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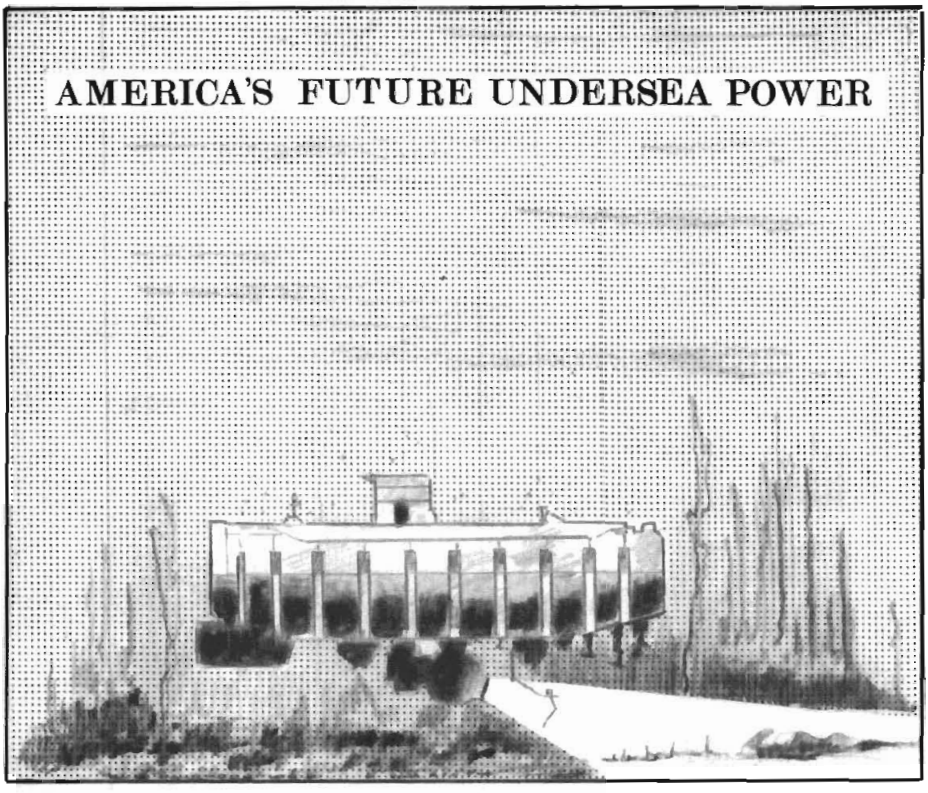

Address by

The Honorable Claiborne Pell

United States Senator

At the Symposium on Mineral Resources of the World Ocean

Naval War College, Newport, Rhode Island

on 11 July 1968

Holding this Seminar at the Naval War College is, I believe, a good omen for America's future progress under the sea. This is the oldest of our war colleges. It began quietly in 1884, but soon became internationally known when Alfred Thayer Mahan talked--and wrote--about the "Influence of Sea Power on History."

His theory seems simple and self-evident to us now: First, that a nation's sea power comprises many elements, such as size of seacoast, calibre and number of seafaring citizens, industrial capacity for shipbuilding, and so on; and second, that nations which exploit all components of seapower, including of course the construction of warships, can become dominant world states.

Mahan only clarified the obvious perhaps, but his thinking revolutionized national strategy in this country. We soon enlarged our Navy; heightened our bellicosity; and in the brief, whirlwind

war with Spain, achieved instant empire in two hemispheres.

It has been a long while since Mahan spun out his electrifying logic from this beautiful vantage on Narragansett Bay. Since then the War College has remained prestigious in military circles but has never, until today perhaps, under Admiral Hayward's leadership, regained its early prominence as a font of national intellectual leadership.

Now we have a unique chance to regenerate that reputation. As host to our conference, the War College once again is platform to an idea that can affect our future as importantly as Mahan did--I mean the concept of "Undersea Power."

