

Beneath the Waves: The Science & Technology of Deep-Sea Mining

Statement of

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Before the

Subcommittee of Environment

Committee on Science, Space, and Technology

U.S. House of Representatives

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Dear members of the Committee on Science, Space and Technology. I want to thank you for inviting me to speak before your Subcommittee on the science and technology of deep-sea mining.

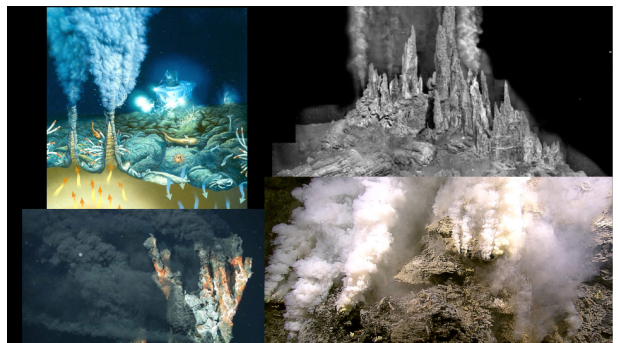
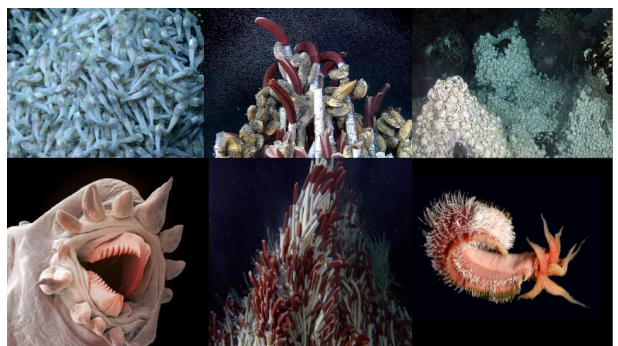
I participated in my first oceanographic cruise out of the Scripps Institution of Oceanography 67 years ago at the age of 17, and since that time, have participated, and in most cases, been the Chief Scientist of 169 expeditions around the world.

I received my Ph.D. in Marine Geology and Geophysics in 1975, focusing on the tectonic, volcanic, and hydrothermal processes of the Mid-Ocean Ridge, helping to confirm the Theory of Plate Tectonics, which now tells us where to find Earth's minerals resources on land and beneath the sea.

I was later Co-Chief Scientist in 1977 of the expedition that discovered the first hydrothermal vents in the Galapagos Rift and their unique chemosynthetic ecosystems which many believe is where complex life first originated on Earth.

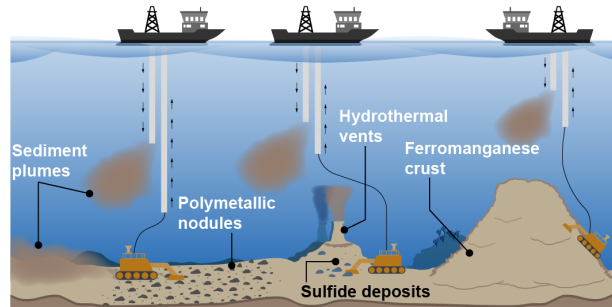
That was followed in 1979 when we discovered the first high temperature "Black Smokers" on the East Pacific Rise at 21 degrees N off the coast of Mexico.

This discovery explained, for the first time, the origin of polymetallic sulfide deposits containing mineral accumulations rich in gold, silver, zinc, and copper as



well as rare earth elements within that mountain range, and explaining for the first time where the minerals making up known manganese nodules and Mn-encrusted volcanic rock surfaces came from; which mining companies are now focusing their energy, and is the primary purpose of this hearing.

What is critical for all of you to know is that mining companies did not find these ore bodies in the deep sea, they were discovered by explorers.



Source: GAO analysis of peer reviewed journal articles. | GAO-22-105507

Equally, if not more important, we did not know they were there. We bumped into them while looking for something else!

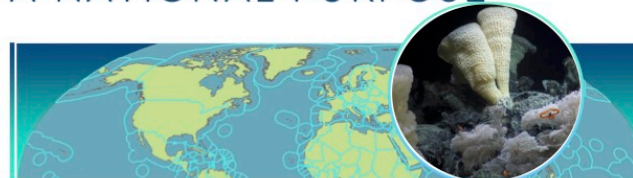
Fortunately, I and other explorers were able to convince both President Bill Clinton followed by President George W. Bush to create NOAA's Office of Ocean Exploration and to recommend the use of dedicated ships of exploration to explore what I like to call the New America since we have better maps of Mars and Venus than 52% of America that lies within our Exclusive Economic Zone.



This unexplored region of America is equal to five and a half Louisiana Purchases, which was acquired with the stroke of a pen.

Fortunately, our EEZ is now being mapped and explored by NOAA, especially through the support of Ocean Exploration Cooperative Institute, having been given the same orders President Thomas Jefferson gave Captain Meriwether Lewis and his Corps of Discovery: “The object of your mission is to explore ...for the purposes of commerce.”

A NATIONAL PURPOSE



The object of your mission is to explore...for the purposes of commerce...you will take observations of latitude and longitude at all remarkable points...Your observations are to be taken with great pains and accuracy to be entered distinctly, and intelligibly for others...Several copies of these as well as your other notes should be made and put into care of the most trustworthy of your attendants...Given under my hand at the City of Washington, this 20th day of June 1803.

— Signed Thomas Jefferson, President of the United States of America and delivered to Captain Meriwether Lewis and his Corps of Discovery

And historians will tell you that the acquisition of the Louisiana Purchase changed the economic engine of our Nation, making it the great nation it is today, and NOAA's second Lewis and Clark expedition now, underway, will lead to the new Marine Economy and change our economic engine once again.

It is critical again for you to understand that NOAA's ocean exploration program is making new discoveries since we go where no human has ever been in the unexplored regions of the New America. On one of those NOAA-sponsored expedition I was on, we bumped into new deposits of rare earths steaming down the slopes of some of the oldest ancient seamounts in America that had virtually no marine life living on its slopes, as well as on the encrusted volcanic terrain through which they are flowing at much shallower depths than where mining companies are focusing their efforts.



The next step that needs to be taken is to determine the size of these deposits and their rare earth elements content as a function of depth.

But again, we bumped it to them while looking for something else, that is what exploration is all about.

Once again, I want to thank you for inviting me to speak.