TIGHAR TRACKS

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Contents

About TIGHAR

TIGHAR (pronounced "tiger") is an acronym for The International Group for Historic Aircraft Recovery, a 501(c)(3) non-profit educational foundation.

TIGHAR's activities include:

- Investigating aviation and aerospace historical questions and mysteries through archival research, forensic data analysis, and archeological expeditions.
- Producing papers, publications, and videos to further the foundation's educational mission.
- Providing expert historical and archaeological research to government agencies for evaluation of cultural resources related to aviation/aerospace.
- Advocating for accuracy, integrity and professionalism in the field of aviation historical investigation and the preservation of the material culture of flight.

TIGHAR's activities are conducted primarily by member volunteers under the direction of a small full-time professional staff. The organization's research is publicly available via the TIGHAR website.

On the Cover

Charles Nungesser and François Coli shortly before their Paris to New York transatlantic attempt: dapper, confident, and doomed.

On the Web

https://www.tighar.org

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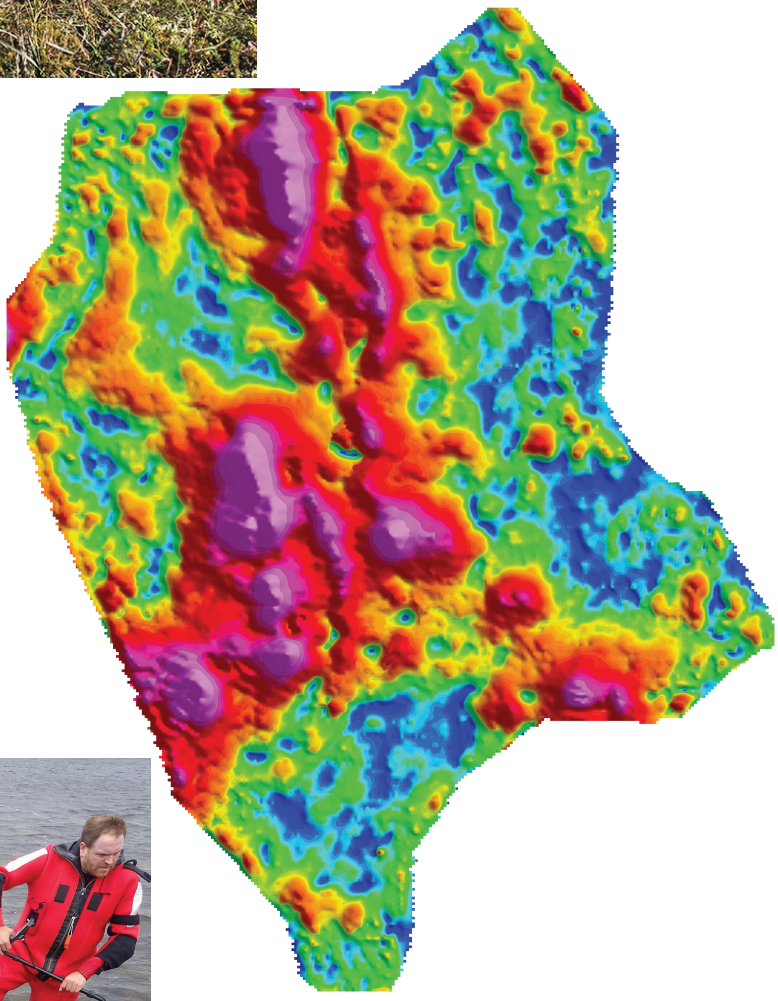
NEW PUBLICITY, NEW EVIDENCE, NEW IMAGERY, NEW FRUSTRATIONS

The summer got off to a rousing start with the broadcast on June 15th of the Discovery Channel "Expedition Unknown" episode "Lindbergh's Missing Rivals." Filmed in September 2021, the one-hour show tells the story of the ill-fated Nungesser and Coli transatlantic attempt and the on-going modern-day efforts to solve the mystery of the White Bird's disappearance. Host Josh Gates goes to Paris where he has a ride in a biplane and visits the landing gear of l'Oiseau Blanc enshrined in the Musée de l'Air et de l'Espace (Air and Space Museum). He accompanies a group of researchers in Maine who track down a proverbial "engine in the woods" only to find it is not the 12-cylinder Lorraine Dietrich of l'Oiseau Blanc but the radial engine of a lost Canadian mail plane. He then goes to Newfoundland to join his friend, TIGHAR's Ric Gillespie, who thinks the remains of the White Bird might be in a remote pond. Josh and Ric helicopter to Gull Pond with scientists who conduct a magnetic survey using a drone. The survey reveals the pond to have intensely magnetic areas due to natural geologic features, but there are several hot spots that are not readily explainable and could indicate the presence of manmade objects like an airplane engine. Dressed in heavy immersion suits against the frigid water, Gates and Gillespie search with metal detectors and Ric gets a "hit" near the spot where he found an artifact in 1992. Whatever is causing the signal is under the edge of a large rock and difficult to investigate, but bad weather is moving in and the helicopter pilot is urging immediate departure. The intrepid investigators continue despite the warning. Two artifacts are recovered at the last moment and everyone flies out safely for a dramatic ending to the show. It's good television and, believe it or not, that's really the way it happened.

The Expedition Unknown episode was well-received and brought the White Bird mystery and TIGHAR's investigation to the attention of millions of viewers. More importantly, the magnetic survey revealed why our earlier attempts to find the engine with remote electromagnetic sensing turned up only false positives. Whether the new anomalies represent natural or manmade material remans to be seen, but we now have a much better idea what we're up against.

Newfoundland Helicopter's Bell 407 lands at Gull Pond with the Expedition Unknown film crew.

Six-rotor drone operated by Pioneer Explorations. The magnetic sensor was at the end of a five meter tether flown five meters above the water surface in transects five meters apart.



Geologic map of Gull Pond showing areas of intense magnetic activity (red/purple). Location of anomalies is confidential and not shown.

Ric Gillespie and Josh Gates search with metal detectors.

TIGHAR Artifact 1-29-P-1 is a piece of copper wire twisted into a loop. There is some indication French aircraft of the 1920s used copper wire for "safetying" threaded components but the artifact is so generic in nature any identification of its source would be pure speculation.

