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# The Illusory Treasure of Davy Jones' Locker

MARTIN IRA GLASSNER\*

Caracas is now behind us, and so is Geneva. Progress has been made toward the accommodation of the multiple conflicting interests entangled over the mineral resources of the bottom of the sea—the treasure of Davy Jones' Locker. While the area of disagreement is being narrowed, the accommodation is being bought at a very high price; nationalism has eaten away the more enlightened proposals made between 1967 and 1970. It threatens to consume entirely the internationalists' dream of an international agency which would own and manage the whole of ocean space for the principal benefit of the poor peoples of the world while preserving as much as possible the integrity of the marine environment.

All is not lost, however. There is still a chance to salvage something tangible from the wreckage of a dream. At the New York session, or some subsequent session, the Third United Nations Conference on the Law of the Sea may still adopt a meaningful scheme

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for sharing the abundance of the seabed with those who need it most.

#### THE CONTENTS OF DAVY JONES' LOCKER

After Caracas, it seemed that there was substantial agreement on an "economic zone" of not more than 200 nautical miles to be allocated to each coastal and insular State within which the State would exercise jurisdiction over the living and nonliving resources for its own benefit. At the time, this more than twentyfold extension of traditional coastal State jurisdiction seemed quite drastic and even excessive. Today, on the eve of the New York session, it seems quite normal and to some even rather modest. According to part II, article 62 of the Informal Single Negotiating Text which emerged from Geneva, the outer limit of the continental shelf is defined as being a *minimum* of 200 nautical miles from a State's baselines (which may be a considerable distance from shore). Beyond that, it extends "throughout the natural prolongation of its land territory to the outer edge of the continental margin."<sup>1</sup> This "natural prolongation" extends in some places as far as 1400 miles from shore.<sup>2</sup>

Furthermore, if history is any guide, some States before long will conjure up some "logical" and "natural" reasons for expanding their national jurisdiction, reducing still further "the common heritage of mankind." However, for the present we shall accept the Geneva limits as being irreversible and use the term "seabed" only for that portion of the bottom of the sea beyond the continental margin.

The technical literature on the mineral resources of the seabed is abundant and some of it is quite detailed. There is no need to duplicate it here and, with one exception, only very recent sources are used to indicate the nature and extent of this potential treasure. According to John L. Mero, the sediments of the sea floor can be classified into five major groups: pelgatic sediments, including calcareous and siliceous oozes; terrigenous sediments; animal debris; miscellaneous minerals including zeolites, phillipsite, palagonite, cosmic spherules and red clay; and manganese nodules, crusts and other deposits on virtually all surfaces in certain parts of the seabed.<sup>3</sup>

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1. U.N. Doc. A/CONF.62/WP.8/Pt. II, at 27 (1975) [hereinafter cited as the Text].

2. It was not so long ago (remember?) that the International Court of Justice observed that "by no stretch of the imagination can a point, for example, 100 miles off a coast" be considered "adjacent" to the coast.

3. J. MERO, *THE MINERAL RESOURCES OF THE SEA* 53-83 (1965). Mr. Mero is currently president of Ocean Resources, Inc. of La Jolla, California.

In addition, the "hot brines" and metalliferous muds of the Red Sea and elsewhere are mineral-rich. More recently discovered are such things as (1) metallic sulphide deposits and perhaps petroleum along the boundaries of the great plates which constitute the crust of the earth;<sup>4</sup> (2) hydrothermal manganese deposits, perhaps overlying even more massive metallic deposits including copper, over some 100 square kilometers of the median rift valley of the Mid-Atlantic Ridge,<sup>5</sup> and (3) gold and ten rare earths in a similar position in the Pacific.<sup>6</sup> All of these constitute part of the "common heritage," but it appears that only the manganese nodules will have any commercial value into the intermediate future. We shall therefore confine our analysis to them.

The manganese nodules contain at least 27 elements in varying proportions and another 14 constituents, also varying widely.<sup>7</sup> Among them, the only ones of current commercial interest are manganese, copper, nickel and cobalt. There are about 25 factors involved in calculating the economic value of a nodule deposit, of which the grade of the deposit, or the proportion of desired metal, is most important.<sup>8</sup> The deposits found so far in the Atlantic, Indian and South Pacific Oceans, while often containing dense accumulations and larger-than-average sized nodules, are of relatively low grade. Although they are of high potential value in some places, at present they are of little importance to the mining community. Of all the components of the nodules, copper (Cu) and nickel (Ni) appear to be of the greatest immediate value. The largest deposit of high Cu-Ni concentration found so far is in the southeast and south central North Pacific Ocean, in a narrow band cen-

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4. Rona, *New Evidence for Seabed Resources from Global Tectonics*, 1 OCEAN MANAGEMENT 145-59 (1973).

5. National Oceanographic and Atmospheric Administration Release No. 74-59 (Apr. 10, 1974).

6. Piper & Graef, *Gold and Rare-Earth Elements in Sediments from the East Pacific Rise*, 17 MARINE GEOLOGY 287-97 (1974).

