

TIGHAR TRACKS

THE JOURNAL OF THE INTERNATIONAL GROUP FOR HISTORIC AIRCRAFT RECOVERY



Sixty Years is Long Enough to Wait



*... that they might escape the teeth of time and
the hands of mistaken zeal.*

— JOHN AUBREY
STONEHENGE MANUSCRIPTS
1660

TIGHAR (pronounced “tiger”) is the acronym for The International Group for Historic Aircraft Recovery, a non-profit foundation dedicated to promoting responsible aviation archeology and historic preservation. TIGHAR’s activities include:

- Compiling and verifying reports of rare and historic aircraft surviving in remote areas.
- Conducting investigations and recovery expeditions in co-operation with museums and collections worldwide.
- Serving as a voice for integrity, responsibility, and professionalism in the field of aviation historic preservation.

TIGHAR maintains no collection of its own, nor does it engage in the restoration or buying and selling of artifacts. The foundation devotes its resources to the saving of endangered historic aircraft wherever they may be found, and to the education of the international public in the need to preserve the relics of the history of flight.

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Finding Amelia

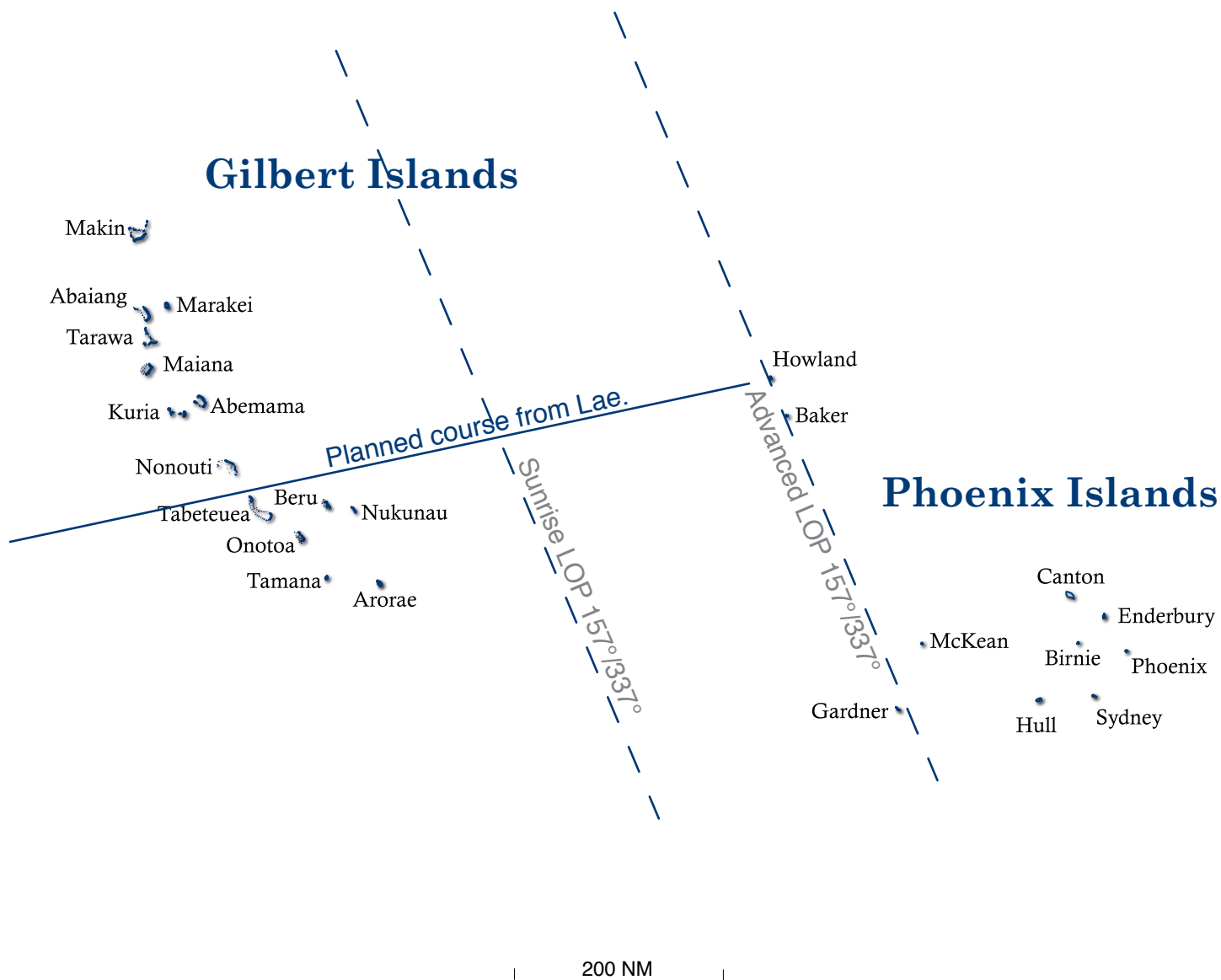
Next year, 1997, will mark the 60th anniversary of the disappearance of Amelia Earhart and Fred Noonan during their 1937 World Flight attempt. We think that sixty years is long enough to wait for the answer to one of the 20th century's greatest riddles.

The idea, born during World War Two, that Amelia Earhart may have been a spy or was somehow abducted by the Japanese has always been absurd, but decades of sensational speculation have given that fantasy a place in American folklore. More common today is an acceptance of the ultimate 1937 finding that the flight simply got lost, ran out of gas, crashed at sea and sank into oblivion. Although attractive in its simplicity, the documented circumstances of the disappearance and the subsequent search show it to be, perhaps, too simple.

There is another answer. It is not a new answer. In fact, it is the oldest answer, the one considered to be the most reasonable by those most knowledgeable at the time of the disappearance. Naval and aviation experts agreed that Earhart had, most probably, landed at an island which lay on the navigational line she had said she was following. That line of investigation was abandoned on the basis of a brief aerial search one week later. TIGHAR has done nothing more than pick up the old and now very cold trail where the U.S. Navy left off in 1937.

This special issue of *TIGHAR Tracks* summarizes the results of eight years of TIGHAR research. It is our statement of the case for a conclusive search of Nikumaroro, formerly known as Gardner Island, an uninhabited atoll in the Phoenix Group of islands in the Central Pacific nation of Kiribati.





Pacific Ocean

RADIO LOG

USCGC ITASCA

Date

1 JULY 1937

Finding Amelia

L.G. BELLARTS CRM ON WATCH

ENTRIES

TIME

Log Jam

WATCH STARTED AT// SIGNALS HEARD LOGGED ONLY//

1900

VERY WINDY AND SEEMED SHIFT ABOUT

1917

NO SIGS ON DURING PERIOD

1945/48

WATCH 0200 Drifting to westward of Howland Island... Wind, East, Force 2 (light breeze)... Temperature;

81° F... Sky Condition; clear... Sea Condition; 1 (moderate swell, calm sea)

2015-18

KHAQQ DE NRUI A A A A NRUI HOWLAND ISLAND A A A A

2030-35

UNREADABLE FONE SIGS ON OR ABT 3105

35-40

SENT WEA TO KHAQQ ON 7500

255-58

KHAQQ DE NRUI A A A A NRUI HOWLAND ISLAND A A A A

2100-05

Itasca nodded gently in the tropical night, waiting, listening. Far to the west, the Lockheed Electra flown by Amelia Earhart and navigator Fred Noonan was inbound to Howland Island, its planned mid-Pacific refueling stop enroute to Hawaii and California and the completion of the first aerial circumnavigation of the globe by a woman. Everyone knew that Earhart's flight from Lae, New Guinea across more than 2,500 miles of trackless ocean would be the most challenging of her career and *Itasca's* job was to stand by off Howland to render navigational assistance. On shore, crewmen would chase the birds off the coral runway for her landing and mechanics would service the plane. Two wire service reporters stood ready to describe the landing and interview the fliers. It would be a memorable morning.

In fact, the events of July 2, 1937 would become the stuff of legend. Recorded in not only the ship's log but in three radio logs as well, the facts surrounding the flight's failure to arrive at Howland Island would be interpreted in several official reports and, over the years, speculated upon by countless searchers, researchers, authors, screen writers, and the public at large. Many solutions to the mystery have been offered, some apparently logical, others patently absurd, but none offering any semblance of proof. As with all legends, the story has become skewed and stylized through endless retellings from differing perspectives until, nearly sixty years later, the popular perception of what happened bears little resemblance to the picture painted by the original record.

Good conclusions can not be drawn from bad facts. A critical re-examination of the *Itasca's* logs and new information made available by the discovery of long-lost documents has enabled TIGHAR to piece together a more accurate account of the events of that morning. Especially helpful was an eight-page letter written days after the disappearance by Eric Chater, General Manager of Guinea Airways and Earhart's host in Lae. The letter, which describes in detail the preparations made and the difficulties experienced by Earhart and Noonan prior to departure, had been misfiled by the recipient and only surfaced in 1992. It answers many long-disputed questions about the airplane and its crew at the time of the final takeoff. Also of great help is the existence, in the U.S. National Archives, of the original sheets from the *Itasca's* primary radio log for that morning. Tradition-



Courtesy National Archives

ally, the logs are re-typed (the term is “smoothed”) to correct errors and overstrikes, but in this case the *Itasca*’s chief radioman, Leo G. Bellarts, had the foresight to save the original messy sheets. The log is an invaluable tool in reconstructing what happened in the *Itasca*’s radio room and aboard the aircraft.

Itasca Primary Radio Log entry for 11:55-58 p.m. July 1, 1937

KHAQQ DE NRUI (GAVE HER OUR WEA ON 7500)

2355-58

ABOARD *ITASCA*: KHAQQ is Earhart’s radio call sign, DE is Morse code shorthand for “from” and NRUI is *Itasca*’s call sign. *Itasca*’s transmitter can not send voice on 7500 Kilocycles. This message is sent in Morse code. The previous evening the ship received word that Earhart had departed Lae at 00:00 Greenwich time (10:00 a.m. in Lae and 11:30 a.m. at Howland) that morning and should be expected at Howland 18 hours later, or 05:30 a.m. on July 2nd. The sun will not rise at Howland until 06:15 a.m. but the officers aboard *Itasca* think the flight could easily take 20 hours.

ABOARD NR16020: For Earhart and Noonan the time is 11:25 Greenwich. Their 00:00 takeoff means that they have been in the air 11 hours and 25 minutes. In a message sent from Lae and received by *Itasca* two days before, Earhart specifically said she would use Greenwich time during the flight. She does not know that *Itasca* is, nevertheless, using local time which, at Howland, is Greenwich plus 11 and ½ hours. Earhart also expects that the *Itasca* will follow her requested radio schedule in which she listens for messages on the hour and the half hour, and transmits messages at quarter to and quarter past the hour. As the *Itasca*’s code message is being sent on 7500, Earhart is tuning her receiver to 3105 to listen on the half hour. When the *Itasca*’s transmission ends at 23:58 (11:28 for Earhart) she probably doesn’t even have her headphones on, not that it would make any difference. Not only is the weather being sent on the wrong frequency but Earhart has repeatedly asked the Coast Guard to “report in English, not code, especially while (I am) flying.” Neither she nor Noonan can read Morse code.

Itasca Primary Radio Log entry for 02:45-48 a.m. July 2, 1937

HEARD EARHART PLANE / BUT UNREADABLE THRU STATIC

0245/48

ABOARD *ITASCA*: Although the words are unintelligible, the operator is confident the transmission is from Earhart. In a later report, the ship’s captain, Cmdr. Warner K. Thompson, explained that the wire service reporters recognized Earhart’s voice (they had covered her flight to Hawaii in March). In the same report, Thompson also alleged that the operator heard Earhart say “cloudy and overcast” at this time, but no such phrase appears in the log.

ABOARD NR16020: It is 14:15 Greenwich. Amelia’s transmission, whatever its content, is made exactly on schedule. At this point the flight is 14 hours and 15 minutes enroute and, according to the fuel management tables prepared for Earhart by Lockheed’s Kelly Johnson, has expended 724 of the 1,100 U.S. gallons of fuel aboard at takeoff. Johnson’s procedures (see below) provide just over 24 hours of endurance, leaving a 20% (5 hour) reserve which, according to Army Air Corps Lt. Daniel Cooper aboard the *Itasca*, was considered standard for long-distance flights.

*Fuel Management Procedures
prepared especially for Earhart by
Lockheed engineer Clarence L.*

Kelly” Johnson.

*These power settings yielded a
cruising speed of 130 knots.*

TIME	ALTITUDE	MANIFOLD PRESS.	R.P.M.	GAL./HR
1 hour	0-8,000 ft.	28.5 inches Hg	2,050	100
3 hours	8,000 ft.	28 inches Hg	1,900	60
3 hours	8,000 ft	26.5 inches Hg	1,800	51
3 hours	8,000 ft	25 inches Hg	1,700	43
Rest	10,000 ft	24 inches Hg	1,600	38

ITASCA PRIMARY RADIO LOG ENTRY FOR 03:45-4? A.M. JULY 2, 1937

EARHART HEARD FONE/ WILL LISSEN ON HOUR AND HALF ON 3105-SEZ SHE 45/4--

ABOARD *ITASCA*: "Fone" refers to radiotelephone as opposed to Morse code. Earhart reaffirms her schedule for receiving transmissions and that she will remain on 3105 Kilocycles. Although very faint (Strength 1), this is the first intelligible message received by *Itasca* and the operator attempts to clarify the log entry by adding a dash and "sez she" at the end. For some reason, the termination time for the message is not completed. In later reports, Cmdr. Thompson inserted the word "overcast" into this message. The word does not appear in any of the original logs nor in the report filed by Lt. Cooper who was present in the radio room at this time. In short, the notion that the Earhart flight encountered overcast weather during the night (which would have thwarted celestial navigation) is not supported by the original logs.

ABOARD NR16020: The time is 15:15. Once more, Earhart's transmission is on schedule. If on course, the flight should be roughly 500 nautical miles out and have recently passed over the island of Tabiteuea in the Gilberts. (Islanders later reported that an aircraft was heard to pass high overhead that night.) If Earhart has followed Johnson's tables, her situation looks like this: Fuel remaining: 338 gals. Hours of fuel remaining (at 38 gph): 8.9 hrs. Estimated time to Howland: 3.8 hours.

ITASCA PRIMARY RADIO LOG ENTRY FOR 04:53 A.M. JULY 2, 1937

SENT WEATHER /CODE/FONE/ 3105 KCS- (HEARD EARHART -(PART-CLDY)- 0453
 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 0500

ABOARD *ITASCA*: Close examination of this puzzling entry reveals that it is actually made up of three separate notations. The first entry states that *Itasca* sent the weather by both code and voice on 3105 (the correct frequency) at 53 minutes past the hour (the wrong time—again). The operator then went back and added (note the platen misalignment between the first two dashes) a parenthetical notation that Earhart had been heard and had apparently said something about "partly cloudy." In a third action, the reference to "partly cloudy" was typed over with a series of dashes which was continued on the next line. The impression created by the log, and expressed in Cmdr. Thompson's later reports, is that Earhart broke in off schedule.

ABOARD NR16020: The time is 16:23. At this point in the flight, transmitting off schedule would be very uncharacteristic for Earhart. It would appear more likely that *Itasca* heard the tail end of her scheduled 16:15 transmission. Her report of partly cloudy conditions agrees with the *Itasca's* Deck Log for this time period which describes "clear skies with detached clouds."

ITASCA PRIMARY RADIO LOG ENTRY FOR 06:14-15 A.M. JULY 2, 1937

WANTS BEARING ON 3105 KCS// ON HOUR// WILL WHISTLE IN MIC 14//
 ABOUT TWO HUNDRED MILES OUT// APPX// WHISTLING// NW 15

ABOARD *ITASCA*: The signal is now stronger (Strength 3) and consistent with the estimate of "two hundred miles out" but Earhart's request for a bearing comes as a surprise. The Coast Guard expected to provide signals upon which Earhart would take bearings, not the other way 'round. Besides, the *Itasca's* direction finder can not respond to a relatively high frequency such as 3105. Also puzzling is Earhart's apparent willingness to wait 45 minutes for a bearing which would, by then, be meaningless.

ABOARD NR16020: The time is 17:44. So far, the flight has been guided by dead reckoning and celestial navigation but now Noonan's calculations place the aircraft approximately 200 miles

from Howland and within range of assistance from radio direction finding. However, in a test flight the day before, Earhart had been unable to take a bearing on the station at Lae, attributing the problem to the closeness of the station. In fact, at no time during the world flight is Earhart known to have successfully used her direction finder. Clearly, her confidence in the technology, and in her own ability to use it, was not high. It is hardly surprising that she would prefer to simply provide a signal and have someone else tell her what direction to fly. She wants the information at her next scheduled receiving time: "on the hour" Greenwich time, not in 45 minutes.

ITASCA PRIMARY RADIO LOG ENTRY FOR 06:45-6 A.M. JULY 2, 1937

PSE TAKE BEARING ON US AND REPORT IN HALF HOUR--	0645
I WILL MAKE MOISE IN MIC-ABT 100 MILES OUT	0646

ABOARD *ITASCA*: Frustration is mounting. Repeated attempts to establish contact and explain that Earhart's unanticipated request is also unreasonable have received no reply. Now she is once again asking for a bearing but, inexplicably, she is willing to wait half an hour for the information. The sun is up and her arrival should be imminent. Her transmission is received at Strength 4, indicating that the flight is drawing closer. However, although generally ascribed to Earhart, the words "about 100 miles out" appear to be the operator's. The notation was added sometime after the original entry (note the platen misalignment) and is similar to the —SEZ SHE comment in the 0345 entry. It's an important point because, at 130 knots, the airplane cannot be 200 miles out at 06:15 and 100 miles out half an hour later.