TIGHAR Artifact 1-29-P-2 is a disk of low-carbon steel plated with nickel on its convex service. Its location, shape, dimensions, apparent age, and composition suggest it is related to the cylindrical artifact (1-21-P-1) found in 1992.

TIGHAR Artifact 1-21-P-1 is roughly half of a cylinder that appears to have been blown apart in an explosion. When discovered in 1992, the interior surface had a residual film of oil, suggesting it was a component of a machine.

The diameter of the disk fits the implied diameter of the cylinder. The cylinder is too small to be an engine cylinder from the White Bird's Lorraine-Dietrich engine, but it could be some other component or from a completely unrelated machine.

Our first trip to Newfoundland this summer was in June, shortly after the Expedition Unknown episode aired. Hoping the television show might prompt residents of the Cape Shore to come forward with more stories about "the plane in the pond," we partnered with the Placentia Area Historical Society to hold an evening of public discussion at historic St. Luke's Anglican Church in Placentia. On June 18 about forty local residents heard Ric give a talk on the White Bird and Project Midnight Ghost. Newfoundland archaeologist Dr. Lisa Daly explained that Gull Pond is now a protected archaeological site and discussed how TIGHAR is working with Newfoundland authorities to be sure our investigation complies with all provincial regulations.

Ric invited the audience to share what they knew or had heard about the plane in the pond. Anecdotes are, by definition, not hard evidence, but stories of airplane wreckage being seen and recovered from Gull Pond in the 1930s and '40s are woven in the fabric of local folklore. We interviewed a few surviving witnesses when we began our Newfoundland investigation in the early 1990s, but everyone with first-hand knowledge has now passed on. Any new stories would be second-hand at best but might help fill in some gaps and there was always the chance someone might have a previously undisclosed artifact. We were not disappointed.

Cape Shore resident George Lannon came forward with information that appears to answer an important question. None of the stories about wreckage seen or recovered from the pond in the early days describe debris that was obviously from an airplane, so why did everyone attribute it to a plane crash? The story, as we knew it, was based on an interview with Nicholas McGrath done in 1970, the year before he died, and an interview with his son Patrick done by Ric Gillespie in 1992.

Ric Gillespie and Patrick McGrath, 1992.

On a Sunday or Monday in May of 1927 (May 9th, the day the White Bird went missing, was a Monday), Nicholas McGrath, 39, of Patrick's Cove, was trapping muskrat on the Branch River a few miles southeast of Gull Pond when he heard three explosions in rapid succession off to the northwest. The following winter, while hunting caribou, Nicholas was crossing the frozen Gull Pond when he saw a piece of blue-painted metal through the ice in the shallow water near the northwest side of the rocky island. Remembering the explosions he heard the previous spring, he thought an airplane must have crashed in the pond. But why would he associate blue-painted metal with an airplane?

George Lannon related what he was told by Patrick McGrath while they were bird hunting in 1959:

> He said that his father used to be in there 'rattin', they called it, looking for muskrat, in the wintertime. He said the wing of a

plane was sticking out of the pond, and this was probably around 1928, ’29, ’30, around there.

George Lannon

Lannon’s version compresses the story. You don’t trap muskrat in the winter, but if what Nicholas McGrath saw was recognizable as “the wing of a plane” it would leave no doubt about what happened.

Lannon also said Patrick told him, “They found a coat in by the pond with brass buttons on it, and they sewed the brass buttons on another coat.” According to the story, the coat was not in the pond but “in by the pond” and had apparently been there for some time. That a Cape Shore Newfoundlander would salvage and re-use attractive buttons is completely credible, but it is difficult to construct a scenario in which anyone would have, and lose, such a coat in that remote place. Nungesser and Coli did not wear uniforms under their heavy leather coveralls, but they may have had them aboard in anticipation of festivities after their arrival in New York. If so, a uniform coat could conceivably wash up along the pond shore. If the salvaged buttons were indeed sewed on another coat, they may still exist.

Mr. Lannon’s recollections of details related by Patrick McGrath date from 1959. Patrick did not mention them in his interview with Gillespie in 1992, but it is the nature of memory that stories become condensed and simplified over time.

TIGHAR producer Mark Smith recorded the entire evening and edited it into an hour-long video now on the TIGHAR Youtube Channel at https://youtu.be/gAzMVC89HqA. It’s a classic example of TIGHAR oral history research at work.

At the end of the evening, the president of the Placentia Area Historical Society took Ric aside to tell him a woman in the audience wanted to speak with him after everyone had left to “straighten him out on something.” Expecting to be taken to task about some aspect of TIGHAR’s investigation Ric, of course, agreed.

Introducing herself (we’ll withhold her name for now) she asked if Ric remembered that when TIGHAR was here back in 1994 there was a rumor someone had binoculars of French manufacture that had been found near the pond years before. Ric said he remembered the story.

And somebody told you my husband had the binoculars so you came and asked him about them.

Ric: I honestly don’t recall, but okay, if you say so.

He told you he didn’t know anything about them.

Ric: Okay. I know we were never able to find out if there was anything to the story.

Well, he was lying to you.

Ric: I’m sorry??

He’s the one who found the binoculars. He was in the country. (Cape Shore people refer to the interior of the peninsula as “the country”.) We have a cabin back there. We pick up everything that’s in the country because we don’t want no garbage in there. In 1988 he was looking for things to pick up and he ended up kicking what he thought was a bottle. When he picked it up it was binoculars, okay? They were in seven or eight inches of moss. When Martha talked to me about it – because Martha found out about it – (reference to Martha Drake, at that time Newfoundland’s Director of Historical Resources) she said the moss grows an inch every decade, so that would bring it to the right period of time.”