7. An excellent source for detailed data and maps about nodules is the unpublished manuscript, D. Horn, M. Delach & B. Horn, *Metal Content of Ferromanganese Deposits of the Oceans, 1973* (Technical Report No. 3, Office for the International Decade of Ocean Exploration, National Science Foundation).

8. Mero, *Potential Economic Value of Ocean-Floor Manganese Nodule Deposits*, in PAPERS FROM A CONFERENCE ON FERROMANGANESE-DEPOSITS ON THE OCEAN FLOOR 192 (Horn ed. 1972).

tered at about 10°N, 140°W and bounded by 8°30'N, 150°W, 10°N and 131°30'W.<sup>9</sup>

Nodules from this deposit will assay about 1.9 percent of nickel, 2.3 percent of copper, 0.2 percent of cobalt and 36 percent of manganese on a dry weight basis. Deposits of the nodules can be found in other areas of the ocean which assay as high as 2.6 percent of cobalt or 55% of manganese. In general, the chemical composition of the nodules is very uniform over large lateral distance of the Pacific; however, the concentration of the nodules can vary markedly throughout any given deposit . . . . In general, the average size of the nodules is about 4 cm; however, within a given deposit, this size range may vary from 1 to 20 cm.

At the present time, potential nodule mining companies are interested only in the monolayer of nodules at the surface of the sea-floor sediments. Although nodule beds can be found at a number of horizons down the sediment column, it is not thought that it would be economic to mine and process the gangue sediments to secure the buried nodules . . . . Also, it is not thought possible to mine the crustal manganese deposits of the sea-floor due to the difficulties of breaking these crusts free from their solid attachment to sea-floor bedrock . . . .

Although deposits of manganese nodules can be found in almost all depths of water in the ocean (they can be found in 6 ft. of water in some Scottish Lochs), only those lying below about 3,000 m of water are presently being considered as economic to mine. The higher grades of nodules are generally found in depths of water ranging from 4,000 to 6,000 m.

On a Pacific Ocean-wide basis, it has been estimated that there are some 1.5 trillion tons of the nodules presently at the surface of the sea floor and that the nodules are forming in this ocean at the rate of about 10 million tons/yr . . . .<sup>10</sup>

This is faster than potential mining operations are likely to harvest them, but most of the newly-forming nodules will not be economically exploitable.

#### TAPPING THE TREASURE

During the past decade, the technical literature and the popular press have carried glowing accounts of the bountiful treasures to be obtained from the sea. Increasing demand and improved technology will, it is said, almost automatically mean a superabundance of many minerals from the sea flowing to the land. One of the most consistently optimistic authorities has been John Mero. In 1970, for example, he estimated that there would be five ongoing

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9. D. Horn, M. Delach & B. Horn, Ocean Manganese Nodules, Metal Values and Mining Sites, 1973 (unpublished manuscript, Technical Report No. 4, Office for the International Decade of Ocean Exploration, National Science Foundation).

10. Mero, *supra* note 8, at 195.

nodule operations by 1975 and perhaps 50 by the year 2000.<sup>11</sup> The fact is that presently there is not a single commercial nodule mining operation functioning and none is expected before 1977 at the earliest and probably not until 1980.

There is, however, considerable mining of continental shelf resources, both hydrocarbons and hard minerals, in numerous locations around the world. According to a recent survey, of 120 countries reviewed, 39 have issued licenses or concessions for mining operations which will extend partially or entirely beyond the 200 meter isobath. Others have licensed production of nearshore sand, aragonite, heavy metals, nickel, tin and brine. So far there are no producing oil wells beyond the 200 meter isobath.<sup>12</sup> As for the future of shelf mining:

There is likely to be increasing exploitation of industrial minerals in relatively shallow water, both in those areas where commercial dredging is already in full swing and elsewhere, in response to local economic factors. These factors include those arising from increasing public resistance to the exploitation of minerals on land.<sup>13</sup>

Other factors are (1) proven and economic machinery and techniques for prospecting, mining, transporting, processing and marketing the minerals; (2) the lower costs and risks of mining on the shelf compared with the seabed; (3) demand for many shelf minerals which is growing more rapidly than the demand for principal minerals of the nodules; and (4) location of perhaps ten percent of the manganese nodules, including some high-grade ones, in relatively accessible areas of the continental margin.

Much of the information on current nodule mining is proprietary, but what is known is summed up quite well by A.A. Archer<sup>14</sup> and a series of articles, some of them unsigned, in a recent issue of *Mining Engineering*. Discounting the Howard Hughes' Summa Corporation-CIA venture, there are only three consortia actively engaged in nodule prospecting and sample mining. They are headed by Tenneco (Deepsea Ventures, 91 percent owned by

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11. Mero, *A Legal Regime for Deep Sea Mining*, 7 SAN DIEGO L. REV. 500 (1970).

12. Abers & Meyer, *New Information on Worldwide Seabed Resources*, 2 OCEAN MANAGEMENT 61, 65 (1974).

13. Archer, *Progress and Prospects of Marine Mining*, MINING MAGAZINE 150, 157 (1974).

14. *Id.* at 155-62.

