

# TITANIC

## Epilogue for

By ROBERT D. BALLARD

WOODS HOLE OCEANOGRAPHIC INSTITUTION



LIKE SOME ghostly Flying Dutchman, R.M.S. *Titanic* (above) seems forever to steam across the ocean floor in this dramatic painting by Ken Marschall. Lost in the North Atlantic after collision with an iceberg on April 14, 1912, the fabled luxury liner sank in 13,000 feet of water with a loss of more than 1,500 lives.

Here in abyssal darkness the ship's rust-streaked bow

stands silhouetted by a halo of artificial light from our manned submersible, *Alvin*. The sub's tethered robot, the "swimming eyeball" *Jason Jr.*, trains its floodlights and video camera on the ship's massive starboard anchor.

We found *Titanic* in the summer of 1985 and explored her more thoroughly the following year.\*

In all we took more than 70,000 still photographs of the

ocean floor that included the parted bow and stern sections with our towed camera sled, dubbed ANGUS. The artist studied the photographs to produce the accompanying illustrations. Later 108 images were painstakingly assembled over many months to create the startling mosaic at right.

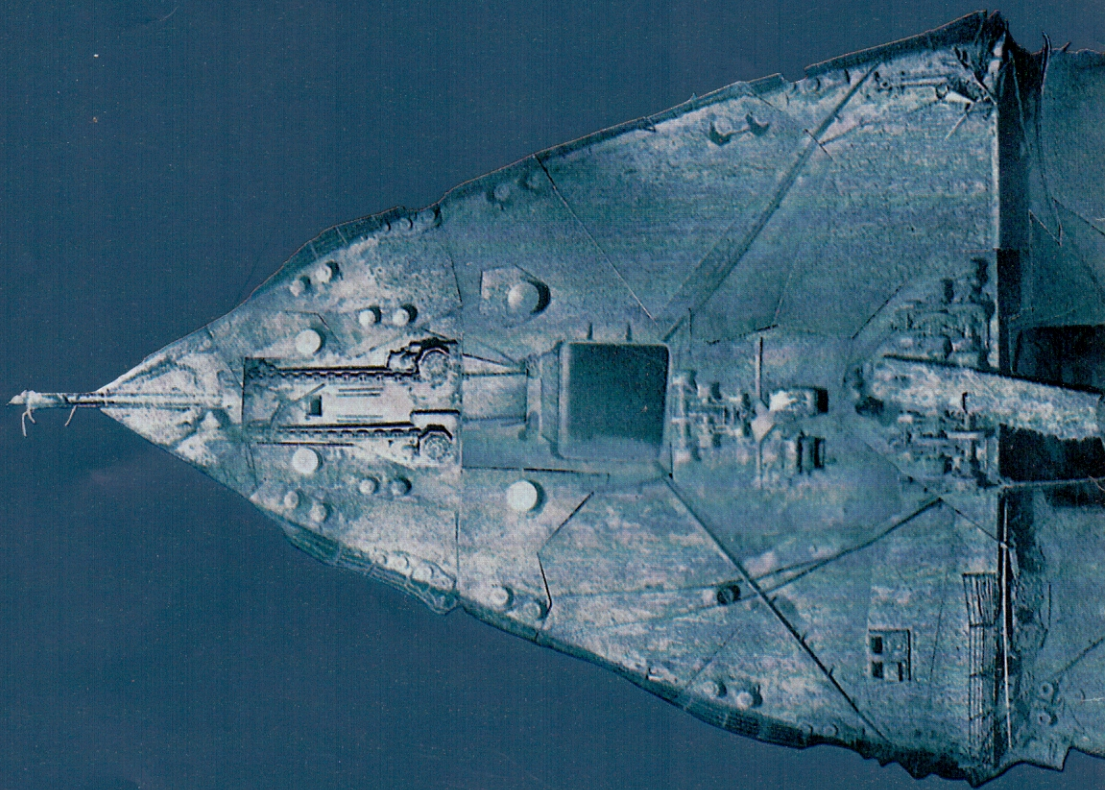
Taking those pictures was like playing a vast three-dimensional game of Pac-Man blindfolded. ANGUS, tied by cable to our research ship, was trolled back and forth night after night just above *Titanic*. The sled's three still cameras operated continuously, but no video cameras helped the operators on the surface guide it through what we feared would be an unseen maze of rigging, masts, and debris.