She then showed Ric letters documenting that, in 1995, the binoculars had been sent to

the Canadian National Museum of Science and Technology in Ottawa. The Curator of Physical Sciences & Space wrote:

> I hope your binoculars have arrived back safely. I've had the opportunity to inspect them and they are of French manufacture. The design and finish are typical of those made from the 1890s to WWI or even a bit later. French makers pretty well had the market on low-cost binoculars cornered in this period.
>
> The threads on the objective lenses are 0.5mm pitch from crest to crest which one would expect of French binoculars – British manufacturers had not converted to metric threads – i.e. flank angles are apx. 47-48° and the crests and roots rounded. The black painted finish is also typical French style, it being cheaper than the chemically treated surfaces found on British and German instruments. If I were guessing, I'd say these binoculars were probably made by or for Chevalier or Lemaire though both of these firms normally stamped their names on binoculars on the rings around the eye lenses.

Ric told her he would love to see the binoculars if her husband would permit it. She reached in her purse and pulled out the binoculars. "He doesn't know I took them. He didn't even want me to come to this meeting but I thought you should know about them."

Ric thanked her and, with her permission, Mark Smith photographed the binoculars.

They're a fascinating artifact. The binoculars are in remarkably, perhaps unbelievably, good condition. There is no maker's mark so the identification of them being French, while probably correct, is not confirmed. The binoculars and the alleged depth of moss in which they were said to be covered are consistent with the 1927 time period but, although it seems logical that Coli would have binoculars with him for identifying coastal features, there is no known record of binoculars being among his navigational tools.

Most troubling is the question of how any heavy object from the plane could get to where the binoculars were allegedly found. The finder's wife says he refuses to tell anyone the exact location but he was supposedly cleaning up trash in the area around their cabin and there are no cabins in the immediate vicinity of Gull Pond.

The plane crashed in the pond. Buoyant wreckage could be carried down the Branch River by the spring flood (as some stories suggest), but binoculars found on land at some distance from the pond imply that someone or something carried them there. Foxes on the Cape Shore are reportedly notorious for chewing through leather. If there were binoculars in a leather case amidst wreckage on the island, a fox might drag them away. Another possibility is that one or both of the crew may have survived and tried to walk out – unlikely but

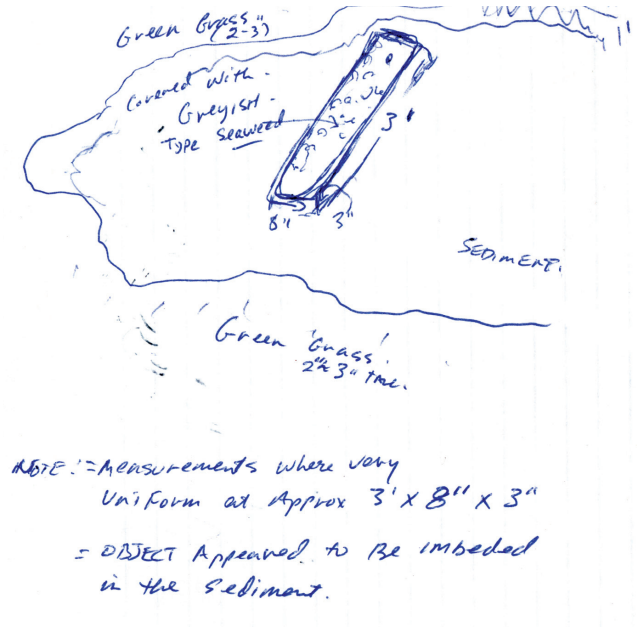
not impossible. There are no reports of human remains being found anywhere, but foxes and bears would make short work of a body lying on the muskeg. If the finder of the binoculars can be persuaded to pinpoint the location, a metal detector sweep of the area would be worth doing.

The second objective of our June trip to Newfoundland was to collect information at the pond in preparation for the planned September search expedition. We needed to reconfirm our thirty year-old data on pond depth and bottom morphology, and we also wanted to collect material for the application of a whole new scientific way of looking for evidence. We learned about it while trying to answer an old question.

Reviewing records and video of our previous work, we saw that during the May 1994 search, one of our divers encountered a rectangular manmade object roughly 3 feet long by 8 inches wide lying in about six feet of water. It was covered in "grayish seaweed" and embedded in the muddy bottom with only about 3 inches showing. The artifact was in an area where the bottom was covered with sediment and short grass-like vegetation. Of special interest was that the grassy bottom immediately surrounding the object appeared to have been gouged away.

When the diver came ashore we videoed his description of what he had seen.

> It's like something that hit there – I dunno – if you were looking for something that hit the bottom, like something scoops it – ya know? That thick, deep down *[holds hands about 18 inches apart]* we have muck. What it looks like, you have a piece about this length [holds hands about 3 feet apart] with seaweed all over it. I stopped and looked at it and looked at it. Nothing else there. I looked all the way around. This is sitting about this far *[holds hands about 18 inches apart]* from one edge and nothing else, no rocks around it, nothing out there.



Sketch by diver.

He had no buoy with him to mark the spot and had only a general idea where he was when he saw the object. Attempts to find it again to examine it further were unsuccessful.

What the diver saw in 1994 sounds very much like aircraft debris lying in a ground scar caused by high-speed impact with the pond bottom, but would such scarring still be present 67 years, and now 95 years, after the event? To answer that question we needed to find someone with specialized knowledge of ponds in Newfoundland. At the end of a long string of networking contacts we found the right person, and got more than we bargained for.

Dr. Kathryn Hargan runs the Paleoecology Laboratory at Memorial University in St. John's. The lab collects pond and peat sediment cores, dates them using well-established dating methods (radioisotopes with known half lives), and looks at markers stored in the sediment for evidence of past human disturbance. A pond's history is written in its sediment and the answer to our question of how fast it accumulates is "very slowly." In reply to Ric's question about how long a scar on the pond bottom might survive, Dr. Hargan wrote:

> What I do may very simply help you answer your questions – I reconstruct pond histories. In the case of a plane crash we would look at lead content in the sediments from the gasoline in the plane.

We could also look at charcoal content in the sediments from fires, as well as other disruptions to the ecosystem. I have collected sediment cores from all over the province and have some estimates for sedimentation rates so we could make estimates for how fast the plane wreckage would have been buried within the sediments over 100 years.

We already knew a parts-per-million list of elements in a Gull Pond sediment sample from 1975 shows a significantly higher than normal level of lead. Needless to say, we eagerly accepted Kathryn's help. The collection and on-site processing of core samples is not something we're qualified to do so we included two of her graduate students in the team for our June trip to the pond.

