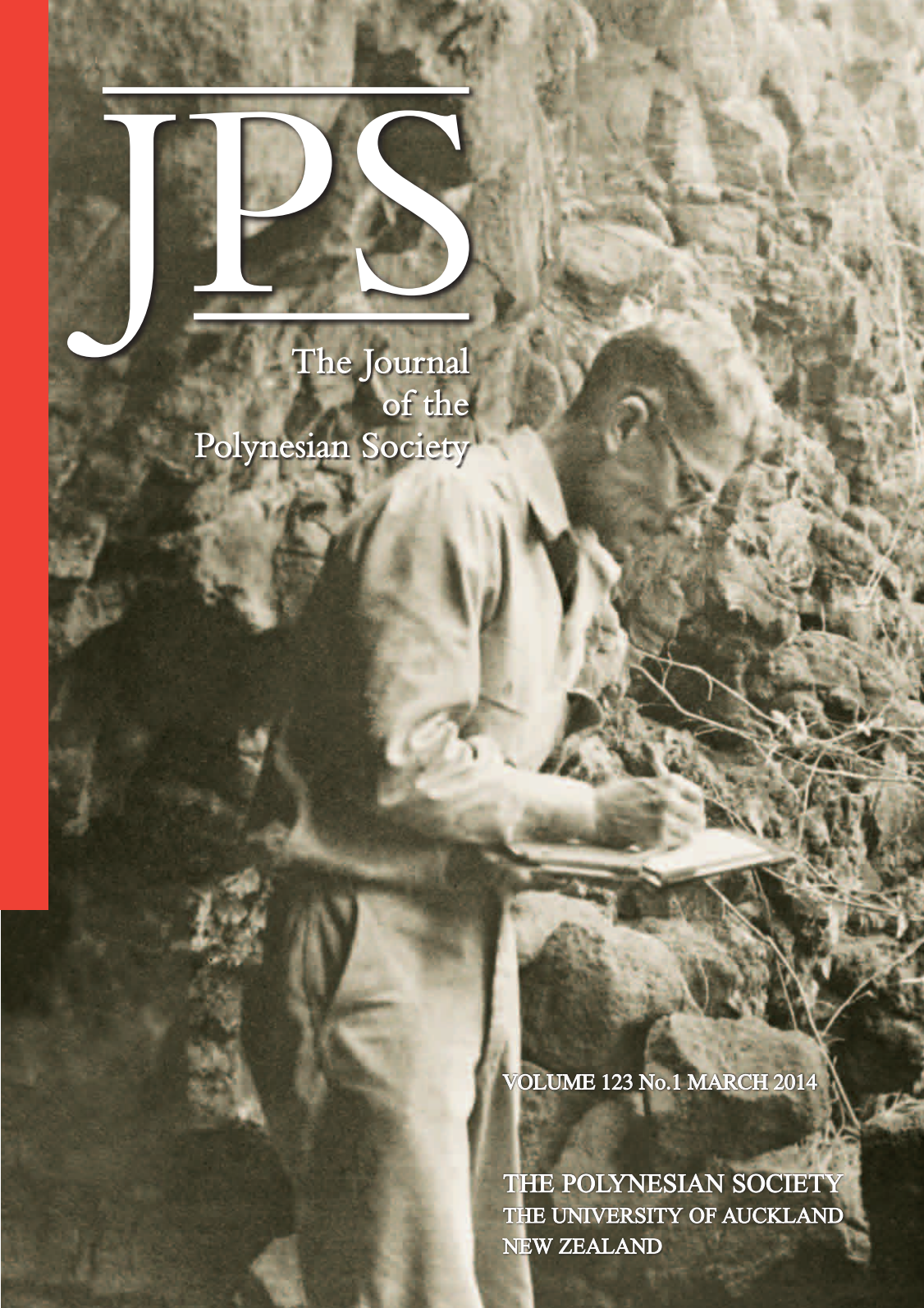

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AUCKLAND, NEW ZEALAND

Volume 123 MARCH 2014 Number 1

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Making JPS Articles More Accessible

This volume marks the beginning of our membership with CrossRef, a not-for-profit association of scholarly publishers whose aim is to support scholarly communication. This citation-linking network now connects some 67 million journal articles and other works from around the world. Each electronic journal article (or other object type) is assigned a "Digital Object Identifier" or DOI, a unique alphanumeric string. Each DOI is associated with a set of basic metadata (authors, issue, page numbers, references cited within the paper, etc.) and a URL pointer to the abstract or full text. The CrossRef service registers the DOI names and URLS in a central DOI directory on behalf of publisher members.

The DOI provides a persistent link to the object's location on the web. This means, for example, if a *JPS* paper is cited in a *Current Anthropology* paper, the DOI will directly link the reader to the JPS site where they can find the abstract or full text. Likewise, references in *JPS* papers have outbound links to the content elsewhere. Overall *JPS* papers will be easier for other authors to find and cite, and our readers can use the DOIs in *JPS* papers to locate related material in other online locations. Here is an example of a DOI http://dx.doi.org/10.1016/j.jas.2014.05.008 which can be followed to the source journal. Our thanks to Ben Davies for facilitating the *JPS* CrossRef membership, and for devising the new *JPS* DOI system. The above information comes from the CrossRef web site: http://www.crossref.org/

Journal readers also will now find the specific citation information (year, volume, issue and page numbers) at the end of each article, below the abstract and keywords. The DOI will appear here as well.

Amendment to Volume 122 (2013) Index

It has been brought to our attention that the 2013 JPS index for Volume 122 (1) inadvertently omitted a *Letter to the Editor* from David Scott Walsh regarding Michael Goldsmith's *The Colonial and Postcolonial Roots of Ethnonationalism in Tuvalu* (*JPS* 121: 129-50). We apologise for this oversight.

Opportunity to Purchase Books from Member's Private Collection

Drs Foss Leach and Janet Davidson are offering members an opportunity to purchase books from their private collection of largely Pacific titles. Please contact them at: foss.leach@gmail.com for more information and a list of the available volumes and prices.

The Polynesian Society's Growing Online Presence

To better serve our members and create more opportunities for interaction with our global community, the Polynesian Society has been working to improve our presence on the internet. Many readers will already be familiar with our website: www.thepolynesiansociety.org. Here, members can access our most recent *JPS* issues, subscribe or renew subscriptions, and find information about Polynesian Society publications. If you wish to be alerted when *JPS* issues are published, you can sign up for email notifications on the website, or follow us using an RSS feed.

You can also find us on Facebook: www.facebook.com/ThePolynesianSociety. Our Facebook page is used to update our community about upcoming *JPS* issues, Polynesian Society events, and items of general interest. We are currently followed by individuals from all over the globe, including many from New Zealand and the Pacific Islands. We hope this interest continues to grow, and look forward to making more connections in the Pacific and beyond.

If you have any questions about using the website or Facebook page, or other comments or queries, please email us at webmaster@thepolynesiansociety.org.

WIND TUNNEL MEASUREMENTS OF THE PERFORMANCE OF CANOE SAILS FROM OCEANIA

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"Traditional" approaches to canoes and voyaging in the Pacific consist mainly of recording seafaring techniques (Gladwin 1970, Lewis 1972, Thomas 1987), documenting canoe building (Damon 2000, George 1998, Tilley 2002), experimental reconstruction and/or sailing in the few remaining traditional canoes (Finney 2003, Lewis 1972, Thomas 1987), measuring canoe performance at sea (Doran 1972, Finney 1977), and in computer simulations (Avis, Montenegro and Weaver 2008; Di Piazza, Di Piazza and Pearthree 2007; Evans 2008; Irwin, Bickler and Quirke 1990; Levison ,Ward and Webb 1973). Another tack consists of predicting hydrodynamics of vessels or aerodynamics of sails in towing tanks, wind tunnels or with computational flow models. To the knowledge of the authors only one such study, on the Marianas flying *proa*, has been published to date for the Pacific (Jackson and Bailey 1999), although in a recent paper, Irwin (2008) discussed the utility of such an approach.

Important early wind tunnel experiments were conducted by Czeslaw A. Marchaj, National Finn sailing champion in Poland, Research Fellow in the Department of Aeronautics and Astronautics at Southampton University, and later an independent aerodynamics consultant. His publications such as "*Sailing Theory and Practice*" written in the mid 1960's, followed by "*Aero-Hydrodynamics of Sailing*" (1988), "*Seaworthiness: The Forgotten Factor*" (1986) and "*Sail Performance: Techniques to Maximise Sail Power*" (2010), have become classic references. His involvement in many different research projects, such as rig design for a 12-metre America's Cup challenger, and development of sail rigs for Third World fishing fleets, also led him to study the Polynesian "crab claw" rig. During his long career, one of the important hypotheses he developed is that "the practically extinct crab claw type of sail -once used by the Polynesian seafarers—is superior to the fiercely guarded product of racing and rating rules", namely the triangular Bermudan sail (Marchaj 2003: 161).

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But what does Marchaj mean by "crab claw" rig? No detailed description of the rig is given except that "crab claw rigs were characteristic of western Polynesia when Tasman and Schouten were exploring in the Tonga area in the 17th century" (Marchaj 2003: 160, Fig. 143). Referring to his figures (Marchaj 2003: 175, Figs 133, 139, 141, 142, 146, 148, 160), his "crab claw" rig can be defined as an "*axisymmetric*" triangular sail, with a deep bay or hollow in the head, spread between two spars slightly curved in plan, fixed to a vertical mast. This sail, while not replicating any particular Oceanic rig, does have similarities with the axisymmetric sails used in Fiji and Tonga, although there it is slung from a pivoting forward leaning mast (contra the fixed vertical mast in Marchaj), its tack is fixed to the prow (this detail is unclear in Marchaj's figures), and it seems to have had a more pronounced camber.[1] Marchaj's objective was not so much to copy actual Oceanic sails, but to test "basic rigs" (Marchaj 2003: 153).

The primary objectives of this paper are twofold: (i) to test different traditional Pacific rigs in a wind tunnel, rank their relative performance, and compare these results with other studies, in particular Marchaj's "crab claw"; and (ii) to question developmental implications of such results and consider whether the geographic distribution of the various rigs could shed some light on the history of settlement within Oceania.

Such experiments should prove helpful when attempting to better comprehend the maritime world faced by prehistoric sailors. Indeed, even though Pacific seafaring has captured the attention of scholars for centuries, debates continue about the performance of ancient canoes (Anderson 2000, 2001; Finney 2006; Irwin 2008; Levison *et al.* 1973), the extent of maritime knowledge (Irwin 1992), the architectural traits and rigs of vessels of the past (Anderson 2000, 2001; Doran 1981; Horridge 1987, 2008) and the evolutionary processes that shaped them (Beheim and Bell 2011, Doran 1981, Haddon and Hornell 1975, Horridge 1987, Irwin 2008, Neyret 1974, Rogers and Ehrlich 2008). We advocate here that the physics of aerodynamics (and eventually hydrodynamics) should help to ,better understand the technological capacities and constraints on sailing canoes in relation to their history, environment and distribution.

PACIFIC RIGS TESTED

We chose ten rigs (some of which are no longer used, some are still in use) with different types of sail geometry to represent the diversity across the Pacific, from the Philippines to Eastern Polynesia. These rigs used two distinct means of coming about: shunting and tacking. Shunting canoes (*Ninigo, Massim, Arawe, Micronesia, Tonga, Santa Cruz and Vanuatu*) always keep the outrigger, and thus one side of the hull, to windward. The bow becomes the

stern and vice versa. Their hulls are symmetrical fore and aft, and sometimes asymmetrical windward to leeward with fuller forms to windward. Tacking canoes (*Vanuatu, Tonga, Tahiti, Hawaii, Marquesas*) have dedicated bows and sterns and their outriggers will thus be alternatively on the windward and leeward side.[2] Their hulls are symmetrical port and starboard.

Drawings of the ten sail types are shown in Figure 1. Traditional sails are still used in scattered locations in Oceania, although nowadays they are generally rendered in canvas (or even rice sacks) instead of traditional pandanus mats.[3]

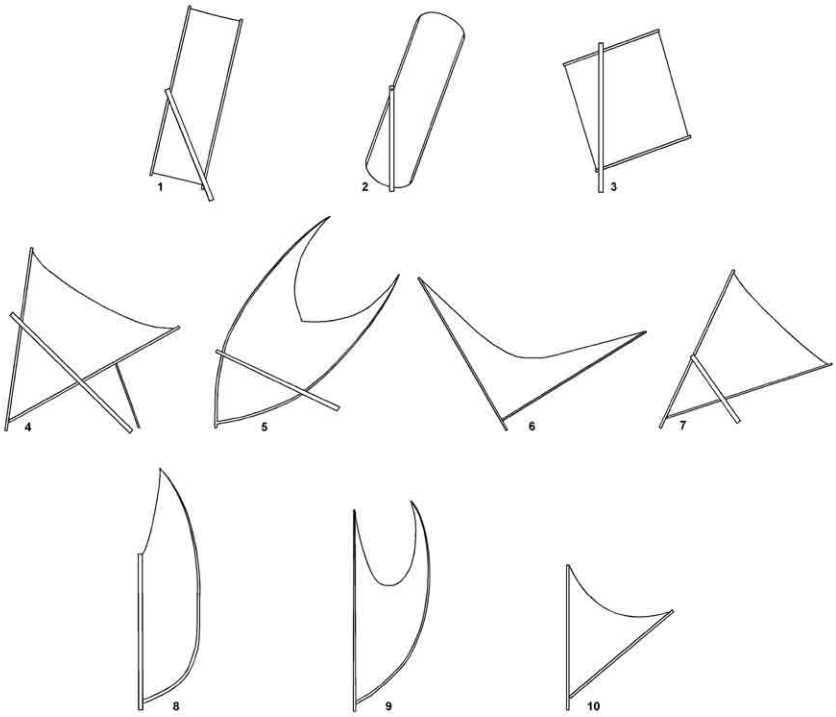

Figure 1. Drawings of the different model sails. 1. *Ninigo*, 2. *Massim*, 3. *Arawe*, 4. *Micronesia*, 5. *Santa Cruz*, 6. *Vanuatu*, 7. *Tonga*, 8. *Tahiti*; 9. *Hawaii*, 10. *Marquesas*. Sails 1, 2 and 3 are Oceanic lugsails; 4, 5 and 7 are Oceanic lateens; 6, 8, 9 and 10 are Oceanic spritsails.

Where sails have disappeared, our best sources are the drawings of early voyagers, especially those of Admiral Pâris who gave the most detailed measured plans of canoes ever made. Many of them have been re-published by Rieth (1993). Captain Cook, some of his officers, notably Bligh, and the various artists who accompanied him on his three voyages, especially Parkinson, Hodges and Webber, made numerous drawings and sketches of now vanished canoe types. Haddon and Hornell (1975) and Dodd (1972) made important contributions towards Pacific canoe typology and understanding of their historical evolution. Their books are the most complete compilations of images of Pacific canoes, and include those of Pâris' and Cook's artists.

For clarity, we refer to the different sail types by the name of the island or archipelago where they were recorded. Their order of presentation is roughly from West to East, regrouped into three rig types: Oceanic lugsails, Oceanic lateens and Oceanic spritsails. The dimensions of our sails and spars were taken either from scaled drawings (*Micronesia*, *Tonga*, *Santa Cruz*), sketches or photographs illustrating the sail at right angles. Human figures (assumed to be 1.7 m tall) were used for scale.

Ninigo is the boomed lugsail still used on shunting single outrigger canoes in the Ninigo Islands (Western Bismarck archipelago) of Papua New Guinea. The rectangular sail is lashed between the yard and the boom, which ends in a fork stepped upon the lower end of the mast. The mast is socketed on the leeward gunwale and is pivoted toward the bow during the shunting manoeuvre like an Oceanic lateen. Our example is based on the sails from Haddon and Hornell (1975 [2]: 176, Fig. 108) and Lewis (1972: 267, Plate XII).

Massim is the unusual rig of the shunting[4] outrigger canoe *nagega* (*anageg* after Damon 2000) still in use in the eastern part of the Kula Ring area, notably on Gawa and Murua Islands in the Milne Bay Province, New Guinea (Malinowski 1961, Munn 1977, Damon pers. comm. 2010). The rig has been described as "flattened oval" or "rounded oblong" in Haddon and Hornell (1975 [2]: 279-81, 1975 [3]: 53) and as "tilted elliptical" by Horridge (1987, Fig. 83, type p). Our model rig is based on a photograph (Haddon and Hornell 1975 [2]: Fig. 150), with the length to width ratio calculated at 1:4 to correct for picture distortion. Perhaps the clearest image of this sail is from Irwin (1999, Fig. 14.2).

Arawe is the boomed lugsail used on fixed vertical masts on shunting single outrigger canoes in scattered locations around the Bismarck Archipelago, north of New Guinea. Our example is based on a photograph by Speiser from the Arawe Islands, off the southwest coast of New Britain, published in Haddon and Hornell (1975 [2]: 162, Fig. 98). Whether these sails are still in use is unknown to the authors.

Santa Cruz is a type of shunting Oceanic lateen sail with a very deep hollow in the head. This distinctive rig is restricted to the Santa Cruz group at the south end of the Solomon Islands. Today, reconstructed *Te Puke* (*Tepuke*) canoes with this rig are again sailing in the Solomon waters.[5] Photographs and drawings used for our model sail come from the Templeton Crocker Expedition of 1933, as published in Haddon and Hornell (1975 [2], Fig. 33) and from Pâris ([1843], Plate 114).

Micronesia is a shunting Oceanic lateen sail used on outriggers throughout the Marianas, the Carolines, Kiribati and the Marshalls. Our sail is based on an example from Puluwat Atoll, in the Caroline Archipelago, measured by Doran (1981: 30, Fig. 10). This sail has a wide tack angle (the angle between the yard and the boom) and the yard is normally rigged nearly vertical, although it may be adjusted lower.

Tonga refers to the Oceanic lateen sails used on large double or outrigger voyaging canoes in Tonga, Fiji and other nearby islands. This rig differs from *Micronesia* in that the tack angle is always narrower and its yard lower. It was still in use in the mid-19th century in Tonga. This rig is still sailing on several of the southern Lau Islands in Fiji (Gillett 1993). Although most canoes with this rig used the shunting manoeuvre, one type, the *Tongiaki*, had the particularity of coming about by tacking (Thomson 1908: 295). The best illustration of the rig of a *Tongiaki* is from Hodges (Dodd 1972: 77; Haddon and Hornell 1975 [1], Fig. 192).

Vanuatu is a variant of the Oceanic spritsail, known as the butterfly sail. It is used with both tacking and shunting manoeuvres. It is characterised by two long edges supported by straight spars, a wide tack angle (about 90°) and a deep symmetrical curve of the head**.** This rig, once used in the central and northern islands of Vanuatu, disappeared in the early 1900s. Height, width and curvature ratio come from photographs by Speiser (1996: Plate 62.7) and McCulloch (Haddon and Hornell 1975 [2]: 30, Fig. 18).

Tahiti is a type of Oceanic spritsail, with a characteristic head supported by a sprit and extending above the mast head. It was once used on both double and outrigger canoes. This rig disappeared about 200 years ago. Our measurements are based on drawings made by early explorers to Tahiti, especially a sketch by Parkinson (Dodd 1972: 127), as well as drawings by Webber and Hodges (Dodd 1972: 130, 131, 139). The canoe sail from Tahiti discovered at the British Museum, with a width to height ratio of 1:6, has recently improved our understanding of this sail (Hiquily *et al.* 2009).

Hawaii is a type of Oceanic spritsail spread between a vertical mast and a curved sprit, with a very deep curve in-between, somewhat resembling the *Santa Cruz* and *Vanuatu* rigs. No longer in use, it is poorly documented. The best field sketch we found to replicate the sail was drawn by Webber (Dodd 1972: 116).

Marquesas is a type of Oceanic spritsail spread between two straight or nearly straight spars, fallen into disuse today. Our sail is based on a drawing by Hodges which, according to Haddon and Hornell, is the only record of an ancient Marquesan sail (Haddon and Hornell 1975 [1]: 35, see also Dodd 1972: 132-33).

MAKING THE SAILS

Our rigid experimental sails (Table 1) were made out of laminated epoxy-fibreglass with the outer surface left rough to reflect the traditional ones of plaited *Pandanus tectorius* mats, as well as to insure a fully turbulent flow regime. Surface roughness and wind velocity are important factors to promote the transition from laminar to turbulent flow in order to make certain that model results are comparable to full scale sails (Schlichting 1979).

While data is available for rig geometries and sail planform (sail shape when viewed from side), details of their airfoils are unknown. Rather than attempting to study differences in airfoils, all sails were laid-up on the same male mould with maximum camber at mid-chord and flattened sections fore and aft. Marchaj has shown that cambers between 1:7 and 1:10 at mid chord are "the best all-round compromise" for the different points of sail, although somewhat too full for maximum efficiency sailing to windward in strong winds (Marchaj 1964: 129-133, 138). In any case fragile mat sails would

Table 1. Geometrical characteristics of the different rigs. Sail surfaces of reference (S) were calculated in m^2 from digital photographs of the models.