The mosaic was produced by NATIONAL GEOGRAPHIC in collaboration with Madison Press Books. Technician John Porteous at Woods Hole Oceanographic Institution made an initial selection of images. Graphics specialists Serge Martinot and Leo Chapman of Dodge Color, Inc., in Washington, D. C., matched the final selections precisely, with adjustments for angle, perspective, and even variations in depth. In one case where ANGUS missed a section, a video frame was substituted. Only two small pieces (dashed lines) are missing.

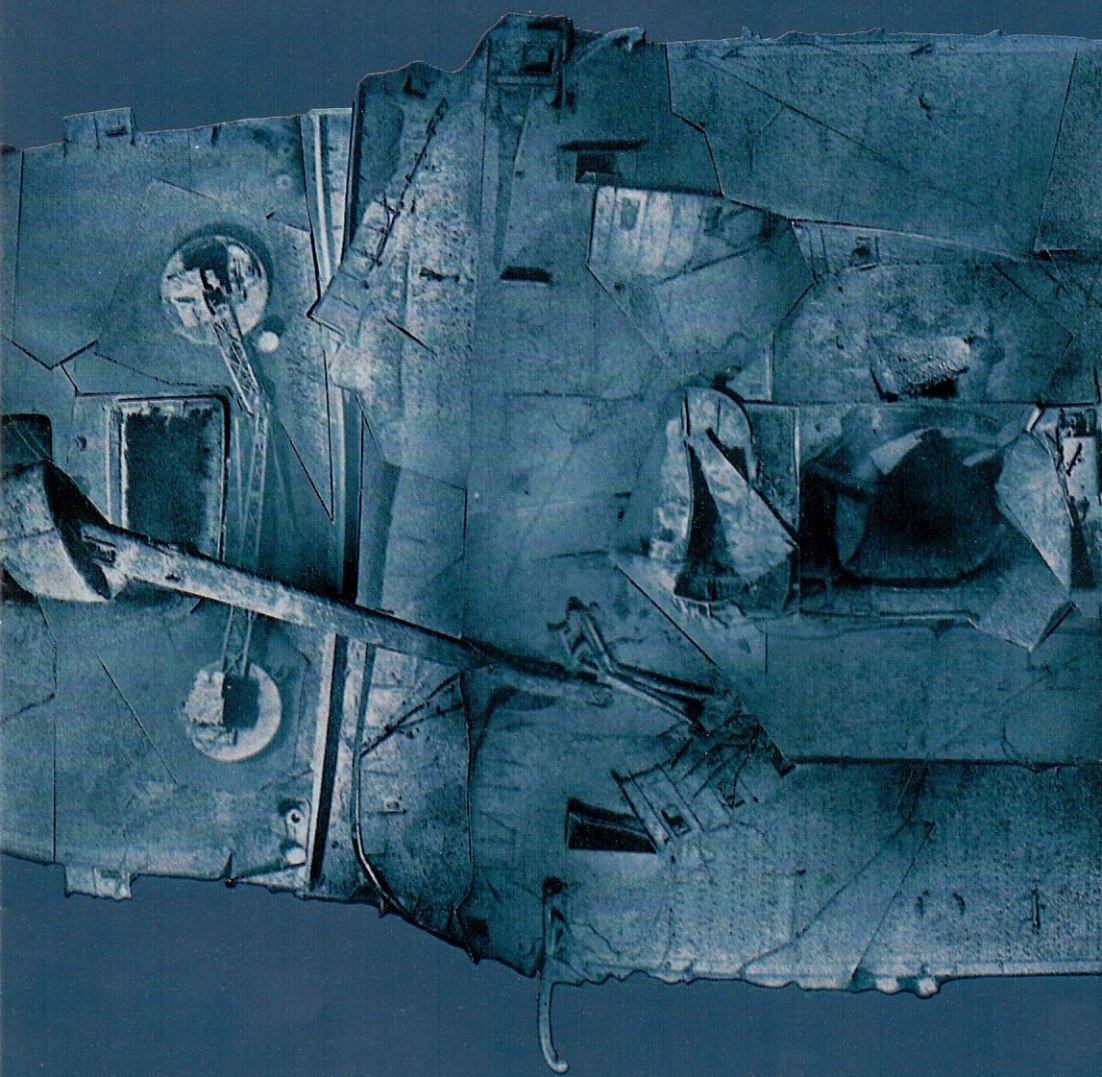
\*See NATIONAL GEOGRAPHIC, December 1985 and December 1986.



