

The Archaeological Context of the 1940 Nikumaroro Bones Discovery

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November, 2017

Introduction

In 1940, colonists on Nikumaroro Atoll in the Phoenix Islands discovered a human cranium on the southeast end of the island. They buried the cranium, but Gerald Gallagher, Administrator of the Phoenix Islands Settlement Scheme under which the island was being prepared for settlement, became aware of the discovery and recovered twelve additional bones¹ and various artifacts, which he sent (along with the cranium, which he had excavated) to the headquarters of the Western Pacific High Commission (WPHC) in Fiji. The bones and artifacts all went missing during World War II, but not before the bones had been measured and commented upon by Dr. David Hoodless, then Principal of the Central Medical School for the Colony of Fiji. Correspondence and internal WPHC memoranda about the bones discovery (which we colloquially refer to as “the bones papers”) were discovered in 1997 in the Kiribati National Archives by historian Peter MacQuarrie, and substantially augmented by TIGHAR discoveries in the WPHC archives then on file at Hanslope Park in England.²

In a 1998 paper, physical anthropologists Karen Burns and Richard Jantz, with input from Richard Gillespie and me, concluded that the bones discovered in 1940 may quite likely have been those of Amelia Earhart.³ In a 2015 paper,⁴ Pamela Cross and Richard Wright have dismissed this conclusion.

The purpose of the paper presented here is to outline the archaeological background to Gillespie’s and Jantz’s discussions.

Where Were the Bones Found?

Gallagher’s 17th October 1940 telegram reports that the bones were found “on South East corner of island,” under a “ren” tree⁵ (*Tournefortia argentia*). His reports provide no further detail other than distance from the high tide line, but he was directed to make an “organised search” of the area. A 1941 U.S. Navy airphoto shows that vegetation had been cleared near the island’s southeast end – an activity that would most likely be a necessary part of what Gallagher described as an intensive search⁶ – adjacent to an unvegetated linear feature shaped like the numeral seven. This feature is stable, appearing in multiple aerial and satellite images through the years. This made the location imaged in 1941 fairly easy to find.

In 1996 TIGHAR researchers performed an initial survey of the site, which we call the “Seven Site” because of the adjacent natural clearing. Noting only bird bones, a hole in the ground, and surface artifacts easily attributable to the 1939-63 colonists and the 1944-46 Coast Guardsmen, TIGHAR did no further work there at the time

Some months later, in 1997, historian Peter McQuarrie found the documents surrounding the 1940 bones discovery; this, of course, drew our attention back to the Seven Site, leading to four episodes of archaeological work there. In 2017, forensic dogs alerted on the ground under a fallen Ren tree (see below) and nowhere else in the vicinity,⁷ strongly suggesting that the tree we call “the Big Ren,” or a previous tree at the same location, was the site of the bones discovery.

**I’m grateful to Ric Gillespie and Joe Cerniglia for critical comments on drafts of this paper; all responsibility for errors and omissions is mine, however.*

Artifacts Associated with the Bones

Statements by Gallagher, Dr. K.R. Steenson and others in the bones papers⁸ indicate that the following artifacts were found in association with the bones:

- A Benedictine bottle;
- Parts of a woman's and man's shoes;
- Small corks on chains;
- Part of a sextant's inverting eyepiece; and
- A sextant box, wooden, with dovetailed corners, inscribed with the numbers 3500 and 1542.

All of these artifacts have been lost, and none is documented as having received much attention by the WPHC, with the exception of the sextant box.

The sextant box was examined by Cdr. G.B. Nasmyth and Harold Gatty, the latter a world famous aerial navigator then organizing commercial aviation operations in the Pacific. Gatty thought the box was English and had most recently been used simply as a container. Gallagher had identified the box as being for an "old fashioned" sextant "probably painted over with black enamel." Perhaps because celestial observations from aircraft were made using

a bubble octant rather than an old fashioned mariner's sextant, Gatty opined that the box would not have contained an instrument used in trans-oceanic aeronautical navigation.⁹ Although Gallagher reported the box to be marked with numbers, Nasmyth noted "no distinguishing marks" and said only that the dovetailed corners suggested French origin.

TIGHAR research into the numbers on the sextant box leave little doubt that it was for a Navy Surveying Sextant manufactured by Brandis & Sons of Brooklyn, New York. The 3500 is apparently the maker's number, while the 1542 was likely inscribed on the instrument and noted on its box when it was inspected at the U.S. Naval Observatory. Brandis boxes have dovetailed corners. A large number of Brandis sextants were acquired by the U.S. Navy toward the end of World War I, and disposed of as surplus thereafter. Some were modified for aeronautical use. Earhart's navigator, Fred Noonan, reportedly used a nautical sextant as a "preventer" (backup) instrument when navigating for Pan American on its Pacific routes, and a photo of the navigation room in a Pan Am Clipper on which Noonan served shows a Brandis sextant box.¹⁰

Archaeological and Oral Historical Work Pertaining to the Seven Site

In 1996, 2001, 2007, 2010 and 2017 we conducted archaeological surface survey and excavations at the Seven Site. In 2011 a TIGHAR team visited veterans of the Nikumaroro colony now living in the Solomon Islands and collected oral historical information on uses of the site. A comprehensive report on Seven Site archaeology is in preparation.

