

WHEN the Royal Mail Steamer *Titanic* slid beneath the waves on April 15, 1912, more than an "unsinkable" ship went down. An age of ostentatious and arrogant worship of wealth also began a fast slide into oblivion. It was the end of Mark Twain's "Gilded Age," when a young, brash America saw millionaires assume the aura of royalty, and the French phrase *nouveau riche* had become part of our vocabulary. Faith that money could fix anything and that man had conquered nature was confounded when the sea swallowed the proudest ship afloat. Like Humpty-Dumpty, all the king's horses and all the king's men couldn't bring her back.

World War I, Marxist revolution in Russia, and the graduated income tax all came along soon after. An epitaph for this arrogant era was mouthed by a sailor in Southampton: "Lady, God himself couldn't sink this ship."

Titanic, whose very name rang with invincibility, thus became a symbol. Her sudden disappearance enhanced an already mythical reputation. Now her dark grave has been penetrated for the first time in 73 years. The team that found her tells the story in this issue.

There are those who would raise her. Massive amounts of money might make it possible, but for what purpose? The band won't begin playing again, the era won't rise with her. Let us leave her and those who died with her in peace.

We also bring you the story of Nicaragua, a country whose suffering signals the end of another era. The age of the banana republics will not sink as quietly as *Titanic*—but just as surely and with a far greater loss of life. In the year the great ship sank, U. S. Marines came ashore in Nicaragua a second time to reinforce a U. S.-backed regime. Except for a nine-month period they stayed until 1933. Today we send no Marines—only dollars.

A third article describes another era of profound change. In the single lifetime of Daniel Boone 1.8 million square miles of North America changed hands as the United States was formed out of the colonial lands of England, France, and Spain.

The *Titanic* that rests on the bottom today isn't the same as the one that sank. The banana republics have changed even more. The wilderness that Boone loved is gone forever. For better or worse, no amount of money nor all the king's men can raise or revive any of them—or the eras they represent.

Wilbur E. Garrett

EDITOR

NATIONAL GEOGRAPHIC

December 1985

How We Found *Titanic* 696

A U. S.-French scientific expedition, led by Robert D. Ballard and Jean-Louis Michel, uses high technology to locate the wrecked liner two and a half miles down in the North Atlantic and record unforgettable images.

Vatican City 723

The world's smallest sovereign state is also the powerful heart and headquarters of the Roman Catholic Church and its 800 million members. James Fallows and photographer James L. Stanfield provide an intimate tour, including a closeup perspective of the Vatican's premier citizen—Pope John Paul II.

Treasures of the Vatican 764

Drawn from the centuries, select masterpieces in the Vatican's dazzling collection are revealed by staff photographers James L. Stanfield and Victor R. Boswell, Jr.

Nicaragua: Nation in Conflict 776

Mike Edwards travels the length and breadth of this key Central American nation to report on the Sandinista revolution, now entering its seventh year. Photographs by veteran combat cameraman James Nachtwey.

Daniel Boone 812

Sorting fact from fiction, Elizabeth A. Moize tells the story of the legendary frontier hero. Photographs by William Strode.

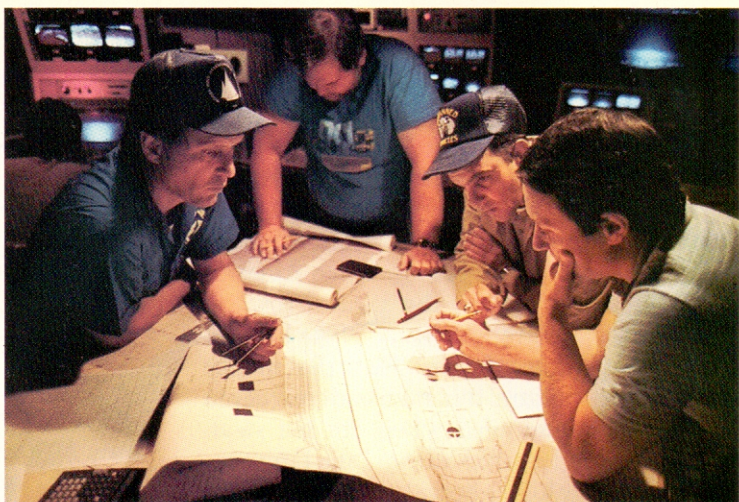
The Ohio Valley

A historical and modern map portrays the crucial pathways along which pioneers expanded the original Colonies into a nation.

COVER: A rattail fish glides in the deep above *Titanic*'s foredeck, port rail, and mooring bitts. Photograph courtesy WHOI, IFREMER, and Robert D. Ballard.

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How We Found



TITANIC

By ROBERT D. BALLARD WOODS HOLE OCEANOGRAPHIC INSTITUTION

In association with

JEAN-LOUIS MICHEL INSTITUT FRANÇAIS DE RECHERCHES POUR L'EXPLOITATION DES MERS (IFREMER)

ICANNOT BELIEVE my eyes. From the abyss two and a half miles beneath the sea the bow of a great vessel emerges in ghostly detail (**right**). I have never seen the ship—nor has anyone for 73 years—yet I know nearly every feature of her. She is S.S. *Titanic*, the luxury liner lost after collision with an iceberg in 1912 at a cost of 1,522 lives.

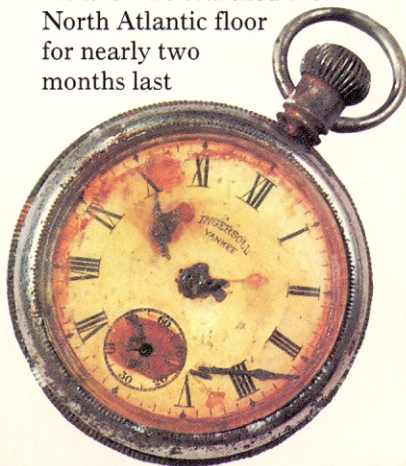
The sea has preserved her well. In this mosaic of two photographs the lines of the deck's teak planking are visible beneath a thin coating of "snow" formed by remains of marine organisms. Other features stand out in the strobe lights of our towed undersea vehicle. Twin anchor chains run from windlasses, lower right, beneath a tangle of cables to hawsepipes near the

bow. A ventilator shaft lies open between the chains, and capstan heads stand on either side. Twin bitts for securing mooring lines and spool-like rollers to guide them stand along the port rail, bottom. In the peak of the bow an extra anchor for emergencies lies beneath its handling boom.

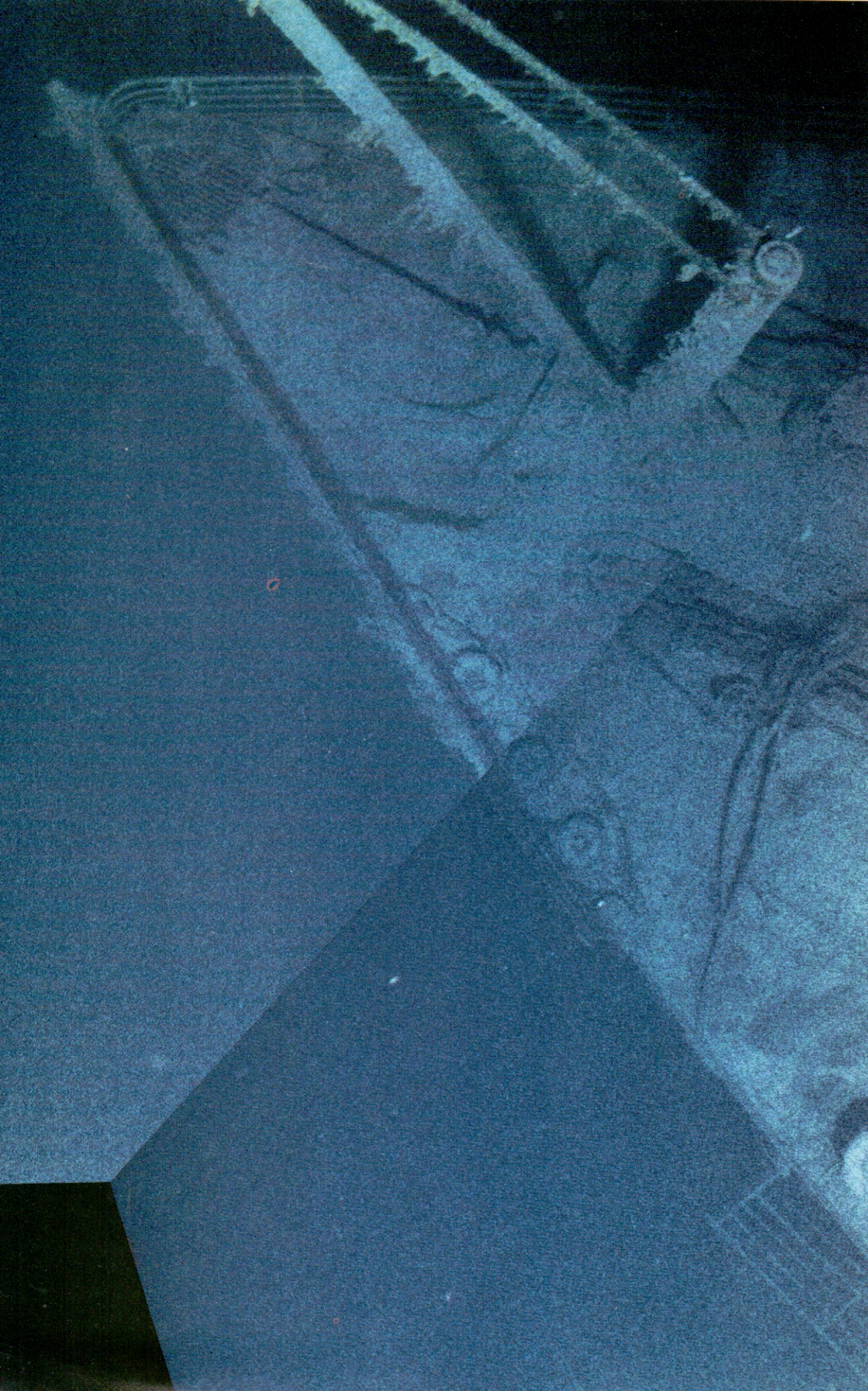
These historic photographs are the work of U. S. and French scientists and technicians who searched the North Atlantic floor for nearly two months last

summer to locate *Titanic's* grave. A key figure throughout the project was my French colleague and fellow chief scientist of the expedition, Jean-Louis Michel, seen opposite me (**above**) with his chin in his hand aboard the Woods Hole research ship *Knorr*. U. S. Navy Lt. (jg.) George Rey joins us in studying plans of *Titanic's* rigging, a constant hazard to our undersea vehicles.

