

Quest #202 Shipwrecks!

Christine Young, Program Host: I'm Christine Young. Next time on Quest we go underwater in search of Maine shipwrecks.

Nautical archaeologist, Warren Riess is one of the best in the field. He'll take us along as he dives for three underwater wrecks.

What are the best ways to preserve shipwreck relics? Scientists debate wet versus dry, and the risk of sport divers getting to shipwrecks before archaeologists. That's next time on Quest.

(Music)

Christine Young, Program Host: Coming up on Quest, we go diving with one of the country's leading underwater archaeologists to find Maine shipwrecks. Scientists used to think the best way to preserve shipwrecks was to keep them wet. We'll see how the new thinking in preservation is to treat wrecks like kiln-dried lumber, and what can happen when treasure hunters, not archaeologists, are the first ones to find a shipwreck. Quest is next.

Male: Production of Quest on Maine Public Television is made possible in part by Garrand & Co., Inc., of Lewiston, a full-service advertising agency providing marketing, direct response, and public relations solutions for clients throughout New England.

(Music)

Christine Young, Program Host: Sailing days are over for the Cora F. Cressey, now at rest here at Core Island Cove in Medomak. This turn-of-the-century, five-masted schooner goes back to the days when ships would wreck off the treacherous coast of Maine nearly every day. There have literally been hundreds of shipwrecks here in Maine. Many of us have an insatiable curiosity about these ill-fated ships, probably because few of them are as easy to get to as the Cora F. Cressey. Warren Riess dives the waters of Maine each summer in search of mysterious wrecks. Riess is considered one of the best underwater archaeologists in the country. His recent dive at Boone Island is one reason why. Dana Hutchins followed that dive.

(Singing sea chanty) Oh, here's to Philip Spencer who when about to die, when sinking down beneath the waves like shouted out..

Chorus: So fill your glasses to the brim and drink with manly pride. Humanity received a blow when Philip Spencer died.

Oh, here's to those of greater fame, martyrs without a sigh, they loved the name, they died in flame, they rescued their..

Dana Hutchins, Segment Host: In the summer of 1995, off the Maine coast at York, scientists found a buried treasure. Even though there weren't any gold or jewels found in this archaeological jackpot, to these scientists this find is as good as it gets.

Hoisted out of these clear green-blue waters was a panoply of military items from a bygone era. Nine cannons and a number of grenades and other munitions were retrieved from a shipwreck nearly 300 years old.

In the summer these waters can be deceptively calm, but at other times of the year navigators consider this area as one of the North Atlantic's most perilous.

The British merchant ship Nottingham Galley was shattered when it crashed onto the rocks at Boone Island in a December snowstorm in 1710.

The tallest lighthouse in Maine now helps keep ships off her rocky, barren, shrubless shoals, which are nearly invisible in high surf.

Like many other shipwrecks along Maine's coast, the Nottingham Galley has fascinated Warren Riess.

Warren Riess, Maritime Historian/Archaeologist: We know almost nothing about the merchant ships of the time period ... very common, so common nobody wrote about them. The ship came, it left. We don't know how the ship was designed. We don't know how it was built. Today, I cannot draw you a picture of that ship, even ... with any detail at all. Nobody knows.

Conversation.

Dana Hutchins, Segment Host: Riess is an underwater archaeologist, and at the top of his field in Maine. He's well versed in nautical archaeology and history, and teaches several courses at the University of Maine.

Warren Riess, Maritime Historian/Archaeologist: Was this the gun that was down in the crevice, that we had so much trouble getting out?

Male: Ya, it was, 'cause that's where that came out of.

Dana Hutchins, Segment Host: Riess is also an archaeological consultant who gets research grants to look for wrecks like the Nottingham Galley. He's going back to Boone Island to search in deeper waters.

The British ship loaded with supplies was headed for Maine in thick winter weather when it rammed into Boone Island.

Boone Island is more ledge than island. It's only 700 feet long and none of it is more than 14 feet above sea level. Even though it was only 8 miles from the shores of York, the Nottingham Galley crew was marooned for weeks, as one storm after another tormented them and prevented any passing ships from seeing them. All 14 men on board survived the crash, but only 10 were left 3 weeks later when help finally arrived. It was extremely cold and there was no place sheltered enough to build a fire. They also had very little to eat. They subsisted on mussels and rockweed.

Two crew members died trying to reach the shore on a makeshift raft, and 2 others died of exposure. During the final days one of the dead, a portly carpenter, was eaten by the survivors so they could stay alive; but perhaps just as horrible as the cannibalism was the tragedy of being so close to the shore they could see it, but no one could see them.

Warren Riess, Maritime Historian/Archaeologist: Four men died and yet a miracle of tenacity and ability that 10 of them lived that long.

(Music)

Dana Hutchins, Segment Host: There's no question that there have been numerous shipwrecks in Maine.

Libraries throughout the state are lined with stories about wrecks caused by violent weather, or ragged rocks, or drunken crews. Some were even intentional collisions, or sabotage.

(Music)

Dana Hutchins, Segment Host: During the last couple of centuries there were many ships plying Maine waters. Not only because of the trade going in and out of our ports, but also because all of the ships Maine was building.

(Singing a sea chanty) ... and listen to my song. I'll tell you how I met me fate when I was very young.

Dana Hutchins, Segment Host: Despite our fascination with shipwrecks, only a small number of them have actually been found. We think we know a lot about wrecks, but we really don't.

Warren Riess, Maritime Historian/Archaeologist: Yeah, I think a lot of people don't understand that we don't know how ships were built. We're just starting to learn that. These were well-kept secrets. These were...the shipwrights were very talented. They were the rocket scientists of their age. The ship was the most complex technical thing that a maritime culture could make and was the most expensive thing they would make. It's like the space shuttle today, or something like that.

