Chapter 4



Ed and Marion Link

Ed Link: Man-In-Sea

They that go down to the sea in ships,
That do business in great waters,
These see the works of the Lord
And his wonders in the deep.

— Psalms

In 1974 I was on Catalina Island, aboard the ship *Swan* and watching the filming of the ABC television movie, *Trapped Beneath the Sea.* Lee J. Cobb, playing the part of diving pioneer Ed Link, was watching two divers being lowered on a commercial diving platform from the side of the ship. The divers, Bob Meek and Jock Menzies, were playing the parts of Navy rescuers attempting to free Link's submarine, the *Johnson-Sea-Link,* which had become trapped on the sea bottom at 350 feet. Inside the submarine were four other divers, and one of them was Link's son, Clay. Time was running out for the trapped men.

The Hollywood movie was a re-creation of a real-life tragedy that occurred on June 17, 1973. In the actual incident, Navy rescuers had failed to act quickly enough, and Clay Link and Al Stover had died in the back of the submarine. In that real-life version, Meek and Menzies had been the pilots of the *Johnson-Sea-Link.*

As I watched these two play the part of the Navy divers, I found it an extreme irony that the survivors of the tragedy now played the part of those who had failed to rescue their friends. That two men lived while two men died was a result of circumstances I had known well because I'd written a detailed account of the accident for *Skin Diver Magazine.*

I was chagrined to see that the Hollywood version of the disaster had included unrealistic romance and unnecessary drama. The submariners

dramatized their fears of going into the deep as if they were doomed Jonahs sinking into the mouth of a bottomless whale. Their girlfriends emoted theatrically about relationships and danger. The script missed the deep and subtle drama of Ed Link's struggle—his life work at odds with the loss of his own flesh and blood. Even so, I was momentarily overwhelmed by the adventurous world of filmmaking, where the treasure is not gold, pieces of eight or Spanish galleons, but a mere seed of an idea that blooms into cinematic splendor.

The life and character of Ed Link needed no cinematic embellishment, however; the real thing was drama enough. Link was the originator of Man-in-Sea, a revolutionary underwater program that allowed divers to stay and work in the ocean for extended periods of time.

In the early 1950s, divers were limited to staying only a few short minutes underwater at a depth of 300 feet. Keller's dive in 1962 was the first attempt to put man on the ocean floor at 1,000 feet; but Keller and his companion, Peter Small, could stay no more than a few minutes at that depth. Ed Link was determined to find a way for divers to remain submerged.

The incentive came from the oil industry, because offshore oil platforms needed to reach into deeper water where new sources of oil were being discovered. Offshore platforms require human hands to work on the structures at depth for an extended time. The problem was in finding a way to prevent deep-sea workers from experiencing either nitrogen narcosis or the dreaded bends during the undersea work.

At depths below 130 feet, nitrogen in pressurized air causes a drunken feeling which usually renders any deep underwater work largely ineffective. At 300 feet a diver can easily lose consciousness completely.

In coming back to the surface, nitrogen, dissolved in the bloodstream during a dive, can turn into bubbles, much like the bubbles that are released when a bottle of champagne is uncorked. A bubble lodged anywhere in the body can cause the "bends", a painful and sometimes fatal paralysis. To allow the nitrogen to work itself out of the bloodstream, a diver must stop for a time at various depths in a programmed ascent called decompression.

Eventually it was discovered that divers could surface quickly, then enter a decompression chamber aboard ship where the pressure within is comparable to that of the diver's deepest descent. Then, the pressure inside the chamber is slowly brought back to normal again.

However, in the early 1950s, decompression techniques were not perfected. No one knew how long a diver could stay underwater without harm to himself. Hannes Keller had tried breathing different air mixtures to replace the nitrogen during his rapid descent and ascent, but these gas combinations proved nothing



Photo by Hillary Hauser

Two divers being lowered into the ocean off Catalina.

about prolonged diving time. It was still believed that if a diver stayed underwater at length, his decompression time could be days, or weeks.

Then, in 1957, U.S. Navy Captain George Bond discovered a physiological phenomenon that solved the problem. He found that after a time, the inert gases of the diver's air supply completely saturate the body tissues. After a while, the tissues cannot absorb any more inert gas, no matter how long the diver stays underwater. When the saturation point is reached, decompression takes the same amount of time, whether the diver has been down for two days or a month. Testing his theory at a U.S. Navy laboratory, Bond discovered that the total saturation time is 24 hours. Bond's discovery paved the way for Ed Link to take the theory and prove it.