ABOARD NR16020: The time is 18:15. The requested bearing was not received at 18:00 nor has anything at all been heard from the *Itasca*. Earhart tries again, sticking to the schedule and asking for a bearing "on half hour" (not "in half hour"). Meanwhile Noonan has taken a celestial observation of the rising sun and has plotted a line of position (LOP) which runs 337° to the northwest and 157° to the southeast. He can place this line very accurately on the surface of the earth and, through dead reckoning, theoretically advance the line until it falls through the intended destination. When the calculated time has elapsed he will know that he is on a 337/157 line that passes through Howland Island. The trouble is, he can't be sure just where on the line they are, so if they don't hit Howland on the nose he will not know whether to turn left or right on the line. That's why the radio bearing is so important. Fuel remaining should be 224 gals. or 5.9 hours. If his "two hundred miles out" estimate at 17:44 was accurate and they don't have a significant headwind (*Itasca* was reporting easterly winds at 7 knots), they should reach the advanced line of position and, ideally, Howland Island in about an hour. At this point the lack of response on the radio is disturbing, but if they can see Howland when they reach the advanced LOP it won't matter.

ITASCA PRIMARY RADIO LOG ENTRY FOR 07:42 A.M. JULY 2, 1937

KHAQQ CLNG ITASCA WE MUST ON ON YOU BUT CANNOT SEE U BUT GAS IS RUNNING LOW BEEN UNABLE TO REACH YOU BY RADIO WE ARE FLYING AT A 1000 FEET	42
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ABOARD *ITASCA*: The situation is growing more tense. It is clear that Earhart has not heard *Itasca*'s transmissions although they are now receiving her at maximum strength (S5) indicating that she is within at least one hundred miles and possibly much closer. A second, less detailed, radio log kept by the ship records this message as "EARHART ON NW SEZ RUNNING OUT OF GAS ONLY HALF HOUR LEFT CANT HEAR US AT ALL." Lt. Cooper's report and the ship's Deck Log, however, both agree with the primary radio log that the phrase is GAS IS RUNNING LOW. Cmdr. Thompson knows that the flight should have enough fuel to stay aloft until noon.

ABOARD NR16020: The time is 19:12 and Howland has not appeared as hoped. Earhart has dropped down to 1,000 feet so as to get under the scattered deck of clouds. She and Noonan believe they are very close to their destination but really need to know which way to turn on the line to find Howland. With 188 gals. remaining, enough for just 4.95 more hours, they are now burning their reserve. Gas is running low. There is, however, a contingency plan that will guarantee landfall before the fuel is exhausted. By turning right (157°) and running down the advanced line of position, one of four islands is bound to appear. If they are now too far north they will come to Howland. If they are already south of Howland then Baker, McKean, or Gardner Island will eventually appear, provided they begin running southeast on the line when they have roughly three and a half hours of fuel remaining. Their situation at this point is serious but not desperate.

ITASCA PRIMARY RADIO LOG ENTRY FOR 07:58 A.M. JULY 2, 1937

KHAQQ CLNG ITASCA WE ARE CIRCLING BUT CANNOT HR U GA ON 7500 WID A
LNG COUNT EITHER NW OR ON THE SKD TIME ON $\frac{1}{2}$ HOUR (KHAQQ S5 A3) 0758

Courtesy Purdue University Library Special Collections



ABOARD ITASCA: Apparently Earhart's transmissions are coming in so loud that the speakers are distorting her words. At first the operator thinks he hears "WE ARE DRIFTING BUT CANNOT HEAR YOU" but that can't be right so he goes back, partially erases DRIFTING and types in CIRCLING, which seems more reasonable to him. There is also confusion about how much fuel she has left. If Earhart is really expecting to run out of gas at 08:12 (HALF HOUR LEFT at 07:42) why is she asking Itasca to "GO AHEAD ON 7500 KILOCYCLES WITH A LONG COUNT EITHER NOW OR ON THE SCHEDULED TIME ON THE HALF HOUR" by which time she will already be in the water?

ABOARD NR16020: The time is 19:28 and the situation is now serious enough that Earhart, for the first time, departs from her regular transmission schedule. She probably says, "WE ARE LISTENING BUT CANNOT HEAR YOU..." then asks for a long count on 7500 either now or in two minutes. Having failed in repeated attempts to get the ship to take a bearing on her, she will try to use her direction finder to take a bearing on the ship.

ITASCA PRIMARY RADIO LOG ENTRY FOR 08:00-03 A.M. JULY 2, 1937

KHAQQ CLNG ITASCA WE RECD ~~NR~~ UR SIGS BUT UNABLE TO GET A MINIMUM PSE
TAKE BEARING ON US AND ANS 3105 WID VOICE / NRUI DE KHAQQ LNG DASHES
ON 3105 -/ NRUI2 DE NRUI P AR 0800-3

ABOARD ITASCA: The ship can not give Earhart a "long count" on 7500 Kilocycles because its transmitter is incapable of sending voice on that frequency, but it does repeat the letter A in Morse code (dit dah, dit dah, dit dah), the prearranged signal for homing transmissions from *Itasca*.

Earhart reports hearing the signal but is “unable to get a minimum” and again asks *Itasca* to take a bearing on her. She sends long dashes on 3105.

ABOARD NR16020: The time is 19:30. Earhart switches to her loop antenna and, for the first time, hears radio signals. It is not the human voice she hoped to hear but at least the repeated letter A indicates that *Itasca* has heard her. Turning the loop antenna mounted over her head, she attempts to get the signal to fade away (“get a minimum”) which will enable her to take a bearing, but her direction finder cannot respond to such a high frequency. She reverts to her previous attempts to get them to take a bearing on her.

ITASCA PRIMARY RADIO LOG ENTRY FOR 08:43 A.M. JULY 2, 1937

KHAQQ TO ITASCA WE ARE ON THE LINE 157 337 ~~WL~~ WL REPT MSG WE WL REPT N ES S
THIS ON 6210KCS WAIT, 3105/A3 S5 (?/KHAQQ XMISION WE ARE RUNNING ON~~XX~~ LINE₄₃

ABOARD *ITASCA*: Nothing has been heard from Earhart for nearly three quarters of an hour during which time *Itasca* has been trying to reach her almost constantly. The HALF HOUR GAS LEFT deadline is long since past when suddenly Earhart is back, very loud. The operator, apparently caught off guard, has already logged in other traffic at 08:44 and 08:45 which he strikes over and alters to 08:42 and 08:43 so that the new Earhart message will appear in sequence. She reports that she is on the line 157/337 and will repeat the message on her other frequency, 6210 Kilocycles. Then she says, “wait.” The operator has just typed in the end notations 3105 (the frequency), A3 (voice), S5 (Strength 5) when, quite unexpectedly, Earhart says something about running on the line. The resulting log entry is so jumbled as to be impossible to reliably decipher, but has been traditionally represented as “We are running north and south.” Whatever the words were, they were the last *Itasca* would hear from Earhart.

ABOARD NR16020: The time is 20:13 and, in spite of everything, Earhart is still sticking very close to her radio schedule. She may also have made her scheduled 19:45 (08:15 local time) transmission to *Itasca* but it wasn’t heard because, as the log shows, *Itasca* was trying to call her at just that time. For the past hour she and Noonan have been running back and forth on and near the line of position hoping to spot the island. Noonan can, of course, take additional sun shots but it will be another two hours or so before the sun will have changed enough to give him a reliable “cut” across his original 337/157 line. There are now 150 gals, just under 4 hours, of fuel remaining aboard the aircraft. They will soon have no choice but to begin running southeast on the line of position. Due to the skip characteristics of 6210 Kilocycles, Earhart’s decision to switch to that frequency effectively shuts off any further reception by *Itasca*.

Conclusion:



The Coast Guard’s official position that the Earhart flight ran out of fuel and crashed at sea shortly after the final transmission heard by the *Itasca* is not supported by the facts.

Found Objects

TIGHAR's case hinges upon the artifacts found on Nikumaroro. If they are random pieces of junk such as might be expected to litter any Pacific atoll, then the notion that the Earhart flight ended on this particular island is no more credible than the many other unsupported theoretical solutions to the mystery. If, however, there is reason to believe that just one object discovered on Nikumaroro came from the lost flight, then any answer to the riddle must explain how it got there and a concerted search for more evidence is certainly warranted.

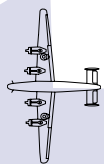
Man-made objects are not difficult to find on Nikumaroro. The atoll's quarter century (1938 to 1963) of habitation left the once-settled areas strewn with the kind of debris that is the essence of archaeology. Some of that trash—a very, very small proportion—came from at least two aircraft, even though from 1938 to the present, no aircraft of any description was ever wrecked, damaged or repaired at Nikumaroro. All of the airplane-related material has been found in the island's abandoned village and, in most

cases, shows clear signs of having been put to local use. Several of the objects, although undoubtedly from an airplane, are so generic as to defy connection with any particular make or model. A handful of other pieces can be reliably linked to the Consolidated Model 32 (B-24, PB4Y-1, etc.), the most ubiquitous of the WWII types which operated in the region. Other pieces of aircraft-related material found on the island do not appear to be from any wartime or later aircraft. They do, however, exhibit features consistent with a specific Lockheed Model 10E Special which is known to have been lost in that part of the Pacific in 1937.

The following is a description and evaluation of the twelve aircraft-related objects found on Nikumaroro to date. The artifacts are presented in the order in which they were discovered. In most cases, their physical properties have been established with the help of governmental or private laboratories. The opinions expressed about their probable origins are solely TIGHAR's. The map on page 22 shows where each artifact was found.



1. Navigator's Bookcase (TIGHAR Artifact 2-1)



Date Found: October 1989 during TIGHAR's NIKU I expedition.

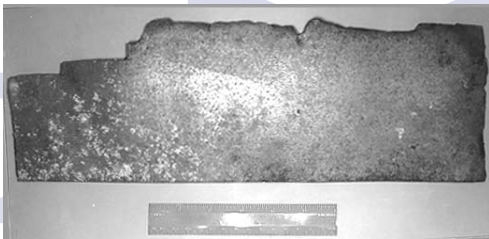
Materials analysis: Federal Bureau of Investigation (FBI) Laboratory Report date: December 31, 1990.

Description: An open box constructed of .040 inch aluminum with a single row of four .25 inch diameter holes offset left of center on the side facing the opening. Traces of a sloppily-applied greenish yellow coating are present on the interior surfaces. Stamped into the metal in three locations is the designation 28F4023.

Condition: One side of the box has been removed, possibly with a hack saw, and the remaining corners have been cut apart, apparently with the same tool. Interior fixtures once secured with #4 ($\frac{4}{32}$ inch) AN442 (flat head) rivets have been removed, leaving enlarged and deformed holes.

Identification: Artifact 2-1 is Consolidated Aircraft Part Number 28F4023, officially described as “Box–Furn., Navig. Book & Paper Stowage.” Although designed for the PBY (Consolidated Model 28), this particular bookcase has been modified for installation in a B-24 type airplane. Early examples of the Consolidated Model 32 (B-24C and some B-24D/PB4Y-1 aircraft, a total of 1,653 machines) were equipped with PBY bookcases. Later, Consolidated designed a special bookcase for the Liberator which carried a 32F** part number.

Commentary: At first, this artifact really had us stumped. It was obviously a PBY part, but the mounting holes indicated that it was never installed in a PBY. Could it have been aboard Earhart’s airplane? It took two years of research to determine that the answer is no, but knowing that it came from a B-24 became important in the light of later discoveries.



2. Sheet of aluminum with red paint (TIGHAR Artifact 2-2)

Date Found: October 1989 during TIGHAR’s NIKU I expedition.

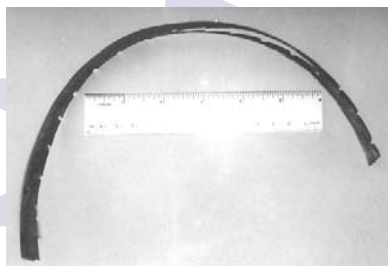
Materials analysis: National Transportation Safety Board (NTSB) Report date: March 5, 1992

Description: The sheet is about 5.25 inches wide by 15.5 inches long and is 0.032 inches thick. The long straight edge of the piece appears to have been an original manufacturer’s cut. The piece appears to have been further mechanically cut where right angle corners are evident. Magnified examination of the inside corner sections of these cuts revealed deformation patterns typical of cuts made with a pair of tin snips. The remaining edges of the sheet appear to be typical tearing fractures. One surface of the sheet has a rusty brown stain on about half of its area. The opposite surface has a faint red coloration over a portion of its surface. The material is 2024 (previously known as 24ST) aluminum but is not Alclad (a corrosion inhibiting treatment).

Condition: Even though the aluminum is not Alclad, the piece exhibits only mild surface corrosion. The area of apparent red paint on one surface may or may not be a result of local adaptive use.

Identification: unknown

Commentary: The absence of rivet holes along the original manufacturer’s cut edge, and the fact that it is not Alclad, argue against this piece ever having been part of the skin of an airplane. The small rectangular strips cut from one end suggest that this might be connected to an incident remembered by Coast Guard veteran Ernest Zehms who was stationed on the island in 1944. In 1992 Zehms recalled that one of his friends collected some small pieces of aluminum from a B-25 wreck on Canton Island and brought them to Nikumaroro for the purpose of making aluminum watch bands. However, when shown a photograph of this artifact Zehms did not recognize it. It is worth noting that an inventory of the Earhart aircraft taken after the March 20, 1937 crash in Hawaii lists “2 Pcs. Sheet metal Alcoa” (Item #66) as being among the spare parts carried.



3. Cut Strip of Aluminum (TIGHAR Artifact 2-3)

Date Found: October 1989 during TIGHAR's NIKU I expedition.

Materials analysis: NTSB. Report date: March 5, 1992

Description: This is a 14 inch long by $\frac{1}{2}$ inch wide strip of .040 inch nominal thickness aluminum alloy (Alclad). The strip has a manufactured edge along one side and an unidentified edge separation along the other side that intersects a line of $\frac{4}{32}$ inch diameter holes. The holes are nominally spaced $\frac{3}{4}$ inch on center. The strip is deformed in a spiraling curl suggestive of the waste side strip produced from cutting with a pair of tin snips.

Condition: One end of the strip exhibits exfoliated corrosion.

Identification: unknown

Commentary: Nowhere on a Lockheed Model 10 are there #4 rivets so closely spaced. The only other artifact found on Nikumaroro which exhibited exfoliated corrosion is Riveted Assembly 2-2-V-8, a known B-24 part.



4. Aluminum Plate (TIGHAR Artifact 2-5)

Date Found: October 1989 during TIGHAR's NIKU I expedition.

Materials analysis: NTSB

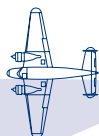
Report date: March 5, 1992

Description: This is a roughly rectangular piece of 2024 Alclad about 2 inches by 5 inches and 0.062 inches thick.

Condition: There is a straight sheared edge (manufacturer's cut) along one long side, a bending overstress fracture along one short edge, and the other two edges exhibit typical saw cut markings. A ragged hole went through one end of the plate as if cut by multiple strikes with a thin narrow instrument such as a small chisel or screwdriver. A second similar hole was cut partially through the plate.

Identification: unknown

Commentary: The plate is the same thickness as Riveted Assembly 2-2-V-8, a known B-24 part. There are no .062 skins on either the B-24 or the Lockheed 10. This is probably part of a structural member and may be part of 2-2-V-8.



5. Dado (TIGHAR Artifact 2-18)

Date Found: October 1989 during TIGHAR's NIKU I expedition.

Materials analysis: NTSB

Report date: March 5, 1990

Description: This aluminum sheet metal assembly is made up of at least four separate components, a wide web (0.032" thick), a narrow flat strip (0.022" thick), a 180° flange (0.022" thick), and a 90° flange 0.022" thick. Overall, the assembly is 16.75 inches long by 6.5 inches wide. All four edges of the web appear to be manufacturer's cuts with $\frac{3}{32}$ inch diameter rivet holes and remnants of rivets nearby. The 90 degree flange is attached to one long edge of the web by rivets spaced



This photo of the "long rivet tail" with "bluish woven fabric" at its base was taken prior to the NTSB's examination. It shows that the fabric was actually the top layer of a sandwiched structure which included .25 inch of kapok-

like material. Unfortunately, further analysis is not possible. The fabric and the material were lost during the NTSB's examination.

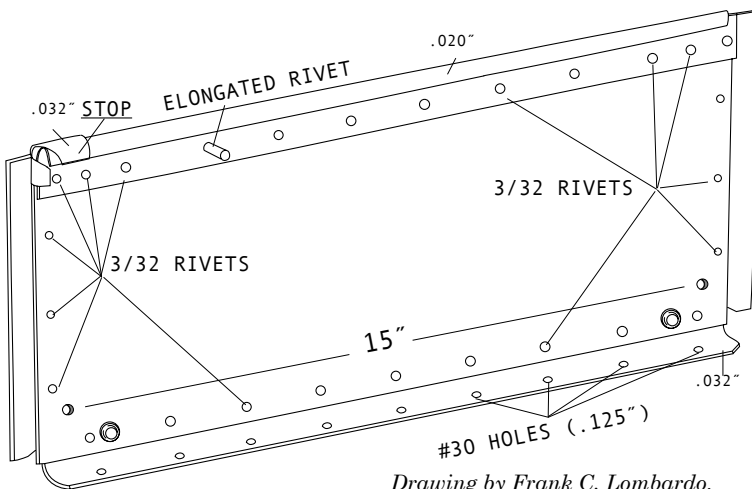
1.75 inches apart. The 180 degree flange and the flat strip were riveted to opposite sides of the other long edge of the web.

