

DEEP SEA EXPLORATION

(Discovering the Riches Beneath the Sea)

Steve Krar

Of all the transportation revolutions of this century, the one by which humans conquered the oceans' greatest depths got the least attention; it was done on shoestring budgets and with almost no thought of profit.

Early Sea Exploration

It was September 1932, and William Beebe was going down in the waters of Bermuda to a depth of 2,200 feet. A telephone line linked his tiny craft to the ship above. From there his voice would be broadcast to America by the National Broadcasting Company. Just as the ascent began Beebe saw two barracuda-shaped fish slowly swim past, each about six feet long, with large eyes and numerous luminescent teeth. A string of twenty bluish lights ran along their sides, and additional lights hung from long whiplike protrusions below them.

Beebe Meets Barton

Otis Barton, a wealthy engineer, met with Beebe, and Beebe's interest rose when he saw that Barton had brought detailed blueprints of a deep-sea craft he had designed and said he would use his money to pay for its construction. In early 1929, Barton had his sphere made that was cast out of steel and weighed five tons. Barton discovered this was too heavy and had a lighter one made that weighed two and a half tons. It would carry both Barton and Beebe and named it a *Bathysphere*.

The bathysphere had oxygen tanks and trays filled with chemicals that would absorb moisture and carbon dioxide. It also had three portholes made of three-inch-thick fused quartz, with a searchlight rigged to shine out through one of them. All this heavy construction was necessary for the pressures at depth would approach 100 atmospheres.

Beebe and Barton reached 1,426 feet during the summer of 1930. Two years later, in the descent broadcast by NBC, they reached 2,200 feet. In 1933, the National Geographic Society agreed to sponsor a new series of dives. The bathysphere was refurbished, with new portholes, telephone equipment, and oxygen system. In August 1934 Beebe and Barton reached a record depth of 3,028 feet; they might have gone deeper, but the supporting cable was about to run out.

World War II

After World War II, Barton built a new bathysphere called the benthoscope and reached a depth of 4,500 feet off California in 1948. Its replacement was in the form of a fully independent

deep-diving craft that could maneuver in depths without having to dangle at the end of a cable. This was the work of a Swiss physicist, Auguste Piccard, and not only would it go eight times as deep as Barton's bathyscope but would open the sea to routine research operations. Fifteen months later Piccard reached 55,563 feet, and had shown the way to the stratosphere and that others would follow his lead.

Piccard's Bathyscape

Piccard had been thinking about applying concepts from aeronautics to build a radically new type of deep-sea craft, one that would amount to an undersea dirigible. Piccard christened his vision the bathyscaphe, from the Greek for "deep boat" which had many advantages over the bathysphere. The bathyscaphe would ride at its ease in the waveless depths, permitting longer and deeper descents, with comfort.

In 1948 the bathyscaphe was ready, Piccard named it *FNRS 2*. An early mission for *FNRS 2* was to descend unmanned to 4,600 feet, where an automatic timer would release the ballast. Half an hour later *FNRS 2* came bobbing back to the surface, with an on-board depth gauge showing a successful descent to 4,500 feet.

Early in 1952, Piccard was asked to direct the construction of the *FNRS 3* in Trieste, Italy for which the craft was named. In September 1953, Piccard took *Trieste* 10,392 feet to the bottom of the Mediterranean off Naples. *FNRS 3* reached a depth record of 13,287 feet off Dakar in 1954.

American Interest

In 1955, Jacques (Piccard's son) appeared on television in London, where he met Robert Dietz, a civilian oceanographer with the U.S. Office of Naval Research (ONR). Dietz joined him and marveled at this "privately owned submersible of radical design" built in an era when "submarines should be built by government agencies." He invited Jacques to Washington, where he gave a paper on bathyscaphes to a meeting of more than a hundred oceanographers. Early in 1957 the ONR arranged to charter *Trieste* for more than two dozen dives, reaching as deep as 10,500 feet and the Navy was so pleased with the results that in 1958 bought *Trieste* and shipped it to San Diego.

Mariana Trench

Trieste made a number of dives into the mile-deep waters off Southern California. However ONR officials were looking ahead to a descent to the deepest part of the ocean: the

Challenger Deep, 35,800 feet down in the Mariana Trench. In January 1950, it reached the bottom of the Marianna Trench and found the bottom a powdery grayness.

Deep Sea Vessels of the Future

Yet the future would not belong to bathyscaphes such *Trieste*, the successors were deep-diving submarines, most successful of which was *Alvin*, built in 1964. This craft featured the traditional thick-walled sphere, first of stainless steel and later of titanium.

From Beebe's bathysphere to *Alvin*, deep-sea technology had developed almost entirely in response to human curiosity and to the lure of exploring a new frontier, with no monetary profit motive.