

# Wooden Boat

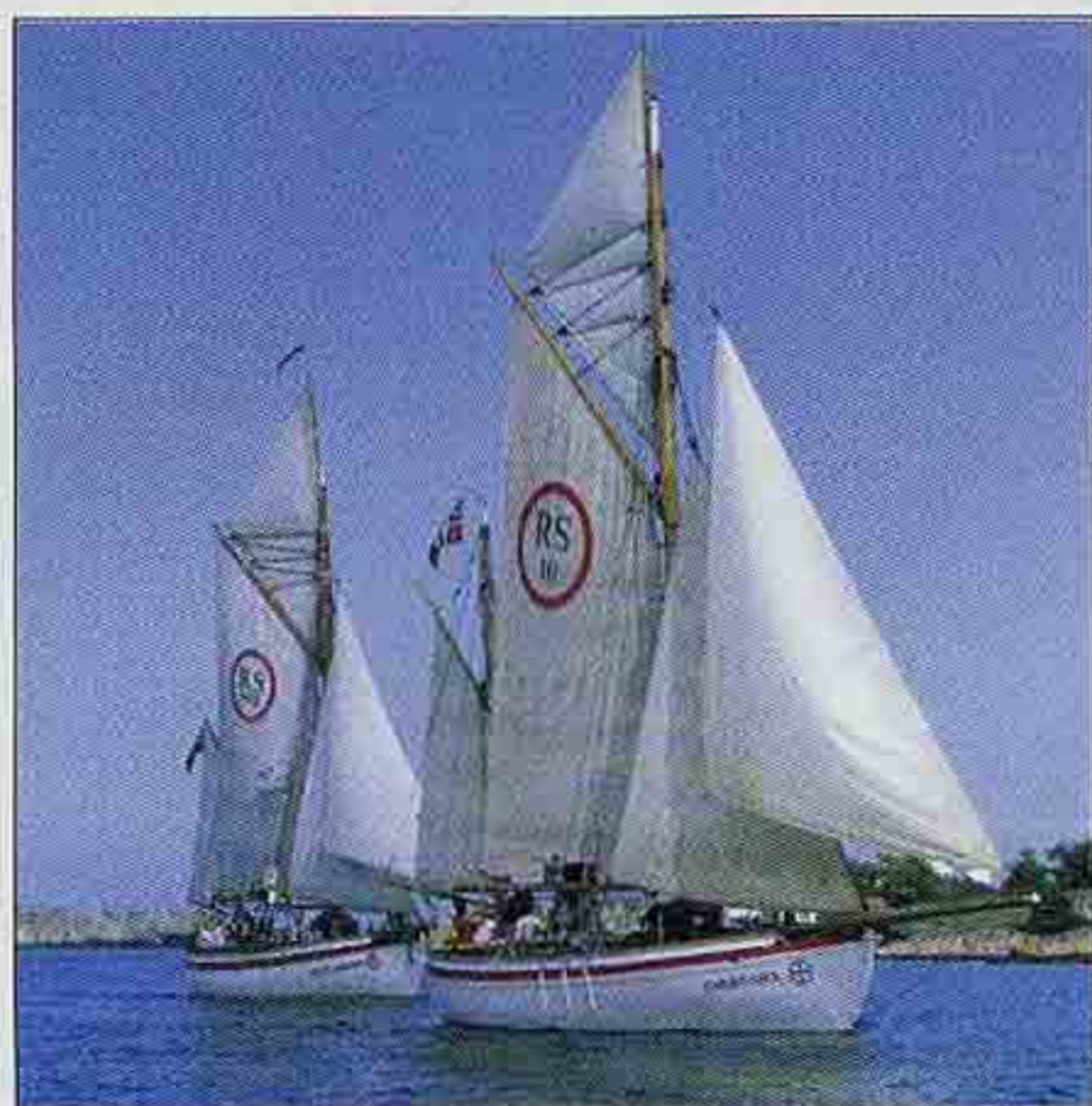
THE MAGAZINE FOR WOODEN BOAT OWNERS, BUILDERS, AND DESIGNERS



South Georgia's Robb White  
Defending Against Shipworms  
Licensing of Yacht Designers  
Alaska's Ranger Boats  
A Sunken Classic is Raised and Restored



JUNE 2001  
NUMBER 160  
\$5.50  
\$6.99 in Canada  
£3.75 in U.K.