The big question anytime you schedule work at Gull Pond is weather. We were in Newfoundland for only four days, gambling we would get at least one helicopter-friendly day. Sunday, June 19 turned out to be the only choice, although the wind was forecast to be marginal; 15 knots, gusting to 25. We met the helicopter at the abandoned U.S. Naval Air Station in Argentia for the 15 minute ride to the pond and landed in an open grassy area we selected as a base of operations for the September expedition. We inflated the boat the students would use to collect the sediment core sample and TIGHAR diver Lee Paynter donned a dry suit for his planned work in the chilly water. Then it all went to hell.

The wind was stronger than predicted, blowing at least 20 knots, gusting to 30. Despite heroic paddling, the students found it impossible to control the inflatable boat. Ric put on a heavy neoprene immersion suit and tried to walk the boat to where there was enough sediment for the students to take a core sample. He could make progress where the bottom was rocky and the pond shallow enough for him to touch bottom, but the sediment is in the deeper areas and he couldn't make headway pushing the boat while swimming. Meanwhile Lee, burdened with 80 pounds of weights and a Scuba tank, found it impossible to crawl over the slime-covered rocks in less than a foot of water to get to where he could swim. Final score: Gull Pond 2, TIGHAR 0.

Whitecaps on the pond.

On the way out, we had the pilot make a low-level swing around the pond. Ric stuck his iPhone out the window and shot some video just for the heck of it. Back in St. John's that evening, licking their wounds over a few beers, Ric, Mark Smith, Lee Paynter, and Ernie LeRoy looked at the video and were astonished to see how clearly the bottom of the pond could be seen.

Light bulb: If TIGHAR drone pilot/photo guru Mark Smith could shoot a low-level, high-resolution photographic survey of the entire pond on a calm, sunny day, we should be able to see exactly where the bottom is shallow and rocky and where it's deeper and sediment-covered. That information would let us focus the September search on the areas most likely to hide an engine.

To schedule the photo mission we would, once again, be playing Weather Roulette. Mark would need at least three days of lead time, so we would be spending the money to get him to Newfoundland with no guarantee the forecast would hold.

We spent the month of July tracking weather systems with Mark on alert, ready to launch, but there was no window of opportunity until August 1st. New glitch. Forest fires in northern

Newfoundland and Labrador had all of the helicopters tied up doing fire suppression. Our local outfitter, TJ Green, would have to take Mark in over land in an eight-wheeled amphibious Argo. It had never been done. Two previous attempts to get an Argo to the pond on trails coming in from the west had failed when the vehicle got stuck in a bog or encountered one of the many impenetrable forests of dwarfed trees known as "tuckamore." This time TJ would try going in from the east.

This is an Argo – Part ATV, part boat.

We decided to go for it. On July 30th Mark flew to Newfoundland and on August 1st he and TJ headed out across the barrens. The ride in proved to be extremely rough but they succeeded in reaching the pond. The wind was stronger than predicted and at the upper limit of what the drone could handle, but despite the drone software screaming "I can't do this!" Mark was successful in flying a good survey. In hundreds of twenty megapixel overlapping photos taken from an altitude of 50 meters (164 feet), the survey gives us unprecedented detail of the pond's bottom morphology and some unexpected clues about where to look for airplane wreckage.

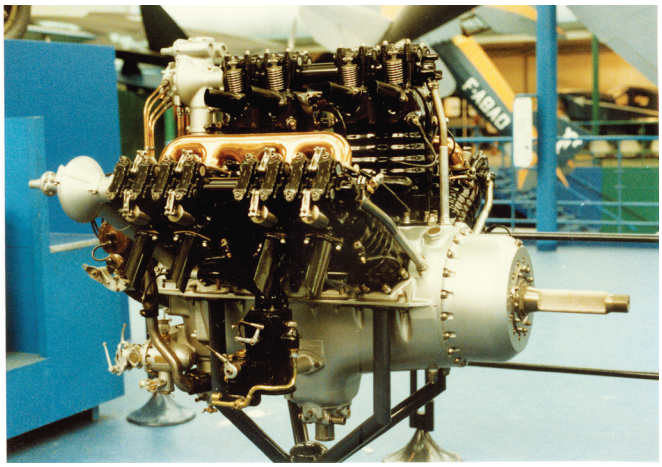
In this photo, several large rocks in shallow water have been pushed shoreward, scraping a trail behind them. An insert from another photo shows two people for scale.

We were surprised to see that at the north-northwest end of the pond, and only there, rocks probably weighing as much as 500 pounds have been pushed shoreward. In a typical winter, the pond freezes solid to the bottom where the water is less than about three feet deep. In the spring, wind-driven ice flows apparently pile up at the north-northwest end, driving encased rocks shoreward. That tells us the predominant wind is from the south southeast. Floating aircraft wreckage, or debris in shallow water around the island that later became encased in ice, would logically be moved north northwestward over time.

WHAT WENT WRONG?

The available evidence strongly suggests the White Bird, after suffering an inflight malfunction, attempted an emergency landing on Gull Pond. The aircraft was capable of making a successful water landing and yet the attempt resulted in the destruction of the machine and the death of its crew. What went wrong? There were no witnesses to the crash other than three rapid explosions heard a few miles away, so we must rely on anecdotal reports of wreckage seen later and physical evidence we have found ourselves to reconstruct possible crash scenarios. The severely damaged nature of the wreckage reportedly seen and the artifacts we've found lend credibility to the story of explosions being heard. Whatever happened appears to have been an extremely violent event. All of the debris seen or recovered from the pond, and all three artifacts found by TIGHAR, were in shallow water immediately adjacent to the small rocky island in the middle of the pond. If, in attempting to land, the aircraft struck the rocks on or near the island, the impact could have shattered the plywood hull and ruptured the three fuel tanks causing the reported explosion and leaving wreckage in the immediate area.

