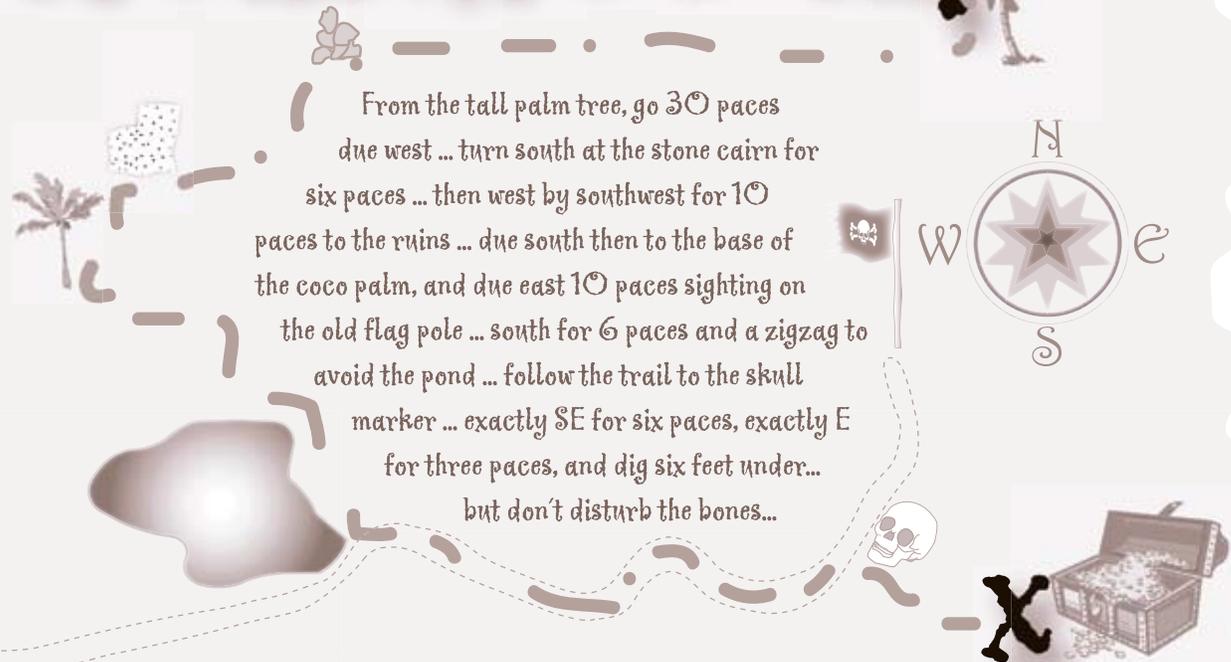


TIGHAR Tracks



A Publication of The International Group for Historic Aircraft Recovery
TIGHAR · 2812 Fawkes Drive · Wilmington, DE 19808 · USA · www.tighar.org

Treasure Map



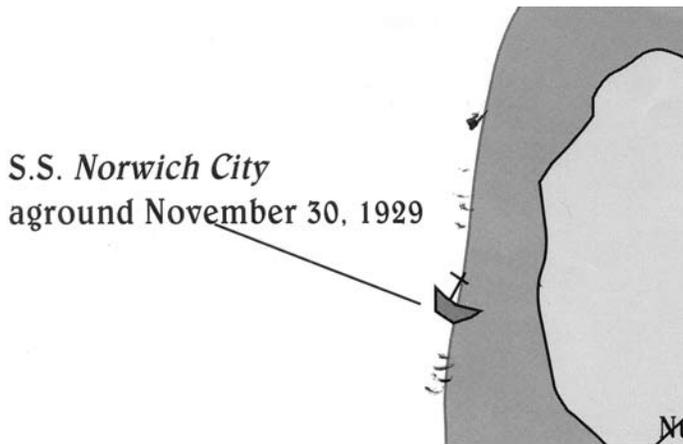
Recent analysis of the satellite imagery (see "To Look Down Like a Frigate Bird," *TIGHAR Tracks*, May 2001) and historical photos of Nikumaroro has raised the possibility that the aircraft wreckage on the reef supposedly seen by Emily Sikuli (see *TIGHAR Tracks* Vol. 15, page 25, "The Carpenter's Daughter") may still be right where she saw it.