Dana Hutchins, Segment Host: Of those shipwrecks that we know about, there are a few famous ones, usually caused by winter storms.

The mouth of the Kennebec River was well known for being perilous because of strong tides and more rocks than are humanly possible to keep track of.

In November of 1849 the Hanover, a 600-ton clipper ship, with a load of Spanish salt en route to Bath, capsized and broke into pieces.

Robert Webb, Curator, Maine Maritime Museum: Our speculation is that the captain decided to come in the deep, narrow passage, but he found that the tide was out-flowing so that it was shoaling up. It was getting too shallow for a ship, so he tried to turn around, and when he turned around the stern of the ship hit the sandbar and rolled over.

Well, in those days, of course, the charts were not accurate and there was a lot of movement at the mouth of the river. There always is, even to this day, a lot of silting, the sandbars shift around. It's a little difficult to know where things are unless you're actually out there plunging around with some kind of electronic device and, of course, they didn't have those in those days. It was a by-guess and by-God system and they thought they had it made, but they discovered part way in that they ought not to have tried it.

Dana Hutchins, Segment Host: The 24-man crew, all from Phippsburg, perished.

Robert Webb, Curator, Maine Maritime Museum: It was a terrible tragedy because the men were all local. They had been away from home for 3 years. The captain, in fact, had a son he'd never seen, and it was altogether a deeply felt loss in the community because so many of the young men were lost in that one single shipwreck.

Dana Hutchins, Segment Host: The people on shore waiting for the ship to come in could do little but watch the disaster unfold before them.

Robert Webb, Curator, Maine Maritime Museum: This is a souvenir of the wreck of the Hanover in 1849, the ship that floundered at the mouth of the river during that year. The legend about this basket, and many of the other things, is that they washed ashore after the ship broke up, right off the beach, and the basket washed ashore along with the bodies of the victims, so that it was a tragic situation. The people recovered as much of the vessel as floated to shore, but all that was left of it, really, were a few representative artifacts like this.

Dana Hutchins, Segment Host: Not far from where the Hanover was lost, the 400-ton schooner Joseph Luther went aground.

Jane Stevens, Author/Journalist: This is a 5 x 7 negative of the Joseph Luther that was wrecked on Whaleback Rock, or Whaleback Island, right out at the mouth of the Kennebec River in December, 1900.

Dana Hutchins, Segment Host: Jane Stevens of Popham Beach has the original glass plate negatives of the wreck. They were taken by her uncle, Captain Jim Perkins, who was a steamboat captain at the turn of the century.

Jane Stevens, Author/Journalist: Captain Jim was an amateur photographer.

As a matter of fact, I have heard that he had a darkroom set up in the pilot house of one of his steamboats. So he shot everything that came in the Kennebec, or went out, for a period of about 50 years.

Dana Hutchins, Segment Host: The 7 men on board the Joseph Luther were saved by a local lifesaving station crew.

Jane Stevens, Author/Journalist: The thing that made it stand out to me was the cat that was rescued from it. My father told me the story of the wreck, and he told me about Gussey Hodgkins, who was a member of the Coast Guard at the lifesaving station then. The Coast Guard went out to the boat and threw a line to them and, one by one, dropped the crew members in the pitcher's buoy. Meanwhile, each time somebody would come across, the boat was sinking a little bit, and so each trip was a little more treacherous than the one before, and they finally got the last man off, and Gussey heard the cat crying, and he asked the captain for permission to make one more trip out to get the cat, and the captain gave him permission, and he just got over there, got the cat and got back in time, when everything collapsed. They took the cat back to the Coast Guard station, which was then the Honeywell Beach Lifesaving Station. They named the cat "Honey" for Honeywell Beach, and he was the mascot there for a long time.

Dana Hutchins, Segment Host: But once on the rocks, the Joseph Luther was there to stay. After a series of storms her hull split in half.

Jane Stevens, Author/Journalist: Because you see, the surf piles up over this rock, pounds onto these things, and this was in December, and the next Fourth of July they had a big bonfire, community bonfire and burned the rest of it.

Dana Hutchins, Segment Host: Jane even has a souvenir from the wreck.

Jane Stevens, Author/Journalist: This is a deck prism which may very well have come from the deck of the Joseph Luther. These were spotted on decks of ships, especially ships carrying coal. Coal would often catch fire in the hold and they wouldn't know it and it would burn for days. They'd have these spotted over the decks, implanted right in the deck, and they'd be all over, so they could see if something was on fire in the hold, and you can see where this has had a lot of things hauled over it, people walking over it. They're making reproductions of these now.

Dana Hutchins, Segment Host: But you have the original.

Jane Stevens, Author/Journalist: Yeah, the original ... I have the original and I like that. That shows that it's real.

Dana Hutchins, Segment Host: The Portland Head Light on Cape Elizabeth has been another treacherous place for mariners to navigate. On Christmas Eve in 1886 the Ann C. Maguire crashed at Alden's Rock. The vessel hit so hard the lighthouse shook. The crew was saved, but the ship was a total loss.

Dana Hutchins, Segment Host: There are some wrecks around Maine that are easy to find, for parts of them stick up above the surface of the water. Several can be seen at low tide in Boothbay Harbor ... and until recently we could watch two ships, Hester and Luther Little, decaying in Wiscasset Bay; that is, until they collapsed into the sea.

Male: Here we go ...