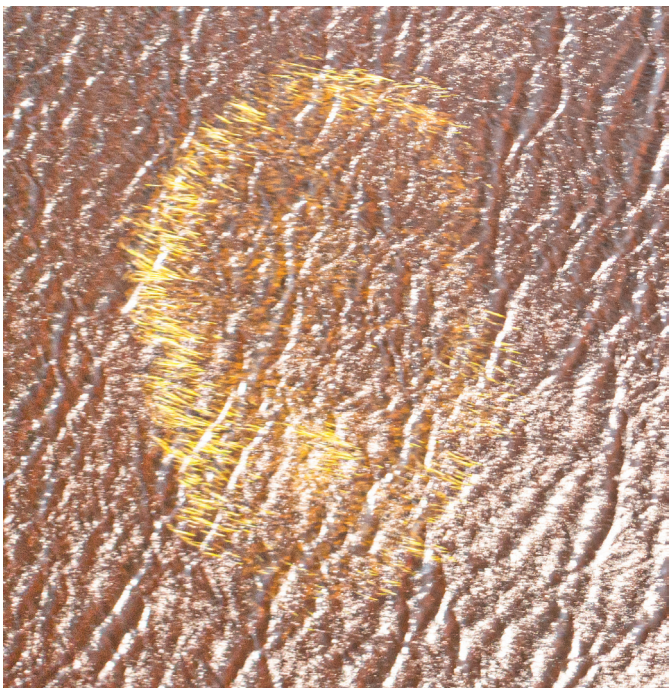
The strongest evidence against that scenario is what wasn't seen or found anywhere near the island: the 960 pound Lorraine Dietrich engine.



If the plane blew up upon hitting the rocks on and around the island, its difficult to explain how the engine ended up far enough away that it was never found. Where could that be? Most likely in one of the deeper sections of the pond where the bottom is covered in sediment, but those areas are all at least 50 meters (164 feet) from the island. The plane could have crashed elsewhere in the pond and the debris on and near the island floated there attached to buoyant wreckage. People saw wreckage on and near the island because that's where debris would be visible from shore, and to winter caribou hunters who could walk to the island on the ice. But there is also a problem with that scenario. If the plane didn't hit the rocks, why wasn't the landing successful? What caused the crash and explosion? The August 2022 photo survey provides a possible answer and an entirely new accident scenario.

A few of the photos show small patches of emergent marine grass, but one spot might be significant. Vegetation in the pond grows only in places where the bottom is covered in sediment to hold the roots. In one place, the grass grows in an almost perfect circle roughly 135 feet in diameter. In the center of the circle the bottom is bare rocks at an estimated depth of about six feet; so we appear to have a place in the middle of a sedimented area where there is a hole surrounded by an elevated circular berm, reminiscent of a bomb crater.

It could be caused by the near-vertical impact of an object heavy enough, and going fast enough, to have the observed effect. There is no record of the Cape Shore ever being used for bombing practice. If it was, the local population would know about it and there should be many bomb craters.



Short of a meteor, the only logical cause for such a feature is an airplane crash and, of course, there is considerable evidence a plane did crash in the pond.

But how could the White Bird, while trying to land on the pond, hit the water going almost straight down?

One of the most common causes of fatal accidents in forced landing attempts is the pilot's failure to maintain flying speed during the approach, resulting in a stall/spin. Nungesser's landings in l'Oiseau Blanc during flight tests were all at light weights. Faced with a forced landing with nearly a thousand pounds of fuel remaining, the airplane was heavier and its stalling speed higher than he was accustomed to. If the aircraft stalled and spun during the landing approach, an estimated 5,432 pounds of airplane would hit the pond going somewhere between 50 and 80 miles per hour depending on how high it was when the stall occurred.

The circular feature could also be completely natural, but there's nothing like it anywhere else in Gull Pond or neighboring ponds. It was high on our list of priority targets to be investigated in September.

Hypothetical vertical impact in six feet of water (to scale).

Anatomy of a Spin

When airflow over the wings is too slow to sustain flight, the wings "stall" – the aircraft stops flying and enters a dive. The plane picks up speed, the wings again generate lift, and the pilot can recover from the dive to resume normal flight.

If the stall occurs during a turn, as the nose drops and speed increases, the outside wing(s) begin to generate lift while the inside wing(s) are still stalled, causing the plane to rotate in a, steep out-of-control spiralling dive known as a "spin." The outside wing(s) are essentially flying around the stalled inside wing(s). To regain control, the pilot must stop the rotation so that both wings are generating lift. The pilot can then pull out of the dive – **IF** there is enough room.

A stall/spin at low altitude, such as during a landing approach, is almost always fatal.

In late August, as the expedition date approached, anticipation was running high. Logistics were in place, funding was adequate, and a team of ten TIGHAR volunteers had their airline and hotel reservations. In the seven days we planned to be in Newfoundland we were hoping to get at least three days of flyable weather – a reasonable gamble – but we were blindsided at the last minute by two unexpected events.

First, the Newfoundland underwater archaeologist whose services we had engaged for this expedition notified us that he would not be available. He runs a commercial marine survey business and a lucrative contract opportunity had come up. He offered a replacement, but the individual was only available for the first five of our seven days. Regardless of weather, we had lost Day 6 and Day 7.

Then the helicopter company informed us they would only be able to support us on our last three days. They had been flying almost constantly through July and August on forest fire suppression missions. The fire situation had abated and they were standing down to do maintenance and give the pilots some much needed rest. The only days they would be able to fly for us would be Days 5, 6 and 7.

With no underwater archaeologist available on Days 6 and 7, that left Day 5 as the only day we could do any work in the water, and then only if the weather that day was flyable. That's an unacceptable gamble. We had no choice but to postpone the expedition until next spring. All of the U.S. team members were able to get either refunds or vouchers for future travel, but it was still a bitter disappointment.