In 1999 Emily told us of seeing debris on the reef at Nikumaroro in 1940 or '41 which her father, the island carpenter, told her was the wreckage of an airplane. Her story was particularly interesting to us because the general location she described, the reef-flat off the western end of the atoll, was where a variety of other anecdotes and evidence

had already led us to suspect that the Earhart airplane had been landed and subsequently destroyed by the surf.

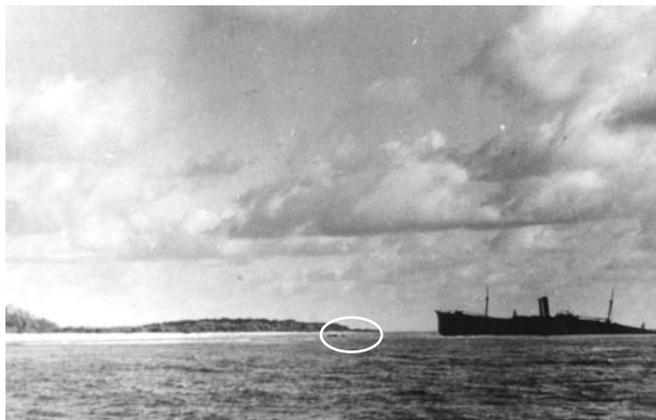
Emily was quite specific about what she saw and where she saw it. She spoke of a red, rusty object which she estimated to be about 12 feet long with a large round shape at one end. She said that it was out at the reef edge "where the waves break" and that it was about 300 feet north of the wreck of the S.S. *Norwich City*. The wreckage, she said was in very bad condition and could only be seen at low tide (see marked map next page).

Looking for possible photographic corroboration, we examined a photo of that part of the reef taken by British Colonial Officer



This is the map Emily marked for us during her interview. The darker, larger mark farthest north is her mark. The smaller marks were made to show her where the surf breaks.

Eric Bevington during a visit to the island in October 1937. There, a few yards ahead of the bow of the *Norwich City*, could be seen some kind of debris on the reef which seemed to match Emily’s description. Another photo, this one taken in 1939 by the New Zealand survey party, showed something on the reef that might be the same feature.



Eric Bevington took this photograph in October 1937. Photo courtesy E. Bevington.

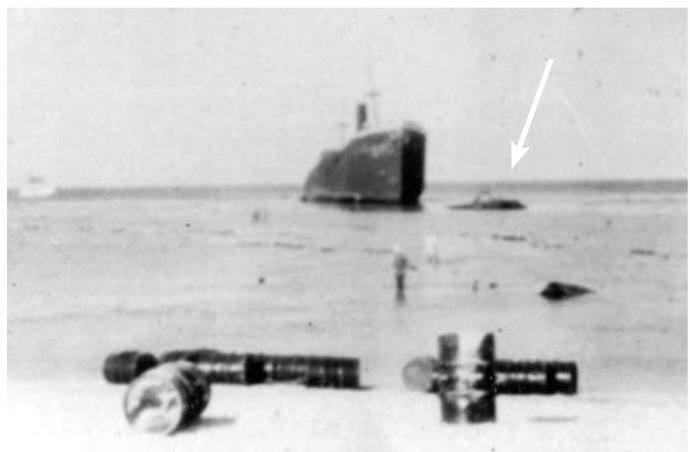


The New Zealand survey party took this photograph in December, 1938. Photo courtesy Wigram Air Force Museum, New Zealand.

The question of whether the features in the Bevington and New Zealand photos could be Emily’s Object relied upon determining just *where* on the reef the feature was. Jeff Glickman at Photek spotted a chunk of something on the reef not far from the bow of the *Norwich City* in a 1938 aerial photo taken immediately prior to the New Zealand survey. Photos taken by the Kiwis on the ground during that survey show that chunk to be a slab of hull plating from the shipwreck.



The 1938 aerial photo and the Kiwi detail photo. Photos courtesy Wigram Air Force Museum, New Zealand.