	Height (H) (m)	S (m^2)	Aspect ratio (H^2/S)	Camber
Ninigo	0.31	0.03026	3.17	1:11
Massim	0.29	0.0267	3.15	1:10
Arawe	0.27	0.0424	1.72	1:11
Micronesia	0.31	0.04431	2.17	1:10
Santa Cruz	0.39	0.0383	3.97	1:10
Vanuatu	0.29	0.01939	4.34	1:10
Tonga	0.25	0.03355	1.86	1:10
Tahiti	0.44	0.03298	5.87	1:7
Hawaii	0.38	0.0273	5.29	1:10
Marquesas	0.26	0.01498	4.51	1:11

generally be taken down in these conditions. Giving all our sails the same airfoil facilitates comparison, although being rigid they cannot reflect all the complexity of real sails which stretch, twist and change camber depending on heading and sail adjustment.

Masts were made from 4-8 mm diameter carbon fiber tubing. Yards, booms and sprits were constructed using 3 mm diameter carbon rod, bamboo (*Tahiti, Santa Cruz*) or wood (*Massim*, *Hawaii)*. Spritsails were fixed to the axis of the mast. Yards, sprits or booms were fixed on the windward side of the sail. Additional geometrical characteristics of the tested sails are show in Table 1.

METHODS OF MEASURING THE AERODYNAMIC FORCE IN A WIND TUNNEL

In a wind tunnel, a fan blows air over a static model sail mounted on a sensitive balance which measures aerodynamic forces (lift, drag, pitch) generated by airflow over the sail. The magnitude of these forces depends on wind speed, sail area, angle of incidence, sail geometry (camber, aspect ratio) and characteristics of the sail surface (porosity, roughness, etc.) (Marchaj 2003: 79).

Tests were carried out in the subsonic wind tunnel named "Bois" at the "Ecole Nationale Supérieure de Mécanique et d'Aérodynamique" in Poitiers, France. It has an open circuit with an octagonal test-section (1 m^2), producing a uniform flow to a maximum speed of 80 m/s (meters per second), with a turbulence level less than 0.3 % at 40 m/s. To avoid wall interference effects, the model sails were less than 50 cm high.

The sails were mounted on a turntable connected to a balance which measures the force on six axes. Here we are mainly concerned with the drag force (D), parallel to the wind direction and the lift force (L), perpendicular to the wind direction (Fig. 2). Sails were initially adjusted parallel to the wind (angle of incidence (α) of 0°). The turntable is rotated from 0° to 80° (by 2° steps) and then back to 0°, so as to verify the first results. Greater incidences are generally not used by sailing canoes. Oceanic lateens cannot sail directly downwind because the rig is held up by wind force. It has no stays on the leeward side and will fall overboard or capsize the canoe if the sail is caught aback, that is when the wind pushes the sail against the mast. Oceanic spritsails could sail safely almost directly downwind with their sails turned forward of the mast, as can be seen in the numerous illustrations from Hawaii and Tahiti by Cook's artists.

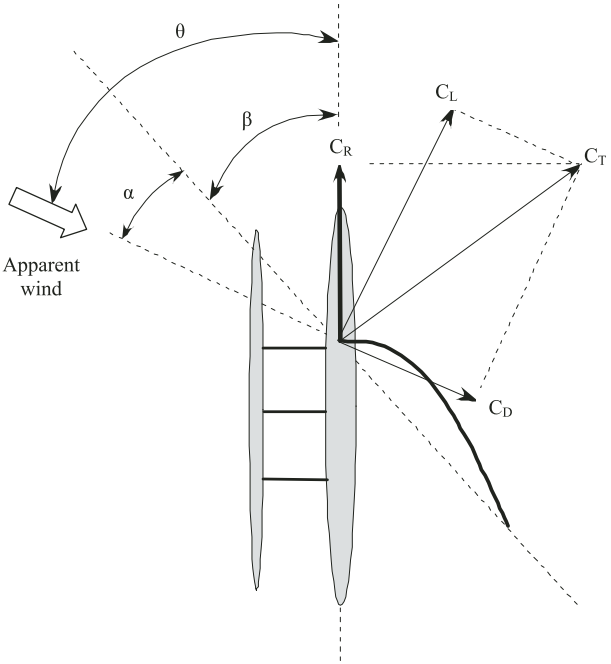

Figure 2. The coefficients and angles used in these experiments and discussed in the text.
C_L is the lift (L) coefficient.
C_D is the drag (D) coefficient.
C_T is the resultant of both C_L and C_D.
C_R is the driving force coefficient that is C_T projected onto the heading.
α is the incidence of the sail relative to the apparent wind.
β is the angle which represents the trim of the sail relative to the heading.
θ is the angle formed by the apparent wind and the heading; it characterises the point of sail.

RESULTS

In Figure 3 lift and drag measurements obtained from the ten test sails are plotted as coefficients of lift ($C_L=2L/(\rho.S.v^2)$) and drag ($C_D=2D/(\rho.S.v^2)$). The measurements are normalised to the surface area of the sail (S). True wind speed is referred to as v; ρ is the air density. The curves give the magnitude of the resultant force, varying with incidence for each sail at a given wind speed. A wind speed of 25 m/s was chosen so that the measured forces would

fall in the zone of maximum sensitivity of the balance for all sails, except for *Santa Cruz* where the test was made at 20 m/s; this was done because at higher speeds, oscillation of the tips of the sail shook the balance, causing inaccurate measurements. This difference in wind speed has no effect on our unit-less coefficients. It should be noted that in Figure 3, the incidence of 0° is defined as the point of zero lift or $C_L = 0$.

At low incidences, once the sail fills, its lift begins to increase and the curve climbs steeply. Where the tangent to the curve is nearly vertical, the lift increases much faster than the corresponding drag and the lift/drag ratio is at its greatest. Beyond this point, both lift and drag continue to increase but the C_L/C_D ratio decreases. Where the tangent to the curve is 45°, the drag begins to increase faster than the lift. The maximum windward performance of the sail is between these two tangents or points. Lift and drag still continue to increase, up to the stall, the summit of the curve, where lift is at its maximum. Beyond this point the curve descends and drag force becomes increasingly important. At very high incidences (beyond 60°), the sail is propelled more by drag than by lift.

In light of Figure 3, it appears that close-hauled (that is when sailing to windward), lift to drag ratio (L/D) is the most important factor. *Massim*, *Ninigo* and *Tahiti*, have the highest L/D and are expected to be the most efficient of the ten sails tested when sailing to windward. With respect to beam reaching (with the wind at 90° and the sails at their highest C_L), *Santa Cruz* has the best performance of all, although *Ninigo* and *Massim* are almost as good. They are followed by *Arawe*, *Micronesia*, *Vanuatu* and *Marquesas*. The other three sails (*Tonga*, *Hawaii*, *Tahiti*) have the lowest maximum C_L. Broad reaching and running (from about 100 to 160° off the wind), there is little difference in the performance of all the sails, although again *Santa Cruz* is the best.

Two classes of stall can be noted, relatively abrupt or gentle. A possible explanation for the abrupt stall of *Tahiti* and *Massim* lies in the elongated shape and high aspect ratio of their sails, as well as their nearly vertical leading edges. This makes them behave somewhat like airplane wings with a two-dimensional stall (occurring at nearly the same moment along the height of the sail). For the other sails, with inclined leading edges (*Tonga*) and/or large changes in geometry along their lengths (such as the deep curves in the heads of *Santa Cruz* and *Vanuatu* sails), the stall is certainly modified by three-dimensional effects, such as vortex lift. Vortex lift works by capturing the vortices generated along the leading edges (yard and boom) of the sail, keeping them attached to the surface and retarding the stall (Marchaj 2003: 161-66).

To further examine the power of these rigs, the coefficient of driving force (C_R) is plotted against the heading of the canoe (θ) (Figs 2, 4). C_R is the resultant of coefficients C_L and C_D projected onto the course sailed or

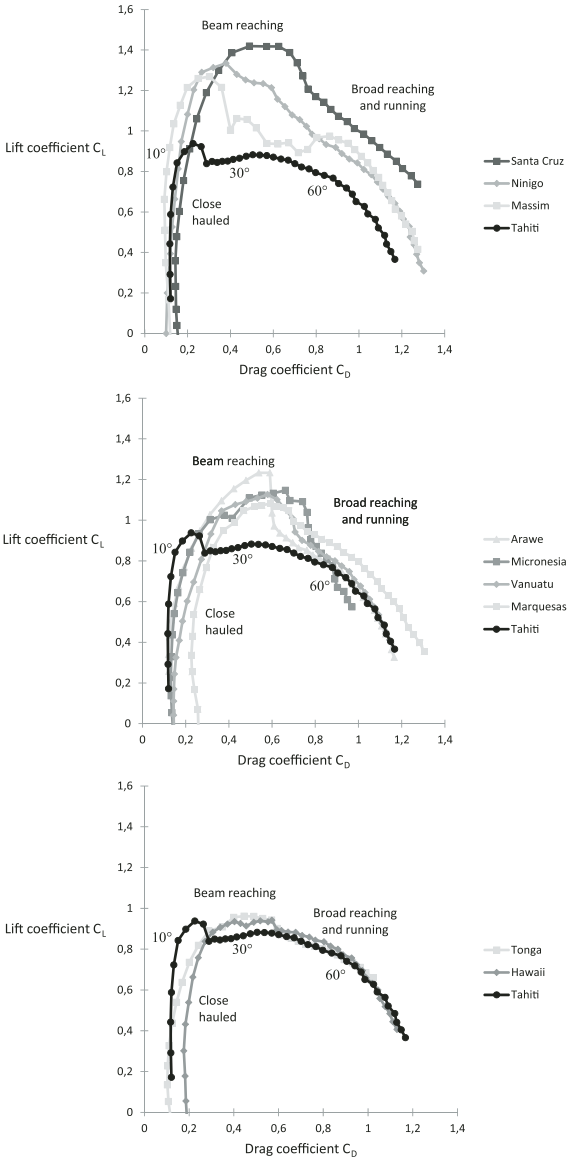

Figure 3. Drag coefficient over lift coefficient. *Tahiti* has been repeated on the three diagrams to facilitate comparisons. The dots represent 2° increments of sail incidence. Incidences of 10, 30 and 60° are indicated for *Tahiti*.

heading.[6] To calculate maximum C_R ($C_R = (C_D.\text{Cos}\beta) + (C_L.\text{Sin}\beta)$), one has to determine appropriate values of angle (β), that is, the trim angle of the sail relative to the heading. The method used in these experiments consisted of calculating C_R at 5° increments of β (from 0 to 180°) and plotting the best result, which represents a sail adjusted for its highest efficiency.

Not surprisingly, the ranking of the sails at different heading angles against driving force coefficient (C_R) in Figure 4 is similar to that obtained with the C_D over C_L coefficients (Fig. 3). At low heading angles, from about 30° to 80°, three sails (*Santa Cruz*, *Ninigo*, *Massim*) are remarkable for their higher efficiency. Four other sails (*Arawe*, *Micronesia*, *Vanuatu*, *Marquesas*), while somewhat less efficient close hauled, have similar performance throughout almost the entire range of headings. The last three sails (*Tonga*, *Hawaii*, *Tahiti*) also cluster together with lower performance throughout, except for the case of *Tahiti* when close hauled. Indeed *Tahiti* appears to be specialised for windward headings. In the light of these observations, it appears that in general, Oceanic lugsails (*Ninigo*, *Massim*, *Arawe*) are more efficient than Oceanic lateens or spritsails and that within these last two groups, there is fairly high variability. However, at heading angles greater than 55°, one Oceanic lateen (*Santa Cruz*) surpasses them all.

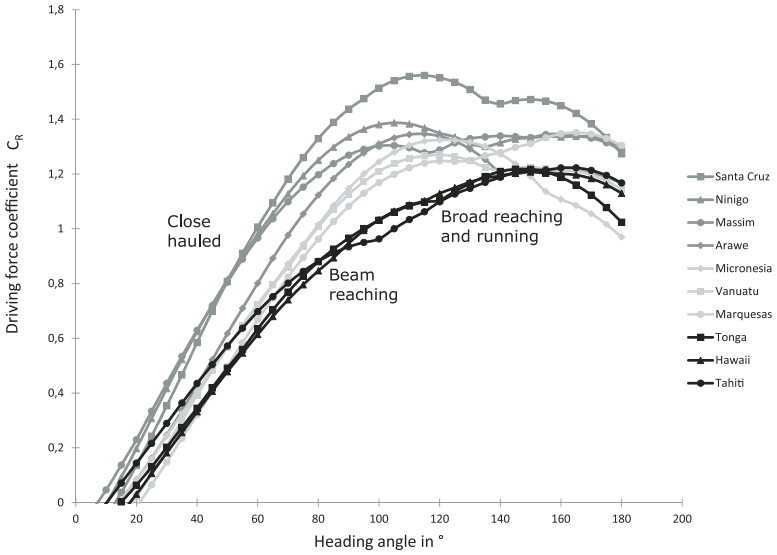

Figure 4. The driving force coefficient (C_R) over the heading

The ranking discussed here is a first attempt at a general comparison of sail efficiency based on lift and drag characteristics. But to derive more complete performance figures, such as canoe velocity relative to wind speed and heading, will require additional studies on the hydrodynamics of canoe hulls and estimation of sail area to canoe displacement. Finney has noted that shunting canoes rigged with the Oceanic lateen should sail significantly faster than spritsail-rigged tacking canoes with their nearly upright leading edges (Finney 2006: 131). Although the wind tunnel tests did not clearly differentiate an Oceanic lateen class versus an Oceanic spritsail class, the general pattern is that lateens are the more efficient. Since the sail area to displacement ratio of spritsails is also much lower than that of lateens,[7] it is likely that Finney is correct.

DISCUSSION

The aerodynamics of sails are now well understood for conventional yachts but little work has been done on traditional sailing canoes. The results presented here are thus still somewhat preliminary since there are only two limited comparative studies available: Marchaj's "crab claw" and Jackson and Bailey's Marianas *proa*. Among our sails, the one that most closely replicates the performance of Marchaj's "crab claw" (2003: 160, Fig. 142) is *Santa Cruz* (Fig. 5). This raises the question of why the driving forces of *Santa Cruz* and Marchaj's "crab claw", to which we can add *Ninigo* and *Massim*, are substantially higher than the others. Marchaj discussed the following factors as contributing to the efficiency of his "crab claw" sail: leading edge stiffness, relatively flat camber, a planar (untwisted) sail, a rounded nose or tack angle and a moderate sweepback or yard angle (Marchaj 2003: 167-73). For Marchaj, a stiff leading edge produced higher lift. All our model sails had relatively stiff, round leading edges, except *Santa Cruz* whose thin tipped spars oscillated at high wind speed. As far as camber, Marchaj noted that for his axisymmetrical conical sails, "the less the camber, the higher the lift" (Marchaj 2003: 169). Our sails moulded with the same camber at mid chord did not allow comparison. Marchaj noted that a "crab claw" sail with its tack fixed to the deck, holding the sail planar and untwisted, gave as much as 35% more driving force than the same sail with its tack left free (Marchaj 2003: 170). All the Oceanic rigs tested here had fixed tacks, effectively eliminating sail twist and improving efficiency. Marchaj found that a rounded tack angle with curved spars (D in Figs 161, 164) was superior. Indeed, our *Santa Cruz* model was more efficient than the *Tonga* and *Micronesia* sails with their straight spars and pointed tacks. Marchaj claimed that for best performance to windward, the sail should be set with a medium sweepback angle (Marchaj 2003: 173, Fig.162). He used yard angles of 7°, 38° and 69° aft as measured

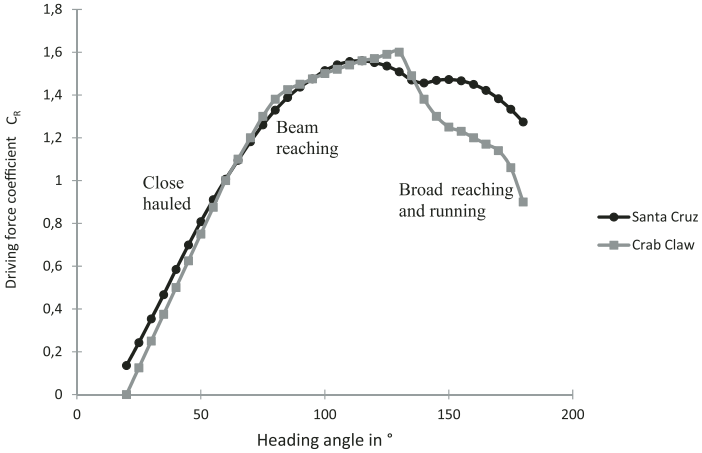

Figure 5. A comparison of driving force coefficients of the *Santa Cruz* sail and Marchaj's "crab claw" sail (after Marchaj 2003: 160, Fig. 142).

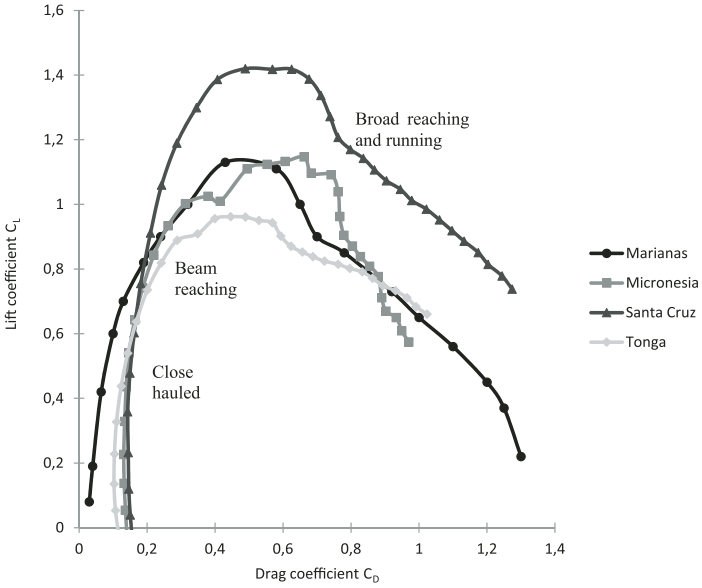

Figure 6. Three Oceanic lateen sails, *Micronesia*, *Tonga* and *Santa Cruz* compared to the Marianas *proa* (after Jackson and Bailey 1996: Fig. D.4).

from his Figure 162. Our best data on the effects of variable yard angles are for the *Massim* Oceanic lugsail. It was more efficient with its yard angle at 10° and 20° than at 30°, 40°, 50°.

The performance of Jackson and Bailey's (1996) Marianas *proa* rigged with an Oceanic lateen sail is consistent with our three Oceanic lateens. Their maximum values are closest to our *Micronesia* and the overall shape of their curve to *Santa Cruz* (Fig. 6). These broader comparisons tend to support our results.

Oceanic sailing canoes have been shaped by hundreds, even thousands of years of experiences and indeed their rig types appear to be correlated with the history of settlement inferred from geographical distribution and historical linguistics. Within the vast area settled by Austronesian sailors, we recognise three regions, each with its distinctive and exclusive rig type. Today, the western region, from Indonesia and the Philippines to northern New Guinea, is inhabited by Western Malayo-Polynesian speakers, whose dominant canoe type is a double outrigger that tacks through the eye of the wind and carries a rectangular Oceanic lugsail. The central region, including Island Melanesia, Western Polynesia and Micronesia, is peopled by Oceanic speakers whose prevailing canoe type is the shunting single outrigger with an Oceanic lateen sail. The last region is Eastern Polynesia, where tacking canoes carry Oceanic spritsails.[8] While we have no archaeological evidence of the antiquity of any of these types, their distribution correlates with the three major periods of Pacific settlement: the arrival of the Austronesians in the western region perhaps 6,000 years ago, in the central region around 3,500 years ago and in the eastern region some 1,000 years ago. If indeed, these three rig types were used by the Austronesian sailors who discovered and settled each of these three regions, it implies that Oceanic lugsails, lateens and spritsails were all innovated before the settlement of the newly discovered regions. While our model sails, based on relatively recent data can be classed into these three types, we do not think of any of them as representing ancient prototypes, but rather as the outcome of a long history of local innovations and/or borrowings.

There are other models in the literature about Austronesian canoe origins. Among the most recent are those of Horridge (2008) and Irwin (2008). For Horridge (2008: 86) the ancestral rig used for the settlement of Western and central Oceania was "the triangular sail… supported by two-booms, pushed up with a loose prop [mast]" (our shunting lateen rig type). For Irwin, the simple two-spar rig (Oceanic spritsail) is the oldest, predating the three-spar Oceanic lateen. He argues it was the one probably used during the Lapita settlement of the central region some 3,500 years ago (Irwin 2008), as well as for the discovery of East Polynesia some 2,500 years later (Irwin 2011).

