estimated as \$1 trillion per year. Add to this that the laying and leasing of the cables themselves is a most profitable business, with a rate of return on investment of 30 to 50 percent per year.. Thus it appears the Gemini cable will be so profitable that the parent companies are already planning a “Gemini-2” and that Worldcom will be able to sell capacity on the cable to other operators at a 2000% profit.

The fibre-optic cable industry is an example where technological development was very much faster than legal development, and the industry today enjoys its existence in a legal vacuum, still relying on the High Seas Freedom to lay cables and pipelines enshrined in a Convention of the year 1884, which has been taken over, practically unchanged, by the Law of the Sea Convention of 1982.,

On the continental shelf, the Law of the Sea Convention authorizes coastal States to regulate the routing, laying and the maintenance of the cables, and the harmonization of these activities with other uses of national ocean space; and regimes are emerging in many States and also, for instance, in the European Union as a whole. These also include fiscal regimes, the payment of fees for licences, property taxes for cable head-ends, etc. The Authority, at present, has no such powers, but clearly, it should have them. For the safety of the cables themselves, the Authority must ensure the avoidance of conflict of uses of the area, it must agree to the routing and know exactly where these cables are and be informed about their maintenance. In return for

these regulatory activities the Authority would be entitled to some payments. A minimal tax, either in the form of a Tobin tax, let us say of 0.001 percent on the trillion dollar annual business transacted through the cables, crossing the Area which is the Common Heritage of Mankind would not only revitalize the Authority but change the whole picture of international development cooperation and constitute a first positive answer to the insistent call, by the World Bank, the United Nations system and the developing countries, for “innovative ways” of generating “new and additional funding” to enable developing countries to implement all the Conventions, Agreements and programmes emanating from the Earth Summit of 1992.

Finally, the international sea-bed is already being used for construction of permanent deep ocean sea floor observatories. Quite a few have already been constructed by the United States, Japan, and Europa. Scientists and Engineers funded by the National Science Foundation and affiliated with the Incorporated Research Institution (IRIS), the University of Hawaii, and the Woods Hole Oceanographic Institution, have successfully created the first permanent, deep ocean sea floor observatory, able to observe ocean processes over periods of years. By connecting a junction box to a retired telephone cable on the sea floor in the middle of the Pacific Ocean, between Hawaii and California, the observatory, called “the Hawaii 2 Observatory” or “H2O, is placed in 16,400 feet of water. A seismometer and a standard hydrophone are the first instruments that have been installed at the site to listen for seismic events such as earthquakes and tsunamis.

HUGO (Hawaii Undersea Geo-Observatory) is a submarine volcano observatory located at the summit of Loihi volcano southeast of the Island of Hawaii. Loihi is an active volcano, likely to become the next Hawaiian island in about 100,000 years. HUGO was installed in 1997, when a 47 km electro-optical cable donated by AT&T was installed between the island of Hawaii and the summit of Loihi. A Junction box attached to the cable allows instruments to be

installed and removed using a submersible. Electrical power and commands to instruments are sent to the Junction Box from shore, and data from the experiments are sent through the optical fibers to shore.

Future observatories are in the planning stages; the most ambitious of which is NEPTUNE, which will instrument the Juan de Fuca tectonic plate off the northwest coast of the U.S. using about thirty junction boxes and two cable connections to shore. In addition to monitoring the plate boundaries, NEPTUNE will be capable of monitoring hydrate deposits on the continental margin and movement of salmon along the coastline.

This new use of the international sea-bed is closely related to the growth of the fibre optic cable industry: The cost of the observatories has become affordable through the use of decommissioned cables which litter the deep sea-bed. With the rapid progress of the fibre optic technology and the incredible increase in demand for transmission capacity, these cables become obsolete within a few years and are decommissioned. They are, however perfectly adequate for the use by the observatories and constitute a most valuable asset which should be monitored and safeguarded by the International Sea-bed Authority.. Given the Authority's mandate to coordinate scientific research in the Area and even to conduct such research itself, clearly the Authority has everything to gain from cooperation with the observatories, IRIS in Washington DC.. The Authority should keep a register of the observatories and the cables installed on the ocean floor, with a view to future cooperation in environmental and resource monitoring.

IV.

The continuous discovery of new resources and the introduction of new uses and services into the international sea-bed area could provide an economic basis for the International Sea-bed Authority even broader than envisaged by Arid Pardo in the sixties and seventies. If, through an evolutionary and cooperative approach and the adoption of protocols as may be required, the

Authority could adjust its scope to changing times and circumstances while remaining faithful to the principles on which it was founded, in particular the principle of the Common Heritage of Mankind establishing that the Area its resource base and services must be used for the benefit of humankind as a whole, with particular consideration of the needs of poor countries, the conservation of the environment and biodiversity and that it must remain reserved for exclusively peaceful purposes, this really may be the beginning of the building of a new economics of peace..