



RESOURCES

Some findings and conjectures from recent research
into resource development and use



I am tempted to believe that what we call necessary institutions are often no more than institutions to which we have grown accustomed, and that in matters of social constitution the field of possibilities is much more extensive than men living in their various societies are ready to imagine.

—RECOLLECTIONS OF DE TOCQUEVILLE

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NO MAN'S SEA

ONE OF THE KNOTTIEST QUESTIONS of resource use confronting nations today is how they can reach an agreement on sharing the rich supply of mineral deposits known to exist on the deep sea floor. These deposits, in the form of nodules rich in manganese, cobalt, nickel, and copper, are becoming increasingly attractive as economic sources of supply and are opening up the whole thorny matter of who has the right to exploit them, what limits should be put upon their exploitation, and by whom.

There is no clear-cut limit to the extent of the rights of the coastal state to the resources of the sea bottom. And there is no jurisdiction to govern the interests of the world community in the resources that lie beyond the limits of the coastal states, however these limits are defined.

The Geneva Convention on the Continental Shelf (1958) states that the limits of the exclusive rights of a coastal state extend "to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources. . . ." Thus, the only limit is that which is measured by the criterion of exploitability.

This open-endedness resulted chiefly from reluctance of the Convention delegates to grapple with the apparent inequities of a geologically determined boundary. For the continental shelf is not uniform in width; it may be only a few miles wide off one state's coast, but several hundred miles wide off another's.

Most authorities feel that some limit is necessary at some point short of mid-ocean, and that beyond that limit the sea bottom is international in character. However, there is no jurisdiction or set of rules to govern exploitation in this international area. The sea's bot-

tom might be considered as no one's property, and therefore subject to appropriation. Or it might be considered (as is accepted for the fish in the superjacent waters) as the property of the world community, and therefore not subject to unilateral appropriation. If the former view holds, then the sea bottom is up for grabs—to be appropriated by the first party to make its claim and defend it successfully. Under the latter view, rights to the sea bottom would have to be constrained by some concept of the public interest.

There are some who think the best approach to future exploitation is essentially passive. Let us wait and see, they say, until a pioneer exploiter mines an area of the deep sea, so that we can learn from his experience the technological, economic, and policy problems involved.



The danger in such an approach is obvious. If we postpone the establishment of a jurisdictional regime, we may find ourselves locked into an undesirable position because of the pressures stimulated by the initial development. I believe that it is necessary to work out some set of rules to govern exploitation of the bottom of the sea *before* the act. The question is, which of three possible regimes would be feasible, most efficient and most acceptable to a sufficient number of nations in both the short and long run?

THE NATIONAL LAKE or coastal state approach has superficial appeal. The exploitability criterion of the Convention on the Continental Shelf opens the way for appropriating larger and larger areas of the sea bottom adjacent to a state's coasts. By accepting or asserting this Convention as a valid guide, a state could extend its jurisdiction across the sea bottom until it reaches a point midway between its shores and those of an opposite coastal state. The attraction to the United States is that we have long coastlines on the Atlantic and Pacific Oceans and the Gulf of Mexico.

The regime would permit each coastal state to lease and protect exclusive rights to the resources within its area, and to extend its administrative techniques out to deep water, choosing as rapid or as slow a development as it deemed economical. If the state did not care to exploit the resources itself, it could lease rights to foreign companies and extract a royalty income. This solution, at least on the surface, appears clean and easy. But there are some major drawbacks.

The drawbacks chiefly hinge on the role of the world's islands. According to the Continental Shelf Convention, islands have the same rights as mainlands, and, indeed, it is difficult to see how they could be excluded. Thus, the French and the British would be among the chief beneficiaries of the national lake approach. The French would receive a vast area of the Indian Ocean because of Kerguelen, Crozet, and others islands, and a large area of the eastern tropical Pacific, in part because of tiny Clipperton Island. To the British would go more than half of the South Atlantic Ocean, because of Ascension, St. Helena, Tristan da Cunha, and South Georgia, and a large share of

the North Atlantic because of Bermuda and the Bahamas.

But what about the other powerful nations? The United States would win a vast section of the North Pacific, but at the same time it would find its freedom to operate in all oceans to be severely restricted. Since special-purpose rights tend to become generalized, jurisdiction over the bottom could extend upwards through the superjacent waters and the fish therein, to the surface waters, until all the seas become territorial seas, thereby restricting both commercial and military mobility. Even if that didn't happen, U.S. firms would have to deal with a multitude of coastal states to operate outside their own waters.

More significantly, perhaps, the national lake approach would provide virtually no gains to the Soviet Union, other than a small slice of the Northwest Pacific and the Barents Sea and Arctic Ocean. And without the agreement of the U.S.S.R., no regime would be viable.