In 1962 Link put diver Robert Stenuit in an aluminum diving chamber and lowered him 200 feet into the Mediterranean Sea. He stayed down 24 hours, proving that man could survive longer periods at depth underwater.

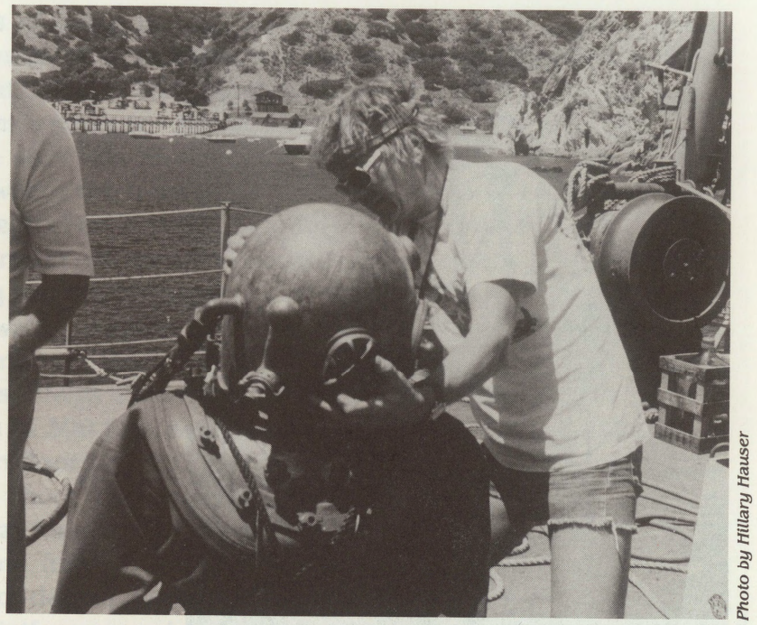


Photo by Hillary Hauser

Director Billy Graham helps diver Jock Menzies with his hard hat. (right).

Director Billy Graham conferring with producer Frank Capra, Jr. on the set of "Trapped Beneath the Sea." (opposite)

The saturation dive ushered in the era of Link's Man-in-Sea programs. Although others—including Jacques Cousteau and the U.S. Navy—were conducting similar experiments, Link persisted where the others held back. He launched SPID (Submersible, Portable, Inflatable Dwelling) in 1964. It was the forerunner of all underwater habitats. Robert Stenuit and Jon Lindbergh stayed in SPID for two days and nights at a depth of 432 feet. This was the longest and deepest dive man had ever made.

In addition, Link designed a special sea lift hydraulic crane, which led to the development of the first small diver lockout submarine.

In a lockout system, a diver enters a separate chamber in a sub, which is pressurized to the depth outside. Then the hatch is opened and the diver swims out. Later, he can reenter the chamber and be brought slowly back to surface pressure. With Link's hydrocrane, the entire submersible could be hauled aboard the surface ship before the diver reached surface pressure. Then the diver continued to decompress while the others exited the chamber.

Deep Diver was launched in 1967. With this the era of Man-in-Sea entered full swing. *Deep Diver* was entirely self contained and capable of reaching depths of 1,200 feet. When two divers locked out of this mini-submarine at 700 feet, it was a landmark in oceanographic exploration. But Ed Link was not through yet.



Photo by Hillary Hauser

With Seward Johnson he established the Harbor Branch Foundation, a marine science center backed by the Smithsonian Institution and based in Florida. Here he constructed through assistance, the *Johnson-Sea-Link*, a small submersible he nicknamed the "Bubble Sub." The *Johnson-Sea-Link* featured a transparent, acrylic, spherical chamber forward for unobstructed observation. An aluminum alloy compartment aft contained a hatch for lockout diving operations. Capable of diving to 1,000 feet, the *Johnson-Sea-Link* was considered Ed Link's crowning achievement.

For Link, the untried, uncharted path had been continually validated by sweet success. When a man tries something completely new, such validation is important, for by the successes he maps his course. But success itself is hard-earned. Sometimes the price is paid afterward in the form of unforeseen sacrifice.

Link's sacrifice was his son.