A haunting memento, the watch (**left**) was recovered from the floating body of a victim on April 23, 1912, a week after the disaster. A water stain on the dial indicates that the hour hand stood just short of two o'clock when the watch stopped. *Titanic* went down at 2:20 a.m. local time.



NATIONAL GEOGRAPHIC PHOTOGRAPHERS EMORY KRISTOF (ABOVE) AND BRUCE DALE (LEFT)





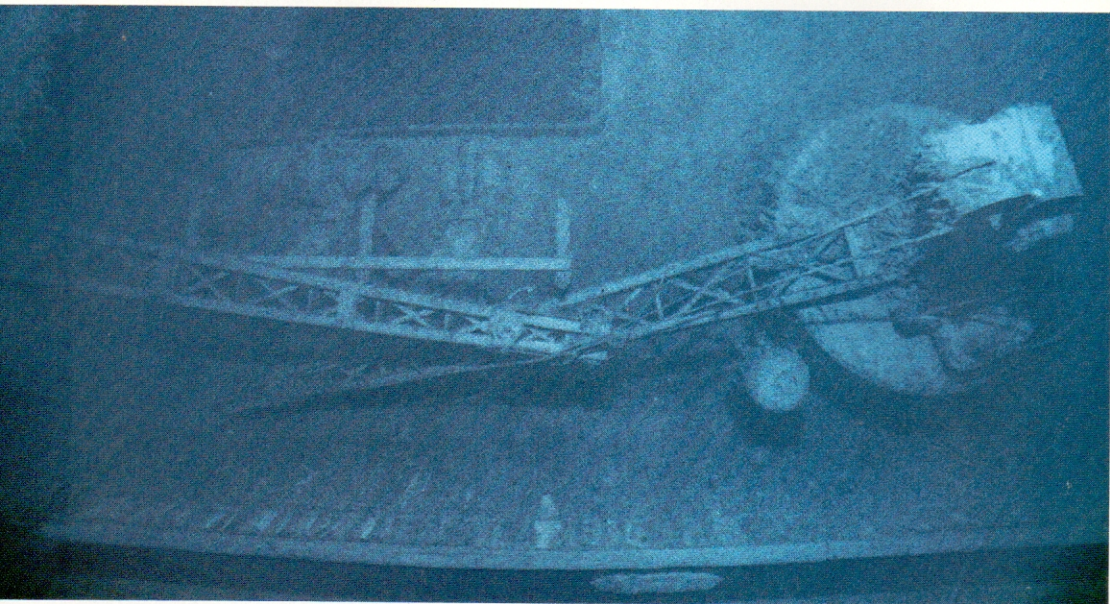
Mute testimony of the wreckage

AS WITH ALL great disasters, eyewitness accounts of the loss of *Titanic* vary widely, and aspects of the event are still being argued. Our portrait of *Titanic*, though far from complete, sheds new light on details of her death as well as her present condition on the ocean floor. To produce the painting at right, National Geographic

artist William H. Bond consulted builders' plans, leading experts, and our photographic files for accurate data. Letters are keyed to photographs throughout the article, giving the location aboard ship for each scene.

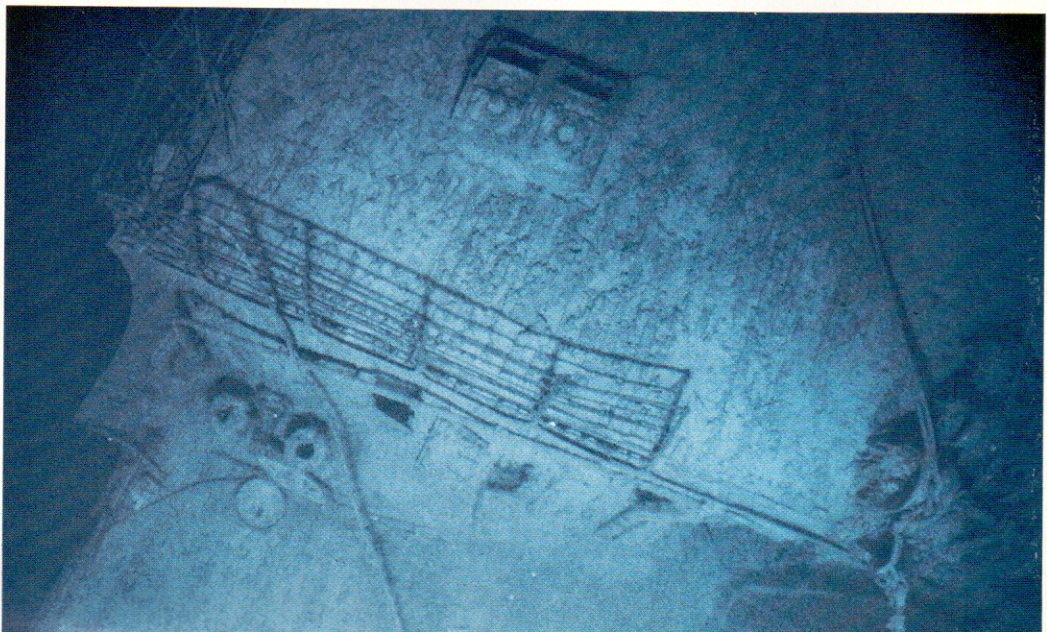
Our still photographs were taken from ANGUS—a "blind" camera sled towed from the surface and guided by means of sonic beacons on the seafloor. Only

when ANGUS was raised and the film developed could we tell precisely where the craft had been. The scene (**below**) of two cargo cranes was recorded from a point dangerously close to *Titanic*'s bridge. Another (**bottom**) shows the after portion of the ship's forecastle with a partly open ventilator (top of photograph) forward of the twisted guardrail. A broken



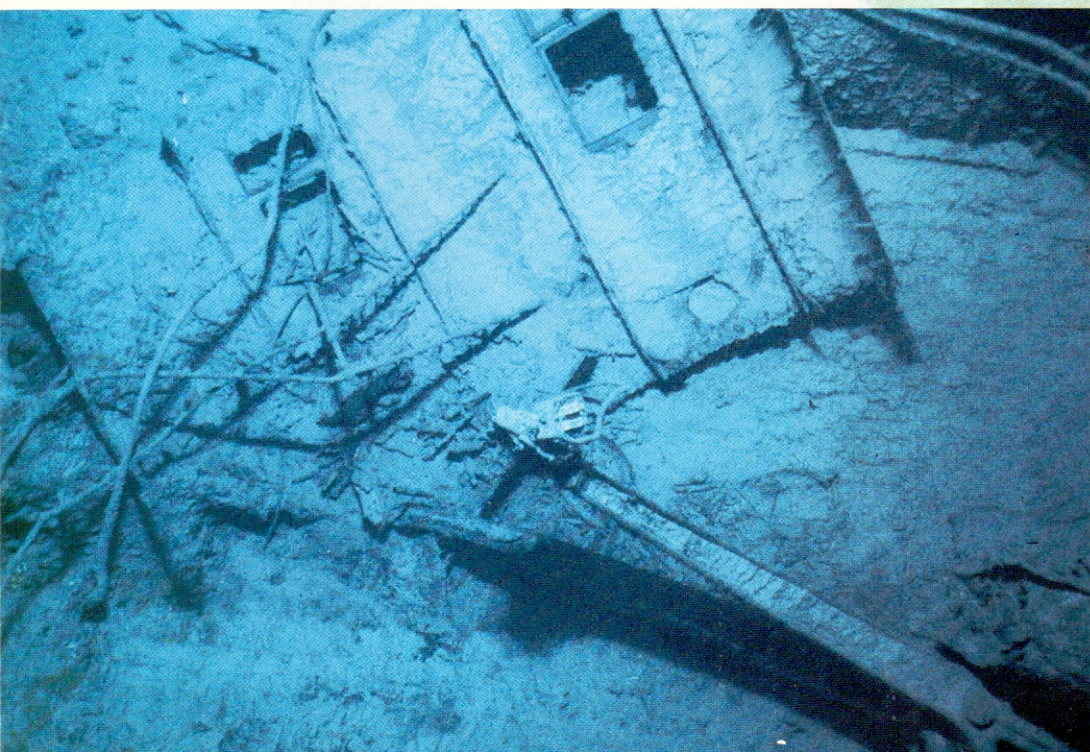
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UNDERWATER PHOTOGRAPHS COURTESY
OF WOODS HOLE OCEANOGRAPHIC INSTITUTION,
IFREMER, AND ROBERT D. BALLARD



