THE MYTH OF A.D. 1680: NEW EVIDENCE FROM HANGA HOʻONU, RAPA NUI (EASTER ISLAND)

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INTRODUCTION

The "collapse" of pre-industrial societies throughout the world has become a central theme in recent popular and scientific writing (see, for example, Diamond 2005; Morrison 2006). In these discussions, scholars have looked at a variety of factors viewed as central to demographic collapse and political failure that include: a) the role of climate in the destabilization of ancient economies (deMenocal 2001); b) the intensification of agriculture and declining productivity (Tainter 2006); c) environmental degradation (Bahn & Flenley 1992); and d) Western contact and the introduction of European diseases (Ramenofsky 1987; Stannard 1989). Previous discussions of Rapa Nui (Easter Island) culture history fall under this rubric and Rapa Nui has been portrayed as a prime example of a society that destroyed itself due to environmental degradation and resource depletion coupled with an increasing population. According to most authors, this led to political instability and upheaval that resulted in major social and religious transformations (see Bahn & Flenley 1992; Flenley & Bahn 2003; Diamond 2005, 2007; Kirch 2000).

The timing of these processes on Rapa Nui has been an issue, and the year A.D. 1680 has been noted by numerous scholars as a key date for sociopolitical change (see, for example, Ayres 1975; Bahn 1993; Diamond 2005, 2007; Flenley 1979, 1996; Heyerdahl & Ferdon 1965; Horrocks & Wozniak 2008; Stevenson 1984, 1997). It was in or around this year that the legendary battle between the Hanau Eepe (recorded alternatively as meaning "fat or heavy-set people" (correctly) or "long ears" (incorrectly); see Mulloy 1993) and the Hanau Momoko (interpreted as "thin, slender people" or "short ears", correctly and incorrectly, respectively; see Mulloy 1993) was said to have occurred at the Poike Ditch (Heyerdahl & Ferdon 1965). Information about this battle is based on oral traditions recorded ethnographically (Englert 1948; Métraux 1940; Routledge 1919; Thomson 1891). The calculation of the date of the battle comes from genealogical estimations (Englert 1948), as well as a single radiocarbon date obtained at the Poike Ditch during Thor Heyerdahl's Norwegian Expedition excavations in 1955 (Smith 1961a). However, more recent archaeological excavations have shown that there is little archaeological evidence to substantiate the story of the battle at this location (Vargas *et al*. 1990, 2006; also see Smith 1990; Van Tilburg 1994). Nonetheless, the date of A.D. 1680 has, for many scholars, continued to be referenced as the most significant in Rapa Nui culture history.

In this paper, we explore what we refer to as "the myth of A.D. 1680" by critically examining the origins of the use of this date, its significance in Rapa Nui culture history, and interpretations that have been made by researchers during the past 50 years. We suggest that the date of A.D. 1680 has often been wrongly interpreted and erroneously projected onto the archaeological record. This date has been used as shorthand to describe numerous changes to Rapa Nui society, which have not been securely documented. We present preliminary results of obsidian hydration dating (OHD) and radiocarbon dating from Hanga Hoʻonu that indicate Rapa Nui society did not "collapse" in the late 17th century, rather only exhibited dramatic changes to human demography and settlement following European contact in 1722.

ETHNOGRAPHIC ORIGINS AND ORAL TRADITION

During the 18th and 19th centuries, various vessels visited Rapa Nui, introducing the islanders to western traditions, diseases, and slave raiding (McCall 1981; Richards 2008). By 1877 the population had plummeted to 110 persons (Fischer 2005). From 1889 to 1940, numerous "salvage ethnographies" recorded oral traditions on Rapa Nui. These ethnographies contain extensive information on Rapa Nui social structure, customs, and beliefs; however, they must be examined with caution due to the context in which they were recorded. The severe population decline would have resulted in the loss of traditional knowledge, and those stories that were collected may have been shaped more by the contemporary social context than the pre-contact period that they were supposedly describing. It has been proposed that these ethnographies "relate principally to the final century of Rapa Nui political history as an independent island, and reveal little about the organization of the chiefdom prior to the impacts of western culture" (Stevenson 2002:213-214).

Many of the ethnographies collected during the late 19th and early 20th centuries contain stories and legends about specific events, such as the initial settlement of the island, genealogies of kings, and legendary battles. As Métraux (1940:74) states, "references to intertribal wars are frequent in Easter Island folklore. They reflect real conflicts between tribes (*mata*) whose quarrels and feuds ended only after the advent of the missionaries [after 1864]". One of the most legendary battles is that between the Hanau Eepe and the Hanau Momoko at the Poike Ditch. This story was first recorded by Thomson (1891), and slightly modified versions of it were subsequently recorded by Knoche (1913), Routledge (1919), Vives Solar (1930), Lavachery (1933), Métraux (1940), and Englert (1948, 1970).

Despite differences in the causes of Hanau Eepe animosity towards Hanau Momoko, all of the recorded stories agree that the result was the plotting of Hanau Momoko destruction. The Hanau Eepe planned to kill all of the Hanau Momoko by driving them into a ditch, or a series of ditches, that the Hanau Eepe had excavated near the base of the southwestern side of the Poike Peninsula. The ditch was filled with grasses and wood to be used as fuel to burn the Hanau Momoko to death. However, according to legend the Hanau Momoko used trickery to drive the Hanau Eepe into their own ditch, killing all or the vast majority of them. Using the genealogy of a man named Ororoina who was thought to have survived the attack and allowing 25 to 30 years per generation, Englert (1948:157) estimated that the battle between the Hanau Eepe and the Hanau Momoko occurred ca. A.D. 1680.

The Poike Ditch: Oral Tradition and Archaeology Meet

The first systematic archaeological program on Rapa Nui was conducted in 1955 by the Norwegian Expedition. Smith, a member of the expedition, sought to test the validity of the legendary battle at the Poike Ditch through archaeological excavation. Smith (1961a:385) wrote:

> This tradition is deeply rooted among the inhabitants of the island, but both Métraux (*ibid.* [1940], p. 72) and Lavachery (1933b, pp. 346-347) conclude that the natives originated the tale to account for a natural feature of the terrain.