Tenneco, does the actual work under a service contract), Kennecott and International Nickel. Each of these multinational consortia has already spent \$20 to \$30 million and proposes to spend \$150 to \$200 million before production of two to three million tons of nodules per year (dry weight) actually begins by 1985. Others, including French and Japanese firms and the Soviet Union, have indicated their intentions to begin mining soon.<sup>15</sup>

On November 15, 1974, Deepsea Ventures filed with the United States State Department a notice of discovery, a claim of exclusive mining rights and a request for official protection for operations in an area of 60,000 square kilometers between 15°44'N, 124°21'W, 15°16'N and 124°40'W on the Pacific Ocean floor at depths of 2300 to 5000 meters. The area is 1000 kilometers from the nearest island and 1300 kilometers seaward of the outer edge of the nearest continental margin. The claim stated production would begin within 15 years and continue for 40 years. This claim is an indication both of the possibilities and the problems of nodule mining.<sup>16</sup>

Several methods of recovering nodules are presently in use. The hydraulic, suction and continuous line bucket systems are currently most favored. Others are proposed or being tested. A similar state of technology exists with regard to processing nodules. Various types of leaching and smelting methods have been tested and others are planned or proposed. In all cases of both mining and processing, while the principles are well known and published, the details are proprietary.<sup>17</sup> Furthermore, published estimates of costs differ widely, as it is impossible to calculate them accurately before commercial mining on a large scale actually begins. Nevertheless, some commentators have found it possible to make some general remarks on the anticipated profitability of seabed mining.<sup>18</sup>

Experience in the relatively shallow water on continental shelves strongly suggests . . . that it is reasonable and certainly prudent to assume that mining and metallurgical costs of deep-sea mining ventures will not be less than those involved in winning the same commodities from deposits on land.<sup>19</sup>

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15. Li & Tinsky, *Meeting the Challenge of Material Demands from the Oceans*, 27 *MINING ENGINEERING*, Apr. 1975, at 28-29.

16. Note that the area staked out is in the heart of the region previously determined to contain the richest of all nodule deposits.

17. 27 *MINING ENGINEERING*, Apr. 1975, at 37-55 illustrates a number of these methods with photographs, diagrams, charts and tables.

18. C. Richard Tinsley of Chrysler Corporation, in his article, *Economics of Deep Ocean Resources—A Question of Manganese or No Manganese*, *id.* at 31-34, includes detailed comparisons of published estimates of capital and operating costs, output and prices for the four major nodule minerals. He points out that manganese production would not be very profitable and apparently at this point only Deepsea Ventures intends to engage in it.

19. Archer, *supra* note 13, at 155.

The rapid advance of technology may lead to the development of cheaper methods of off-shore prospecting, mining, processing and marine transportation. It is as likely that the delivered cost of minerals produced on land will also benefit from new technology. It is, however, always possible that the exploitation of otherwise uneconomic deposits of some minerals may be subsidized by a government for strategic reasons to ensure supply of a material not produced domestically.<sup>20</sup>

The gains from producing metals from nodules lie less in monopoly returns than in preventing world prices—especially for copper and nickel—from rising at previous rates during what is expected to be an era of high and continuously rising demand. As metal prices rise, re-cycling increases and formerly marginal deposits of lower-grade ores are opened up . . . . Moreover, nations that are high consumers of metals seek to reduce their imports from countries which supply a major fraction of virgin world output and in some cases have unstable political regimes.<sup>21</sup>

There is also the possibility of substitutes for nodule metals becoming more widely used, thus reducing the demand and hence the profitability of mining the nodules. Substitutes are only partially price-related and also depend on the better ability of a new product to do the required job.

Finally,

[i]t is quite possible that the recovery of nodules might turn out to be an attractive commercial proposition, as predicted by its proponents. On the other hand, it must be remembered that technical feasibility is a much more common occurrence than economic feasibility.<sup>22</sup>

We must also consider the very real possibility of unforeseen environmental damage which may be done by the mining operations. Mero, ever the optimist and long an employee of mining firms, denies this flatly, saying,

- 1) there will be no measurable environmental damage done in mining and processing of these nodules;
- 2) the full-scale development of these deposits as a source of industrial metals will allow society to close many of the sulphide mines on land which are presently a substantial source of air and land pollution; and

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20. Archer, *Economics of Off-Shore Exploration and Production of Solid Minerals on the Continental Shelf*, 1 OCEAN MANAGEMENT 5, 37 (1973).

21. Eckert, *Exploitation of Deep Ocean Minerals: Regulatory Mechanisms and United States Policy*, 17 J. LAW & ECON. 143, 150-51 (1974).

