

wreckage probably would prove so little?

First, we felt an obligation to confirm, as much as possible, our reconstruction of the tragedy and learn whether anything could be added to our conclusions. Secondly, the Navy believed it was time to develop deep-sea search techniques for future emergencies. Someday we might be called on to find and study for research purposes a missile or spacecraft lost at sea. Right now a nuclear reactor from *Thresher* lay at the bottom of the sea. It was not contaminating the water with radioactivity, but scientists wanted to know what effects the sea was having on it.

When I arrived at Woods Hole, a series of photographs from the *Atlantis II* camera was on display. They didn't create the feeling of unqualified success. I made out a couple of sea urchins—and unidentifiable foreign material.

"But remember," Molloy said, "we spotted this material not far from where *Skylark* saw an oil patch after the last message."

TRUE—but, nevertheless, the Navy had to label the findings "inconclusive." We went back to work, although this time we did narrow our search to a 2-by-2-mile square area in Delta. At least we knew that beneath it was something that nature had not put there.

Now the sciences of precise navigation, electronics, and oceanography went on attack—abetted immensely by luck. On May 28, *Conrad*, a research ship of the Lamont Geological Laboratories, began deep dredging and dragged up a packet of 15 enveloped "O" rings. These are gaskets used on pipes carrying fluids under high pressure, such as those on *Thresher*. Our hopes had never been higher, and we sent the rings to the court of inquiry at Portsmouth, N. H.

The preliminary report came back: "Yes, they could have come from *Thresher*. Also from any large airplane, aircraft carrier, or similar craft."

The strike, however, inspired Fritz Hess on the *Atlantis II*. He fashioned a do-it-yourself dredge of coat hangers and wire that looked something like a kitchen dish-drying basket. He pulled up rocks, sea life, and some derisive comments. Then one day he appeared in my cabin and put two corroded plates on my desk.

"You've dredged up something from power batteries all right," I said. "Could be from an automobile, though." Hess thought otherwise, however, so I put them in a box and sent them to Portsmouth. This time the report came back: "The battery plates appear identical with those of the *Thresher's*—the grids, chemicals, electrodes."

Now we were ready for *Trieste*! Or were we? Some experts felt so. I didn't. Dredging had come up with light debris, but the hull itself might be hundreds of yards away. We needed a more confined target area before sending down the *Trieste*, a craft never before used in this type of work and capable of covering only a small area of ocean floor—about one knot in three or four hours. Discussions converted neither side, so we decided to take our individual arguments to Washington for a decision.

On May 30, I received a phone call in Washington from my Annapolis classmate—and opponent in the following morning's debate—Capt. C. B. Bishop. He told me he had just received a

report by radio-telephone. "*Conrad* has photographed the actual hull!" he informed me.

We immediately released the news to the press, and when I flew north the next morning the headlines blared: "THRESHER FOUND!" It was a great day until I saw Dr. J. L. Worzel, chief scientist on *Conrad*, come down the gangplank that afternoon. His face was gray.

"Why did you tell the papers?" he asked.

"You had photographed the hulk," I reminded him. "It was positive identification."

"We photographed something all right," Worzel replied. "We accidentally photographed our own camera equipment!"

During World War II, I got a few medals for combat experience, but the experience of a press conference June 1 seemed as tough an action as I'd ever faced. We had made mistakes—not only in photography but in releasing the information without thorough checking. We had to admit the error. The press was kind; we appreciated it.

Worzel did more. While the *Trieste* debate resumed, he went doggedly back to work. During every available hour, *Conrad* photographed in "Delta" area. On June 14 Worzel vindicated us all.

Conrad's camera clearly photographed an oxy-



A clue to the lost sub's location was this oxygen bottle photographed by a submerged camera.

gen bottle used on subs, a sonar hydrophone similar to that used in submarine construction, and a chunk of metal plate covered with insulation. We had no doubt now that we were closing in on the *Thresher* and could send down the *Trieste*.

Lieut. Comdr. Donald Keach is in charge of the *Trieste*, and he began the first of two series of dives in late June. They were not particularly conclusive because of monumental navigation problems. Remember, we were 220 miles from the nearest land, trying to pinpoint a two-mile-square area with sonar beams. And while we would lower the *Trieste* at one specific point, we had no idea how far it might drift in subsurface currents. Once on the ocean floor, with limited visibility, Keach faced another problem: in which direction did he inch along? Was he headed for *Thresher* or away from it?

The bathyscaph could not locate the wreckage we had photographed, although Keach did see light debris on his first dives. One encounter was particularly poignant. Looking through the thick survey window, Keach spied something yellow on the smooth sand surface: the lettering—"SSN." It was a bootie—a nylon shoe-covering which sailors use for protection when working in the radiation compartment. "SSN-593" was *Thresher's* designation, but the numbers apparently were on the underside of the bootie.

Trieste completed five dives before power trou-

ble caused us to return it to Boston for repairs. We realized time was running out for us when Keach began his second series of dives Aug. 23. Soon autumn storms, including hurricanes, would be whipping up the East Coast. But we had a couple of weeks—and we were so close.

Keach went down this time with a piece of equipment he had never used before, a mechanical arm with which he hoped to pick up debris. Big pieces would be too heavy to lift at that depth, but some pipe or plate might be salvaged.

The first dives discovered little, but on Aug. 28 Keach headed along a south line, and our frustrations turned to high hopes. "It looks like I'm going through an automobile junk yard," Keach reported. "There's everything down here—heavy stuff, too." With the mechanical arm, Keach latched onto a hunk of pipe and brought it up.

When we developed Keach's pictures, we knew five months' work was about to pay off. We stood looking at photos of an internal watertight hatch, large strips of rockwool insulation, and a large fragment with numbers, "4 . . . 3 . . . 0," the *Thresher's* bow waterline markers.

How close had we come? Eighty yards, 150 yards? I was sure *Thresher's* hulk was within that radius. Keach would have to strike out in various directions from his "junk yard," but one certainly would be the payoff.

We had almost forgotten the pipe. I put it in a glass display case in the ship's store: the men had worked tirelessly on this expedition, and I wanted them to see some tangible result. At night we sent it to the radio shack and that seemed to be that—except for a young sailor with sharp eyes who scrutinized the corroded pipe.

"COMMODORE," I was told the next morning. "A sailor claims there's lettering on that pipe." Hundreds of pairs of eyes had missed it, yet some shipyard worker had used a drill to etch identifying marks, including "593 Boat."

On Aug. 29 Keach dove for the ninth time and headed south. The trail petered out. We were getting more anxious: we had come so far in what had seemed at times an impossible assignment. Now we worried about weather—and the *Trieste*. Its power was erratic again, and it had sprung a minor leak. With all this in mind, we sent Keach down Sept. 1. There was little doubt now that Keach was closing in on *Thresher*. Then, just as he was so close, *Trieste's* power failed again.

We knew now that the search for the *Thresher* had ended. The *Trieste* would have to be completely overhauled and that would take months. When we headed for Boston Sept. 3, I suppose we had mixed feelings. Against needle-in-haystack odds, we had come within yards of success; in a matter of days we would have found *Thresher's* compartments. With the disappointment was a compensation, though.

This spring we expect to be back out there with all our hard-won knowledge—and more. We will improve our equipment this winter and then, within a few months, return to the previously unexplored depths of the *Thresher* area.

So winter for us is a time to wait, work, and anticipate calmer seas. It probably will not be long before we again will be over the area, working on an integral part of the Navy's research and development program.