Mahan would doubtless define "Undersea Power" in primarily strategic terms relating to the strength of our nation in relation to other nations. He would probably talk about such items as operating area for our nuclear submarines, mineral and living resources for our wartime munitions, and our industrial capability for turning out underwater weaponry. I would describe Undersea Power more broadly and add the many peacetime potentials to be found in the vast subocean regions of the world. For Undersea Power also includes opportunities beyond our national boundaries of territorial limits and continental shelf.

This conference centers on one key component of Undersea Power--mineral resources of the world ocean.

We have all heard and read much in recent years of the infinite riches that lie under the seas ready for easy collection by the first nation to attain the necessary technological prowess. Yet we have been told more of the bright prospects than of the dull drudgery of evolving the necessary hardware and learning to employ it. Rear Admiral Odale D. Waters, Jr., the Navy's distinguished oceanographer; Jacques Cousteau, the imaginative French diver, photographer and innovator of man-in-the sea projects; and many others--and I include my own book, *Challenge of the Seven Seas*, with, I hope, disarming immodesty–have all sketched a rosy image of the extraordinary underwater life than man can accomplish in the years to come.

The great value of our seminar here is that it focuses on fact and practicality rather than on dream and misty prognostication. I think the Navy's well used term "practicable" should characterize our conference's efforts.

With "practicability" as our theme, we may well provide a byword to America's quest for Undersea Power. To keep this idea alive at the Naval War College, I would like to see established a chair in Oceanology. It would be filled by a different expert each successive year who is known for his *practical* achievements in one or more of the many nonmilitary facets of Undersea Power: Fisheries, desalination, manufacture of submersibles and other undersea hardware, man-in-the-sea experimentation, deep submergence rescue techniques, and so on. Incidentally, the Navy has demonstrated that it can and does contribute to practical, civilian uses of oceanology as a regular spin-off of its findings in military research. Admiral Waters has insisted on constant alertness for possible civilian application of any oceanologic discovery. He and the U.S. Navy deserve special commendation for this wise and unparochial policy.

Our interest here is to delimit dimensions and location of mineral resources. But I would also like to mention the practical requirement for human and material safety in our ever deepening probe for dollar-convertible fruits of the sea. Early in the history of man's conquest of the air, as well as the sea surface, pioneering airmen and seamen lost their lives with disheartening frequency. Even now we suffer mishaps in both media which remind us of the difficulty and inherent risk in defying

gravity. Strangely and fortunately, we have so far avoided accident in orbit, although this is doubtless the most dangerous of the three spaces of the earth--outer, air and ocean.

The Navy has had to face the most terrible mishaps with the mysterious loss of the nuclear submarines *Thresher* and *Scorpion*. The Navy has mustered all conceivable measures to correct the causes of these disasters, including the personal attention of top naval officials. For example, the then President of the Naval War College, Vice Admiral Bernard L. Austin, was named in 1963 to head the *Thresher* inquiry. I am happy to note he has assumed charge of the current investigation into the disappearance of the *Scorpion*.

Deep submergence rescue vessels are now being designed and tested to find sunken subs and remove their personnel. In fact, the Navy recently sent one such craft, the advanced diving system, ADS-4, plus a four-man submarine to join the search for the *Scorpion*.

The Navy is not alone being plagued by unsolved problems in underwater operations. Right here in Narragansett Bay a diver from a private firm died last year while working on the deep foundations of that monster bridge you can see just south of this building. Equipment failure apparently was the cause.

To get closer to the subject of this conference, we must concede that the technology of extracting minerals from the seabed is not yet foolproof either.

One instance is the fabulous gasfield in the North Sea, which has become a very lively prospecting region. Nature there is often wild. Fifty-foot-high waves and strong tidal currents are frequent foes of efficiency and safety. Already two giant drilling rigs have been knocked to the bottom by wind and sea. These rigs are so large they can house 50 men with living and recreation quarters, workshops, storerooms and heliports. Yet turbulence near the sea's surface, as well as pressures further down, still combine to make mineral exploitation 'unsafe at any depth'--at least in an absolute sense.

