



A SHORT HISTORY OF A LONG PROJECT



IF THIS IS TIGHAR'S EIGHTH EXPEDITION TO NIKUMARORO, WHY IS IT

The Earhart Project was launched summer's trip will be TIGHAR's eighth to the Phoenix Group. Because the because we've been to the island so among some that we are flogging a dead or nothing activity. It's either there or it's surely we would have found it by now.

But a moment's reflection makes it obvious that is a process of gathering and evaluating evidence, correct answer. You always find what you're investigation of the Earhart disappearance is, like hypotheses based upon the available evidence; testing those hypotheses through experimentation (i.e. archaeological examination); and accepting, rejecting or modifying the hypotheses according to on-the-ground results. By repeating the process, we refine the search and are increasingly able to accurately predict the results.

As shown in the following expedition-by-expedition review of the project, it's a tedious and often frustrating way of ferreting out the truth. Unfortunately, it's the only one that works – aside from pure dumb luck, and our luck just ain't that reliable.



nineteen years ago and this expedition to Nikumaroro – our ninth project has continued for so long and many times, there is a misconception horse. They see investigation as an all not, and if there were anything there,

? true investigation isn't like that at all. Investigation eliminating possibilities, and zeroing in on the searching for in the last place you look. TIGHAR's all science, a progressive process of developing

1989: NIKU I

We didn't call it Niku I. When we first decided to visit the island in 1988 we never expected that we would be going back. The first trip was simply The Earhart Expedition. The big silver airplane would either be lurking in the bushes or it wouldn't.

When we arrived in 1989 we found an island that was far too big to search in the three weeks we were there. We hacked through the dense tropical underbrush exploring the island as best we could while our team of scuba divers swept the surrounding reef slope, but we found no big silver airplane. However, we did find airplane debris in the abandoned village – scraps really – bits and pieces left over from salvaged airplane parts that had been cut up for local use such as fishing lures and combs.

On the very last day (of course), one of our exploring parties found a small grave far from the settled area. We were aware of an old story that Earhart's bones had been found by the island's first settlers but had been disposed of by "superstitious natives." Could the rumor be true? The grave was constructed in a style typical of the Pacific islanders, but it was all by itself back in the bush. Did it hold the bones of Amelia Earhart? To find out we would have to get permission to open the grave and come back equipped to do an archaeological exhumation of whatever lay within.

Not long after we got back home, we had another reason to return to the island. A veteran of the Coast Guard Loran station that had been on the atoll during WWII told us of seeing a mysterious "water collection device" back in the bush at a spot somewhere along the island's north shore. He drew a sketch of a metal tank that seemed to be roughly the size and shape of one of the Electra's fuel tanks? Had he happened upon the place where Earhart and Noonan had tried to survive? The tank should still be there. All we had to do is find it.

1991: NIKU II

We didn't call the second trip Niku II. The 1991 expedition was "The Return to Nikumaroro." We had permission to find out what was in the grave and we were going to locate that metal tank on the



north shore. We were also able to raise the money to hire Oceaneering International to do a sonar sweep around the perimeter of the island. Surely this time we'd be able to either prove or disprove the hypothesis that Earhart and Noonan ended up on the island.

Things got off to a promising start. When we arrived at the island we discovered that a storm had torn up the western beach front and deposited, among the washed-up coconuts and palm fronds, a chunk of aircraft skin with a distinctive rivet pattern. Was it from the Electra? As we began carefully excavating the grave, we stumbled upon some very old shoe parts nearby. According to the story, "size nine American shoes" had been found with the bones. We had a fragmented rubber sole that might have been about a size nine and a "Cat's Paw, USA" heel. We were feeling pretty good.

Big disappointment. The grave held the bones of a tiny, probably still-born, infant. Meanwhile, over on the north shore, an exhaustive and exhausting survey of the beach front turned up no sign of a water collection device.



The gravesite on Aukaraima. TIGHAR photo by P. Thrasher.

We didn't have an Electra fuel tank and we didn't have Amelia's bones, but did we have her shoe and a piece of her airplane?