Page 58

## FEATURES

### 40 Native Treasure

The beauty of black locust

*Robert Thompson*

### 45 Shipworms

The wood-boring teredo moves north

*David D. Platt*

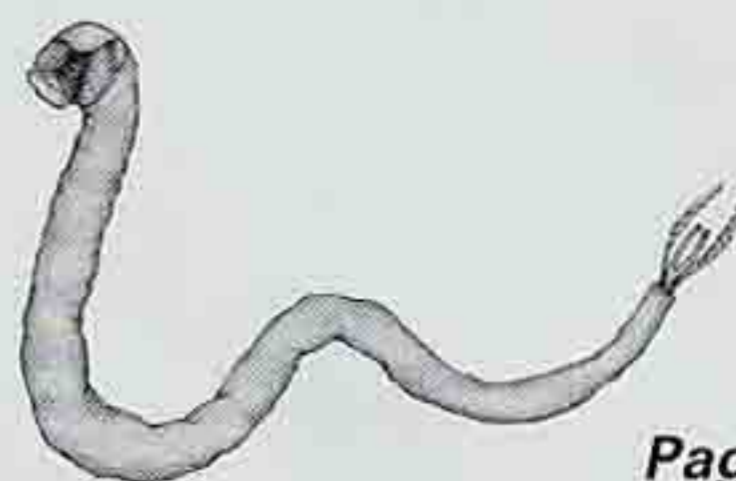
### 50 Challenging the Test

Small-craft designers are wary of engineering licensing for naval architects

*Tom Jackson*



Page 80



Page 45

### 58 Raising CHRISTIANIA

A sunken maritime treasure is retrieved and restored

*Nic Compton*

### 66 The Heir Island Sloop

Modern features, traditional values

*Bill Mayher*

### 72 Cantieri Navale dell'Argentario

Restoring America's classic yachts

*Bruce Halabisky*



Page 66

### 80 The Evolution of Robb White

Boats and free thinking in south Georgia

*Matthew P. Murphy*

### 86 Men, Ships, and the Trees

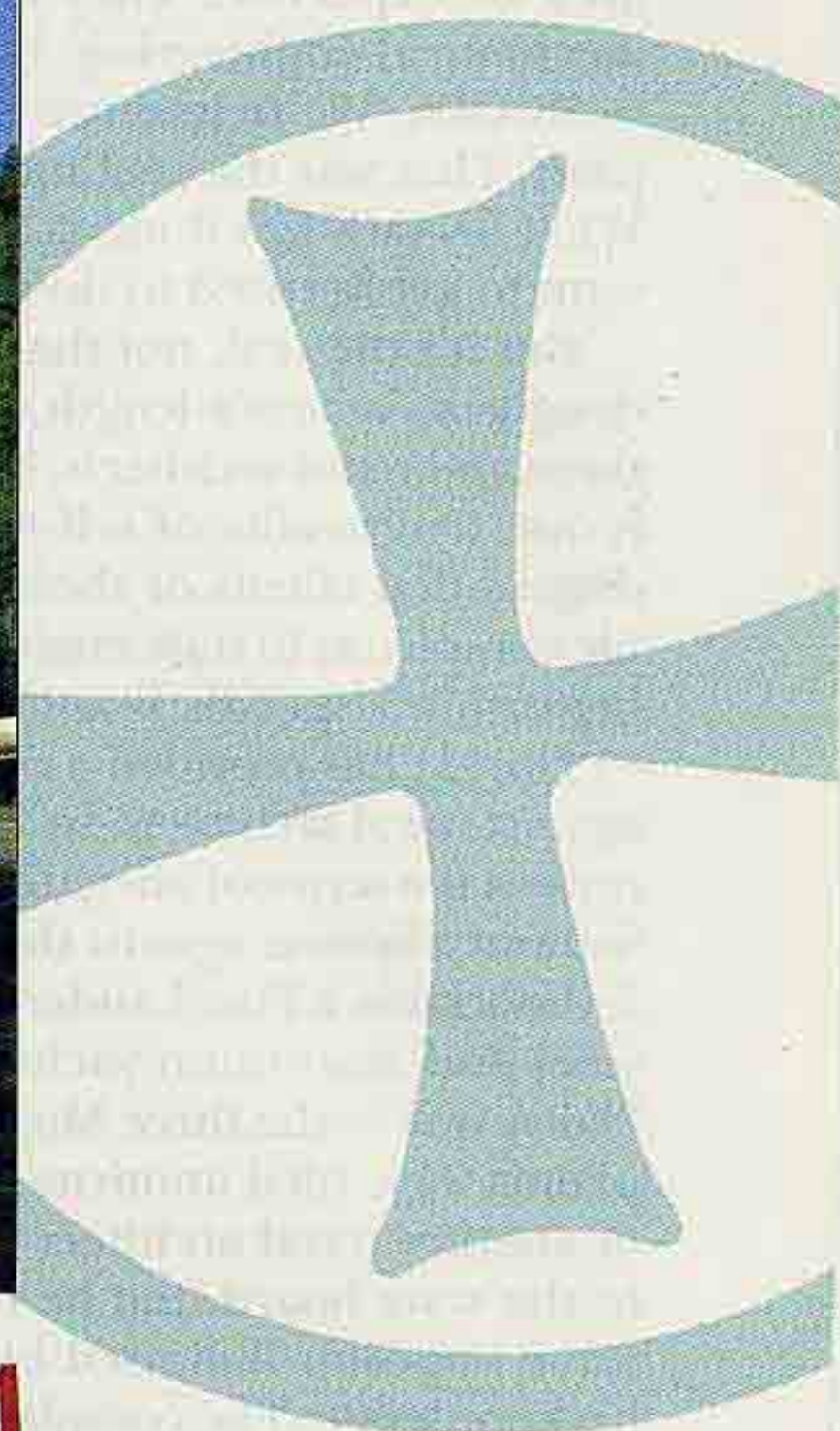
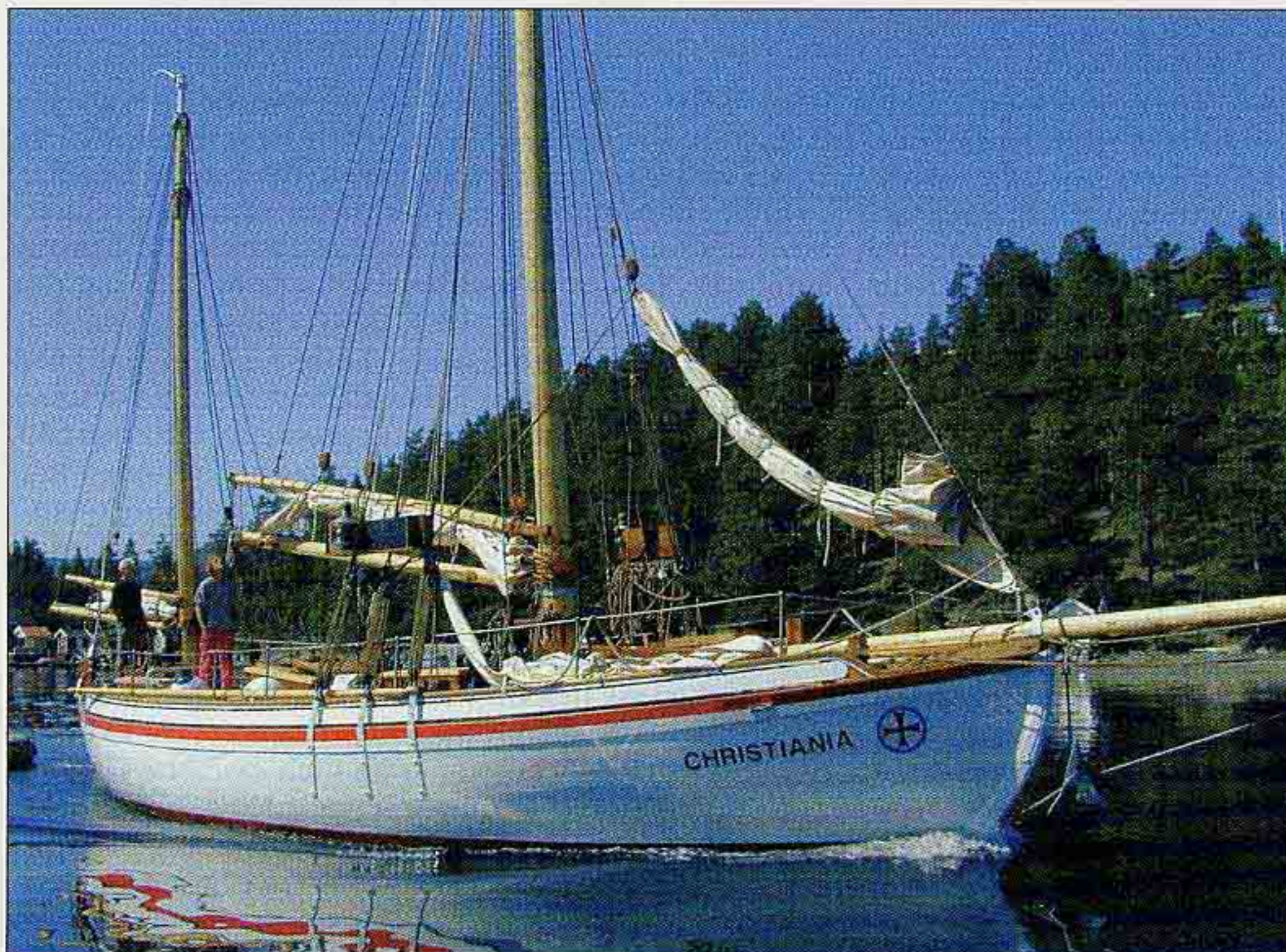
The Ranger boats of Southeast Alaska

*Douglas Cole*

### 106 Building Handy Billy: Part II

An efficient 21' launch

*Maynard Bray and Doug Hylan*



## Raising CHRISTIANIA

A sunken maritime treasure is retrieved and restored

by Nic Compton

Photographs by Johan Petersen

“The incredible words go out on the air: ‘Mayday, Mayday, Mayday. This is CHRISTIANIA, Lima Mike Six Five Eight Four. Position...’ It is like an unbelievable movie. It cannot be true. This is CHRISTIANIA, Norwegian Rescue Ship number ten, which rescued thousands of ships and hundreds of people. Built for going out when others go in; a hull of oak with enormous dimensions. The driest Colin Archer on Earth; in first-class shape, not a rotten plank. And conditions are rough, but normal. But the water around our feet is real enough.”

This was how co-skipper Johan Petersen described the dramatic events of the night of September 9, 1997. The 47' CHRISTIANIA was on a routine passage from Oslo to London—her third crossing of the North Sea that year—when, 15 miles off the southern tip of Norway, she fell off a wave and suddenly developed a massive leak. Despite pumping for three hours with four bilge pumps, by the time the helicopter arrived the yacht was already low in the water. Even the two gasoline-powered emergency pumps that were lowered down to her, with a combined capacity of 300 gallons per minute, were not enough. Four hours after hitting the wave, Johan and the rest of

the crew scrambled into a life raft, and two minutes later their beloved family yacht slid, stern first, into the sea.

The loss of CHRISTIANIA sent shock waves throughout the traditional boat world, particularly in Norway. For CHRISTIANIA was no ordinary boat—she was a Colin Archer, and no ordinary Colin Archer either. She was one of just three surviving MkI rescue ships designed by Norway's most revered naval architect and boatbuilder of the 1890s. More than just a boat, she was a piece of living history. That this should happen to her, of all boats, was all the more surprising as she had been comprehensively restored by the Petersen family in 1977 and thoroughly maintained ever since. The general consensus was that she was “as good as new.” If this could happen to CHRISTIANIA, were any of the old boats safe?

In the usual run of things, the story would end here. CHRISTIANIA had sunk in 1,620' of water, and the chances of rescuing the rescue vessel from that depth seemed pretty remote. But a few weeks later the Petersens returned with a remote operated vehicle (ROV) and managed to locate the vessel on the seabed at 56° 48' north, 7° 39' east. Unbelievably, CHRISTIANIA was sitting quite comfortably, upright in the mud. Closer inspection suggested

CHRISTIANIA rises from the sea floor. She was lifted most of the way in a bow-up attitude, and was leveled before she reached the surface.



that she was intact apart from some damage to the rudder. "She looked just fine sitting in the mud bottom just as she would normally float on the surface," says Johan. "She had just waited."

