



The Nikumaroro bones identification controversy: First-hand examination versus evaluation by proxy – Amelia Earhart found or still missing?



Pamela J. Cross ^{a,*}, Richard Wright ^b

^a Archaeological Sciences, University of Bradford, Bradford, UK

^b Emeritus Professor of Anthropology, University of Sydney, Australia

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ABSTRACT

American celebrity aviator Amelia Earhart was lost over the Pacific Ocean during her press-making 1937 round-the-world flight. The iconic woman pilot remains a media interest nearly 80 years after her disappearance, with perennial claims of finds pinpointing her location. Though no sign of the celebrity pilot or her plane have been definitively identified, possible skeletal remains have been attributed to Earhart. The partial skeleton was recovered and investigated by British officials in 1940. Their investigation concluded that the remains were those of a stocky, middle-aged male. A private historic group re-evaluated the British analysis in 1998 as part of research to establish Gardner (Nikumaroro) Island as the crash site. The 1998 report discredited the British conclusions and used cranial analysis software (FORDISC) results to suggest that the skeleton was potentially a Northern European woman, and consistent with Amelia Earhart. A critical review of both investigations and contextual evidence shows that the original British osteological analyses were made by experienced, reliable professionals, while the cranial analysis is unreliable given the available data. Without access to the missing original bones, it is impossible to be definitive, but on balance, the most robust scientific analysis and conclusions are those of the original British finding indicating that the Nikumaroro bones belonged to a robust, middle-aged man, not Amelia Earhart.

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1. Introduction

Forensic and palaeopathological investigations of historical individuals often fascinate both the scientific community and the general public. The *Journal of Archaeological Science*, *British Medical Journal*, *Scientific American*, and *Journal of Forensic Sciences* have all published articles using physical anthropological methods to identify historic individuals such as Egil Skallagrimsson, Armstrong Custer, John Paul Jones, and Adolf Hitler (Byock, 1995; Hardarson and Snorraddottira, 1996; Marchetti et al., 2005; Rogers et al., 2004; Weinstein, 2005; Willey and Scott, 1999). These articles, and other research, use expertise in osteology, taphonomic processes and palaeopathology to re-evaluate actual skeletal remains or published descriptions of remains to assign personal identity. This paper continues that tradition by evaluating two reports with contrasting findings regarding the identification of a set of skeletal remains as possibly those of the missing American celebrity pilot Amelia Earhart.

Earhart, one of the first female airplane pilots and a celebrity of the early 20th century, disappeared with her navigator, Fred Noonan, during their attempt to circumnavigate the world in 1937 (Adler, 2015; Long and Long, 2000: 11–15, 58). Amelia Earhart and her contemporary, Charles Lindbergh, were the glamorous faces of the 1930s Age of Aviation, and her status as an American icon was already well in the making when she and Noonan began their record-breaking journey around the world's equator. They never made that last record. Instead they became legends, when, after one last, brief radio message, they and their plane disappeared in the mid-Pacific. Today, the bright red Lockheed Vega Earhart flew solo across the Atlantic in 1932 flies in the Smithsonian galleries, a reminder and symbol of both her disappearance and her enduring fame.

On June 29th 1937, after flying some 20,000 miles, Earhart and Noonan began the last, most dangerous portion of their round-the-world flight. Between them and California was 7000 miles of the vast, remote Pacific. Leaving Lae, New Guinea, their first refuelling stop was the tiny, two mile by one mile Howland Island 2556 miles (4113 km) away. Balancing flight conditions, speed, altitude and navigation were crucial and difficult. The plane left overloaded with the fuel necessary to make the long flight and soon after take-off the expected headwind

* Corresponding author.

E-mail address: p.j.cross@student.bradford.ac.uk (P.J. Cross).

speed increased dramatically from 15 to over 26 mph. Sporadic radio conditions plagued communication, but still indicated they were on course for Howland shortly before Earhart's last message saying they were nearly out of fuel. The US Coast Guard vessel waiting near Howland to help guide them in never sighted the plane. Extensive search efforts were made by the Coast Guard and Navy without success. Two years later, with no signs of the lost flight, Earhart and Noonan were declared dead (Gillespie and TIGHAR, 2006: 46–62, 101, 130, 188, 196; Long and Long, 2000: 11–18, 214).

Given the dramatic life and disappearance of Amelia Earhart, it's not surprising that the fate of that lost flight continues to intrigue. Books, papers, articles and television programmes continue to speculate on the fate of the missing aviators and their plane. Theories abound from expert research to the most dubious of conspiracy theories and have produced films, articles and books (Adler, 2015; Aron, 2005; Burns et al., 1998; Fox, 2011; Griffiths, 2014; King, 2009; King et al., 2004; Long and Long, 2000; Lorenzi, 2012; Mendelsohn, 2012). The discovery of a partial skeleton on Nikumaroro, a small atoll of the Phoenix Islands about 300–400 miles from Howland Island seemed particularly significant (Burns et al., 1998; King et al., 2004:4). British officials treated the discovery seriously and had the remains analysed in 1940. The medical official, Dr. D. W. Hoodless, concluded that the skeleton belonged to a stocky, middle-aged man and the investigation was dropped. Records of this investigation were found by researchers of The International Group for Historic Aircraft Recovery (TIGHAR) in the late 1990s, including the osteological report and examination notes by Dr. D. W. Hoodless.