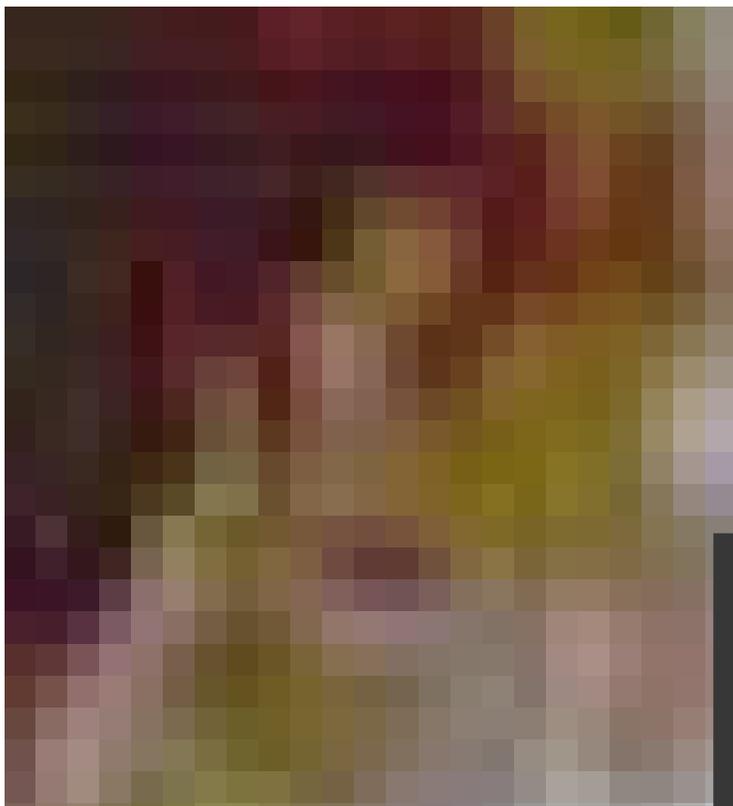


The feature in the Bevington photo was in that same location. Clearly this was not corroboration of Emily’s story.

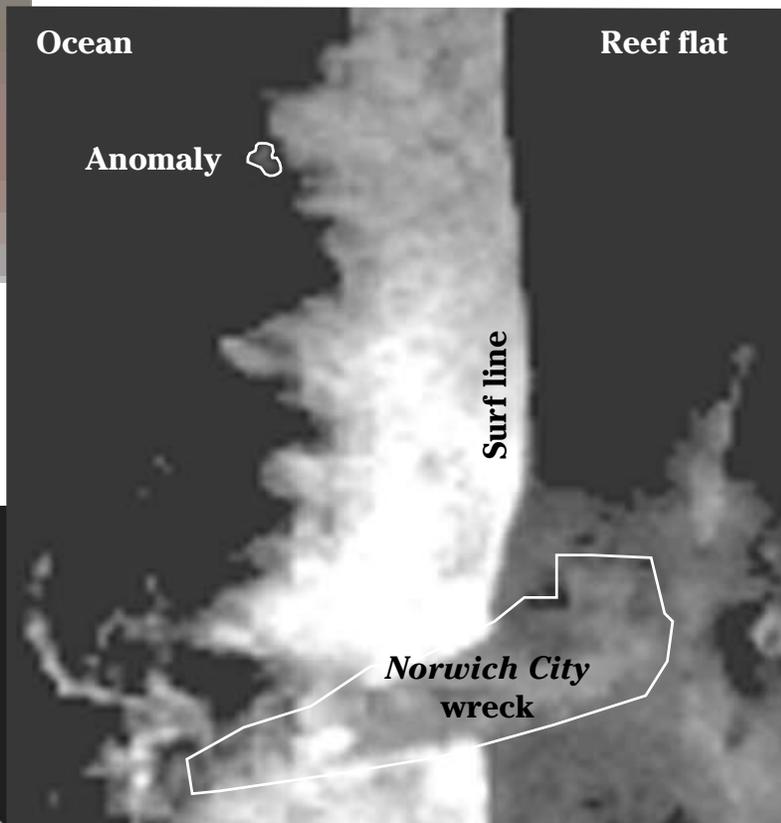
The first photographic clue that Emily’s Object might still be there came on May 11th of this year when Dr. John Pratt (TIGHAR #2373), in looking closely at the color satellite imagery, noticed a couple of anomalous rust-colored pixels at the reef edge about 60 meters (200 feet) north of the shipwreck. They are behind the surf line and were, therefore, under water at the moment the imagery was acquired (see top of page 3).

