

The Submarine "*Explorer*"

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The submarine "Explorer" on the beach at San Telmo

The submarine "*Explorer*" is a submersible built by Julius H. Kroehl and Ariel Patterson in Brooklyn, New York for the Pacific Pearl Company in Panama. The keel was laid down in 1863, was completed in 1865 and placed in service in 1866. In 1869, the submarine was abandoned in the Pearl Islands Archipelago, where it had been working, and its hull still rests there.

Construction

The "*Explorer*" is 39.4 feet long, 12 feet high and has a beam of 11 feet. The bottom of the craft bottom is perfectly flat and has two hatches 4-1/2 feet wide by 6 feet long for harvesting operations. It had a displacement of 80 tons and carried a complement of 3 to 6 men. The submarine was hand powered, had a single propeller and could achieve a maximum speed of 4 knots.

The design of the craft included a large volume external high pressure air chamber (200 PSI) as well as water ballast tanks. The water ballast was used to submerge while the pressure air pressurized the crew's compartment to the pressure of the water at working depths of up to 103 feet allowing them to open the hatches on the floor and giving them access to the oyster on the ocean floor. This air pressure was also used to empty the ballast tanks when the vessel was ready to surface.

The Harvesting Operation

As the submarine approached the bottom, the hatches were opened for the purpose of gathering the oysters. The water was kept out of the vessel by the pressured air contained in the chambers. As the sub rested on the bottom, the oysters were collected by the crew and stowed away. They moved around the ocean floor by means of the 3-foot diameter propeller cranked by hand.

Diving Fever

The problem of decompression was still not clearly understood in 1869 and again and again, the reports after a dive or two would report, "all the men were again down with fever." A contemporary (August 1869) newspaper account of dives in the Pearl Islands documents 11 days of diving to 103 feet, spending 4 hours per dive, and ascending with a quick release of the pressure to ambient (sea level) pressure. Modern reconstruction of "*Explorer's*" system suggests an ascension rate of 1 foot per second which would have brought the men to the surface in less than two minutes. The result was decompression sickness. Using present day U.S. Navy diving standards, a two-hour dive (half of the documented time spent by the men in "*Explorer*") at a depth of 103 feet would require a surfacing schedule of one hour, 32 minutes and 40 seconds with staged stops at 30 feet, 20 feet and 10 feet. As it was, in 1869 the men were all sick from their fast ascents with the submarine operations grinding to a halt.



History Of "*Explorer*"

After construction, the submarine "*Explorer*" was partially disassembled and shipped to the Panama Pacific side of the Isthmus in December 1866. There, in the Gulf of Panama, laid the Pearl Island Archipelago with its rich pearl bearing oyster beds. Since the early days of the Spaniards, men had been diving for the treasure without the aid of any breathing apparatus. But, since the advent of a somewhat practical submarine design during the American Civil War, The Pacific Pearl Company thought the submarine was the answer to the mass harvesting of pearls.

Once in Panama City, the submarine was assembled and one of its builders, Julius Kroehl, carried out experimental dives in the Bay of Panama (not to be confused with the Gulf of Panama). These dives cost him his life as he contracted the "diving fever" and died in September 1867. The submarine languished on the beach until 1869, when a new engineer and crew took it to the Pearl Islands to harvest oyster shells and pearls. The 1869 dives to depths and profiles that would inevitably lead to decompression sickness, resulted in the entire crew succumbing to the "fever". Because of this, the craft was laid up in a cove on the shores of the island of San Telmo in the Pearl Islands and remains there to this day.



LEFT: Archeologist making notes on condition of "Explorer". RIGHT: "Explorer" in the cove on San Telmo Island at high tide.

The submarine's rusting hull was well-known to the locals, but they had presumed it to be a remnant of World War II. In 2001 the remains of the submarine piqued the interest of archaeologist James P. Delgado of the Institute of Nautical Archaeology. Since then, many studies of the wreck have been carried out and a 2007 report summarized preservation options of the vessel for the Panamanian government and recommended the recovery, preservation and public display of the raft in Panama. Metal analysis confirms the craft is in critical stage and faces irreversible deterioration and loss.

SOURCES

Photos and Material

1. *"Sub Marine Explorer"*, Wikipedia.
2. *"Misadventures of a Civil War Submarine"*, by James P. Delgado, 2012.
3. *The Wait Institute*.
4. *The Hunley Store*.
5. *Institute of National Archaeology*.