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Man in the Sea

Man *is* going to colonize the oceans, and it might just as well be *our* men. To compete successfully, we must be able to move faster in the sea, to go deeper, to stay down longer, than anyone else. We must understand more about the sea—its interfaces, its interactions with the atmosphere, its bottom and deep into its bottom, its shorelines, the motions within its bulk, everything it contains, the life and chemicals in it.

We are already beginning to occupy the sea. At a recent symposium on Buoys, the discussion was concerned with all kinds of platforms in the sea—manned or unmanned, surface or submerged—for observation or for actual exploitation of sea resources. Ships and buoys and then much more sophisticated complexes of platforms will form future oceanic cities and lead to the occupation of the surface of the sea.

At the same time, we are beginning to go down. New experimental submarines are being built. Experiments such as those sponsored by the Navy to stay for long periods 60 meters down are a next step toward occupying the ocean depths. Magnificent work has been done in the exploration of the deep-sea sediments and the earth's crust below the sea by ingenious, remote seismic methods, by the coring and drilling of the ocean bottom. Already phosphorites and diamonds are being taken commercially from the shelves in the sea, and nodules may be an inexhaustible source of other minerals in the future. The deep-diving vessels will provide the first prospecting with a man-on-the-spot on the bottom of the ocean. The little deep-diving submarines will be the burros of the ocean prospector.

In colonizing and exploiting the sea we will have formidable competition. Already the Russians, employing hundreds of vessels, fish on our doorstep with modern, efficient factory ships. The Japanese outfish us too, not only on our doorstep but also on the high seas.

If we are to meet competition successfully we must organize our efforts better. We must find a way of avoiding the great waste entailed in building a national program by the addition of thousands of little individual projects. Rather, we should employ a scheme of supporting, in larger chunks, institutions, laboratories, and industries that have good people. Then we should allow their initiative to make the program. We must find ways of instrumenting large sections of the oceans for experimental purposes, and we must make these areas available to private institutions and industries as well as to the Navy. This would encourage scientists to undertake the large-scale kind of engineering experimentation that is necessary for the occupation of the sea.

To achieve these objectives I have suggested the establishment of "sea-grant colleges" in existing universities that wish to develop oceanic work. The sea-grant college would focus attention on marine science, and it would develop strengths in the applications of marine science in colleges of aquaculture and oceanic engineering. These would be modernized parallels of the great developments in agriculture and the mechanic arts which were occasioned by the Land Grant Act of about a hundred years ago. Basic funds, undesignated except that they be used by sea-grant colleges, could be obtained in much the way that agricultural support has been obtained in the past. Establishment of the land-grant colleges was one of the best investments this nation ever made. The same kind of imagination and foresight should be applied to exploitation of the sea.—ATHELSTAN F. SPILHAUS, *Dean of the Institute of Technology, University of Minnesota, and member of the Board of Directors of AAAS*