Dana Hutchins, Segment Host: The science of discovering shipwrecks that have fallen to the ocean floor often-times is much like underwater geology. In fact, Warren Riess borrows geological mapping equipment when he goes out to see what may be underwater, and in some cases, under the dirt and mud on the ocean floor. He relies heavily on several devices that send out sound waves to help him see if there's anything at the bottom. Side scan sonar looks like a torpedo. It sends off sound waves 50 meters to each side. They travel to the bottom and create an image that shows how high an object is off the bottom of the sea bed.

Richard Swete, Nautical Archaeologist: As it shoots sound down and then listens, it clicks and listens and it's getting a return from the bottom, and right now we've got fairly flat bottom, maybe something out over here. Later we'll come by again here and take a closer look at that.

Dana Hutchins, Segment Host: His sub-bottom profiler is mounted on a surf board. It sends long sound waves straight down, right through the layers of sediment at the bottom.

Richard Swete, Nautical Archaeologist: Normally, what you see is as you go over sand and mud, you see all those levels right down the bedrock and that gives us an idea of whether we're going over different types of sediment, where the bedrock is. It really helps us analyze our side scan sonar and our magnetic data. Once in a while you can find a shipwreck with it, if you happen to go right over the shipwreck.

Dana Hutchins, Segment Host: From time to time he'll also use a robotic vehicle, called an ROV, to take pictures or explore ahead of the divers. But the best way to see what's underwater is for he and his colleagues to suit up, jump in with both feet, and look around for themselves.

Richard Swete, Nautical Archaeologist: First off we're going to lay our baselines and lines, and stuff like that, off of the Zodiac, that's numero uno.

Dana Hutchins, Segment Host: One year, after bringing up to the surface 9 cannon and other treasures from the Nottingham Galley, Riess went back to check deeper waters around Boone Island, looking for more artifacts from the wreck.

Warren Riess, Maritime Historian/Archaeologist: If we could find the timber, personal artifacts, or hardware from the ship, we could still learn an awful lot. The cargo, okay, we're not going to find any cargo, but we could find out a lot about the people who sailed the vessel, who owned the vessel, built the vessel, and take their stories

that we can glean out of those artifacts and the relationship of those artifacts, and then take that information into what we know about that time period .

Dana Hutchins, Segment Host: Once on location, they weighed anchor and got down to business. The first job was to lay out grid lines so that they could conduct a systematic search.

Richard Swete, Nautical Archaeologist: I'll hook it up and you take off with the tape, and then when you're there at the end of the tape you give me a tug. I'll give you a tug back.

Dana Hutchins, Segment Host: Then they suited up and dove in. Once on the bottom, the divers searched along the grid line that they had previously set up, looking into all the nooks and crannies that they came across.

Richard Swete, Nautical Archaeologist: We were hoping to find a sandy or muddy bottom off of the ledge where the timbers of the ship might've gone, any organics or ceramics, glassware, anything like that that would represent either the ship or the cargo, or artifacts from the crew.

Dana Hutchins, Segment Host: Warren's dive team also relied heavily on a metal detector for signs of iron debris.

Conversation

Dana Hutchins, Segment Host: After every dive, Warren debriefed the men as to where they went and what they found or didn't find.

After one area had been thoroughly explored, careful records were made and the reference line was moved.

Then the procedure was repeated at a new location.

On day two, while motoring out to their location, a pod of whales passed them by.

Once on location, the search resumed. Later, Warren decided to break out the ROV to do a preliminary search of the deep water below the ledge.

After two days of searching, the team had come up with slim pickings. The only evidence they found of the wreck were a few balls of cannon shot that they chose to leave at the bottom.

It was foggy on the third and last day of the expedition.

Male: Hook on the tape. Do our circle searches out to 15 meters, come on back on due with the tape. Come to the deep end buoy, grab the shackle. Bring the shackle up with us.

Dana Hutchins, Segment Host: The search had moved around the side of the island, away from where the cannons had been found. The thinking was that currents might have pushed some debris away from the original position of the wreck ... but nothing was found there either.

At the end of three days of diving their search had produced no new significant finds, but that was okay by Warren. At least they had the satisfaction of knowing that they had found all that there was to find.

Meanwhile, back at the lab, the cannons brought up last year sit in a bath of electrolytic solution which takes the salt out of the iron and helps restore some of its strength.

Male: So, you think that's a navy broad arrow?

Warren Riess, Maritime Historian/Archaeologist: That's a navy broad arrow, that's been struck in there.

Dana Hutchins, Segment Host: Warren, and his assistant J.B., who participated on the dive, is also an historical archaeologist. Together they delicately clean out the old gun and look for any clues they might find.

Warren Riess, Maritime Historian/Archaeologist: Can you do then ... give us an illustration of this part for comparison?

Dana Hutchins, Segment Host: Warren's wife, Katherine, is an artist. Her talents are called upon for the purpose of sketching certain markings on the cannon. A sketch can produce a much clearer illustration than a photograph.

So, just what are the fruits of all this labor?

Warren Riess, Maritime Historian/Archaeologist: To us, this is like going in and finding new diaries and new journals in the archives that nobody's found before, that no one knew existed, or information that are parts of the greater whole that tell us so much more about that time period.

(Music)

Christine Young, Program Host: Not all Maine shipwrecks are off the coast. Some have sunk to the bottom of our rivers. The remains of some 30 revolutionary warships are buried in silt in the Penobscot River. Ships will deteriorate quickly when left out in the elements like the Cora F. Cressey, but for those ships we choose to save, we now have much better ways of doing that. Bob Demers has more on the science of preserving shipwrecks, even those 300 years old.

Warren Riess, Maritime Historian/Archaeologist: The Penobscot Expedition to me is an important trove of historical information that we're not going to find anywhere else.