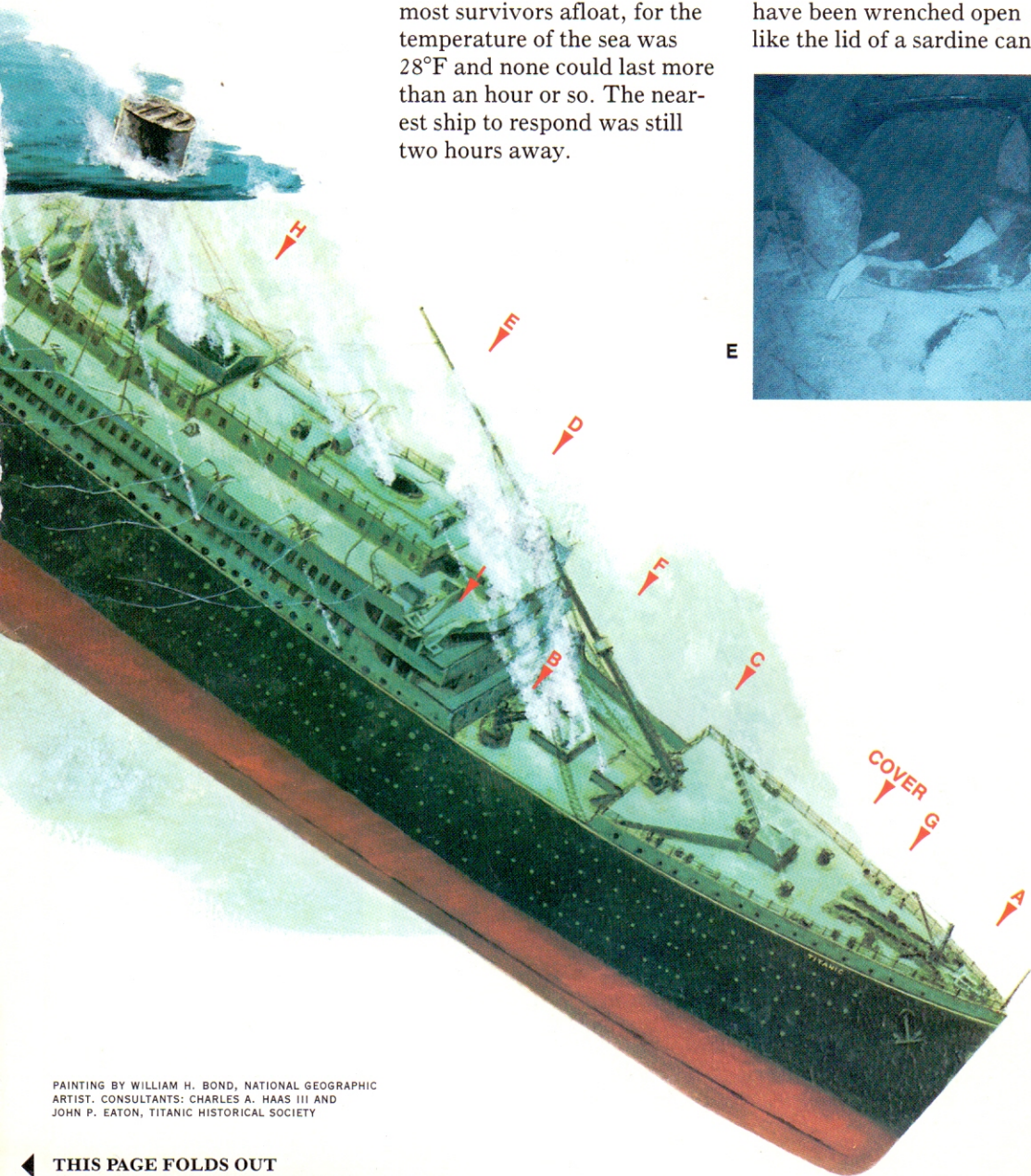
lifeboat davit (**lower left**) with the block still attached lies alongside a collapsed bulkhead from the officers' quarters.

The great liner tilts only seconds before her plunge to the bottom—two hours and 40 minutes after the iceberg tore a gash some 300 feet long in her starboard side near the bow. Six of her 16 watertight compartments were flooded, and as the sea rose above the watertight bulkheads, adjoining compartments flooded like

sections of an ice-cube tray. Yet *Titanic* stayed afloat more than an hour longer than most experts on board predicted.

Many of the 2,227 passengers and crew had abandoned ship or been swept away when the vessel briefly upended in the water, then settled back at an angle. All 20 lifeboats and rafts—less than half the number needed—had been launched, many of them only partly filled. Nearly all had pulled away from the ship for safety. That action doomed most survivors afloat, for the temperature of the sea was 28°F and none could last more than an hour or so. The nearest ship to respond was still two hours away.

One of our photographs confirms the loss of the foremost of *Titanic*'s four giant stacks, not shown in the painting. Some accounts maintain that the funnel collapsed violently when the ship upended; others claim it worked loose as the water engulfed it. Our pictures support the former conclusion. During one sweep along the superstructure we took a photograph (**below**) showing the huge circular opening where the funnel once joined the deck. Massive steel flanges have been wrenched open like the lid of a sardine can.



PAINTING BY WILLIAM H. BOND, NATIONAL GEOGRAPHIC
ARTIST. CONSULTANTS: CHARLES A. HAAS III AND
JOHN P. EATON, TITANIC HISTORICAL SOCIETY



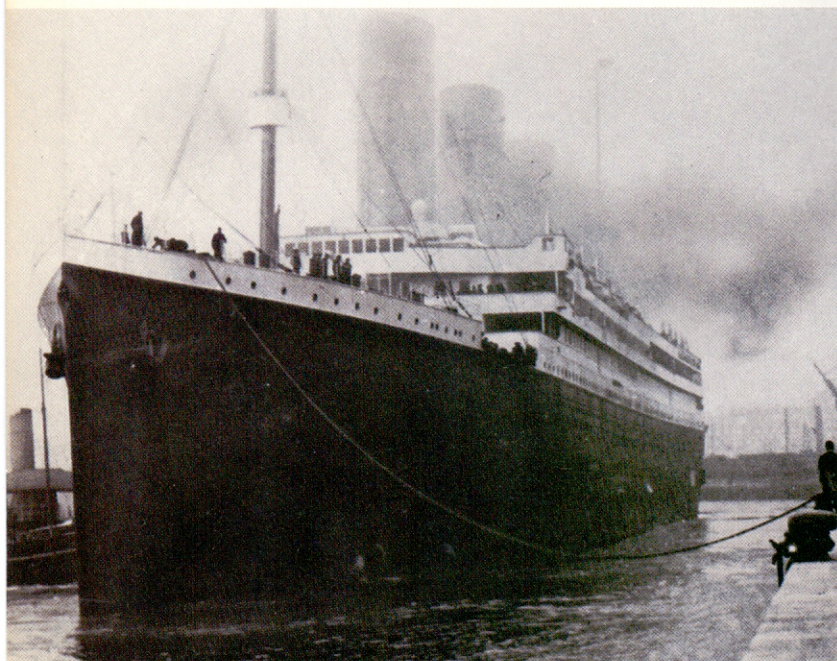
SYMBOL of disaster, *Titanic's* hydroid-encrusted crow's nest (*opposite*) emerges in startling detail in a close-up. The same crow's nest shows clearly with two men in it in the scene below as the ship leaves Southampton, England, on her first and only voyage. Our underwater photographs reveal that when the forward funnel collapsed, it pulled the mast backward, so that today its top lies across the bridge. A circular windlass beneath the mast lies

between open holds.

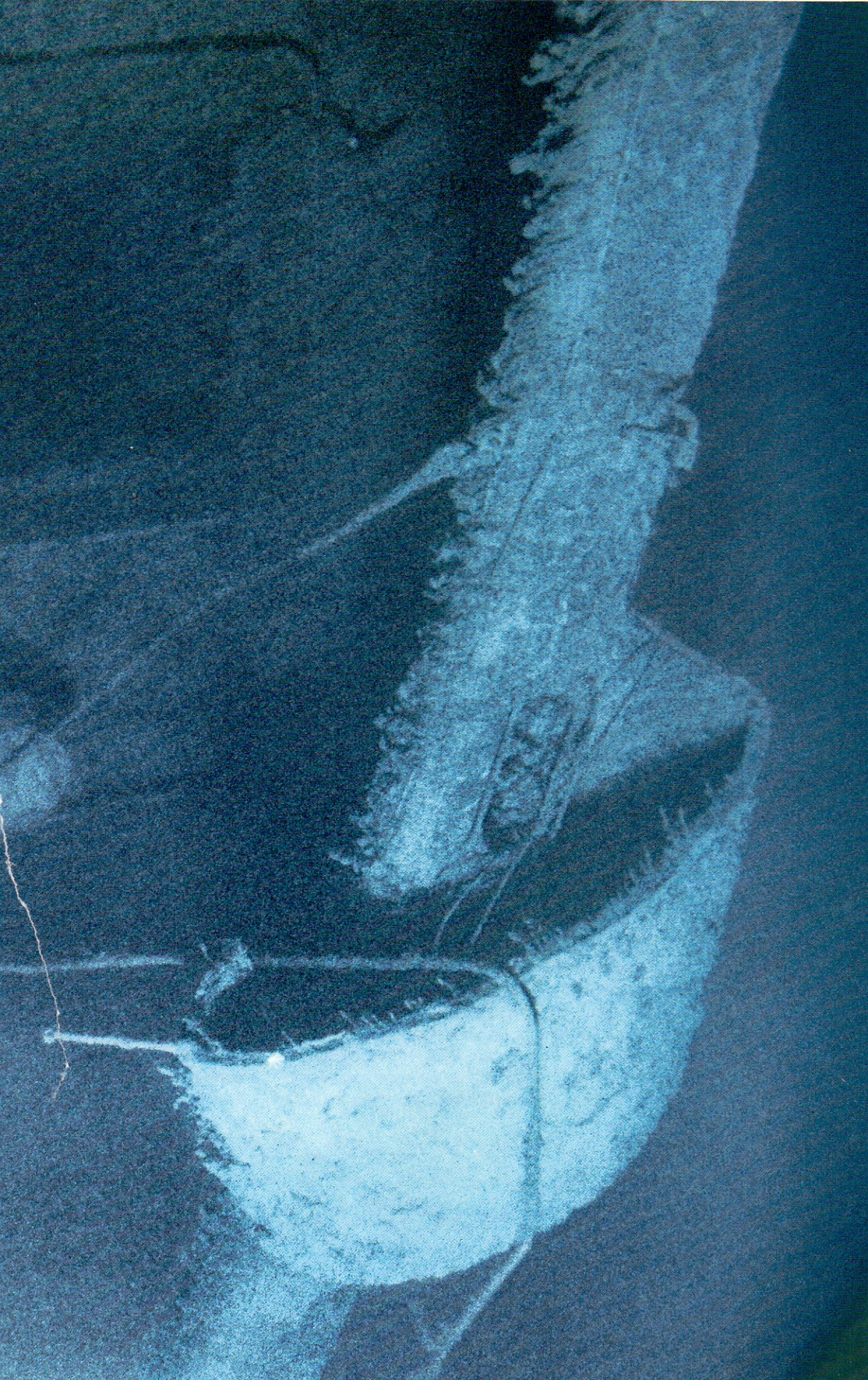
To me the view of the crow's nest most expresses the *Titanic* tragedy. It was from this station that lookout Fred Fleet, who survived, first sighted the iceberg one-fourth of a mile dead ahead. Instinctively he gave three rings on the bell above the crow's nest. The bell's bracket appears as a faucet-like fixture on the right of the mast. Lower down a pair of circles marks the receptacle for the telephone over which Fleet warned the bridge, "Iceberg right ahead!"