THE FLAG NATION approach would permit the exploiter to operate under the protection of the nation whose flag he flies, appropriating a section of the sea bed wherever he finds resources of value. The exploiter might be an individual firm, a consortium, a mixed public-private enterprise, or a government itself. If the respective government is willing to guarantee protection and the exploiter feels that the guarantee will be effective over a sufficient length of time, then one of the major deterrents to exploitation becomes insignificant.

There would, of course, eventually be conflict and competition for the same resource area. If it were between two firms flying the same national flag, it could be resolved through some form of bidding mechanism, similar to the arrangement for allocating oil rights on the U.S. continental shelf. If it were between different nations, however, the absence of international authority would require some other mechanism for allocating resources. Reso-

lution might be possible through bilateral or multilateral agreement.

This approach, which calls for minimal government involvement, has much appeal as a simple, straightforward development. However, the proposal assumes that nations will be willing to protect the claims of their companies or operations in international areas—an unlikely event if political reaction looms greater than the potential benefit. Moreover, this approach would require the influential nations to establish rules that would prevent a headlong race to appropriate vast areas of the sea bottom. Proof of performance within a certain length of time might be a requirement preventing the race, but how would such a rule be established and enforced? And how would controls be enforced governing an exploiting firm's output—which could be so huge as to upset the world market for any one mineral? A performance requirement in itself would create incentives to produce more rapidly than might be economically justified.

AN INTERNATIONAL REGIME seems the approach most likely to be acceptable over the long run, and also most likely to protect the interests and permit the efficient operations of the exploiting firms. Whether it is feasible depends upon man's ability to develop the required institutions, which, I suggest, can best be developed under the umbrella of the United Nations.

Let us see how the regime might work.

The individual entrepreneur, from whatever nation, would bid for the exclusive right to explore and exploit a certain area for a specified resource. This bid might be expressed in terms of royalty payments.

Other mechanisms might also be possible, such as a bid on percentage of net revenue, or on a cash bonus payable in installments. For high-risk operations, such as manganese mining, the initial bids would not be enough to deter exploitation, and, over the long run, would be no greater than the payments the firm would be expected to make under the flag nation approach.

An international authority would be in a position to prevent excessively rapid rates of output that would depress prices and revenues to all producers.

Some requirement for perform-

ance within a period of years should be invoked.

An inspection scheme would ensure that the rights of the lease were not abused and that the operation would not damage the marine environment or make inefficient use of the resource.

None of these international requirements differs substantially from the domestic ones relating to the exploitation of oil resources on the U.S. continental shelf.

Determination of a boundary between the interests of the coastal states and the interests of the world community is obviously difficult. An international regime, however, may facilitate reaching a decision. For example, a relatively restrained coastal state limit might be selected along with a scheme that would recognize the interests of the coastal state outside of that limit. Where a resource is exploited relatively close to a coastal state, the royalties paid to the international authority might be split between that authority and the adjacent state: the closer to shore, the higher the percentage received by the state; and the farther from shore, the greater the percentage to the authority. This would permit U. S. firms to operate throughout the world's oceans under a single set of rules. Problems of expropriation and inflated royalty rates would be greatly diminished.

The most crucial point, however, would lie in the ability of the au-

thority to guarantee and protect the exclusive rights of the exploiters—a matter that would depend upon the degree to which the regime was accepted by the world community. This, in turn, would depend upon how each participant viewed his net gains against the net gains of all others. For the exploiting nations, the gains would be in terms of orderly development, control over uneconomical rates of exploitation, and a better guarantee of exclusive rights than under a flag nation approach. For the non-exploiting nations, gains would be obtained by direct sharing of royalties where exploitation takes place close to their shores, and by indirect sharing of royalties where exploitation is clearly within international waters.

If the non-exploiting nations are to feel that they are sharing in the benefits of the regime, indirect sharing of royalties is essential. This might take the form of devoting the revenues to some generally beneficial purpose such as reducing worldwide malnutrition. It would seem advisable to place the task of revenue distribution or use in the province of the General Assembly, thus leaving the authority free to conduct its primary task of management reflecting the interests of the exploiting nations.

Adapted from a paper by Francis T. Christy, Jr., presented before the American Bar Association National Institute on Marine Resources.



The Advantages of Being Middle-Sized

FROM THE VIEWPOINT of business and industry, the larger cities have clear advantages: cheaper and more flexible transportation and utility systems, better research and development facilities, a more skilled and varied labor supply, and better facilities for educating and retraining workers. These economies

of scale are captured by private business as lower private costs; many of the attendant social costs, such as additional traffic congestion and air pollution, are sloughed off on society. In themselves, these factors would tend to promote urban growth and great size.