Bob Demers, Segment Host: The 30 American ships that were burned and left to sink into the Penobscot River in 1779 were parts of one of America's most humiliating naval defeats, but the Penobscot Expedition, as it was called, is still a bonanza for scientists even though it has been heavily salvaged and picked over in the past 200 years.

Male: Here we go Warren, 21 years later ...

Bob Demers, Segment Host: David Switzer was one of the first scientists on the scene after students of the Maine Maritime Academy discovered the wreck.

David Switzer, Nautical Archaeologist: It's one thing to, we'll say, conserve the Constitution, but it's another thing to conserve the victim of a rather ignominious naval episode, so we decided that discretion was the better part of valor, and the best way to do it would be to conserve it through documentation.

Bob Demers, Segment Host: Excavation of the first of the 30 ships began in 1975. This was the Defense, a privateer. It was the first underwater archaeological excavation in the United States.

Warren Riess, Maritime Historian/Archaeologist: We didn't have enough money, meaning the state, the federal government, didn't have enough money to bring up the whole hull and to conserve it. It would have cost in those days probably half a million dollars, in today's money maybe 3 or 4 million dollars, plus having a building to put it in, and take care of it for the rest of eternity. So, the decision was made to study it carefully underwater and then we buried it, so that, basically, none of the biota, the different little munchkins down there that eat wood, would attack it.

Bob Demers, Segment Host: The American ships were destroyed so they wouldn't fall into the hands of the British. Their remains are scattered from Castine to Bangor in Upper Penobscot Bay in the Penobscot River. It was the third year of the Revolutionary War, a time when the colonists needed a victory badly.

Ed Churchill, Chief Curator, Maine State Museum: Americans had send out 20 warships, 20 transports, had got in a battle between the land commander and the ship commander over who would attack first because there were 3 British vessels to get rid of, and so he wanted the land commander to take over first. The land commander wanted the ships out of the way, so he ... they argued for 2 weeks.

Warren Riess, Maritime Historian/Archaeologist: When the Americans were cut off by this very powerful British squadron, they knew the game was up. There was no sense in fighting. In fact, one ship from New Hampshire tried to fight their way out and within minutes they were just about all killed or wounded. The rest of them knew better than that and decided to head upriver, and when they realized they couldn't set up a proper defense they lit fire to their ships. They got off, took off what they could. You know, it wasn't a bad tactic, once they were in such a bad situation, burn your ships and run, go back and build some more.

Ed Churchill, Chief Curator, Maine State Museum: It was a great embarrassment, besides being a horrible naval defeat. It was the worst naval defeat until Pearl Harbor, so I guess at that time they thought they could start talking about it.

Warren Riess, Maritime Historian/Archaeologist: We took a sample right from the top of the ceiling plank and that's shown. That is not what we were planning to do because we thought it'd all be covered, so take your sample, maybe the next one down.

Bob Demers, Segment Host: Nautical archaeologist Warren Riess is another scientist intrigued with the Penobscot Expedition. He has helped find at least 3 of the ships in the mud and muck at the bottom of the Penobscot River.

Warren Riess, Maritime Historian/Archaeologist: The visibility when the current's moving is just about zero, and I mean that. Put somebody's face in the water with a mask they're seeing 2 or 3 inches, and then it's a swirl, all of kind of mud up in the water, and once that settles down at low tide, the best I've seen is about 3 foot visibility, more likely 1 to 2 feet visibility, so we really have to count on electronics to bring us close to a site, if possible.

Bob Demers, Segment Host: Scientists were not the first to find the Penobscot fleet. A number of Mainers have been making a living stripping submerged ships for their valuables. As a result, the state now has laws against commercial salvaging. But, it was back in the 1950's when another ship belonging to the Penobscot Expedition, the Warren, was first spotted, and it was a local salvage diver that found it. One of its cannons was taken to the Penobscot Marine Museum in Searsport. Many other items were sold. Today, what's left of the Warren can be seen at low tide.

Warren Riess, Maritime Historian/Archaeologist: Then the local people who lived right there, and who were devastated economically by the war that was going on all around them, and the constant raids by the British, were getting everything they could, blocks, pulleys, rope, pieces of canvas, anything they could to either use or to sell

for food. So, probably by the early 1800's the site was pretty much scavenged and all we're finding now are the timbers in sections down in the mud.

Bob Demers, Segment Host: The rest of the Penobscot Expedition is hard to find now, for the ships are firmly lodged in the mud and there's probably not many artifacts left. We're lucky to find as much as we did from the Defense.

Now on permanent display at the Maine State Museum are nearly 50 military items from the ship. Because they were found in Maine territorial waters, they belong to the state of Maine.

The museum also has several hundred artifacts from the ships, not collectibles, rather slices of colonial life, like a cooking cauldron and mess kits.

Ed Churchill, Chief Curator, Maine State Museum: This is the cauldron in which they cooked the meals. They'd have water in it. It was all surrounded by brick. It was built right in. You can see it right there, the little brick structure. They were given a portion of pork or beef, wrapped a string around it and had a little tag on it. Each tag had an individual group's name on it, put it in there, cooked it, and then when it was done they brought it out and they all ate together.

Bob Demers, Segment Host: Because these artifacts had been underwater for 200 years they had to be conserved. That took several years of work.

Ed Churchill, Chief Curator, Maine State Museum: If you didn't do any conservation, a piece that's like this, by the time it dries out is like that. It just totally withers away and so, on the wood, what we have to do is replace the water with a water-soluble wax called polyethylene glycol, and so that's gradually put in as the water comes out. The metal we put through an electrolysis procedure which stabilizes the item and stops the rust from continuing on.