On June 17, 1973, in a project sponsored by the Smithsonian Institution, the *Sea-Link* made a dive to the scuttled destroyer *Fred T. Berry,* 20 miles off Key West. Aboard the *Sea-Link* were Clay Link, Ed Link's son, who was supervisor of Life Support Systems at Harbor Branch; Al Stover, an expert submariner; Jock Menzies, an ex-commercial diver and pilot of the sub; and Bob Meek, an ichthyologist and scientist working at Harbor Branch. Clay Link and Al Stover were stationed in the rear lockout compartment, while Meek and Menzies piloted the

sub from the acrylic sphere in front. The two compartments were separate, with no passageway between.

At 351 feet, while trying to pick up a fish trap, the *Johnson-Sea-Link* became tangled in a cable from the *Berry*. The U.S. Coast Guard learned of the trouble and flashed a message to the Chief of Naval Operations in Washington: "Submiss/ Subsink"—an official distress call that signalled the beginning of a tragic 36-hour ordeal.

The Navy sent its submarine rescue ship *Tringa,* which arrived by 4 p.m., about six hours after the first call for help. By 8 p.m., it had set up its four-point mooring, only to find itself 50 feet off position. The ship moved and re-anchored. By 11 p.m., they were in place.

Because there was no diving bell aboard the *Tringa,* the Navy dispatched its "Roving Diving Bell" from San Diego. However, by 3 a.m. the next morning, the divers had gotten within ten feet of the sub, only to report that they could see the *Sea-Link,* but do no more. The diving bell arrived and went down at 9:20 a.m., but the swift ocean current prevented proper placement of the bell. A second attempt was made at 1 p.m., but the bell reached a depth of only 300 feet, snagging on the *Berry* itself.

Meanwhile, inside the *Sea-Link,* the trapped divers tried to encourage each other via the communication system between the chambers. Meek and Menzies fared better in their front compartment than Stover and Link because they were insulated by their acrylic sphere. The aft compartment, constructed of highly conductive aluminum, grew cold and the cold proved fatal.

In an enclosed chamber, divers cannot rebreathe their own air, because of carbon dioxide poisoning which leads to blackout. However, baralyme, a powdery substance that scrubs carbon dioxide from the air, can be used, but it loses its effectiveness below 70°. The temperature in the back compartment was considerably lower than that. Later reports revealed that Stover and Link spread the baralyme over their bodies, hoping that their body temperatures would keep the baralyme warm enough to continue scrubbing carbon dioxide from the air.

Around 1 p.m., after the second rescue dive had failed, Meek and Menzies started to use the air from the emergency breathing system on the sub. By this time, Stover and Link had lost consciousness. A later report said that Stover, an expert submariner, understood that he and Link were not going to make it and turned off their air supply to give Meek and Menzies a better chance of surviving.

Joe MacInnis, a doctor of undersea medicine who had worked with Link in his early diving experiments with Stenuit and Lindbergh, flew down from Canada to keep watch with his mentor aboard the *Tringa.*

Finally, the commercial salvage vessel *A. B. Wood* sent down a Naval Ordnance Lab Sled to the site. The sled was equipped with television monitors

and sonar, which located the trapped sub and guided a hook from the *Wood* to it. The *Wood* grabbed the *Johnson-Sea-Link* and hauled it to the surface.

When the hatches were opened, the rescuers saw that Link and Stover were dead.

The accident was an awful setback to the ocean fraternity, which watched the news, stunned. However, Link, in the deep of his darkest hour, said: "We've got to try harder."

To prevent such a tragedy from occurring again, Link and the Harbor Branch Foundation began building a rescue system to ensure that divers would never have to rely on other institutions for rescue. "This can make our future operations safer, as well as more helpful to others," he wrote, "as we all agree that we must learn to live with the oceans for our future developments."

He knew that the element of chance extends to every attempt to do something new and different. The price he paid for his knowledge was dear—the chance had taken the life of his son—but he forced himself to look forward, to improve the situation that had exacted his awful sacrifice.

Notes

1. Personal correspondence to Hillary Hauser, November 6, 1973.

Suggested Reading

Marion Clayton Link, *Windows in the Sea* (Smithsonian Institution Press: City of Washington, 1973).
Nicholas B. Zinkowski, *Commercial Oil-Field Diving* (Cornell Maritime Press, Inc.: Cambridge, Maryland, 1971).