Thus, Smith's excavations were devised to test whether the ditch was a natural or cultural feature, and to look for evidence of the battle. He excavated six test units and one longer trench, and noted the presence of at least two bands of "black and red deposits composed of charcoal and burned earth" (Smith 1961a:386). Two charcoal samples from the excavations were submitted for radiocarbon dating. One of the samples (K-501) was taken from the zone of extensive burning in the ditch, and the other was taken from the surface of the ground underneath a supposed mound (K-502).

The charcoal samples yielded a date of 280 B.P. ± 100, or A.D. 1676 ± 100 years for K-501, and 1570 B.P. ± 100, or A.D. 386 ± 100 years for K-502. Smith interpreted the earlier date (K-502) as being indicative of the original construction of the fortification, which would have been reused during the battle between the Hanau Eepe and the Hanau Momoko. The more recent date (K-501) was interpreted as the time when the battle occurred. On this basis, Smith (1961a:391) concluded that the archaeological data substantiated the legendary battle.

Upon re-examination of the data from the 1955 Poike excavations, Smith (1990:37) concluded that three hypotheses could explain the series of ditches and mounds; 1) that a deep ditch would have served as an ideal planting location to feed the workers at Rano Raraku, providing a sheltered area with the mounds serving to control run-off, and that the charcoal resulted from the burning of stalks and leaves during harvest, 2) that the ditch could have functioned as a series of earth ovens (*umu*) to feed the workers at Rano Raraku, which is supported by the traditional name for the ditch, which is *Ko te umu o te Hanau Eepe* (The Earth Oven of the Hanau Eepe), and 3) that it is unlikely that the ditch would have served as a fortification as it was discontinuous and could be outflanked on either end. Later excavations at the Poike Ditch by Vargas *et al.* (1990) and others revealed that there was no evidence of human activity *directly* associated with the charcoal layers in the ditch, thus discrediting the archaeological significance of the layer associated with the single radiocarbon determination of A.D. 1676 ± 100. They found no evidence of human remains and excavations revealed four distinct stratigraphic layers, which showed a series of occupational events that may have represented agricultural activities (Vargas *et al.* 2006:380-381), which may support Smith's first hypothesis. However, in spite of the later interpretations and evidence that refuted Smith's claims, the culture history model developed by Smith and the Norwegian Expedition based on this single radiocarbon date continued to shape later archaeological studies.

Culture History and the Myth of A.D. 1680

With reference to the Poike Ditch excavations, Smith concluded that the lack of *mata'a* (obsidian weapons), together with the date of *c.* A.D. 1680, suggested that the battle between the Hanau Eepe and the Hanau Momoko marked the end of the Middle Period (dated to A.D. 1100 to A.D. 1680), when the *mata'a* was either unknown or rare, and the beginning of the Late Period (A.D. 1680 onwards), when this artifact type became common (Smith 1961b:391). Smith's Middle Period, also known as the "Ahu Moai" period, was characterized by the construction of monumental architecture in the form of platform *ahu* (ceremonial platforms) and *moai* (megalithic statues), and this period was when the society reached its greatest level of socio-political complexity. The Late Period, conversely, was described as "decadent", reflecting a breakdown in the social hierarchy, and it was also known as the "Huri Moai", or statue-toppling, period. Englert (1970) also used the mythical battle as the endpoint of megalithic construction (*i.e.*, the manufacture of *moai*), and the beginning of a period characterized by a general decline in cultural achievements. Thus, the battle became the singular chronological marker of a transition in the three-phase culture history established by Smith and the Norwegian Expedition based on stylistic traits of *ahu* and the presence or absence of certain artifact types (Smith 1961b:210-212; also see Mulloy 1961).

Although numerous researchers have critiqued and altered the timing of the three periods that comprise the culture history established by the Norwegian Expedition, most scholars still adhere to the notion that there were three general phases in the course of the pre-contact Rapa Nui sequence (Figure 1) (see, for example, Ayres 1975; Kirch 1984, 2000; Lee 1986, 1992; McCoy 1979; Stevenson 1984, 1997; Van Tilburg 1986; Vargas *et al.* 2006). While Kirch, Lee, McCoy, Van Tilburg, and Vargas place the transition to the third phase in the 16th century, Ayres and Stevenson use A.D. 1680 as the chronological marker for the beginning of the third phase. This date has also appeared in analyses of smaller data sets as well as archaeological syntheses in recent years (see, for example, Bahn & Flenley 1992; Diamond 2005, 2007; Flenley & Bahn 2003; Horrocks & Wozniak 2008; Shaw 2000a).