Post-expedition research seemed to indicate that it was the right kind and size of shoe. The faded logo on a metal bottle cap found in the same area identified the product as an over-the-counter stomach-settling medication of the 1930s. Earhart is known to have suffered from some stomach trouble during the world flight.

Analysis of the piece of airplane skin revealed that the type of aluminum, the thickness, and the size and style of rivet matched perfectly with an area on the underside of an Electra. The rivet pattern was close, but not quite right, but then Earhart's airplane was extensively repaired after her crash in

Hawaii. No one could say exactly how the repairs were carried out. Traces of manufacturer's labeling still visible on the artifact established that it was a grade of aluminum authorized only for use in repairs.

Nothing we had found was indisputably Earhartian, but what were the chances that so many good clues on such a remote island could be simple coincidence? In our judgment, there was a sufficient preponderance of evidence to consider the basic mystery solved. Our critics did not share that view and the public was treated to another round of heated controversy about the fate of Amelia Earhart.

It was clear that much more evidence was needed and we began planning for what, by this time, we could only call "Niku III." Unable to put together the funding for a planned return in 1993, we put Niku III on hold and turned our attention Project Midnight Ghost. New developments in the search for the White Bird raised the prospect of success in that earlier and, in many ways, more challenging mystery. We reasoned that finding Nungesser and Coli would make it possible for us to raise the money to continue the work on Nikumaroro, but three years of research and several expeditions to Newfoundland resulted in the same situation we faced in the Pacific: lots of compelling gun smoke but no smoking gun.

Meanwhile, research on the Earhart Project continued and, in 1995, there was a breakthrough. Forensic imaging analysis of a 1941 aerial photo by Jeff Glickman of Photek, Inc. disclosed the presence of a man-made object deep in the bush on Nikumaroro in the area where the Coast Guard veteran reported seeing the "water collection device" – the metal tank we couldn't find in 1991. Now we knew that there really was something there and, more to the point, we knew exactly where it was.

1996 – NIKU III P

Knowing the location of a potentially historic site carries a heavy responsibility and we felt it was important that we examine and document what was there before we made the information public. We also recognized that the site might have nothing to do with Earhart and we didn't want get everyone all stirred up just to be disappointed. Instead, we put together a small, unpublicized expedition

funded by a single donor. The trip's express purpose was to locate and identify the man-made object that appeared in the 1941 photo. For want of a better name, we called this trip Niku III P (P for Preliminary).

We succeeded in finding the object and it was, indeed, a tank – but it was not an Electra fuel tank. It was a steel tank used for rainwater storage. Faded lettering on its side read "Police Tarawa." We had seen several similar tanks in the abandoned village. There were a few other artifacts scattered around, all of them explainable as having come from the village. No airplane parts. Nothing that suggested a castaway, much less Amelia Earhart.



The expedition felt like a complete bust but, before we left, and more or less for the heck of it, we carried out a small excavation in the village at a collapsed and washed-over structure which we believed had once been the carpenter's shop. Nothing very interesting turned up except some electrical cables with connectors of a type we had seen used on aircraft radios.

1997 – NIKU III

Niku III P had tested and seemingly disproved the hypothesis that the water collection device seen by the Coast Guard veteran was associated with the Earhart disappearance. Nonetheless, the site across the lagoon where we had found the shoe parts in 1991 still needed a closer look. If the old story about bones being found on the island was true, and if the shoe parts and bottle cap we found during Niku II were Earhart's, then perhaps the Electra had landed on a vegetation-free area not far from where the shoe parts were found and had subsequently been washed into the lagoon. We could test that theory with a remote-sensing, electromagnetic search of the lagoon bottom in the suspect area. It also seemed likely that more thorough archaeological examination of the village might produce more airplane parts.

Preparations and fund raising for Niku III went forward and in February of 1997 we embarked again, this time with more people, a new hypothesis,

and new technology with which to test it. Unfortunately, we picked the wrong time of the wrong year and got tagged by two tropical cyclones (known in our part of the world as hurricanes). The work was accomplished despite very dangerous weather and sea conditions, but once again the results were mostly negative. No airplane wreckage in the lagoon and nothing more found at the shoe site. The village search did turn up numerous bits of airplane debris but most of it was either too robust to be from the Electra or too small and generic to be attributed to any particular aircraft. We collected the bits and pieces anyway, including a small cut piece of clear plastic that looked like it might be Plexiglas.