Bob Demers, Segment Host: For the past few summers, Riess has led a team of scientists and divers to the site of the Defense wreck.

John Barlow, Marine Biologist: Tony, are we ready to launch now?

Bob Demers, Segment Host: Like other underwater archaeology projects, this one borrows techniques and instruments from geologists such as side scan sonar, sub-bottom profiler, even a robot, to get a better look at what may be left of the Penobscot Fleet.

John Barlow, Marine Biologist: If the wreck that we're looking for has some components of it that stick above the bottom, they'll give an echo and they'll produce shadows from the sound and we can see it. So, it actually allows us to see what's there. The trick is not seeing them, it's finding where to look. I mean, if you know where to look you can find it.

Okay, we'll do one more pass.

Have you got a compass?

Male: I do.

John Barlow, Marine Biologist: Okay.

Male: We'll at least know whether we're going fore or aft. We were going forward, I think.

From the looks it was going forward, because I think that's curving like that.

Bob Demers, Segment Host: In 1996 Riess and his team went to the Penobscot River again. Besides searching for what they haven't seen before, Riess will also be checking on the hull they re-buried in the river and covered with plastic and mud. He wants to uncover part of it and take a sample to his lab to see how well it's being preserved.

Conversation: We'll get this off to Orono...

Bob Demers, Segment Host: This is what you'd call the study while in the water method. Once he and other scientists figure out how well the Defense is doing it will help them to figure out what to do with the other 5 ships of the fleet that have been found as well.

Warren Riess, Maritime Historian/Archaeologist: Preliminary analysis indicates that, in fact, some of the wood is still being attacked by anaerobic bacteria and some of it that's standing in part of the mud is being attacked by little arthropods called lamnoria, which actually will tunnel into the wood and destroy it, so we have this anaerobic, meaning without oxygen, bacteria that's slowly eating away at the site.

Bob Demers, Segment Host: How best to preserve underwater wrecks is an open-ended question for archaeologists today. For years scientists have favored what's called the big wet site method, so that the remnants of wooden ships are kept wet once we leached the salt out of them.

... right where the buoy is.

Bob Demers, Segment Host: But, there's a couple of scientists in Maine who have challenged the wet is best notion. They experimented with a technique which is widely used in our forest products industry, but which seemed crazy to archaeologists.

Molly Carlson is an archaeological conservator who specializes in waterlogged wood. Several years ago she was presented with the daunting task of conserving what was left of the last remaining Maine clipper ship in the world.

Molly Carlson, Archaeological Conservator: It's becoming more the trend, I think, in nautical archaeology to either not bring up your hulls, or to try to study them in situ because the expense of doing a full-scale conservation treatment is prohibitive, and not everyone can do that anymore.

Bob Demers, Segment Host: The Snow Squall belonged to that romantic age of fast sailing ships that criss-crossed the globe.

Nicholas Dean, Nautical Archaeologist: Going out, based on the Boston shipping lists, her cargo was sent to Honolulu, would be everything from buggies, brooms, clothing, chairs, crockery, glass, you name it.

Bob Demers, Segment Host: Built in the mid-1800's in Cape Elizabeth, she was a very fast, small clipper with fine lines.

Nicholas Dean, Nautical Archaeologist: She went to a China port, usually Shanghai. Then she would load tea, silk, firecrackers, matting, all these exotic kind of things, for the New York market.

Bob Demers, Segment Host: The Snow Squall was in service for a little more than 10 years when she went aground in the Falkland Islands near Cape Horn. She was abandoned as a total loss. It sat there for more than 100 years before it was discovered by Americans.

Nicholas Dean, Nautical Archaeologist: And John Smith, who is now the director of the museum down there, collared me and a couple of other Mainers, sort of marched us over to the dock, pointed down at this withered bow, and said "Well, she's one of yours. What are you going to do about it?" And we got back and, amazingly, the people in South Portland did not throw us out of their office and say, 'what a bunch of nuts.' They said 'what a nifty idea.'

Bob Demers, Segment Host: In 1987, at great expense, it was brought home to Maine.

Nicholas Dean, Nautical Archaeologist: When you're scrabbling around the bow trying to keep the tarps from blowing off, trying to keep the thing wet, trying to get the mud out, there's no romance to it at all. Once I'm back, and I can look at my notes and so forth, yes, then it gets very romantic, but at the time all you can remember is how cold you are and how hard you're working, and how much you would really like a cup of hot coffee.

Bob Demers, Segment Host: Getting the Snow Squall back into Maine turned out to be just one obstacle. The next one was how to preserve her. The bow was taken to the Spring Point Museum in South Portland and propped up in a wooden structure. It was kept wet in the building so that the wood would be too wet for fungi, and also to wash the salt out of the wood.

Spring Point Museum couldn't afford the upkeep of the Snow Squall and it offered the remains to the Maine Maritime Museum in Bath, but that museum didn't have the budget to do the immersing.

Molly Carlson, Archaeological Conservator: When I realized that this wet section was going to come to a building much as you see here, framed in wood, unheated, and it would be wet, still it would be enough water that would come off of the ship, plus the decay fungi spores which would come with it, that in time this building would rot just like our storage building rotted.

Bob Demers, Segment Host: There are several organisms that are a nuisance to those trying to preserve wooden ships. Some we can see, like gribbles, which are very tiny, but leave telltale hourglass nibble areas on the wood.

Molly Carlson, Archaeological Conservator: They like to live in the inner tidal area and they're extremely small, 1/4 to 1/8 of an inch long, and they burrow into the wood, are limited by oxygen for as deep as they can go.

Bob Demers, Segment Host: Much less noticeable are ship worms, which are actually mollusks, like clams. They're not much wider than a _ inch, but they love to burrow in wood, along its grain.