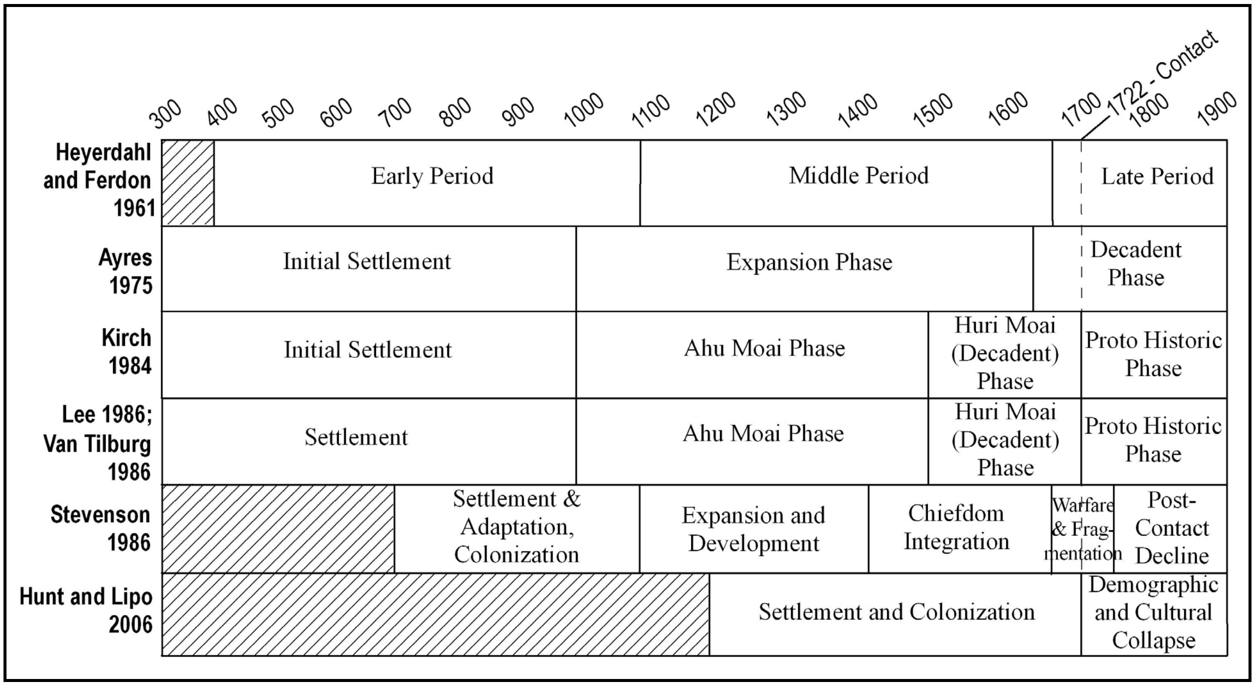

Figure 1. Comparative cultural chronologies (after Lee 1992:9; fig.2.1; and Shepardson 2006:203; fig.6.3).

In most archaeological accounts, the last phase of the general three-phase pre-contact chronology is characterized by cultural and ecological "collapse", which resulted from overpopulation and overexploitation of resources. Kirch (1984:264) has characterized Rapa Nui as "…a society which — temporarily but brilliantly surpassing its limits — crashed devastatingly". Many researchers suggest it was at this time that the chiefly elite of the hierarchically organized society were displaced from power and replaced by a new warrior class (*matato'a*), the building of monumental architecture ceased, and warring groups intentionally toppled the statues of other groups (see, for example, Diamond 2005; Flenley & Bahn 2003). As McCoy (1979:162) notes, "The overthrow of ahu images and the cessation of statue carving are the chief distinguishing characteristics of the Norwegian expedition's late period, genealogically and archaeologically dated A.D. 1680 to 1868 (Ferdon 1961)." According to this scheme, long periods of warfare ensued, and inland elite-managed field systems were replaced by local subsistence agriculture on the coast, which resulted in a loss of surplus agricultural products as inland field systems were abandoned (Stevenson 1997). Regarding this supposed breakdown of the chiefly economy and surplus production, Diamond (2005:109) states that:

> As their promises were being proved increasingly hollow, the power of the chiefs and priests was overthrown around 1680 by military leaders called *matatoa*, and Easter's formerly complex integrated society collapsed in an epidemic of civil war.

Archaeological Interpretations Shaped by the Norwegian Framework of A.D. 1680

As the chronological marker of the beginning of the third general phase, the date of A.D. 1680 has variously been used to mark a shift in the socio-political structure of society (Bahn 1993; Bahn & Flenley 1992; Diamond 2005; Flenley & Bahn 2003; Horrocks & Wozniak 2008; Stevenson 1984, 1986, 1997; Stevenson & Haoa 1998; Van Tilburg 1994), a shift in ideology and burial practices (Shaw 2000a, 2000b), changes to the settlement pattern (McCoy 1976; Stevenson 1984, 1986, 1997; Vargas 1998), the cessation of statue carving (Diamond 2007), and as the date marking a dramatic societal collapse that resulted from significant ecological change and deforestation (Diamond 2005; Flenley 1979, 1996). The primary data, however, do not support A.D. 1680 as a chronological marker.

Palaeo-ecological data have been combined with archaeological data to propose that a pre-contact cultural collapse was triggered by deforestation and over-exploitation of resources. Human-induced deforestation of the palm forest is said to have been complete by around A.D. 1640, leading to physical erosion (Flenley & Bahn 2003:167). The palynological work of Flenley and his colleagues indicates that deforestation occurred, but these studies have been inconclusive in establishing the exact timing of this process due to difficulties in dating pollen cores from floating swamp vegetation and events from the last 500 years using radiocarbon. On the basis of two pollen cores at Rano Kau, it is thought that the process of deforestation occurred during the large interval from ca. A.D. 676 to A.D. 1550 (Flenley 1993, 1996, 1998; Flenley *et al.* 1991; Flenley & King 1984). Yet Flenley (1996:140) concludes that:

> The start of forest decline is now associated more exactly with the start of the archaeological record. The date of final forest demise is now closer to the date of 1680 A.D., which is the supposed date for the final crash of the civilization. What seems likely is that the loss of resources provided the background conditions which meant that any other perturbation of the environment (such as the major drought hypothesized by McCall (1993)) could trigger off the major collapse which apparently occurred.

Although Flenley's data indicate that deforestation ended around A.D. 1550, he uses the Norwegian Expedition's framework and references A.D. 1680 for the final collapse of the civilization. The use of the year A.D. 1680 in his model for the deforestation of Rapa Nui (Figure 2) conveys the notion that it was a significant date in the palaeo-ecological record as well as the cultural sequence. In his re-analysis of the data set from Rano Kau, Flenley goes on to conclude that the explanation that a cultural collapse occurred as a result of contact with Europeans is invalid because "… this version of events would not square well with the island legends of famine and internal warfare" (Flenley 1998:127).