It was then that the decision to salvage her was made. Had they found a pile of splintered timber beyond reasonable repair, as they had half expected to, it would have been pointless going on. But with CHRISTIANIA in such unexpectedly good shape, the improbable idea of actually lifting her from the seabed suddenly had to be taken more seriously. It had never been done before, but friends in the oil industry assured them that the technology—in theory at least—was there. CHRISTIANIA would, however, have another 18 months of waiting a third of a mile beneath the surface before that theory was put to the test.

Norway's famous Redningskøyter were created to prevent the terrible loss of life suffered for centuries by Norway's fishermen working the fisheries off the exposed west coast—in the mid-1800s as many as 700 men were lost each year. In fact, the country lagged behind others in Europe, most of which had established lifeboat services in the first half of the century, starting with Britain's Royal National Lifeboat Institute (RNLI) in 1824. Finally, in 1891, the Norsk Selskab til Skibbrudnes Redning (NSSR), the Norwegian Society for Sea Rescue, was established, and the following year a competition was held for the design of a suitable lifeboat. The Norwegian coastline needed a very different kind of boat from the other European ones that had land-based rescue stations.

By that time Colin Archer had become a well-established designer and boatbuilder. He had made his money setting up a sheep farm in Australia with his brothers and in 1861 had returned to Norway on the death of his father, a Scottish migrant. Despite having no formal training in naval architecture, Archer decided to pursue his lifelong passion for boats and set up a boatyard at his family home in Larvik. As well as designing pilot boats and yachts, he devised the famous polar vessel FRAM, used by the Norwegian explorers Nansen and Amundsen on their voyages to the Arctic and Antarctic (see WB No. 85).

Archer was on the NSSR board of judges, which found none of the entries entirely satisfactory. And so he was asked to refine his proven pilot boat design for use as a lifesaving vessel. The result was the famous double-ended, double-planked, and fully decked "sea petrels," as they were nicknamed, which have gone on to inspire countless imitations around the world in various materials from



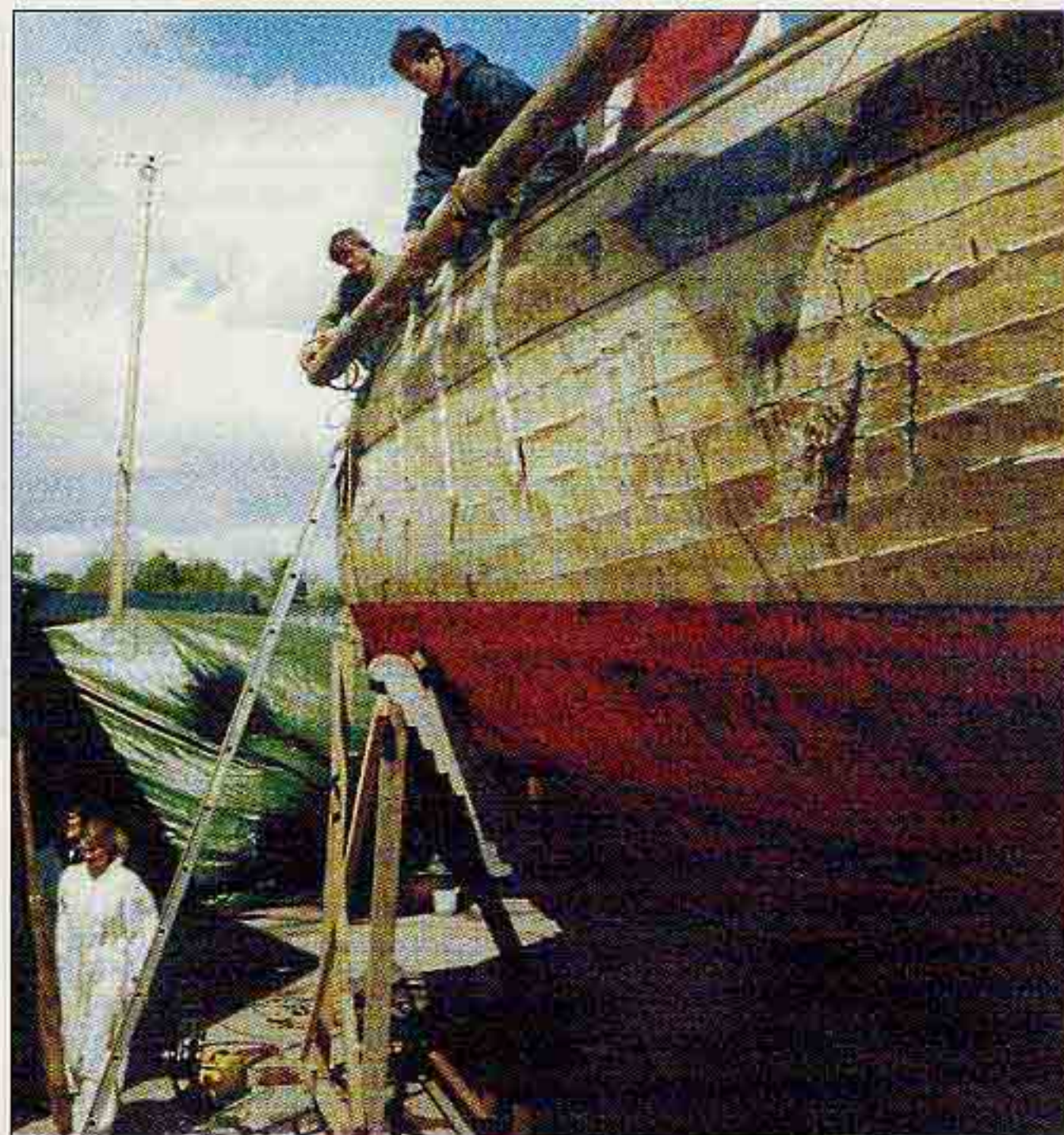
CHRISTIANIA sees the light of day for the first time in 18 months.

wood to fiberglass to ferrocement. Of the 35 original vessels that were built, only three were wrecked while in active service, and 12 are still sailing some 100 years later.

In 1896 the original design was refined by cutting away the forefoot, among other changes, to produce the Svolveer class, of which 10 were built. Later, the design was made beamier and filled out aft to accommodate an inboard engine, although the service remained sail-powered until 1930.

Despite carrying sail number RS10, CHRISTIANIA was the fourth vessel produced to the original design. She was built in 1895 by Carl Arnold at the Christiania shipyard and was named after Norway's capital (later renamed Oslo). During 37 years of active service near Finmark in northernmost Norway, she saved 90 ships, 257 people, and assisted 2,881 boats—a record bettered only by her sistership RS8 OSCAR TYBRING. After retiring from service in 1932, she was converted to carry cargo by the addition of an engine and wheelhouse and a much-reduced rig. Later, she was purchased and converted to a yacht by Erling Brunborg.

The Petersens had an indirect connection with CHRISTIANIA from her earliest days as a yacht. From 1957 to 1960, Carl Emil Petersen, Sr., and his friend Brunborg completed a circumnavigation aboard the 44' RUNDØ, a pilot boat built in 1925. Once back in Norway, Carl Emil bought Erling's share of the vessel and



**Left**—CHRISTIANIA was transported from Mandal to Telemark aboard the coastal freighter NORDSCOTT.

**Above**—Throughout the entire recovery and rebuilding, many Petersen family friends contributed time and advice. Here, a volunteer crew cleans and dismantles CHRISTIANIA at the yard in Telemark.

for the next decade sailed her in home waters while he and his wife Tori produced their own flock of seabirds: three boys named Carl Emil, Jr., Børre, and Johan. The boys were brought up with “one foot on the deck,” as Johan puts it, and aged just ten and eight the two eldest accompanied their father in RUNDØ for the first part of a trip around the island of Spitsbergen in the Barents Sea north of Norway, the first yacht to do so.

Before long Carl Emil, Sr., and Tori were off again, this time on an expedition to northeast Greenland, taking the whole family with them as far as Iceland, from where the children flew home. Their parents didn’t get off so lightly, however, and on the return trip RUNDØ was crushed in drifting ice and had to be abandoned. This is the stuff of adventure books, and indeed Carl Emil, Sr., has written several books of his journeys which have become definitive sailing texts in Norway.

Meanwhile Carl Emil’s old comrade Erling had gone off to Norway’s west coast to find a replacement for his half-share of RUNDØ. He came up with an old rescue boat turned coaster by the name of CHRISTIANIA. After restoring her fully to sail, he cruised the south coast of Norway around Risør, where he ran a restaurant, until 1968 when he sold her to a young man with a passion for traditional Norwegian craft. Richard Cook sailed her in northern Norway until his death in a car accident in 1975, after which the vessel lay idle for several years until the Petersens reemerged on the scene.