22. Branco, *Rational Development of Sea-Bed Resources: Issues and Conflicts*, 1 OCEAN MANAGEMENT 41, 48 (1973).



3) due to the unique physical and chemical structure of the nodules, with their large and chemically reactive surface area, there is some indication that the nodules may be quite useful in greatly reducing pollution of the atmosphere from other operations such as power production and automobile exhaust emissions.<sup>23</sup>

This assessment may be correct, but it is at best premature. The few serious studies of potential environmental damage, notably by the Lamont-Doherty Geological Observatory of Columbia University, are still inconclusive. Archer doubts that "established nickel mines, whether based on sulphide or laterite ores, will . . . be displaced by marine mining."<sup>24</sup> It would be unwise at this early stage to assume that nodules can somehow reduce air pollution, though it is possible. The environmental consequences of seabed mining remain unknown.

#### WHO WILL GAIN AND WHO WILL LOSE FROM SEABED MINING?

The question of the distribution of benefits from deep seabed mining can be divided logically into two parts: (1) who will benefit and who will lose from the progressive reduction (since 1967) of the international seabed area to that portion lying beyond the outermost edge of the continental margin? (2) Who will benefit and who will lose from mineral production within the newly defined international seabed area during the next quarter century or so?

As for the first question, the answer is painfully obvious; the farther out to sea the limits of national jurisdiction extend, the more a few rich countries will benefit. The proposed 200-mile economic zone itself would include within national jurisdiction 35.86 percent of the total area of the sea, or 37,750,000 square nautical miles, with only 67,517,000 square nautical miles left in the international area. Extending national jurisdiction to the edge of the continental margin would transfer another 5,000,000 square nautical miles from the international to the national zone. Only five countries would gain significantly. These are Canada, Australia, the Soviet Union, Norway and Argentina.<sup>25</sup>

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23. Mero, *supra* note 8, at 192.

24. Archer, *supra* note 13, at 159.

25. These statistics were compiled from Hodgson, *National Maritime Limits: The Economic Zone and the Seabed*, in *LAW OF THE SEA: CARACAS AND BEYOND* 186 (F. Christy ed. 1975) and *OFFICE OF THE GEOGRAPHER, U.S. DEP'T OF STATE, THEORETICAL AREAL ALLOCATIONS OF SEABED TO COASTAL STATES BASED ON CERTAIN U.N. SEABEDS COMMITTEE PROPOSALS* 5 (1972). For a discussion of countries who would gain from a 200-mile economic zone only see L. ALEXANDER, *GEOGRAPHICAL FACTORS AND PATTERNS OF ALIGNMENT*

Not all continental margins, of course, are equally rich in minerals. A broad margin does not automatically bring great wealth. But certainly for the foreseeable future the greatest offshore wealth will come from petroleum and natural gas. According to the best available estimates, the countries with the greatest potential hydrocarbon resources in the area beyond 200 nautical miles are Canada, Australia, Malagasy Republic, United Kingdom, Brazil, New Zealand, South Africa, Namibia (controlled by South Africa), Soviet Union and United States. Nearly half of these resources would be controlled by Canada.<sup>26</sup>

Even the occurrence of manganese nodules (though not necessarily their grade) beyond 200 miles favors the rich countries. Currently, only the Soviet Union, the United States and South Africa are known to have at least moderate deposits on their outer margins.<sup>27</sup> Other statistics show that expansion of areas of national jurisdiction will, in various ways, benefit rich countries more than poor countries.<sup>28</sup> Nevertheless, with a few exceptions, it is the poor coastal countries that are leading the fight to enclose ever more of the sea within national limits.

Both the rush to grab the often mineral-rich continental margin and the desire to establish some kind of benefit-sharing scheme for the minerals of the seabed are predicated upon an increasing demand for minerals and a diminishing supply of them on land. But, because of their position as either consumers or producers of the minerals found in the nodules, various States have raised questions about the impact of seabed mining on their economies.

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IN PERSPECTIVES ON OCEAN POLICY 317-35 (1974); Glassner, *Developing Land-Locked States and the Resources of the Seabed*, 11 SAN DIEGO L. REV. 633 (1974). Under this allocation, fully half of all the ocean space to be closed off will go to only 35 countries, of which ten will share 30 percent of the enclosed area. Of these ten, the United States gains the most (2.2 million square nautical miles) and only four (Indonesia, Brazil, Mexico and Chile) are developing countries, but they are not among the poorest and all are major producers of land-based minerals.

26. NEPTUNE, May 7, 1975, at 10.

27. Albers, Carter, Clark, Coury & Schweinfurth, *Summary Petroleum and Selected Mineral Statistics for 120 Countries, Including Offshore Areas*, in GEOLOGICAL SURVEY PROFESSIONAL PAPER 817 (1973).

28. An excellent source of detailed information on States' relationship with the sea and with the existing law of the sea is J. GAMBLE, *GLOBAL MARINE ATTRIBUTES* (1974).

Current consumers, largely the rich industrialized States, desire to keep mineral prices low and if possible, to reduce prices as the mineral supply expands due to seabed production. Potential consumers (developing countries beginning to industrialize) also will want low-cost raw materials for their infant industries. Current land-based producers want prices maintained at high levels, if not raised, and are therefore wary of new supplies entering the market. Potential producers of landbased metals may be deterred altogether in starting up new mines because of the competition of nodules. Potential nodule miners want security of tenure, protection of their claims and a high rate of return on their investments. Clearly, some of these objectives conflict and law of the sea treaty provisions will have to reflect an accommodation of these interests.