What practical steps must we take to solve the many variables that still separate us from comfortable extraction of the seas' mineral and other treasures? The distinguished lecturers invited here by the Navy, the Department of the Interior's Geological Survey and the University of Rhode Island can give you some answers. I welcome this chance to offer my own suggestions.

First, we must have more applied research, plus an advisory service to disseminate new findings from such research; also, more education and training to increase the number of ocean engineers and technicians. These, of course, are the prime features of the Pell-Rogers Sea Grant College bill. It is, for the present, being administered by the National Science Foundation. I regret to say that this program has been sadly underfunded since its enactment in 1966. As Larry Booda wrote recently in *Under-Sea Technology*, "the National Sea Grant College Program is doing the best it can with the money that has been appropriated, but it will take years for its effect to be felt."

I wish that the many different groups active in American oceanologic endeavors would publicly support and defend this vital mechanism for tapping our marine resources. It has caught the imagination of marine science institutions throughout the nation. Scores of them have submitted grant-worthy projects which are totally in the spirit of the program. But many of these eager applicants have had to be rejected until more money is budgeted. We must not let their enthusiasm wane. Your articles in the newspapers, scientific and professional journals, as well as your letters to members of Congress, will help keep this program on track.

The second step toward more practical oceanologic development must be a closer coordination of the Federal gov-

ernment's ocean-oriented departments in the Executive Branch. The two dozen or so different divisions in the Executive Branch should be compressed into two or three at most, with the closest sort of orchestration of their activities under a single United States Oceanologist.

The President's Marine Sciences Commission, chaired by Dr. Julius Stratton, presumably will soon come up with its recommendation on governmental organization for oceanology. I look forward with very real interest to what they propose. I anticipate that legislation along the lines I have just roughly outlined will find good backing in Congress. I certainly will work for passage of a bill to streamline and strengthen our present ramshackle, loose-jointed approach to oceanic opportunity.

Next, increasing use should be made of the ingenious modern route to scientific and technologic advance known as the "systems approach."

It is not too difficult to view the process of exploring and exploiting the mineral wealth of the ocean as a series of steps arranged in orderly fashion. The whole process--from early planning through intermediate operations to the final stages of marketing and consumption--should be viewed as a system. For it, a systems approach should be adopted to achieve the optimum performance toward our objectives.

The systems approach is not entirely new. Although the phraseology is fresh, the concept has its roots deeply implanted in science and engineering. It was not invented by any one nation or any single individual, but is the product of logical and successful steps in overcoming different but related obstacles toward a common end.

In probing and exploiting ocean resources, the systems approach is necessary to deal with the different parameters of ocean phenomena and their interaction. These parameters differ radically from those related to mining on land. Their nature and complexity in the sea environment require a systems approach to integrate all related activities within one entity. The effectiveness of a systems approach depends, of course, on such factors as cost, time, engineering design and application, and information control and data processing. Every minute factor within this system has its effect in the final plan of how to use ocean resources.

I am glad to note that Vice President Humphrey's National Marine Sciences Council last year ordered a study along these lines to be made by the System Development Corporation. This should facilitate the Commission on Marine Science's effort to reshape the Federal oceanologic establishment.

But even before Federal reorganization, I hope that the latest pretty inactive version of the Interagency Committee on Oceanography, which is now called the Committee on Marine Research, Education and Facilities, will continue to encourage the closest practical working relationships among the various oceanologic programs. Not only is this necessary to prevent inefficiencies due to overlap and duplication, but also to keep costs as low as possible.

On this point I would like to compliment the Departments of Navy and Interior and the University of Rhode Island for their outstanding cooperativeness in planning and implementing this meeting. I trust that these joint arrangements can become the rule rather than the almost unique exception which this conference is. In addition, I urge that private enterprise take part wherever feasible. For, outside the security aspects of our march toward more knowledge of and ability to work and live in ocean space, the profit motive should push us to our ultimate expansion of Undersea Power.