But other forces work in the op-

posite direction. They originate for the most part in the household sector. Alarms of an urban crisis are almost invariably couched in the color words of amenities: congestion, pollution and other aspects of bigness, or at least poorly managed bigness. It is, in fact, not at all clear from this largely impressionistic (and frequently impassioned) literature whether the hypothesized rising costs and/or deteriorating quality of urban life with greater scale is due to some naturally scarce factor, such as fresh air or clean water, or due instead to the probable or demonstrated failure of urban public policy and management.

To date, the most that can be made of these popular problems of great city size is that they have slowed slightly the growth of the largest urban areas: in the United States, probably New York and less clearly Chicago. But, paradoxically, the loss of amenities with great size may redound to support the growth of the second echelon of metropolitan areas. Metropolitan areas with over a million population but less than Chicago's 8 million offer substantial infrastructure in support of modern business although they do not rival New York and Chicago on this score. But then neither are their problems quite as big.

WE COULD ARGUE that New York must wrestle with a somewhat more advanced form of each of the classic urban problems, or we could argue alternatively the equivalent: that New York must face each new problem in urban management first. Thus, New York was the first to have to learn how to handle 10 million people, and must soon be the first to master the problems posed by 20 million. Each successively smaller city, roughly in its rank order, has one more example from which to profit, whether the examples be good or bad. Chicago finds the path a little easier because New York has done it before, and Detroit profits from the pioneering of both. Detroit, that is, should be able to offer in 1970 a better organized version of the 5-million population cluster, as a partial offset to the disadvantages it suffers living in the shadow of the greater choice and urbanity of Chicago.

A good case can be made that each of the two dozen or so urban areas with a million to 5 million

population will net out to about an average growth rate over the next fifty years, and more than double in size. New York and Chicago will pave the way, perhaps at a slowing rate. All this assumes, of course, the absence of national policy that would restrict the continued growth of big cities. And at this time and vantage point, it seems likely that our national policy will be directed more toward mastering the management of large population clusters than toward preventing their growth.

Adapted from a paper by Wilbur R. Thompson, presented at a conference sponsored by the Committee on Urban Economics of Resources for the Future, January 1967.



Backwoods Economics

LARGE AND IN MANY CASES irreversible changes in the American landscape and its plants and animals have taken place in the process of wresting a modern industrial society from the wilderness. And there are reasons to fear that additional and unnecessary degradation of natural environments may continue. Public action to preserve places of extraordinary scenic beauty can in itself raise problems which neither the market nor the government is equipped to handle adequately.

When an agency of the public undertakes to resolve conflicting interests, a decision favoring the pre-

dominant viewpoint is often regarded as necessary, since it reflects the principle of majority rule. But when improvement in the allocation of resources is at stake, to follow the preference of the majority can sometimes lead to an uneconomic allocation not justified by the original purpose of public intervention.

An economic allocation would require provision to be made for the entire spectrum of individual tastes in proportion not only to their representation in the population but also to the intensity with which they are experienced. That even an exclusive taste may be gratified in the private sector is clearly shown by the existence of custom shops and individual services of all kinds. Why, then, should a public agency, confronted with a choice between providing a good or service that appeals to many or an alternative that pleases a small minority, necessarily choose what is favored by the many? Taken to a logical conclusion, if such decisions come up *one at a time*, and if each decision favoring the commonly held preference pre-empts one of the remaining opportunities for indulging an esoteric taste, in due course all of the resources or configuration of land forms and biota considered by many to offer unique experiences will have been extinguished one by one.

SINCE THE GOVERNMENT is deeply in the resources field and to a large extent dominates the remaining wildlands, much of the grand panoramic landscapes, and all navigable streams, allocative machinery is required if we wish to safeguard rare natural environments. It is not merely a question of, say, adjusting the margins between hydropower production and more water-based recreation. Catering to the mass demand for lakes for swimming, boating, and water skiing is not enough. Provision should also be made for

those who prefer to canoe in white water or fish in free-flowing streams.

I can visualize an explicit policy to ensure that the dominant tastes are indulged only in proportion to their representation, while the minority tastes are accommodated in proportion to their representation, taking into account also the intensity of the demand as well as the number of individuals nurturing each. This will require viewing resource configurations as parts of systems, not as individual cases, with an appropriate allocation of resources within the system to accommodate the widest range of demands in proportion to their representation.

Extracted from "Some Environmental Effects of Economic Development," written by John V. Krutilla, of RFF, for the Fall 1967 issue of Daedalus.



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