Niku III was certainly an adventure, but adventure was not what we were after. We had succeeded in disproving another hypothesis, and it had nearly a cost us of our lives. Forced to seek sheltered water on the way home, we put into Funafuti in Tuvalu where we hoped to catch a flight back to Fiji – but



Storm at sea: a white squall approaches in 1997.

the airline's one aircraft was soon grounded with mechanical trouble and most of the team was stuck on Funafuti. After nearly ten years of investigation, all we had was a bunch of old stories, and a collection of interesting artifacts, none of which – as our critics delighted in pointing out – were conclusively associated with Earhart. The project's prospects looked bleak indeed.

But as the storm that had driven us to Tuvalu began to clear, so did the dark clouds of our bad luck. We discovered that among the residents of Funafuti were people who had lived on Nikumaroro before the settlement was abandoned in 1963. We collected several accounts of aircraft debris washing up on the island in the 1950s. The reported locations all suggested that the wreckage originated somewhere along the western reef.

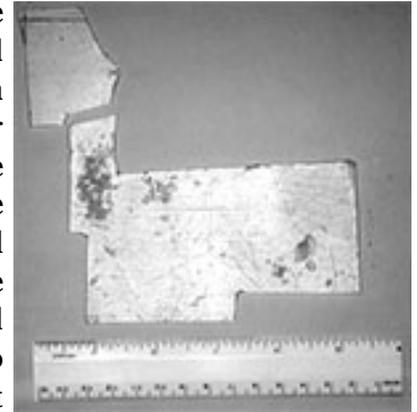
When we got home we asked Jeff Glickman of



Photek, Inc. to examine aerial mapping photos of Nikumaroro taken in 1953 to see if they might show any of the reported debris. Sure enough, forensic imaging revealed what appeared to be a debris field of light-colored metal on the atoll's western reef.

At last we had an hypothesis based on more than old stories and speculation. If there were pieces of airplane wreckage on the western reef in 1953, there might well be wreckage in the bush along the island's rugged western shoreline.

Further evidence that our luck had changed came when the piece of clear plastic found in the village proved to be Plexiglas (polymethyl methacrylate) of the correct thickness and subtle curvature to match Lockheed Part No. 40552 – the cabin windows of the Model 10 Electra.



The Plexiglas piece.

But the real breakthrough came later that year when a TIGHAR member doing unrelated archival research in Tarawa happened across a file containing official telegrams describing the 1940 discovery of a skeleton on Nikumaroro that “is just possibly that of Amelia Earhardt” [*sic*]. By the spring of 1998 we had tracked down and copied the complete British records of the incident in an obscure archive in England. The old story was no longer rumor but documented history – and the records yielded a wealth of information.

In 1940, bones and artifacts suspected of being Earhart's had been found on the island at a castaway's campsite. According to the discoverer, British Colonial Service officer Gerald Gallagher, a work party found a human skull and buried it. Learning of the find a few months later, Gallagher conducted a thorough search of the area and found a partial skeleton, the remains of a man's shoe, a woman's shoe, a sextant box, a fire, dead birds and a dead turtle. The bones were sent to Fiji for identification where a colonial doctor took measurements and judged them to be those of a man. British authorities, fearing that “Thinnest rumours which may in the end prove unfounded are liable to be spread,” decided not to mention the find to the Americans.

Was the evaluation correct? Among the official records of the incident were the doctor's original notes detailing the measurements from which he drew his conclusions. We asked two leading forensic anthropologists to independently assess the measurements using state-of-the-art analytical tools. They concluded that, "the morphology of the recovered bones ... appears consistent with a female of Earhart's height and ethnic origin."

Confirmation that the body of a female castaway of Earhart's general description had been found on Nikumaroro three years after she disappeared was sweet vindication, but it raised a raft of new questions. Where was the castaway's campsite? Only a partial skeleton had been found. Did the missing bones, presumably carried off by giant Coconut Crabs, still exist? Were there other artifacts at the site which might confirm the identity of the castaway? Did the bones and artifacts taken to Fiji still exist? If so, could we track them down?