Condition: Corrosion of the assembly components is heavy with the areas of the 180 degree flange and flat strip showing perforations. The space between the flange, web, and strip was filled with what the NTSB judged to be corrosion products, but TIGHAR researcher Frank Lombardo has performed a more detailed inspection and believes that these "corrosion products" are, in fact, remnants of micarda stripping installed to inhibit corrosion. A long rivet tail is located in the area of severe corrosion. During optical examination, the NTSB noted small remnants of a bluish woven fabric around the rivet tail.

Identification: This type of assembly, known as a dado, was used in the interior finishing of small cabin-class airplanes to protect the juncture between the cabin wall and floor. Although we have the complete assembly, there is no part number as is found on military fixtures (for example, the Navigator's Bookcase) Military aircraft do not normally carry this type of interior furnishing.

Commentary: Because they are interior furnishings rather than structural components, dados can vary greatly depending upon the cabin configuration of the particular aircraft. The available plans for the Lockheed Model 10 are for the airline version and include structures similar, but not identical,

to the object found on Nikumaroro. No plans or photographs of the final configuration of the cabin of Earhart's airplane are known to exist. There are, however, several interesting observations which can be made about the artifact.

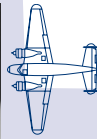


*Drawing by Frank C. Lombardo,
TIGHAR #1806*

As shown in the reconstruction at left, the mounting holes by which the dado was affixed to the aircraft structure are exactly 15 inches apart. The Lockheed Model 10 fuselage is built on a 15 inch standard, with bulkheads, circumferentials and stiffeners spaced, on the average, 15 inches apart.

Specifications for the Lockheed Model 10 call for the cabin area to be insulated with .25 inch kapok. The insulation, known by the trade name "Seapak," was often blue.

The 90° flange along the base of the dado was attached to the aircraft floor with screws in metal-floored aircraft or nails in airplanes with wooden flooring. On the artifact, pry marks on the underside of the flange at the holes indicate that, in this case, nails were probably used. The floor of the Lockheed 10 was made of wood.



6. Aircraft Skin (TIGHAR Artifact 2-2-V-1)

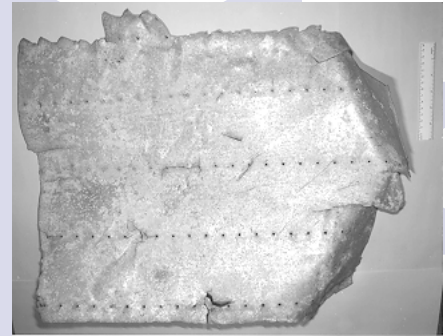
Date Found: October 1991 during TIGHAR's NIKU II expedition.

Materials analysis: NTSB

Report date: March 5, 1990

Description: This is a sheet of 0.032 Alclad measuring roughly 23 inches by 19 inches. There are four rows of evenly spaced $\frac{3}{32}$ inch diameter rivet holes with a 1 inch pitch (space between centers) and one row of $\frac{5}{32}$ inch diameter rivet holes with a nominal pitch

of 1.25 inches along its long dimension. There is no line of rivet holes across the width of the sheet. The rows of rivet holes are not parallel but show a slight angling toward the row of larger holes. Nominal spacing between rows is 4.25 inches at one end of the sheet and $\frac{1}{8}$ to $\frac{1}{4}$ inch closer at the other end. One rivet is still present. The length of the undeformed rivet shank (distance between the manufactured head and the formed head) indicates that the skin was previously attached to an underlying member approximately 0.06 inch in thickness. The faint outline of $\frac{1}{2}$ inch tall letters "AD" are present on what was the exterior surface of the skin. Also visible in this area is the streaked remnant of a much-degraded greenish coating.



Condition: The sheet is bounded by fractures on all four edges (no manufacturer's cut is present) and has a pronounced curvature across the short dimension. On one side the fracture runs generally along the line of $\frac{5}{32}$ rivet holes. The fracture intersects all of the $\frac{5}{32}$ inch diameter holes except for three unfractured holes which are unevenly spaced. The skin around the $\frac{3}{32}$ inch diameter rivet holes is dimpled inward toward the concave side of the sheet suggesting that the surface was area loaded from the concave side while the rivets and underlying structure were intact. Scratch marks on the interior (concave) surface adjacent to some of the rivet holes suggests the further removal of underlying structure by prying with a hand tool. Post-separation abrasion and erosion damage have obliterated the fracture faces and, in the opinion of the NTSB, positive determination of the modes of fracture can not be established. However, the NTSB did note that the fracture geometry along the line of $\frac{5}{32}$ rivet holes is consistent with tearing separations in both directions away from the area of the intact holes. Deformation adjacent to the fracture along one edge of the sheet indicated that it had been folded 90 degrees toward the convex side at least twice prior to separation. The only place on the sheet exhibiting significant corrosion is an area roughly 1.5 inches in diameter located immediately adjacent to the "tab" with the three undamaged $\frac{5}{32}$ rivet holes. The corrosion originated on the interior surface of the sheet and has perforated the exterior surface in three pinpoint-sized locations.

Identification: This is a forcibly removed section of aluminum which was once part of an airplane skin. The aircraft was of all-metal construction and was manufactured in the United States, probably before 1939. The surviving rivet is an AN 455 AD 3/3. The head style, known as the "brazier" head, was replaced in most applications by the "universal" head (AN470) sometime after 1940. The letters "AD" noted on the exterior (convex) surface are the last two letters in the word "ALCLAD" which was stamped onto the aluminum in red ink at the time of manufacture by Alcoa Aluminum as part of the product labeling. Complete examples of this same size and style of lettering (ALCLAD 24S T3) have been noted on aluminum used in repairs or modifications to two surviving Lockheed 10s: c/n 1015, recently rebuilt as a replica of Earhart's

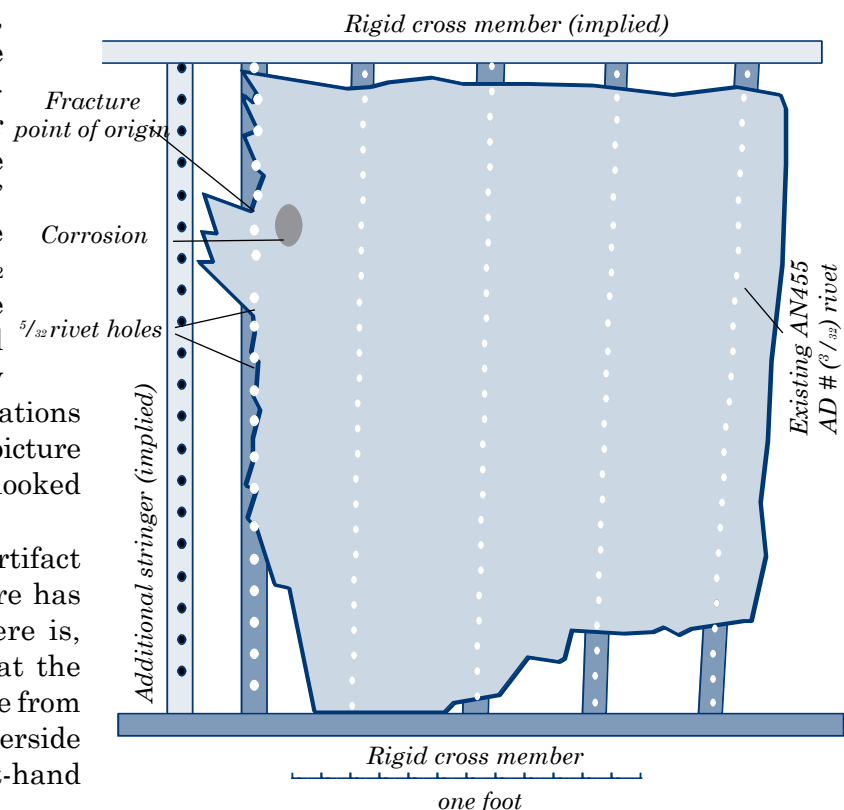
aircraft and currently registered NX72GT, and c/n 1052 in the New England Air Museum collection. Similar labeling has also been found on a small patch on the nose of a Douglas C-47 in the Dover AFB Museum collection. The font, or type style, of the lettering does not appear to match any of the styles used by Alcoa for aluminum manufactured during or after World War II. The fact that the lettering is not aligned with the grain of the metal indicates that the labeling was hand-stamped, a practice replaced by rolled-on labeling when aluminum production boomed after 1939.

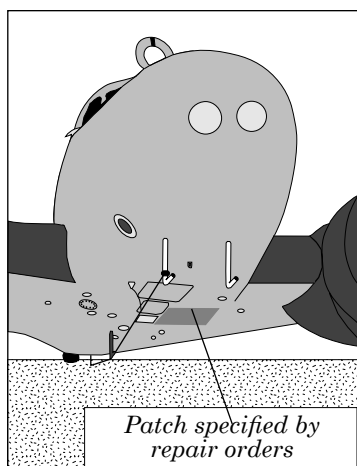
Commentary: This is, by far, the largest and most complex aircraft artifact found on Nikumaroro to date. It is also the most controversial. The skin's material components, dimensions and rivet pattern are similar, but not identical, to some portions of the Lockheed Model 10. TIGHAR initially noted the artifact's similarity to the underside of the Electra just forward of the cabin door and attributed the differences to changes made when the Earhart aircraft was repaired following its March 20, 1937 accident in Hawaii. Critics correctly pointed out that such structural changes could not have been made without a wholesale re-engineering of the aircraft for which there is no evidence. Subsequent research has identified another location on the Earhart aircraft which seems more promising.

2-2-V-1: Finding A Fit

The artifact has some distinctive aspects which provide important clues to its origin. The presence of $\frac{3}{32}$ inch diameter rivets (the smallest commonly available size) in a 0.032 inch (relatively thin) skin suggests an aircraft of moderate, rather than large, size. Also, the absence of a crossing row of rivets in the skin's 23 inch length is quite unusual. Other clues to the original structure come from the way in which the aluminum failed. The edge which has been fractured by being bent 90° exhibits a straight break indicative of a crossing internal structural member at that point. Likewise, in the lengthwise dimension, the change from $\frac{3}{32}$ to $\frac{5}{32}$ rivets suggests a boundary with a larger internal structural member. The peaked wave shapes in the "tab" protruding from the edge where the sheet tore along the line of $\frac{5}{32}$ rivet holes indicates the presence of another row of similarly sized and spaced rivets approximately 2 inches away. From these observations we can construct a more complete picture of what the structure must have looked like.

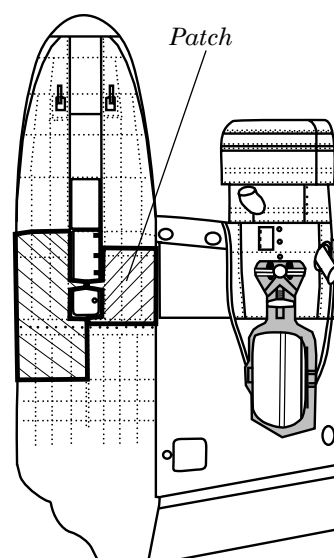
To date no exact match to Artifact 2-2-V-1 in materials and structure has been found on any aircraft. There is, however, evidence to suggest that the sheet found on Nikumaroro may be from a repair patch installed on the underside of the Earhart aircraft on the left-hand





(pilot's) side of the airplane just forward of the main beam (wing spar).

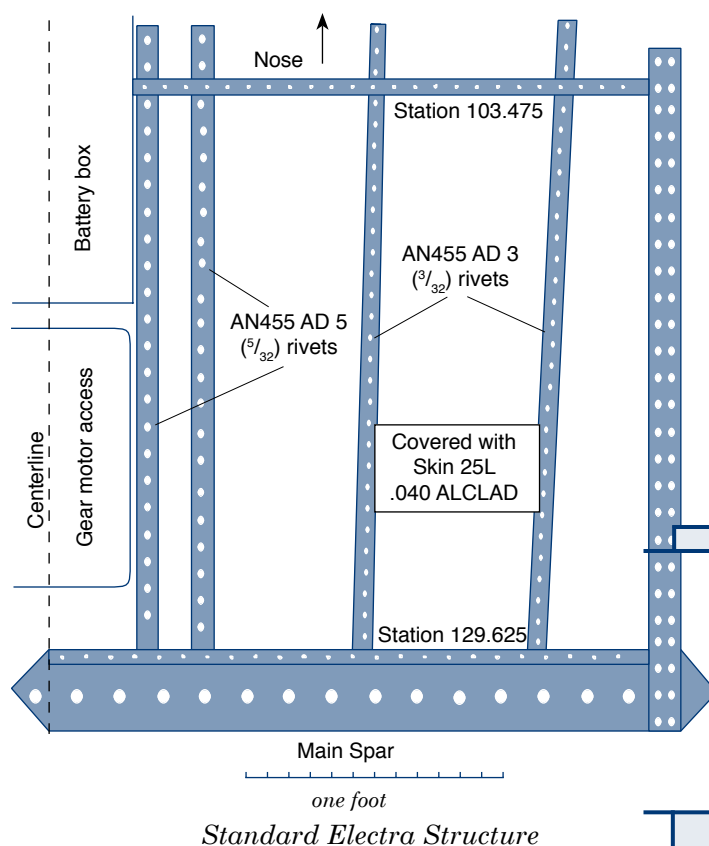
That such a patch was installed is documented in Lockheed Repair Orders for c/n 1055 (Earhart's Electra) signed off as completed on April 19, 1937. The belly of the Model 10, in this area, features two 0.040 inch Alclad skins, "25R" on the right and "25L" on the left. When Earhart groundlooped the airplane in Hawaii, the right side of the belly was virtually wiped out while much less damage was done to the left side skins. The repair orders call for the replacement of most of the right side



skins, including all of 25R. For 25L, the decision was made to replace only the damaged portion instead of replacing the entire skin. Fuselage Assembly repair item #6 says to "Replace left hand bottom skin from a point 9½ inches aft of

slanting bulkhead to main beam—rivet new skin in place with double row of rivets similar to joint in slanting bulkhead."

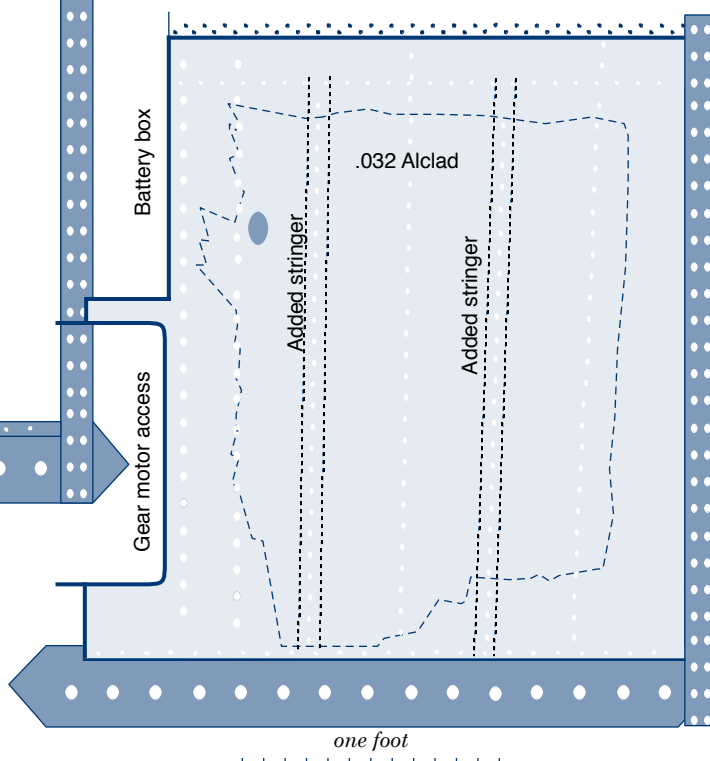
There is no documentation or known photograph which shows just how this repair was effected, but if the patch was constructed



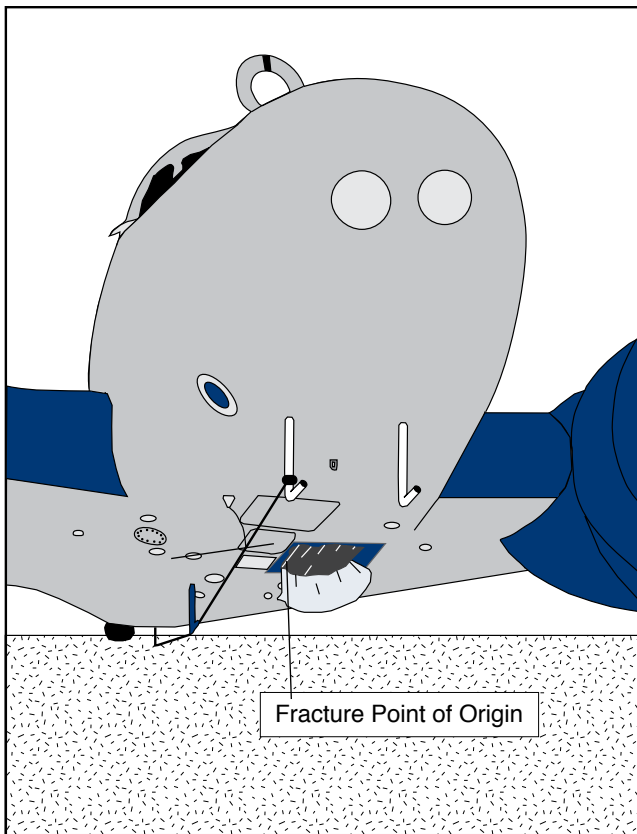
Standard Electra Structure

of 0.032 (rather than 0.040) Alclad and reinforced with two additional longitudinal stiffeners added between the standard stringers, the resulting structure would be an exact match to the sheet found on Nikumaroro.