Molly Carlson, Archaeological Conservator: From the outside you can't really tell that wood is infiltrated with these types of animals, but you can see how much weaker this piece of wood would be.

Bob Demers, Segment Host: But the biggest problem for Carlson was that the Snow Squall had a severe case of wood decay fungi. This kind of fungi makes wood rotten by turning it into peat moss, which is what it is supposed to do out in the forest.

Molly Carlson, Archaeological Conservator: At that point I phoned up Dr. Rice at the University of Maine and said, "This is the scenario. This is the problem. What do you suggest?" and he said, "Well, I just happen to have a kiln that I know is available in Old Town, that is probably big enough, and I think the only way that you're gonna

get around these 2 problems is to kiln-dry it." At that point we chatted for a little while and I put the phone down and I said "Oh, my goodness, we're going to kiln-dry a boat."

Bob Demers, Segment Host: They couldn't find a kiln large enough for the entire section of the Snow Squall, so they had to cut it up into 2 sections, one 18 feet long and the other was the mast step where the mast comes through the ship to the keel. The problem was no one had ever tried preserving wooden ships this way. Rice suggested a dehumidifying kiln used to dry out white pine.

Robert Rice, Timber Physicist: When we brought it in here the bow of the ship was right about here. It was about 12 or 14 feet tall and the ship itself, the section that we were drying, was about 15 to 17 feet long.

Bob Demers, Segment Host: Carlson left it up to Rice to come up with a formula for how much heat to use and they both monitored and tested sections as they dried them.

Robert Rice, Timber Physicist: Now what happens in this dry kiln is that moist, warm air is blown across the drying object. It goes into those holes. Inside those holes is a dehumidifier. That dehumidifier condenses the water out of the air. The drier air goes upward. It's reheated with a coil and recirculated around the ship, so that we get a constant supply of dry, warm air going across the ship and it helps dry it.

Robert Rice, Timber Physicist: They weighed the ship. They found that we had lost about 10,500 pounds of water during the drying process.

Bob Demers, Segment Host: Nine weeks later the sections were delivered dry to the Maine Maritime Museum.

Molly Carlson, Archaeological Conservator: This vessel is now in very good hands and now that it has been taken away from its 2 principal threats, one being decay fungi—the high heat that we were able to have, we believe, sterilized the fungi growing in the wood—and the high moisture content that it had been living in. Obviously, now we have a much lower moisture content and I don't believe that there's a way for the wood to re-infest.

Bob Demers, Segment Host: This is not to say that scientists don't immerse artifacts in baths anymore. They do, but it's a long and expensive process, but they don't have the resources to preserve all the artifacts that are found in Maine's waters. For every dollar spent underwater, another \$25 to \$30 will be spent to conserve what's found.

David Switzer, Nautical Archaeologist: In the long run the kiln-dry process is much less expensive and it's much less time consuming. Every wreck may not qualify. Snow Squall had been partially wet and partially dry and she had been kept wet for 3 years, from 1987 when we brought her back, so I think she was the perfect product for a kiln-dry process.

Bob Demers, Segment Host: Yet depending on what Riess and his team learned from their experiment in the bottom of the Penobscot River, we may be leaving more of our shipwrecks right where they are.

(Music)

Christine Young, Program Host: How to preserve shipwrecks is just one concern of nautical archaeologists. The growing popularity of recreational diving is another. There is much more risk now of shipwrecks being looted before scientists get a chance to investigate them. Sometimes divers come upon wrecks just by chance. But, for archaeologists like Warren Riess, it can take years of study to locate a historical shipwreck.

Barbara Noyes-Pulling tells us about Riess' 13-year exploration for one such wreck.

Barbara Noyes-Pulling, Segment Host: In the Bible the Angel Gabriel was a messenger from God whose job was to deliver good news.

Maine has its own Angel Gabriel. In the early 1600's the British named a merchant ship of theirs Angel Gabriel and it brought welcome supplies to struggling colonists on the Maine Coast.

Segment Host: But the ship disappeared in a hurricane that struck colonial Pemaquid, now known as the town of Bristol. At the time, colonial Pemaquid was the northernmost English settlement in the New World.

More than 350 years later, Warren Riess is on a personal mission to find the watery grave of the Angel Gabriel.

Warren Riess, Maritime Historian/Archaeologist: There's a constant irritation that it's here and, it's like teasing us, you know, and we keep coming back.

Segment Host: Since 1978 he has made 13 luckless trips to find the ship.

Warren Riess, Maritime Historian/Archaeologist: My wife would tell you it's stubbornness, and it's kind of hard to give up when it's that good a prize, if you will, for what I do.

Segment Host: And he is not the only one looking for it. British army divers also have tried to find the wreck.

Warren Riess, Maritime Historian/Archaeologist: We hadn't moved into this area earlier because the electronics we were using, magnetometers, side scan sonar, would give a lot of false readings in a mooring area, a lot of yachts, fishing boats, they have iron chain going down. The moorings are iron pins, usually in granite, but sometimes they're old iron or steel mushroom anchors. This drives the electronics crazy. We wouldn't be able to tell what we're looking at and now we have to go in and look at every square foot by eye and use the metal detector by hand underwater to really see what's in here. This could be the spot and it's been right under our nose for all these years, but we knew to leave it 'til later, hoping we could find things better with normal electronic gear than we use.

Could we use a dive pin in here, your fish pin? Maybe right there ...

Segment Host: This is the summer of 1996. Riess once again scraped together funding to bring a team of archaeologists and divers together to more thoroughly search this two-square mile area in Pemaquid Harbor.