Concerning the central region, linguistic reconstruction of Proto-Oceanic (POC) indicates that canoes were dugouts with sewn on gunwale strakes, single outriggers and sails, although no terms could be reconstructed for either the type of sail or the maneuver (shunting or tacking) (Greenhill and Clark 2011; Pawley and Pawley 1994**)**. The one reconstruction that allows inferences about rig type seems to be reflexes of **jila* whose meanings range from boom or yard to mast in different lower order subgroups of Oceanic languages. According to Pawley and Pawley, in POC **jila* refers to one of the spars supporting the sail, either the yard or the boom in Admiralty Islands (ADM), in Western Oceanic (WO) and in Central and Northern Vanuatu (CNV). Further east, this term refers to yard in Tonga and Pukapuka, sprit or mast in Samoa, mast or spar in Tikopia, and mast in Tahiti, Mangaia and New Zealand (Pawley and Pawley 1994: 350-51). They further note that "the use of reflexes of **jila* to denote a fixed mast is confined to certain parts of Polynesia [Tikopia, Samoa, East Polynesia] and this sense probably represents a post-PPN innovation" (Pawley and Pawley 1994: 351). We believe that the shift in meaning from yard or boom to mast may well reflect a technical innovation from the three spar lateen to the two spar spritsail, where the forward sail spar became a functional mast, somewhere in West Polynesia (Di Piazza in press).

While it is generally agreed that the Oceanic spritsail served for the discovery of East Polynesia, there is divergence in where and when it was innovated. For Horridge, it was after the initial Austronesian expansion. For Irwin, it was prior to the Lapita expansion, therefore more than 3,500 years ago. We argue here that it was during the long pause between the settlement of Samoa and that of East Polynesia.

* * *

For different practical reasons (bans on sailing by colonial administrations, the introduction of canvas, etc.), the weaving of sails has practically ceased in contemporary Pacific societies. To better understand how they perform, we presented data from wind tunnel tests whose results allow ranking of ten Oceanic sails and discussion of differences in relative performance based on empirical data. The analysis brings out some interesting points. Key among these is the relative high efficiency of Oceanic lugsails. The analysis also points to wide variability within the lateen sails, including the surprising high efficiency of the *Santa Cruz* sail. Finally, it indicates the good all-around performance of the *Marquesas* spritsail relative to the *Hawaii* and *Tahiti*.

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NOTES

1. Camber is the depth of curvature of a sail relative to its width (or chord) expressed as a ratio. The narrow Tahiti sail had a 1:7 camber, while the other wider sails varied from 1:10 to 1:11 (Table 1).
2. Tongan, Tahitian, Hawaiian and Marquesas vessels may also be rigged as double canoes, with dedicated bows and sterns.
3. Lewis noted that mat sails make stiffer and better shaped aerofoils. He further wrote that in Ninigo, cloth sails were used for day-to-day fishing and mat sails for racing (Lewis 1999: 29, 30).
4. The *Massim* sail is shunted by simply hauling the head down to the deck and raising the foot, which becomes the new head. Thus, the sail has a dedicated inside (windward) and outside (leeward) surface.
5. For references on *Te Puke* today see The Vaka Taumako Project of the Pacific Traditions Society whose principal investigator is Dr Marianne George (http://www.vaka.org/NSFNotes.html).
6. Leeway is ignored in calculating C_R (Marchaj 2003: 154, Fig. 136).
7. Doran (1981: 63) has published sail area and displacement for the Hawaiian spritsail rigged canoe *Nalehia* and the Carolinian lateen rigged outrigger *Mikael*. *Nalehia* has a sail area to displacement ratio only 55% of that of *Mikael*.
8. Regarding the central and eastern regions, Kirch (2000: 9) noted that "the extremely wide distribution of the Oceanic lateen sail throughout the island Pacific strongly implies that this was the sail type used on the canoe of early Austronesian speakers when they rapidly dispersed across remote Oceania beginning around 1200 B.C. On the other hand, the restriction of the Oceanic spritsail to Eastern Polynesia shows this to be a later, and independent development".

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ABSTRACT

To understand the sailing performance of traditional canoes in Oceania, we replicated ten sail rigs and tested them in a wind tunnel. Measurements of lift and drag forces demonstrate substantial differences in their performance. At low heading angles, from

about 30° to 80° off the wind, three sails (*Massim*, *Ninigo*, *Santa Cruz*) are remarkable for their higher efficiency. Three other sails (*Tonga*, *Hawaii*, *Tahiti*) are remarkable for their lower efficiency from heading angles of about 90 to 130°. In between, four more sails (*Arawe*, *Micronesia*, *Vanuatu*, *Marquesas*) have roughly similar performance to each other. The ranking of these sails is followed by a description of their distribution with inferences on historical evolution of canoe rigs.

Keywords: Oceania, navigation, sailing canoe performance, wind tunnel experiments, Czeslaw Marchaj, "crab claw" sail

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KI TŌ RINGA KI NGĀ RĀKAU Ā TE PĀKEHĀ?[1] DRAWINGS AND SIGNATURES OF *MOKO* BY MĀORI IN THE EARLY 19TH CENTURY

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Ko Rākaumangamanga te maunga,
Ko Ipipiri te moana,
Ko Te Rāwhiti te marae,
Ko Ngāti Kuta te hapū,
Ko Ngāpuhi te iwi,
Ko Te Nana te tupuna,
Ko Ngā Taiapa Rino o Te Poka o Whata Paraua ahau.

Rākaumangamanga is my mountain,
Ipipiri is my sea,
Te Rāwhiti is my marae,
Ngāti Kuta is my sub-tribe,
Ngāpuhi is my tribe,
Te Nana is my ancestor,
Ngā Taiapa Rino o Te Poka o Whata Paraua (Ngārino) is my name.

In May 2013, on a beautiful Monday morning, around 150 members of *hapū* 'sub-tribes' from around the Bay of Islands, including Ngāti Manu and Te Kapotai and the two *hapū* of Te Rawhiti (Ngāti Kuta and Patu Keha), boarded a hired ferry at Opua. Along with members of the Waitangi Tribunal and their retinue, the group visited sacred and important *hapū* sites. We began on our precious *moana* 'ocean' and ended up travelling by bus inland to *marae* 'ancestral community hubs' at Waikare and Karetu. This was to be a historic moment as we heard from our *kuia* 'female elders' and *kaumātua* 'male elders' about the effects of *Te Tiriti o Waitangi* (the Treaty of Waitangi) 1840 and its insidious legacies for us today. The next day our *kaikōrero* 'speakers' began four days of hearings, in which they frequently referred to documents which our *tūpuna* 'ancestors' had signed. In their Briefs of Evidence, they referred to the sacred marks their ancestors had made from their *moko* 'tattoo' on those documents, especially *Te Tiriti* and *Te Wakaputanga* (the Declaration of Independence) 1835. It is one thing to study such *moko* designs on paper or in theory, but it is quite another to see the way that they come alive in the voices of our *kuia* and *kaumātua*. So while this article began in a small office at the University, it ended on the sea in the Bay of Islands.

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The focus of this article is on identifying instances of the practice of Māori portraying their own *moko* and those of close relatives on paper.[2] On one level these markings acted as legal signatures for land transactions and other formal documents; on another, as I argue here, they can be considered as portraits and self-portraits as they captured the primary identity marker for Māori at the time—their own *moko*. This paper discusses key examples across time and space, both from specific people (Te Morenga, Hongi Hika, Tuai, Te Peehi Kupe and John Tuhawaiki) and in relation to specific documents (*Te Wakaputanga, Te Tiriti o Waitangi* and the Wentworth Indenture). It also discusses the regard Māori have for these portraits today.

Moko signatures have typically been examined as part of broader discussions of *moko* (Simmons 1986, Te Awekotuku 2007), Māori literacy (Haami 2004, Jenkins 1993, King 1978), and specifically *iwi* 'tribe' literacy (Ballantyne 2011, Jones and Jenkins 2011). Further studies are enmeshed in discussions of specific documents or events (Evison 2006, Hailstone 1993, Henare 2007, Parkinson 2012, Simpson 1990). The only dedicated study is Sarah Gallagher's "'A curious document': ta moko as evidence of pre-European text culture in New Zealand" (2003: 47) which argued that "moko, like the book, is a physical structure capable of being read by others". Her study identified key examples, such as those by the chief Te Uri o Kanae in the Bay of Islands in 1816 and the sale deed now known as the Wentworth Indenture (1840) in the South Island. Read together these sources provide a survey of key signatories, documents and moments; however, these studies were are done in isolation rather than providing a deeper understanding of the breadth of the practice, both in time and space, as well as an understanding of what this means from a Māori worldview. Here I argue that *moko* signatures and drawings should be read as "sites of cross-cultural exchange" to use Ballantyne's (2011) term, in the intersection of Pākehā print literacy with Māori oral literacy. As such, the signatures and drawings act as mnemonic devices in that they have the capacity to reveal to contemporary audiences the wider worlds in which our ancestors engaged, not only culturally, but also artistically and politically. Such marks are heralded by Māori as *tohu* 'signs', not only physical markings on paper, but also as visionary signs of the future, which would become much more complicated than either group, Māori or Pākehā, could have envisaged.

MOKO DEFINED

Moko is a visible expression of *iwi, hapū* and *whānau* 'family' identity. It is distinctive from Pacific *tatau* 'tattoo' in that it was literally carved into the skin in grooves up to a depth of 6 mm. The result was three-dimensional in appearance, with a play of light and dark across the skin. *Moko* personified

rank and accomplishment as only high-born people or those with proven abilities were eligible to receive one. As Elizabeth Ellis (1990: 264) notes, "[*Moko*] was not an isolated art form. It was part of the whole fabric of *Maori* culture and it changed and developed according to the pressures of the social environment."

Patterns varied according to cultural traditions. Some parts of the *moko* were generic, while other design elements were unique to the wearer and were often inherited according to *whakapapa* 'genealogy'. Many men wore *moko kanohi* 'facial tattoo' over their entire faces, while chosen women received *kauae moko* on their lips and chins. In addition, there were specific designs on the buttocks, and upper and lower thighs for both men and women, called *pakipaki,* and *rape* and *pakituri* respectively.[3] Other areas of the body could also receive *moko* including the back, chest and arms. Each design was named and they were related to each other, resulting in a complex composition which could be "read" by others.

The *tā moko* process would take many hours of work by the *tohunga-tā-moko* '*moko* practitioner', highly respected members of the community, both men and women,[4] who worked on commission, moving from one community to the next. Their tool kit consisted of *uhi* 'chisels' made from albatross bone and other materials: pigments derived from several sources including the *awheto* caterpillar (*Cordiceps robertsii*), a handle to haft the *uhi* onto, and a light wooden mallet to strike the handle. They would also have an *oko* 'decorated pigment container' and *korere*, a carved funnel to feed the recipient once the *moko* was complete. The entire process and all those involved were *tapu* 'sacred' during the process because of the shedding of blood and involvement of the head, the most sacred part of the body for Māori.

MOKO AS SIGNATURE

Throughout time Māori have identified themselves *vis-á-vis* their *moko.* Its distinctiveness was such that *rangatira* 'chiefs' began using them in the 1810s as symbolic of their selves, as their signature, quite literally. On deeds for the sale of land it was an essential element to have a signature to legally validate a transaction. This practice began in Te Tai Tokerau (Northland), most likely because this was the first location where missionaries wanted to buy land. Later, as literacy became more popular, *moko* were used as signature in other areas, and increasingly by whole groups of chiefs. Appendix 1 records all known extant examples of *moko* signatures, from 33 different chiefs, mainly from Te Tai Tokerau (20 named chiefs) and Ngāi Tahu (eight named chiefs).

It is no surprise that the first known *moko* signature is associated with those who officially brought literacy to Aotearoa. On 24 February 1815 at Rangihoua in the Bay of Islands, the Rev. Samuel Marsden negotiated

the purchase of more than 200 acres of land at Oihi in return for 12 axes.[5] The deed was signed by Te Uri o Kanae (or Ahodee a Gunna according to Marsden) and his brother Wharemokaikai of Ngāpuhi. *Kaumatua* 'elder' Hugh Rihari (Ngāti Torehina ki Mataka) explained the circumstances of this moment (Rihari 2010). Marsden had been keen to purchase land where several Church Missionary Society (CMS) houses were located at Te Hohi (settlers later called it Oihi) while he was still in Sydney. The chief Ruatara advised that this land was owned by Te Uri o Kanae and his brother Wharemokaikai, and so Marsden discussed the matter with them. As Rihari explained:

> This was the first 'sale' and had all the hallmarks of an Englishman selling his land to another person. Marsden produced a deed of conveyance drafted by the missionaries, and Te Uri o Kanae's face moko and Wharemokaikai's nose moko were copied onto the paper to validate the deed and demonstrate their agreement. Hone Heke acted as witness and this was noted by putting his thumb print down.[6]

Curiously, but probably reflecting the strata of chiefs there, Hongi Hika drew Te Uri o Kanae's *moko*, as he was "Confident with a pen" (Jones and Jenkins 2011: 92) after which Te Uri o Kanae made his own mark, which Jones and Jenkins presume was a cross. Wharemokaikai then made his mark from his cheek *moko*. Unfortunately the original has been lost, leaving only copies by others.[7]

Rihari (2010) doubts whether the chiefs involved realised the significance of the document. As he suggests, "We know that our people were struggling with Western notions of property ownership, and what a 'sale' entailed into the 20th century—so our tupuna surely didn't have a clue about what was happening to their whenua in 1815." Jones and Jenkins (2011: 92) are more critical about this sale, commenting that "Marsden had no legal authority to administer a land deed in New Zealand".

However, settlers and missionaries of the time felt confident that it would indeed stand up in a court of law, for in November 1819 some 13,000 acres of Kerikeri was sold by Hongi Hika to Marsden acting on behalf of the CMS, again in order to establish a second mission station for his new missionaries fresh from England. Hika was keen to seal the deal, which he did with his *moko* on the deed. Ngāre Raumati chief, Korokoro, was also keen to attract the new settlers and all that this might entail for his own *hapū*. His brother Tuai had travelled back to the Bay of Islands from Europe with the CMS in July 1819, and Korokoro hoped that this might give him priority selling rights in relation to where they might want to establish a mission station. This was not to be, however, and Marsden was swayed by Hika, eventually buying a huge tract of land for a mere 48 falling axes (Elder 1932: 153, Sissons, Wi

Hongi and Hohepa 2001: 26). Given the earlier purchase price this was a dramatic reduction in the value of land, sweetened by the prospect of other benefits that would flow into Hongi's community, such as access to European goods and services.

This land deed (MS-070A, Hocken Library, Dunedin) was signed by both Hongi Hika and his witness, Rewha (or Rewa according to some sources), with part of their *moko*. Hongi included his *tapa-ā-waha* design from around his mouth, the *ngu* and *pōngingia* designs on his nose, as well as the *tīwhana-ā-rangi* designs on his forehead. It is remarkably similar to the drawing he did of Te Uri o Kanae's *moko* four years earlier, certainly in terms of the short marks on the *haehae* lines around the nostrils and the general composition, though it is likely the similarity was because it was a style of *moko* which was popular in Te Tai Tokerau at this time. Only specific parts of the facial *moko* were included in this later "signature" but enough so that it was recognisable. Certainly when compared with Hika's carved self-portrait (now in the Macleay Museum, Sydney), completed around the same time, there are differences in designs around the chin between the 1814 carved version and this 1819 deed. This may be attributed to Hongi being more exact with pen and paper than with the chisel, but also that he may have wanted to be more precise on the land deed because of the nature of the document and the desire to be recognised.

Chiefs used their *moko*, certainly in the north, to signal their consent to other kinds of deals and statements of ownership as well. In 1831, for instance, the ex-British naval captain Thomas McDonnell asked the northern chiefs Te Taonui and Patuone to sign a document registering his vessel, the *Sir George Munro*, as a New Zealand vessel. McDonnell was intent on establishing a new business in the Hokianga and was reliant on Te Taonui as his patron (Belich 2012). Both Te Taonui and Patuone signed using part of their *moko* (Binney, Bassett and Olssen 1990: 29).[8] Long before the Treaty of Waitangi, McDonnell recognised the sovereignty of these chiefs over the country and by asking for their signatures was expecting that others would do the same. This would prove fruitful for him, as he went on to establish a large estate at Horeke on the basis of this document. Unfortunately the physical document has been lost, leaving the oral record alone.

It was during the 1830s that the influx of Pākehā began to have a real impact on Māori, who began holding large inter-*hapū hui* 'gatherings' to identify strategies of resistance and consolidation in ways that Pākehā would understand. Increasingly this took the form of written documents. Three documents record *moko* signatures *en masse*: a letter of petition to King William IV in 1831 and the Treaty of Waitangi and the Wentworth Indenture, the latter both of 1840 (discussed in the next section).

Letter to King William IV, 5 October 1831 by 13 Northern Chiefs
On 5 October 1831, thirteen Māori chiefs from across Te Tai Tokerau signed a letter to King William IV (now in the National Archives in London) in which they asked for the King's protection from Pākehā seeking to take their lands. All the chiefs signed with parts of their *moko* to confirm their consent. This is the earliest document of its kind and a forerunner to the 1835 Declaration of Independence and 1840 Treaty of Waitangi. The letter was drafted by William Yate and probably written by Eruera Pare Hongi, a relation of Hongi Hika. The 13 signatories were: Whararahi and his brother Rewa, Te Haara, Patuone and his brother Tamati Waka Nene, Kekeao, Titore, Tamoranga [Te Morenga], Matangi, Ripe, Atuahaere, Moetara and Taunui [Te Taonui]. The letter was most likely signed at Hika's base at Kororipo Pā, described as "a pa of great mana and tapu where such political, economic, and military issues were often discussed" (*Te Aho Claims* 2013: 199).

Often *rangatira* would meet to "discuss and plan political, economic and military matters of regional importance" (Henare 2007: 112). In writing about the petition, Manuka Henare noted that it "marks the beginning of the acceptance of literacy as a new tool of communication, which these leaders willingly grasped for their purposes" (p. 114), or as *Tā* Apirana Ngata would call it "*ngā rākau a te Pākehā*" 'the tools of the *Pākehā*'. Henare outlined the process of the signing of this letter in that it would be read out loud to those gathered and then, "those who supported its message would come forward and put their *moko* mark, a copy of their facial tattoo, to the paper" (2007: 115). Of this signing, he commented (Henare 2007: 115-16):

> The *moko* mark was considered something holy and binding, because it was taken from the skin of the head, believed to be the most sacred part of a leader's body. The *tohu*, or sign, was the recognised signature of the leader. The placing of the *tohu* on paper was considered an invitation to a relationship between the leader and his people, and King William and his people. The moral and ethical codes implicit in the act would be underpinned by the cardinal values of reciprocity and obligation. Subsequent generations of descendants of the signatories would refer to such *moko* marks as '*taonga tapu'*, a most sacred treasure and commitment.

Henare, Middleton and Puckey (2013: 199-200) observed:

> The rangatira signatories signed this letter with their unique and personal moko designs, rather than the conventional sign or mark offered to the illiterate as an alternative to a signature. These moko were 'considered to be something holy and binding', coming from the head, the most sacred part of the body. By signing in this way, the assembled rangatira imbued the document with

> wairua, thereby both communicating their thoughts and representing them and their mana to the asking—their equal.

He Wakaputanga o Te Rangatiratanga o Nū Tireni, October 1835

Having sent the letter to King George in 1831, the chiefs took further action in 1834 when they chose a flag to represent their new chiefly entity, the United Tribes of *Nū Tireni*. The flag was named *Te Kara*, and came to symbolise the 25 chiefly signatories. All but two of those who had signed the 1831 letter also signed another critical document, including my great great-grandfather Te Nana. *Te Wakapūtanga o Te Rangatiratanga o Nū Tireni* was signed in 1835 by a group of 33 *rangatira* who together became known as *Te Whakaminenga o Ngā Hapū*. This group was comprised primarily of chiefs from Te Tai Tokerau, but also by others aligned with them, most notably Te Wherowhero of Tainui who was associated with the Ngāpuhi chief Rewa, as well as Te Hapuku of Ngāti Kahungunu who was aligned with Pōmare of Ngāpuhi. The first signatures were gathered on 28 October 1835, with the final signatures collected by British Resident James Busby as late as 1839.

As with the 1831 letter, many of the chiefs signed with their *moko* and so it became "a chiefly document" (Henare *et al*. 2013: 210). Others signed with their *moko* later: Tamati Waka Nene, Huhu, Tona, Kiwikiwi, Taiwhanga and Panakareao. Henare *et al*. (2013: 213) have written of the effect of *Te Wakaputanga* as:

> …the affirmation by the King's representative (and later the King himself) of the mana or sovereign power of the Chiefs, and the mutual commitment to a relationship under which the chiefs would protect the King's subjects coming to New Zealand and the King would, in turn, protect and assist the Chiefs in fending off any challenges to their mana.