Ironically, Fleet's words doomed *Titanic*. In response to the warning her officer-in-charge tried to reverse engines and turn hard to starboard. The reversal actually turned the ship slowly to port, and she suffered the fatal gash in her starboard side. Had she rammed the berg head-on, she would likely have flooded only two or three compartments and remained afloat.

Captain Edward J. Smith (*above left*), who was not on the bridge at the time, went down with his command.

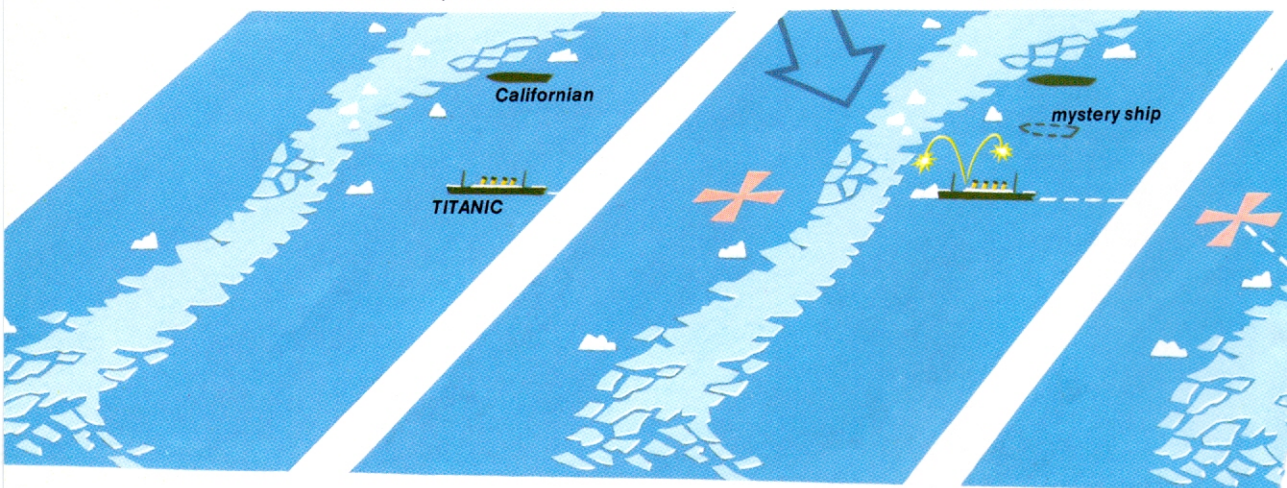


SOUTHAMPTON CITY MUSEUM (TOP) AND MARINERS' MUSEUM, NEWPORT NEWS (ABOVE)



APRIL 14, 1912—11:00 P.M.

11:40 P.M.



Sea search for a legend

OVER THE YEARS a number of expeditions have sought without success to locate *Titanic*—a problem compounded by the North Atlantic's unpredictable weather, the enormous depth at which *Titanic* lies, and conflicting accounts of her final moments. Organizing our search, Jean-Louis Michel and Jean Jarry, the French project leader, and I traced the movement of four ships before, during, and after the sinking. From the outset we discounted the reported position of *Californian*, the ship nearest to *Titanic* and the one that could have saved all aboard if *Californian*'s radio had not been off. That position has always been controversial. In the sequence above we reconstruct what we believe to be *Titanic*'s final hours:

• **April 14, 11:00 p.m.:**

Steaming westward, *Titanic* approaches a barrier of field ice and bergs several miles wide stretching north and south some 400 miles off the coast of Newfoundland. *Californian*, halted by ice to the north, radios a warning and shortly shuts down her set.

• **April 14, 11:40 p.m.:**

At a speed her navigator mistakenly believes to be more than 21 knots, *Titanic* hits an iceberg and radios a distress call with her estimated position (pink cross). But a consistent change in *Californian*'s reported positions indicates that a southeasterly current (arrow) was slowing *Titanic* and putting her off track. After midnight *Californian* and *Titanic* each see the lights of another ship in the other's direction. But according to the two ships' reported positions, the distance between them is

too great. There must be another vessel between them—the "mystery ship" (dotted outline) that has intrigued historians ever since. Later *Californian* sees white rockets on the horizon but doesn't realize they are distress signals.

• **April 15, 2:20 a.m.:**

Titanic goes under, with 705 survivors in lifeboats. The Cunard liner *Carpathia*, which had picked up the first distress call 58 miles to the southeast, continues steaming on a northwest course toward *Titanic*'s reported, but incorrect, position.

• **April 15, 4:10 a.m.:**

Carpathia encounters the drifting lifeboats and begins rescue. Later *Californian*, which has finally turned on her radio, arrives at *Titanic*'s reported position with *Mount Temple* and other ships. The mystery ship, if it ever existed, has long ago vanished. Having taken all elements into account, Jean-Louis, Jean, and I conclude that *Titanic* must lie north of where *Carpathia* met the lifeboats.

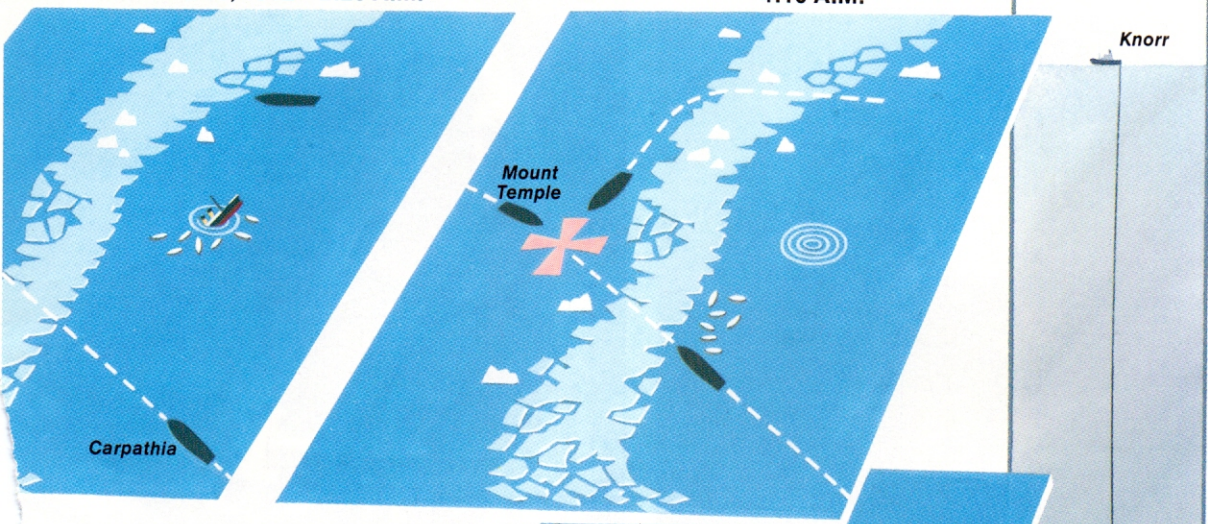
• **June 28, 1985:**

The French ship *Le Suroit* ("Sou'wester") begins "mowing the lawn"—systematically crossing the 150-square-mile target zone with her deep-search sonar. *Le Suroit* covers 80 percent of the zone, leaving



APRIL 15, 1912—2:20 A.M.

4:10 A.M.



only 20 percent for the Americans to search.