In 1998, a paper by TIGHAR and two forensic anthropologists re-examining the identification of the Nikumaroro skeleton was presented at the American Anthropological Association (AAA) annual convention (Burns et al., 1998). The paper was highly critical of the original British analysis and, with caveats, suggested that the skeleton was more likely to have belonged to a European woman, consistent with Earhart. Aspects of the AAA paper are problematic, and following a brief summary of the historical context of the Nikumaroro skeleton investigation, the authors evaluate the Burns et al. (1998) critique and conclusions.

The following summary of the British recovery and analysis of the bones from Nikumaroro is based on primary documentation from the Republic of Kiribati National Archives and Western Pacific High Commission archives (Burns et al., 1998; TIGHAR, 2011b). In September 1940, British colonial administrator Gerald B. Gallagher discussed with various officials the discovery of a skull, bones, woman's shoe and sextant box which he felt might belong to the missing Amelia Earhart. These communications noted the c. 1930 wreck of the ship, "*Norwich City*," (which lost eleven crew members, including Europeans) and recovery of some survivors from Nikumaroro. They also gave details of the remains and the deposition site. On the basis of the shoe, Gallagher suggested the skeleton might be female and therefore possibly Earhart's. Gallagher listed the bones recovered, but declined to suggest the sex of the skeleton, saying an expert was required (Gallagher, 1940d). Central Medical Authority, Dr. Duncan C. M. Macpherson, concluded that Gallagher's evidence was insufficient to identify or exclude the bones as belonging to Mrs. Putnam. He recommended that the bones be sent to the University of Sydney Anatomical Department or Fiji (Central Medical School) for further examination (Macpherson, 1940).

The remains were shipped to Suva (Fiji) via the R.C.S. "*Nimanoa*." On board they were examined by Dr. Lindsay Isaac, acting Senior Medical Officer "in charge of Medical and forensic investigation throughout the whole colony" (Isaac, 1941a). Isaac examined the material and identified the remains as belonging to an "elderly male of Polynesian race," and adding, "the bones have been in sheltered position for upwards of 20 years and possibly much longer" (Isaac, 1941b). Isaac also noted that some of the bones crumbled during transport.

At the Central Medical School (CMS), the bones were examined by Hoodless (1941). Hoodless concluded that the remains most likely belonged to a c. 5' 5 1/2" stocky male of European or mixed

European ancestry, probably between 45–55 years old. Upon receipt of the Hoodless report, Macpherson concluded that the remains were not those of Amelia Earhart and the case was closed without further action.

2. Examining the original analysis and counter claims

The re-examination of archaeological skeletal remains is undertaken on a regular basis. Different examiners bring different specialisms and perspectives, and new analytical techniques are developed offering new data for interpretation. Sometimes new examinations confirm old conclusions and sometimes they radically alter the old interpretation. In the case of the Nikumaroro bones, the skeletal evidence was lost during World War II. Subsequent attempts to trace the bones indicate that they were moved to Australia, probably Sydney, but no further evidence has been found. Despite the lack of the original bones, TIGHAR felt a re-examination of the reports and data using modern expertise might suggest different conclusions. Using the materials gathered by TIGHAR researchers, Burns et al. (1998) produced a paper re-analysing the case with two aims: evaluating Dr. Hoodless' competence, and applying new techniques to the data provided in Dr. Hoodless' papers. The Burns et al. (1998) paper accepts Hoodless' conclusion that the bones represented an individual too short to be Noonan, but challenged the overall findings that the bones represented a c. 65 inch, 45–55 year old stocky male of European or mixed-European heritage.

In particular, the paper challenges Hoodless regarding his anatomical expertise and his methods for estimating stature. Towards the second aim, Burns et al. (1998) reinterpret Dr. Hoodless' cranial metric data using the statistical software *FORDISC* to produce a result supposedly indicating that the skull was most similar to Norse females. The paper concludes, with caveats, that the Nikumaroro bones appear consistent with the missing Earhart. Subsequent references tend to lose the caveats.

2.1. Hoodless' medical and osteological expertise

"Skeletal measurements taken over 55 years ago by a now-deceased individual of unknown expertise, with no description of the methods or assumptions employed, must be used with great caution" (Burns et al., 1998; King et al., 2004:237–42). The function of this statement appears simply to label Hoodless as not competent to assess or measure a human skeleton. However, even basic research reveals a great deal about Hoodless' expertise, all of which underscores his competence. King et al. (2004:260–262) makes it clear that TIGHAR researched Hoodless' background.

Dr. David W. Hoodless (1887–1955) was not some 'individual of unknown expertise' asked to evaluate a partial skeleton on a whim. As is obvious from the communications referenced earlier, the British thought the remains might belong to Earhart or Noonan and considered their identification an important issue. Hoodless, chosen to make the assessment, was the Principal of the Central Medical School (CMS) in Fiji (Fig. 1). At his death, the British Medical Journal described Hoodless (BSC, LMSSA) as a respected medical teacher and principal (1955). He completed his medical degree in 1935, having been teaching at the CMS since 1929. Hoodless taught theoretical/practical anatomy and physiology (CMS was known for dissection and skeletal analysis), and also did pathological lab work and clinical practice (Guthrie, 1979:15, 20, 31, 34; King et al., 2004:262; Robertson, 1991:55–6, 62). He could also be described as a practising cultural anthropologist. Hoodless was active in native communities as a doctor and collected information about Fijian beliefs and practices, particularly regarding disease and health (Guthrie, 1979:23–5). While Hoodless was obviously not trained as a modern forensic anthropologist, his background indicates he was perfectly competent to assess sex, age, body type, and ancestry of a human skeleton.

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