Pursuing this hypothesis further, we know that the sheet failed due to area loading from the interior side—in other words, it was blown outward with sufficient force to rip the heads off many of the $\frac{3}{32}$ rivets and tear the skin through the larger $\frac{5}{32}$ rivet holes like paper torn through



Possible Repair Resulting in Exact Match to Artifact



perforations. Walter Korsgaard, the FAA's explosives expert for its investigation of the PanAm 103 bombing, examined the artifact and felt that it showed deformation typical of a low-grade fuel/air explosion. If this sheet was once part of the patch on the belly of NR16020, directly above it was a 118 gallon fuel tank. Immediately adjacent, on the centerline of the aircraft, and nearest to the spot of anomalous corrosion on the artifact, was the main battery. A fuel leak which trapped vapors between the floor and the skin, ignited by a spark from the battery, or even an explosion of the battery itself, might result in the weakest part of the structure—the patch—fracturing in just the manner seen in the artifact. Such a scenario is entirely consistent with other evidence which indicates that the Earhart aircraft was landed successfully on Nikumaroro and sent radio distress calls for two days until the signals stopped abruptly late on the night of July 4, 1937. Still attached by its rearward edge and some remaining stringers, the hanging flap might present an inviting piece of metal for a later Gilbertese discoverer to break and pry off and carry back to the village.

Conclusion:

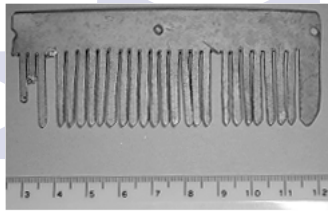
**Based upon the evidence presently available,
Artifact 2-2-V-1 appears to have once been part of the
Earhart aircraft.**

Caution: Don't Try This At Home

The drawings in this analysis will probably not match your neighborhood Lockheed 10. Of the 148 Electras built, at least a dozen survive today, all of which have had long and varied careers, often including accidents and modifications. To establish what the belly of Earhart's machine probably looked like, TIGHAR started with microfilmed engineering drawings for the standard airplane on file at the Smithsonian. We next tracked down every accessible surviving example of the Model 10. TIGHAR volunteers travelled to these aircraft and taped large sheets of paper to their bellies (the airplanes', not the volunteers') and made rubbings which traced every rivet, skin border, drain hole, access door, you name it, between the slanting bulkhead (Station 93) and the Main Beam (Station 129 5/8). TIGHAR researcher Frank Lombardo (#1806) then converted the tracings to mylar transparencies, enabling a full-scale, one to one comparison of the several aircraft.

We found considerable variation. C/N 1015, a 10A which was later converted to a 10E and has since been rebuilt as a replica of Earhart's c/n 1055, has a stiffener added at Station 114 creating a crossing line of rivets not present on the original aircraft. Another 10A, c/n 1052, features not only the added stiffener but also has larger rivets than the standard Electra. By contrast, the oldest surviving example, c/n 1011, has no stiffener at Station 114 and features the small AN455 AD3 rivets seen on the artifact. This aircraft also appears to have been repaired with thinner than standard skin beefed up with supplemental stringers.





7. Aluminum Comb (TIGHAR Artifact 2-2-V-5)

Date Found: October 1991 during TIGHAR's NIKU II expedition.

Materials analysis: NTSB

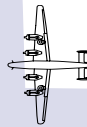
Report date: March 5, 1990

Description: The comb is crudely formed with parallel saw cuts separating the teeth. It is $3\frac{7}{8}$ inches long by $1\frac{3}{8}$ inches wide and is made from 0.032 Alclad sheet. Three $\frac{3}{32}$ inch diameter holes are nominally spaced $1\frac{7}{8}$ inches apart.

Condition: Although broken, the comb exhibits little or no damage from corrosion.

Identification: unknown

Commentary: The fashioning of such combs from aircraft aluminum was not uncommon in post-war Polynesia. Combs are specifically mentioned in the one account we have of the local use made of the crash at Sydney Island. When shown a photograph of this artifact, a former resident of Nikumaroro attributed it to the Sydney crash. Nowhere on a Lockheed 10 are #3 rivets found spaced $1\frac{7}{8}$ inches apart in 0.032 skin.



8. Riveted Assembly (TIGHAR Artifact 2-2-V-8)

Date Found: October 1991 during TIGHAR's NIKU II expedition.

Materials analysis: NTSB

Report date: March 5, 1990

Description: This assembly was made up of two aluminum alloy members. One member was roughly triangular in shape and appeared to be complete and relatively undamaged. The other member was severely damaged by exfoliation corrosion making it difficult to determine its original shape or configuration. However,

there were four identifiable $\frac{5}{32}$ inch diameter rivet holes along one edge with the formed tail portion of one rivet remaining. The two pieces of the assembly were connected by three large $\frac{3}{16}$ diameter intact rivets that were marked with a single dimple in their manufactured heads. A partially-legible part number was stamped into the structure—32B108?. (Note: The artifact was lost while in NTSB custody. It is believed to have been accidentally thrown out by the laboratory cleaning staff.)

Condition: As mentioned by the NTSB, portions of this artifact exhibited severe exfoliation. There was also evidence of extensive cutting and shearing caused by tools or implements.

Identification: This is, without question, a B-24 part. It could be part of one of the many belt-frame assemblies (Part Number 32B1081) in the rear fuselage or it could be part of the nose gear emergency release mechanism (Part Number 32B1089).

Commentary: Like several other artifacts found on the island, this appears to be a scrap left over from local use. It may be related to the Aluminum Plate (Artifact 2-5). The exfoliation seen on the Cut Strip (Artifact 2-3) suggests that it may have at one time been exposed to the same conditions (immersion in salt water?) as the Riveted Assembly.



9. Channel Section (TIGHAR Artifact 2-2-V-9 & 10)

Date Found: October 1991 during TIGHAR's NIKU II expedition.

Materials analysis: NTSB

Report date: March 5, 1990

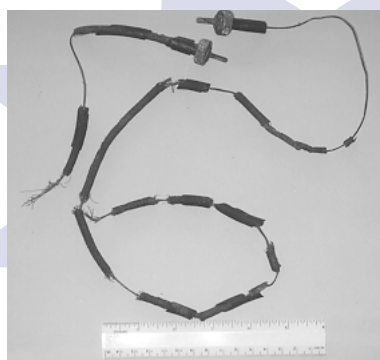
Description: This is a C shaped formed aluminum sheet channel approximately 7.25 inches long by 3 inches wide with a nominal material

thickness of 0.062 inch. The channel has a $2\frac{3}{8}$ inch wide web and two $\frac{3}{4}$ inch wide flanges, one at 90 degrees and the other at 110 degrees. The 110 degree flange has three $\frac{5}{32}$ inch diameter holes containing rivet pieces and also has three complete $\frac{3}{16}$ inch rivets. A portion of the flange or bracket is riveted to the inside surface of the web with two $\frac{3}{16}$ inch rivets. The long axis of the bracket piece is set at an approximate 80 degree angle to the longitudinal direction of the channel. Two strips of aluminum, catalogued together as Artifact 2-2-V-10, fit both with each other and with Artifact 2-2-V-9. The strips each have a single line of $\frac{5}{32}$ rivets with irregular spacing.

Condition: One end of the channel has been transversely saw cut through the entire cross section. The other end also exhibits saw cut marks but only partially through the section thickness. The remaining section thickness was bent and broken at the cut. The bracket piece was severely damaged by exfoliation corrosion.

Identification: unknown

Commentary: This artifact was once part of an aircraft's internal structure, but no match is apparent to any component in the Lockheed 10. The proportions of the piece suggest that the B-24 is a more likely candidate and the presence of exfoliation corrosion would appear to strengthen that possibility.



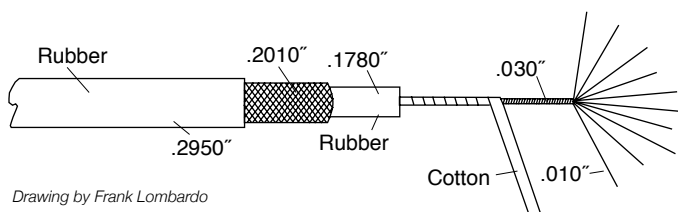
10. Cables (TIGHAR Artifact 2-3-V-1)

Date Found: February 1996 during TIGHAR's NIKU III Preliminary expedition.

Description: These are two lengths of coaxial cable totalling 40.35 inches in length. Each end has a single-pin connector with a knurled tightening nut. The cable consists of an outer layer of rubber insulation covering a shielding braid of tinned copper wire over another layer of rubber insulation. The core is made up of ten twisted strands of wire wrapped with cotton.

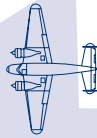
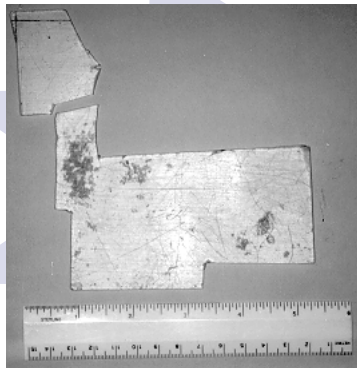
Identification (partial): The connectors are Howard P. Jones Series 101 plugs manufactured from the mid-1930s onward and used on certain models of Western Electric, Bendix and Sperry receiving equipment. The construction of the cables indicates aviation use and matches the description of 70 or 72 ohm coaxial cable used for antenna lead-ins for radio receivers.

Condition: Various components of the cable are missing in many areas, but entire cross-sections survive to permit a full description of the original make-up. The connectors are in remarkably good condition.



Drawing by Frank Lombardo

Commentary: Specifications for military-approved coaxial cable in 1941 begin with a 12-strand core. It may be that the 10-strand cable found on Nikumaroro is an earlier civilian type. Documentation is being sought. The Earhart aircraft carried Western Electric and (possibly) Bendix receivers.



11. Plexiglas (TIGHAR Artifact 2-3-V-2)

Date Found: February 1996 during TIGHAR's NIKU III Preliminary expedition.

Materials analysis: Winterthur Museum Analytical Laboratory

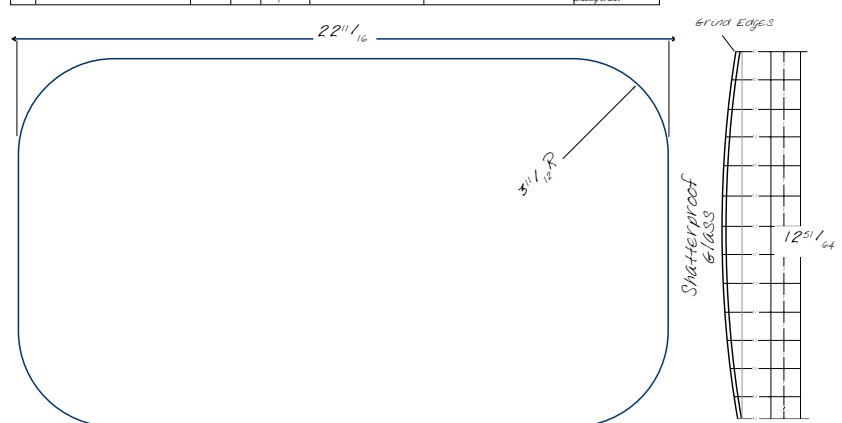
Report date: February 22, 1996

Description: This is an irregularly shaped sheet of transparent polymethyl methacrylate (PMMA), tradename Plexiglas. It measures nominally 4.75 inches long by 2.5 inches wide and is $\frac{1}{8}$ inch thick. A second fragment is roughly 1.75 inches long by 1.5 inches wide and fits a fractured edge of the larger piece. Both pieces exhibit a slight but uniform curvature over the surface.

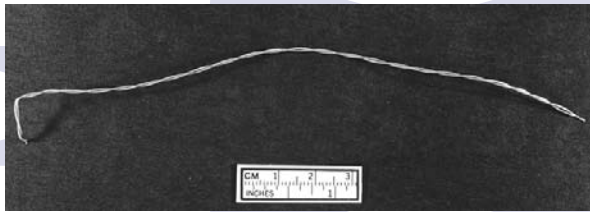
Condition: The convex surface of the sheet exhibits a number of shallow scratches, while the concave surface has only a few. One edge appears to be an original manufactured edge. The others exhibit saw marks. There is no evidence of heat damage. Because PMMA must be heated to at least 90°C to be formed, the curve of the surface on this sheet is probably original.

Identification: This appears to be a scrap from Lockheed Model 10 Part Number 40552—Window Glass, Fuselage, Cabin.

F	SEE CHANGE NOTICE	1-19-37	R.L.S.	NOTES	10	10	
E	THICKNESS $\frac{1}{8}$ WAS $\frac{5}{32}$	1-19-37	S.D.P.	MATERIAL FINISH	PER GRP	PER AC	FT
D	SHATTERPROOF WAS PLATE GLASS	2-12-35	L.I.C.		NO. REQUIRED		
C	$\frac{1}{8}$ SPAD $\frac{1}{8}$ H.H.P.O.						
B	PLATE GLASS WAS SHATTERPROOF	3-21-36	R.L.S.				
A	CHANGE						



Commentary: Lockheed engineering drawings show that the material, the curvature, and the thickness of the artifact match those specified for the cabin windows of the Electra. A number of changes were made to the material and thickness specifications for the windows over the production-life of the Model 10 (1934 to 1941). Of particular interest is a change specified for January 15, 1937 at which time the window thickness was reduced from $\frac{5}{32}$ to $\frac{1}{8}$ inch. The date is significant because it was just at that time that the cabin windows in Earhart's airplane were replaced and additional special windows were installed as part of her world flight preparations. The curvature and thickness of the Plexiglas found on Nikumaroro exactly matches Lockheed's specifications for Electra cabin windows at the same time Earhart's new windows were installed. They do not match any window on the B-24.



12. Aircraft Safety Wire (TIGHAR Artifact 2-3-V-3)

Date Found: February 1996 during TIGHAR's NIKU III Preliminary expedition.

Materials analysis: United Technologies, Hamilton Standard Propeller Division

Report date: August 26, 1996

Description: This is a length of 304 stainless steel wire 6.75 inches long comprised of two strands of .010 inch wire twisted together in a very even left-hand twist with an average pitch of .564 inches. There is a 90 degree bend located approximately .582 inch from one end.

Condition: Both ends of the wire have been cut. There is no evidence of failure from fatigue or high tensile loading. The wire is in excellent condition.

Identification: This is aircraft safety wire, also known as lock wire, of a type widely available from the 1930s onward.

Commentary: Although as innocuous an artifact as could be imagined, this is yet another object found on Nikumaororo which was, at one time, part of an airplane. The only clues to its origin may be its somewhat unusually long tail and the fact that its twist may have been hand-done rather than twirled with special safety wire pliers. Early mechanics prided themselves on the precision of their lock wire work.

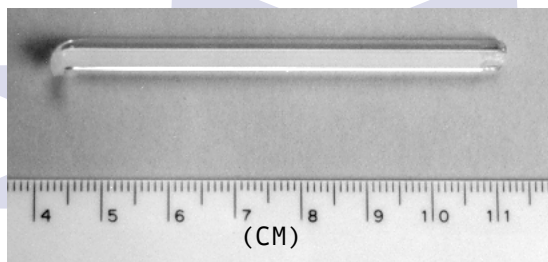


The numbers on this map refer to the artifact numbers in the text above. For general orientation see island map, page 28.

There is another category of physical evidence found on Nikumaroro which may be connected to the Earhart disappearance. The objects found near the lagoon shore on the island's southeastern arm, known as Aukaraime (south) district, differ in both character and circumstance from the aircraft-related pieces encountered in the village. The material recovered from the once-settled area was purposely brought there and put to local use. In contrast, the artifacts found on Aukaraime appear to have arrived by accident rather than intention, and show no sign of having been used for anything but the purpose intended by the manufacturer. While the aircraft artifacts were found during walk-through searches of the village aimed at finding just such objects, the discovery of the Aukaraime objects was pure serendipity.

On October 6, 1989, the last day of TIGHAR's NIKU I expedition, three team members came upon a small grave near the lagoon shore in the unsearched area southeast of Bauareke Passage. When subsequent research determined that this was the same area where island folklore said the bones of a white man and woman had been found in 1938, the decision was made to examine the grave upon our return in 1991. An archaeological excavation was conducted with the permission of I-Kiribati authorities and the grave was found to contain the bones of a very small, possibly stillborn, infant. No evidence was found which might connect the grave or its contents to the Earhart disappearance. (A popular rumor that Amelia was pregnant lacks any credible foundation.)