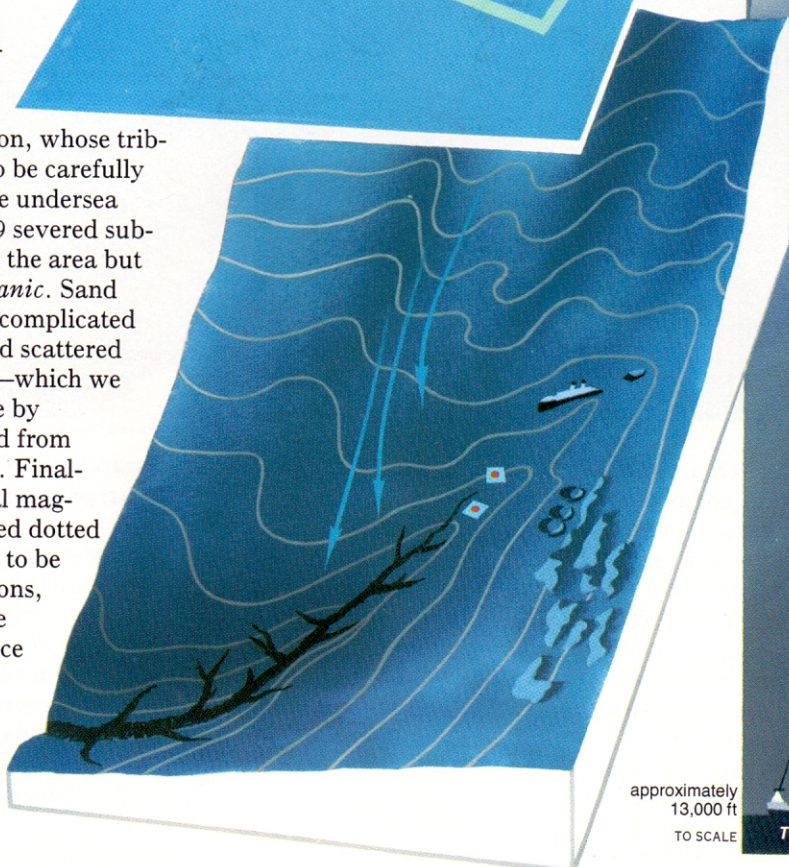
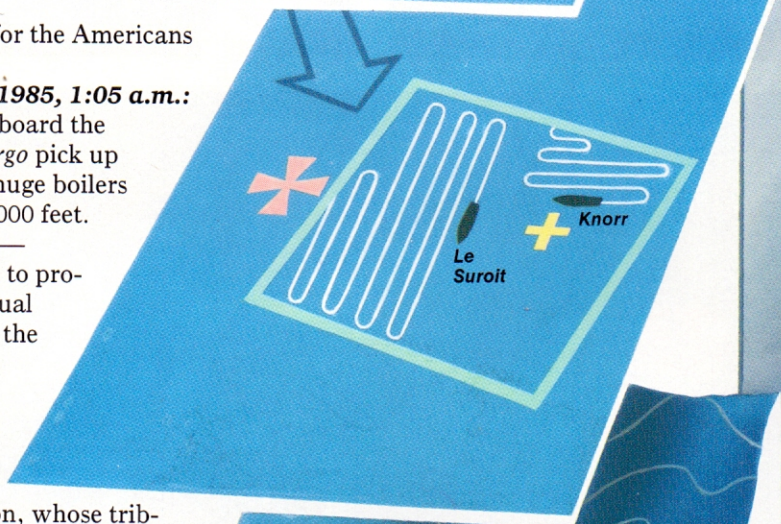
• **September 1, 1985, 1:05 a.m.:**

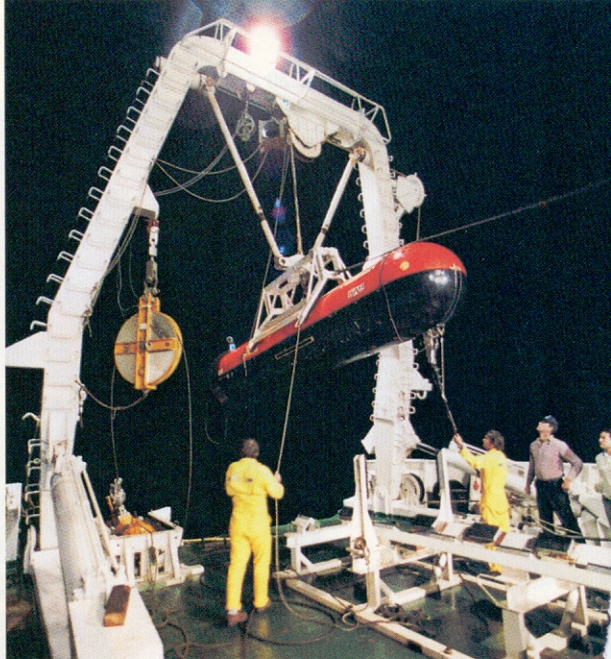
Video cameras aboard the search vehicle *Argo* pick up one of *Titanic*'s huge boilers at a depth of 13,000 feet.

A bottom profile—slightly modified to protect *Titanic*'s actual position—shows the complex terrain.

Titanic and her parted stern section lie in the

area of a submarine canyon, whose tributaries all had to be carefully explored. A huge undersea landslide in 1929 severed submarine cables in the area but did not bury *Titanic*. Sand dunes eastward complicated our search, as did scattered "bomb craters"—which we think were made by boulders released from melting icebergs. Finally, two abnormal magnetic readings (red dotted flags) turned out to be geologic formations, not the ship. The enormous distance between us and the target is indicated in the scale drawing at far right.





PHOTOGRAPHS THIS PAGE AND UPPER RIGHT BY EMORY KRISTOF

TEAMWORK and high technology combined to solve a historic puzzle. The French and Americans worked superbly together on a model project for future undersea exploration. A vital tool on the American side was our search vehicle *Argo* (**opposite, top**), seen beginning a two-hour descent to *Titanic*'s hull. The hollow steel frame sup-

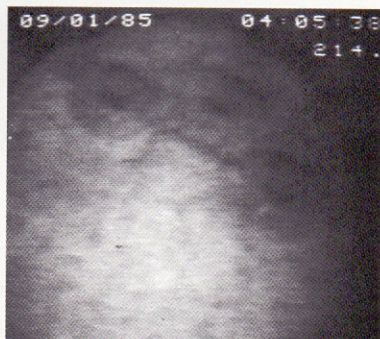
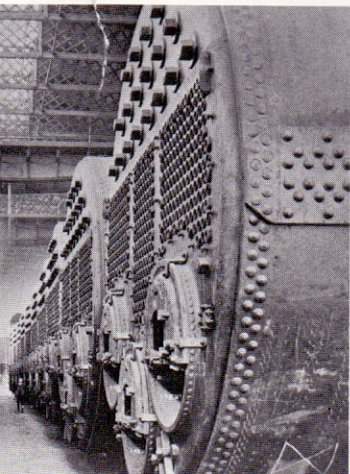
ports video cameras, side-scan sonar, a computerized timing system, and a battery of other electronic gear.

Argo's support ship, the Woods Hole research vessel *Knorr* (**top left**), has two sets of rotary blades shaped like eggbeaters below the keel, allowing us to maneuver sideways as well as fore and aft.

The French team aboard the

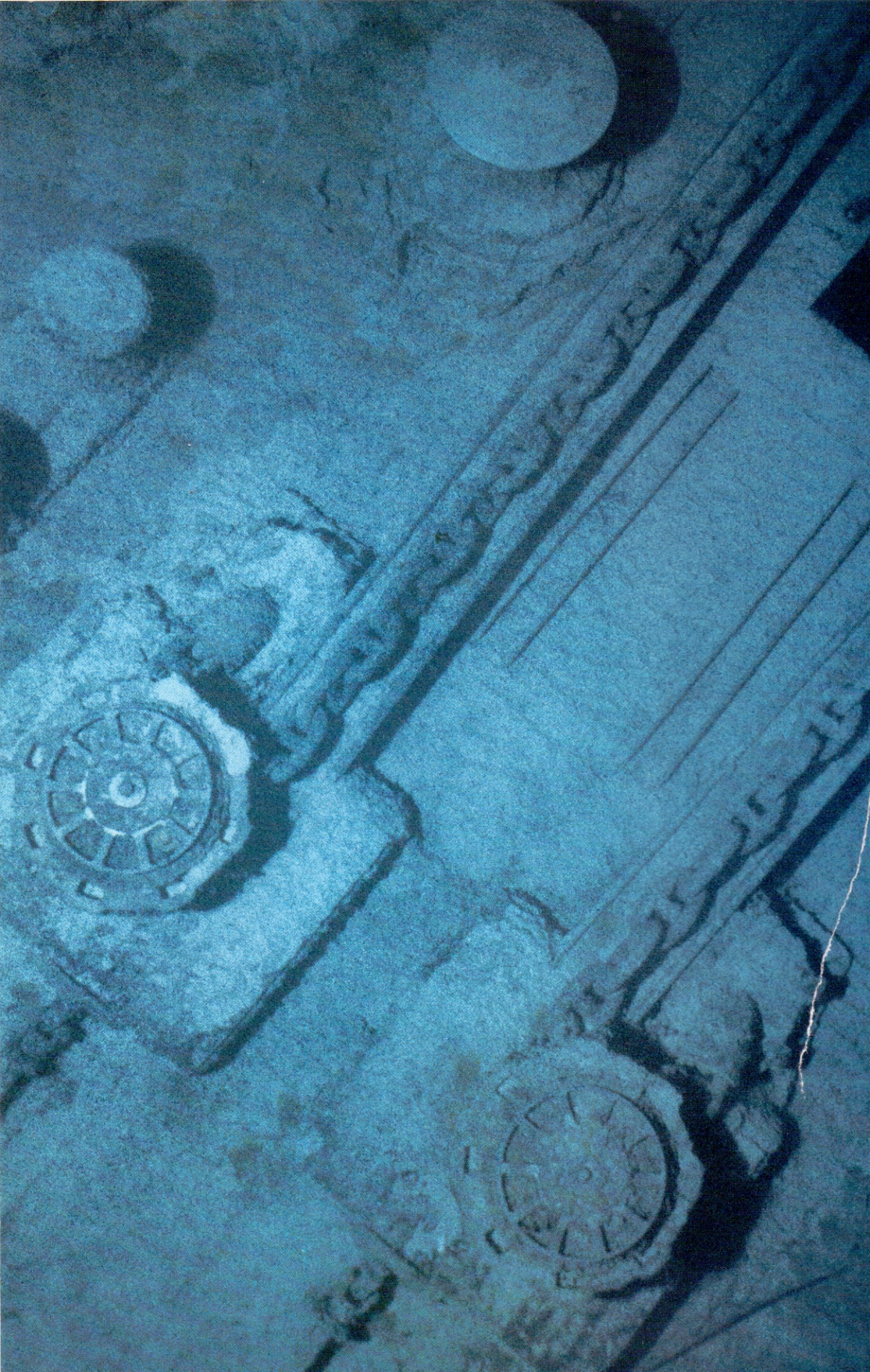
research ship *Le Suroit* (**top right**) prepares for a night launch of SAR, their revolutionary sonar search vehicle, which can survey a strip of ocean floor more than half a mile wide at each pass.