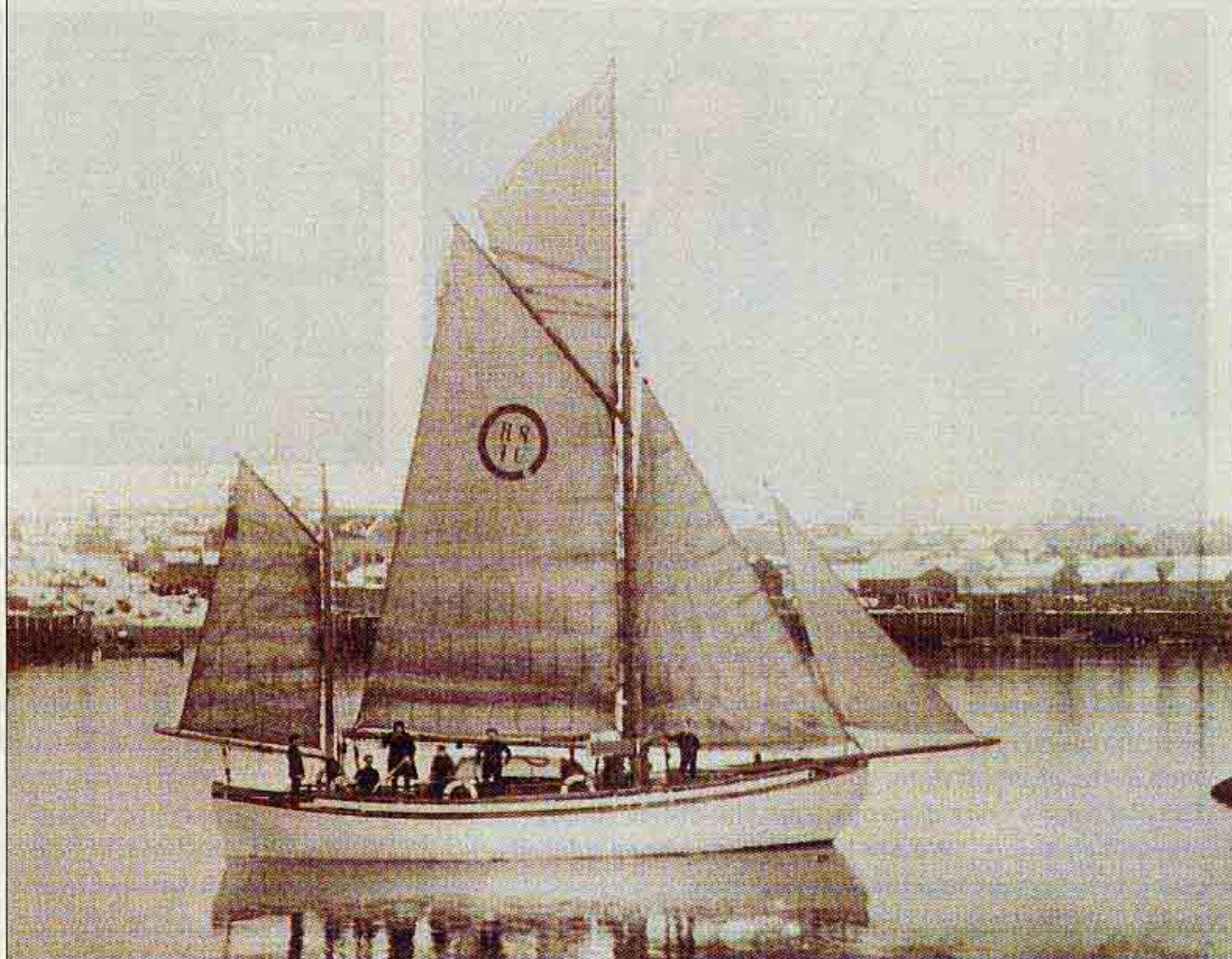
After the loss of RUNDØ off Greenland, the family remembered Erling’s old CHRISTIANIA and took her over that autumn. Before long they had fitted a new deck, replaced the topside planking, and carried out a com-

plete restoration of the boat—at which point she was considered “as good as new.” The following year the whole family embarked on a circumnavigation of the British Isles, aiming to reach the Isle of Man for the 1979 millennial Viking celebrations. Johan was just nine years old, but he remembers having to heave-to in a gale amid the oil rigs in the North Sea, and his disappointment at realizing, when Elizabeth II opened the proceedings, that the British Queen was “just an ordinary lady with a stupid hat.”

But the Petersens are not only responsible for instilling their three sons with a love of sailing. From 1980 CHRISTIANIA started to take part regularly in the Tall Ships races, in which at least half the crew must be between 15 and 25 years old. Up until 1997, when CHRISTIANIA joined the Aberdeen-to-Trondheim leg, she had taken part in eight Tall Ships races, taking on board dozens of trainees. Of course, racing results aren’t the main objective, but despite her relatively small size, CHRISTIANIA did manage a first place in class and overall in the run from Kiel to Norrköping in 1987. Oslo’s esteemed life-saver was also to be found at traditional boat rallies around Europe, winning a prize for best restoration at the famous Douarnenez festival in 1988.

**B**y the summer of 1997, Johan was about to start a master’s degree in social anthropology at the London School of Economics. His accommodation for the year was to be CHRISTIANIA herself, which was to be moored on the Thames for the duration. So, after completing the Scotland-to-Norway leg of that year’s Tall

CHRISTIANIA in service in Vardø in northernmost Norway at the end of the 19th century.



Ships races, CHRISTIANIA headed south to Oslo. There Johan and his brother Carl Emil, Jr., were joined by four friends, Are, Anne, Runa, and Michael, all in their twenties and with varied sailing experience. They headed south as far as Lindesnes, where they waited a couple of days for the Force 9 southwesterly to abate.

That Monday the wind veered to the northwest, which meant it was no longer on the nose, though it was still blowing a strong gale—"perfect for CHRISTIANIA," as Johan says. After all, the rescue boats were designed to put to sea when others were heading for shelter, so they need a bit of a blow to get them going. Indeed the British designer John Illingworth is said to have compared their performance to windward to "a cow in a bog." But there was nothing cowlike about CHRISTIANIA as she flew through 14' waves at 7 knots under just mainsail and jib, heading across the North Sea for London. Johan and Carl Emil even contemplated putting up more sail, but with nightfall approaching they agreed to hold off until the next morning. It was a wise decision.

The events that followed are every sailor's nightmare: a sudden inexplicable leak with no clear source in the midst of a gale, at night, and many miles from land. The boat's inner layer of planking and her bilge partly hidden by lead ballast exacerbated the situation, depriving the crew of clear access to the damaged area. Changing tacks to try to lift the leak had no effect, and four bilge pumps were unable to keep up with the incoming water, which they later estimated at 370 gallons per minute. The brothers stayed on deck trying to keep CHRISTIANIA afloat until the last possible minute, not wanting to believe that the boat that had looked after them for so many years had been irretrievably struck down.