Similarly, Merata Kawharu (2008: 54) has argued that "[s]upport for the Declaration was a way of renewing and broadening the relationship previously established in 1831, 1833 and 1834". Read in this light, the documents were a way of beginning to formalise relationships with various non-Māori groups, such as the French on the one hand, and the British Crown on the other. *Rangatira* were keen to protect their interests, and saw the power of the European letter and document as one strategy in which to do that. *Rangatira* had by this time a range of economic ventures which they were keen to foster and enhance, and expected Europeans to maintain order over their own people lest Māori have to sort out matters.

Te Tiriti o Waitangi /The Treaty of Waitangi, 1840

Perhaps New Zealand's most famous document, the Treaty of Waitangi, replete with a phenomenal 544 signatures over nine sheets,[9] was created to be distributed according to tribal region. Hailstone (1993) identified four different types of signatures used by the chiefs on the Treaty: those derived from their *moko*, simple crosses, quasi-signatures based on Hobson's, and textual signatures. In the first group there are 44 examples from all over the country. This group can be further sub-divided into three groups. The first are those who used single and double spirals, as evidenced from the signatures of Kawiti, Mokoare, Te Rangi Topeora (a Ngāti Toa Rangatira woman), Rehurehu, Te Tutaki, Te Mako, Te Peika, Te Haereroa, Mahuika, Te Potae and Tamaiwakanehua. The next group drew a single spiral as their mark, including Tamaiwhahia and Nuka Taipari from Ngāi Te Rangi. The third group drew a series of parallel lines joined at one end, most likely sourced from the *tapa-a-waha* lines around the edges of the mouth. Pōmare from the North as well as Te Urimaitai, Te Panepane and Te Tore from the East Coast all marked their identity this way. The last form is interesting as it is a classic *mangopare* 'shark' design which could have been sourced from anywhere in the face. Te Hakeke of Ngāti Apa signed at Tawhirihoe Pā on 21 August 1840 in this way. Henare *et al.* (2013: 221) narrowed down the number of chiefs who placed *moko* signatures on *Te Tiriti* to 17, and identified them as mostly chiefs from eastern Tai Tokerau, specifically from the *hapū* of Ngāti Hine, Ngāti Manu, Te Kapotai, Te Uri-o-Te-Hawato, Ngāti Kawa, Ngāre Hauata, Ngāti Hineira and Te Uri Taniwha. This suggests a regional preference for this practice.

Descendants of Pōmare (Ngāti Manu), Kawiti (Ngāti Hine) and Tirarau (Te Parawhau) who attended a *hui* at Kawiti Marae, Waiomio, in 2011 spoke of how they believed their ancestors' *moko* represented "sky, water and Papatūānuku" (Henare *et al*. 2013: 230). They explained that "Tirarau's [signature] is Te Taki-o-Autahi (the Southern Cross), Pōmare's [signature] is Ngā Wai Ata Rere (the meeting/confluence of three rivers), Kawiti's [signature] koru represents Te Whanautanga o Te Ao (the birth of the world)" (Henare *et al*. 2013: 230). As evidence of the veneration that they gave these marks, the *whānau* called them "*tohu*" which can be translated on one level as marks, but on a deeper level as signs which stand in for the ancestors as if they were still here, rather than being just a mark on a paper. And indeed these were *tohu*, for they foretold of great change for the chiefs and their communities, in unforeseen directions through the process of the Treaty of Waitangi.

Only two chiefs signed all three documents (1831, 1835, 1840): the brothers Te Wharerahi and Rewa (Ngāi Tawake, Ngāti Tautahi, Te Patu Keha and Te Uri-o-Ngongo). Both were well-known figures around the Bay of Islands and

regularly took part in Hongi's *taua* 'war parties' around the North Island. Rewa was known as a peace-maker, even to this day, and probably because of this inherited Hongi's leadership when he died in 1828 (Sissons *et al*. 2001: 37). Te Wharerahi, the elder brother, had strong alliances in the Bay of Islands as his wife Tari was the sister of the chiefs Eruera Maihi Patuone and Tamati Waka Nene. Subsequently all three were present when *Te Tiriti* was discussed in early February. Rewa explained that they did not need any other rulers as they already had their own, while Te Wharerahi argued that the Treaty would bring peace; he was supported in this by his brothers-in-law. The Patu Keha chief Moka was set against it. Ultimately Te Wharerahi signed the Treaty as did a reluctant Rewa, but Moka refused, though his name is there in script.

Eight others signed both the 1835 and 1840 documents: Pōmare II (Ngāti Manu), Kawiti (Ngāti Hine), Pumuka (Ngāti Rangi, Ngāti Pou and Te Roroa), Tama Pukututu (Te Uri o Hawato, Te Uri o Ngongo), Marupo (Ngāti Rahiri, Te Whanau Tara, Te Whanau Rongo, Ngāti Pou, Maturahurahu), another man named Marupo (Te Whanau Rara, Ngāti Hau), Te Awa (Ngāti Paoa) and Te Ngere (Te Uri Kapana, Ngāti Wai, Te Uri Taniwha). These were some of the leading men of the day, and critical advocates for their people in the midst of unprecedented change. They would have known of each other, and most likely showed their solidarity by signing documents together.

The selection of only one part of the *moko* on these documents is explained by Hailstone (1993: 309) who noted that chiefs were left only a 5 mm space to sign once their names had been spelt out in European script. Therefore it was just as well that most of the signatories could not write English and instead used, "pictorial figurative marks" to represent themselves. Hailstone (1993: 309) identifies these as, "almost certainly representative of a part of a particular chief's *moko*". He also points to another custom which appears on the Treaty sheets, which may explain how *moko* signatures appeared in groups rather than by themselves: in most of the sheets, there is one "style" of signature probably due to chiefs following the style of the signatures already on the sheet. According to Hailstone (1993: 310), "it is likely that whichever chief first signed the respective copy of the Treaty, set the precedent for the others who would not wish to lose face—hence the almost total agreement in terms of style and image used on each sheet".

The Wentworth Indenture, 1840

The same could be said for another important document, which was also grouped tribally. The 1840 Wentworth Indenture (sometimes also called the Wentworth-Jones deed[10]) recorded the sale of the entirety of the South and Stewart Islands by eight Ngāi Tahu chiefs to William C. Wentworth and John Jones for £240 plus annual stipends.[11] On the second page of the Indenture,

eight of the most important South Island chiefs signed with their *moko*.[12] The Māori names, in parentheses, follow Evison (1990): John Tuhawaiki, Tohowaki, Kaikoreare, Tuckawa (Tukawa), Patuckie (Topi Patuki), Jackey White (also known as Karetai, cousin of Taiaroa), Tyroa (Te Matenga Taiaroa[13]), and Bogener (Te Waikai Pokene). These were the leading chiefs of the area at this time, and were seeking to take advantage of keen purchasers of land in Sydney, and thus travelled there to secure a deal.

Three of the signatories (Tuhawaiki, Bogener and Kaikoreare) show their complete *moko kanohi* 'facial *moko*', whilst Jackey White's is almost complete except for the left upper cheek spiral (*paepae*) and related *koroaka* and *putaka* (*moko* elements between the cheek spirals and the ears). Taiaroa and Tohowaki, meanwhile, have only included their forehead patterns, the *tapa-a-waha* and some of their cheek designs, though whether this was done due to a lack of time, lack of skill or unwillingness to make the complete *moko* is unclear. It also may be that their actual facial *moko* were incomplete, though this is unlikely given their inclusion as vendors of such a large tract of land. That these *rangatira*, or in Ngāi Tahu dialect *rakatira* 'chiefs', were all signing documents is no surprise, given that, according to Ballantyne (2011: 244-45), "[b]y around 1850, roughly 50 percent of high-ranking Ngāi Tahu men were able to sign their names on land deeds", and this is probably a conservative estimate. Indeed, most of the chiefs also signed their name in text as well, on the third page. The Wentworth Indenture attracted criticism in Sydney because of the inequities of scale, with some 20 million acres being sold for what seemed to be a pittance. Indeed, the Queen's representative, Sir George Gipps, stepped in and subsequently nullified the deal through the courts in Sydney.

Multiple Signings: The Case of John Tuhawaiki[14]

There is only one case of multiple *moko* signatures by the same person, those drawn by *Kati Ruahikihiki* chief John Tuhawaiki. He drew/signed his *moko* at least six times between 1838 and his death in 1844,[15] including on the Wentworth Indenture in 1840, and on a range of documents now in the Hocken Library in Dunedin,[16] including on a letter dated 28 March 1843 declaring ownership of Ruapuke Island (Tuhawaiki 1840).

Each of the signatures is slightly different and because of that we get some sense of the idiosyncrasies of his *moko*. In particular, the *titi* 'forehead'is formed from two large downwards *koru* facing one another, whilst it is clear that there was no *paepae* (upper spiral on his left cheek). There are also differences in all three self-portraits along the *putaringa* edges by the ears and along the upper forehead. In the third drawing, his inclusion of eyes and lips reveals a new awareness by Tuhawaiki of the representation of the

individual, with the result bearing a close relationship to Western modes of portraiture. This is a distinct shift from his incomplete signature on the Wentworth Indenture where his eyes are mere dots.

Tuhawaiki also stands out in this history of Māori self-portraiture as he was able to write his name in script which he included on two of his self-portraits. This reveals him becoming more accomplished and confident in using literacy; some of the signatures are simple text, whilst others are characterised by a flourishing at the ends to his letters. They also allow us to date the self-portraits, as they usually accompanied the drawings. For instance, textual signatures from 1840 (including his signature on the Treaty of Waitangi on 10 June 1840) are relatively simplistic without any joined letters, compared with the drawing in the Hocken Library, which is very finely executed.[17] In those which he signed both with his *moko* and with text, it is highly likely that Tuhawaiki was making a political or social statement about who he was; he was stating very firmly that he was a chief and owner of the land and distinct from those to whom he was selling. He was proud of his identity as Māori, specifically Kati Ruahikihiki. As Ngahuia Te Awekotuku (2007: 29) so eloquently summarises:

> Tuhawaiki's image did not fade from the face of the earth; instead this precisely composed and authoritative self-portrait endures as one of the most compelling symbols of that extraordinary time. Much more than a Ngai Tahu war leader and clever entrepreneur, Tuhawaiki reaches across time as a gifted artist and powerful visionary, whose words and face continue to inspire.

Signs of a Rangatira: Te Rauparaha

With the influx of new settlers from England and their eagerness to purchase land, more deeds began to be signed with the *moko* of their owners. This was not just limited to the North however. In 1833 in the lower North Island, Ngāti Toa Rangatira chief Te Rauparaha used his *moko* as a signature on a document presented by Captain John Blenkinsopp of the whaler *Caroline*, which the chief believed was for "the right to procure wood and water… in exchange for a ship's cannon" (Burns 1983: 184). Blenkinsopp had married Te Rauparaha's first cousin (and the daughter of Te Peehi Kupe), probably as a political alliance, which would have meant that he was "well received" (p. 184) when he introduced this deal. However, Te Rauparaha later discovered that it was not a contract for provisions, but rather a land sale. Burns described his reaction: "Infuriated, he tore the paper up, shouting that the contract was ended. The cannon proved to have been spiked, and was useless" (p. 186).

This might not be the only time that Te Rauparaha signed deeds in this way. In 1839 a man identified as "Te Ropera" signed a land transfer with William Barnard Rhodes for 256,000 acres at Waikanae in exchange for £150

in the form of arms, ammunition, tobacco and various items. The provenance to Te Rauparaha is from the identification of the vendor as "Te Ropera" by Webb's Auction House which sold the deed in 2012.[18] Rhodes had come from Sydney to purchase land in and around Wellington "to establish cattle runs and trading stations" (Patterson 2012). Ultimately Rhodes signed deeds for some 2 million acres in both the North and South islands, much of which was disallowed by the Land Claims Commission. That same year (1839) Te Rauparaha was approached by Colonel William Wakefield who was keen to buy land as well, and a deed was settled in payment for guns, blankets and other goods. The deal was subsequently disputed and eventually nullified by Lieutenant Governor William Hobson in 1840. Te Rauparaha was adamant he had to protect his lands, and would sign the Treaty of Waitangi twice in expectation that this would guarantee protection.

On the 1833 deed, Te Rauparaha has carefully shown his facial *moko* as well as small naturalistic eyes and a mouth, adding a further dimension to the work. In reality he had less *moko* than he shows here, a fact corroborated by many portraits of him over his lifetime, particularly the intricate 1847 drawing by William Bainbridge (ATL, QMS-0122-140A), but this may have had more to do with a limited time frame than any deliberate act of omission on his part. In the 1839 deed, Te Rauparaha has placed his *moko* on a 90 degree angle to the text. Equally unusual, he has only included part of his *moko* with no nose designs and only the *tiwhana-a-rangi* on the forehead, the *tapa-a-waha* around the mouth and the *korowaha* spirals around the jaw. In fact, someone else has added to the *moko* on the deed, perhaps to "even out" the design, though it is too obvious to seriously be considered part of the original design. Because of Te Rauparaha's status and *mana* it is unlikely that any *Māori* would do such a thing, particularly as the *moko* is from his head, the most *tapu* part of his body.

WRITTEN EVIDENCE OF MOKO SIGNATURES

It seems that the drawing of *moko* remained a fairly rare occurrence in the early 19th century, enough to invite comment from several early Pākehā. Dumont D'Urville witnessed Māori signing in this way in the early 1820s and recognised it as such:"While they were drawing up the deed of purchase in writing, the leading chiefs had a special *moko* (design) put on their faces. Then they added this same *moko* at the bottom of the deed, as a sort of signature" (in Rosenman 1987: 193). This is indeed an unusual account, as it appears that the *rangatira* received their *moko* just before signing the document, and it was this fresh design that was added to the deed. It is interesting that D'Urville only saw it as "a *sort* of signature" [my emphasis] even though it would have been treated as legally sealing the deal.

Pākehā considered this way of signing a curious practice, yet one which would be regarded as binding should any suggestion of impropriety arise. Shortland (1974: 84) gives some insight into this when he wrote in 1843-44:

> There [in Sydney] land speculations were then in fashion, and their formal appearance, with the addition of a tattooed face, scrawled in place of a signature, gave them a *marketable value* [my emphasis]. In many cases, goods to a large amount were sent to New Zealand without any security that they would ever be paid for, other than the deposit of such a document as the one above.

Private collector Dr Thomas Hocken, at an unknown date, annotated (in pencil) an 1839 grant of land to James Fowler from Karetai of *iwi* Kati Ruahikihiki which included his *moko* (Karetai1839). Hocken (n.d.) wrote: "Specimens of tatu [sic] signatures where the natives unable to write, signed deeds by drawing their tatu [sic] marks. The method was adopted long before the days of colonization when traders, chiefly from Sydney, purchased land." Certainly during the early years of the 19th century, trade between the Bay of Islands and Sydney in particular was brisk, with much travelling back and forth of both Australian traders keen to exploit local resources and Māori keen to learn more about the wider world, in particular the purchase of muskets.

The 1840s saw an increased use of *moko* signatures. Jameson (1842: 234) noted that the practice was *de rigueur*: "…every individual having a right in the land…was necessary, not only to satisfy the demand of the chief, but also of those adherents and relatives of *both* sexes [my emphasis], and to have with their signatures or attested marks (*moko*) affixed to the deed of sale." Certainly we see more Māori using *moko* as their mark on a wide range of documents at this time. By the mid-1840s Māori culture had begun to feel the impact of colonial contact and many *iwi* and *hapū* were focused on stopping any further European expansion onto their lands. Under the auspices of the Treaty of Waitangi of 1840, Governor Grey had started to flex his legislative muscle and slowly but surely impose English law upon the land and its people. As a result, Māori began to realise that their signatures on the Treaty could have implications much greater than they could have anticipated at the time. Moreover, by the end of the 1840s more Māori were literate and able to sign using text and were keen to follow how Pākehā signed documents. Further, the Government was becoming increasingly wary of land dealing done on the sly, and so were watchful of new land sales. This undoubtedly influenced Pākehā in the type of signature that they would accept on such papers. The result was that *moko* signatures were not seen on any land deeds after the mid-1840s.

In addition to the *moko* placed by chiefs on letters and other formal documents, there is a second corpus of drawings also by Māori but on informal papers such as journals and letters. Only eight examples have been found to

date, but undoubtedly with further research more will be uncovered. Appendix 2 lists extant examples, beginning in 1815 with a drawing by Te Morenga on board the *Active* and finishing in the 1880s with Tāwhiao.

Te Morenga's Self-portrait, 1815

The earliest occurrence of Māori drawing their own portraits was in March 1815 by Te Morenga, the Ngāti Hine *rangatira* from Taiamai in Northland. He had met Rev. Samuel Marsden and European traveller John Liddiard Nicholas when they had landed in the Bay of Islands. He would soon become Marsden's closest Māori friend, travelling with him around New Zealand and to Sydney, acting as his interpreter and ally. At this time Te Morenga was one of the most powerful figures in the Bay of Islands, along with Hongi Hika and Pōmare.

On 9 March 1815, on board the missionary vessel the *Active*, Nicholas gave Te Morenga a pen, "which I directed him to use for the purpose [of drawing his own *moko*], and which he now handled for the first time" (Fig.

Figure 1. A facsimile (from Nicholas 1817 [II]) of Te Morenga's *moko*, as drawn by the chief in 1815 while aboard the *Active* (see text for details). Courtesy and copyright: Alexander Turnbull Library, Wellington, collection reference A080-061.

1).[19] The validity of the original was later questioned by Enid Ellis (1978), who claimed that the original was actually redrawn by Samuel Neele, the engraver who worked on Nicholas's publication.

Te Morenga's self-portrait is one of the most distinct in this second group in that it is obviously asymmetrical (reflecting the way in which *moko* for men were asymmetrical), omitting as it does specific parts of the design, such as the *titi moko* at the top of the forehead, and the *koroaka* or cheek spiral on the sides by the ears. The drawing is all the more remarkable given the fact that this is the first time that Te Morenga had picked up a pen, according to Nicholas at any rate. Also worth highlighting is the detail which has been included, and the way in which Te Morenga was able to render complex double spirals with relative ease and precision.

Tuai's Two Portraits of his Brother Korokoro, 1817-19

There is only one instance of a person drawing the face of someone else twice. Buried in the Special Collections of the University of Birmingham (UK), and most recently unearthed by Alison Jones and Kuni Jenkins, is a remarkable drawing by Tuai (sometimes also called Tui) of his brother Korokoro, both of Ngāre Raumati from the Bay of Islands. In 1818 Tuai had become famous along with Titere, both ex-students of Samuel Marsden's school in Parramatta, Sydney, for their travels to England in 1818, some of the first Māori to journey there (*Te Aho Claims Alliance Report* 2013: 194).

As with Te Peehi's drawing mentioned next, Tuai's drawing is exceptional in that it records the *moko* of his older brother Korokoro. Jones and Jenkins (2011: 152, 156) suggested that this may show "…a spiritual visit from Tuai's elder brother, with whom he had a close relationship, and under whose authority he was travelling". As they noted: "So intensely could Tuai recall the details of his brother's face that he traced it, in detail, with pen and ink; this face was for Tuai rich with tribal meaning and brotherly comfort" (p. 156).

Even more significant is that there is a second portrait, also made in England, by Tuai of his brother Korokoro (Fig. 2). In comparing the two, both portraits have eyes included (very rare in general) and have the same *moko* designs across the face, and through to the forehead. The Birmingham example is much more detailed, however, with each of the heavy lines around the mouth and across the forehead showing the *haehae* cuts. There is also more information about the upper forehead, and the designs on the right cheek appear more balanced. The Auckland example, by comparison, may be an earlier rendition, given the simplicity of some of the design fields, and the filling in of the '*tīwhana*' lines on the forehead. Despite this, the drawings provide an incredible insight into Tuai's memory and the intricacy of the *moko* of the period. It is even more poignant given the fact that shortly after

Figure 2. Drawing by Tuai (Ngāre Raumati) of his brother Korokoro, done in England, in 1818. Courtesy and copyright: Auckland Libraries, Sir George Grey Special Collections, GNZMMS 147.

Tuai's death in 1826 his Ngāre Raumati people based around Te Rāwhiti were besieged by Ngāpuhi and enslaved by them. The survivors were distributed throughout the Bay of Islands thus bringing an end, some say, to Ngāre Raumati as a major political force in the area.

Te Peehi Kupe's Self-Portrait, 1824-25

Being in England was also the impetus for another *moko* drawing. In 1824 the Ngāti Toa Rangatira chief Te Peehi Kupe boarded the ship the *Urania* and then refused to leave until he was taken to England for an audience with King William IV (which he was successful in gaining). He was also keen to secure firearms for use by his people, not surprising given recent military events

that had seen the deaths of many, including two of Te Peehi's young sons. He arrived in England and spent at least a year there,[20] including eight months in Liverpool. During this time he made a number of drawings.[21] One of these was undertaken while he was having his portrait done by John Sylvester (now in the Rex Nan Kivell Collection, National Library of Australia, NK1277 T1372). During the sitting, Te Peehi became most interested in how he was being rendered, and was adamant that his *moko* be replicated accurately; accordingly we may presume that the portrait is correct. As Craik (1830: 330-31) described it:

> The figure, he [Te Peehi] explained, not being by any means a mere work of fancy, but formed according to certain rules of art, which determined the direction of every line. It constituted, in fact, the distinctive mark of the individual; and one part, indeed, of that on his own face, the mark just over the upper part of his nose, Tupai constantly called his name; saying, 'Europee man write with pen his name, —Tupai's name is here," pointing to his forehead.