The grave excavation required six days (October 13–17, 1991). On October 15 a team member noticed a broken thermometer on the ground in an area of coral rubble approximately 100 feet northeast of the grave. Further inspection of the area revealed the presence of an aluminum bottle cap with a distinguishable logo. Nothing else was found in this spot.



13. Thermometer, broken (TIGHAR Artifact 2-2-G-5)

Date Found: October 1991 during TIGHAR's NIKU II expedition.

Description: This is a clear glass rod $2\frac{5}{8}$ inches in length with a diameter of $\frac{5}{32}$ inch. One end has a formed right-angle hook $\frac{1}{16}$ inch in length. The rod is triangular in

cross-section and appears to be constructed of two bonded, concentric layers with a white opaque band imbedded between the layers along one side of the triangle. A minute (less than pin-hole sized) opening runs the length of the rod at its approximate center and terminates in a bulb at the hooked end.

Condition: The rod is broken at both ends. No trace of markings or gradations are visible on the white band or the rod. The external surface of the glass is smooth and shows no sign of abrasion. There is a trace of foreign material at the straight break and a few flecks have found their way into the central tube to a depth of about 5mm.

Identification: The object is clearly a thermometer of some kind.

Commentary: No match has been found to any specific type of thermometer. The hook at the end is particularly puzzling. Thermometers are easily broken, but this one is broken at both ends. How did that happen? The glass shows no sign of having been tumbled about on the rough coral as one might expect if it had been washed ashore from the lagoon. But if it was simply dropped, where is the rest of it? And how did foreign material get 5mm down into the central tube?



14. Threaded metal cap (TIGHAR Artifact 2-2-G-6)

Date Found: October 1991 during TIGHAR's NIKU II expedition.

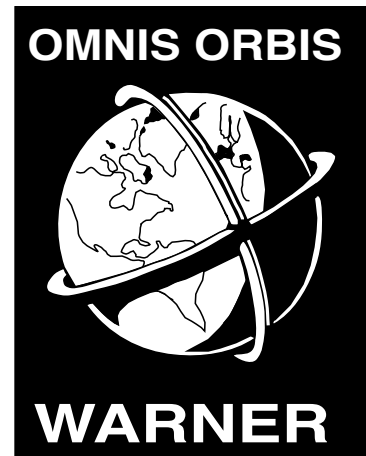
Identification Assistance: Warner-Lambert Company

Description: This is a threaded aluminum bottle cap 2 inches in diameter. Traces of white or cream-colored paint are visible on its exterior surface and there is a logo, faded but legible, centered on the top of the cap.

Condition: Most of the paint has bleached off but corrosion damage to the underlying surface is minimal. The top is very slightly dimpled in several places and its circular shape has been deformed by flattening along one side, with a corresponding bulge opposite. There is a reddish-brown discoloration or stain along part of the edge and top.

Identification: This is the cap from a bottle of patent medication manufactured by William R. Warner & Company of New York. Beginning in 1932, Warner used this particular logo on the caps of three products: Agoral, a laxative; Cal-Bisma, a stomach-settler similar to Pepto-Bismol, and Alka-Zane, a remedy for indigestion similar to Alka-Seltzer. The logo remained in use into the early 1950s.

Commentary: There are, of course, a number of possible explanations for the bottle cap's presence on the island. However, because Earhart is known to have suffered from stomach trouble during the world flight, and because the cap was used on products contemporaneous to that time, and with so much other evidence pointing to Earhart's presence not only on this island but on this specific part of the island, the artifact deserves a close inspection.



Several observations raise interesting questions. The slight indentations on the top of the cap suggest light tapping with a hard, somewhat pointed instrument. The flattened side indicates either a sharp blow or deliberate compression, perhaps to dislodge a stuck cap from the bottle. But where's the bottle? No glass (except for the thermometer) was found anywhere nearby. The reddish-brown stain is particularly intriguing and merits chemical analysis.

On the morning of October 16, another team member was sitting on the ground changing his boots about 40 feet southwest of the grave. As he watched a land crab scuttle by, its legs knocked aside a leaf revealing an old shoe heel on the ground. The surrounding area was cordoned off and meticulously examined. Over the next two days various remnants of two shoes were discovered.

15. Shoe parts (TIGHAR Artifact 2-2-G-7)

Date found: October 1991 during TIGHAR's Niku II expedition.

Identification assistance: Cat's Paw, a division of The Biltrite Corporation.

The many fragments which make up this artifact have been cataloged under 9 separate sub-headings based upon the nature of the material or object, and the specific spot where it was found.

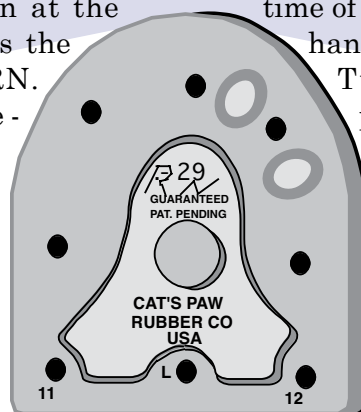


Artifact 2-2-G-7/1, Cat's Paw heel

Description: This is a rubber shoe heel 3 inches long by $2\frac{7}{8}$ inches across its greatest width. It is nominally $\frac{1}{4}$ inch thick and is pierced by 8 ferrous nails. The exterior (bottom) surface is considerably worn. The interior surface exhibits a number of codes and markings molded in at the time of manufacture, plus the hand-written letters RN.

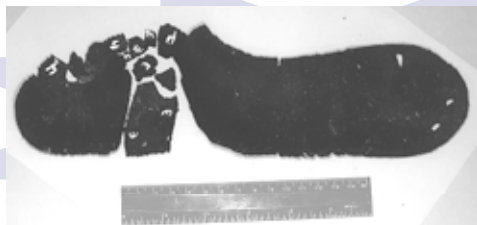


Condition: The rubber is hard and probably somewhat contracted. Remnants of all eight nails are extant but severely oxidized. The washers surrounding the nails are present in six of the holes.



Two shallow depressions anchors for white rubber "traction

Identification: This is a Cat's Paw replacement heel manufactured in the United States in the mid-1930s for a left shoe of either a large woman's or small man's size. The hand-written RN may be stock coding applied by the repair person.



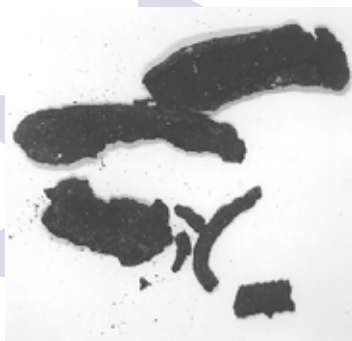
Artifact 2-2-G-7/2 through 5, Sole

Description: These are fragments of a rubber shoe sole nominally $\frac{1}{4}$ inch in thickness. The largest fragment is $6\frac{7}{8}$ inches in length and measures roughly $2\frac{1}{2}$ inches wide across the narrowest part of the instep. When reassembled, the suggested length of the sole is approximately $10\frac{7}{8}$ inches. Eight holes are present where the heel was once attached and the

alignment precisely matches the nails in Artifact 2-2-G-7/1 (see above). Holes along the edge where the uppers were stitched to the sole are spaced $\frac{3}{16}$ inch apart.

Condition: The rubber is hard, brittle and probably somewhat contracted.

Identification: This is the sole of a woman's left shoe of a style known as a blucher oxford. The location of the stitching holes establish the style and the tightness of the stitches (even allowing for contraction) indicate a woman's shoe. The length and width indicate a woman's size $8\frac{1}{2}$ or 9 narrow. The Cat's Paw replacement heel (Artifact 2-2-G-7/1) found with the fragments was almost certainly once attached to this sole.



Artifact 2-2-G-7/6 through 8

Description: These are fragments of an unknown material (possibly leather) approximately $\frac{1}{8}$ inch in thickness.

Condition: The material is hard, brittle and, in some cases, has curled inward along its edges.

Identification: Unknown. These may be pieces of the layered base which goes between the sole and the replaceable part of the heel.



Artifact 2-2-G-7/9, Brass eyelet

Description: This is a brass eyelet with a diameter of $\frac{5}{16}$ inch and a depth of $\frac{1}{16}$ inch. The hole has a diameter of $\frac{1}{8}$ inch.

Condition: Tarnished but otherwise undamaged.

Identification: Such an eyelet might have many uses but the context in which it was found suggests that it was employed as a shoelace grommet. The aperture is too small to accommodate the laces of a man's shoe but exactly match the usual $\frac{1}{8}$ inch laces for women's shoes.

General Commentary: The shoe from which Artifact 2-2-G-7 originated was a woman's blucher oxford with brass eyelets and a replacement heel manufactured in the United States in the mid-1930s. The size was $8\frac{1}{2}$ or 9 narrow. The style and size of shoe worn by Amelia Earhart at the time of her disappearance is shown in this detail from a photo taken in

Bandoeng, Java about 10 days before her final flight. Amelia is wearing a woman's blucher oxford with brass eyelets. There are many photos of AE wearing these shoes. The slightly lighter color at the bottom portion of the heel first appears in photos taken just prior to the first world flight attempt in March, 1937 and may indicate a replacement heel. The size of the shoe is readily determined. The rows of rivets visible on the Lockheed's wing are nominally 2.5 inches apart. The shoe in the photo is slightly over 10 inches in length, in other words, a size $8\frac{1}{2}$ or 9.

Since the discovery of Artifact 2-2-G-7 was announced in 1992, there has been a great deal of discussion about Amelia's shoe size. A pair of size 6 dancing slippers in a Kansas museum and the recollections of Earhart's sister have been cited as evidence that AE had tiny feet. AE was 5 feet 8 inches tall and of thin and lanky build. Whatever size shoes she may have worn as a girl, there can be little doubt about the size of shoe worn by the 39 year old woman standing on the Lockheed's wing. It is also difficult to dismiss as coincidence the oft-repeated story of how, in late 1938, the first Gilbertese work party on Nikumaroro came upon the skeletal remains of a white man and woman on the same part of the atoll where TIGHAR found shoe fragments 53 years later. According the old story, the woman's skeleton was wearing American shoes, size nine narrow.



16. Artifact 2-2-G-8, Shoe heel

Date found: October 1991 during TIGHAR's Niku II expedition.

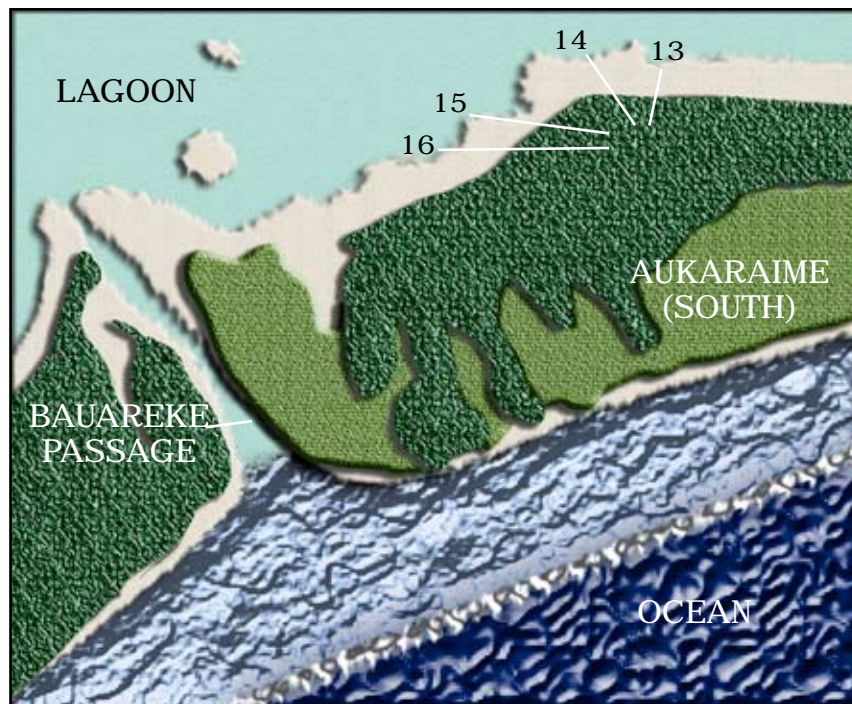
Identification assistance: Cat's Paw, a division of The Biltrite Corporation.

Description: This is a rubber shoe heel measuring $3\frac{1}{8}$ inches in length by $2\frac{7}{8}$ inches across its greatest width. It is nominally $\frac{3}{16}$ inch thick and is pierced by 8 nail holes in which remnants of the washers are still present. The nails appear to have rusted completely away and one nail did not penetrate all the way through the heel. The exterior (bottom) surface is considerably worn, especially on one side toward the rear. The interior surface exhibits no discernable codes or markings.

Condition: The rubber is hard and exhibits the same degree of degradation seen in 2-2-G-7/1, the Cat's Paw heel.

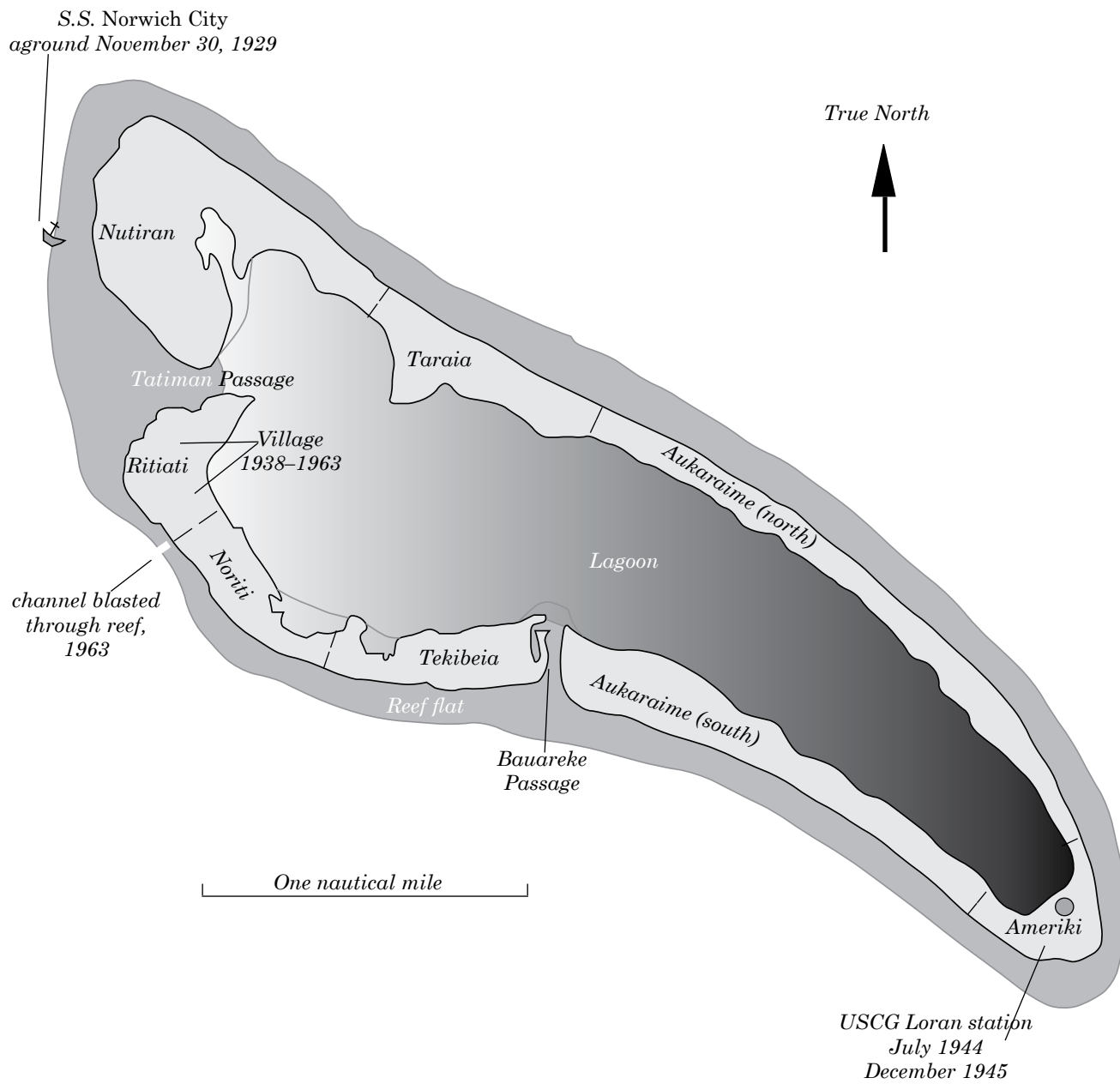
Identification: This is an original heel, slightly larger and more worn than the replacement heel found in the same area. Re-heeling, by necessity, is done to both shoes of a pair. It seems apparent then, that this heel is from a second pair of shoes.

Commentary: The presence of any shoe in this location would be remarkable. The site is far from any settled part of the island and the hot, hard coral rubble is hardly conducive to barefoot strolling. Rubber shower shoes and an occasional sneaker can be found washed up on the ocean beach, but this location is much too far inland for that explanation. That two pair of shoes (one of them belonging to an American woman) should have been abandoned or lost in this place is odd in the extreme. At the same time, the distribution of the fragments and the absence of the other two shoes suggests at least some scattering from the original point of deposition (assuming all four shoes started out in roughly the same place). Because all of the recovered fragments float, water would seem to be the most logical agent of distribution—specifically, flooding of the lagoon about 200 feet away. Logically then, the shoes were originally deposited somewhere between the point of discovery and the lagoon shore. This also tracks with the old island story of a woman's skeleton with American shoes found under the bushes about five feet from the shore.