Along with their desires, many States have apprehensions about deep-sea mining. The major consuming countries want to avoid the kind of "cartelization" represented by OPEC that enables producers of a mineral to wield inordinate political as well as economic power. Producers fear that the major developing country land-based minerals may cause a depression of the market value of their exports if large supplies of ocean minerals become available.

A recent UNCTAD report, for example, says categorically:

The main common finding of the four case studies completed by the UNCTAD secretariat—relating to cobalt, manganese ore, copper and nickel—may be summarized as follows. The earnings of the developing countries from the export of the commodities in question would, in each case, be lower than in the absence of sea-bed mining.<sup>29</sup>

Raul Branco, however, using data from a United Nations report, suggests that "the impact of nodule mining would be felt first on the market for cobalt, next on manganese, then on nickel and finally on copper . . ."<sup>30</sup> He goes on to demonstrate that while cobalt prices would drop most, copper is by far the most important mineral export of developing countries. Nickel, however, is "the kingpin of nodule operations, and it seems reasonable to assume that the seabed mining industry would not expand production to the extent that nickel prices would fall drastically making the operation uneconomical."<sup>31</sup>

An industry analysis reaches the same conclusion from a different angle.

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29. U.N. Doc. TD/B/C.1/170, at 5 (1975). The basic reports are: U.N. Doc. TD/B/449/Add.1 (1973) (cobalt); U.N. Doc. TD/B/483 (1974) (manganese); U.N. Doc. TD/B/484 (1974) (copper); U.N. Doc. TD/B/C.1/172 (1974) (nickel).

30. Branco, *supra* note 22, at 49.

31. *Id.* at 50.

Even for governmentally sponsored programs, which include some of the on-going programs, the probabilities of their intentionally oversupplying these basic commodities are small. Each of these programs will have to be sponsored by investment capital and they will probably look for some rate of return based on the realities of market and competitive conditions at the time of entry. . . . Based on this philosophy, overall market entry would not be dramatic. Accordingly, the prospects of putting the world producers of these competitive products out of business do not seem real.<sup>32</sup>

In a thoughtful article, Giulio Pontecorvo deduces that, on the assumption that costs of ocean mining *will* be very high and therefore the number of miners restricted, ". . . the existing rate of growth in demand seems to be in excess of the rate of growth of ocean output so that any impact, over the next decade, on land-based producers and price would be very modest."<sup>33</sup> On the other hand,

if we use a less restrictive assumption, that sea mining is not significantly more difficult than land mining, the recovery of petroleum, the manufacture of automobiles, etc., then one may come to quite a different conclusion about who, which states, may participate in ocean mining.

. . . .

[I]n the long run, the losers will be the high-cost land-based producers and those heavily dependent on export earnings from the commodities in question.<sup>34</sup>

Mero suggests that the latter situation is quite possible. In a discussion of nodule mining recently, he said,

the way [of mining] I am proposing is a simpler way and a cheaper way and one that I think that any nation that has any kind of industrial base at all can operate. I think that this can be done [though at a relatively low recovery efficiency] at a level of a few hundred thousand tons per year at a capital investment of about \$10 million.<sup>35</sup>

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32. Rothstein & Kaufman, *The Approaching Maturity of Deep Ocean Mining—The Pace Quickens*, 26 MINING ENGINEERING, Apr., 1974, at 31, 33. Both Messrs. Rothstein and Kaufman are from Deepsea Ventures.

33. Pontecorvo, *Reflections on the Economics of the Common Heritage of Mankind: The Organization of the Deep-Sea Mining Industry and the Expected Benefits from Resource Exploitation*, 2 OCEAN DEVELOPMENT & INT'L L. 203, 208 (1974).

34. *Id.* at 210-11.

35. Mero, *The Great Nodule Controversy*, in LAW OF THE SEA: CARACAS AND BEYOND 354 (F. Christy ed. 1975). This volume contains a wealth of material on seabed mining in the contributions of Roy Skwang Lee, Mark Coler, Alvaro de Soto, Richard Greenwald, Giulio Pontecorvo, Robert D. Hodgson, Don Sherwin, Mochtar Kusumaatmadja, John E. Flipse, H. Waldemar Niemotko and others.

Deepsea Ventures takes a different view of the effects of multiple nodule producers on current land-based producers, saying that even this situation

will not be such as to devastate the world markets for these metals. Many other predictions notwithstanding, significant investors from government or the private sector entering into the ocean metals business will not kill the markets nor put the land mines out of business. And, this appears to be true, even if our forecasts of the number of units [of production] are off by 100 per cent.<sup>36</sup>

All of this speculation (and the literature is replete with much more) is to be taken with the proverbial grain of salt because:

The possible scale of nodule mining operations can be suggested only if massive assumptions are made about the future. These involve not only the highly speculative questions of long-term metal demand and price trends, but also the extent of the potential reserves and the commercial feasibility of mining. The latter, in turn, depends upon the pace of technological development necessary to enable nodules to be mined and processed successfully, the size of each "mine" and the quantities of metal each is likely to produce, bearing in mind that nodules have yet to be recovered on a commercial scale.<sup>37</sup>

Perhaps the most reasonable projection of gainers and losers from ocean mining appears in a recent United Nations report. While only a few excerpts can be included here, the entire report merits careful study.