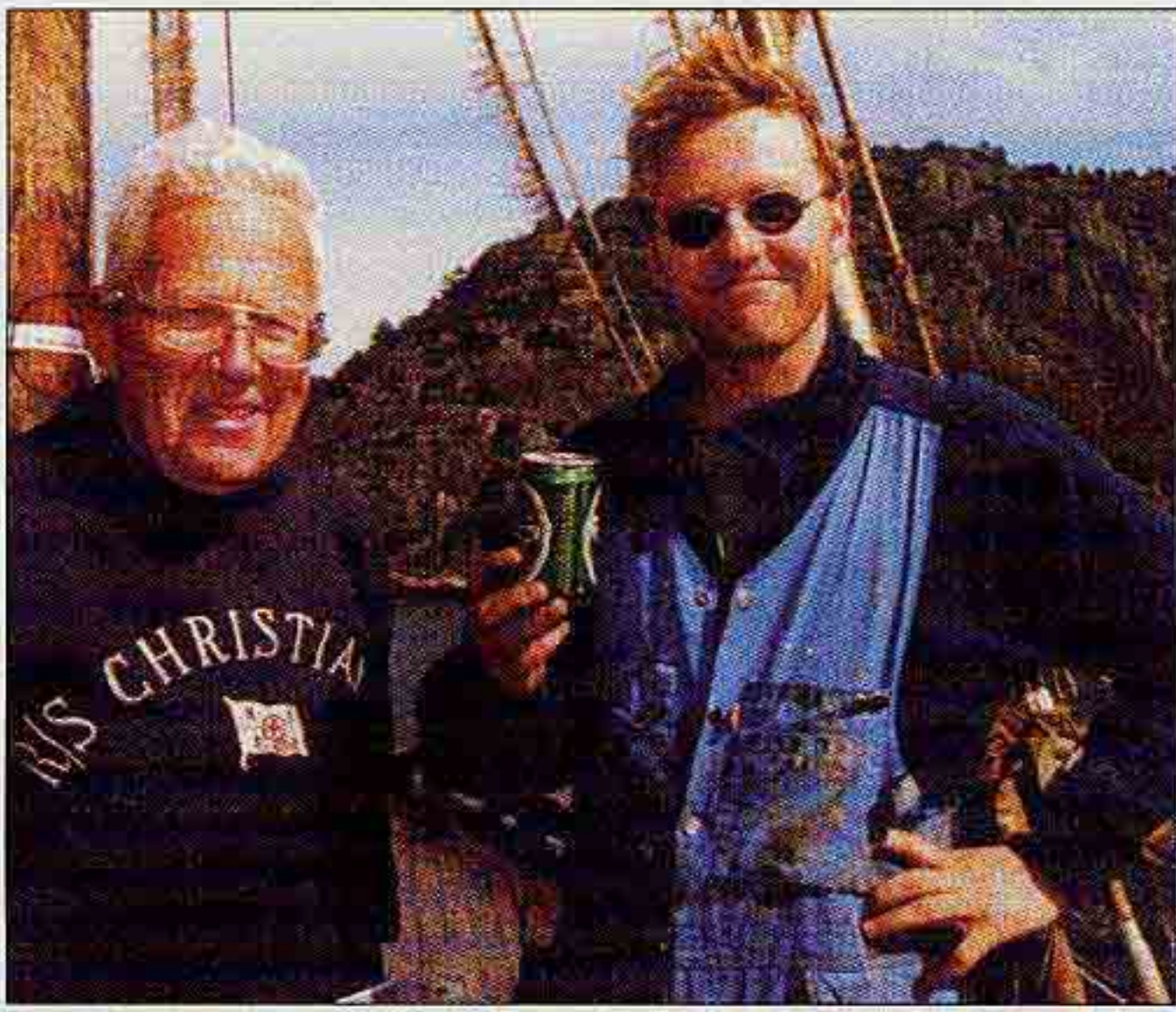
"It was very unreal. Like a nightmare you expect to wake up from any moment," says Johan. "We were not afraid, though. We felt we had good control and knew we had the right equipment to save ourselves. We had

radio contact from early on, and had the life raft inflated two hours before we left ship. But it was terrible to realize we were losing CHRISTIANIA."

As they eventually joined the others in the life raft and watched the yacht sink to the bottom, Carl Emil shouted: "Shit. There goes 102 years of history." It must have seemed as if Colin Archer himself were turning in his grave. For, as great as the personal loss was, even then they were all acutely aware of the even greater loss for Norwegian maritime culture.

**T**he discovery of CHRISTIANIA on the seabed in a state of semi-preservation raised hopes that she might be raised. But was it technically possible? Knut von Trepka, skipper of CHRISTIANIA's sistership RSI COLIN ARCHER and an oil rig engineer, thought so. He played a crucial role in advising the Petersens on the project and devised a cradle to support the hull while it was being lifted. Meanwhile, the family members were busy trying to find ways of funding the project; at full commercial rates, the operation would be beyond their means, so it was a matter of persuading a salvage company to take on the job at cost.

Eventually, the offshore engineering company Stolt Comex Seaway agreed to have a go. And so, 20 months after CHRISTIANIA sank, the brothers, accompanied by their father, Knut von Trepka, and Jan Muren (another friendly engineer), boarded the 300' KINGFISHER in Haugesund. The high-tech oil exploration vessel is fitted with dynamic positioning which, aided by computer-controlled thrusters and propellers, keeps it precisely on station. The ship also carries ROVs, winches, and a crew of 40. In the center is the "moon pool" down which the largest winch is operated to keep the weight central and provide protection when launching and recovering the rig and tools.



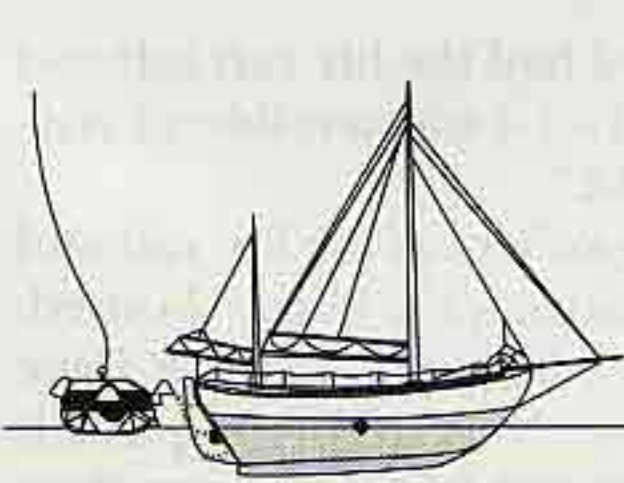
Carl Emil Petersen, Sr., and son Johan share a "matured" beer that survived a year and a half in CHRISTIANIA's cabin, seen in the photo at right, soon after the boat was raised. The electronics were destroyed, but the dishes simply required cleaning. "We are lucky to have been a family doing this project together," says Johan.



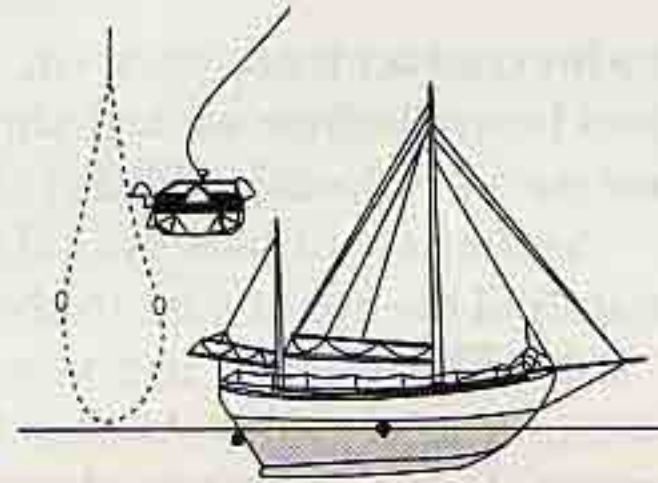
KINGFISHER arrived at 56° 48' north, 7° 39' east at 4:25 a.m. on Sunday, May 2, 1999. As the sun rose, the weather was clear and the sea almost calm, in complete contrast to the last time they were at the same place on board CHRISTIANIA. After a tense hour, the ROV found the yacht, looking just as she had when discovered, except that the current had shifted the sea bed and more of her underwater shape was now visible.

The plan was to slip the two halves of a cradle down along each end of the hull and to then join them together. The vessel would be lifted bow first, since that end was

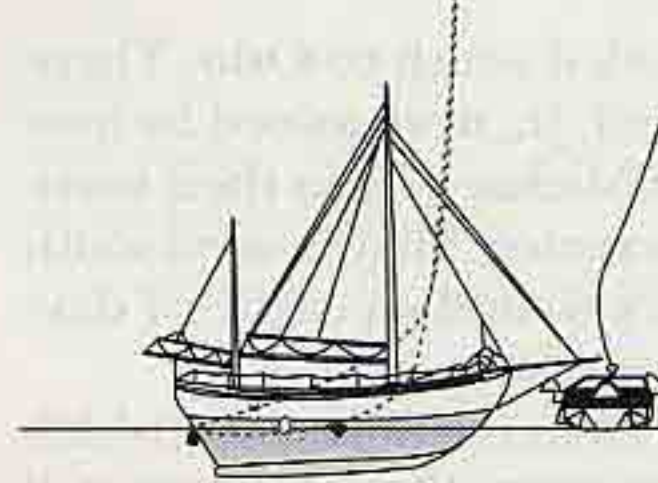
*How CHRISTIANIA was raised...*



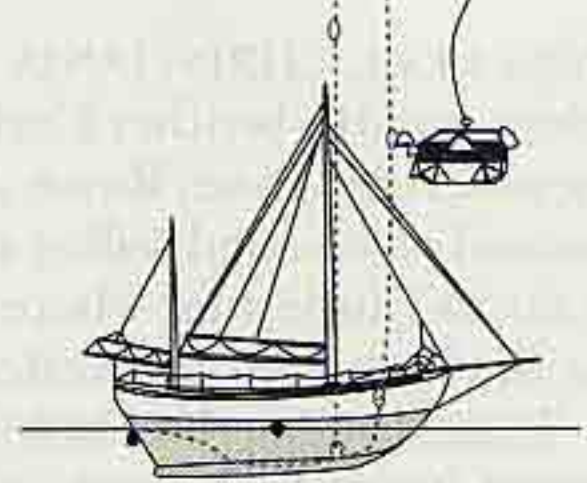
1. Cut rudder hinges with grinder, remove rudder