Te Peehi's knowledge of *moko* and his insistence on the precision of his *moko* led him to begin drawing his own *moko* for Sylvester. Craik (1830: 331-33) explained:

> Still further to illustrate his meaning, he would delineate on paper, with a pen or pencil, the corresponding marks in the amocos [*moko*] of his brother and his son, and point out the difference between these and his own. But it was not only the portion of the decoration which he called his name with which Tupai was familiar; every line, both on his face and on the other parts of his body, was permanently registered in his memory…. The depth and profusion of the tattooing, he stated, indicated the dignity of the individual; and according to his rule, he must himself have been a chief of distinguished rank, as scarcely any of the original skin of his countenance remained.

Te Peehi signalled that *moko* in general was an indicator of rank and *mana*, and because of the "depth and profusion" of his own, it was a clear signal of his own status within Māori culture. Te Peehi's memory of *moko* was so extensive that he was also able to draw from memory the *moko kanohi* 'facial *moko*' of his younger brother Te Rangihiroa and eldest son Te Hiko o Te Rangi, a well-known carver and *waka* 'canoe' builder, as well as a chief and the man he had entrusted their people to whilst he was in England. As an English contemporary of the day observed (Craik 1830: 332-33):

> When Tupai's [Te Peehi's] talent in this species of drawing was discovered, many applications were made to him by his Liverpool acquaintances for specimens of his art; and for a fortnight a great part of his time was occupied in

> manufacturing these pictures of the scars with which his face was impressed…. Some of his performances also exhibited representations of the figures on other parts of his body; and he drew for Dr. Traill [his physician] the amocos [*moko*] of his brother and of his eldest son.… On finishing the latter, he held it up, gazed at it with a murmur of affectionate delight, kissed it many times, and, as he presented it, burst into tears.

It is interesting how Craik sees Te Peehi's *moko* as "scars"—he had earlier called them "stains"— and in many ways they were; *moko* recorded Te Peehi's biography, so that he could point out his *whakapapa* and his position in the *iwi* and *hapū* for his foes and allies alike. In England, *moko* were altogether unfamiliar and novel, and Te Peehi's marked him out as someone from the wider Pacific region. Te Peehi was keen to fit in with British high culture, and was "constantly on the watch to observe the behaviour around him" (Craik 1930: 322). Te Peehi's popularity was inextricably tied to his facial *moko*, as can be evidenced by the requests from "his Liverpool acquaintances" for a memento of his visit and their relationship. At the end of the day though, Te Peehi was in unfamiliar waters, and by inscribing the faces of his brother and son he was able to retain and reinforce his connection with them through their *moko*.

When King Tāwhiao subsequently visited England in 1884, seeking redress for land grievances, the Russell Square, London-based artist H. C. Seppings Wright took the opportunity to make his portrait. Tāwhiao, as with Te Peehi, also insisted that his *moko* designs were depicted in a high quality manner. On the second day of the sitting, Tāwhiao drew a number of works to illustrate this. As one contemporary commentator noted (Anon 1884: 2):

> But the King was able to explain that these designs were reproductions of tattooing art with which he is familiar. More than that; by means of signs and the aid of a lady's photography which was lying on the table, he showed clearly that one of his designs was a *fac-simile* of the decoration on the chin of his Royal spouse.

Just as with Renata Kawepo (see below), drawing the *moko* of a close female relation/spouse seems to have been of much interest; for Seppings Wright we might assume that this was an artist-to-artist interest, if he indeed considered the drawings to be art. For Tāwhiao, it was essential his *moko* be accurately depicted, as people, certainly Māori, would identify him because of this alone. In addition, making errors in depicting the design might lead to breaches of *tapu*; certainly, as Roger Blackley pointed out in his article humourously entitled "King Tawhiao's Big O/E", Tawhiao was already feeling vulnerable to breaches of personal protocol during this visit (Blackley 2012: 37). It is unfortunate that neither the portrait, nor Tawhiao's drawings have been found to date.

Renata Kawepo, 1843

Two remarkable drawings by Renata Kawepo of Ngāti Kahungunu in the journal of missionary William Cotton in 1843 provide much information not only about the people they depict, but also because of the *moko* names that are inscribed on the drawings. The first drawing depicts the flattened out *moko kanohi* of a male chief and identifies the separate parts of the designs. On top of the pencil drawing another *moko* has been added, this time of a woman, complete with not only her *moko kauae* but also with *hotiki* 'design between the eyebrows', the latter a form usually reserved for high-born women. However, the male *moko* depicted is not that of Kawepo, if we compare it to a photograph of him as an older man in the 1880s (he died in 1888).

Kawepo has a fascinating, but not uncommon, biography. When he was a young man he was taken as a prisoner-of-war by Ngāpuhi in the 1820s and was kept by them for ten years before being released. Over this decade he was given a *moko* because of his status, most likely by a travelling *tohunga-tā-moko*, as Ngāpuhi had none on hand. He spent time in the Bay of Islands in the late 1830s, and in 1843 he accompanied Bishop Selwyn on a three-month visit to various Anglican mission stations around the country. William Cotton meanwhile was a young Anglican missionary recently arrived from England, but semi-fluent in Māori despite this, the ship's journey having been a long one and with Māori on board.

The drawings are all the more remarkable because Kawepo was not known as an artist, and both are detailed and complex, suggesting he had spent some time on each of them. Actually composing these designs, especially the men's one, required time and patience, particularly given that it is so clear and well-proportioned. As with Te Rangikāheke's profile drawing of the face (see below), it was important to render the *moko* just right, not only because it was a *moko*, but also because each part of the design was being named.

Other Drawn Self-Portraits

In the Alexander Turnbull Library (ATL) in Wellington are four further examples of *moko* self-portraits. The earliest is one captioned "Moko or face pattern drawn by a native from memory" c.1843 (ATL, 89179½). In this pencil drawing, there is a very strong sense of the artist, by the way in which the *moko* is rendered on a slant looking down to his left. It is disconcerting, in that it appears as if the person is about to come right out of the paper. The *moko* is shown almost complete, with clear asymmetry, particularly along the *koroaha* and *putaka* designs by the ears.

About the same time, the artist George French Angas copied a drawing originally made on a slate by a man called Tawhito (ATL F.108155½; Neich 1993: 162, Fig. 78). As Angas only travelled around the North Island between

Auckland and Wellington over a period of five months, thus we can assume that the drawing was done in this region. Angas drew many portraits of Māori at the time and so became fairly confident in portraying *moko*.

There are two distinct features about this drawing. Firstly it is rendered in side profile, a manner of representation that was not altogether unknown in Māori art, as for instance, *manaia* figures on carvings are always shown in profile. In this case, however, the side profile was in relation to a human figure. Secondly, the artist has shown himself with eyes, a full head of hair and dressed in a *kākahu* 'cloak'. Neich (1993: 162-63) called this "a conceptual mix [in which] the individual is still denoted by his tattoo, but his naturalistic appearance is also accorded some recognition". In this way the artist did not want to only show himself as having *moko*, but as a person with hair and clothing in a method used by Pākehā artists of the period. This may have been affected by the context in which the drawing was produced, as at this time writing slates had been provided to some Maori communities as part of the push for literacy and often were offered first to chiefs to engender their support. The resulting self-portrait effectively translates traditional carving practices, which not only rendered an individual's *moko* but also their physiognomic details, into a two-dimensional format.

In another self-portrait from 1844 the artist focused on the separate parts of the *moko* and their individual names; this may have been done by a person named Te Whatanui (ATL, C-103-001-1). The drawing was included in the scrapbook of Walter B.D. Mantell who in 1844 was in South Taranaki and Porirua, before he moved to the South Island in 1848. The tribal affiliation of this man could be any one of a number of *iwi*, many of whom were on the move during this period. In this drawing, the artist has named specific parts of the *moko*, including *te ngu* 'upper nose' and *te wha* 'chin'. The face has been only partially rendered by lines representing the left hand side of the nose, the *tapa-a-waha* (rays from the nose to the chin) and the *putaka* spiral (lower spiral on the left cheek). The reason for the partiality of the *moko* is unknown; perhaps Mantell only wanted part of the design, or perhaps the artist was only keen to relinquish part of his *moko*.

The fourth drawing in the Alexander Turnbull Library has a humorous origin. In the late 1840s, the young Thomas Collinson spent time around the West Coast of the North Island and sketched a series of landscapes. He also met the Te Ati Haunui-a-Paparangi chief Kawana Pitiroi Paipai at Putiki Pā in Wanganui. Collinson attempted to draw Paipai in 1846 along with his *whare* (home) (ATL, A-292-032). Collinson noted on his drawing: "The tattooing I drew did not satisfy him so he drew himself." Paipai's self-portrait shows ovals for the eyes and mouth, *tapa-ā-waha* lines around the mouth, two *koru* for the chin, and the outer edges of the *tīwhana* rays on the forehead. Below this, as if to confirm the artist/author, Kawana has signed his name in text "+Kawana Pitiroi Paipai".

Te Rangikaheke's Drawing of Moko, Especially the Face, Pre-1858
One final example to be added to this corpus was drawn by Wiremu Te Rangikāheke of Ngāti Rangiwewehi, whose 800-page manuscript (1854) was used as the basis for much of the work published by Sir George Grey (Manuscript No. 89, now in Auckland Libraries). Within these books are a number of drawings of *moko*, not only from the face (MS. pp. 450-51) but also designs of the *pūhoro* 'thighs', *raperape* 'buttocks' and *tuarā* 'back' (MS. p. 452). The primary intention was to illustrate the text and in doing so record for future generations this knowledge. Arini Loader (2008: 68) argued that the material written down by Te Rangikāheke is not actually his, but rather belongs to his Te Arawa people, and that "they are communally held stories that bind Arawa people through time and space and speak to an Arawa worldview in an Arawa nation in which the sovereignty of Te Arawa is assumed". In this way, it can be argued that each of the *moko* depicted here are specific to Te Arawa, particularly as Te Arawa were one of the last *iwi* to enjoy *moko* practitioners expert in the *uhi* technique. Whether these drawings are self-portraits or not is difficult to ascertain due to a lack of comparable visual material. We can assume, however, given the detail of the drawings that the *moko* were either his own, or those of close relatives.

THE ART OF MĀORI PORTRAITURE AND SELF-PORTRAITURE

It is crucial for these self-portraits and portraits to be understood within Māori worldviews, rather than trying to make them fit into existing Western European paradigms. I have elsewhere written about the nature of both portraiture and self-portraiture in relation to those renderings by Māori of their *moko* (Ellis, in press) but for the purposes of this essay three major considerations are outlined. Firstly, within the Western European forms, there are a spectrum of types of depictions, from the idealised through to the photo-realist. In this way, what we see in the paintings and sculptures is frequently not exactly accurate. Rather, what we see is what the artist *wanted* us to see. Secondly, these forms have changed over time and space, particularly with the advent of photography. Lastly, it is important to remember that the genres of portraiture and self-portraiture are not the sole prerogative of artists based in Western Europe but, as argued here and elsewhere (Caro 2010, Pearlstone and Ryan 2006), were occurring in communities across the globe and through time. As Caro (2010: 165) argued: "The production of the Native subject outside the dominant signifying system is not only possible; it has always occurred." In addition, this article follows Caro's (2010: 165) intentions to "disrupt the stability of Western notions of Native identity, [and] also to recognize that indigenous views of identity are themselves, plural, and, at times, irreconcilable".

Within Māori art specific ancestors were depicted in carvings and given *moko* to emphasise their significance in the *whakapapa*. Neich (1993: 142) wrote of the practice of Māori portraiture, identifying it as being distinct from the Western European tradition as it was not based on a "visual likeness". However, it is argued here that Māori did aim for visual likeness, in that the self-portraits were recognised not only by other *rangatira*, but also that some chiefs were fastidious about the accuracy of their *moko* when portrayed by Pākehā artists and were aiming for an exact likeness.

These were individuals who wished to assert their personal *mana*, as well as that of their *hapū*, and by extension their *iwi*. These men were distinct personalities, however, evidenced by the fact that their individual names have come down through the *whakapapa* along with their exploits. Their *mana* extended out to their personal belongings which were arguably their own to create and dispose of, if only for the benefit of their people. Witness, for instance, the ways in which *waka taua* and other carved objects were distributed through various social and political networks in order to uphold the *mana* of the chief, as well as their people. In this way, individualisation of ownership did indeed occur; if there were any concerns then ultimately the chief would be the recipient of a visit from a *taua muru* 'plundering party' in order to rectify this and return social order.

Neich (1993: 142) continued that in relation to portraiture, certainly within Māori carving, it was "metonymical, in that a characteristic part of the individual was used to signify the whole person". This applies to the *moko* signatures in that with so many of them, what is depicted is the essence of the face as represented with a single distinct part of the design which the chief felt would symbolise him. What is probably the most unique aspect of 19th century *Māori* self-portraiture is that the physiognomic features were omitted in preference to the lines of the *moko*. Many of the *moko* signatures/self-portraits are of a complete full face *moko*. Of these, about half include physiognomic features, particularly the eyes, nose and lips; in others parts of the self-portrait seem to have been deliberately omitted. In such a case it may be that the signatory did not want all their *moko* to be portrayed, keeping some of it for themselves, and placing just enough of the design so as to be recognisable by other chiefs.

The portraits, the second group, are distinctive from those on documents as most of them have included physiognomic details, albeit the most obvious—the eyes and the mouth. In this way there is a double portrait in operation. On one level there is the *moko,* which is flattened out and thus takes into account both profile and frontal design elements. On the next level, there are simple physical details of the mouth and lips taken front on which are generic and probably bear little if any relationship to the actual physiognomy of the

artists. The inclusion of hair and cloak in Tawhito's portrait, for instance, adds further depth, both spatial and contextual, to the image.

Another unusual feature of the *moko* signatures/portraits is that the artists/signatories flattened out their *moko*. Thus their drawings were rectangular in shape, with a central line down the centre of the face, dividing the composition. This mode of representation is complex and requires skill and precision. In the drawings, the *moko* is always depicted as well-balanced, in which the lines and spirals are clearly rendered and achieve a sense of unity and harmony. Being able to achieve this was no simple matter, and reflected how the chiefs thought of their *mana*, and themselves.

The drawn self-portraits reveal a degree of idealisation by the chiefs. The way in which they perceived themselves comes through clearly. The *moko* which they drew not only showed their external selves, but also revealed the way they felt about themselves. In some cases, the men depicted themselves with more *moko* than they had in real life, perhaps to give themselves more status. This is not uncommon with self-portraits in that the artist wishes to present the best possible face for posterity.

Significance of the Signatures/Drawings

> A statement has been made that different patterns constituted heraldic devices which distinguished different tribes. That this is an assumption based on an English background is proved by the fact that chiefs invited tattooing artists from other tribes who had acquired a reputation for their particular designs. The visiting artist reproduced the design of a particular school, and if it was a tribal device, the patient would have been branded with the distinguishing pattern of the artist's tribe, which is absurd. (Hiroa 1949: 299)

The drawn self-portraits discussed above reflect, more than anything else, encounters and relationships between Māori and Pākehā, both here and overseas. In England, Te Peehi Kupe was deep in foreign soil and probably used the opportunity to draw such figures to reacquaint himself with key members of his *whānau* and to keep that relationship warm. The same could be said for Tuai's picture of his brother, and Tāwhiao's drawings of his wife and himself. These types of drawings were encouraged by the English people they were staying with, and embraced by the artists who were keen to capitalise on being new faces in the local community.

In New Zealand these moments of engagement seem to have been on a similar level, with Pākehā being interested in the most obvious visual difference between themselves and Māori—that of *moko.* On one level Māori enjoyed the attention, but ultimately when they thought that Pākehā scribes might misrepresent their *moko*, they picked up the pen themselves and created a new practice, such as the case with Tāwhiao and Te Peehi Kupe.

In doing so the chiefs affected the pieces of paper on which they wrote on a totally different level. Brad Haami (2004: 24) recognised the relationship between *tapu* and these forms of documents:

> To have the *korero* [words] and oral traditions recorded on paper in books, letters and diaries gave these documents a degree of sacredness. A special relationship governed by notions of separation, restriction and prohibition was created between the writer, the person written about, and the guardian of the document. The marks, *moko* images and signatures of chiefs written on paper were deemed *tapu*. To damage these documents was to insult the signatories.

Michael King (1978: 14) had earlier noted that: "… records may have intensive degrees of *tapu* because they contain much of the *tapu* and *mauri* that belonged to the topic and the person who recorded it". Hailstone (1993: 307) also mentions this:

> For the Maori people the prints represent much more than simple marks, they are part of their ancestors and as such maintain their spiritual qualities quite often moving them to tears or private reflection, quite unrelated to the Treaty's political or legal relevance. For the European, they are seen as art objects which fit European art-making traditions. In either case, cultural consciousness regarding the Treaty is increased regardless of the reference point.

This would certainly explain the presence of the *moko* signatures on important documents, particularly the petition to King William and on the Treaty of Waitangi. In many ways, the marks which these *rangatira* put down could be seen as setting aside the documents as important and warranting special behaviour around them. Māori used to set aside specific geographic areas with *pou rāhui*, wooden markers daubed with red *kokowai* pigment. This would be done for any number of reasons, including to prevent over-fishing, to identify burial grounds, or to signal the site as belonging to a specific chief. I argue that in this way the *rangatira* signatories were continuing this traditional practice.

The fact that the *moko* or the signature, even when partially rendered, was recognisable by others was commented on by Polack (1840 [II]: 43):

> The men chiefly delight in these stains [*moko*] and incisions which are so far from being confined to one fashion or pattern, that tribes are known by such distinctive marks, and many chiefs whose countenances have never been seen by a distant tribe, are known, simply by the distinguishing mark which has been peculiarly engraved on their countenances. We had several opportunities of testing this fact, from having taken some likenesses of the chiefs residing in the north, and on showing them to some families resident

> at a distance upwards of 400 miles, they were immediately distinguished and named, though no connection existed between those persons, or had even at any period seen each other.

The Wentworth signatures together provide the most complete picture that we have of any tribal group's *moko* at any point in the 19th century, though whether this signals a tribal style or the style of a particular *tohunga-tā-moko* is unclear. The fact that the *moko* were drawn by the wearers themselves makes them particularly important, and offers contemporary Ngāi Tahu *moko* practitioners a glimpse into their *moko* heritage.

These signatures and drawings were not just any drawings, they were the artists themselves, and tantamount to their person. A self-portrait of a *rangatira* was seen as *the rangatira*, rather than simply a representation of him. *Rangatira* were particularly concerned that their *moko* be replicated accurately when their portraits were being done by Pākehā artists. This comes through clearly as the catalyst for Paipai, Te Peehi and Tāwhiao drawing their own *moko*. Given that the Pākehā artists would not have had any training in the intricacy of *moko* design and aesthetic, and given that these chiefs would have received such education as part of their tuition as chiefs, it is not surprising that the *rangatira* were able to depict their *moko* so clearly. Their *mana* was at stake. They wanted to be recognised by their *moko* more than anything else, and as such they needed to oversee its depiction very carefully.

That those who drew their self-portraits were usually chiefs and always men is not a coincidence. Chiefs were the ones to whom missionaries, traders and travellers were dependent upon in terms of their safety and well-being as well as their future. If considered favourably by the chiefs then they were able to purchase land or organise other such dealings. Moreover, chiefs were conscious of the impact of these drawings, in that their full-face *moko* provided virtual photographs of them that could be used by the journal owners as aide memoire of their travels in New Zealand, and also to keep the relationship between them warm.

It is a pity that we have, so far, no record of a Māori woman drawing her own *moko*, but this reflects gender stereotypes at the time more than anything else. It was to Māori men that Pākehā spoke and entered into cordial relations with; Māori women were seen and treated by Pākehā as they themselves treated their own women, that is, as chattels of their male relations, such as their fathers, husbands, brothers and sons. In reality of course Māori women were not considered this way within Māori culture; they were chiefs in their own right in some areas, most notably in the tribal regions of Ngāti Porou and Ngāti Toa Rangatira. They held land and they fought alongside men in battle. Perhaps further research will reveal some instances of this practice.

Ultimately what these chiefs did was a brave move, in that they were risking their own personal *tapu* by extending out from their persons onto paper. To this day their drawings remain central to their descendants and are revered in much the same way as photos and paintings and other images. Indeed, these drawings are all the more special as they were made done with their ancestors' own hand.