Conclusion:

The various shoe fragments are most probably from the shoes said to have been found in this location with the bones of a white woman and man in 1938. It is very likely that the shoes, and the bones, belonged to Amelia Earhart and Fred Noonan.



Paradise Lost

Finding Amelia

In archaeology, as in much of life, context is everything. Underwear on the bedroom floor can be a housekeeping chore or a legal issue depending upon whose underwear is on whose floor. A fossilized microbe in a rock becomes much more interesting if the rock happens to come from Mars. To know for certain whether pieces of aircraft aluminum found on a Pacific atoll are routine or startling requires more information about both the aluminum and the island.

Years of research have enabled us to assemble a fairly detailed chronicle of events on Nikumaroro, and yet the historical record does not account for the most interesting of the objects discovered there. Somehow, the people who once lived on this island acquired, and put to their own use, debris from at least two aircraft. One was an early example of the Consolidated B-24 Liberator. While the particulars are not yet documented, a plausible explanation for the presence of this material is suggested in the island's history. The other airplane seems to be Amelia Earhart's Lockheed Model 10E Special. Also found, but on a different part of the island, were the remains of a shoe which appears to match the type and size of those worn by Earhart. Although no more difficult

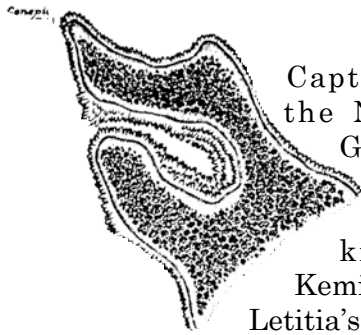
to explain than the B-24 parts, the apparent Earhart-related artifacts must be held to a higher standard of scrutiny because the implications of their presence on the atoll are historically significant.

Nikumaroro is a jigsaw puzzle, now largely complete, with some crucial pieces still missing. Attempting to explain, or explain away, the presence of objects for which there is no documented explanation requires speculation, but the trick to intelligent guessing is to guess as little as possible. That's why a thorough knowledge of context is so important. To stand the best chance of finding the hard evidence that will fill in the missing pieces of the Nikumaroro puzzle we must understand the picture we have so far.

Although there is some evidence of prehistoric human contact with the atoll, the recorded history of the jungled ring of coral which lies at 4°40' south latitude, 174°32' west longitude begins with an American whaling ship plying the waters of what was known as the South Seas Whale Fishery. It was in this region, noted for its abundance of sperm whales, that Melville would place the final confrontation between Ahab and Moby Dick.



1825



Capt. Joshua Coffin of the Nantucket whaler *Ganges* charts the position of an uninhabited coral atoll known variously as Kemin's Island and Mary Letitia's Island. Coffin names

Although sadly inaccurate, this was the only map of Gardner Island publicly available at the time of the Earhart flight.

the island after the ship's owner (and apparently his father-in-law), U.S. Congressman

Gideon Gardner.

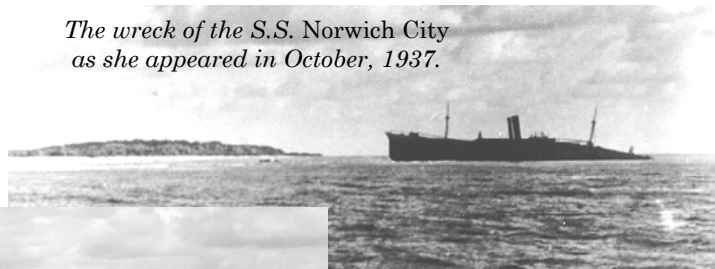
1929

Late on the stormy night of November 29, S.S. *Norwich City*, a 5,587 ton British freighter bound from Melbourne to Vancouver in ballast, runs hard aground on the reef at the island's northwest end. An SOS is immediately sent out but the ship's oil tanks have been ruptured and fire forces the crew over the side into the teeth of the storm. Eleven of the ship's thirty-five men drown trying to reach shore. The survivors are rescued five days later. The wreck becomes a prominent landmark which slowly deteriorates over the years. Its massive triple-expansion steam engine is still visible today.

1840

On August 19 the U.S.S. *Vincennes* of the U.S. Navy Exploring Expedition confirms the island's position and name. In the first, but by no means the last, erroneous assumption about the island by the U.S. Navy, Commander Wilkes noted, "Believing this to be the island discovered by Captain Gardner, I have retained his name."

The wreck of the S.S. Norwich City as she appeared in October, 1937.



E. R. Bevington



The wreck of the S.S. Norwich City as she appeared in October, 1991.

TIGHAR photo by P. Thrasher

1856

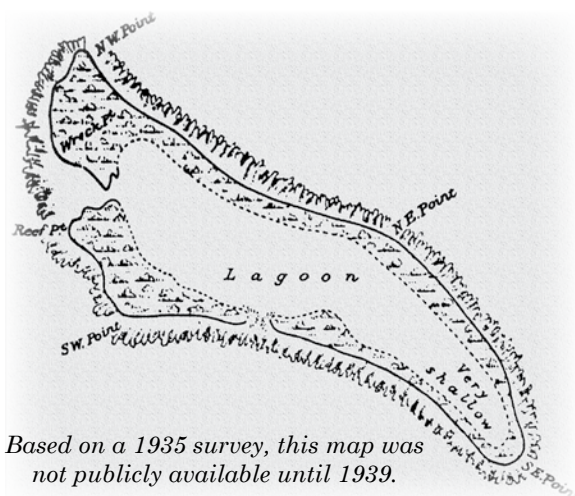
The island is claimed by C.A. Williams & Co. of New London, Connecticut under the American Guano Act but no worthwhile guano deposits are found. All claims are relinquished in 1882.

1935

On August 18 H.M.S. *Wellington* calls at the island and collects information from which the first (somewhat) accurate map of the shoreline is made.

1892

On May 28 H.M.S. *Curacao* calls at Gardner Island to claim the island formally for Great Britain. Twenty Niue islanders are there planting coconuts under a British license granted (somewhat prematurely) to entrepreneur John T. Arundel. Drought forces the abandonment of the project sometime before 1894.



Based on a 1935 survey, this map was not publicly available until 1939.

1937

On February 15, in response to new American claims of ownership to islands of the Phoenix Group, H.M.S. *Leith* calls at the atoll for just long enough to send a party ashore to erect a flagpole and placard proclaiming British ownership. This renewed interest in Central Pacific atolls is prompted by the emerging prospect of trans-Pacific commercial air travel and the need for suitable refueling locations.

On July 2, Amelia Earhart and Fred Noonan disappear aboard Lockheed NR16020. When last heard, they are near (but unable to find) Howland Island 350 nm to the northwest. Earhart says she is proceeding along a 157°/337° navigational line, but does not specify in which direction. Gardner Island lies very close to the 157° line and is within the aircraft's hypothetical fuel range.

During the nights of July 3 and 4, bearings are taken by Pan American stations at Oahu, Midway and Wake, on radio calls suspected of originating from the lost airplane. The majority of the bearings cross in the vicinity of Gardner Island. Experts at Lockheed assert that the signals indicate that the airplane must be on land and able to operate its right-hand, generator-equipped engine. The battleship U.S.S. *Colorado* is dispatched to search the islands of the region.

On July 9, three Vought O3U-3 floatplanes launched from the *Colorado* fly over Gardner Island searching for the lost Lockheed. No airplane is seen but the Senior Aviator later reports that "signs of recent habitation were clearly visible but repeated circling and zooming failed to elicit any answering wave from possible inhabitants and it was finally taken for



One of the three aircraft which flew over Gardner Island on the morning of July 9, 1937 searching for the Earhart plane. Courtesy U.S. National Archives.

granted that none were there." (The last documented habitation of the island was the brief stay by Arundel's coconut planters in 1892.)

July 9, 1937. "Here, signs of recent habitation were clearly evident..." Photo courtesy Nat'l Archive of New Zealand.

The earliest known aerial photo of the island is taken from one of the Navy search planes.

On October 13-15, a party of 19 Gilbertese delegates led by Gilbert & Ellice Islands Colony Lands Commissioner

Henry E. (Harry) Maude, assisted by Cadet Officer Eric R. Bevington, perform a cursory inspection of the atoll to evaluate it for future colonization by settlers from the overcrowded Gilbert Islands. Prominent among the Gilbertese



October 14, 1937. "In the afternoon we got a canoe and Maude came in it. ...We found many interesting things including signs of previous habitation." Diary of British Colonial Service Officer Eric Bevington. Photo by E.R. Bevington

delegates are Tem (Mr.) Mautake Maeke, Permanent Head of Delegates; Teng Koata, Magistrate of Onotoa; and Assistant Native Medical Practitioner Tutu. Severe back pain limits Maude's activities but Bevington makes a difficult all-day trek around the atoll with some of the Gilbertese. His diary describes coming upon "signs of previous habitation" which he later described as "looking like someone had bivouacked for the night." Although only 111 of Arundel's coconut trees had survived, the island's lush environment was judged suitable for future colonization. Because of the atoll's unusual abundance of Buka trees (*Pisonia grandis*) the Gilbertese name the island Nikumaroro after the legendary home of the goddess/ancestor Nei (Miss) Manganibuka who was said to have come from a beautiful island covered with Buka trees which lay southeast of the Gilberts.

1938

On December 1 a party of six New Zealanders arrives to begin an evaluation of the island as part of the British Pacific Islands Survey Expedition. Their purpose is to determine whether the lagoon is suitable for seaplane landings and to assess the practicality of constructing an airfield on the atoll. At least two aerial photographs



December 1, 1938. Photo taken from Supermarine Walrus launched from HMS Leander.
Photo courtesy Nat'l Archive of New Zealand.

of Gardner Island are taken from a Supermarine Walrus aircraft launched from the cruiser H.M.S Leander. The survey team focuses on taking soundings in the lagoon and mapping the island's northwestern tip, the only land area big enough for a runway.

On December 20 Lands Commissioner Harry Maude returns aboard the Royal Colony Ship (RCS) *Nimanoa*, this time assisted by Cadet Officer Gerald Gallagher, to drop off the first colonists of the Phoenix Island Settlement Scheme (with the unfortunate acronym P.I.S.S.). Although the New Zealand survey party is on the island at this time, their presence is unrelated to the arrival of the first settlers. The Gilbertese work party, made up of six men from Onotoa and four from Arorae (both islands in the southern Gilberts), is put ashore to begin clearing land for the establishment of a village and coconut plantation. Maude is disappointed to see that a severe drought has turned the lush paradise he had seen in 1937 into a parched and hostile landscape.

On December 22 Maude and Gallagher depart to deposit other settlers on Hull and Sydney Islands to the east. Jack Kima Pedro, a half-Portuguese/half-Tokelau construction foreman, is left with the work party to operate two condensing plants for the distillation of drinking water.

1939

On January 2, Maude and Gallagher return to Gardner to find the work party greatly distressed because well-digging attempts have failed to find drinkable water and one of the condensing units has burned out. Maude puts Mautake, Koata and Tutu ashore to help with the search for water.



January 2, 1939. "...I decided to land all the headquarters staff, including Native Medical Practitioner Tutu, to assist in the search for water." Report by Native Lands Commissioner Maude. Left to right, NMP Tutu, Head of Delegates Mautake Maeke, Native Magistrate Koata. Photo by E.R. Bevington.

On January 4, with no water yet found at Gardner, Maude and Gallagher once again depart to check on progress at the other islands, leaving the Gilbertese officials behind to help the ten-man work party in the desperate and wide-ranging search. Their trek later becomes part of the island's folklore, as does another story. Sometime in these early days (possibly during the great search for water) the workers are said to have come upon the bones of a woman and a man. They could tell that they were white people from the remnants of their clothing and from their shoes. No one knows what became of the bones but the area where tradition holds that they were found is the same region where Bevington noted "signs of previous habitation" a year and a half earlier

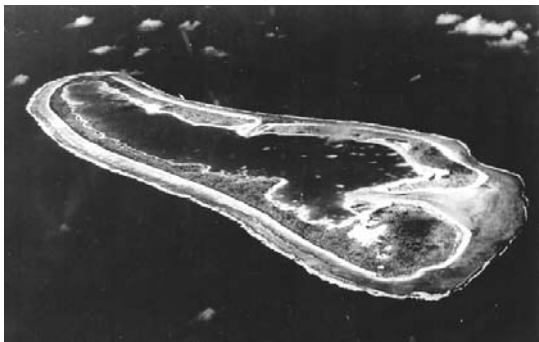
The week following Maude's departure is marked by unusually high westerly ocean swells. Water levels measuring four feet above the already high spring tides pummel the island's west-facing shorelines and may have overwashed some portions of the atoll.

Late in the month (the exact date is not certain) Maude checks in at Gardner on his way back to Tarawa in the Gilberts. "A fair supply of well water" has at last been found and the Gilbertese officials rejoin RCS *Nimanoa* for the trip home. The original ten-man work party, however, is

not happy. Five of the men consider the newly found well-water undrinkable and all are ready to abandon the project. Maude only succeeds in convincing them to stay on by promising to return soon with their wives.

On February 5 the New Zealand survey party departs having determined that the atoll is not a desirable base for aircraft operations.

On April 28 Maude returns with twelve new settlers for Gardner including the wives of the workers. He also brings materials for the construction of a 10,000 gallon cistern (which still stands). By this time rains have returned the island to its former bountiful appearance.



April 30, 1939. Photo looking north to south taken by a U.S. Navy aircraft from U.S.S. *Pelican*. Absence of vegetation just east of the southern lagoon passage may indicate recent overwash. Tradition holds that bones were found near this area. Courtesy U.S. National Archives.

On April 30 a floatplane (probably a Grumman J2F Duck) is launched from the seaplane tender



Village as of April 30, 1939.

U.S.S. *Pelican* to take a mosaic of aerial mapping photos as part of a U.S. Navy survey of the Phoenix Islands.

On June 17 additional settlers arrive bringing the new colony's population to a total of 58 (16 men, 16 women, 11 boys and 15 girls).

During this period the island's government is headed by Teng Koata who acts as supervisor and magistrate. Around this time, according to legend, his wife has an encounter with the goddess Manganibuka on a remote part of the island.

On November 28 the U.S.S. *Bushnell* arrives to begin an American survey of the atoll. The island's shoreline is established by sighting from eight "primary stations" (which include three eighty-foot steel towers erected along the northern shore) and fourteen "secondary stations." Extensive soundings are taken in the lagoon and surrounding ocean. Magnetic and tidal observations are also made. A population of eighty colonists is reported as living in "about twenty grass houses."

On December 5 the *Bushnell's* survey is completed and the ship departs.

1940

In late September, Gerald Gallagher, promoted to Acting Officer In Charge of the Phoenix Island Settlement Scheme, moves his headquarters from Sydney Island to Gardner. Gallagher, known to the Gilbertese as "Karaka" and to his fellow officers as "Irish," is the island's first and only resident European magistrate.



Photo by E.R. Bevington

"Irish."

In December, Gallagher reports "severe and almost continuous north-westerly gales" which cause considerable damage to the village and alter the course of the southern lagoon passage.



November 18, 1940. "[The Government Rest House], although smaller, is modelled after the Native Lands Commissioner's house on Beru (Gilbert Islands)." Report by Gerald B. Gallagher, Officer-in-Charge, P.I.S.S.

TIGHAR Collection

1941

In May, Gallagher goes to Fiji (headquarters of the British Western Pacific High Commission) on leave.

On June 20 at least four PBY flying boats of U.S. Navy Patrol Squadron 22 visit the island as part of a "Reconnaissance of Pacific Islands



Village as of June 20, 1941

of the Phoenix Islands." Nine aerial photographs are taken and at least one of the aircraft lands in the lagoon and calls at the village which is reported to be "inhabited by 30 natives presided over by a native magistrate and policed by a member of the Gilbert & Ellice Islands Colony Constabulary."

On September 24 Gallagher returns from Fiji aboard the S.S. *Viti* but has become seriously ill enroute. He dies three days later and is buried in the center of the Government Station area of the settlement. No replacement officer is appointed. Teng Koata retires and returns to Tarawa. His position as head man is taken by Teng Iokina.



Gallagher's grave, February 4, 1996.

TIGHAR photo by John Clauss.

1942

On November 30 Colonial Service Officer D.C.I. Wernham visits the island and finds the coconut plantings healthy, with one tree approaching bearing age. The island is outside the active war zone and no contact with Japanese forces is known to have occurred.

1943

On April 23 District Officer R. M. Major visits the island and finds the trees healthy and the population "not discontented."

On November 17 the District Officer returns aboard a U.S. Coast Guard flying boat with a survey party to select a site for the construction of a Loran navigation station. The island's southeastern tip is chosen. The population at this time is officially listed as 57.



November 17, 1943. U.S. Coast Guard PBY 189 is met by canoes from the village. Photo by Jack Shea

1944

On July 24 U.S. Coast Guard Construction Detachment D (Unit 211) arrive aboard USCG *Balsam* to begin construction of the Loran facility.

On August 17-18 a British officer, Lt. Col. Huggins, finds that little progress has been made by the colony since Gallagher's death.