8(c). As regards the "impact on consumers" reference has been made to savings on imports of metals and ores, and alleviating balance of trade problems. This will not be applicable for the first one or two decades of nodule mining . . . . Another argument has been that declines in metal prices will benefit consumers at large, namely the public. However, savings from lower prices of raw materials, which do not represent a large proportion of costs, tend to be absorbed by manufacturers in the form of higher profits or wages, and are seldom passed on in the form of lower prices to consumers . . . .

9. It follows that only a few traditional mineral producers are likely to be affected by nodule mining in the near future . . . .

10. If the impact of nodule mining is expected to be rather moderate for both producers and consumers for the foreseeable future, who will benefit most from this new industry? The answer is obviously the world community at large and the advanced countries possessing nodule technology in particular. The latter countries would benefit from a redistribution of revenues among mineral producers, and would tend to become the dynamic centres of future mineral production. They would gain from: (a) the spill-over effect of technology into other activities; (b) the income effect of producing equipment and supplies for nodule miners (backward linkages), incomes and employment from nodule mining, transport-

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36. Rothstein & Kaufman, *supra* note 32, at 36.

37. Archer, *supra* note 13, at 161.

ing and processing, and the establishment of new industries for further processing the metals (forward linkages); and (c) lesser dependence on foreign suppliers of raw materials—in fact, they would become net exporters of cobalt, and perhaps of manganese and nickel.

11. Assuming that an effective international régime and machinery will be created, the future sea-bed mining industry can bring some important new benefits for the world community at large. It will establish a practical field of international co-operative effort in resource exploitation at a time when increasing concern is being voiced over the adequacy of natural resources for the continuing growth of the world economy. It will thus also contribute to the creation of new institutional arrangements to minimize the adverse effects of technical progress on the economies of developing countries producing raw materials. Last, but by no means least, nodule mining will in due course generate substantial revenues, which could be used for the benefit of developing countries and, particularly, the least developed countries.<sup>38</sup>

Note the qualifying phrases "Assuming" in the first sentence of paragraph 11 and "in due course" in the last sentence. There is no assurance *that* and no indication *when* "substantial revenues" will become available for distribution to the developing countries. "In fact," the report later states that

studies prepared by UNCTAD have concluded that nodule mining could not generate enough revenues for the Authority to compensate the losses incurred by developing countries due to the increased supply of minerals from the sea-bed.<sup>39</sup>

A recent study by the American Society of International Law reaches the same conclusion based on earlier studies.

Accordingly, if revenue sharing is limited to the hard minerals of the deep seabed, its impact would be merely a symbolic victory for the view that the resources of the seas beyond national jurisdiction are the common heritage of mankind.<sup>40</sup>

Only if it were politically feasible to have revenue sharing landward of the 200 meter isobath would truly significant amounts be available for equitable sharing.<sup>41</sup>

Even such an incurable optimist as John Mero states flatly,

[a]s a source of revenues for development in the poorer nations of the world, the manganese nodules will never meet expectations.

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38. Economic Implications of Sea-Bed Mining in the International Area: Report of the Secretary-General, U.N. Doc. A/CONF.62/37 (1975). This is a follow-up to U.N. Doc. A/CONF.62/25 (1974).

39. U.N. Doc. A/CONF.62/37, at 15-16 (1975).

40. Charney, *The Equitable Sharing of Revenues from Seabed Mining*, in POLICY ISSUES IN OCEAN LAW 67 (1975).

41. *Id.* at 75.

The total revenues generated from such operations, even if present land-derived metal prices were maintained for ocean products, would not provide more than a few cents per capita for the people of the less developed nations. Some persons . . . arrive at a grand figure of several hundred trillions of dollars which they assume is available for the gathering. It is an illusion, of course, and best dispelled as soon as possible . . . .<sup>42</sup>

#### DISPELLING THE ILLUSION

Without using any statistics, we can state with certainty some facts derived from the foregoing: (1) Davy Jones' Locker contains almost unimaginable wealth. The largest proportion of it exists in the form of hydrocarbons in the continental margin and a smaller but still vast amount in the form of manganese nodules on the seabed, with lesser amounts in many forms of a wide variety of minerals on and beneath the margin and the seabed beyond. (2) The "Locker" is being partitioned by the Third United Nations Conference on the Law of the Sea into an "international" zone and well over a hundred zones of "national jurisdiction" extending from shore (or a straight baseline) out to 200 nautical miles or the edge of the continental margin whichever is further. (3) The bulk of the treasure has thus been appropriated by coastal States, especially rich ones, leaving the common heritage with, for the foreseeable future, only manganese nodules scattered over virtually the entire bottom of the sea at very great depths. (4) There is an immediate and apparently insatiable demand for the treasures of the continental margin, and the technology *and* experience are already in hand to extract, transport, process and market them profitably. (5) Production of minerals from the continental shelves has been growing rapidly and is likely to accelerate and move farther from shore as demand grows. In addition, rich nodule deposits have been found on some outer continental margins and even within the proposed 200-mile economic zones of a number of States. Thus, mining on the shelf (margin) is likely to compete directly with deep seabed mining. (6) Both in terms of area of sea bottom acquired and value of minerals produced in the next quarter century or so, only about a third of the States of the world will benefit substantially from the current expansion of coastal State jurisdiction over mineral resources. Those which stand to gain most in real terms from the "broad shelf" doctrine are already, with a few exceptions, quite rich. (7) The States with extensive continental margins beyond the 200-mile economic zone have agreed in principle to share the revenues