Summary of Research Results to Date

In summary, there is archaeological and oral historical evidence of human activity at the site during four time periods:

Before 1940, when a castaway may have lived and died there;

*In 1940-41, when Gallagher and the colonists searched the site, likely in the context of logging its valuable Kanawa (*Cordia subcordata*) hardwood and preparing the site for coconut planting;*

In 1944-46, when U.S. Coast Guardsmen from the nearby long range radio navigation (LORAN) station appear to have hunted birds and conducted target practice at and around the site; and

Sporadically from around 1941 through the 1950s, when the area was cleared and planted in coconuts, and young men from the colonial village occasionally camped there while hunting birds and turtles.

These sequential activities have created a complicated archaeological record, made more difficult to interpret by the fact that there is virtually no soil at the Seven Site within which stratigraphy can develop. Almost everything from all four phases of human activity occurs in the uppermost ten centimeters of the coral rubble that makes up the site.

Analysis of the Seven Site is not yet complete,¹¹ but we can say the following with some confidence about the pre-1940 “castaway” period:

- Someone ignited and maintained four substantial campfires, presumably in sequence, scattered over an area of about 1100 square meters. There are other smaller, more ephemeral campfire sites that we think most likely reflect episodic use of the site during the 1941-63 period.
- The four major campfire sites contain varying quantities of fish, bird, and turtle bones.
- The fish bones appear to represent an unselected sample of reef species, suggesting to us that the camper was catching whatever he or she could catch – unlike what could be expected of island people with greater knowledge of the reef. The camper apparently

removed the fish heads before cooking, unlike island people who value and consume fish heads (Jones 2011).

- The bird bones represent species readily available on and around the Seven Site – boobies and frigate birds (Collins 2011). Whoever caught them apparently skinned them – a behavior reported by colonial veterans in the Solomon Islands but also employed in preparing fowl in the United States.¹²
- Turtle bones include parts of the carapace and plastron, probably representing one adult sea turtle (Hutchison 2011), and long bones from several infantile turtles (Jones 2011). Island people on the whole do not eat baby turtles.

The Seven Site also contained two ca. 2m² concentrations of *Tridacna* sp. (“giant”) clam shells, one representing seventeen clams, the other nineteen.¹³ In one deposit, adjacent to a campfire feature, the valves are undamaged, as though they were opened simply by exposing them to heat. In the other, the “lips” of several valves are damaged, apparently by the forceful insertion of a small wedge found nearby, fashioned from the rim of a steel barrel. Some have been smashed open with rocks. This is very atypical of island people, who know how to harvest *Tridacna* clams by quickly cutting their adductor muscles while they are filter-feeding in the lagoon or on the reef, then cutting out the meat and leaving the valves behind. If they do bring a complete *Tridacna* ashore, they know that simple exposure to the heat of the sun or a fire will cause its valves to open.

We recovered (or recorded and left in place) a diverse range of artifacts at the Seven Site. The most prominent were many sheets of corrugated iron, rusted into tiny pieces, which we think were associated either with clearing the site in 1940-41 (perhaps for skidding logs down to the lagoon) or with post-war development of the site for coconuts. The most common artifacts are cartridges and occasional spent slugs from M-1 carbines, carried by the U.S. Coast Guardsmen. A few .22 caliber rounds were found, perhaps from a pistol that Gallagher is recorded as having owned. Most interesting from the standpoint of identifying the castaway who presumably lived and died at the site are:

- Two broken, partially melted bottles apparently dating to before World War II, found in one of the campfire features, which appear to have shattered while standing upright in the fire; we suspect that they represent an attempt to boil water. One bottle was most likely made to contain St. Joseph Liniment or St. Joseph Penetro (cough syrup) while the other was a returnable U.S. beer bottle probably manufactured prior to World War II.¹⁴
 - In the same campfire feature, both halves of a snap fastener consistent with those on a Burroughs Wellcome & Co. wooden “Tabloid” first aid kit; a “Tabloid” kit is documented to have been aboard Earhart’s Electra on the first World Flight.¹⁵
 - Two adjoining fragments of a piece of thin beveled glass, almost certainly from a mirror, several fragments of red material chemically consistent with early 20th century rouge, and some tiny fragments of ferrous metal, all of which we interpret as the collective remains of a woman’s compact, similar in shape and size to an object shown in Earhart’s hands in two contemporary photographs (See King 2012);
 - A small footed jar that contained a mercury-based product, similar to jars containing mercury-based ointment used in the early 20th century to fade freckles (Earhart had freckles) (See Cerniglia et al n.d.);
 - A fragment of a Mennen bottle, probably once containing skin lotion;
 - The base of a skin or hair lotion bottle whose base code indicates it was manufactured by Owens-Illinois at Plant 14 in Bridgeton, New Jersey (See Cerniglia 2012);
 - A bone-handled, double-bladed jackknife, manufactured by the Imperial Cutlery Company of Providence, Rhode Island sometime between 1930 and 1945, apparently disassembled to remove the blades, possibly for use in fashioning a spear.¹⁶ A similar but not identical knife is recorded as having been aboard Earhart’s Electra after its accident in Hawaii during the first World Flight attempt;
 - A zipper pull, made by the U.S. based Talon company and reliably dated to not earlier than 1933 and not later than 1936;¹⁷ Earhart wore zippered slacks, and carried at least one zippered bag in the Electra; and
 - A tiny piece of aluminum foil with lettering on it that, while sparse, is consistent with that of an American signal torch, and whose unmarked side exhibits traces of sulfur (67%), silicon, zinc and iron consistent with flammable black powder.
- Other artifacts, such as several leads for a mechanical pencil, what may be the remains of a hair-curling iron, the probable remnants of a flashlight battery, and many, many tiny fragments of thin ferrous metal, remain in analysis.
- Finally, in 2010 we recovered a single phalanx (finger/toe bone) from a spot under the Big Ren. The University of Oklahoma DNA laboratory was unable to extract usable DNA for analysis in 2010, so at present even species identification is uncertain. It could have been the phalanx of a sea turtle (though we have found no other adult sea turtle bones at the Seven Site other than those of the carapace and plastron) or of a dolphin (though we have found no other dolphin bones at the site). This bone is currently awaiting further analysis.
- In 2015 Dawn Johnson retrieved samples of the coral rubble “soil” at the base of the Big Ren. These were subjected to controlled inspection by highly trained forensic dogs employed by the Institute for Canine Forensics (ICF).¹⁸ Dogs alerted on two of the samples, indicating that they sensed an association with human remains. This fortified our impression that the area around the Big Ren is where the bones were found in 1940, and helped motivate the National Geographic Society to support the 2017 work in which ICF canines alerted repeatedly under the Big Ren. Soil samples from alert sites are currently under analysis.
- Of course, there are multiple ways to account for the artifacts, bones, shells and fire features that make up the Seven Site, but one of the more efficient plausible hypotheses is that a woman from the United States lived and died there in the late 1930s, after which several other uses of the site complicated the evidence left by her presence and passing.

Notes

- 1 Mandible with 5 teeth in place (one of which was apparently lost before examination in Fiji); partial right scapula; first thoracic vertebra; rib fragment; left humerus; right radius; right innominate; right femur; left femur; right tibia; right fibula; right scaphoid.
- 2 See https://tighar.org/Projects/Earhart/Archives/Documents/Bones_Chronology.html and subsequent pages for a complete presentation of the “bones papers” in chronological context.
- 3 https://tighar.org/Publications/TTracks/14_2/14_2bones.pdf
- 4 “The Nikumaroro bones identification controversy: First-hand examination versus evaluation by proxy — Amelia Earhart found or still missing?” By Pamela J. Cross, Richard Wright. (ScienceDirect at <https://www.sciencedirect.com/science/article/pii/S2352409X15300109>.)
- 5 Common names of trees used here, and by Gallagher, are those employed in the language of Kiribati.
- 6 The clearing may have also been connected with the logging on the site that we suspect led to discovery of the bones.
- 7 Except in and around the hole where we suspect that the cranium was buried for a time.
- 8 See https://tighar.org/Projects/Earhart/Archives/Documents/Bones_Chronology1.html and subsequent pages, especially notes of 4 September, 23 September, 1 October, 6 October, 17 October 1940; 1 July, 8 August 1941.
- 9 See https://tighar.org/Projects/Earhart/Archives/Documents/Bones_Chronology5.html, 8 August & 11 August 1941.
- 10 See https://tighar.org/wiki/Sextant_box_found_on_Nikumaroro.
- 11 See https://tighar.org/wiki/The_Seven_Site, accessed 12/3/16, for a somewhat dated and incomplete interim report.
- 12 This is indicated by a lack of lower leg and foot bones; when one skins a bird, one pulls the skin down to the lower legs rather like removing a pair of overalls, then cuts off the lower legs and discards them with the skin and feathers. For a demonstration from the U.S., see <http://www.backyardchickens.com/t/36358/skinning-a-chicken-warning-graphic-pics>, accessed 12/3/16.
- 13 Scattered fragments nearby could indicate that each Tridacna feature originally contained one or more additional clams.
- 14 Based on consultations among Joseph Cerniglia, William Lockhart, and the author. The green bottle matches Fuerst Design Patent 90023, which was used for St. Joseph Liniment and Penetro. The beer bottle appears to be of the American Export style, intended for sale within the United States west of the Mississippi River, and returnable.
- 15 See <http://ameliaearhartarchaeology.blogspot.it/2016/05/earharts-first-aid-kits-at-seven-site.html>.
- 16 See https://tighar.org/wiki/Pocket_knife. More parts of the same knife were recovered in 2010.
- 17 See <https://tighar.org/wiki/2-8-S-3>.
- 18 See <http://www.hhrdd.org/>, accessed 12/3/16.

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