Warren Riess, Maritime Historian/Archaeologist: We can drop them at the outshore. This way they'll go down, go along the line and make sure the line is way out ...

Segment Host: The money comes from several sources and sometimes even the descendants of crew members of the Angel Gabriel have helped to fund some of Riess' searches.

Warren Riess, Maritime Historian/Archaeologist: The Angel Gabriel came here in 1635, and was the supply ship for the trading post that was owned by the same people who owned the trading post here at Pemaquid, and came over from Bristol, England, with some passengers aboard, and we think that she came in and anchored one night. Most of the passengers and crew got off and then early the next morning the hurricane came.

Richard Swete, Nautical Archaeologist: It's out there because many people still, many of the inhabitants, or the residents of the state of Maine, are direct descendants from survivors of that occurrence and the oral tradition,

again, just hung around for many, many years and those descendants are very proud of the fact that they came from that incident. It's much the same as what a Massachusetts person would say if they were descendants from those that came on the Mayflower.

Segment Host: On this bright mid-summer morning Riess and his team are beginning a four-day search. This time they will concentrate their efforts on the outer harbor, just east of the Fort William Henry replica. Some historians think the Pemaquid settlement may have extended farther out from the inner harbor than previously thought. They began by marking off the area with lines to guide the divers as they searched. Our cameras accompanied the dive team in order to document their search efforts.

Richard Swete, Nautical Archaeologist: We dropped in the first anchor buoy close to shore, right about where the low tide mark is, approximately, and then we stretched the line, the baseline, out, which is a 30 meter, 100 foot rope with a tape on it, all in metric, and we have another 50 foot, a 15 meter tape on a reel, and they'll work either side of that tape.

Segment Host: Each day the crew meticulously explored every square inch in a designated search area. Their hope was to find at least one clue that could lead them to the ship.

Male: There's nothing there, man. No bottles, no shirts, there's nothing. No beer cans.

Male: One beer can.

Warren Riess, Maritime Historian/Archaeologist: Obviously, we have to be optimists just to keep hunting for this long period, for such a little return thus far.

It's the cleanest harbor I've ever seen. You go along, you don't see anything modern or old. I just don't know.

Segment Host: But on day four, they had to admit that the whereabouts of the Angel Gabriel would remain a mystery, at least until next year.

Warren Riess, Maritime Historian/Archaeologist: We could be floating right over it and they could run into it at any minute, or it may be that we're long gone and Peter here, when he grows up, is gonna find it for us. Good, he'll carry on the quest for the Holy Angel Gabriel.

Barbara Noyes-Pulling, Segment Host: Riess is optimistic that he is going to find the Angel Gabriel. When he does he'll have artifacts no one else in Maine has, for we've never found an English ship from the 1600's that we could excavate, and learn about that period of our history.

Warren Riess, Maritime Historian/Archaeologist: Every once in a while I'll go to the conferences and people I don't even know from other counties will come up to me and ask me if we've found the Angel Gabriel yet. They've been kind of waiting for information about that time period. And one of the great things about a shipwreck is that we can date all of the artifacts on it right to a day. You know, August 15, 1635, every single one of those artifacts were in use.

Richard Swete, Nautical Archaeologist: Our terrestrial counterparts who do land archaeology are very, very interested in it because they want to see what sorts of supplies may have been carried over on the Angel Gabriel and so they're really, really anxious for us to find it.

Warren Riess, Maritime Historian/Archaeologist: It was built in a time period we know very little about how they built the ships. It was built within 10 years or so, well 12, of when the Mayflower was built. We don't know

how the Mayflower was built. We don't know how they did that, so we'd get an idea if we can find this ship, the technology of the time, the craftsmanship of the time.

Segment Host: After being in the ocean for nearly 400 years many of the artifacts disintegrate and look insignificant, but to archaeologists they will represent an amazing time capsule.

Bruce Bourque, Archaeologist: If we could find the Angel Gabriel, and if she survived as a hull through the storm, and of course, we don't know any of that, we should find virtually everything she brought from England. She made landfall at Pemaquid and the storm hit so soon after she landed that they got very little, if anything, off the vessel. So, if it landed in a muddy bottom, such as the Defense here, well, I think you can see from the range of preservation, everything from an iron cannon ball and she would have had some armament to protect herself from predation at sea. These lead-based metals would certainly survive, but you know, you might even get a potato skin, depending on how quickly she settled into the mud, how quickly the supply of oxygen was cut off.

We've all been supporting Warren in his search for lo, these 20 years. The technology gets better. The search narrows. The ship has to be there somewhere. Where could it go?

Segment Host: Diving and retrieving objects in the field is only a small portion of nautical archaeology. The real science comes later, but the tedious work of making all these seemingly valueless objects, long buried, fit together to tell us stories about the past.

Warren Riess, Maritime Historian/Archaeologist: For example, again the Angel Gabriel, if we found her and we studied all the artifacts from it, and did, maybe, more historical research, how does that change what we thought about not only Pemaquid, England, but this whole area of New England and the colonization of America, the interaction with the Indians. That's what we call the interpretive stage.

Bruce Bourque, Archaeologist: A nautical excavation such as this, let me use the overworked metaphor of the iceberg, what people see of the excavation is simply the tip that's above water. The vast effort and expense of cataloguing, analyzing, preserving, storing, exhibiting, remains yet to be done.

Segment Host: But since funding for underwater archaeology is not easy to come by scientists sometimes find themselves at odds with those looking for treasures, such as sport divers.

Male: Ready Chris?

Christine Young, Program Host: We may know where a wreck is sitting on the bottom of the ocean, but there's no money to excavate it. It's a love-hate relationship between archaeologists and sport divers.