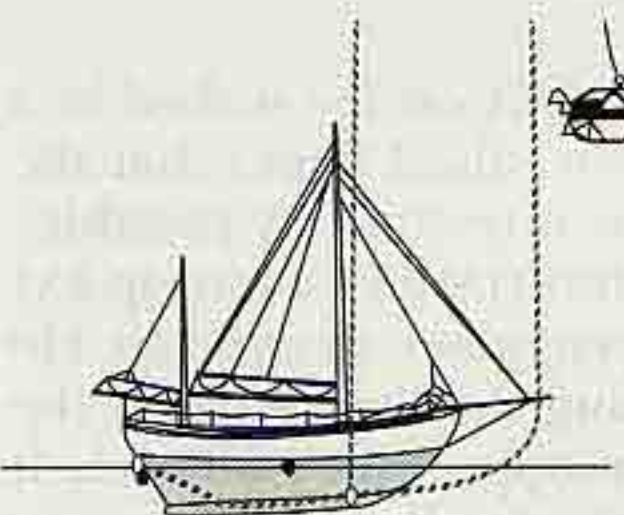
2. ROV guides lifting slings into position



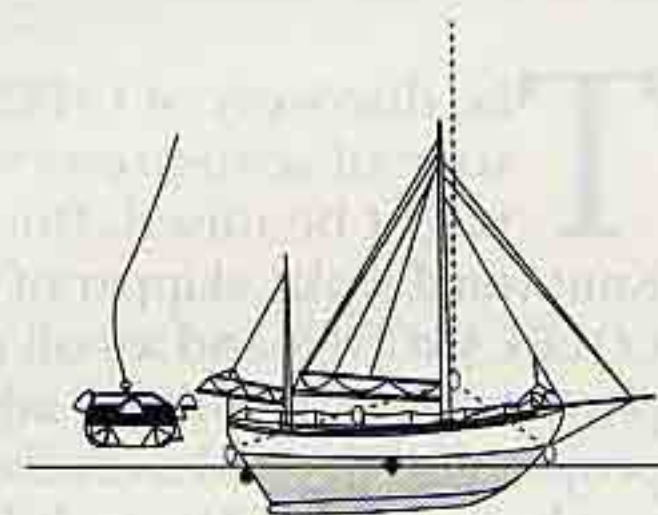
3. Lower lifting cable, which is led through surface ship's "moon pool"



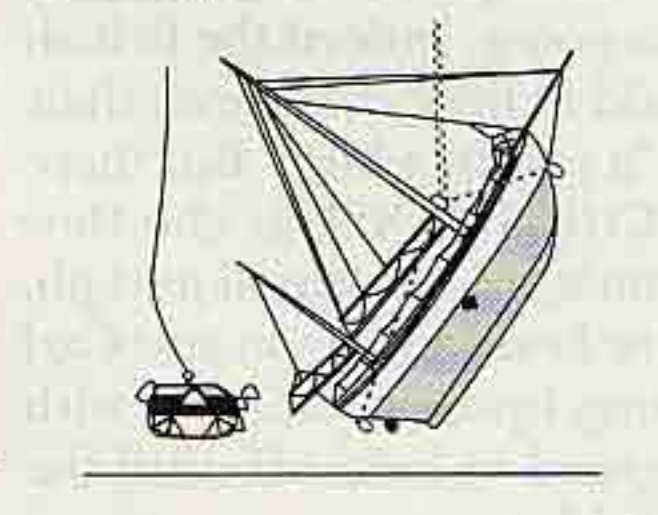
4. Fasten fore sling to master link 1 using ROV



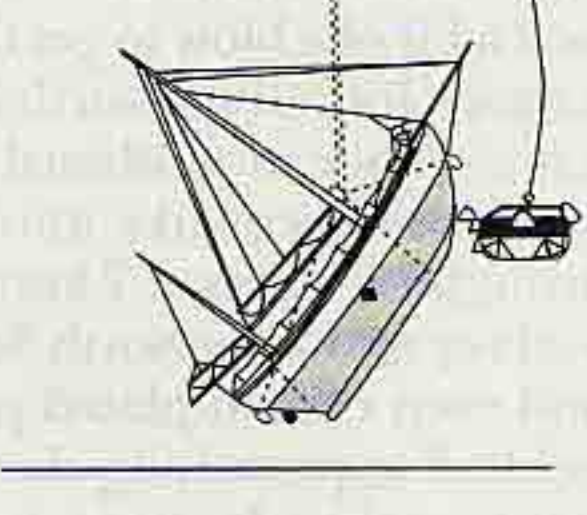
5. ROV swims around and fastens fore sling in master link 2



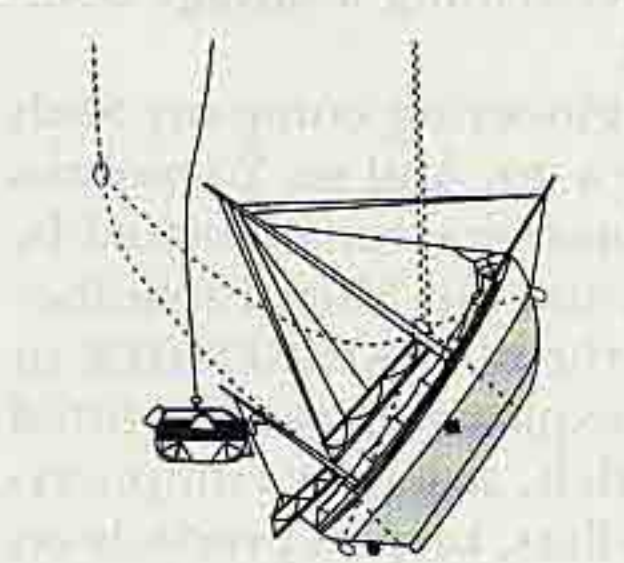
6. Apply tension to cable while using jet to dredge around hull