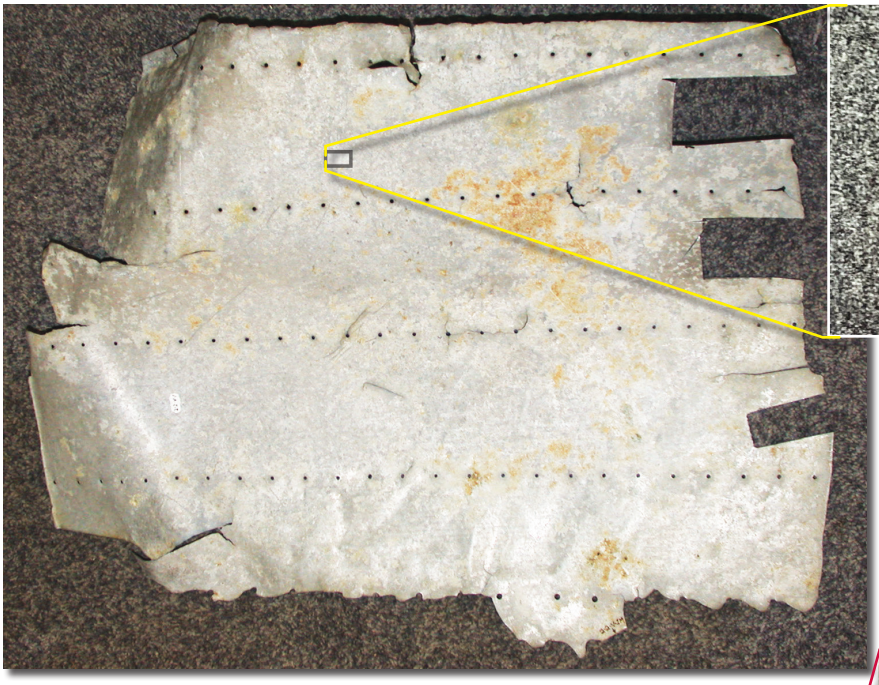
Hoping to at least get the sediment core sample collected, we made several attempts to find a day when TJ could take Kathryn to the pond over land, but each time we had to abort due to forecast high winds. The solution to the problem was obvious. In the winter, the pond can be accessed faster and easier by snowmobile. Wind is not a factor. Walk out onto the frozen pond, drill a hole in the ice in an appropriate spot (selected from the photo survey) and collect the sediment core sample. Additional samples can be collected from nearby ponds as a control.

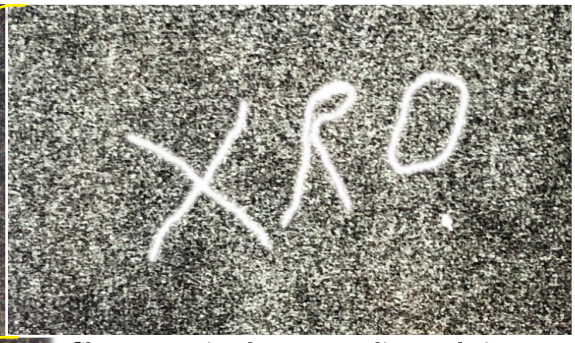
We've done this before. Ric (complete with beard) and Newfoundland archaeologist Roy Skanes in 1994. Roy will be joining us again for 2023.

We'll need a new archaeologist and a new permit, but the Newfoundland archaeologist we used 28 years ago is still working and eager to help. How much archaeological investigation we'll be able to do through the ice remains to be seen, but Ric and Mark will be there. No dates have yet been set for the winter expedition and spring expeditions, but it's already clear 2023 will be a busy and expensive year for field work. As always, we'll be depending on you, the members of TIGHAR to make it possible.

2-2-V-1 Update:
Neutrons, Numbers, & Labels

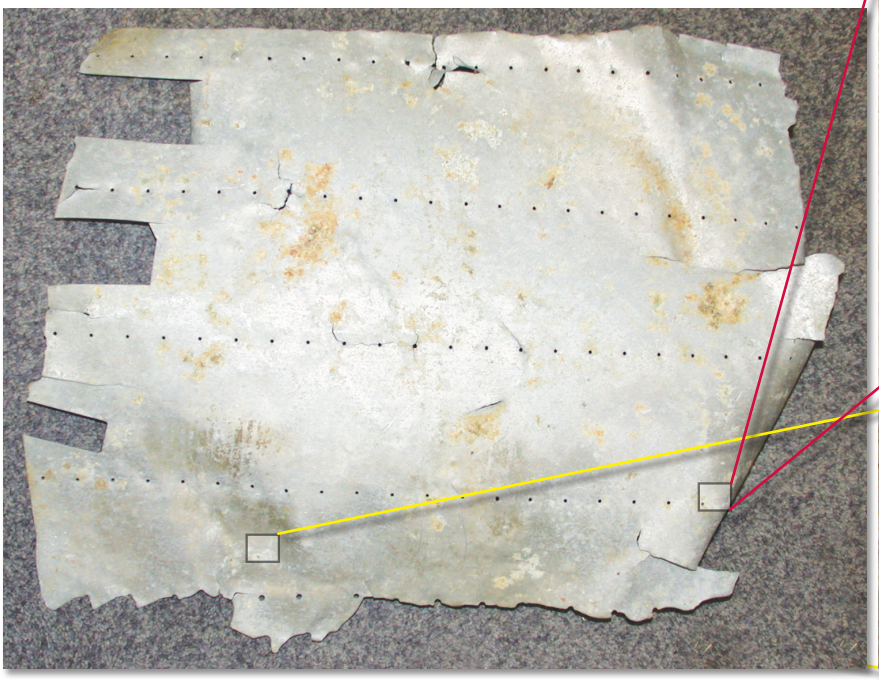
On September 27, 2022 the Penn State College of Engineering Radiation Science and Engineering Center (RSEC) reported the results of its Neutron Radiography experiment on TIGHAR Artifact 2-2-V-1. The Breazeale Nuclear Reactor was used to take neutron beam radiographs of the artifact's exterior surface on a Phosphor Imaging Plate with a resolution of 50 microns (.05mm). The experiment revealed numbers too faint to be seen with the naked eye and/or hidden under patches of coral growth. Some are easily explained. Others are, at this time, a complete mystery.

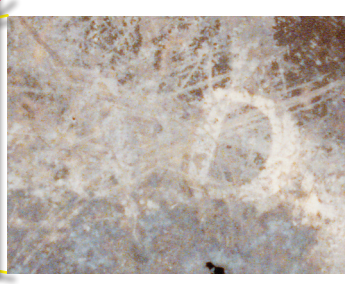




Characters in the raw radiograph images are dark and difficult to see. They have been highlighted here to make them visible.

Letters visible to the naked eye on exterior surface.