On September 29 the Gardner Loran goes on the air. The station is staffed by 25 men as USCG Unit 92. The commanding officer, Ensign Charles Sopko, restricts his men to the immediate area around the station and limits their contact with the colonists to prevent "fraternization."

Sometime in late 1944 or early 1945, PBY pilot Lt. (jg) John Mims sees the Gilbertese settlers using an aircraft control cable as a heavy-duty fishing line leader. Asked about its origin, one of the Gilbertese replies that, "When our people first arrived a few years ago there was an airplane here."

September 24, 1944. The U.S. Coast Guard Loran station at the island's southeastern tip. Photo courtesy Charles Sopko.



1945

On January 25 Lt. Col. Huggins returns and instructs the settlers to devote more time to planting and less to village maintenance.

Sometime in “the late war years” a large four-engined aircraft is reported to have crashed on Sydney Island two hundred miles to the east. Details are not clear, but supposedly the bodies of the crew were recovered and the wreck abandoned to be salvaged for useful metal by the local settlers. This is probably the source of a few B-24 parts which later turned up on Gardner. During the time that the USCG Loran station was at Gardner, PBVs delivered mail and perishable supplies. Records still exist for all of those flights. On no occasion was an aircraft reported lost or even damaged at Gardner Island.

In December the Loran station is de-activated and abandoned.

1946

In March a Coast Guard work crew disassembles and secures the station’s Loran gear in the quonset huts formerly used as living quarters. Floyd Kilts, a Chief Carpenter’s Mate involved in this work, later (in 1960) tells a San Diego newspaper reporter that one of the Gilbertese told him of “the skeleton of a woman with American shoes and the skull of a man” found by the island’s first settlers in 1938.

1947

In June a new supervisor-magistrate, Aram Tamia, is appointed to try to speed up development of the colony which is deemed to have stagnated during the war years. As a youth Aram Tamia had served as Gallagher’s personal assistant. A visit by Chief Lands Commissioner B.C. Cartland and District Officer McKenzie finds the situation “even less satisfactory than had been thought.”

1948

Further official visits during the year confirmed a need for a re-organization of the colony.

1949

On January 2 Lands Commissioner Paul B. Laxton arrives to give the settlers a choice between repatriation to the Gilbert Islands or committing to further development of the atoll under a system of land grants and leaseholdings. Six families elect to leave, three of whom were among the first colonists, but the remainder stay on. The village is moved to the site “originally selected by Mr. Gallagher, freeing the main area of developed trees for a leasehold party selected from Manra (Sydney Island).” These Sydney residents may have brought with them a few useful pieces of aluminum salvaged from the wartime crash on that island.

1953

A new aerial photo survey of the island shows the enlarged settlement. During this period the island reached its maximum population of nearly 100 people.



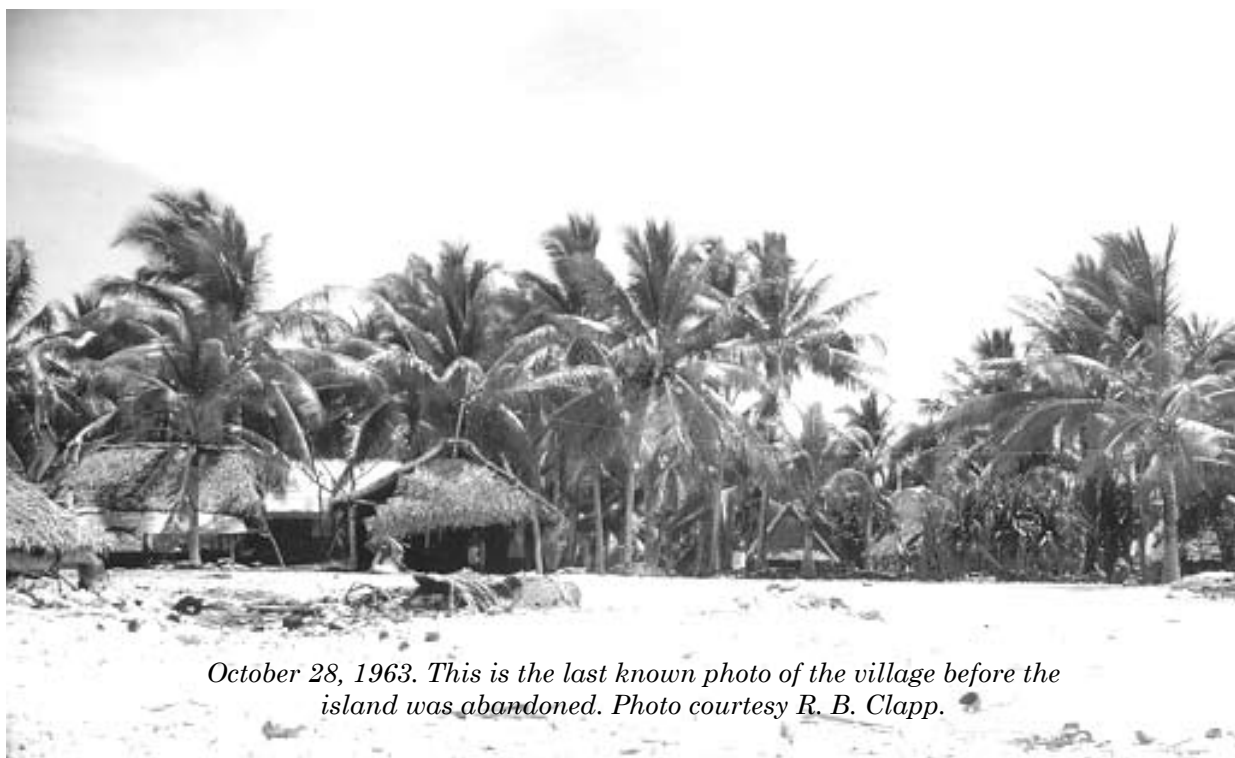
*Village as of
April 2, 1953*

1963

Yet another severe drought damages the coconut plantations and prompts a British decision to abandon the colony. A channel is blasted through the reef at the island’s west end to facilitate the evacuation and the process of resettling the island’s residents 2,000 miles to the island of Vaghena in the Solomons is begun.

1964

A scientific party from the Smithsonian Institution visits the atoll to study the bird and plant life. Only a few residents remain to be moved.



October 28, 1963. This is the last known photo of the village before the island was abandoned. Photo courtesy R. B. Clapp.

1975

Smithsonian naturalists return, this time aboard a U.S. Air Force helicopter. It is believed that the now completely abandoned island was under consideration as a possible test site for biological weapons. Fortunately, that never happened.

1978

On October 24-27 a party of geologists employed by Geomarex Corp. surveys the lagoon for exploitable minerals. None are found.

1979

Gardner Island becomes part of the new Republic of Kiribati and is officially renamed Nikumaroro.

1989

From September 17 to October 6, TIGHAR's Niku I expedition ranges far and wide over the island hoping to find the Earhart aircraft in the underbrush. Scuba divers scout the edge of the fringing reef on the chance that the Electra rests somewhere on the first shallow shelves of coral. In the last days of the expedition, exhausted, disappointed and empty-handed, the team puts aside dreams of dramatic success and contents

itself with whatever scraps the abandoned village might offer. Of the nineteen village artifacts deemed worthy of collection, only one—Artifact 2-18, the dado (see page 13)—ultimately emerges from the analytical process as a probable relic of the Lockheed.



1991

From October 10 to 19 TIGHAR's Niku II expedition team targets specific areas on the island while the ship conducts a side-scan sonar search of the deep water off the reef. As in 1989, the underwater search is fruitless while, on-shore, the search for a possible campsite seen on

the atoll's remote northeastern arm by Coast Guardsmen in 1944 is also negative. The excavation of a suspicious grave near Bauareke Passage on the south coast produces the bones of an infant, not Amelia Earhart, but coincidentally encounters shoe fragments and



other interesting objects nearby. Again, in the last days of the expedition, an inspection of the abandoned village turns up aircraft debris, including a torn section of aluminum skin. Research would eventually show that the artifact could be part of a unique repair patch known to have been installed on the Earhart aircraft in May 1937.

1995

Interviews with former residents of Nikumaroro now living in the Solomon Islands corroborate the story that bones were found by the first work party in 1938/39. No one knew a story about an airplane having been on the island.

1996

From February 2 to 5 TIGHAR's Niku III Preliminary expedition tries again to locate the campsite on the northeastern shore, this time guided by early aerial photos which have been digitized and enhanced to reveal the presence of metal debris. Hopes that the campsite is that of Earhart and Noonan are dashed when the debris is at last located but proves to be comprised of objects from the Gilbertese settlement two miles away. For a third time, the apparently defeated expedition ends with a walk through the abandoned village, and once again, aircraft parts are found. This time the recovered artifacts include a fragment of Plexiglas which subsequent analysis shows is probably from Lockheed Part Number 40552, the cabin window of an Electra (see page 21).



CLUES AND CONCLUSIONS

Eight years and over a million dollars of research have presented us with a complex body of evidence worthy of a Sherlock Holmes or an Hercule Poirot. Our abilities, sadly, are not the equal of those worthies nor is our investigation carried out in the comfortable realm of fiction. History is a far harsher arena where only solid research and sound logic produce happy endings.

It appears that the residents of the village on Nikumaroro had access to Amelia Earhart's aircraft and removed pieces of it for their own use. The entirely independent discovery of what appears to be the remains of one of Earhart's shoes on another part of the island strongly suggests that the Lockheed parts were not imported by the settlers but arrived on the island with the shoe. Unlike the B-24 parts, none of the artifacts attributable to the Lockheed seem to have been cut from major structural members, but are, rather pieces of easily removable components. This is also true in the case of the only known anecdote describing the presence of an aircraft on the island. In 1944 or '45, Navy pilot John Mims saw an aircraft control cable being used as a heavy-duty fishing line leader. Upon inquiring, he was told by an islander that when the first settlers arrived there had been an airplane there.

The scarcity of Lockheed pieces in the village implies a minimal rather than

wholesale salvage of the aircraft. Furthermore, the apparent origin of the section of aluminum skin (see page 16) indicates that, at the time of its removal, the aircraft was either standing on its landing gear or lying on its back (otherwise, the protruding flap of skin would be crushed). That the airplane would be found intact and on its wheels on Nikumaroro was predicted in a message received by the original searchers on July 5, 1937. Coast Guard Headquarters in San Francisco advised:

OPINION OF TECHNICAL AIDS HEAR
[sic] THAT EARHART PLANE WILL BE
FOUND ON ORIGINAL LINE OF POSI-
TION WHICH INDICATED POSITION
THROUGH HOWLAND ISLAND AND PHEO-
NIX [sic] GROUP. RADIO TECHNICIANS
FAMILIAR WITH
RADIO EQUIPMENT
ON PLANE ALL
STATE DEFINITELY
THAT PLANE RADIO
COULD NOT FUNC-
TION NOW IF IN
WATER AND ONLY
IF PLANE WAS ON
LAND AND ABLE TO
OPERATE RIGHT MOTOR [equipped with a
generator] FOR POWER...

A relatively successful landing on Nikumaroro is also consistent with well-established island folklore describing the discovery of the bones of a white woman and man by the first settlers in 1938 (see page 32). The credibility of that account is, in turn, bolstered by TIGHAR's recovery of what appears to be one of the shoes men-

WHEN THE FIRST SETTLERS
ARRIVED THERE WAS AN
AIRPLANE THERE.

tioned in the story (see page 25). Neither the bone story nor the location of the shoe fragments is associated with aircraft debris. The available evidence, therefore, argues for an arrival which permits the occupants to exit the aircraft.

The physical evidence found on the island suggests that the aircraft landed successfully somewhere on Nikumaroro; that Earhart and Noonan perished near where the shoe fragments were found; that their bones were found by later settlers; and that the airplane itself was separately discovered and, to some extent, salvaged for useful material. Logically then, the bones and the rest of the airplane should still be there.


If that conclusion is correct, it must also be true that the airplane's location has been such as to elude discovery by the several formal surveys and many casual explorations of individuals who would have surely recognized its significance. Some areas of the island are overgrown with such dense vegetation that it seems marginally possible that an object the size of a Lockheed 10 might have remained undiscovered for all these years. A more likely hypothesis may be that the aircraft was in a relatively accessible location until after the first pieces were removed, and then moved, or was moved, to an inaccessible one. If we discount the possibility that the airplane was removed by some human agency without the knowledge of the locals (seemingly a safe assumption), we're left with natural forces (wind and water) which could remove it either seaward and over the edge of the fringing reef, or into the central lagoon. Virtually all of the natural force acting upon the atoll, from whatever direction, results in movement toward the lagoon, so it is difficult to see the ocean as a likely repository for the aircraft. By the same token, an aircraft washed into the lagoon by storm action would have to be

on a part of the island subject to overwash in such events. There is only one such place on Nikumaroro.

Aerial photos taken in 1938, 1939, and 1941 show that a wedge of land just east of the southern lagoon outlet (Bauareke Passage) was, in those years, subject to overwash from large westerly swells. Free of vegetation at that time, and comprised of a hard level pan of coral rubble, this wedge presented at least 1,200 feet of acceptable landing area facing toward the lagoon and directly into the prevailing easterly winds. At least in theory, a Lockheed

**THE BONES AND THE REST
OF THE AIRPLANE SHOULD
STILL BE THERE.**

10 could be successfully landed in this location, ending up not far from the lagoon shore. Taxiing the airplane into the shade of the bordering Buka trees to get it out of the blistering tropical sun would be a logical next step but could have unwittingly defeated the Navy's brief, unexpected (by Earhart and Noonan) aerial search a week later. The lagoon shore in this area, cooled by the easterly trades, is among the most pleasant on the island and would be a logical site for an encampment. This is the area where Eric Bevington saw "signs of previous habitation" three months later, and where island tradition holds that the bones were found in 1938. Just inland from this area is where TIGHAR found the shoe fragments. An episode of large westerly swells, such as the one reported to have occurred in January 1939, could have washed the airplane into the lagoon and covered it with enough silt and sand to obscure it from view.

This is but one hypothetical scenario to explain the abundance of evidence which places the Earhart flight on Nikumaroro. There may be others, but it is clear that a conclusive search of the village, the bush, and the lagoon stands an excellent chance of making further discoveries which could answer the riddle of the Earhart disappearance once and for all. 

The NIKU III Expedition Once And For All

The objective of the expedition

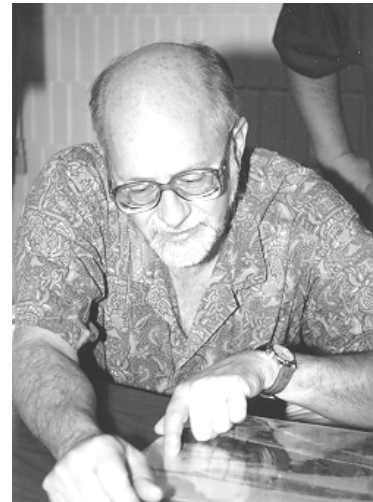
will be to find, photograph and, where practical, recover additional physical evidence relating to the disappearance of Amelia Earhart and Fred Noonan. The scientific party will be comprised of 20 individuals and, as with previous expeditions, a representative of the Republic of Kiribati will monitor all activity at the island. A full thirty days of operations at Nikuamaoro are planned. Departure from Honolulu is set for late January 1997.

Village Survey

A team under the direction of noted archaeologist Thomas F. King, Ph.D., SOPA (TIGHAR #0391CE) will conduct a survey of the island's formerly settled areas. The detailed exploration of the densely overgrown village will be aided by digitized and enhanced aerial photos of the settlement taken in its heyday, keyed to global positioning system (GPS) technology provided by Trimble Navigation, Ltd. The methodology to be employed will involve identifying specific formerly inhabited sites and carefully clearing away subsequent overgrowth and fallen vegetation to permit both visual and remote sensing inspection. It is hoped that

this survey will uncover artifacts which will be conclusively identifiable as components salvaged from the Earhart Electra.

Thomas F. King, Ph.D. has extensive archaeological experience in Micronesia and served as Project Archaeologist on TIGHAR's Niku I expedition in 1989. TIGHAR photo by P. Thrasher.



An example of the challenge facing the Village Survey team, this photo shows the Rest House pictured on page 33. Only the corrugated metal portion of the original structure at the right-hand side of the photo is recognizable. TIGHAR photo by R. Matthews.

Lagoon Search

A smaller team will operate a launch especially outfitted with remote-sensing technology with which to search the lagoon floor for large metal targets. An electromagnetic (EM) sensor and a Schonstedt Instruments underwater magnetometer will detect the presence of both ferrous and non-ferrous objects while a sub-bottom profiling sonar unit will provide information on the general size and shape of targets, even if they are buried under silt and sand. Promising targets will be excavated, inspected and photographed by divers. Accurate search transects will be achieved through GPS navigation. It is hoped that the lagoon search will yield the main body of wreckage of the Earhart aircraft.



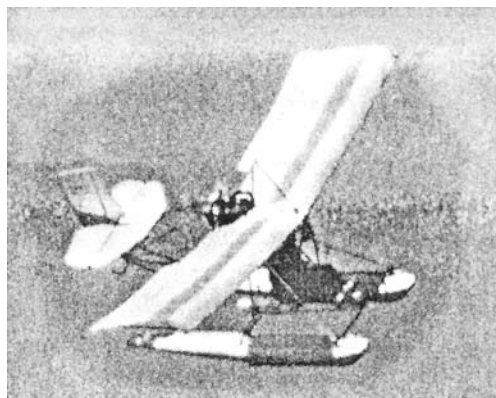
U.S. Army Corps of Engineers hydrologic engineer Kenton Spading (TIGHAR #1382CE), shown here inspecting a Trimble Navigation GPS unit, will lead the Lagoon Search team. TIGHAR photo by P. Thrasher.