1998 – THE KANTON MISSION

About this time, another story cropped up that seemed worth investigating. Supposedly, in 1970, the crew of a helicopter supporting USAF operations at Kanton Island, 200 miles northeast of Nikumaroro, spotted a radial aircraft engine on the western reef. Out of curiosity, the crew reportedly airlifted the engine back to Kanton where it eventually ended up in a dump. We inspected the dump but found that it had been bulldozed and filled in. Whatever was there in 1970 was now buried under several tons of coral rubble. Subsequent investigation revealed the story to be, although well intentioned, almost certainly apocryphal.

1999 – NIKU IIII FIJI BONE SEARCH I

With better evidence than ever before that we had the right place, we started organizing for another major expedition to be known as Niku IIII (we chose four slash marks rather than "IV" for marketing reasons). The target date for the expedition was 2001 and to lay the groundwork we put together a two-pronged research effort. One team would make a short trip to Nikumaroro to investigate the western

shoreline for aircraft wreckage while a second team tried to track down the bones in Fiji

Despite days of hacking through dense beach front vegetation, the shoreline search turned up no airplane parts. In Fiji, official records and former government workers were not able to trace what had become of the bones, but interviews with former residents of Nikumaroro produced more stories of an airplane wreck on the atoll's western reef.

2001 – NIKU IIII

As we prepared to launch our seventh trip to the Phoenix Group – our sixth to Nikumaroro – the biggest question was where to concentrate our efforts. Was the site where we had found the shoe parts in 1991 the place where bones were found in 1940? Our 1997 re-examination



of the area had found nothing further to support that hypothesis. Was the castaway's campsite somewhere else entirely? The records we found in England were not specific about the location – only that it was somewhere toward the southeast end of the atoll. Perhaps there was more information in the archive in the Kiribati National Archives.

A research trip to Tarawa in the spring of 2001 produced several hundred pages of new information about the island's colonial history, including a number of hand-drawn maps that showed a small section of land along the northern coast as being set aside for "Karaka" or "Komitina." Karaka was the local rendering of Gallagher – Gerald Gallagher, the British Colonial Service officer who had discovered the castaway's bones and campsite in 1940. Komitina is the word for Commissioner, the general term applied to all administrative officers. The location of the plot of land reserved for "Commissioner" Gallagher was the very place where we had found the water tank in 1996. The official records we found in 1998 made it clear that Gallagher had made a thorough search of the castaway's campsite. A thorough search would take time and hard work. Was the tank there to provide water for the 1940 search? Had we already found the castaway's campsite and didn't know it?

When we returned to the site in 2001, cleared away the dense tropical vegetation, and began a

detailed archaeological examination of the area, we quickly found strong indications that this was indeed where the bones had been found. The site exactly matched Gallagher's description, including the remains of several small fires with bird and fish bones that exhibited burn damage. There were also the bones of a turtle and deposits of clamshells that had been opened in the manner of New England oysters. Shards of glass found together were not from a single broken object but rather appeared to be pieces collected as expedient cutting tools.

There was even the hole where the skull had been buried and subsequently dug up by Gallagher.

Time did not permit a full inspection of the area, but enough was found to establish that, for the first time in the history of the project, we had a primary archaeological site connected to documented historical events believed, at the time, to be related to the Earhart disappearance.

Soon after our return we began preparations for Niku V.

2003 – NIKU VP & FIJI BONE SEARCH II

Over the years, our work in the Phoenix Group has drawn international attention to this remote and relatively untouched corner of the world. In 2002, a scientific party from the New England Aquarium was studying Nikumaroro's pristine coral reef when the expedition leader noticed what appeared to be a metal wheel (no tire) stuck to the coral in shallow water near the shore of the old village. The wheel was too small for an automobile, and there were never any cars on the island anyway. He thought it looked to be about the right size for an airplane wheel but he also assumed that TIGHAR researchers must have seen it many times. We hadn't. The wheel must have been uncovered by beach front erosion that is becoming more prevalent with the rising sea levels associated with global warming.