These signatures and drawings chart a shift in Māori culture not to replace the oral with a written culture, but rather to extend existing patterns of oral and visual language to include paper. From the 1840s onwards, Māori used text in their carvings to identify key ancestors and in response to growing literacy among their people. In the *whare whakairo* 'decorated meeting house' named Te Hau ki Turanga (opened in 1845), the chief Raharuhi Rukupo of Ngāti Kaipoho of Rongowhakaata chose to add text to his carved figures. No doubt this was to demonstrate his literacy, as well as to confirm his status within Māori art history as an innovative artist. The fully decorated meeting house itself was a new concept with its proliferation of carvings on the interior of the house. In a similar way, weavers began incorporating their own names in the borders of cloaks and other spaces. These signatory chiefs then, often also artists in their own right, shifted back and forth between modes of representation of the self, whether that be in text, or through *moko*.

The drawings are put forward here as a form of indigenous self-portraiture. It is unclear whether this was a cultural practice within traditional Māori arts, as the only references we have come from carvings from the early 19th century. It represents a shift of personal space in that chiefs began to see themselves in the third person, a state necessary for creating self-portraits. In many ways they had to be objective where they could in order to make as true a likeness of themselves as possible. On the other hand, they also wanted to show their own status as chiefs, and they needed to maintain a distance between themselves and the people. As such their *moko* had to emphasise this distance, and did so by depicting their *moko* as unique and more ornate than anyone else's, and thus were recognised by others as this chief or that.

Ultimately, these chiefs have left us a significant corpus of *tohu*, in which we can chart varieties in *moko* designs across the country, and in doing so we have a snapshot of what *moko* practice was in specific moments in time, most notably in the 1830-1840 period (with the King William letter, Declaration of Independence, Wentworth Indenture and Treaty of Waitangi). That so many instances have been uncovered demonstrates that this practice was in fact more widespread than previously thought, and they have become embedded in several *iwi*'s print traditions, most notably Ngāpuhi's and Ngāi Tahu's. It is here that chiefs made their signatures as political statements of their *rangatiratanga* or 'sovereignty', whether that was to sign away their land or

to call on a King to save it. These signatures need to be read not as standing in for the chief, but rather as *being* the chief. The fact that they were made in pencil or pen rather than in oil paint or photography is immaterial. Their *moko* endure through time, binding future generations to the work of their ancestors and reminding them that they must continue their fight.

* * *

Self-portraits and portraits of *moko* have a relatively short history (1815-1884) within Māori art history, yet they provide many revelations about my people and how they saw themselves. They represent not only visual records of the people who made them, but on a deeper level were made as strong political statements about the *mana* of the men who drew them. *Moko* were particularly important in this respect as Māori actively sought to assess how Pākehā would fit into their world. Māori were keen to assert their independence and sovereignty. The sale and purchase of land affected not only Māori ways of life, but also, more importantly, how they saw themselves. For people so connected in terms of their identity with their *tūrangawaewae* 'homeland', its alienation caused waves of loss, still being felt today in many areas.

These *moko* are revered as portraits of the men who drew them by their descendants today. In some ways they are more sacred to them, for the simple fact that they were produced by the hand of their ancestor who chose his best side to be shown. Here then we have the transfer of *moko* from the skin onto paper, undertaken by chiefs, many of whom were not familiar with print and paper. These marks continue to resonate with the *tapu* of their producers and inspire *ihi* 'power'*, wehi* 'awe' and *wana* 'fierce energy' in those who meet them today. For us from Te Rawhiti, the *moko* of our chiefs remains integral to our identity, especially as we move through our Waitangi claims. They are a window into our past, and provide inspiration that we may continue the legacy of those chiefs and their brave moves in pen.

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ABBREVIATIONS

AIM	Auckland War Memorial Museum Library, Auckland
AL	Auckland Libraries, Auckland
ATL	Alexander Turnbull Library, Wellington
GNZMMS	Grey's New Zealand Māori Manuscripts, Auckland Library, Auckland
NA	National Archives, Wellington

NOTES

1. Adapted from the well-known *whakatauki* 'proverb' composed by Ta Apirana Ngata. It loosely translates as 'your hands grasping the tools of the Pākehā'.
2. It is possible that there were earlier instances; however, due to a lack of comparative material, both visual and oral, it is difficult to establish any earlier examples.
3. I have chosen to use the terms of *Tohunga-tā-moko* '*moko* specialist' Tame Poata (Tom Porter) as published in Te Awekotuku, *Mau Moko*, pp. 230-33. The originals are in Michael King's papers related to his book with Marti Friedlander, *Moko-Maori Tattooing in the 20th Century,* in the Alexander Turnbull Library (Papers MS-Group-0667). Poata was from Ngāti Porou, my other tribe, and one of the few whose practice incorporated both *uhi* and needle work around the early 20th century. In the case of missing terms, I have used those with kind permission from *Tohunga-tā-moko* Mark Kopua, also from Ngāti Porou.
4. There are few mentions of women *moko* practitioners, but they did exist. D'Urville mentioned seeing a female prisoner-of-war in the Bay of Islands in the early 1830s completing a *moko* on the entire back of the wife of a chief. Michael King also mentions two women working in the early 20th century (Kuhukuhu Tamati and Te Hikapuhi Poihipi Clayton Te Kiri). In the 21st century women like Henriata Nicholas and Christine Harvey are continuing the art of *moko*.
5. At least one of these axes has survived and is held in a private *whānau* collection.
6. Brief of Evidence B 013(a), WAI 1040, 2010), 10-11.
7. There may have been earlier examples, as Alison Jones and Kuni Jenkins (2011: 35) write of Māori signing on as sailors on European whaling ships in the Bay of Islands from 1800 onwards. As they describe, "Maori men were required to sign – with a cross, like the other sailors who could not write their names – a statement that they were legally bound over to work on a particular vessel for a certain period."

8. This was in reaction to the boat's seizure in Port Jackson and confiscation of its cargo.
9. Two originals plus a further five copies were made for distribution. See Michael King's (2009) fascinating documentary series *Lost in Translation* for a personal insight into the moments surrounding the signing of many of the sheets.
10. There are two versions of this deed; Wentworth's version is the Mitchell Library in Sydney.
11. The sale did not go ahead as it was stopped by the Government of the day.
12. The last of the eight chiefs, Patuckie, departed from the others in that he drew his face in a naturalistic style reminiscent of Western art. He also did not include any *moko*. Perhaps he did not have any.
13. Tyroa quite possibly used his *moko* as signature following the practice of his father Korako and cousin/brother-in-law Jackey White (Karetai). He may have brokered this deal, as he had earlier sold a parcel of land to John Jones in 1838 when in Sydney; his daughter would later marry another of the men from the 1838 deal, Edward Weller, probably as a strategic alliance. John Jones owned seven whaling stations in and around Foveaux Strait, and this 1838 deal was considered to be very cheap for the price (Facto 1945: 7).
14. There are several cases of chiefs signing more than once. Te Haara (Ngāpuhi) signed the King William petition in 1831 with lines of *moko* and is also recorded in Polack (1840 [II]: 49) with a signature of spirals and parallel lines. Kawiti (Ngāti Hine) also has his *moko* reproduced by Polack (1840 [II]: 50) though unfortunately this was redrawn and stylised by Polack; Kawiti also signed the Treaty of Waitangi on 13 May 1840 with an unfurling double spiral. Titore (Ngaitawake) also signed twice, once on the King William letter and later on a document reproduced by Polack again (p. 49).
15. At the end of writing this MS., I discovered three of these six manuscripts in the collection of the Hocken Library, frustrating but one of the challenges of research materials becoming available over time. These will hopefully form the basis for a further project.
16. These can be found by doing a search on the Hocken Library archive database called Hakena using the keywords "Tuhawaiki Moko".
17. There are two published images of this self-portrait (Robley 1987: 13, Fig. 8).
18. This document is now in private hands.
19. The original was later acquired by the collector Ken Webster in London and in 1970 was acquired by the Alexander Turnbull Library, Wellington.
20. Te Peehi became ill with measles and was unable to return home, staying on in England. Whilst there, he was given many gifts which he sold in Sydney on the way home. He bought hundreds of guns and shipped them home which gave Ngāti Toa Rangatira a distinct military advantage in the years to come. Te Peehi was killed in Kaiapoi Pā in 1828.
21. Craik's 1830 book contains the only remaining image we have by Te Peehi, and unfortunately this has been redrawn by the book's engraver. Most people, however, credit the drawing to a similar one redrawn from this copy in 1963 by Gordon Walters.

Appendix 1. Drawings of *Moko* Signatures 1814-1840.

Date	Person	*Iwi* (tribe)	Original recorded in/by	Present location[1]	Reference
Unknown	unknown	Unknown	Land deed	ATL: 22775½	
Feb 1815	Te Uri o Kanae	Ngāpuhi	*The Missionary Register 1816*, p. 328	*The Missionary Register 1816*, p. 328	Ellis 1978
Feb 1815	Un-named witness to the above	Ngāpuhi	*The Missionary Register 1816*, p. 328	*The Missionary Register 1816*, p. 328	
4 Nov 1819	Hongi Hika	Ngāpuhi	Land grant to Church Missionary Society	Hocken Library: MS-0070/A	Binney 2007: 43, Figure 4.2
4 Nov 1819	Rewha, brother/father of Moetara	Ngāpuhi	Land grant to Church Missionary Society	Hocken Library: MS-0070/A	Binney 2007: 43, Figure 4.2
June 1831	Te Taonui	Te Popoto	Deed of registration drawn up by Thomas McDonnell of the *Sir George Murray* as a NZ vessel		Binney *et al.* 1990: 29
June 1831	Patuone	Ngāti Hao	Deed of registration drawn up by Thomas McDonnell of the *Sir George Murray* as a NZ vessel		Binney *et al.* 1990: 29
5 Oct 1831	Rewa	Ngāi Tawake *hapu* of Ngāpuhi Patu Keha (later)	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Wharerahi (elder brother of Rewa, and brother-in-law of Patuone)	Ngāitawake *hapu* of Ngāpuhi Patu Keha (later)	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1

1 Abbreviations explained on page 56.

Date	Person	*Iwi* (tribe)	Original recorded in/by	Present location	Reference
5 Oct 1831	Patuone	Ngāti Hao, Ngāti Pou	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Te Morenga	Urikapana	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Moetara, son of Rewha	Ngāti Korokoro, Te Hikutu, Ngāti Hau, Ngai Tu	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Taonui	Te Popoto	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Tamati Waka Nene	Ngāti Hao, Te Roroa, Ngāti Miru	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Atuahaere	Ngāti Tautahi	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Matangi	Te Popoto? Te Mahurehure	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Ripe	Te Uri-o-Hua, Te Uritaniwha	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Kekeao	Ngāti Matakiri, Te Uritaniwha	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
5 Oct 1831	Haara	Te Uri-o-Te-Hawato, Ngāti Rangi	Letter to King William	National Archives, London: CO 201/221, pp. 387-88	Binney 2007: 113, Figure 13.1
1830-35	Haara	Te Uri-o-Te-Hawato, Ngāti Rangi	Polack 1830-35		Polack 1840 [II]: 49

– *continued over page*

Date	Person	*Iwi* (tribe)	Original recorded in/by	Present location	Reference
1830-35	Wakatiri	Chief of the Bay of Islands	Polack 1830-35		Polack 1840 [II]: 49
1830-35	Titore	Chief of the Bay of Islands	Polack 1830-35		Polack 1840 [II]: 49
1830-5	Kawiti	Chief of Waimate and Maunganui	Polack 1830-35	Redrawn in stylised manner; original lost	Polack 1840 [II]: 49
1836	Patuone	Ngāti Hao	Receipt for armour made for him	Cambridge University Library: RCS/RCMS 278/46	Parkinson 2012, Figure 4
1839	Karetai		Grant of land for a house and cultivation to James Fowler	Hocken Library: MS-0808A	Robley 1987: 14
1840	Unknown	Kai Tahu?	Sale of c1000 miles of North Canterbury for 60 pounds to a Sydney merchant	ATL: EP/1975/1515/10-F	
14 Aug 1833	Te Rauparaha	Ngāti Toa Rangatira	Sale of Cloudy Bay to Capt J Blenkinsopp	NA: AAYZ 16001 NZC 133, 24(1)	
1839	Te Rauparaha?	Ngāti Toa Rangatira	Sale of land at Waikanae to William Barnard Rhodes	Private Collection. Sold through Webb's, 2012.	
28 March 1840	John Tuhawaiki	Kati Ruahikihiki	Declaration of ownership of Robucka [Ruapuke] Island	Hocken Library: MS-0808/B	Simmons 1986: 71, Figure 70
1840	John Tuhawaiki	Kati Ruahikihiki	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Tohowaiki	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990

Date	Person	*Iwi* (tribe)	Original recorded in/by	Present location	Reference
1840	Kaikoareare	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Tuckawa (Tukawa)	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Patuckie or Tobie (Topi Patuki)	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Karetai (also known as Jackey White)	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Te Matenga Taiaroa	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
1840	Te Waikai Pokene	South Island	Wentworth Indenture	Mitchell Library, Sydney (SAFE / MLMSS 7574); ATL (MSO-Papers-4947).	Evison, 1990
17 Feb 1840	Kawiti	Chief of Waimate and Maunganui	Treaty of Waitangi	National Archives, Wellington	
17 Feb 1840	Pomare	Ngāpuhi	Treaty of Waitangi	National Archives, Wellington	
6 Feb 1840	Te Makoare		Treaty of Waitangi	National Archives, Wellington	
1840	Others		Treaty of Waitangi	National Archives, Wellington	
1840	Chief	Kai Tahu	Sale of 1000 miles of North Canterbury to a Sydney merchant	ATL: EP/1975/1515/10-F	

Appendix 2. Self-portraits drawn upon request.

Date	Person	*Iwi* (tribe)/*hapu*	Original recorded in/by	Present location	Reference
March 1815	Te Morenga	Ngāti Hine	Originally drawn on board the *Active*, but later redrawn	ATL: A080-061	Jones and Jenkins 2011: ill. 35; Nicholas 1817 [II]: 217; Sissons *et al*. 2001: 28
1818	Drawing of Korokoro's moko by Tuai	Ngāre Raumati	Drawing upon request	CMS/ACC14 C2	Jones and Jenkins 2011: ill. 46
1818	Drawing of Korokoro's moko by Tuai	Ngāre Raumati	Drawing upon request	GNZMMS 147	
1843	Renata Kawepo	Ngāti Kahungunu	Drawing upon request	Cotton, 1843: IV.	
1844	Te Whatanui?	Otaki	W. B. D. Mantell Scrapbook, 1840-1872; possibly by Te Whatanui	ATL: C-103-001-1	
1846	Kawana Pitiroi Paipai	Putiki	Thomas Bernard Collinson drawing	ATL: A-292-032	
Before 1854	Wiremu Maihi Te Rangikaheke	Ngāti Rangiwewehi		GNZMMS 89	
1884	Tāwhiao	Tainui	*New Zealand Herald*, 1 Nov 1884, supplement, p. 2 (description only, no image)	Auckland Libraries	Neich 1993: 163

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ABSTRACT

Self-portraits using *moko* 'tattoo' have a relatively short history (1815-1884) within Māori culture, yet they provide many revelations about Māori and how they saw themselves. These took two forms: those which were made on land deeds across the country, and those made on request for Europeans. Examples range from a letter to King William IV in 1831 signed by 13 Ngāpuhi chiefs, to a self-portrait by Te Peehi Kupe of Ngāti Toa Rangitira made in Liverpool, England and two drawings by Tuai of his Ngāre Raumati brother Korokoro. I argue here that these drawings should be read as part of a unique system of Māori self-portraiture in which the physiognomic details so critical in Western European traditions of self-portraiture are replaced by

complex forms of *moko*. In doing so, they provide a snapshot into cross-cultural engagement and interaction between Māori and Pākehā, and suggest a deeper level of Māori understanding of such practices than previously thought. That these drawings are regarded *as* the ancestors by their descendants today is evidence of the enduring power of these *tohu* 'sign'.

Keywords: literacy, *moko,* Ngāpuhi, Ngāti Toa, Rangatira, Ngāi Tahu, print, portraiture, self-portraiture, Māori, tattoo, New Zealand

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RE-DATING OF THE KULI‘OU‘OU ROCKSHELTER, O‘AHU, HAWAI‘I: LOCATION OF THE FIRST RADIOCARBON DATE FROM THE PACIFIC ISLANDS

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In the early 1950s, Kenneth Emory excavated a number of rockshelters along southeastern O‘ahu, Hawaiian Islands (Emory and Sinoto 1961). Among these, Kuli‘ou‘ou Rockshelter (O1) has a certain status as the first archaeological site in the Pacific Islands to be directly dated via the then newly introduced radiocarbon method (Fig. 1). The date of 946 ± 180 before 1950 (Lab sample identifier: Chicago C550; Emory and Sinoto 1961: 14-15, Fig. 11) from the base of the rockshelter’s cultural deposit (Emory and Sinoto 1961, Fig. 6) greatly influenced archaeologists’ views of regional cultural sequences in East Polynesia. The suggestion of a 1,000 year prehistory in the islands and the ability to directly date cultural materials “…..opened up undreamed possibilities for reconstructing the prehistory of the area,” as Emory and colleagues (Emory, Bonk and Sinoto 1959: ix) so aptly stated. Largely ignored at the time was a second, much later radiocarbon date from the site of “AD 1739 ± 150” as reported by Emory and Sinoto (1961: 15).

Over the last three decades archaeologists have debated “long” versus “short” chronology models for the settlement of East Polynesia, including Hawai‘i, stimulating many to re-analyse and re-date sites originally excavated and dated in the 1950s, 60s, and 70s. This work has led to a revised understanding of the colonisation period for Hawai‘i, with an emerging consensus that the archipelago was settled after AD 800–1000 (Athens, Rieth and Dye 2014; Dye 2011; Kirch 2011; Mulrooney, Bickler, Allen *et al*. 2011; Rieth, Hunt, Lipo *et al*. 2011; Wilmshurst, Hunt, Lipo *et al*. 2011a, 2011b). This research stimulated our renewed interest in re-dating the use of Kuli‘ou‘ou Rockshelter. Even if correct, the wide error range for the early

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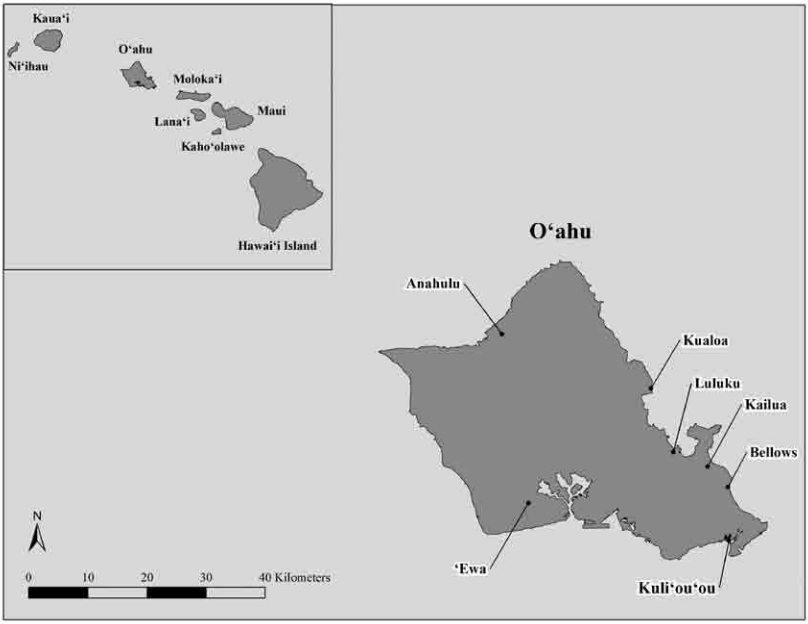

Figure 1. Map of the Hawaiian Archipelago displaying the location of Kuli'ou'ou Rockshelter and the earliest reliably dated sites on O'ahu. Anahulu (Kirch 1992), Kualoa (Carson and Athens 2007), Luluku (Leidemann, Hartzell, Gordon *et al.* 2003), Kailua (Athens n.d.), Bellows (Dye and Pantaleo 2010), 'Ewa (Athens, Ward, Tuggle *et al.* 1999; McDermott, Shideler, Winieski *et al.* 2000).

Site O1 date (see discussion below) had led archaeologists to argue for the need to re-date the lower Kuli'ou'ou deposits using modern ^{14}C methods (Kirch 2011, Kirch and McCoy 2007).

This paper presents the results of six new AMS ^{14}C dates run on charcoal of identified short-lived and medium-lived species. We utilise these data, along with a re-evaluation of the two dates obtained by Emory and Sinoto, to present a revised chronology for the Kuli'ou'ou Rockshelter. In addition, we discuss the implications of new wood charcoal identifications from the two lower deposits at the O1 rockshelter for illuminating general vegetation patterns in the Expansion to Proto-Historic periods. Finally, the broader implications of our revised chronology are considered for the prehistoric sequence of O'ahu Island and in the larger context of the settlement sequence for the Hawaiian archipelago (see Fig. 1).