Settlement pattern studies have also been hindered by the use of A.D. 1680 in the framing of interpretations (see, for example, McCoy 1976; Stevenson 1984, 1997; Stevenson & Haoa 1998, 2008; Vargas 1998). McCoy (1976), in his settlement pattern analysis of the southeastern coast, examined the comparative densities of different site types in an attempt to develop models for settlement. In the absence of chronological control, McCoy assumed that the settlement pattern was representative of a new, more complex household settlement pattern that developed in the late 17th to 18th

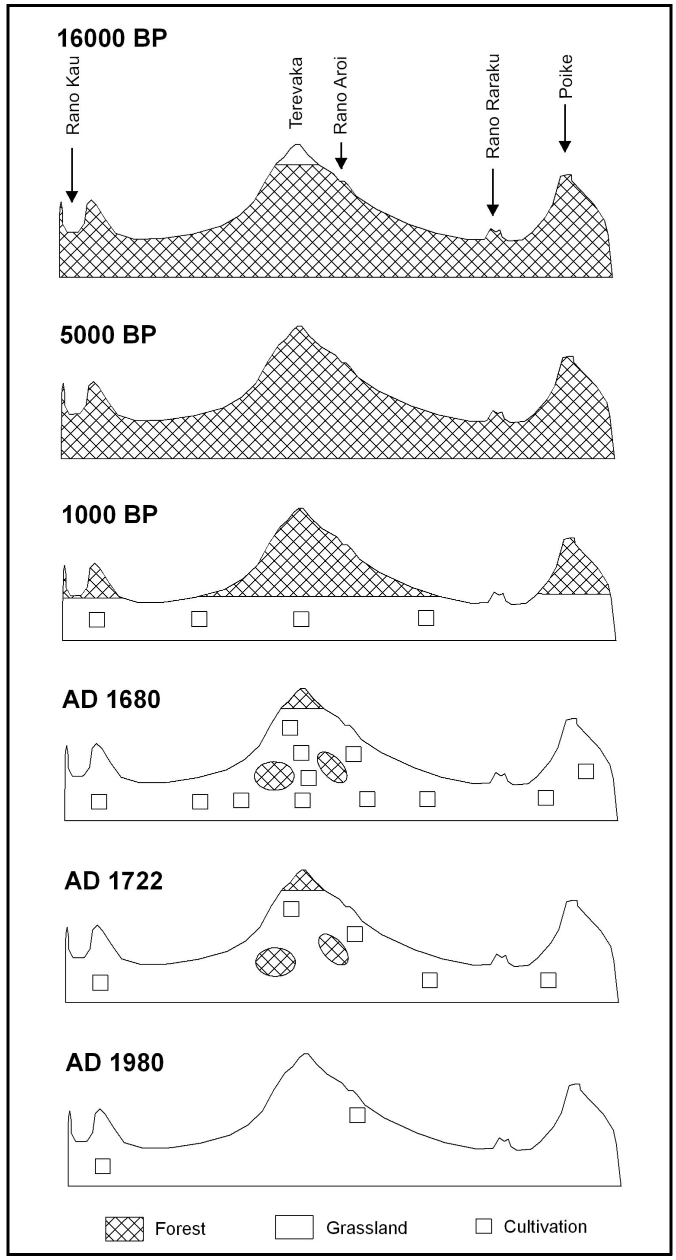

Figure 2. Flenley and Bahn's schematic representation of vegetational change on Rapa Nui as reconstructed from pollen evidence (after Flenley & Bahn, 2003:165; fig.43-3).

centuries, following an environmental change that occurred as early as the 16th century (McCoy 1976:145). McCoy estimated that deforestation must have occurred by ca. 1600 because the island was deforested at contact in 1722, and that constant conflict resulted from resource scarcity combined with a large population size that peaked by A.D. 1600. He noted that there was good agreement between his estimate for the beginning of a phase marked by constant conflict at A.D. 1600 and the radiocarbon date of A.D. 1676 ± 100 from the

Poike Ditch (McCoy 1976:141), leading him to conclude that there was strong evidence for such a change in the late 17th century. However, McCoy's data are somewhat contradictory to this conclusion. His settlement model showed that features were uniformly clustered across the landscape, and that their form and distribution was indicative of marked social stratification (McCoy 1976:148-9). As there was little temporal control in his data, the notion that a competitive, disintegrated political system replaced an integrated hierarchical system in the late pre-contact period has little empirical validity. His interpretations thus appear to have been significantly shaped by conventional notions about the timing of events, as opposed to secure archaeological data.

Earlier work by Stevenson included various large-scale settlement pattern analyses and analyses of residential features (Stevenson 1984, 1986, 1997; Stevenson & Haoa 1998, 2008). In his 1984 survey of the south coast, chronometric data for settlement were collected in the form of obsidian hydration dates from 167 residential features. The emergence of interment locations such as semi-pyramidal *ahu* by A.D. 1692 and an increase in the frequency of *mata'a* in a sample of 33 specimens during the 18th century led Stevenson to state that the earlier models (i.e., Ayres 1975; Ferdon 1961) for Rapa Nui culture history were supported. He added that "Oral tradition recounts a major period of internal strife and endemic warfare occurring around 1680 A.D. (Englert 1948)" (Stevenson 1984:179). His data indicate a slight reduction in frequency along the south coast in the 17th century, but a major decline in population is not observed until the 19th century (Figure 3). However, these determinations were calculated using the optical method to measure hydrated surfaces, which has recently been shown to be inherently erroneous (see Doremus 1995; Rogers 2006). Thus, these data must be assessed with caution.

