Scenes from a Treasure Hunt

Deep-sea Mining is a Highly Current Topic, but Its Roots Go Back More Than 100 Years

They lie in the depths of the oceans where no sunshine ever penetrates. Four or five kilometers below the surface, fist-sized lumps shaped like potatoes or blackberries litter the seabed. They grow by only a few millimeters in a million years, and they are regarded in some quarters as the salvation of the energy transition. That is because the valuable raw materials they contain could be used in electric cars or wind turbines. We are talking about manganese nodules.

Dr. Ole Sparenberg comments that the prospect of deep-sea mining to extract these nodules is often presented as a very new development even though "the topic has a long history that is often not considered." The environmental and economic historian from the Department of History at KIT wants to change this and has dedicated a book to the subject. The strange concretions were first discovered in 1873 when they filled the trawling nets of HMS Challenger during its first deep-sea oceanographic cruise. "They were exhibited in museums back then much in the way the moon rocks were later on," Sparenberg says. "They only began to be seen differently after the Korean War." Fears of raw materials shortages were especially prevalent during the 1960s and 1970s. The Western world's hunger for raw materials had risen sharply. More and more colonies that had previously been relied on as cheap sources of raw materials were breaking away from their former rulers. The industrialized world was alarmed by the prospect that this redistribution of political power might enable the states where mines were located to gain the kind of commodity power that the oil price shock in 1973 had already demonstrated. That brought the nodules on the seabed into focus as an alternative source of raw materials.

Manganese nodules: A raw material extraction zone or a habitat? (Photo: Ifremer, https://creativecommons.org/licenses/by/4.0*)*

"The formation of manganese nodules is very complex," Sparenberg says. "We know that metal ions precipitate out of seawater and cluster around a crystallization nucleus." The most diverse metals come together in this way. The nodules contain nickel, copper, cobalt, lithium, and rare earth elements as well as manganese. Polymetallic nodules is therefore a more appropriate name for them. But it has only partly prevailed (along with manganese nodules, ferromanganese nodules, and various other terms).

In the 1960s and 1970s, it seemed that it was surely only a matter of time before commercial exploitation of these concretions would commence. Some people regarded them as a virtually inexhaustible source of raw materials that simply needed to be picked up. The fact that many of them lie under 4,000 meters of water scarcely registered as a problem. On the eve of the moon landing, a spirit of optimism prevailed. "However, the whole thing turned out to be far more complex, technically challenging, and susceptible to glitches than anticipated and it was, above all, more expensive," Ole Sparenberg comments.

Polymetallic nodules, a topic of interest to German industry from as early as more than 50 years ago. (Photo: Ole Sparenberg)

"And it was also gradually becoming apparent that the feared raw materials shortages were not actually about to materialize in the short run." A pilot mining operation confirmed the feasibility of extraction in 1978, but after that the hype died down.

Today we have returned to the same point once more. The question of when commercial mining will start is being posed again. "The path that developments will take is still open," the environmental historian says. "But I can easily imagine things turning out as they did in the 1980s and the manganese nodules remaining on the ocean floor."

The reasons would be different now, however. A few decades ago, the bottom of the deep sea was thought of as a bleak and largely lifeless place, but today we know that it supports a diverse and sensitive ecosystem. Mining enterprises could not expect to tamper with this ecology and emerge unscathed. As the life cycles of organisms unfold extremely slowly in the darkness of the deep sea, any harm caused would be lasting. Ecological issues are therefore at the top of the agenda for opponents of deep-sea mining today. But its proponents also advance environmental arguments. They contend that the collateral damage caused by deep-sea mining is lower than that caused by conventional terrestrial mining operations.

"One of the most interesting findings I came across during my research is the fact that none of the parties see another failure as a desirable perspective for the future," Ole Sparenberg remarks. We can certainly learn from history here – even if the lesson turns out to be simply that more possibilities exist than we care to acknowledge. ■