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42. Mero, *supra* note 8, at 200.

from mining in this area only (when there are any) with the international community.

The underlying accommodation that revenue sharing represents is that, in exchange for agreeing to coastal state jurisdiction to the outer edge of the margin, the international community would receive a share of the benefits of mineral exploitation. Very few developing coastal states are likely to be affected to a significant degree.<sup>43</sup>

(8) While technology for developing nodules has apparently been tested and pronounced satisfactory, it has still not been proven economical under real market conditions over a period of time. (9) There are, apparently, considerable profits to be made ultimately in nodule mining, including spin-off benefits, but most of them will accrue to the rich countries and their mining companies, of which there will probably be relatively few. (10) Some governments, despite the initial unprofitability of mining nodules of less than the highest quality, may, for political, social or "national security" reasons, subsidize private miners or engage in mining of the seabed themselves. (11) There will be little adverse economic impact on developing country land-based mineral producers of nodule metals for at least the next two decades, and any such damage can be easily compensated for. (12) The impact of nodule mining on the physical environment of the sea is still uncertain. It is still not possible to assert with assurance that seabed mining is environmentally safe or even that the benefits will outweigh the environmental costs, though this is probably true. (13) The long struggle in Committee I to resolve the questions of who may exploit the nodules, on what terms, how revenues and other benefits shall be generated for the international community, and how these revenues and other benefits shall be distributed is an important one and is likely to continue at New York in the spring of 1976 and probably beyond.<sup>44</sup> Without a doubt, the answers will profoundly affect future international relations. However, they will do little to close the growing gap between rich and poor peoples for a long time. (14) A way must be found to implement the principle of equitable sharing in the

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43. Stevenson & Oxman, *The Third United Nations Conference on the Law of the Sea: The 1975 Geneva Session*, 69 AM. J. INT'L L. 763, 782-83 (1975). The revenue-sharing provisions may be found in article 69 of part II of the Text, *supra* note 1.

44. Charney, *supra* note 40, offers some provocative and useful ideas about revenue generation and distribution.



bounty of the bottom of the sea very soon or the other achievements of the Conference may be destroyed along with the illusion of treasure from the seabed.

#### LOOKING AHEAD

It is a truism, but one worth repeating, that the world today is in a state of rapid and profound change. Students of history have a fair idea of where we have been. Keen observers may have glimmers of where we are now, but not even the most prescient futurists can have any clear idea of where we are headed.

We do know that the population of the world is increasing rapidly; that the rich people of the world are getting richer almost as rapidly; that many of the poor people of the world, who are aspiring to a life somewhat above the subsistence level, are not going to make it; and that science and technology are enabling us to exploit and despoil our tiny planet more quickly than ever.

We also know that the demise of old-fashioned imperialism has encouraged many former colonial peoples to demand a fair share in the operation of this planet as well as a fair share of its riches. This is the foundation for the United Nations Declaration on the Establishment of a New International Economic Order and the Charter of Economic Rights and Duties of States.

We also know that in the evolution of human, social, and political organization over the past 10,000 years or so, we have reached a stage in which we have nearly abandoned tribalism, feudalism and absolutism. The nation-state system—only some 300 years old—is already obsolete, unable to cope with many complex situations that transcend State boundaries. But nationalism—like most human traditions—is durable and, in the newly independent countries and elsewhere, seems even to have been resuscitated. No one can say when it will crest and finally begin to give way to some variety of supranationalism better able to deal with the problems of a crowded, interdependent, deteriorating and restless world.

Knowing all this, we can only be saddened by the fading of the dream of a meaningful “common heritage.” In 1970, only 18 States claimed *any* sort of “national jurisdiction” beyond 12 nautical miles or the 200-meter isobath.<sup>45</sup> Since then, the area beyond these lines (which may arguably be considered to have been the common heritage) has been steadily whittled away until nearly two-fifths of

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45. Limits and Status of the Territorial Sea, Exclusive Fishing Zones, Fishery Conservation Zones and the Continental Shelf (FAO Fisheries Circular No. 127, Rome 1971).

the sea is claimed as being under national jurisdiction, with no assurance that the process has come to a permanent halt. This writer, like Louis Henkin, has been "fighting the lost, quixotic battle for narrow coastal State jurisdiction for a long time now, so long that I have become almost immune and no longer so unhappy about what has happened."<sup>46</sup>

Realistically, it is probably too late to retrieve any of the area lost by the international community to the latest version of "manifest destiny." Therefore, it may be helpful first to try to understand why the developing countries have essentially foregone the bulk of the riches of the sea floor (at least for the next generation or so) and then to suggest how they can benefit from the new era of ocean development without sacrificing any of their other basic objectives.