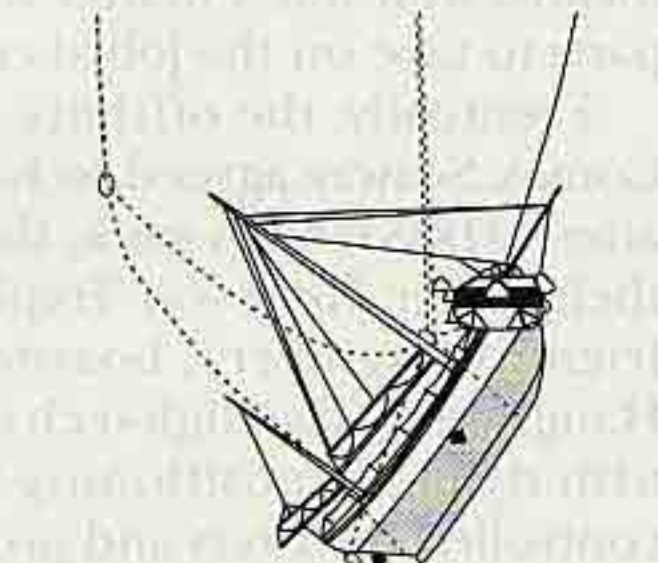
7. Lift CHRISTIANIA



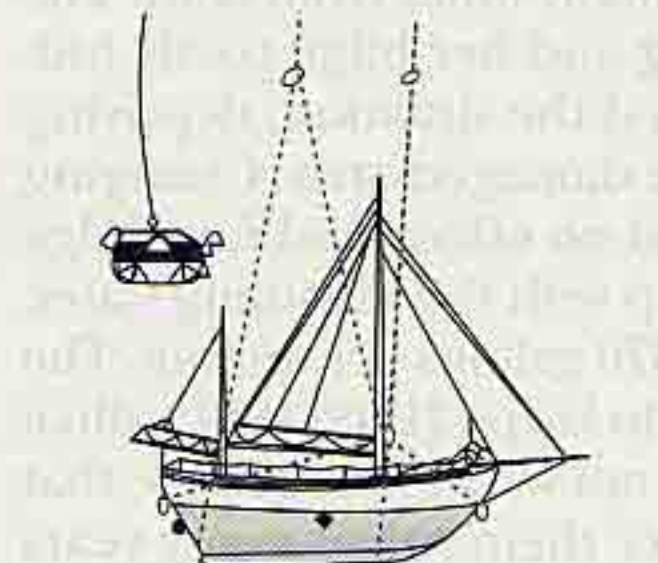
8. ROV fastens three security slings



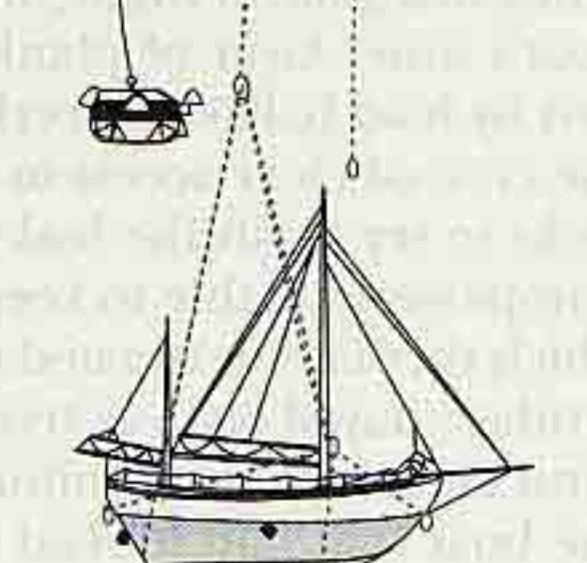
9. Fasten lift slings to crane cable, which leads over KINGFISHER's side



10. Fasten forward lift sling to crane cable

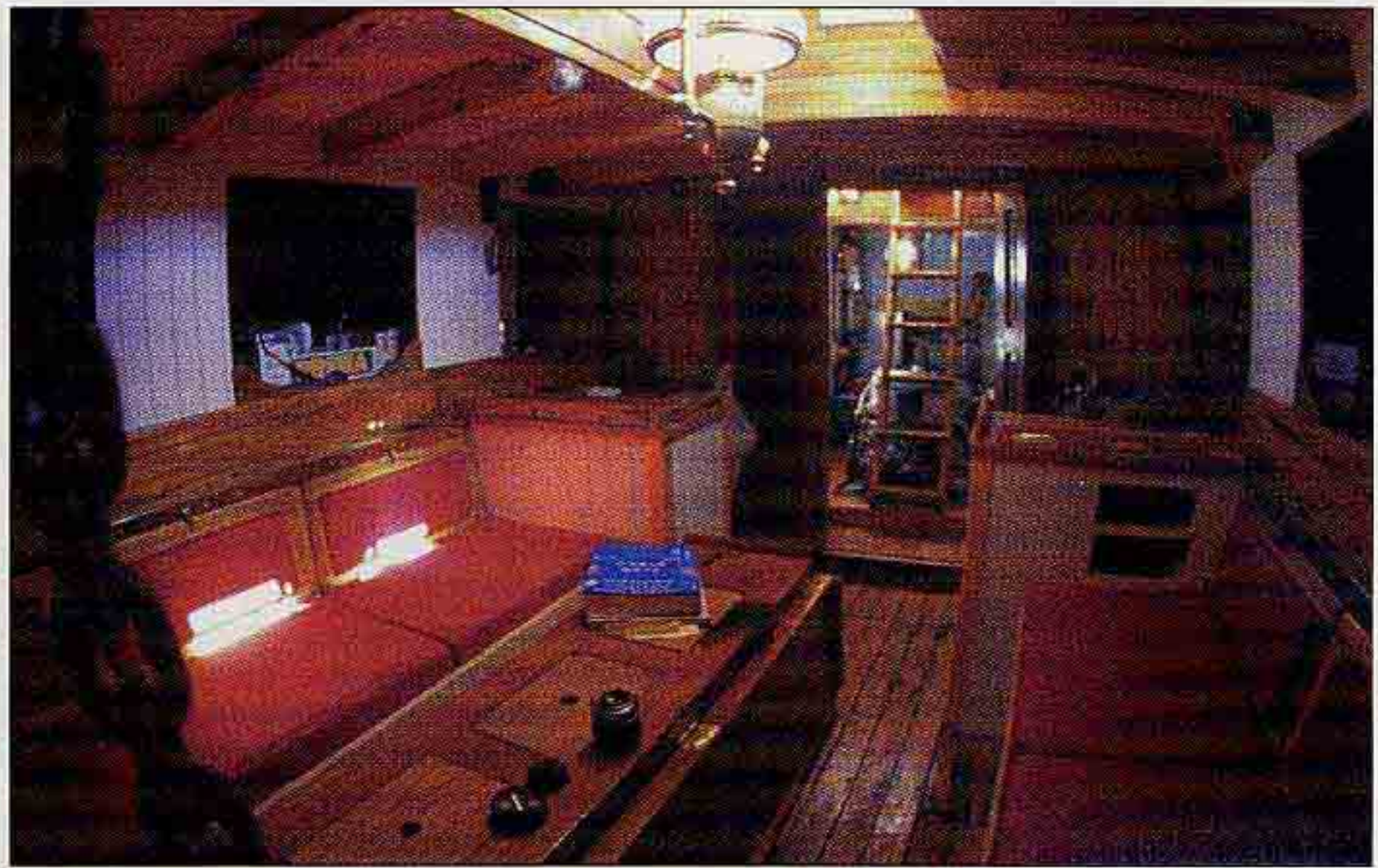


11. Lower moon pool wire until crane takes entire load



12. Disconnect and withdraw moon pool cable, and lift until CHRISTIANIA's main deck breaks surface alongside KINGFISHER

STOLT/COMEX SEAWAY



the shallowest and therefore less likely to “stick” in the mud. It would also prevent the rigging from fouling the lifting gear. After 17 hours of painstaking work, maneuvering the ROV around the vessel and using a variety of tools pulled out of the machine’s “stomach,” the cradle was in place and CHRISTIANIA was ready to be raised.

As the winch was wound in, the tension mounted—both 1,600’ underwater and right above on the surface in KINGFISHER’s control room, as the Petersens watched their months of planning being put into action. At three tons of lift the bow began to move; at ten tons it began to lift; and at 13 tons the whole boat lifted off the seabed, smoothly and with unexpected ease. It took ten minutes for her to be lifted the first 1,000’, her bowsprit pointing upwards dramatically. At 330’ below sea level, the winch was stopped and the vessel hung, suspended in “mid-water.” Two additional straps were fitted, and the boat was leveled and its weight shifted to the port winch so that she would emerge alongside KINGFISHER rather than in the small “moon pool.”

Finally, at 9:00 a.m. on May 3, 1999, the top of CHRISTIANIA’s mast broke the surface of the sea, gradually followed by the rest of her seaweed-encrusted rig. Symbolically, this was the great moment, and the photographs of this strange, tentacular sea monster appearing out of a swirling, empty sea are some of the most memorable maritime images ever. For the family and friends, such as brother Børre, who had arrived later on a modern rescue ship, it must have been a painfully moving sight. Aboard KINGFISHER, however, the crew were professionally level-headed. “That part had become ‘normalized’ from watching her and working with her through the cameras for two days,” says Johan.