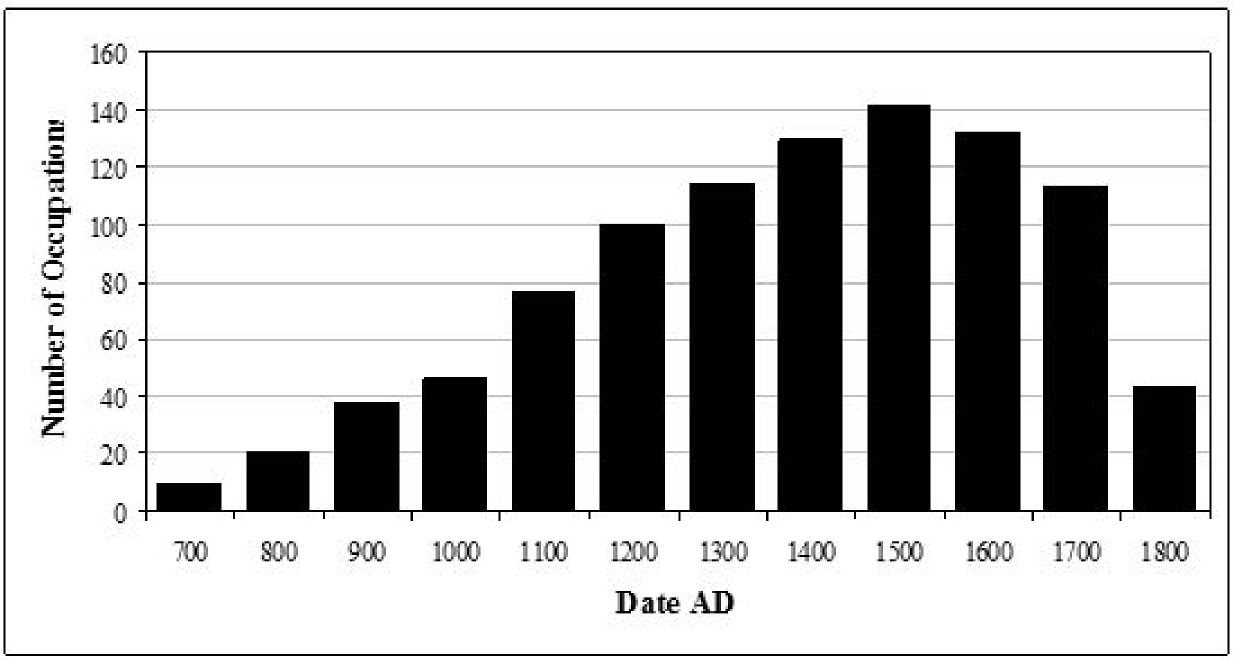

Figure 3. Obsidian Hydration Dates from residential features sampled by Stevenson (1984) on the South coast (after Stevenson & Haoa 2008:8; fig.1-5).

LAND USE IN HANGA HO'ONU

New preliminary data from Hanga Ho'onu (La Perouse Bay) (Figure 4) shed light on the utility of A.D. 1680 as a chronological marker. This area was intensively surveyed by Stevenson and Haoa from 1995 to 2001 (Stevenson & Haoa 2008), and during the last two years we have re-surveyed large portions of it and conducted additional excavations. Stevenson and Haoa (2008:173) originally identified four distinctive zones of land use and based initial interpretations of the settlement pattern in this area within the orthodox culture history model. They proposed 1) a Near Coastal Zone, which was used as a sacred area during much of the pre-contact cultural sequence and later became desanctified when the social hierarchy declined late in the pre-contact era; 2) a Lowland Plain, which is thought to have been occupied continuously and developed during much of the Rapa Nui cultural sequence; 3) the Interior Uplands, characterized by a lack of domestic features and the presence of a large agricultural area that may have been managed by elites with semi-permanent on-site managers that was thought to have been abandoned in late pre-contact era; and 4) an Interior Valley with settlement similar to that of the Lowland Plain. The Hanga Ho'onu Project area is unique in that it contains

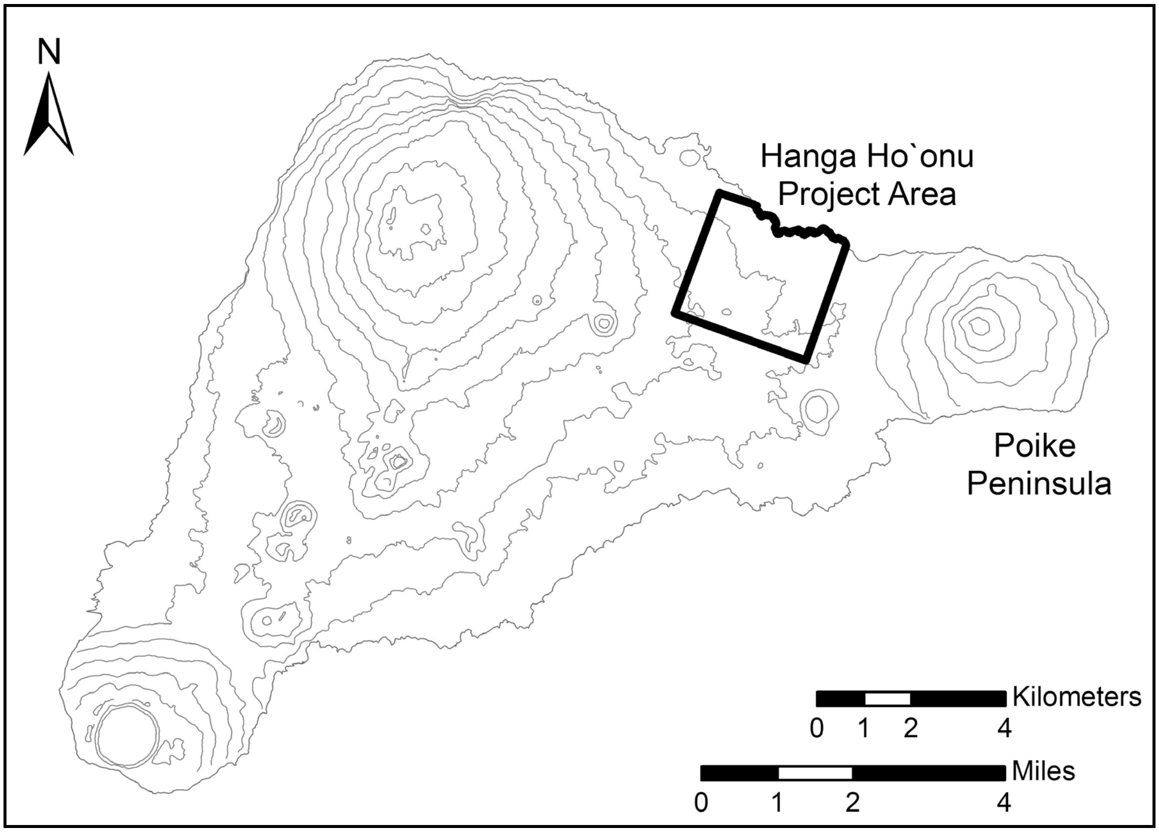

Figure 4. Location of the Hanga Ho'onu Project Area on Rapa Nui.

these four distinctive land use zones in a relatively compacted area. Thus, it provides an ideal setting for looking at the overall settlement pattern for the island as a whole, which contains similar zones at larger spatial intervals. Here, we discuss preliminary results of the dating of 18 shovel test (ST) units that were excavated near habitation structures and relate to overall landscape use in the project area.