When we learned about the sighting we were immediately concerned that further storm activity would carry away the artifact, so we mounted another small, quiet expedition to recover it. As in



the past, we dubbed this interim expedition a "preliminary" to the next planned trip.

Our team reached the island in the summer of 2003, but we were too late. The shoreline was devastated and the wheel was nowhere to be found. Searching inland, in the hope it had been washed ashore, the team found a number of aluminum artifacts that appeared to be more scraps left over from local use of airplane parts. Upon closer inspection, they proved to be additional examples of a component we found in the same area during our very first visit to the island in 1989. We still don't know for sure what purpose they served but the available evidence suggests that they were heat shields used to insulate the fuselage-mounted fuel tanks from the heating ducts that ran along the floor on each side of the cabin in Earhart's Electra.

In 2003 we also made another attempt to find out what happened to the bones that were sent to Fiji, but once more we were not able to pick up the trail. Our luck seemed to be in remission.

2007 – NIKU V

The Niku V expedition – our eighth to Nikumaroro and our ninth to the Phoenix Group – will focus on the two established archaeological sites which have yielded artifacts believed to be associated with the Earhart disappearance – the old village and the castaway's campsite. This expedition will further excavate, examine and expand those sites.

The Old Village

Our quest for airplane-related artifacts will focus on the portion of the abandoned settlement at the

atoll's western end where we have found aircraft debris on previous expeditions. We know that the Pacific islanders who lived there from 1939 to

1963 cut up sheet aluminum and plexiglas salvaged from aircraft wrecks for local use – primarily for making fishing lures and decorative objects. Our previous archaeological excavations in the village



have produced left over scraps from that activity. The aircraft artifacts found to date fall into three categories; components from a WWII Consolidated B-24, components that do not fit any known WWII type and appear to be consistent with Earhart's Electra; scraps that are too small or generic to attribute to any particular aircraft.

The B-24 parts appear to be explainable. No aircraft crashed or was damaged at Nikumaroro during WWII or afterward. Kanton Island, two hundred miles away, was the site of a large and active U.S. military airfield during the war and at least one B-24 is known to have crashed there. In the 1950s, Kanton (then spelled Canton) became an important refueling stop for British and American trans-pacific commercial flights and people from Nikumaroro were employed there. The B-24 parts were probably imported to Nikumaroro in the post-war years by returning workers.

The aircraft parts that do not fit any known WWII type and appear to be consistent with Earhart's Electra are harder to explain unless they did, in fact, come from Earhart's airplane. There is a tradition among the people who formerly lived on the island that there was aircraft wreckage on the western reef when the first settlers arrived in 1939. The larger pieces of wreckage are probably now in the very deep water off the edge of the reef. Searching that environment is beyond the scope and financial resources of this expedition, but our hope is that the village will yield more aircraft debris that will be sufficiently identifiable to justify the expense of a deep water search.

The Seven Site

Our search for human remains and/or personal effects will be concentrated on the area near the atoll's southeastern tip where the campsite and partial skeleton of a castaway were found in 1940. Known to us as the "Seven Site," from a large natural bare spot in the vegetation in the shape of a numeral seven, the location was confirmed by our 2001 expedition to match the description of where the partial skeleton was found in 1940.

Only five teeth were present when the skull and mandible were recovered in 1940, so it would seem that twenty-three teeth (not counting four wisdom teeth which may or may not have been present) came loose and fell out before the partial skeleton was discovered. Only thirteen relatively large bones, of the three hundred fifty bones in the human body, were found in 1940. The bones that were missing are

believed to have been carried off by giant Coconut Crabs (*Birgus latro*). Some of the missing bones and teeth may still survive and could, if recovered, yield DNA for matching against Earhart's living relatives. Finding them among the dense tropical vegetation and coral rubble will be a daunting task.

Special Investigations

In addition to the archaeological work, we'll be carrying out three special investigations during Niku V.

Taphonomy Study

The bones that were missing from the partial skeleton found in 1940 were presumably carried off by giant coconut crabs (*Birgus latro*). To conduct an efficient search for those bones, if they still exist, we need to know where to look.