Aboard *Knorr* Jean-Louis Michel, standing next to me at far right, and others of our joint team survey the video screens (**above**) during a



HARLAND AND WOLFF, LTD./CHARLES I. SACHS (LEFT)

run by *Argo*. The moment of triumph comes as the unmistakable form of one of the giant boilers (*left*) materializes. The three circular furnace doors match those shown in a historic photo (*far left*) taken during *Titanic*'s construction. A digital readout atop the screen records September 1, 1985; 4:05 a.m. Greenwich mean time; compass heading 214°.



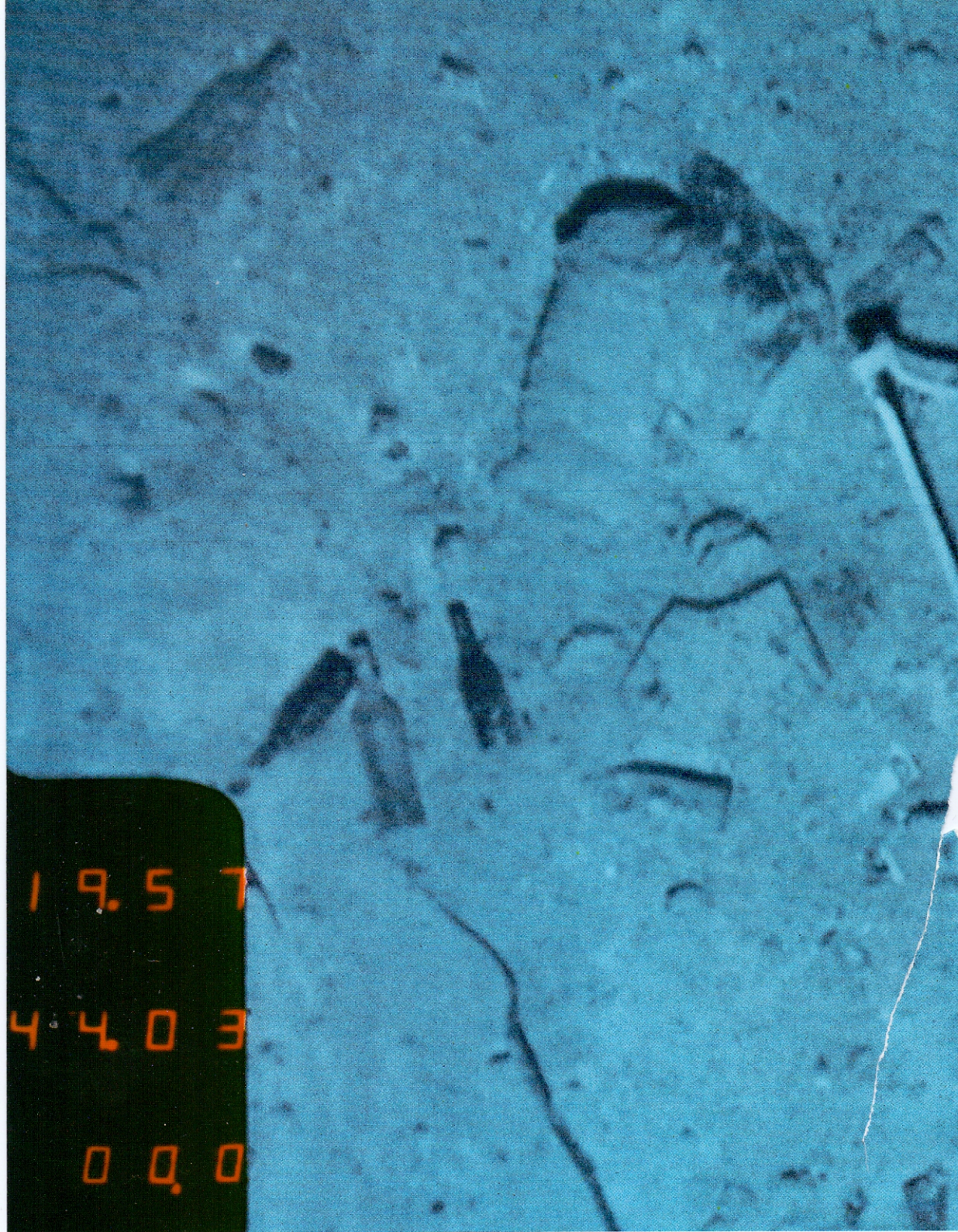
PRECISION portrait of *Titanic's* foredeck (**left**) reveals the remarkable preservative action of the deep sea. This view from 20 feet above the deck was made during our expedition's final photographic run. The direction of the bow is at upper right. Windlass heads, anchor chains, capstans, and mooring bitts all appear ready for action beneath a thin film of marine organisms. Not so *Titanic's* human element. Marine scavengers long ago disposed of the victims' bodies. *Titanic* is more monument than tomb.

Elegance of a vanished age emerges in a beautifully designed cut-glass window (**right**) photographed by our cameras in a field of debris scattered across the ocean floor hundreds of yards astern of *Titanic's* hull. We discovered the window in an early photograph of the ship's second-class smoking room (**upper right**). The window appears as a panel in the door at far left. To me the window symbolizes the striking contrast between violence and calm in *Titanic's* last moments. In some areas of the ship one-inch-thick steel was crumpled like tin foil and in others, such as this, the most fragile ornaments survived intact. The photograph is slightly blurred, but it is possible that some glass panels remain unbroken and in place.



HARLAND AND WOLFF, LTD./CHARLES I. SACHS (ABOVE)





WORLD'S DEEPEST wine cellar lies scattered across the ocean floor in the area of the debris field. Traditional shapes of

bottles, little changed in 73 years, lead experts to identify the bottle at upper left and those at left as Madeiras, ports, and possibly a champagne.



The bottle at lower right is probably a Bordeaux and the longer of the two at upper right a Riesling. They may still be drinkable, though extreme

pressure may have forced seawater through the corks.

Lengths of twisted metal overlie the bottles. The digital readout in the bottom left cor-

ner gives the time: 1957 hours, 44 seconds, on the third day of the month, September. The compass heading is zero, indicating due north.

THE GRAND first-class entrance hall and staircase (**below right**) collapsed under the massive strains suffered by portions of the hull. The camera looks past twisted steel bulkheads (**bottom**) into the gaping hole once covered by the ornate glass dome. We saw no evidence of the elaborate stairway panel and clock, described at the time as representing "Honor and Glory crowning Time."