Stratigraphic excavations were carried out adjacent to a total of 25 residential features at variable distances from the coast to recover obsidian and charcoal samples for chronometric dating. Locations were chosen along two major transects oriented perpendicular to the coast to systematically sample the area (Figure 6). One m test units were excavated according to stratigraphic layers and 10 cm arbitrary levels and were located approximately one meter from surface architectural features. Locations next to architectural features were chosen because they usually contained high densities of refuse in the form of obsidian debitage. The artifacts from these excavations do not necessarily date the occupation of the architectural feature; rather, they provide an indication of temporal land use in the area. All sediments from a depth of 10 cm and below were screened using ⅛ in. screens. One to three mixed cultural layers were encountered in the excavation units. The largely churned nature of sediments was evidenced by the lack of soil structure.

Fifty-one obsidian samples from 18 of the 25 excavation units (ST 1, 4-8, 13-17, 19-22, 24, and 26) were hydration dated at the Virginia Department of Historic Resources Conservation Laboratory in Richmond, Virginia. Numerous researchers have studied the Rapa Nui hydration rate for obsidian for more than 40 years (Ayres 1975; Evans 1965) and calibrated samples from carefully monitored environmental contexts have been shown to correspond well with radiocarbon determinations in recent studies (Stevenson 1984, 1986, 1989, 2000, Stevenson & Haoa 1998, 2008). When samples of obsidian are recovered from subsurface deposits where relative humidity is high and temperature fluctuations are low (see Ridings 1991; Stevenson 2000; Stevenson *et. al* 1993, 1996) it provides a precise dating technique. Although researchers have questioned the accuracy of OHD in recent years (see Anovitz, *et al.* 1999; Ridings 1996), with careful consideration of environmental factors including relative humidity and temperature, and through isolation of intrinsic water content, the rate of hydration for individual artifacts can be accurately estimated (Hull 2001; Mazer *et al.* 1991; Stevenson 1989, 2000**;** Stevenson *et. al* 1993, 1996).

Additional advances in the method have been made with the development of increased precision in infrared spectroscopy (*e.g.*, SIMS calibrated) (Stevenson *et al.* 2001; Stevenson *et al.* 2004). This method has a very low absorbance measurement error, which results in a hydration thickness measurement error of ± 0.03 µm, allowing researchers to determine dates to within ± 21 years (Stevenson

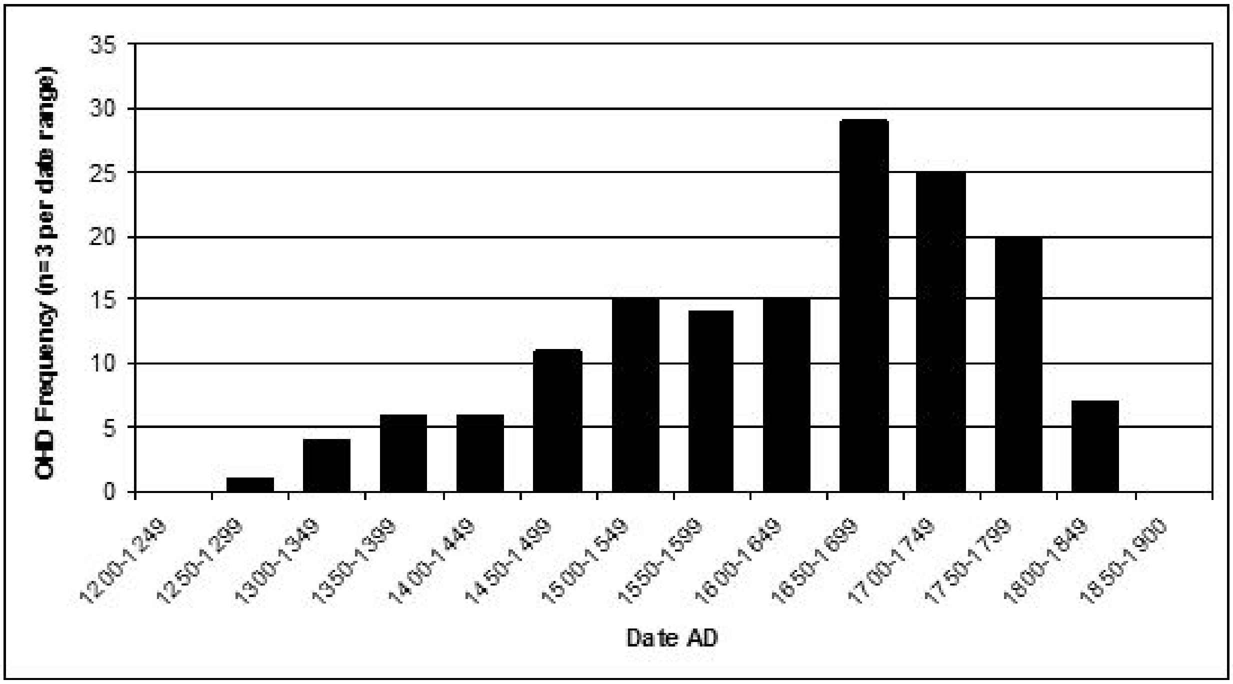

Figure 5. Obsidian Hydration Dates from 18 excavated locations in the Hanga Ho'onu Project Area.

& Novak *in prep.*). In the laboratory, an MTEC 300 infrared photoacoustic (PAS) accessory mounted on a Bomem MB-120 series spectrometer was used for the analysis. Spectra were collected at a resolution of 16 cm^{-1} and carbon black was used as a reference for background collection. Win-Bomem spectral analysis software was used to measure absorption peaks using a baseline placed tangential to the peak minima.