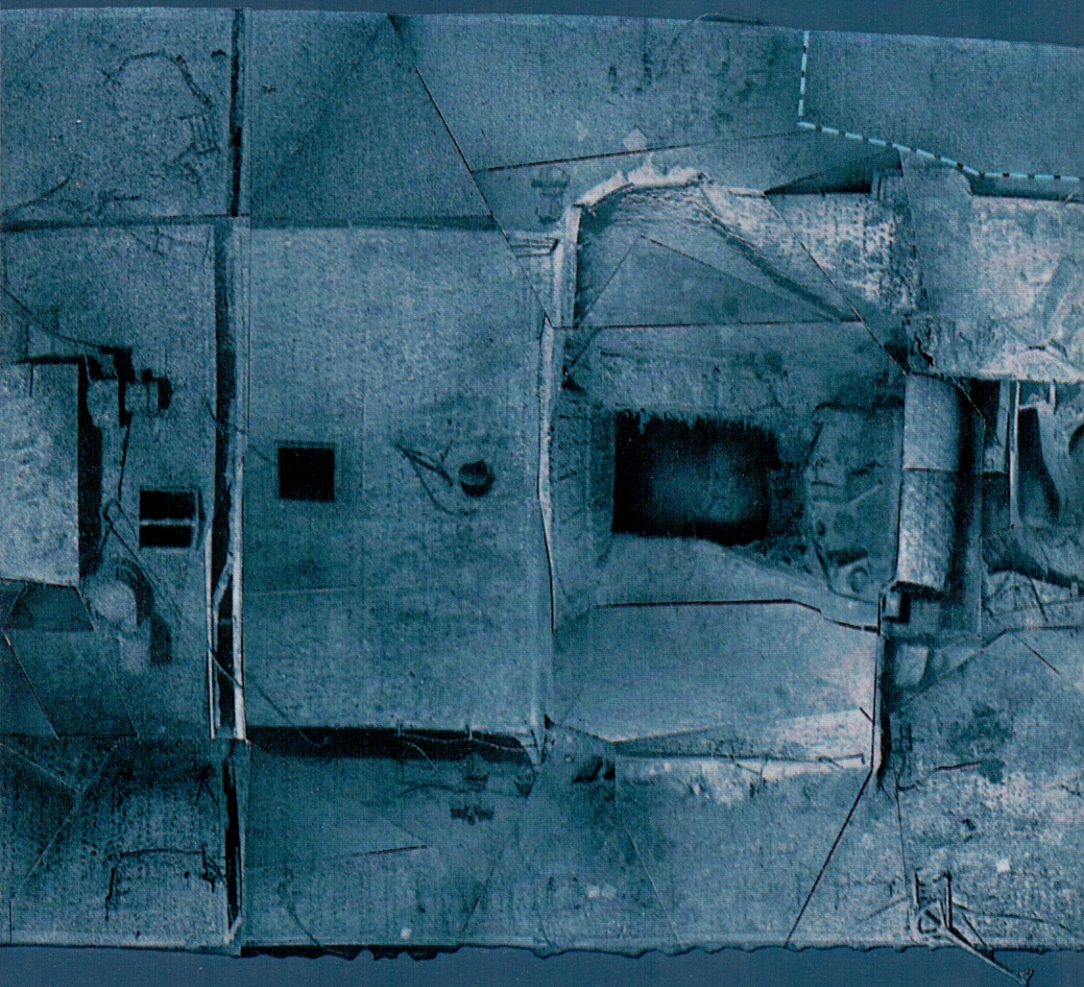
Mosaic of a lost giant combines  
108 separate photographs in a historic  
portrait—the first complete view of *Titanic*'s  
450-foot shattered forward section.