Interpreting a digital image at the very threshold of its resolution is always dangerous

and it's hard to know if one or two odd pixels represent "noise" in the image or an actual "thing" on the ground. In the color satellite image each pixel is a square four meters (13.1 feet) on each side but its color is influenced by the pixels bordering it, each of which is influenced in turn by other bordering pixels, and so on. On the face of it, two rust-colored pixels would seem to suggest a rust-colored object eight meters (26.2 feet) long and four meters (13.1 feet) wide but that is very deceiving. The object or feature could easily be much



These three images are (above) the four meter resolution color satellite photo; (right) the one meter resolution panchromatic photo; and (below) a reduced image of the entire island, showing where the anomalous pixels are located.



shorter and/or narrower and of sufficient color intensity to dominate the pixels. The color, too, is an average of what the satellite's digital sensor sensed. For example, a four-meter area that was half red and half white would produce a pink pixel, but so would a four-meter pink area. In this case, the particular color of the pixels is unlike any of the known "noise" in the image and unlike anything on shore. The closest similarity is to some parts of the *Norwich City* and a couple of unidentified features in the water off the edge of the reef at the southeast end of the island. This is the same area where barrels of diesel fuel were floated ashore to resupply the U.S. Coast Guard Loran station during World War Two, so it may be that we're seeing steel drums that were holed on the reef edge and sank there.

The panchromatic (black and white) satellite imagery that was acquired simultaneously with the multispectral (color) imagery is much "tighter," with a single pixel representing one

meter on each side, but again, each pixel is influenced by its neighbors. Although the panchromatic picture presents more detail, it does not penetrate the water nearly as well as the blue/green band of the multispectral image. Looking in the same spot as the maverick pixels in the color image, we see five pixels in the panchromatic image that appear to be distinct from the background and the surf.

The implication is that there is something there that is roughly three meters (10 feet) long and variously one to two meters wide, but again, that can be deceiving. About all we can say is that the feature is present in both images and seems to be larger in the color image than in the black and white—which may suggest that we're seeing more of it in the color image because of the better water penetration.



Norwich City debris field in 1985.

Norwich City debris field in 1999.