The OHD method measures the penetration depth, or mass uptake of ambient diffused molecular water (H_2O_{me}) into the surface of glass. The diffusion of water in glasses has been shown to be strongly correlated with the concentration of structural water (H_2O_t) within the surface hydration layer itself, which is referred to as concentration-dependent diffusion (see Anovitz *et al.* 1999; Stevenson & Novak *in prep.*). At present, there is no published calibration for determining total structural water (H_2O_t) content from PAS measurements. Therefore, it was necessary to calculate two values for each of the 51 samples in order to obtain an estimate for total structural water (H_2O_t) as well as ambient diffused molecular water (H_2O_{me}) of the hydrated surface for each sample. Each flake was cut parallel to the hydrated, or archaeological, surface with a slow-speed trim saw into 9 mm^2 coupons with a thickness of <3 mm. The unhydrated surface was polished to an 800 grit finish, rinsed with de-mineralized water and left to air dry. Following preparation, initial water content (H_2O_t) was estimated using the absorbance value measured at the 3570 cm^{-1} hydration peak of the polished surface. This hydration peak is sensitive to both molecular water (H_2O_m) and hydroxyl (OH), which are summed to determine the total structural water concentration (H_2O_t). Polished surface absorbance measurements ranged from 0.1134 to 0.1973, showing that a constant absorbance value for the initial water content of Rapa Nui obsidian cannot be applied. Next, the ambient diffused molecular water (H_2O_{me}) concentration was estimated using the absorbance measurement from the hydration peak at 1630 cm^{-1}, which enabled the calculation of a chronometric determination using a hydration rate established by Stevenson that takes environmental data including relative humidity and effective hydration temperature into account.

The 51 obsidian hydration dates from Hanga Ho'onu do not support a pre-European contact demographic collapse in the area. As Figure 5 shows, there is evidence for continued occupation of Hanga Ho'onu until well into the post-contact phase, and a significant decrease in overall occupation does not occur until after A.D. 1800. At some locations, artifacts were incorporated into the sediment matrix over a period of time that was upwards of 350 years and at many locations the sediments appear to have been substantially churned, probably as a result of gardening. This shows the importance of dating a large number of obsidian samples from each location in order to assess the full range of occupation. Here, we assess land use in the area using preliminary results of the dating of 1 to 10 samples from each of the 18 excavation units analyzed. The dating of over 400 samples recovered from 50 shovel test excavation units in the Hanga Ho'onu project area is currently in progress.

Four samples of charcoal were also submitted for radiocarbon dating. As Table 1 shows, these data alone are inadequate for identifying fine-grained temporal shifts in settlement, and for determining whether significant changes to settlement occurred before or following European contact. However, these age determinations, shown as 95.4 percent confidence intervals (2-Sigma) alongside OHD determinations from three

Table 1. Radiocarbon Dates from the Hanga Ho`onu Project Area.

Sample	*Excavation Context*	*Zone*	*Determination BP*	*Calibrated date AD at 95.4% prob.*	*OHD range*
Wk-24284	ST 12, Level 3 (20-30 cmbs)	Lowland Plain	214 ± 30 BP	AD 1640-1710 (24.9%) AD 1720-1820 (60.4%) AD 1830-1880 (5.5%) AD 1920-1960 (4.6%)	AD 1330-1757
Wk-24285	ST 16, Level 4 (30-40 cmbs)	Far Interior	314 ± 30 BP	AD 1500-1600 (56.6%) AD 1610-1670 (38.8%)	AD 1561-1834
Wk-24286	ST 22, Level 3 (20-30 cmbs)	Interior Uplands	157 ± 28 BP	AD 1670-1740 (26.1%) AD 1790-1960 (69.3%)	AD 1306-1781
Wk-24287	ST 22, Level 8 (70-80 cmbs)	Interior Uplands	90 ± 30 BP	AD 1690-1730 (11.4%) AD 1800-1950 (84.0%)	AD 1306-1781

excavation locations, are useful in showing that the dates obtained using OHD are in agreement with determinations obtained using the less-precise method of radiocarbon dating.

The spatial distribution of excavations was examined in relation to Stevenson and Haoa's (1998, 2008) landscape model (see Figure 6), as well as existing cultural chronologies (Figure 1). Materials were dated from six excavation units in

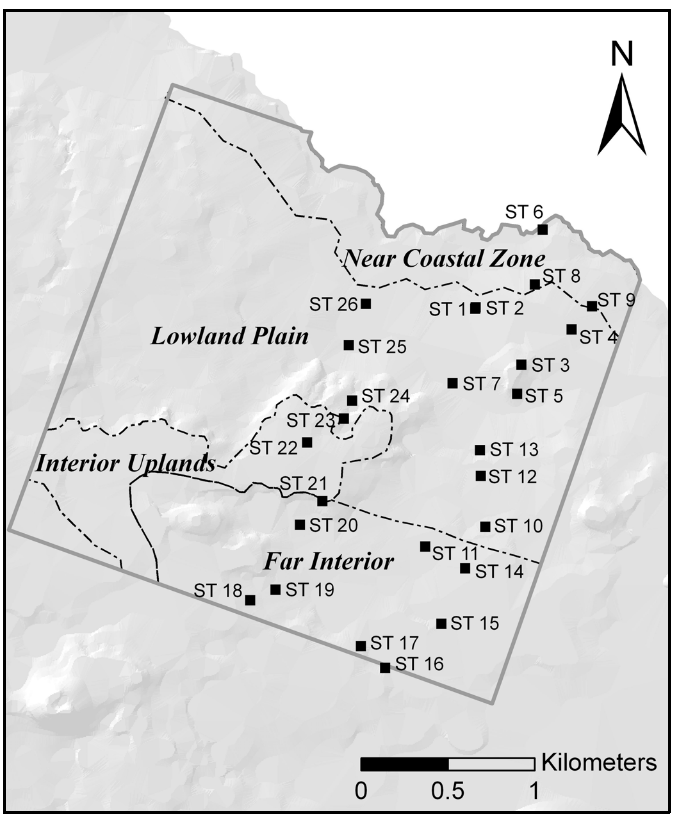

Figure 6. Sampling locations with dated material in relation to Stevenson and Haoa's (1998, 2008) landscape model.