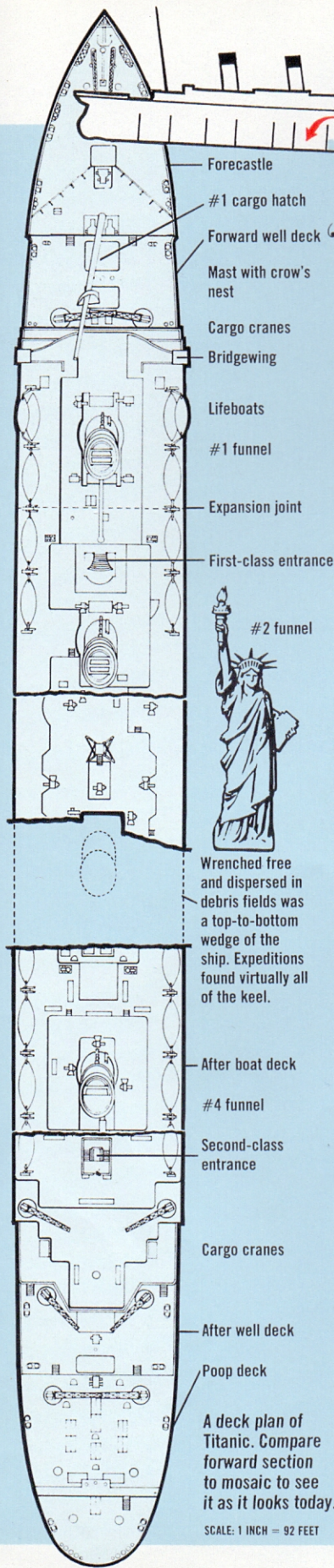












SCALE: 1 INCH = 92 FEET

# How the "unsinkable" ship sank

NEARLY SIX TIMES as long as the Statue of Liberty is high, *Titanic* was designed so that damage to any two of her "watertight" compartments could be contained. In one of the 20th century's first major lessons on the limits of faith in technology, the ship proved tragically inadequate when it collided with reality.

Controversy has swirled about *Titanic's* sinking. Many experts had thought that the ship went down in one piece, a belief ruled out by our 1985 and 1986 expeditions. We found the bow and stern more than 600 yards apart. Based on our dives last year and bolstered by a rereading of survivors' accounts, I believe this is what happened:

Water entered six forward compartments after the ship struck the iceberg. As the liner nosed down, water flooded compartments one after another (1), and the ship's stern rose ever higher out of the water, until the stress amidships was more than she could bear. She broke apart just forward of the third funnel, in a tear angling toward the stern (2). The bow portion began to sink.

With the bow gone, the stern—still afloat and undamaged except for the break—temporarily settled back to a nearly level position. But it was too late; the stern rapidly

flooded and rose out of the water, pivoting on the surface. The stern held that vertical position for about a minute (3) and then slowly slipped beneath the surface. Recalled a survivor who watched from a lifeboat: "She turned her deck away from us, as though to hide from our sight the awful spectacle."