HAWAIʻI AND THE EAST POLYNESIAN CHRONOLOGY DEBATE

The development of a robust, reliable chronology for Hawaiʻi and East Polynesia has had a long history, with advances made as new techniques have become available and with greater attention being paid to the specific materials dated and their contexts. During the last half century, estimates for the Polynesian colonisation of Hawaiʻi have ranged from the claim of Emory *et al*. (1959) for a settlement at South Point dating to AD 124 ± 60 to Wilmshurst *et al*.'s (2011a, 2011b) recent assertion that the archipelago was not discovered by Polynesians until after c. AD 1200. Certainly, there is no longer any reliable empirical support for claims that Hawaiʻi was settled during the first few centuries AD (*contra* Graves and Addison 1995; Hunt and Holsen 1991; Kirch 1985, 1986). Current debates focus on a c. 300-400 year span for colonisation between roughly AD 950-1200 (Athens *et al*. 2014; Dye 2011; Kirch 2011; Mulrooney *et al*. 2011; Rieth *et al*. 2011; Wilmshurst *et al*. 2011a, 2011b).

Kirch (2011; see also Kirch 1986) summarises the history of archaeological estimates for the colonisation of Hawaiʻi, contextualising these investigations within the regional frameworks for East Polynesia as a whole. Two issues have clearly driven these estimates and ensuing: (i) the substantive issue of the geographical structure of East Polynesian colonisation that is as much based on linguistic and comparative ethnographic data as archaeological data and (ii) the technical improvements in radiocarbon dating and their application to the archaeological record.

For multiple reasons including linguistic phylogenies, oral histories, comparative ethnography, and general geography, the origination point of the Polynesian voyagers who discovered Hawaiʻi is Central East Polynesia, namely the Society and Marquesas archipelagos. This fact has often caused mentally elastic interpretations of chronometric data from Hawaiʻi and Central East Polynesia in order to conform to a contemporary orthodoxy (see Kirch 1986 for a well-articulated summary). Logically, the earliest evidence for human colonisation in Hawaiʻi has to post-date similar evidence in Central East Polynesia.

Although the geographical pattern of East Polynesian colonisation is robust, the first several decades' of radiocarbon dates (1950s-1980s), and subsequent re-evaluations of these original data, created a bed of sand for a chronological foundation. This is not meant as a critique of the pioneering archaeological work, but rather is knowledge gained by 50+ years of refinement to radiocarbon dating technology and its application by archaeologists. The initial series of dates for most East Polynesian archipelagos are fraught with imprecision (i.e., large standard errors) and likely inaccuracy (e.g., inbuilt age, lack of correction for isotopic fractionation, etc.).

Spriggs and Anderson’s (1993) application of a chronometric hygiene method and more recently the use of a dating sample classification approach by Wilmshurst *et al*. (2011a) and Rieth *et al*. (2011) are two approaches to identifying reliable and problematic dates based on technological and sample-selection issues. Dye’s (2011, Dye and Pantaleo 2010) application of Bayesian calibrations, as a model-based method that incorporates paleoenvironmental and archaeological data, offers a novel approach for estimating colonisation in the Pacific. Athens *et al*. (2014) expanded Dye’s (2011) dataset and provide a more precise colonisation estimate using this model.

Recently, Allen and Huebert (2014) have developed criteria for assessing inbuilt age of wood charcoal and macrobotanical samples, resulting in the definition of short-lived, medium-lived, and long-lived categories. Improvements to radiocarbon dating and a more sophisticated understanding of the technology and sample selection on the part of archaeologists have been the primary drivers improving the precision and accuracy of colonisation estimates for Hawai‘i and East Polynesia.

Our new results for Kuli‘ou‘ou are consistent with previous re-dating efforts of presumed early Hawaiian (Dye and Pantaleo 2010, Kirch and McCoy 2007) and other East Polynesian (Anderson and Sinoto 2002) archaeological deposits in determining that the site is considerably younger than originally thought.

THE KULI‘OU‘OU VALLEY ROCKSHELTER: SITE O1

Setting and Objectives

The Kuli‘ou‘ou Rockshelter is situated near the tip of Mo‘omuku or Ka-lapa-o-Mana, the ridge separating Kuli‘ou‘ou Valley on the east and Niu Valley on the west. The rockshelter overlooks the mouth of the Kuli‘ou‘ou Valley and the adjacent reef situated in Maunalua Bay. Two natural ponds, Paikō and Waiha, were once situated in the vicinity, being fed by Kānewai spring (Emory n.d.). A small fishpond, Kūpapa, was once located in Niu Valley, while the large extant Maunalua Fishpond (Keahupua-o-Maunalua) lies to the east along the coastline.

Kuli‘ou‘ou Rockshelter was first tested by student archaeologist Jack Porteus in 1938, whose discovery of a wealth of artefacts led Emory to choose the site for a University of Hawai‘i at Mānoa archaeological methods course in 1950 (Fig. 2). The six objectives of Emory’s excavations were: (i) to determine the temporal length and sequence of occupation of the rockshelter, (ii) to identify the occupation and habits of the rockshelter residents, (iii) to identify changes in artefact types through time, (iv) to study the domesticated fauna, (v) to gain information about the origins and dates of the first occupation of the Hawaiian Islands in order to test “linguistic and lineage” hypotheses; and,

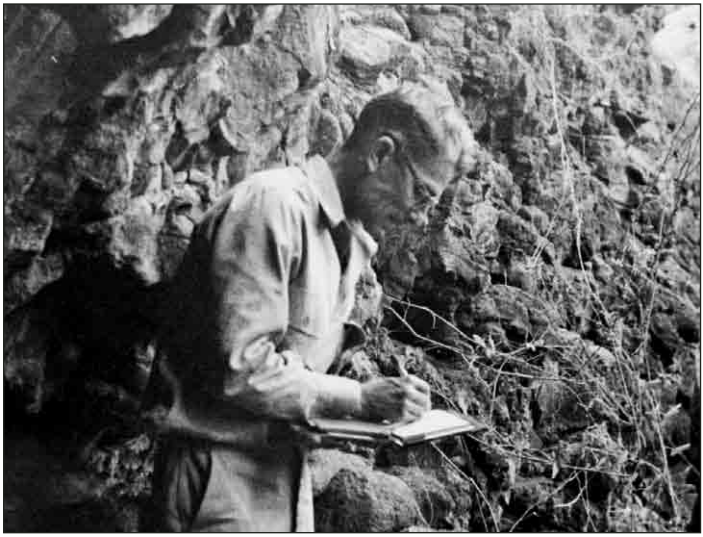

Figure 2. Photograph of Kenneth Emory during the 1950 excavations; reproduced with permission from Bernice P. Bishop Museum Archives (www.bishopmuseum.org).

(vi) to aid in developing archaeological methods and techniques for excavating sites in the Hawaiian Islands (Emory n.d.). These goals were consistent with the culture historical approach to archaeology that was in vogue in Hawai‘i and the mainland United States at the time, an approach that favoured the excavation of rockshelter and sand dune sites that could provide large fishhook and artefact assemblages useful for developing material culture sequences.

The 1950 Field Methods

Emory and Sinoto (1961) describe Site O1 as a remnant lava tube which forms a spacious shelter 15.5 m in length, with a maximum width of 8 m and a maximum height of 2.4 m (Fig. 3). Two stacked stone walls are found at the entry to the rockshelter, along the eastern and southern limits. In the rockshelter's interior, Emory laid out two baselines: an alphabetical line running N-S and a numerical line running E-W, delineating excavation units of three feet by three feet. A total of 42.5 units were excavated during the Porteus and Emory projects (Fig. 4). The Porteus excavations focused mainly to the east of the D line along the rear of the rockshelter and in a small area in the southern part of the rockshelter.

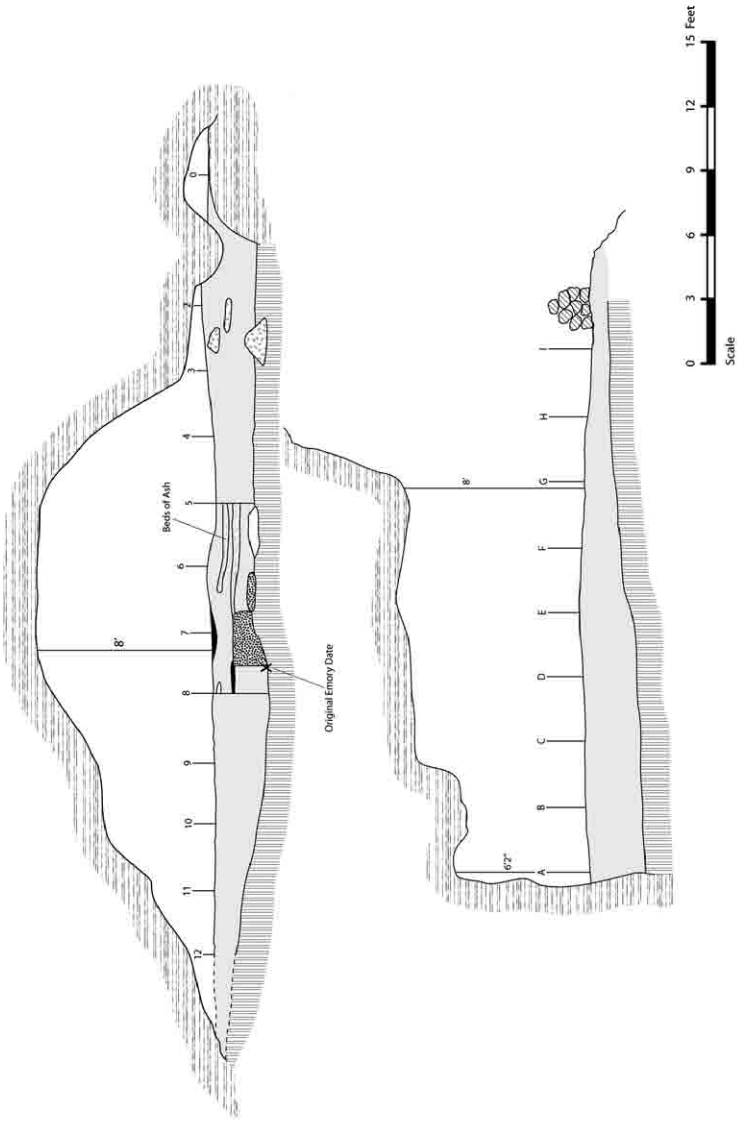

Figure 3. Cross section of O1 Rockshelter with stratigraphic profile (after Emory and Sinoto 1961). X refers to where the original Emory ^{14}C sample was collected.

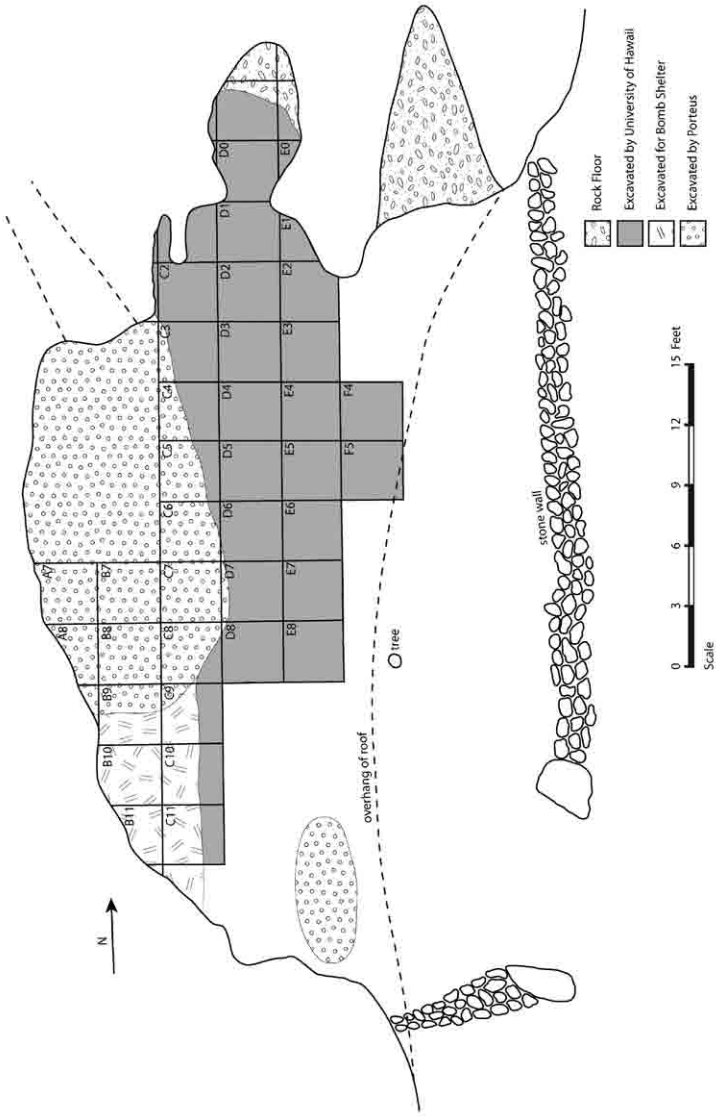

Figure 4. Plan view of Site O1 with units excavated.

Following methods current at the time, Emory excavated in six inch levels as measured from the surface (i.e., 0-6 inches below surface, 6-12 inches below surface, etc.) which are retained herein to facilitate comparison with their original field notes and collections. Excavated deposits were screened through ¼ inch (6.4 mm) mesh (Emory and Sinoto 1961: 12); as a result, the Site O1 collections are biased towards larger artefacts. Smaller remains such as fish bone are undoubtedly underrepresented. Only in two "quantitative units" (D6, D7) defined by Emory and Sinoto as units where "all shell, bone, wood, and foreign stone materials w ere taken from each six inches of depth for a quantitative analysis" (Emory and Sinoto 1961: 11) were full samples of floral, faunal and artefact remains collected. In all other units it must be presumed that formal tools (adzes, adze flakes) and modified faunal remains (cut bone) were likely collected and recorded, but that other unmodified items and waste debris (such as basalt debitage) were not.

Field notes and profile sketches indicate that numerous ash lenses and perhaps pit and fire features were encountered in the Kuli'ou'ou excavations, but these were not recorded or excavated separately from the surrounding deposits. As a case in point, we could not identify any archived wood charcoal samples collected by Emory and Sinoto specifically point-provenienced from *in situ* fire features. Because artefacts and wood charcoal samples were not point-provenienced within the 6 inch levels, and at least some features were dug into these levels but were not excavated separately from the surrounding matrix, these procedures pose a challenge for any re-analysis of the site's stratigraphy and artefact assemblages. Fortunately, units D6 and D7, which Emory and Sinoto identified as among the least disturbed of the rockshelter's deposits in the central protected living floor (1961: 9),[1] were excavated as "quantitative units". Given that special care was taken in the excavating and recording of these two units in 1950, and that they were noted as representing some of the most undisturbed deposits in the rockshelter (Emory and Sinoto 1961: 9), we focused our current project on dating wood charcoal samples that were recovered, in part, from unit D6.

Stratigraphy

Emory and Sinoto (1961) reported the stratigraphy of Kuli'ou'ou Rockshelter in terms of the 6-inch levels in which it was dug, but their notes make it clear that there were four depositional units or stratigraphic layers. The only stratigraphic section provided in their published report is for excavation unit D2 (Emory and Sinoto 1961: 11, Fig. 7) where four layers are identified. Layer I, ranging from 0-6 but sometimes 0-8 inches below surface, consisted of a "yellow-brown, powdery soil". This was mixed with goat manure in

the upper portion, clearly indicating a post-European contact depositional environment. Beneath this, the matrix became a more compact dark brown in which both indigenous Hawaiian artefacts and a limited number of Euro-American artefacts were recovered. Layer II was a grey brown soil with cobble and gravel inclusions, generally 6-14 inches below the surface, but in some areas reaching 18 inches below the surface. Field notes indicate that the upper part of Layer II had a significant quantity of ash and midden including an abundance of faunal remains and organic materials. Based on our analysis of the original field records, the lower part of Layer II had a discontinuous ash lens that appears to have extended along sections of the northern two-thirds of the site. Layer III was lighter grey brown in color, with more frequent gravel inclusions, as well as larger stones. This layer extended from 18-24 inches below the surface and produced fewer artefacts than Layer II. The basal deposit, Layer IV, was light brown in color, ranged in depth and thickness across the site, and has been interpreted as a sterile deposit (Moniz 1997). One must be cautious, however, in assuming that materials from any particular 6-inch level can unambiguously be assigned to any one of these stratigraphic layers. Figure 9 in Emory and Sinoto (1961: 12) provides a photograph of an exposed face (excavation unit not indicated) through the site's deposit, with a large intrusive pit feature cutting through multiple levels.

The Layer III Artefacts and Faunal Remains

Emory and Sinoto (1961) described the numerous artefacts recovered from Site O1 which included coral files, fishhooks and other fishing gear, stone tools, and the broken handle of a shark-tooth knife. Here we focus on artefact types which have relevance to the site's chronology. Adzes, an artefact whose cross-sections were used by Emory and Sinoto as chronological markers, were relatively abundant at Kuli'ou'ou, with 14 complete specimens, 15 fragments, and two blanks/preforms (Emory and Sinoto 1961: 60). The majority of adzes from Site O1 are quadrangular in cross-section, a type regarded by many archaeologists as typical of later phases in the Hawaiian cultural sequence (Cleghorn 1982; Kirch 1985, 1990; but see Cleghorn 1992; Kahn, Mills, Lundblad *et al*. 2009). The recovery of at least two quadrangular adzes in Layer III suggested to Emory and Sinoto that this adze type was present during the first period of rockshelter use. However, four sub-triangular adzes also were collected. This suggested to Emory and Sinoto that Site O1 had a colonisation period occupation, as such adzes were believed to represent earlier forms commonly used in West Polynesia and in early East Polynesian assemblages in the Marquesas and Society Islands (Green 1971, 1974; Kirch 1985: 184-185; Suggs 1961: 63, 110).

Emory and Sinoto quantified faunal remains ("midden") from O1 by weight from the two "quantitative units", D6 and D7 (1961: 17, Table 1). Weight distributions for candlenut, marine shell, land mammal, and crustacean were the highest in 6-inch levels 18-24 in unit D6 and 6-12 in unit D7. Bird bone had the highest frequency in the 18-24 and 24-30 inch levels in both units (0.85 and 1.05 g in 18-24 layer, 0.75 g in 24-30 layer, as opposed to <.20 to .03 g in the 6-inch levels above 18 inches) (Emory and Sinoto 1961: 17, Table 1). Thus bird bone, as measured in weight (g) was highest in the deepest 6-inch levels of both units (Moniz 1997) and found above the underlying sterile deposit (24 inches below surface and deeper), leading Kirch (1982) to posit that Site O1 may have been initially used during an early phase prior to significant human impact on the natural bird populations of the islands. While 17 percent of the overall bird bone assemblage exhibited burning (Moniz 1997), the lack of detailed taphonomic analysis of the site O1 bird bones leaves open the possibility that some of these avifaunal remains could have resulted from pre-cultural (i.e., paleontological) depositional processes.

The 1950 Dates

The primitive radiocarbon dating methods available in 1950 necessitated large samples of charcoal, such as the entire contents from a single hearth or burn event. Not only did this practice potentially merge charcoal burned in a number of different events, but no thought was given to identifying the species of wood or other plant materials involved. In unit D7, a bulk charcoal sample (1 and 5/8 ounces) was collected by Emory. This sample derived from between 24-36 inches below the surface (thus presumably from Layer III). The sample yielded an uncalibrated radiocarbon date of 946 ± 180 before 1950 (Lab sample identifier: Chicago C550, Emory and Sinoto 1961: 15). Lacking isotopic fractionation information, which can result in an adjustment in the radiocarbon age, calibration of this date should be considered with caution. A second sample recovered from excavation unit D7, at 18-24 inches below surface (again, presumably from Layer III) was later dated. This sample yielded a date reported by Emory and Sinoto (1961: 15) as "AD 1739 ± 150" (Lab sample identifier: Michigan M564, Emory and Sinoto 1961: 15).[2] These initial dates suggested that this cultural deposit had at least two phases.

What was unknown at the time, and has been overlooked since, is that these dates were not adjusted for isotopic fractionation (i.e., $\delta^{13}C$ value) and are uncalibrated. They were originally presented as absolute calendar year dates that could be subtracted from 1950. These issues, combined with the large error estimates, make these dates highly suspect.