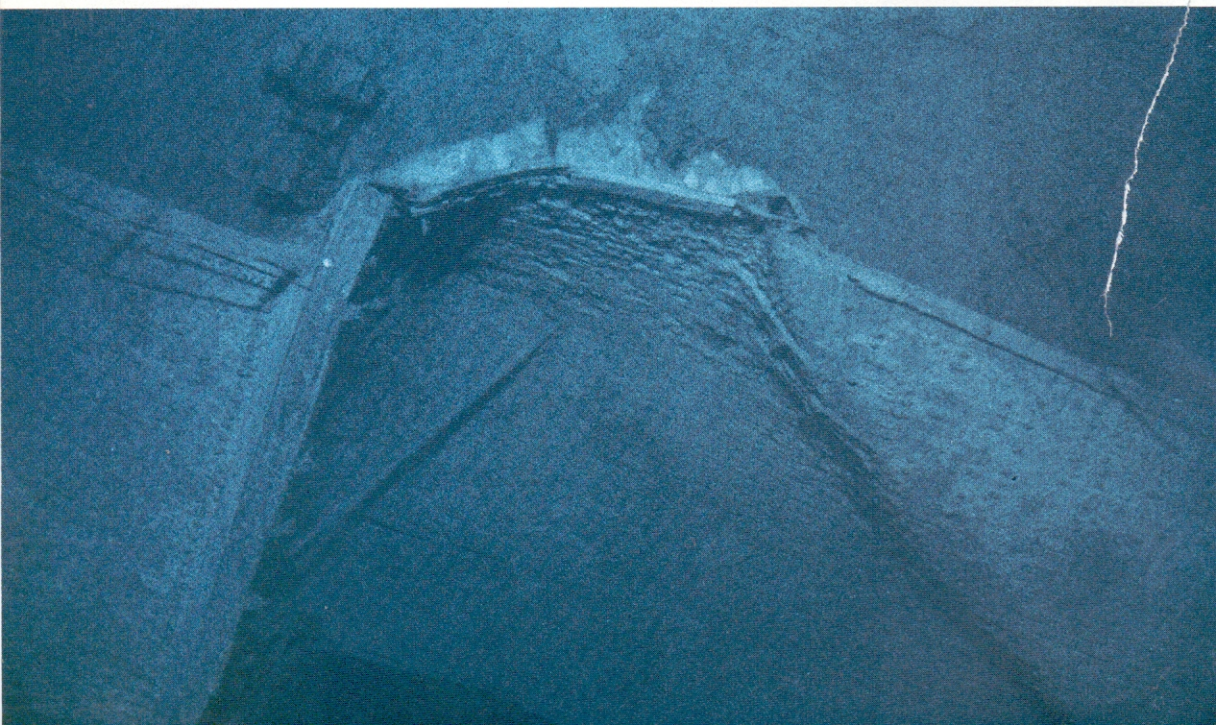
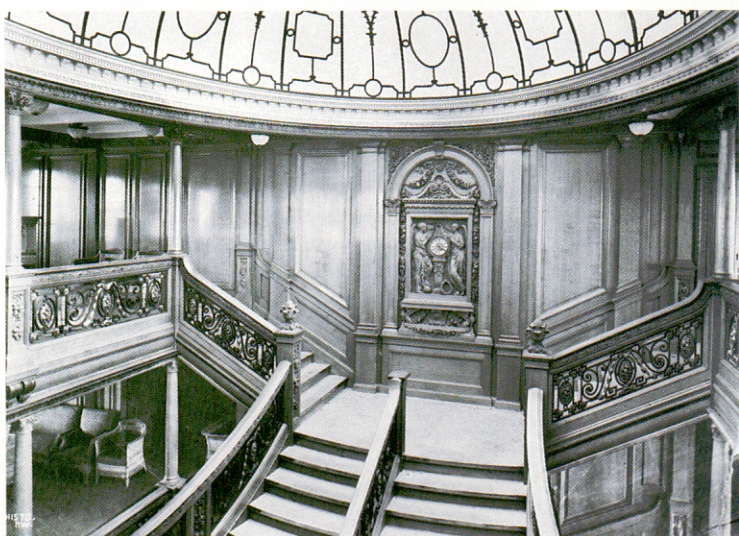
Titanic was not only the largest ship of her day—882 feet 9 inches in length and 66,000 tons displacement—she was also the most expensive. One-way passage in the finest of her first-class suites cost \$4,350, the equivalent of nearly \$50,000 in today's funds.

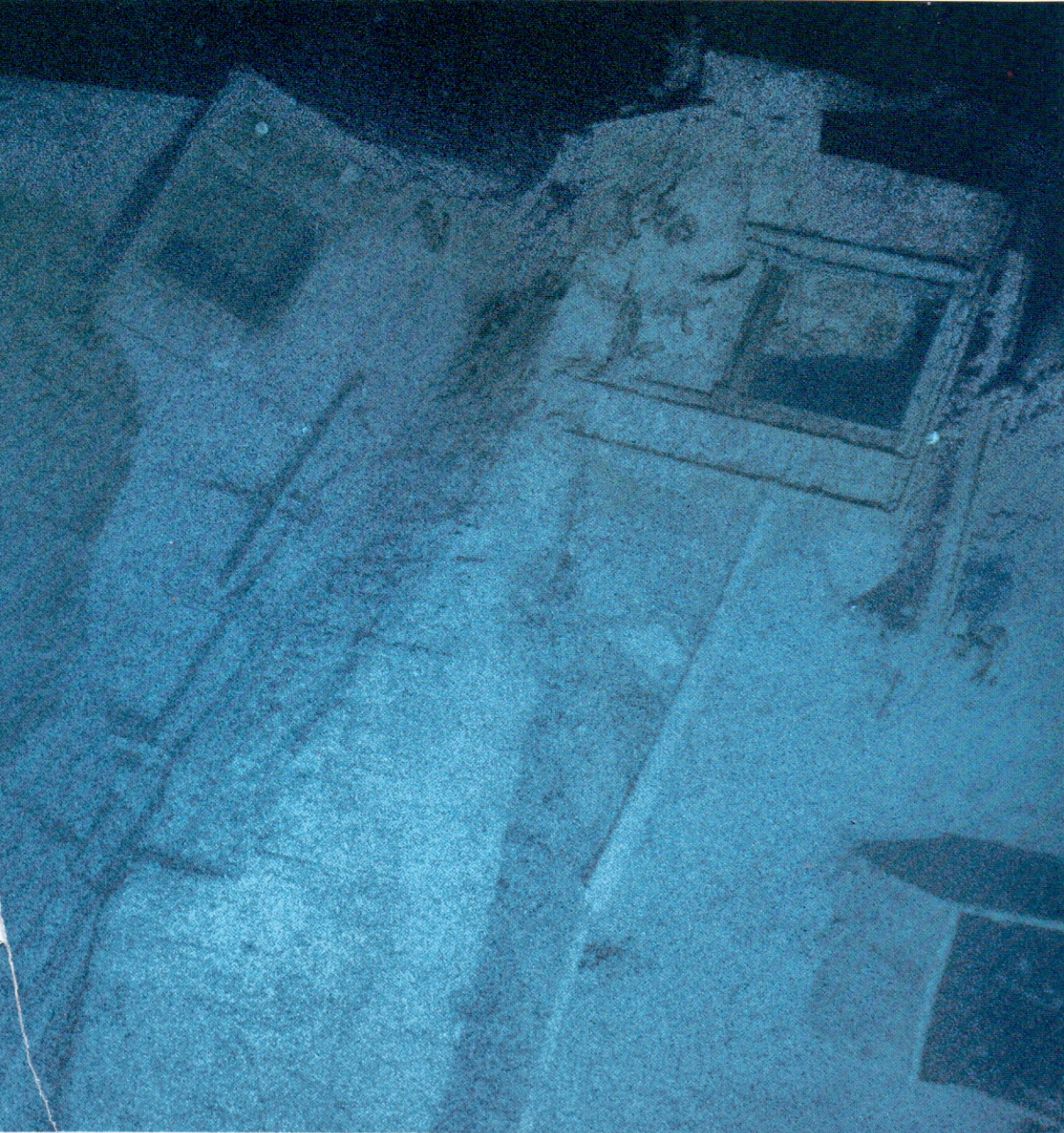
Unfortunately, when disaster struck, wealth sometimes made the difference between survival and death. First-class passengers were generally housed amidships nearest the lifeboats, while third class was quartered forward or aft far below. In some cases ship's personnel prevented third-class passengers from climbing topside until most of the boats

had been loaded and launched.

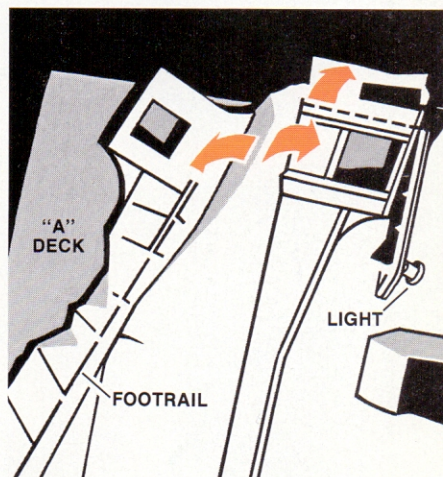
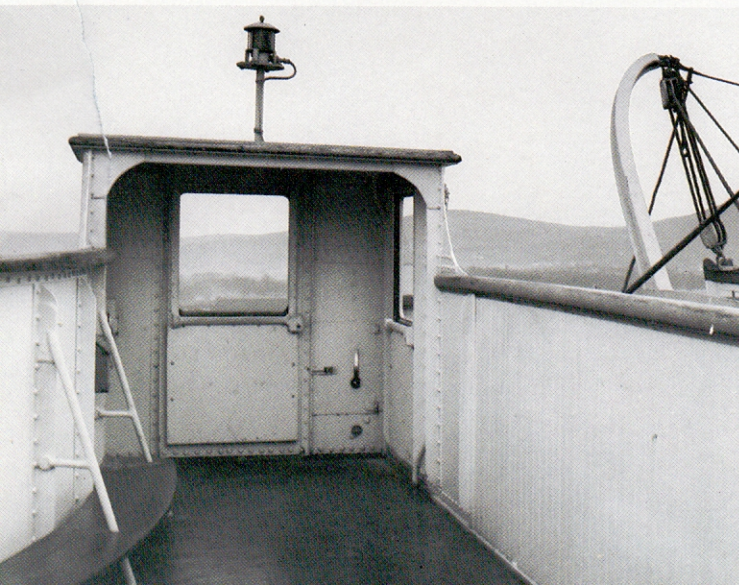
The photographs opposite call to mind *Titanic*'s most famous passenger, one whose enormous wealth proved no advantage. Refused space in a lifeboat with his wife, U. S. millionaire John Jacob Astor is said to have made his way to the starboard wing bridge, identical to one (**opposite, lower left**) aboard *Titanic*'s sister ship, *Olympic*. There, according to survivors, Astor was standing when the forward funnel smashed across the bridge.