At this time the high pricetag on ocean research and development cannot be shouldered without heavy Federal financial infusion. With this public money we are already embarked on vast

scientific and technological advances which one day will lead to suboceanic marvels that still seem as astounding as science fiction. When that day comes, I am sure that private industry will profitably perform the underwater construction, run the transportation systems, set up and operate the extractive mining rigs--as they have in fact already started to do--and handle all the other extraordinary functions in the new undersea frontier just as they now do on the land.

Indeed, private industry's investment in ocean development already exceeds government spending. I only wish we could say the same thing about private investment in the outer space program into which the Federal government has poured so many billions of dollars.

In order to speed us toward this wondrous era of oceanic achievement, I am emphatically sure our outsized budget for outer space should be pared and marine science expenditures increased until the two are *equal.* Money spent to increase our Undersea Power will become, literally, "bread on the water." For, the faster we widen our sea knowledge and build the tools to employ it, the sooner we can reach and use not only the ocean's mineral resources but all its other enormous potential wealth.

Finally, I want to stress again, as I have so often during the past year, that we must push ahead on the diplomatic front to arrange a legal regime for Ocean Space. I am persuaded that we must fill the present gaps in international law which exist in Ocean Space--by which I mean the underwater regions beyond the territorial and continental shelf limits of all nations. Otherwise, we are negligent in our duty to explore and exploit those regions peacefully and profitably. Together with President Johnson, I agree that we must avoid a lawless, violence-ridden race among nations for the pots of golden promise at the bottom of the sea.

These, in short, are my thoughts on a more practical channel toward Undersea Power.

In closing, I would like to philosophize for a moment on the place of Undersea Power in our future. It is true, I believe, that, partly because this country acted on Mahan's advice, we grew to great power status. But times have changed to where nationalistic, imperial appetites must be curbed to maintain peace in the world. I think our attitude on Undersea Power should reflect that change.

Sir Winston Churchill himself personified this change. In his early years, when Mahan was still alive, Churchill acted like a devoted disciple of our influential naval thinker. Indeed, many European leaders expanded their navies in response to Mahan's writings on the importance of seapower. Churchill, as Britain's Sea Lord, championed more growth for his country's already great naval strength. He fought hard in two World Wars with this navy to preserve the Empire of Great Britain.

As Prime Minister, he uttered his

BIOGRAPHIC SUMMARY

The Honorable Claiborne Pell is presently a member of the United States Senate (D., Rhode Island). He attended St. George's School in Middletown, R.I., and holds a B.A. from Princeton University, where he graduated cum laude in 1940, and was awarded an M.A. from Columbia University in 1946.

Senator Pell enlisted in the U.S. Coast Guard prior to World War II and served in the North Atlantic, in Africa, and in Italy. He was released as a lieutenant and is now a captain in the U.S. Coast Guard Reserve. Until elected in 1960 he was director of the International Rescue Committee, member of the National Council of Refugees, and Democratic National Registration Chairman in 1956.

Senator Pell is coauthor of *Challenge of the Seven Seas.*

famous boast, which has proved somewhat ironic: "I have not become the King's First Minister in order to preside over the liquidation of the British Empire."

But even before the end of World War II, Churchill began to change his tune. For example, he started to promote the values of a United States of Europe. Then, at a Harvard University commencement in 1943, he called for closer intellectual partnership between the United States and Britain and declared that: "The empires of the future are the empires of the mind."

President Johnson has struck a similar note in calling for an International Decade of Ocean Exploration. As we learn more about the sea, we will earn more from its resources, mineral and otherwise. Working with other nations in this quest within a peaceful legal climate, the United States can maintain and broaden its present primacy as the world's most progressive Undersea Power.

In this way we can enhance our own economy, improve our relations with other countries, and add to the general welfare of mankind by releasing more of earth's sea-buried wealth.

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Every danger of a military character to which the United States is exposed can be best met outside her own territory—at sea.

Alfred Thayer Mahan, 1840-1914