The bow section sank gently, maple-leaving down and forward. The stern, on the other hand, may have leveled off somewhat and rotated slowly as it sank (4), wracked by changes in hydrostatic pressure and by water rushing in and over it. Falling along with the stern were immense boilers, safes, and other heavy





debris that ended up near it on the ocean floor.

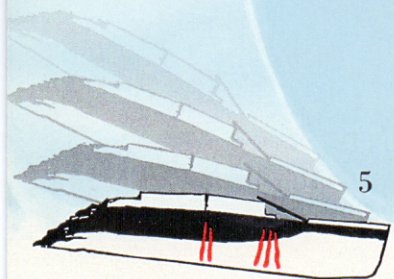
Upon reaching the bottom, the bow (5) plowed into the mud, knifing its way in at a shallow angle. The stern's impact was more traumatic; when it hit bottom (6), it buried itself some 45 to 50 feet, over its propellers, crumpling the steel plating on the hull. In short, the bow landed, the stern crashed.

More than two and a half hours elapsed between the time *Titanic* hit the iceberg and the moment she vanished. Those among her passengers and crew members who could not make it into lifeboats had time to move aft as the bow sank. When the stern went down, most on board fell to the water. John B. Thayer, Jr., who survived, said their cries swelled into "one long continuous wailing chant. . .

like locusts on a mid-summer night in the woods in Pennsylvania." It lasted 20 or 30 minutes before finally dying away.

Dr. Robert D. Ballard's new book, *The Discovery of the TITANIC*, produced by Madison Press Books, is available this fall from Warner Books in the United States, Viking-Penguin in Canada, and Hodder & Stoughton in Great Britain. The paintings by Ken Marschall in this article and the photograph on page 463 are from the book.

PLAN VIEW OF TITANIC BY RICHARD SCHLECHT.  
DIAGRAM BY WILLIAM H. BOND, NATIONAL GEOGRAPHIC  
ARTIST, BASED ON A RENDERING © KEN MARSCHALL



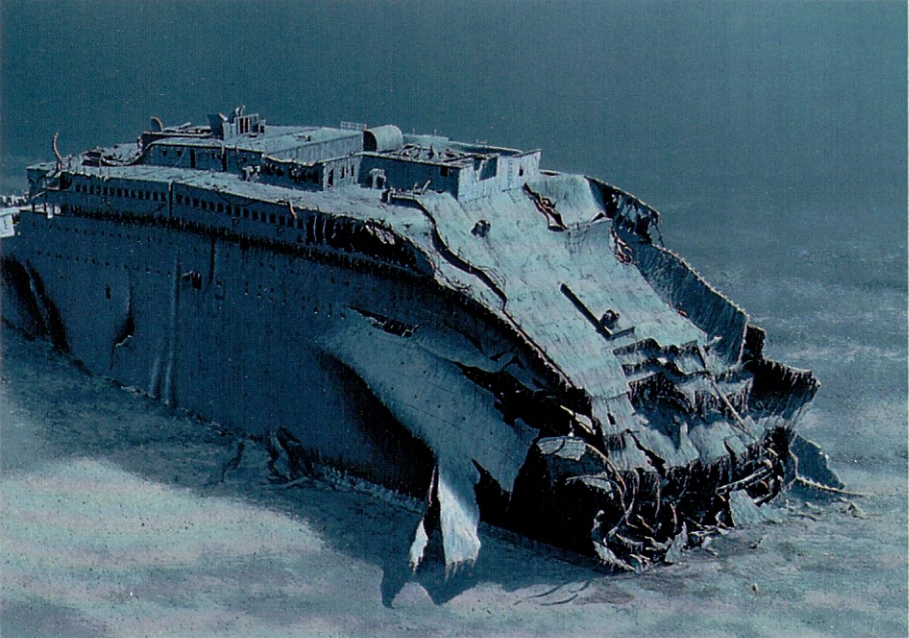
THREE PAINTINGS by Ken Marschall, longtime student of *Titanic*, at right and below, capture the terrible carnage at *Titanic*'s final resting-place. Despite its massive impact with the ocean floor, the ship's bow section (right), some 450 feet of her total 882-foot length, still retains its shape and majesty.