Our photograph of the same area (**right**) confirms the total destruction of the wing bridge, as detailed in the diagram at lower right. All three bulkheads of the bridge have been wrenched apart and flattened as though by a giant steamroller, yet by some fluke the overhead light remains attached to the roof. No human could have survived such a cataclysm, and in fact Astor's body was found afloat but horribly mangled a week after the sinking.





| HARLAND AND WOLFF, LTD./CHARLES I. SACHS (BELOW AND UPPER LEFT); DIAGRAM BY WILLIAM H. BOND



Mosaic of clues to a parted stern section

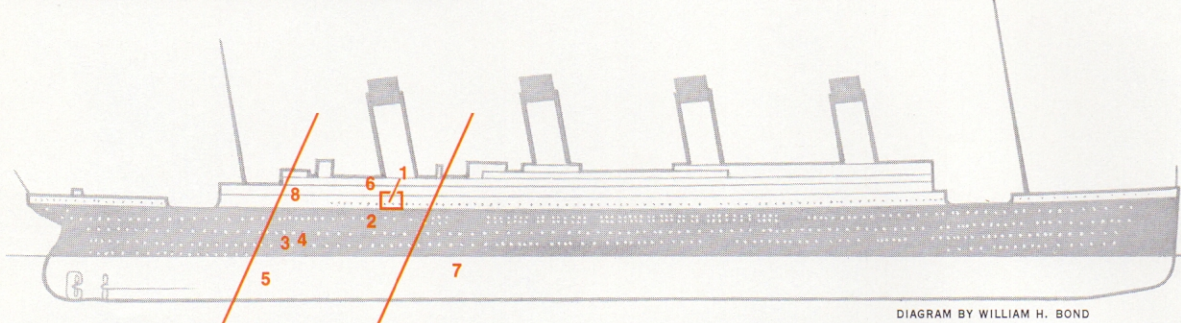


DIAGRAM BY WILLIAM H. BOND



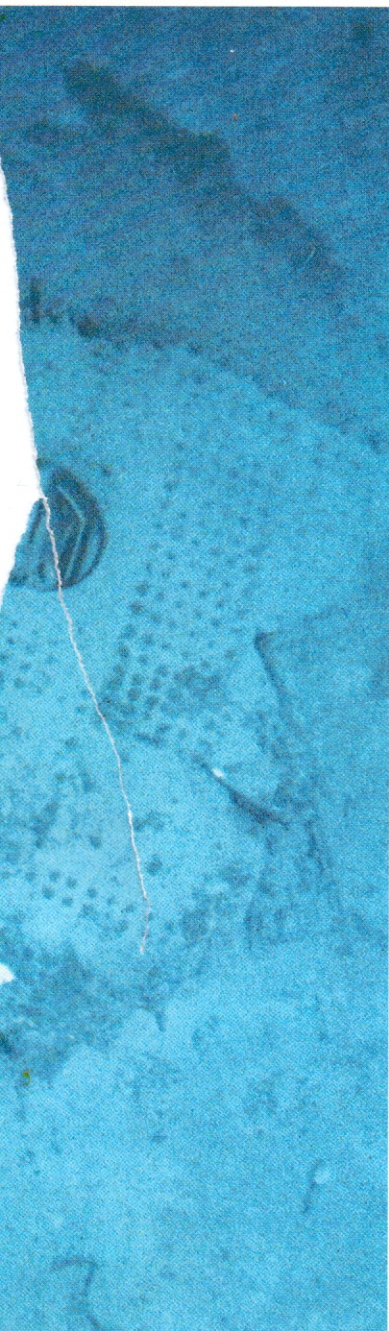
IN EXAMINING these and other photographs of the debris field astern of *Titanic*, we noticed a striking coincidence: All the items identified came from the same area of the hull, though from different deck levels (*diagram, left*). Earlier photographs had told us the stern section was missing, and the implication was clear—the hull had torn in two in this area, where in fact there

was an expansion joint to relieve stress on the hull in heavy seas.

The strongest proof came from a photograph (*lower left*), which shows a section of hull plating with a unique pattern of large and small port-holes. Construction blueprints reveal that the section could only have come from one part of the hull—the exact location of the other items.

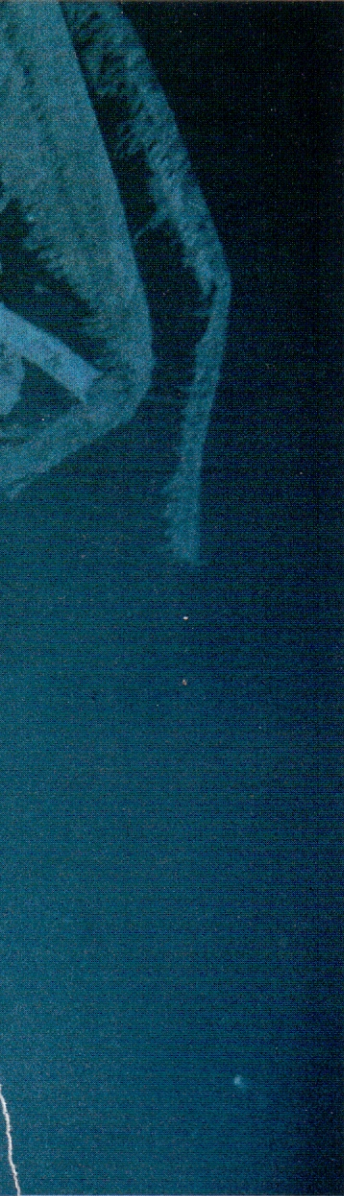
Numbers are keyed to the

items photographed: (1) hull section; (2) metal platter, surrounded by lumps of boiler coal; (3) set of bedsprings, whose narrow width suggests second or third class; (4) chamber pot. Items not shown but also found in the debris field include (5) ship's generator; (6) first-class smoking room tile; (7) water evaporator; (8) second-class smoking room window (*page 709*).





CORK EXAMINER, COURTESY TITANIC HISTORICAL SOCIETY (ABOVE)



STARBOARD QUARTER of *Titanic*'s detached stern (**left**) was photographed in the debris field, though we were unable to determine the fragment's exact size. Whether *Titanic*'s entire stern lies within the debris field is still unknown, but identification of this fragment and the items associated with it is confirmed by a photograph taken in 1912 of the ship's stern area (**far left, bottom**). Items still attached to the deck of the fragment include a twisted section of railing at upper right, spool-like mooring guides along the after gunwale, and part of a steel support, at left, that plainly belonged to the docking bridge seen in the background of the 1912 photograph.

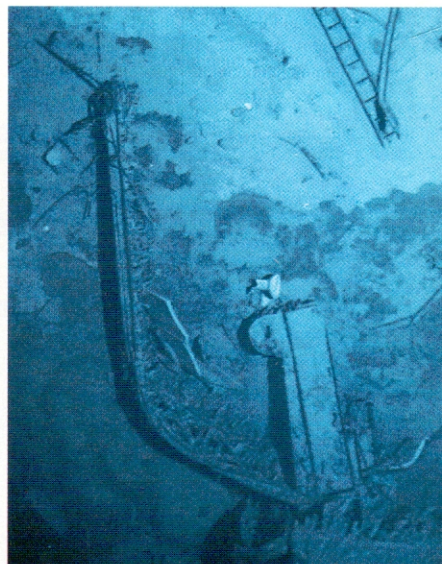


K

Even more conclusive are pieces of equipment photographed in the area of the stern fragment. The engine-room telegraph (**below left**) matches the two in the center of the docking bridge, which was used only for maneuvering the vessel in port. The bell-shaped fixture (**bottom center**) was the foundation for one of the two cargo cranes located forward of the docking bridge on either side of the ship. The tower of one of the cranes, with its distinctive shape like a giraffe's head, appears (**below**) beside its boom.

Despite the obvious damage suffered by *Titanic*, I believe she hit bottom fairly gently—certainly not at the 100-mile-an-hour speed suggested by some authorities. Much of the damage, including fracture of the hull, may have occurred at the surface, or perhaps as she “kited,” or twisted, her way to the bottom.

Over the space of four days our undersea cameras shot more than 20,000 frames of film covering some 8,000 different scenes. Yet we have only sketched in the bare outline of *Titanic*; the full portrait is still to come.



M



EPILOGUE to a tragedy endures in the remaining survivors of *Titanic* and a few emblems of the golden age she represented. Two survivors, Bertram Dean and Eva Hart (**above**) examine ship mementos at Merseyside Maritime Museum in Liverpool, England. The items include a 20-foot-long builder's model with a cork lifejacket by the bow, Captain Smith's dress

sword, a silver spoon, a recovered victim's watch and keys, and a lifeboat nameplate. Because she carried mail for the crown, *Titanic* also bore the honorary initials R.M.S., for Royal Mail Steamer.

Miss Hart, who was seven at the time of the sinking, lost her father but rode a lifeboat to safety with her mother. She recalls that her mother refused to go to bed aboard *Titanic*,

"because she had this premonition, solely based on the fact that she said to declare a vessel unsinkable was flying in the face of God." Of *Titanic*'s final moments she says simply: "I saw that ship sink. I saw all the horror of its sinking. And I heard, even more dreadful, the cries of drowning people."

Like most other survivors, Eva Hart believes *Titanic* should be left intact as a memorial to those who went down with her.

Another memento, a first-class deck chair (**below left**) was salvaged from the floating wreckage by the Reverend Henry Ward Cunningham, who went out with a ship to recover bodies. He later donated the chair to the Maritime Museum of the Atlantic at Halifax, Nova Scotia. Here it stands on the deck of *Acadia*, berthed at the museum.

In a memorable scene (**right**), one of *Titanic*'s lifeboats comes alongside the rescue ship *Carpathia* several hours after the sinking. The relief of rescue was tempered by a grim statistic: While all children in first and second class were saved, two-thirds of the children in third class perished. Nor were the ship's owners disposed to generosity toward survivors. Against claims amounting to more than 16 million dollars, the White Star Line reportedly paid a total of \$663,000.

With luck we will return one day to explore further into the mysteries of *Titanic*. But it must be a gentle exploration, in a realm I tried to describe on our return last September to Woods Hole: "It is a quiet and peaceful place—a fitting place for the remains of this greatest of sea tragedies to rest. Forever may it remain that way." □