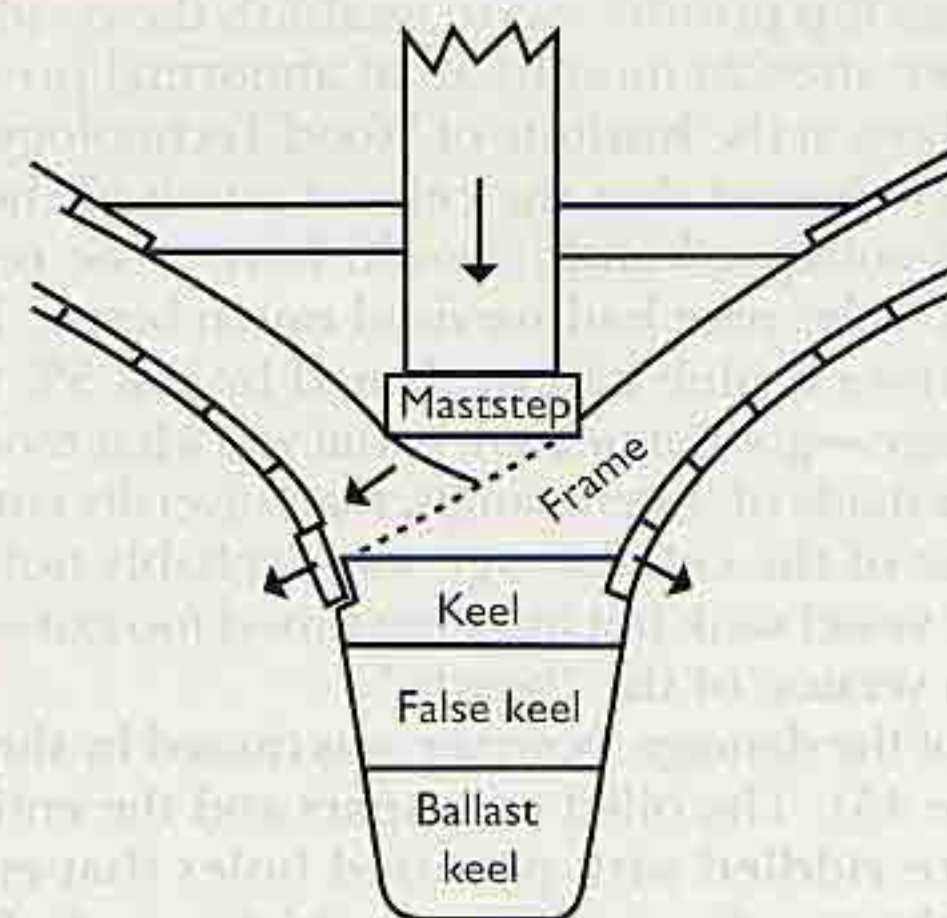
A crew from KINGFISHER were the first onboard and immediately set to pumping the hull out. Once emptied, the vessel floated of her own accord, with no obvious leaks—the hull having seemingly swollen up during its 20 months underwater and healed itself, an irony not lost on the assembled onlookers.

CHRISTIANIA was then towed back to Mandal in southern Norway, where family, friends, and the press were awaiting for an emotional reunion. Once there, she was craned ashore and the Petersens could come to terms with the return of their long-lost family member. Here

The main saloon’s oil lamp came from a ship that wrecked on the Norwegian coast; the crew of that vessel was saved, and the lamp was a gift to the rescuers. It was in turn a gift to the pilot boat RUNDØ, which Carl Emil Petersen owned when she was wrecked in ice on a voyage to Greenland. The lamp, which subsequently was installed in CHRISTIANIA and is shown above in the restored saloon, “has had its ups and downs,” says Johan Petersen.

the damage was assessed and much of the debris removed—including mattresses so saturated with water and mud that they weighed 100 lbs apiece. Personal possessions were strewn everywhere: Carl Emil, Sr.’s paraffin lamp, Jr.’s sunglasses and wallet, and Johan’s CDs which, despite their ordeal, still played just fine. The cans of beer were still drinkable, although water had seeped into the bottles of spirits. Even the visitors’ book and ship’s log were salvageable.

The big question everyone wanted an answer for—including every Colin Archer owner in the land—was, what had caused the sinking in the first place? The



KNUT VON TREPKE/JOHAN J. PETERSEN

A section of the maststep area showing the forces and construction flaw that caused CHRISTIANIA’s sinking. The maststep spread the ends of the two-piece floor timber, which wedged the garboards from the rabbet.



**Right**—Tone Petersen repaints CHRISTIANIA's interior. The saloon has not been altered; limited wood was replaced, as required.

**Below**—Børre Petersen oils the new deck and old hatches in April 2000.

answer was not long in coming. A gap of about  $\frac{1}{4}$ "– $\frac{1}{2}$ " along 10' on either side of the maststep was the clue. (The gap was probably larger when CHRISTIANIA went down and may have narrowed due to swelling and the impact of hitting the seabed.) Closer inspection revealed that the doubled floor timber directly under the mast was not built to Colin Archer's specifications. Instead of both timbers being made of single lengths of wood, as detailed in Archer's plans, the almost had a butt joint in the middle. With age, the nails holding the timbers together had grown tired and allowed some movement between them. As the mast pressed down on the maststep, the step pushed down like a wedge, pushing the two halves of the jointed floor timber apart and opening the garboard seam in the process. It was a small mistake by one builder, probably due to a shortage of good oak, but 102 years later it was enough to sink the boat.

But while the cause of the sinking would be relatively easy to rectify, its consequences were far more serious. First of all, the boat would have to dry out. Before she sank, CHRISTIANIA weighed some 30 tons fully equipped—by the time she was put ashore at Mandal, even after the engine and much else had been removed, she weighed 42 tons. Keeping the hull wet to prevent it from drying out too quickly was a constant task for the first few months and, as a further precaution, the copper bottom sheathing was removed to ensure she dried evenly. It wasn't until the autumn that the wood was finally dry enough for restoration to begin.

Another top priority was to establish the condition of the timber after 20 months at an abnormal pressure of 725 psi. Tests at the Institute of Wood Technology at Oslo University showed that the cells of much of the newer pine had collapsed and it would have to be replaced, while the older pine had survived much better. The oak and heartwood pine had weakened by just 5% with no cell damage—good news, since that was what most of the vessel was made of. Interestingly, the university concluded that some of the cell damage was probably not caused when the vessel sank but by being raised too fast—wood's very own version of the "bends."

Most of the damage, however, was caused by shipworms (see page 45). The oiled pine spars and the entire pine deck were riddled with pin-sized holes that enlarged beneath the wood's surface to the thickness of a finger—although why the worms feasted on some of the identical mast hoops and not others was never quite clear. Some of the interior surfaces were also worm-eaten.

The restoration work was entrusted to Hansen & Arntzen



in Stathelle, who clocked up a total of nearly 9,000 hours. Besides replacing the worm-eaten and pressure-damaged timber, the yard also added substantial reinforcement to the area around the maststep. The keelson was reinforced by a steel plate to spread the pressure from the mainmast, and additional laminated frames were fitted in the area. At the same time, the damaged wooden keel was replaced, along with 40% of the planking—overall, about 30% of the hull timber was renewed. The Petersens took this opportunity to make a few long-wished-for alterations below deck, including double berths fore and aft and a better-working navigation area. The mizzenmast was returned to its original position a foot farther aft, allowing for a larger mainsail, and the rigging beefed up to rescue ship MkIII standards. Other original features, such as the separate storage area in the bow, were reinstated. A new engine was fitted, but many of the old fittings survived, including the Simpson & Lawrence heads, which merely needed a new set of flanges; most of the well-greased shackles could still be opened by hand pressure alone.

The target for the relaunching was Carl Emil, Sr.'s 75th birthday celebration on May 13, 2000 in Oslo. The old sails had been laundered and, along with most of the synthetic running rigging, were found to be more or less intact. On May 10, a crisp sunny day just over a year after she was retrieved from the seabed, CHRISTIANIA set sail once more. After all the drama of the previous few months,



OLE HENRIK NISSEN-LIE

By the summer of 2000, CHRISTIANIA was again sailing in the company of friends. Here she is at the Risør Trebåtfestival with RS-1 COLIN ARCHER.

the overwhelming mood aboard ship was a feeling of homecoming. "Funnily enough, when we finally left the wharf, after the whole restoration process, we mounted and hoisted the sails, took a beer on deck, and it was as if we had never done anything else," says Johan, who had worked full time on the project for the final months of the restoration. "It was back to normal, so to speak. Three years of not having her sailing were wiped out."

The euphoria would come later, when CHRISTIANIA attended the Risør Wooden Boat Festival in August that year—still wearing her pre-sinking sails. It was as if a long-lost heroine had returned. Cameras followed her wherever

she went and, back at the quayside, a steady stream of visitors came to welcome her back and congratulate the Petersens on their work. Looking around on deck it was hard to spot any evidence of what this vessel had endured. Only as you climbed below decks did you notice the companionway ladder, lovingly stripped and reoiled—complete with an abundant crop of worm holes, a poignant reminder of the extraordinary happenings that took place on board Colin Archer's bravest sea petrel.

**▲**  
*Nic Compton, the former editor of Britain's Classic Boat magazine, is now roaming the globe as a freelance journalist.*