As the section bulldozed its way into the mud, it buckled. The after part jackknifed, and the decks collapsed like an accordion at their weakest point, between number two and number three funnels. The third funnel's empty base appears at the extreme aft edge of the section.

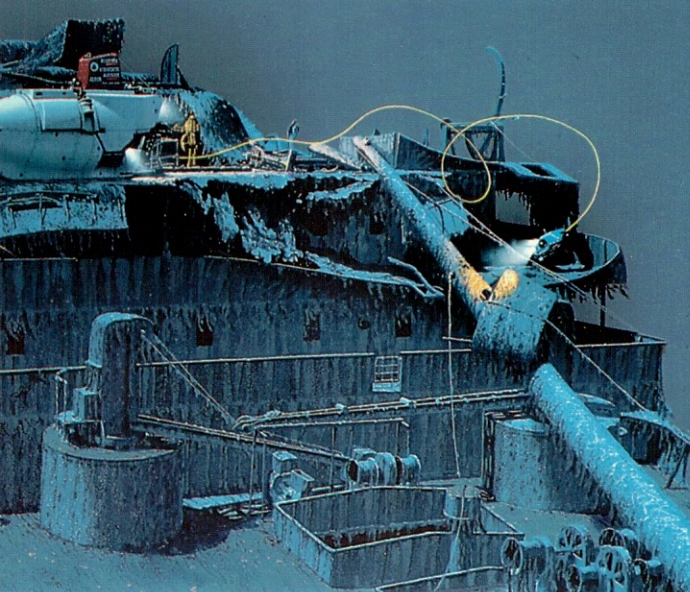
Exploring two areas of the ship most closely linked with her death,











*Alvin* (left) rests on the bridge, while *Jason Jr.* inspects the crow's nest on the toppled foremast. It was from here that lookout Frederick Fleet first spied the iceberg and telephoned the bridge, "Iceberg right ahead!" But it was already too late. Within seconds the ship's starboard side brushed against the berg, and thus began a night of terror.

In contrast to the bow section *Titanic*'s mangled stern, surrounded by its own debris (below left), looks as though it had been alternately torpedoed, bombed, and shelled. The aftermast, snapped at the base, droops forlornly over the rail like a broken cargo boom. Fixtures wrenched from the tortured hull include three cannon-shaped cargo cranes at left and one of the ship's safes at center. At far right *Alvin* inspects the ship's rudder, searching for her propellers.