TIGHAR pioneered the use of water-borne electromagnetic (EM) sensing in aviation archaeological applications during field operations in Newfoundland. Here Dr. David Scott and Kenton Spading use a Geonics EM61 to search for the remains of the lost 1927 aircraft l'Oiseau Blanc. TIGHAR photo by R. Gillespie.

Aukaraima Survey

A third team will seek to locate further personal effects and possibly even human remains in Aukaraima (south) district, the area where previously recovered artifacts and island folklore indicate that Earhart and Noonan may have perished. Methodology will be similar to that employed by the Village Survey team but may also include the deployment of ground penetrating radar (GPR). Scholarly opinion holds that human remains encountered by Gilbertese laborers were probably buried near the site of discovery and the graves marked, but not necessarily in a durable fashion. A GPR sweep of the suspect area could identify a now-unmarked grave.

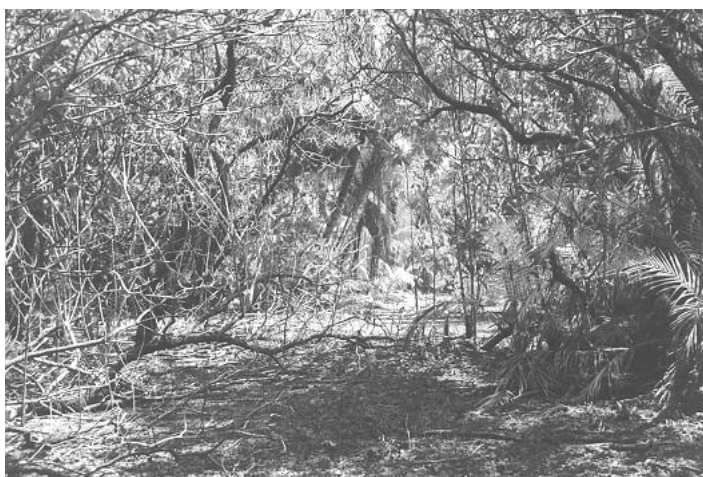


To provide aerial reconnaissance and photographic support for the search teams, the expedition will be equipped with a two-place, ultra-light type aircraft on floats. Shipment of the aircraft and other expedition gear to and from Hawaii is being donated by FedEx (a TIGHAR Corporate Member).

A team leader on TIGHAR's 1991 Niku II expedition, Kristin Tague (TIGHAR #0905CE) will resume the search in Aukaraima (south) district. TIGHAR photo by P. Thrasher.



The Niku III expedition will be led by TIGHAR's Executive Director Richard E. Gillespie. TIGHAR photo by R. Matthews.



Although less jungled than the abandoned village, Aukaraima presents formidable obstacles to detailed inspection for small artifacts. Shielded from cooling lagoon breezes, and with the sun reflecting on the hard, coral rubble surface, the daytime temperature often reaches exceeds 120°F. TIGHAR photo by R. Matthews.

Transportation

The expedition ship will be the University of Hawaii Marine Center's research vessel R/V *Ka'imikai-O-Kanaloa* (for obvious reasons, generally known as "the K-O-K"). As the expedition's base of operations



for the 46 day expedition, the 223 foot ship features all the necessary accommodations and equipment to support the scientific party including a SeaBeam 210 multibeam sonar bathymetric mapping system, state-of-the-art navigation and communications capability, four laboratories, and an electronics shop.

Documentation

Accompanying TIGHAR's Niku III expedition will be a film crew for the award-winning PBS television series NOVA. After a three-month evaluation of TIGHAR's work by NOVA's Science Unit, the decision was made to "produce an independent examination of the Earhart mystery, much like the one we undertook of the Kennedy assassination in 1988. While we plan to look at the whole range of theories about what happened to Earhart and Noonan, we expect a good deal of the program to focus on your expedition and the analysis of any artifacts you find on the island." NOVA's Earhart program is anticipated for the fall of 1997.



The Amelia Earhart Library and Film Festival

Finding Amelia

Listed below are the Earhart-related books and films we know about. Let us know if there are any we've missed. A brief review is provided for those with which we are familiar. Not included in this list are the many books intended for children.

Earhart, Amelia

1929 *20 Hrs. 40 Min.* New York: G. P. Putnam's Sons.

AE's account of the Friendship flight. The title refers to the duration of that flight.

Earhart, Amelia

1932 *The Fun of It.* New York: Brewer, Warren & Putnam.

AE's autobiography (as of her solo Atlantic crossing) and paean to other contemporary female flyers. The title explains why she flies.

Earhart, Amelia

1937 *Last Flight.* New York: Harcourt Brace and Company.

Originally to be titled *World Flight*, this account of Earhart's second and fatal attempt to circle the globe was posthumously assembled, and creatively edited, from notes she had sent home during the trip. Interesting reading, but don't take it all as fact.

Garst, Doris Shannon

1950 *Amelia Earhart: Heroine of the Skies.* New York: Messner.

Howe, James Moore

1950 *Amelia Earhart: Kansas Girl.* New York: Bobbs Merrill.

De Leeuw, Adele Louise

1955 *Story of Amelia Earhart.* New York: Grosset & Dunlap.

Briand, Paul L., Jr.

1960 *Daughter of the Sky.* New York: Duell, Sloan and Pearce.

The very first of the conspiracy books—Amelia flies to Saipan by mistake (a course error of 90°) and is captured by the Japanese.

Morrissey, Muriel Earhart

1963 *Courage is the Price.* Wichita, Kansas: McCormick-Armstrong.

Mrs. Morrissey's account of her sister's life and career.

Goerner, Fred

1966 *The Search for Amelia Earhart.* New York: Doubleday & Co.

A best seller and the most influential of the Earhart books to date. AE was a spy who was captured in the Marshall Islands, imprisoned on Saipan, and died at the hands of the Japanese. Well written. A conspiracy classic.

Dwiggins, Don

1967 *Hollywood Pilot.* New York: Doubleday.

A biography of Paul Mantz with a substantial section devoted to his association with Earhart as her technical advisor. His comment, "She wouldn't listen to Papa" speaks volumes about both Mantz and Earhart.

Burke, John

1970 *Winged Legend—The Story of Amelia Earhart.* London: Arthur Barker.

Klaas, Joe

1970 *Amelia Earhart Lives.* New York: McGraw Hill Book Company.

Pulled from bookstores by the publisher following a lawsuit by the woman Klaas (and sidekick Joe Gervais) said was Amelia Earhart. Best read as fiction if you can find a copy of it.

Pellegrino, Ann Holtgren

1971 *World Flight: The Earhart Trail.* Ames, Iowa: Iowa State University Press.

On the 30th anniversary of Earhart's final flight, the first of many Amelia-wannabes makes it all the way 'round in a Lockheed Electra.

Davidson, Joe

- 1972 *Amelia Earhart Returns from Saipan*. Canton, Ohio: Davidson Publishing Company.

When the name of the author and the publisher match—it's a bad sign.

Davis, Burke

- 1972 *Amelia Earhart*. New York: G. P. Putnam's Sons.

Strippel, Dick

- 1972 *Amelia Earhart: The Myth and the Reality*. Jericho, New York: Exposition Press.

An early, although not very successful, attempt to establish the facts. This backlash against the conspiracy theories has the flight crash at sea.

Carrington, George

- 1977 *Amelia Earhart, A Report*. Vancouver, B.C.: Britnav Services.

Earhart was a spy, flying to Howland and then over Truk and Kwajalein before ditching and being taken in custody by the Japanese who took her to Saipan. Amazing.

Tanous, Peter

- 1978 *The Earhart Mission*. New York: Simon and Schuster. (novel)

Thayer, James Stewart

- 1980 *The Earhart Betrayal*. New York: G.P. Putnam's Sons. (novel)

Backus, Jean L.

- 1982 *Letters From Amelia*. Boston: Bacon Press.

A collection of AE's letters to family, friends and business associates. Provides some fascinating insight into a complex personality.

Knaggs, Oliver

- 1983 *Amelia Earhart: Her Last Flight*. Cape Town, South Africa: Timmins Publishers.

Eyewitnesses around the Pacific clearly remember the lady flyer who was captured by the Japanese.

Loomis, Vincent, with Jeffrey Ethell

- 1985 *Amelia Earhart, The Final Story*. New York: Random House.

Earhart was not a spy, but was mistaken for one when she crashed at Mili Atoll in the Marshalls. Many documents reproduced in appendices, most of which contradict the thesis of the book.

Chadwick, Roxane

- 1987 *Amelia Earhart—Aviation Pioneer*. Minneapolis: Lerner.

Devine, Thomas E., with Richard M. Daley

- 1987 *Eyewitness: The Amelia Earhart Incident*. Frederick, Colorado: Renaissance House.

The U.S. Marines burned Earhart's airplane on Saipan, and Mr. Devine knows it because he saw them do it.

Donahue, J. A.

- 1987 *The Earhart Disappearance—The British Connection*. Terre Haute, Indiana: SunShine House, Inc.

Spies and spies and more spies, spies everywhere you look. The most elaborate plot yet, involving (apparently) everyone within 2,000 miles of Earhart's route.

Morrissey, Muriel Earhart, with Carol Osborne

- 1987 *Amelia, My Courageous Sister*. Santa Clara, California: Osborne Publisher.

Basically a re-issue of *Courage is the Price* with many original documents reproduced.

Brennan, T. C. "Buddy"

- 1988 *Witness to the Execution: The Odyssey of Amelia Earhart*. Frederick, Colorado: Renaissance House.

More spies. Backhoe archaeology on Saipan unearths the actual blindfold ripped from Amelia's eyes before she was executed. (We usually leave the blindfold on.) A video is available complete with witness interviews.

Lovell, Mary S.

- 1989 *The Sound of Wings*. New York: St. Martin's Press.

Close—but no cigar. The best of the biographies to date. Generally well researched and extensively footnoted, Lovell does fine until she tries to deal with the disappearance. Her support of the crashed-and-sank theory is based upon opinion presented as fact and facts that are not true.

Rich, Doris L.

- 1989 *Amelia Earhart, A Biography*. Washington, D.C.: Smithsonian Institution Press.

An endorsement by the Smithsonian doesn't excuse rumor and speculation presented as truth. Poorly footnoted and often just plain wrong.

Keyzer-Andre, Henri

- 1993 *Age of Heroes*. Mamaroneck, New York: Hastings House.

The nonsensical autobiography of a self-aggrandizing character who claims to have seen Japanese documents proving that the Zero was based upon Amelia's captured Electra.

Brink, Randall

1994 *Lost Star*. New York: W.W. Norton Co.

Perhaps the most disingenuous of the conspiracy books. Shopworn and thoroughly discredited speculation presented as new evidence.

Wilson, Donald Moyer

1994 *Amelia Earhart: Lost Legend*. Webster, New York: Enigma Press.

A festival of folklore. They're all here, the eyewitnesses who saw the lady flyer captured, imprisoned, or executed by the Japanese and the American veterans who found AE's suitcase, briefcase, diary, etc.

Roessler, Walter & Leo Ganz

1995 *Amelia Earhart—Case Closed?* Hummelstown, Pennsylvania: Aviation Publishers.

Never put a question mark in a book's title. Crashed-and-sank speculation based upon bad information and unwarranted assumption.

Mendelsohn, Jane

1996 *I Was Amelia Earhart*. New York: Alfred A. Knopf, Inc. (novel)

See review next page.

Anderson, Alison

1996 *Hidden Latitudes*. New York: Scribner (novel)

See review next page.

Film Reviews by Russ Matthews, TIGHAR #0509CE

Flight for Freedom. Feature film, 1943. The story of how famous American aviatrix, Tonie Carter (a transparently fictionalized Earhart), gallantly gave her life to aid U.S. war preparations. It is almost certainly the root of countless Amelia sightings throughout the Pacific Theater. The film is best viewed now as a clever piece of war propaganda and for its revelation that everyone of Japanese descent is a spy. 🐾🐾

Amelia Earhart. Made for TV, 1976. A comprehensive two-part miniseries comprised mainly of vignettes from the life of St. Amelia. The film shows notable restraint in dramatizing the disappearance with an Itasca-centric point of view, yet throws in an (unconsummated) affair with Paul Mantz. 🐾🐾

Amelia Earhart: The Final Flight. Made for cable TV, 1994. The filmmakers actually remained faithful to their source material here—which, unfortunately, turns out to be Doris Rich's error-strewn *Amelia Earhart: A Biography*. The choice of ample, blonde Dutchman Rutger Hauer to play the role of lanky, dark-haired Irishman Fred Noonan serves as a fitting example of why *Final Flight* is the most casting-challenged production of them all. 🐾

Untold Stories: The Search for Amelia Earhart. 1992. Television documentary, NBC News Productions. Hosted by Lindsay Wagner and Boyd Matson. Well, what can we say? A combination of Earhart biography and

the 1991 TIGHAR expedition. It could have been worse. 🐾🐾

Amelia Earhart: The Price of Courage. Television documentary, 1993. aired on PBS as part of "The American Experience." Narrated by Kathy Bates. Hatchet job on GP, with episodes from Amelia's life made up out of whole cloth. Who says if it's on PBS it has to be good? 🐾

In addition to these monuments to the art of film, a variety of TV shows have featured episodes on Amelia through the decades:

"In Search of...Amelia Earhart." Episode of television series "In Search of..." Hosted by Leonard Nimoy. 1970s.

"Unsolved Mysteries" segment, hosted by Robert Stack. 1980s.

"Biography" Episode, narrated by Mike Wallace. 1960s.

"Secrets and Mysteries: Amelia Earhart" episode, hosted by Edward Mulhare. 1990s.

"American Women of Achievement," short film for school use. 1990s.

"The '37-ers," Star Trek: Voyager episode, starring Sharon Lawrence as Amelia Earhart. 1995.

"Amelia Earhart." A&E Biography episode, 1996.

NO YOU WEREN'T

I Was Amelia Earhart by Jane Mendelsohn. Alfred A. Knopf, 1996. 146 pp., \$18.00 (hardcover). Reviewed by Phil Scott.

Poor Amelia Earhart. Ever since she disappeared, her soul has had to endure the torment of a rash of nonfiction works proposing to solve the mystery once and for all. And now this overheated, overbearing, over-praised novel joins them. Author Jane Mendelsohn's Earhart is dark, brooding, and afflicted with a death wish; then, when she and navigator Fred Noonan crash-land on a desert island, the situation deteriorates into a cross between Gilligan's Island and a middleaged *Blue Lagoon*. Personally, I was hoping more for *Lord of the Flies*.

This book has it all, even a convincing argument against reincarnation. There is foreshadowing troweled on thicker than adobe, though only the densest reader wouldn't have a clue about Earhart's fate. There is also a pretentious, phony-profound solemnity reminiscent of a sophomore fiction writing class, plus reams of torrid prose: "I watch the sky as it curves and swells ... voluptuous, sultry in the naked heat, it seems to me to be the flesh of a woman." Gee, why hasn't it ever been like that for me?

As mercifully short as it is, by page 20 I had the distinct impression that the book was already too long. And lest I lose myself in a diatribe on the prose alone, there are some interesting technical errors that made me chuckle when I suppose I should have been breaking into a cold sweat. With a heroic abandon last displayed by Walter Mitty, Mendelsohn has a lost and thirsty Amelia tapping a "dial" and crashing a trainer when the "engine" stalls. A real pilot might call those complicated-looking thingies "instruments," and would probably know that it's the airplane's wing that stalls, not its engine (of which a Lockheed Electra always has two). If you really are Amelia Earhart, Mendelsohn, it's no wonder you got lost.

—Phil Scott's most recent book is *The Shoulders of Giants, A History of Human Flight* from 1919. This review originally appeared in the August/September issue of *Air & Space Smithsonian*. Thanks for letting us run it here, Phil.

Special thanks to David Clark for the cartoon at right. All rights reserved, used by permission.

Hidden Platitudes

Hidden Latitudes by Alison Anderson. Scribner, 1996. 221 pp., \$21.00 (hardcover). Reviewed by Pat Thrasher.

Published back-to-back with *I Was Amelia Earhart*, a comparison between these two books is inevitable, however odious. *Hidden Latitudes* has some distinct advantages over IWAE. For instance, it has a plot. And the author carefully steers clear of any subject which requires even a smattering of aviation knowledge. Also, it is written in plain English rather than Sophomore Artsy. Mostly.

It does feature the apparently obligatory affair between Fred and AE on the remote desert island, with the additional fillip of a baby (lost, of course, to premature birth/miscarriage). Ah, but is it really Fred and AE? We are not to know for sure (this is the High Art part): "My own tale does not in any way attempt to establish or suggest what happened to Earhart and Noonan—if indeed the woman on the island is Earhart. That I leave up to the reader to decide." Well, given that the woman tells of flying her Electra across the Pacific, and places herself last in civilization sometime before World War II, and has a male navigator who drinks (!), and is on an island in Kiribati—oh, forget it.

The most interesting thing about *Hidden Latitudes* is the jacket photo. While fancied up with art effects, it is still clearly a photo of Nikumaroro. In fact, there is a slide in TIGHAR's collection which matches it. I know. I took the photo.



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