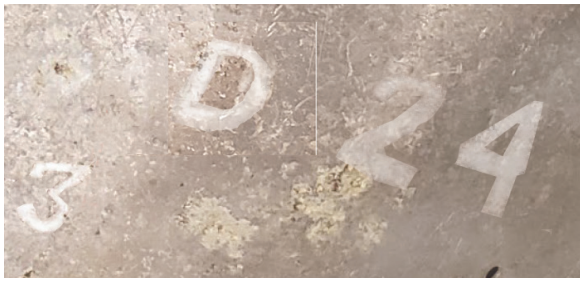
"AD"

Initial neutron radiographs taken in November 2020 identified two areas of interest on the interior (concave) surface of the artifact. What appear to be the handwritten letters XRO were observed and nearby there is something that could be a capital letter E written in cursive.

These discoveries prompted the RSEC to undertake a major upgrade in the system's imaging capability and it was June of this year before they were ready to resume imaging the metal.

This time the work focused on the exterior (convex) surface in the area where a letter "D" is barely visible to the naked eye. The "D," as well as the letter "AD" on another part of the exterior surface, are believed to be surviving remnants of labeling stamped on the aluminum at the time of manufacture. ALCOA labeling on aluminum sheet appears in many variations including "ALCLAD 24S-T" and "ALCLAD 24S-T3," sometimes followed by "AN-A-13." The letters and numbers are 1/2 inch tall.

Immediately following the single letter D, the new imaging found the numbers "24" which is consistent with known ALCOA labeling, but other more puzzling numbers showed up. There is a number "3" below the D, a bit too small to be standard labeling and in an unusual flat-topped style.



Much smaller features, only about 6mm (less than a quarter inch) tall, were observed to the right and below the "24." They appear to be numbers; a "3," followed by a slightly larger "3" or possibly "8," and what could be a "5." We've never seen tiny numbers like this on any of the dozens of ALCOA labeling examples we've examined.

The RSEC report cautions:

> Since the neutron radiography technique is based on the attenuation properties of the neutrons through media, small, random, and chaotic features on the surface of the patch like oxidation and organic growth makes it hard to visually analyze the images for extended periods. All those features due to their randomness can create a pareidolic illusion resembling numbers and letters.

In other words, the strange numbers might not be there at all. The human mind wants to make sense out of what the eyes see. "Pareidolia" can change clouds into camels, lumps of coral can become airplane wreckage, and random noise in a neutron radiograph can resolve into numbers; but a coincidental alignment of three illusionary "numbers" seems unlikely.

Further research may explain the numbers and help move Artifact 2-2-V-1 closer, or farther, from being a relic of NR16020. In any case, TIGHAR sincerely appreciates Penn State's support and the cutting-edge science applied by Dr. Dan Beck, Dr. Kenan Unlu and Alibek Kenges of the Radiation Science and Engineering Center.

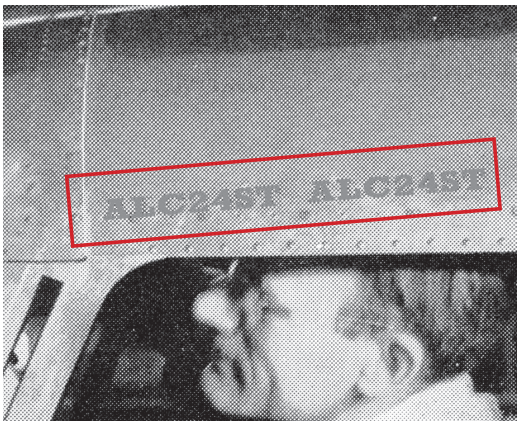
Rosetta Stone

A photograph of a WWII aircraft under construction appears to be a sort of "Rosetta Stone" for tracking the evolution of ALCOA labeling, and it does not bode well for 2-2-V-1 dating from 1937.

The "AD" on one part of 2-2-V-1 and the discovery of the numbers "24" following the single letter "D" confirms our hypothesis that the manufacturer's labeling stamped on the metal was originally "ALCLAD 24S-T."

Example of undated ALCOA labeling identical to that on 2-2-V-1. The yellow zinc-chromate wash must have been applied after 1939.

ALCOA labeling on aluminum sheet changed over time but documenting when those changes occurred has been difficult.



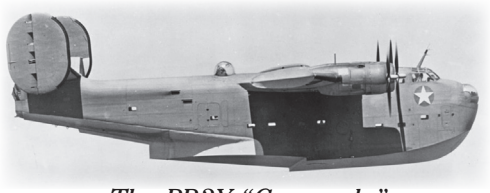
Lockheed Model 10 under construction circa 1936. Photo enhanced to show lettering detail

When Earhart's Electra was built in early 1936, aluminum sheet used by Lockheed was stamped "ALC24ST." The aluminum used in the patch put on the Electra in May 1937 was manufactured and stamped some time prior to that date. For 2-2-V-1 to be part of the patch, ALCOA labeling must have changed by that time to "ALCLAD 24S-T."