During the 2001 expedition, our forensic anthropologist, Dr. Karen Burns, laid out a lamb shoulder on Nikumaroro and documented its deterioration with twice-daily visits to the site. The entire subject – roughly five pounds of flesh and bones – disappeared in the course of five days. Coconut crabs were observed at the site on several occasions, as well as numerous smaller strawberry land hermit crabs (*Coenobita perlatus*). What is not known, and is apparently unknown to the scientific community at large, is exactly what coconut crabs do with bones when they carry them away. Do they take them down into their burrows? Do they carry them for some distance and then drop them? Do they consume them bit by bit? No one knows.

Before our departure from Fiji, Dr. Burns will obtain the bones of a pig. Our team physician, Dr. Robin Acker will help verify that no pathogens are present, as we want to be very sure not to contaminate the island environment. The bones will be frozen and transported to Nikumaroro in a frozen state. Upon arrival, Drs. Burns and Acker will install metal screws in the bones so that they can be found using a metal detector and also attach long, brightly-colored "tails" to make the bones easier to find visually.

The bones will be laid out on Nikumaroro and the crabs will, presumably, after some period of time, take them away. Cameras set to take photos automatically at set intervals should give us information about what bones are taken by which crabs. We'll then try to relocate the bones to learn where the crabs go with them and what they do with them. We'll use that information to design a search for any surviving castaway bones.

Reef/Tidal Survey

The Sokkia company, through Instrument Sales & Service of Wilmington, DE, has equipped us with two SRX Robotic Total Station surveying systems. In addition to documenting the archaeological work, we'll be using this very sophisticated surveying equipment to collect information about the reef-flat where it appears the Electra was landed on July 2, 1937 and subsequently washed over the reef edge. We'll also be collecting current tidal information to verify and/or correct our calculations of tidal condition on the reef in 1937.

“Arrowhead” Investigation

A curious anomaly in a 1938 aerial photo of the island might have been an attempt by the castaway(s) to signal any passing aircraft. A bare spot in the vegetation nearly fifty feet across appears as an unnaturally bright white arrowhead-shape a few hundred yards north of the Seven Site. The feature is not a flaw in the photo and is not present in later aerial photography, suggesting that it might be man-made, possibly by bringing white beach sand or coral inland. We'll locate the spot and see what is there today.



The “arrowhead.”

HOW YOU CAN FOLLOW THE EXPEDITION

Just as we did during the 2001 trip, every day during the expedition's time at Nikumaroro – expected to be from July 19 to August 4 – Executive Director Ric Gillespie will report to TIGHAR's Pat Thrasher via satellite phone. Pat will then write up a summary, including photos from previous expeditions to illustrate the areas where teams are working, and post it on the TIGHAR web site at www.tighar.org. This time, Ric will also be phoning in daily reports to the Associated Press who will cover the expedition both on line and through their wire service, but Pat's coverage on the TIGHAR web site will, of course, have a more personal perspective.

In 2001, we offered TIGHAR members a special poster-size grid map of Nikumaroro based on a satellite photo by Space Imaging. We're making those maps available again this time, plus two new, detailed grid maps based on an even higher resolution satellite image of the island taken by Digital Globe earlier this year. We're very grateful to Digital Globe for making this new imagery available.

The two new maps provide up-close views of the village and the Seven Site, with grid overlays that will let you follow Ric's descriptions of where the teams are working and what they're finding. Historical photos included on each sheet provide perspective on how the island has changed over the years and even since the 2001 expedition.

These are great tools for keeping track of the work on the island but they're also very attractive images in their own right.

Time is short, so during the expedition we'll be overnighting your maps to you. Use the enclosed form or order via the TIGHAR web site today.



Although the circumstantial case for Nikumaroro is already strong, we are aware that for a puzzle as iconic as the Earhart disappearance, the bar for conclusive proof is set very high. The mystery will only be considered to be solved if and when someone finds DNA-matchable human remains, or artifacts that are unquestionably from the plane or its crew. The chances that this expedition will find either or both are higher than on any previous trip but – as always – the only guarantee is that we'll do our best to find whatever is there.