One keen observer of current world affairs sums up the apparent basis for the great sea rush. In reviewing the work of Committee I at Geneva, Jon McLin says,

In no area of the negotiation has progress been as limited, as slow, as laborious as in this one. The cleavage here is a rich country/poor country one, which means that it is burdened with the emotions of broader concerns that both precede and will survive the oceans negotiation. The developing countries profess to be (and their behavior suggests that they are) less interested in maximizing the cash revenues they might derive from the international area than in seizing the occasion to build a new relationship with developed countries, one in which aid, dependency, and paternalism are structurally excluded.<sup>47</sup>

In concurrence with a point made at the beginning of this section, McLin goes on to emphasize that the law of the sea deliberations cannot be isolated from other international issues, especially those of an economic or political nature.

The poor countries, however, may be overplaying their hand. They do not seem to have realized just how deeply the "oil crisis" of 1973-74 has affected the attitude of the industrialized countries toward raw materials. They are determined to assure a secure

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46. Henkin, *Protection of Coastal State Interests vs. the Preservation of International Interests*, in L. ALEXANDER, *supra* note 25, at 345-47. See also Glassner, *supra* note 25, at 644-45.

47. McLin, *The Third United Nations Law of the Sea Conference: Geneva*, at 6, May, 1975 (Vol. X American Universities Field Staff Reports No. 2, West Europe Series).

supply of critical materials, including those in the nodules, for future needs. If the poor countries reach for too much political power, it can prove as illusory as the riches of the nodules have turned out to be for them. Though crucially important, the reaction of the developed States will be only one factor in shaping the future. No one can foresee the status and relationships of countries, blocs, economies and even commodities as little as a decade from now.

In the statement covering his share of the Text, Committee I Chairman Paul Engo recognizes that there are still many disagreements about the provisions he has submitted to the Conference.<sup>48</sup> Nevertheless, there is still room for compromise in the spirit of the Charter of Economic Rights and Duties of States, which uses the words "co-operate" and "co-operation" no fewer than 35 times. Such a compromise could take the form of a 20 or 25-year *resource partnership* between coastal States and the new seabed Authority.

Beginning when the treaty comes into force, *all* coastal States would begin paying into a fund established by the Authority an agreed percentage of the value of all minerals, including hydrocarbons, extracted from their continental margins and economic zones beginning at the 12-mile limit or the 200-meter isobath. These payments would continue for 20 or 25 years. During this time any coastal State *may* either offer to or request from the Authority assistance in developing the marine mineral resources under national jurisdiction. This assistance can take the form of technical information, advice, loans, joint ventures or even complete management. Everything would be arranged for an agreed period of time under terms of a detailed contract.

Such a partnership could have numerous advantages: (1) it would give the Authority a source of income until manganese nodule production begins providing it with significant revenues for redistribution to the poorest States and the land-locked States; (2) it would enable the less developed coastal States to receive assistance in developing their marine mineral resources without having to turn directly to developed States or private corporations; (3) it would enable the Authority to utilize the technical and financial resources of the developed States for marine mineral resource development on a contract basis; (4) it would give the Authority valuable experience in ocean mining without first having to make an inordinately large investment, especially if some or all of the projects at least initially are subcontracted out to mining com-

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48. U.N. Doc. A/CONF.62/C.1/L.16 (1975).

panies; (5) it would provide a mechanism for the transfer of funds from rich coastal countries to poor countries without domestic or international political complications; (6) it would provide a mechanism for the equitable distribution of spin-off benefits, including technology and management skills; (7) it could reduce the dangers of "cartelization" by States, mining companies or the Authority itself; (8) it could include provisions for setting and enforcing standards for the preservation of the integrity of the marine environment in connection with marine mineral development activities; (9) it would enable groups of States, contiguous or not, to contract with the Authority to render or receive appropriate services; (10) most important, by eliminating apprehensions about the whole new world of large-scale ocean mining, it would reduce the potential for conflict over the resources of the sea.

This proposal, while admittedly inchoate and sketchy, is in keeping with the trends of our times. It would provide both minerals and capital for development. It would preserve State sovereignty while fostering international cooperation. And it would not unduly impede the mining companies which are poised to begin commercial harvesting, but would integrate them into the partnership.

We cannot expect to reach the promised land very quickly, if ever, but at least we are making progress.

It is a new development for an international organization to have important responsibilities for resource *management*. Political realities being what they are, there is a case for not attempting more than, in the unfortunately primitive state of institution-building in which we find ourselves, a fledgling international body can manage.<sup>49</sup>

After all, we have only been institution-building for some 10,000 years. What more can be expected?

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49. McLin, *supra* note 47, at 9.