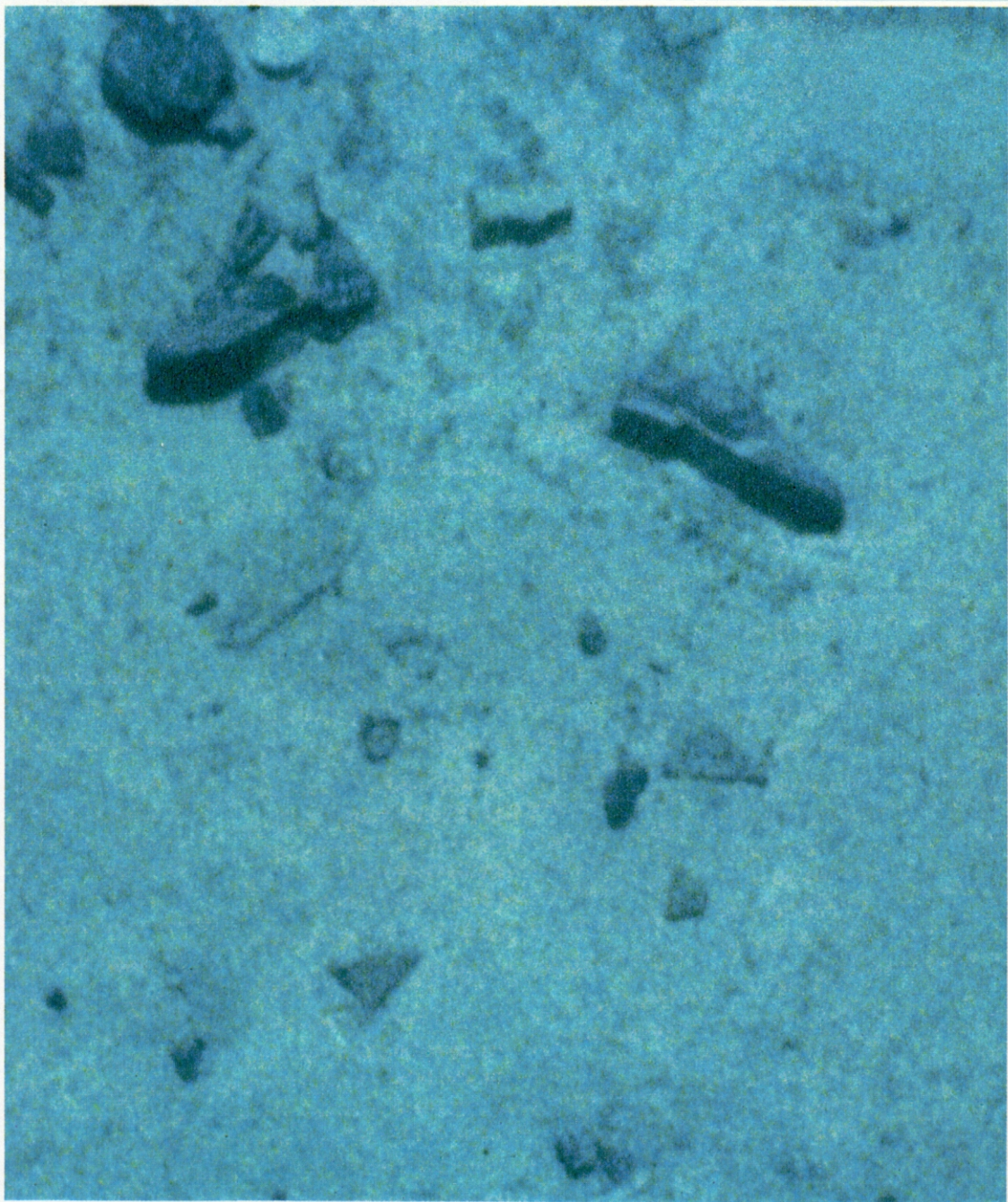
ONE OF THE MOST poignant of all images taken by *ANGUS* is that of a pair of boots (right), resting on the seafloor at such an angle that it is probable that the owner sank to the bottom while still wearing them. Deep-sea scavengers soon disposed of the human remains, but the boots proved inedible. The hostile environment and the tannic acid used to preserve leather on land kept them intact underwater.

Who was the owner of the boots—a passenger, a crew member, young or old? A wealthy man or a poor immigrant? We can speculate, but, as with so many of *Titanic*'s mysteries, we shall never know.

Looking at such photographs long after I left *Titanic*'s resting-place, I became more convinced than ever that it would be wrong to attempt recovery of any of the remains. A photograph like this is more powerful than the recovery of a single shoe; it is a statement in itself, a statement that describes a tragic, frozen moment in time.

But more than anything else, *Titanic*'s grave is, as these shoes demonstrate, hallowed ground.





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## R.M.S. TITANIC

Sailed: April 10, 1912   Sank: April 15, 1912   Found: September 1, 1985

Robert Ballard's hope that *Titanic* should remain undisturbed was not realized. Last July, a French expedition began to retrieve artifacts from the wreck site. Its actions were roundly criticized as grave robbing—justifiably, for the line between curiosity and acquisitiveness seems to have been crossed.

—THE EDITOR