Peter Bell, Sport Diver, Hermon, Maine: If it wasn't for sport divers, a lot of times things would get overlooked, spots would get missed. So, I think there has to be some type of working relationship there.

Barbara Noyes-Pulling, Segment Host: Peter Bell is a Bangor area diving instructor and a history buff. He has been a keen student of the Penobscot Expedition and he himself searched the river for a number of years. It was Bell who, several years ago, located the remains of the Warren.

Peter Bell, Sport Diver, Hermon, Maine: It's like 2 or 3 summers ago when the state had come up and done some surveys in the river. They were looking way down-river from this spot here and I volunteered my information to them and that's how they came upon finding this site. Basically, everything that was here 4 years ago is still here now, and all I've done is dove on it and recorded what I've found and presented my findings to the state.

Barbara Noyes-Pulling, Segment Host: Any certified diver can enter a shipwreck, but if a ship is considered historical, meaning that it's more than 50 years old, divers are not supposed to take anything from a wreck. But more divers are taking to the waters for treasure hunts.

Greg Johnson, Sport Diver, Brunswick, Maine: You know, once you start digging into the wrecks, you'll find that there's a lot of gold that's actually on the bottom of the ocean that hasn't been found. I think they're estimating it at about a billion pounds of gold, so, that'd be the ultimate find, is a gold bar.

Warren Riess, Maritime Historian/Archaeologist: We have problems with people who go out and take things and put them on their shelf and watch them disappear. As I said, the conservation process is very important. The analysis is important, and unfortunately there are some people go out ... in fact, there are states even, there are a couple of states that support that type of thing where things don't go to the museum, where things don't get studied.

Paul Rollins, Sport Diver, South Portland, Maine: I like to think of myself as an underwater dump picker because our wrecks are debris. But, if we didn't have people out there doing that, a lot of the objects would just be lost forever.

Segment Host: Paul Rollins has been diving shipwrecks for about 25 years. His scuba business attracts many people interested in the same thing he is, wrecks to rummage through.

Paul Rollins, Sport Diver, South Portland, Maine: I think everybody's a treasure hunter. Everybody wants a bargain. Everybody loves going shopping with a bargain. Everybody likes garage sales. Well, if you're diving, diving is only a tool to get you to do something else. The whole scuba system, the mask, the tanks, the regulators, all that allows you to do is to be underwater and do what you might do on land.

Segment Host: Rollins himself has quite a collection of artifacts from wrecks he's dove. He has about 10,000 at home. Some are junk and others are worth something, but he thinks state laws are too restrictive about what divers can and can't do at wreck sites.

Paul Rollins, Sport Diver, South Portland, Maine: I think the archaeological law in the state of Maine is really restrictive because, again, if I spend time, effort, and money to go out and find something only to have it taken away from me by the state of Maine because they deem it of historical value without ever contributing to my efforts to go find it, to me that's not equitable. A lot of what I've collected were well before some of the new rules and regulations on artifacts in Maine, but if I don't have 'em here, eventually they'll end up in some museum somewhere. They're gone to the ocean. The ocean will eventually take everything back.

Barbara Noyes-Pulling, Segment Host: Many archaeologists are purists when it comes to allowing others to look around wreck sites. They believe that wrecks should first be excavated professionally, but in recent years a more pragmatic approach has developed among these scientists.

Segment Host: Because research money is hard to find, some scientists are experimenting with entrepreneurial partners, such as private collectors or museums. The entrepreneur will pay the scientist to excavate the site, but the investor gets to keep the artifacts. Warren Riess has worked on such a project and came away convinced serious archaeology and treasure hunts don't mix.

Warren Riess, Maritime Historian/Archaeologist: Usually, there'll be about 3 principle people in the treasure salvage company. One of them's a lawyer, one is usually the front man, and another one may have had a couple courses in history or archaeology, and they have pretty good salaries. They live quite well off the company and

then finally the company goes bankrupt. Time after time you see this. If it's not 100%, it's 99% of them.

Segment Host: But even if scientists can keep a shipwreck intact for study, they don't always what's best for what they've found. Bringing it up to the surface and trying to preserve it is not always feasible. Sometimes the best solution is to simply leave it be, and that means underwater archaeologists oftentimes have to take their chances, hoping they get to a wreck first, and if they're not the first, they hope those that beat them to a site remember all the scientific and historical treasures that could be laying there too.

Greg Johnson, Sport Diver, Brunswick, Maine: As far as taking stuff, you know, I'm not a big believer that you should actually be able to take all the stuff 'cause it's part of the history and stuff, but, you know, we should be able to go and look at it, you know, for years to come.

Warren Riess, Maritime Historian/Archaeologist: In real archaeology the artifacts and all the information that we get goes to, in Maine, the State Museum, and in other states their state museum or university museum, whatever the legal setup is, and that's because we want this information for everyone. These are very rare finds, they're very important and they don't belong to us as individuals.

(Music-brief)

Christine Young, Program Host: Even ships like the Cora F. Cressey have secrets to reveal. When her sailing days were over, she was docked in Boston and only prostitutes and gamblers would venture on board. Undoubtedly, there's a wealth of information to glean from Maine's shipwrecks. For the underwater archaeologists like Warren Riess, there's no striking it rich without an appreciation for history and a lot of perseverance.

Next time on Quest, Maine flora. How we're preserving our rarest plants and the trouble with some invasive ones. I'm Christine Young. Thanks for joining us.

Male: Production of Quest on Maine Public Television is made possible in part by Garrand & Co., Inc. of Lewiston, a full-service advertising agency providing marketing, direct response, and public relations solutions for client throughout New England.