the Far Interior Zone, two excavation units located in the Interior Uplands, eight units in the Lowland Plain, and two excavation units situated in the Near Coastal Zone. Figure 5 shows the frequency distribution of dates obtained using OHD analysis. Each median date has an error value of plus or minus 12 to 41 years. These dates have been placed into 50-year intervals and each determination is displayed using three values (earliest, median, and latest) to account for error ranges that extend into multiple intervals of time. Based on the chronometric dating of each excavation unit, the sampled area of Hanga Ho'onu does not appear to have been occupied until the late 1200s. As Figure 5 shows, there is a single value that falls within the interval from A.D. 1250-1299, and this date comes from Stevenson and Haoa's Near Coastal Zone. During the subsequent interval from A.D. 1300-1350, four dates suggest the occupation of three areas. These are from excavation units located in the Near Coastal Zone (1), the Lowland Plain (1) and the Interior Uplands (1). There are five values from A.D. 1350-1399, which are from four excavation units located in the Near Coastal Zone (1), the Lowland Plain (2), and the Interior Uplands (1). Six values from excavation units in the Far Interior Zone (1) and the Lowland Plain (4) fall between 1400 and 1449, and 11 values fall within the subsequent interval from 1450 to 1499. These dates come from nine excavations, which are located in the Far Interior Zone (2), the Interior Uplands (1), the Lowland Plain (4), and the Near Coastal Zone (2). During the next time interval from 1500 to 1549, there are 15 values from eight excavation areas, located in the Far Interior Zone (1), the Interior Uplands (2), the Lowland Plain (3), and the Near Coastal Zone (2). Fourteen values fall between 1550 and 1599, and these dates come from nine excavation units. These units are located in the Far Interior (3), the Interior Uplands (1), the Lowland Plain (4), and the Near Coastal Zone (1). During the following interval from 1600 to 1649, there are 15 values from eight excavation areas located in the Far Interior (4), the Interior Uplands (1), and the Lowland Plain (3). Twenty-nine values fall between 1650 and 1699, and these dates come from 11 excavation units. These units are located in the Far Interior (4), the Interior Uplands (2), the Lowland Plain (4), and the Near Coastal Zone (1). During the subsequent interval from 1700 to 1749, 25 values are shown. These come from 10 excavation areas, located in the Far Interior (4), the Interior Uplands (2), the Lowland Plain (3), and the Near Coastal Zone (1). There is a slight decrease in the frequency of dates between 1750 and 1799. These 21 values come from 7 excavation areas, which are located in the Far Interior (1), the Interior Uplands (2), and the Lowland Plain (4). During the subsequent interval from 1800 to 1849, there is a dramatic decrease in the frequency of dates, with a total of seven values. These values come from 2 sampled areas in the Far Interior (1) and the Interior Uplands (1). There are no dates that post-date this interval, and the fact that no dates fall after this time is strong evidence for widespread abandonment of the sampled area of Hanga Ho'onu *only after* the mid-19th century (see Figure 5).

CONCLUSIONS

The dating results from 18 excavations in Hanga Ho'onu do not support the traditional culture history model for Rapa Nui and the use of A.D. 1680 as a chronological marker for the onset of demographic collapse. If dramatic societal collapse was experienced during the pre-contact period, we would expect a decrease in the occupation of some areas, especially the Interior Uplands Zone, from A.D. 1680 onwards as the population was politically reorganized. This expectation is not supported by the data. There was an overall increase in landscape use in all zones in Hanga Ho'onu until the interval from A.D. 1700 to 1749, when a slight decrease in the frequency of obsidian hydration dates is evident, and this decrease is followed by a further, more dramatic decrease during the subsequent interval from A.D. 1750 to 1799. At this time, there is no evidence of abandonment of interior locations in this part of the island and re-location to the coast, as proposed by Stevenson and Haoa's landscape model. The dating results indicate that much of the area fell into disuse around A.D. 1800 to 1849 and that complete abandonment of the entire area occurred from 1850 onwards. At present, the data shows that there was continuous occupation of this area until well into the post-contact era, and that the entire area fell into disuse in the protohistoric era probably reflects a demographic collapse that did not occur until after European contact in 1722. These new results can be clearly interpreted as population levels peaking around contact as opposed to the "steep population crash that began in the 1600s" (Diamond 2005:91) that some authors describe.

The narrative of a pre-contact societal collapse on Rapa Nui originated in the archaeological literature with the work of the Norwegian Expedition, and was based largely on ethnographic data and limited observations from earlier explorers and ethnographers. The date of A.D. 1680 has been used as chronological shorthand in many models for pre-contact ecological, demographic, and political change. The primary data from throughout the island, however, do not support A.D. 1680 as a chronological marker. A date of A.D. 1680 is not significant in most palaeoecological, settlement pattern, or socio-political data. The date has been reified as factual, and it is clear that this "fact" needs to be questioned and abandoned. The use of a singular date as the explanatory framework for changes in various aspects of Rapa Nui society conveys the notion that the society underwent dramatic, punctuated detrimental changes, but such changes are not supported archaeologically. The use of this date has shaped interpretations of chronometric data, and some archaeologists are quick to discount dates that fall outside the error range associated with A.D. 1680. In essence they are clinging to a typology that was developed some 50 years ago by the Norwegian Expedition rather than trusting their own empirical results.

To date, only one extensive critique of the Norwegian Expedition's work on Rapa Nui has been presented (Golson 1965), and it has largely been ignored in the literature (but see McCoy 1979; Mulrooney *et al.* in press; Vargas *et al*. 2006 for reviews). The recent debate over whether or not Rapa Nui society collapsed during the pre-contact period is significant in showing that the Norwegian Expedition culture history model needs to be questioned. Recent critiques of the so-called collapse have been instrumental in showing that the evidence for pre-contact societal change is insufficient in supporting the interpretations of archaeological data (Hunt 2006, 2007; Hunt & Lipo 2007; Hunter-Anderson 1998; Mulrooney *et al. in press*; Rainbird 2002; Tainter 2006; Young 2006). These critiques may help scholars to critically rethink the implications of perpetuating such a model for Rapa Nui. It is hoped that through examining the mythical nature of this chronological marker and presenting new preliminary evidence from Hanga Ho'onu, we have taken the first step in abandoning the use of this date completely.

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Sneak peak ... from "**BELLYBUTTON OF THE WORLD**" by Dick Wilhelm ... in the Spring 2010 *Rapa Nui Journal*.

Arrival of the first aircraft on Easter Island, 1967