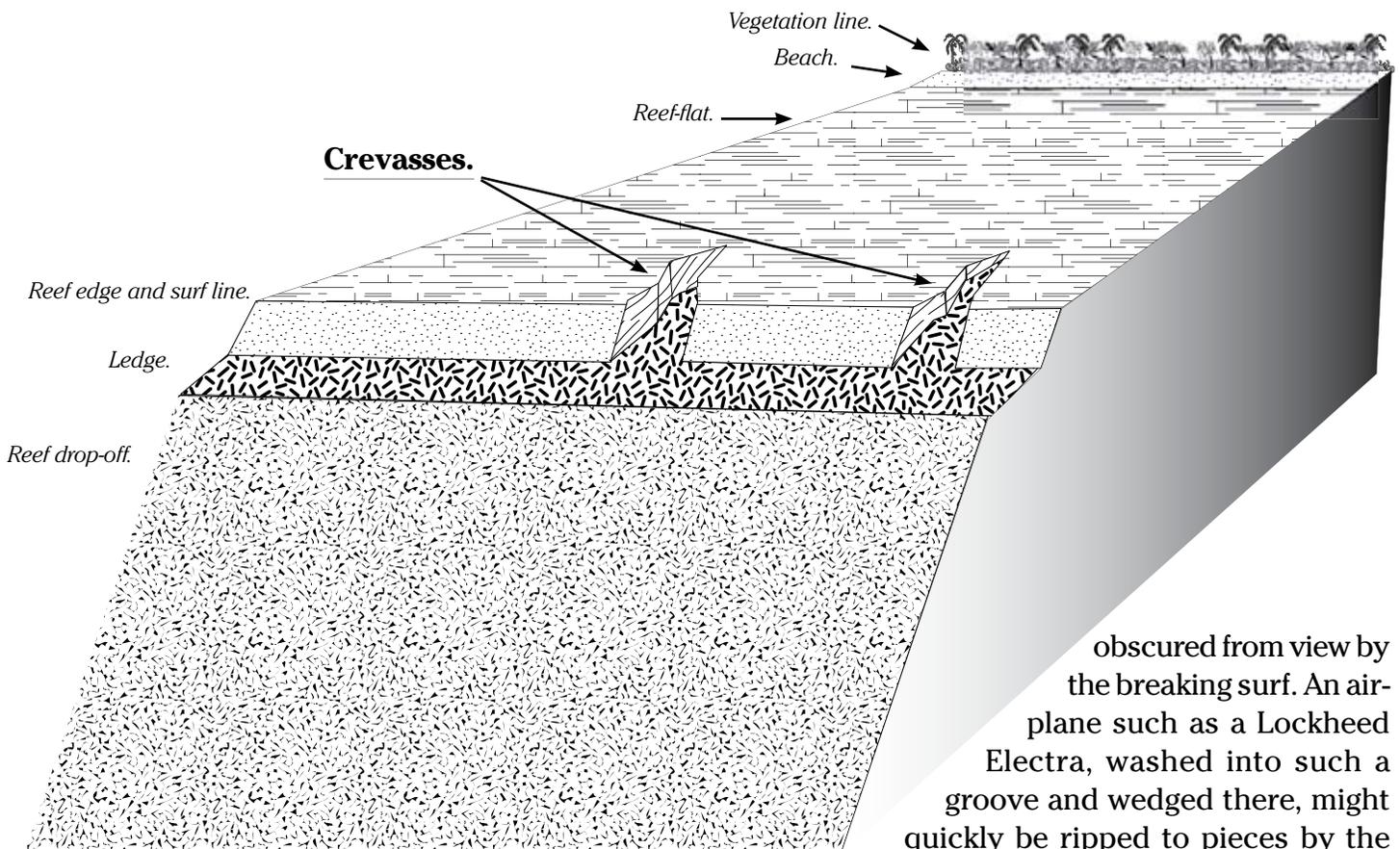
Photo courtesy R. Gifford.

A rust-colored something-or-other on the reef so close to the *Norwich City* might logically be thought to be shipwreck debris, except it's in the wrong place. For most of the year the weather at Nikumaroro comes out of the east and is relatively benign, but from November until April (as we learned to our regret in 1997) immense "westerly" swells sometimes

TIGHAR photos show that between 1989 and 1991 this tank moved approximately 100 meters.



Photo courtesy R. Gifford.



obscured from view by the breaking surf. An airplane such as a Lockheed Electra, washed into such a groove and wedged there, might quickly be ripped to pieces by the

pounding waves, its fragile aluminum structure strewn across the reef flat, leaving only its steel components – engines, engine mounts, landing gear legs, landing gear actuating rods, etc. – behind.

Such a scenario does, in fact, fit the anecdotal, photographic, and artifactual evidence gathered by TIGHAR in the course of our thirteen year investigation.

Another fact that appears obvious from the example of the *Norwich City* is that the ocean is capable of exerting tremendous force against the atoll's western reef. Chunks of the freighter weighing several tons have been moved hundreds of meters by the crashing waves. If Emily's Object was wreckage from the Earhart airplane how could it possibly have remained stationary in such a dynamic environment for three years, let alone still be there now? The only reasonable possibility is that it was jammed in one of the jagged canyons found along the reef edge. Known as "spur and groove" features, these crevasses are typical of coral reef morphology and were originally caused by erosion when the ocean's water level was lower.

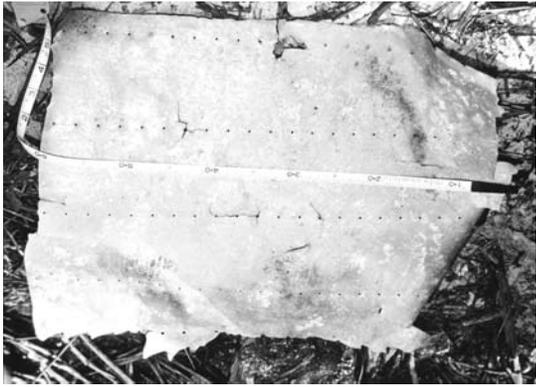
Such a scenario does, in fact, fit the anecdotal, photographic, and artifactual evidence gathered by TIGHAR in the course of our thirteen year investigation.