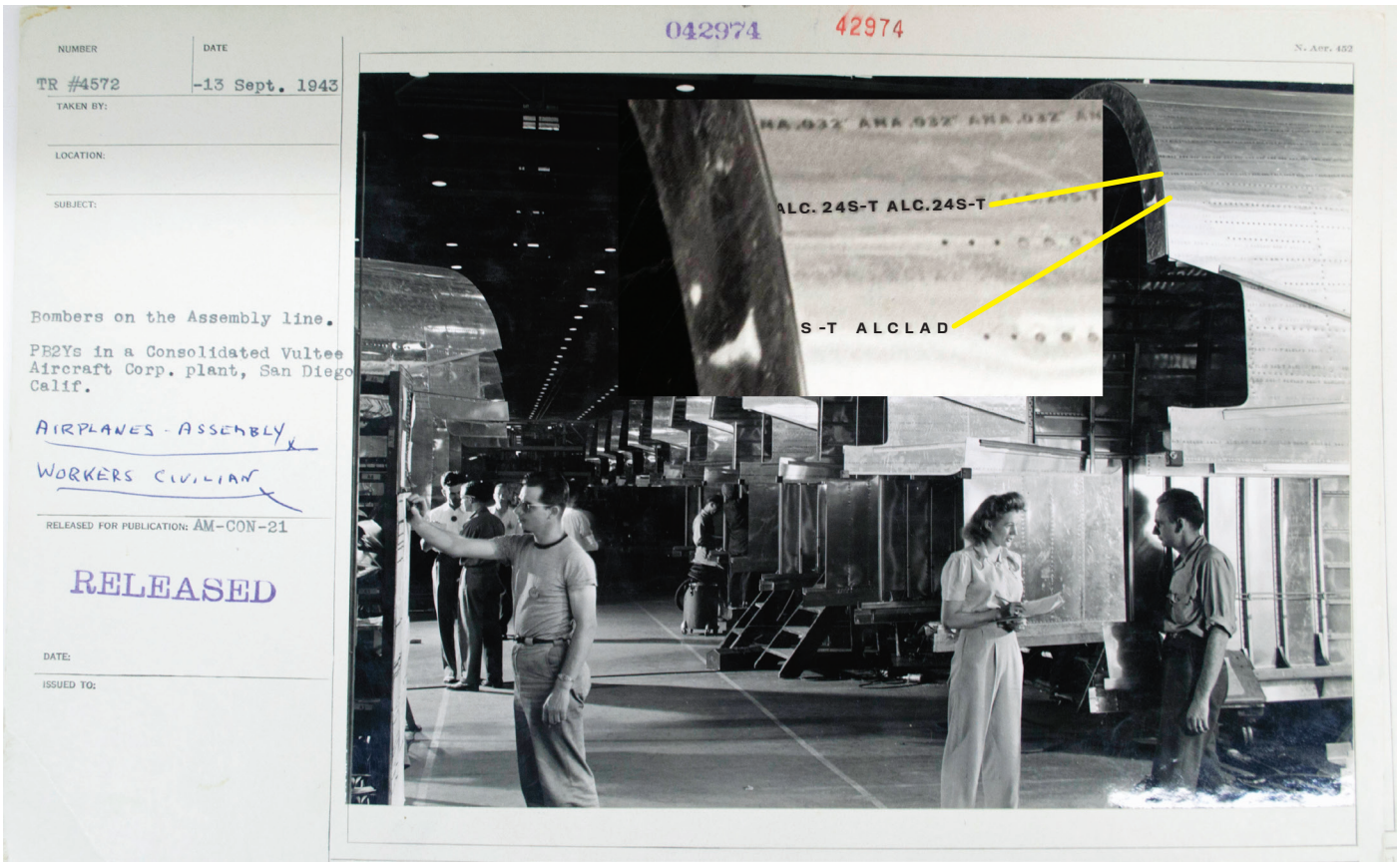
Photos of aircraft under construction by Lockheed, Boeing, Grumman, Martin, and Consolidated show ALC24ST in use as late as 1942. A photo of Consolidated PB2Y "Coronados" being built shows skin stamped "ALC24ST" in one section and sheet marked "ALCLAD 24S-T" in an adjacent skin suggesting the photo was taken during the transition period between the two labeling styles.

Consolidated appears to have been using up old inventory and using recently acquired metal on the same aircraft. The photo is dated September 13, 1943. Photos of labeling on wartime aircraft after 1943 show only "ALCLAD 24S-T" in use.

While not conclusive, the labeling evidence suggests the aluminum in 2-2-V-1 was manufactured not earlier than 1943.



The PB2Y "Coronado"



PB2Ys under construction, with inset detail.

An Alternative Origin?

Meanwhile, after applying state-of-the-art AI (Artificial Intelligence) technology to historical photos, TIGHAR forensic imaging expert Jeff Glickman succeeded in extracting sufficient detail to see that some features present on the artifact are not present on the patch.

In 2017, Tom Palshaw, a volunteer in the New England Air Museum restoration shop, noticed a similarity to the rivet pattern on 2-2-V-1 to a place on the upper surface of a Douglas C-47 wing in the museum's collection. He brought his observation to TIGHAR's attention and, on July 16, 2017, Ric Gillespie and Mark Smith went to the museum and took a close look at the wing. The verdict was "close, but no cigar."

A C-47 is the most logical alternative source for 2-2-V-1. An aircraft of that type is known to have crashed and burned on Sydney Island in the Phoenix Group in 1943. Surviving bits of wreckage were salvaged by the locals. After the war, a few families from Sydney relocated to Nikumaroro.

With evidence mounting that 2-2-V-1 was from an aircraft other than NR16020, Jeff decided to re-investigate the C-47 as a possible source. On August 18 and 19, 2022, Jeff visited the New England Air Museum and performed an intensive forensic examination of the C-47. He is currently evaluating the data and imagery he collected. We'll publish his written report when it is completed.

Douglas C-47

One More Good Flight

"I have a feeling there is one more good flight left in my system, and I hope this trip around the world is it."

–Amelia Earhart
March 1937

TIGHAR'S CONTRACT WITH THE NAVAL INSTITUTE PRESS for the publication of my new book, *One More Good Flight – The Amelia Earhart Tragedy*, was signed May 17, 2022.

As with *Finding Amelia – The True Story of the Earhart Disappearance*, TIGHAR will hold the copyright and receive all royalties. I receive no compensation other than my regular salary as Executive Director.

No historical investigation is ever truly finished, but thirty-four years of research by hundreds of TIGHAR members and forensic experts; multiple trips to archives in the U.S., the U.K., New Zealand, Tuvalu, and Kiribati; and a dozen expeditions to the Phoenix Islands, have assembled the pieces of a jigsaw puzzle that reveal not only what really happened to Amelia Earhart, but why it happened. My job is to present the entire picture in a coherent and entertaining narrative.

Thirty-six of the anticipated forty chapters are finished. The book contract does not permit us to share excerpts publicly but private reviews have been blush-worthy with comments like "masterpiece" and "couldn't put it down." The final manuscript must be delivered to the publisher by December 1st, so the pressure is on.

Production of the roughly 500-page hard-cover book will take several months but, as promised, everyone who contributes at least $100 to the TIGHAR Literary Guild will receive a signed copy.

Ric Gillespie