Anecdotal:

In 1997, Tapania Taeke told us of seeing "part of a wing" on the reef flat southwest of the *Norwich City* in the late 1950s.

Photographic:

Photek's forensic analysis of two separate 1953 aerial photographs identified four small (one or two meters on a side) light-colored objects on the reef flat southwest of the *Norwich City*. In one photo, one of the objects is exhibiting a specular reflection of sunlight, indicating that it is probably metal. There should be no light-colored, reflective metal debris from the shipwreck.



Artifact 2-2-V-1, aluminum aircraft skin, showing damage consistent with having been blown out from an aircraft by water.

Artifactual:

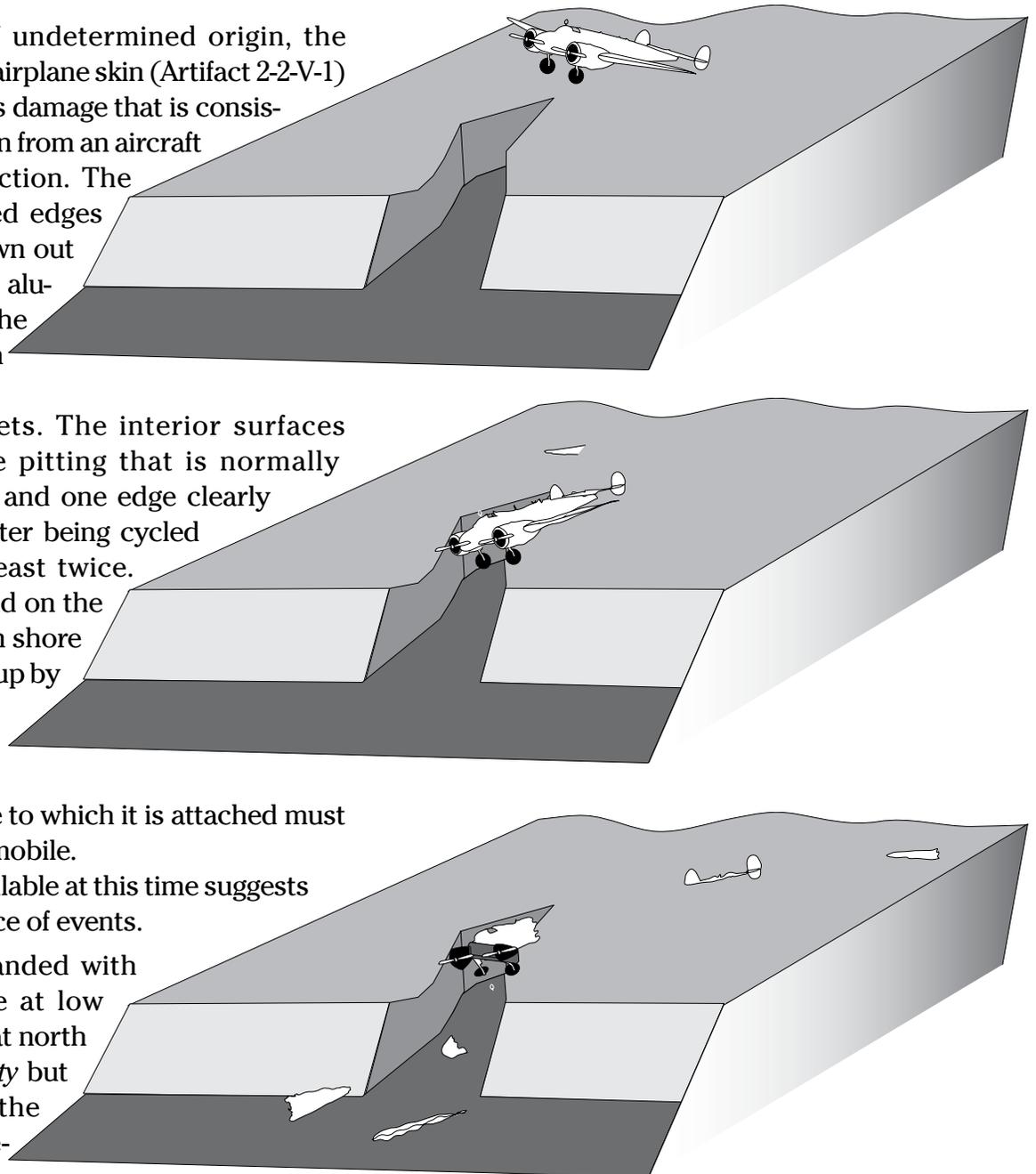
Although still of undetermined origin, the section of aluminum airplane skin (Artifact 2-2-V-1) found in 1991 exhibits damage that is consistent with its being torn from an aircraft by powerful surf action. The piece has no finished edges and was literally blown out of a larger section of aluminum sheet from the inside out with such force that the heads popped off the rivets. The interior surfaces exhibit none of the pitting that is normally left by an explosion and one edge clearly failed from fatigue after being cycled back and forth at least twice. The artifact was found on the island's southwestern shore in the debris washed up by a violent storm. In order for a section of skin to fail in this way, the airframe to which it is attached must be held relatively immobile.

The evidence available at this time suggests the following sequence of events.

1. The aircraft is landed with minimal damage at low tide on the reef flat north of the *Norwich City* but irregularities in the reef surface prevent the airplane from being taxied

to a safer location. Over the next few days the tide rises and falls but calm seas leave the aircraft relatively undisturbed permitting the sending of radio distress calls.

2. On or about July 5th increasing swells and rising surf on the reef force the crew to abandon the aircraft and seek shelter ashore. The waves wash the buoyant *Electra* back and forth until it falls into a groove feature near the reef edge and becomes jammed there.
3. Held immobile by the coral, the *Lockheed* is quickly ripped apart by the crashing surf. Some



parts are pulled out and over the steep reef slope while others are scattered shoreward across the reef flat. The massive main beam, with engines and landing gear attached at each end, remains wedged in the reef groove.

Oddly enough, this is very similar to the theory advanced by Coast Guard veteran Floyd Kilts in 1960 when he told a San Diego newspaper

reporter the story he had heard from the settlers on Gardner Island in 1946 about bones and shoes being found on the island. Whether it is the long-sought answer to what really happened to the lost Lockheed remains to be seen, but we certainly plan to test the hypothesis when we're there in September.

Why Are We Telling You This?

If our speculation is correct, the information and illustrations in this newsletter provide a veritable treasure map to the location of the remains of Amelia Earhart's lost aircraft. Are we nuts to make this information public? We don't think so.

First of all we think that you, the members of TIGHAR – the people who are making this investigation possible – have a right to know the results of the research you are funding.

Second, it's still just a hypothesis. Looks good to us but, heck, each time we've gone to Nikumaroro (five times so far) we've had a theory about where we should look for the airplane, and each time we've been wrong.

Third, even if someone with lots of money and no ethics were convinced that we finally had the answer, it would be extremely difficult to get there ahead of us.

Fourth, we've always said that the point of the project is the development and demonstration of sound historical investigative methodology. That purpose is not served by secrecy. Our failures are as important as our successes because they're an inevitable part of the process.

And finally, if it turns out that we're right, we'd rather that everyone know that we figured it out instead of just getting lucky.

Niku, Niku on the wall,
Fairest island of them all...

TIGHAR members who have made a contribution of \$100 toward the acquisition and analysis of satellite imagery of Nikumaroro have been delighted with the 8"x10" color print they have received in appreciation. Many report that they've framed the photo and hung it on the wall. Their contributions, generously matched by Jim Thompson (TIGHAR #2185) of Select GIS Services, have more than covered the cost of the imagery and we can now apply further contributions to the cost of forensic analysis and processing of the data to be sure we get the maximum benefit from it.

Please note that copyright restrictions prevent us from releasing the raw data for amateur analysis but we can guarantee that you'll be hearing a lot about the results of the professional work being done.

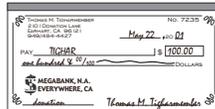
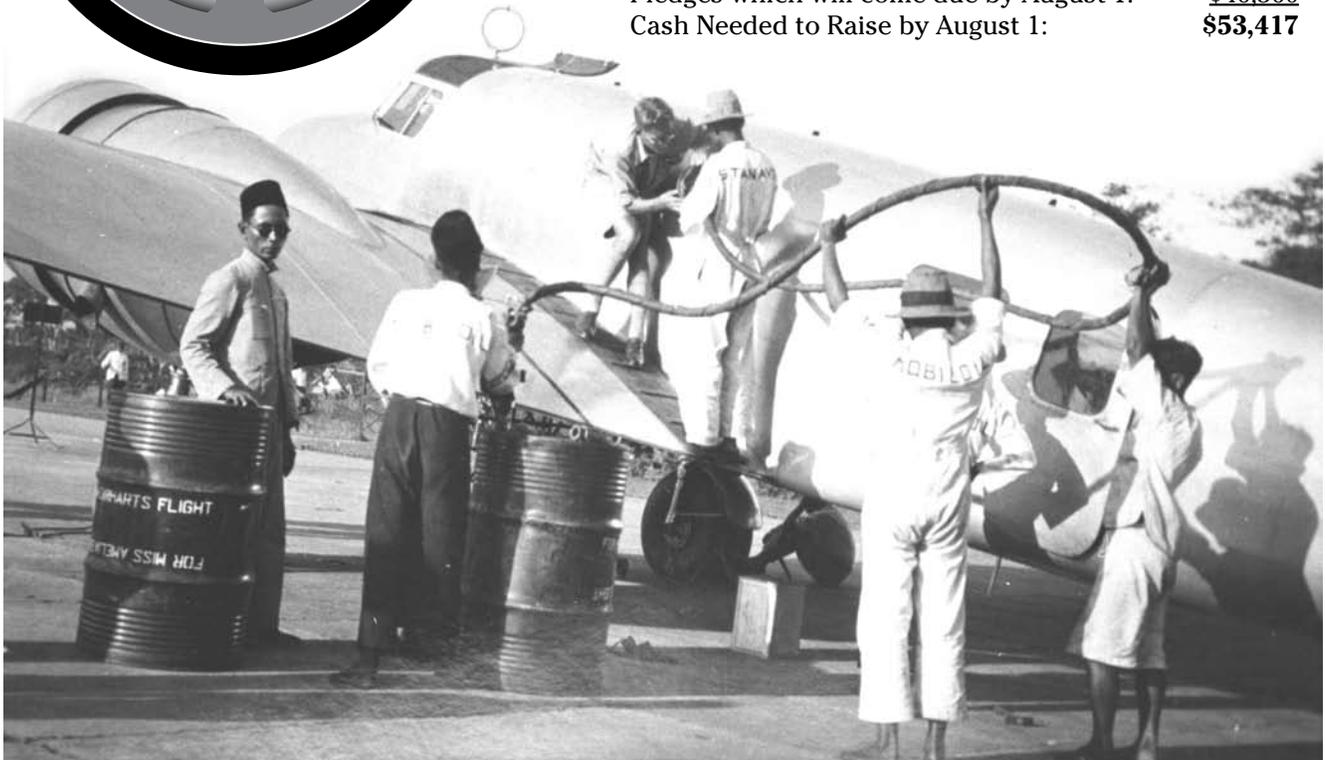
Please use the form on the back of this *TIGHAR Tracks* to make your contribution today.

Topping Off the Tanks



Original Budget for Niku III:	\$500,000
Budget Extras:	
Satellite Imagery	\$3,000
Tarawa trip	\$4,000
Ten extra days of ship charter	\$50,000
Total Budget	\$557,000
Pledges of Support Received:	<u>\$401,800</u>
Balance to Raise	\$155,200

Cash in Hand Needed by August 1:	\$450,000
Cash in Hand to Date:	\$350,223
Pledges which will come due by August 1:	<u>\$46,360</u>
Cash Needed to Raise by August 1:	\$53,417



Please send me a copy (approximately 8"x10") of the SpacelMaging satellite photograph of Nikumaroro. I enclose my donation for \$100.

Name _____

Address _____

Daytime telephone _____

Email _____

Credit card # _____

Expiration date _____