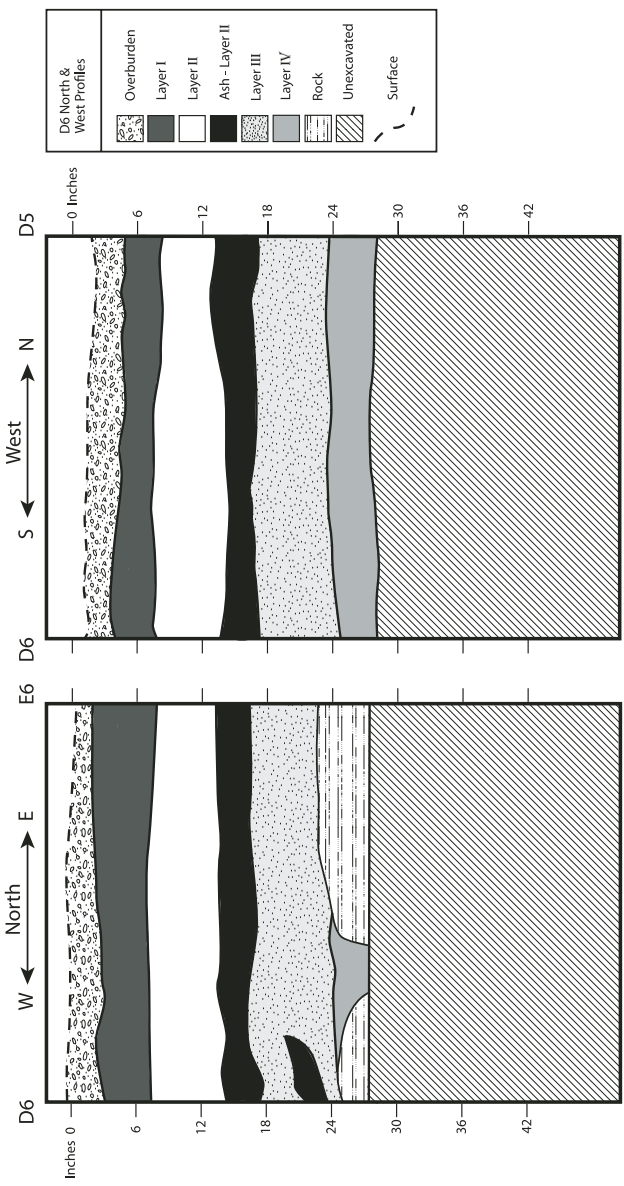

Figure 5. Stratigraphic profile, Unit D6, Site O1.

NEW AMS RADIOCARBON DATES FOR THE KULI'OU'OU VALLEY ROCKSHELTER

The two samples dated by Emory were completely destroyed during radiocarbon dating, requiring us to target other contexts for the re-dating of the site. Generalised (non-feature specific) samples of wood charcoal from the cultural deposits were available for dating and we employed the accelerator mass spectrometry (AMS) method. These samples were contextualised according to the 6-inch levels by which Emory excavated. Emory's dates derived from unit D7, one of the "quantitative units". Since there are no archived charcoal samples from the deepest levels of unit D7, we targeted archived samples from adjacent unit D6 which also was excavated as a "quantitative unit". The stratigraphic profile for unit D6 is presented in Figure 5. In addition, we dated other samples that were designated in the original excavations as "radiocarbon samples" rather than bulk charcoal, assuming that the former had been designated by Emory or Sinoto as being the most appropriate materials to date the site, even if their exact reasons are unknown.

Prior to dating, each sample was identified to species by wood charcoal specialist Gail Murakami (Table 1). The six newly dated samples are listed in Table 2, with details of provenience, sample materials and dating results. Beta-306140 and 306139 date rind from the Polynesian introduced bottle gourd (*Lagenaria siceraria*) and fruit of the indigenous pan-Pacific screwpine (*Pandanus tectorius*); both of these samples lack significant inbuilt age and are classified as short-lived (lifespans of a decade or less, after Allen and Huebert 2014). The *Chenopodium* sample (Beta-306124) would also be classified as short-lived (Athens *et al.* 2014). Beta-306123 dates a stem fragment of *Cordyline fruticosa*, another Polynesian introduction that has the potential for a moderate inbuilt age of several decades, and thus would be considered a medium-lived taxa. Beta-306121 derives from a native shrub unlikely to have significant inbuilt age and would be considered short-lived, while Beta-306122 and Beta-306124 derive from native shrubs that would be considered medium-lived (Allen and Huebert 2014; Rieth and Athens 2013, Table 1). All six samples were processed and dated by Beta Analytic. The wood charcoal samples received standard pretreatments with hot HCl acid washes to remove carbonates and alkali washes (sodium hydroxide, NaOH) to remove secondary organic materials.

Table 2 presents the measured ^{14}C age, as well as the conventional ^{14}C age determined after correction for isotopic fractionation (based on $\delta^{13}C$ values). The conventional age was calibrated using the Oxcal calibration program (version 4.2) and INTCAL09 (Reimer, Baillie, Bard *et al*. 2009).

Table 1. Wood charcoal identifications.

Provenience	WIDL #	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Weight (g)
D6: 1st 6"	LI	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	0.12
	LI	*Euphorbia* spp.	*ʻAkoko*	Native/Shrub	Wood	5.02
	LI	Unknown 1			Wood	0.11
	LI	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	0.11
	LI	*Chenopodium oahuense*	*ʻĀheahea*	Native/Shrub	Wood	0.37
	LI	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	0.28
	LI	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	0.29
	LI	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	0.33
	LI	cf. *Prosopis pallida*	*Kiawe*	Historical Introduction/Tree	Wood	0.85
	LI	Unknown 2			Wood	0.11
	LI	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	0.64
D6 West: 12-18"	LII	cf. *Coprosma* sp.	*Pilo*	Native/Shrub-Tree	Wood	0.48
D6 East: 12-18"	LII	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	0.43
	LII	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	1.12

– *continued over page*

Table 1. – *continued*

Provenience	WIDL #	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Weight (g)
D6 East: 18-24"	LIII	cf. *Osteomeles anthyllidifolia*	*ʻŪlei*	Native/Shrub	Wood	0.09
O1 Sample #102	LII	*Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	0.64
D6: 12-18"	LII	*Pandanus tectorius*	*Hala,* screwpine	Native/Tree	Key	0.46
	LII	*Euphorbia* spp.	*ʻAkoko*	Native/Shrub	Wood	3.05
	LII	*Styphelia tameiameiae*	*Pūkiawe*	Native/Shrub	Wood	1.17
	LII	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	0.26
	LII	*Psydrax odoratum*	*Alahe'e*	Native/Tree	Wood	0.51
	LII	*Erythrina sandwicensis*	*Wiliwili*	Native/Tree	Wood	0.05
	LII	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	0.97
	LII	*Acacia koa*	*Koa*	Native/Tree	Wood	0.98
O1 Sample #103	LIII	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	2.84
D6 West: 18-24"	LIII	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	1.22
	LIII	*Euphorbia* spp.	*ʻAkoko*	Native/Shrub	Wood	2.59
	LIII	*Cordyline fruticosa*	*Kī, ti*	Polynesian Introduction/Shrub	Wood	0.63
	LIII	*Erythrina sandwicensis*	*Wiliwili*	Native/Tree	Wood	0.06

Provenience	WIDL #	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Weight (g)
	LIII	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	0.55
	LIII	*Chenopodium oahuense*	*ʻĀheahea*	Native/Shrub	Wood	0.14
	LIII	cf. *Wikstroemia* sp.	*ʻĀkia*	Native/Shrub	Wood	0.07
	LIII	cf. *Nothocestrum* sp.	*ʻAiea*	Native/Tree	Wood	0.11
	LIII	Unknown 3				0.72
	LIII	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	0.17
	LIII	*Psydrax odoratum*	*Alahe'e*	Native/Tree	Wood	0.47
	LIII	cf. *Bobea sandwicensis*	*ʻAhakea*	Native/Tree	Wood	0.32
	LIII	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *ʻōhiʻa ai*	Native + Historic Introductions/Tree	Wood	0.06
	LIII	Unknown 4			Wood	0.05
O1 Sample #34	NR	*Cordyline fruticosa*	*Kī, ti*	Polynesian Introduction/Shrub	Wood	0.03
	NR	*Euphorbia* spp.	*ʻAkoko*	Native/Shrub	Wood	0.06
	NR	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	0.03
	NR	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	0.01
	NR	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	0.09

Table 2. New AMS radiocarbon dates for Site O1, Kuli‘ou‘ou Rockshelter.

Lab #	Other Sample #	Material & species	Provenience	Conventional age BP	$\delta^{13}C$	Calibrated AD age range (2σ)
Beta-306140	WIDL-1109-22	Charred *Pandanus tectorius* key	D6, 12-18 inches below surface; O1 sample #102	270 +/- 30	-23.1	1515-1598 (42.2%) 1616-1669 (46.4%) 1781-1798 (6.4%) 1948-1952 (0.4%)
Beta-306139	WIDL-1109-21	Charred *Lagenaria siceraria* fruit rind	D6, 12-18 inches below surface; O1 sample #102	40 +/- 30	-24.9	1694-1728 (21.2%) 1812-1854 (19.1%) 1866-1919 (55.1%)
Beta-306121	HRC-1579, 01-1	*Osteomeles anthyllidifolia* charcoal	D6, 18-24 inches below surface	60 +/- 30	-25	1692-1728 (23.6%) 1811-1920 (71.8%)
Beta-306122	HRC-1580, 01-2	*Dodonaea viscosa* charcoal	D6, 18-24 inches below surface	80 +/- 30	-26.4	1690-1730 (25.2%) 1810-1926 (70.2%)
Beta-306123	01-3	Charred *Cordyline* fruticosa stem	D6, 18-24 inches below surface; O1 sample #103	0 +/- 30	-23.7	Modern
Beta-306124	01-4	*Chenopodium oahuense* charcoal	D6, 18-24 inches below surface; O1 sample #103	470 +/- 30	-24.0	1409-1457 (95.4%)

REVISED KULI‘OU‘OU ROCKSHELTER CHRONOLOGY

Figure 6 presents the Oxcal calibrated 2-sigma (95.4%) probability distributions for the six new radiocarbon dates from samples originally collected from levels with depths between 12 and 24 inches below surface. We assume that these samples derived from stratigraphic Layers II (12-18 inches) and III (18-24 inches). The results are indicative of the complex site stratigraphy and the coarse-grained excavation techniques of the 1950s, as described above. The deposits were mixed through prehistoric activities (e.g., creation of scoop hearths and pits), as well as by more recent goat disturbance and the historic use of the rockshelter as a bomb shelter (Emory n.d.).

The new dates do not yield a stratigraphically consistent chronology, with dates inverted with respect to their 6-inch excavation levels. Of four dates from levels between 18-24 inches, one calibrates as modern, two are statistically similar and calibrate with a highest probability in the 19th century, while the last calibrates to the first half of the 15th century. Similarly, the two calibrated dates from the 12-18 inches level present little overlap and appear to represent two distinct burning events most likely dating to the 16th-17th and 19th centuries.

The oldest sample is Beta-306124, which was retrieved from near the bottom of the cultural deposit in a level 18-24 inches below surface, in a similar context to the original Chicago date. This gives us a secure maximum age of the first half of the 15th century for the earliest occupation of Site O1. The much older date (Chicago C550) produced by Emory from a sample recovered from the lower level in unit D7 is likely due to a combination of factors, including the relatively crude state of radiocarbon dating technology at the time and possible inbuilt age in the sample.

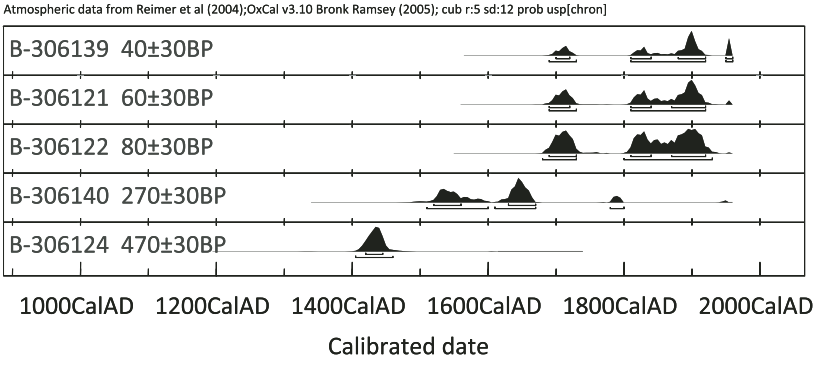

Figure 6. Oxcal plot of new radiocarbon dates from Site O1.

Emory and Sinoto's (1961) younger date is in line with our present results. However, considering that the same technological and sample issues pertain to this date as the earlier Chicago date, the correspondence may be fortuitous but inaccurate (i.e., the true age range for Emory and Sinoto's sample will remain uncertain). The individual dates we obtained are reliable estimates for cultural burning events, regardless of stratigraphic location and the possibility of inversions. Based on our results, human use of the Kuli'ou'ou Rockshelter occurred from the 15th to early 19th centuries, followed by sporadic short-term use during the 20th century. Although the periodicity of these activities is unclear, the amount of cultural material, number of apparent subsurface features, and level of disturbance suggest that the rockshelter may have been used fairly continuously, or was periodically the location of intense activity over c. 400 years. Emory's field notes indicate that a single piece of glass was recovered in the upper 12 inches of the site in addition to some modern historic artefacts (Emory n.d.). The absence of early post-contact artefacts of Euro-American origin in the upper sector of Layers I and II suggests that the site was likely abandoned some time before the early 19th century.

SOUTHEASTERN O'AHU VEGEGATION DURING THE EXPANSION TO PROTO-HISTORIC PERIODS

Weights of identified wood charcoal taxa from units D6 and D7 are provided in Table 3. Although analysis of diachronic change in the vegetation surrounding the rockshelter as represented by charcoal (fuel taxa) (e.g., Dye and Sholin 2013) is not possible due to the poor integrity of the stratigraphic sequence, some general observations are presented. The majority of taxa identified in the Site O1 charcoal samples are tree and shrub species typical of the Lowland Dry Community of Hawaiian vegetation as defined by Gagné and Cuddihy (in Wagner, Herbst and Sohmer 1990: 45). This designation reflects the lowland elevational band (15-2,000 m) in a dry moisture regime (<1,200 mm rainfall). In this scheme, the charcoal assemblage represents a mixture of two unique communities within the Lowland Dry Community: *'A'ali'i* (*Dodonaea*) Lowland Shrubland (Wagner *et al*. 1990: 71) and *Lama* (*Diospyros*) Lowland Forest (Wagner *et al*. 1990: 73). Although not present in large quantities, the dominant species of these two communities, *Dodonaea* and *Diospyros*, were found in most of the samples analysed, suggesting some abundance in the environment. Exceptions to the lowland forest/shrubland communities are *hau* (*Hibiscus tiliaceus*), which would have grown closer to a water source, *koa* (*Acacia koa*) which could have been culturally transported from a higher elevation forest, and *Ipu* (*Lagenaria siceraria*) and *Kī* (*Cordyline fruticosa*), which are both Polynesian economic introductions. *Kiawe* (*Prosopis pallida*), a historically-introduced tree that dominates the current vegetation community

Table 3. Weights of identified taxa in wood charcoal samples from D6 and D7 by six inch layers; weights are listed in grams. "Not listed" refers to samples lacking precise stratigraphic context but known to derive from D6 and D7.

Taxon: \ Sample Context:	0-6"	12-18"	East 12-18"	West 12-18"	East 18-24"	18-24"	Not listed
Acacia koa		0.98					
Aleurites moluccana nutshell	0.33						
Bobea sandwicensis						0.32	
Psydrax odorata		0.51				0.47	
Euphorbia spp.	5.02	3.05					0.06
Chenopodium oahuensis	0.37					0.14	
Coprosma sp.				0.48			
Cordyline fruticosa						0.63	0.03
Diospyros sandwicensis	0.11	0.26				2.84	0.03
Dodonaea viscosa	0.64	0.97	1.12			1.22	0.01
Erythrina sandwicensis		0.05				0.06	
Hibiscus tiliaceus	0.29		0.43			0.55	
Lagenaria siceraria rind	0.12	0.64					
Metrosideros polymorpha	0.28					0.17	0.09
Nothocestrum sp.						0.11	
Osteomeles anthyllidifolia					0.09		
Pandanus tectorius		0.46					
Prosopis pallida	0.85						
Styphelia tameiameiae		1.17					
Syzygium sp.						0.06	
Wikstroemia sp.						0.07	
Unknown 1	0.11						
Unknown 2	0.11						
Unknown 3						0.72	
Unknown 4						0.05	

of Kuli‘ou‘ou, is also present in the upper 6 inches of one of the units. The presence of *kiawe* provides further indication of historic use of the site, either before or after its use as a bomb shelter.

DISCUSSION AND CONCLUSIONS

Site O1 is not the only rockshelter in the Hawaiian Islands with a putative early date which, upon re-dating, has proven to be younger in age than originally claimed. It is instructive to compare our Site O1 results with the case of Kaupikiawa Rockshelter on the Kalaupapa Peninsula of windward Moloka‘i, originally excavated in 1967 by Richard Pearson of the University of Hawai‘i. Pearson collected a number of unidentified charcoal samples which were later submitted by Marshall Weisler for radiocarbon dating (Weisler 1989: 137). One sample (Beta-9276) from near the base of the cultural deposit yielded an age of 880 ± 70 BP (calibrated to AD 1026-1262 [95.4%]), one of the earliest dates then known for Moloka‘i Island. A second sample from a similar depth yielded an age of <120 years—and potentially should have raised questions regarding the validity of the early date—yet Weisler accepted an initial age for the occupation of Kaupikiawa Rockshelter “by the 11th century” (1989: 126). Subsequently, Kirch, O’Day, Coil *et al*. (2003) conducted limited re-excavations in the site, submitting three new samples of charcoal from identified, short-lived taxa for AMS dating. A stratigraphically well-controlled sample from the base of the cultural deposit yielded a conventional age of 650 ± 40 BP (calibrated to AD 1295-1390; Kirch *et al*. 2003, Table 6). Thus the true age for initial human use of the Kaupikiawa Rockshelter was the 14th, rather than the 11th, century.

The cases of both Kaupikiawa and Kuli‘ou‘ou rockshelters underscore how important it is to have good stratigraphic control for radiocarbon samples, but also highlight the absolute necessity for submitting samples that have been botanically identified to short-lived taxa (Allen and Huebert 2014, Dye 2000, Rieth and Athens 2013). Both Kuli‘ou‘ou and Kaupikiawa were excavated at a time when materials were collected by arbitrary levels rather than by natural strata, leaving the stratigraphic context of dated samples uncertain. In both cases, the initial radiocarbon dates were on unidentified charcoal which likely derived from old, hardwood trees or from driftwood collected from the nearby coastlines. Consequently, the initial age estimates for Polynesian use of these two rockshelters were several centuries earlier than subsequent re-dating has demonstrated to be the case.

In sum, the Kuli‘ou‘ou Rockshelter can no longer be regarded as dating to around AD 1000 as suggested by previous syntheses of Hawaiian prehistory. Six new AMS dates on charcoal samples originally collected by Emory now indicate that the earliest occupation of the site most likely dates to AD 1400-1450. The Layer II and III deposits likely represent up to four or more

centuries of continued use before the site was abandoned prior to, or during, the initial decades after European contact. Thus, the site is informative for understanding the transition between the Late Expansion (AD 1400-1650) and Proto-Historic (AD 1650-1778) periods of the Hawaiian cultural sequence (see Kirch and McCoy 2007), but can no longer be considered relevant to the early period of Polynesian colonisation in Hawai‘i.

ACKNOWLEDGEMENTS

Our sincere thanks to the Anthropology Department and Archives at the Bishop Museum for providing us access to the Kuli‘ou‘ou samples and field notes. We particularly thank Tia Reber (Bishop Museum Archives) who was instrumental in locating the photograph presented as Figure 2 and Teresa Ingalls (former Bishop Museum Archaeology Collections Manager) who located the charcoal samples. Diana Izdebeski is thanked for drafting the figures. Melinda Allen and two anonymous reviewers provided insightful comments that greatly improved our final draft.

NOTES

1. Readers will note that the plan view of site excavations at O1 shows that Porteus' early excavations impinged on the western limit of D7 and perhaps D6. In their monograph, Emory and Sinoto (1961) state that D6 and D7 had among the best preserved deposits in the central portion of the rockshelter, leading them to excavate these two units carefully as "quantitative units". Emory and Sinoto (1961: 9) note that only the first 6 inches of the D7 unit were impacted by Porteus' work, and only in a very small section of the southwest limit of the excavation unit. Thus, it seems unlikely that Porteus' earlier work impacted the integrity of the D6 and D7 deposits in any significant manner.
2. As far as we know this date has only been published in t he A.D. format, however, based on the state of radiocarbon dating technology at the time this likely is not a true calibrated calendar age.

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ABSTRACT

Kuli‘ou‘ou Rockshelter (Site O1) in the Hawaiian Islands has a certain status as the first archaeological site in the Pacific Islands to be directly dated via the then newly introduced radiocarbon method. The original date of 946 ± 180 before 1950, from the base of the rockshelter’s cultural deposit, greatly influenced archaeologists’ views of regional cultural sequences in East Polynesia. We present the results of six new AMS ^{14}C dates run on Kuli‘ou‘ou Rockshelter wood charcoal which has been identified to short-lived and medium-lived species. We use these data, along with a re-evaluation of the two dates obtained by the original excavators, Kenneth Emory and Yosi Sinoto, to present a revised chronology for the rockshelter. In addition, we discuss new wood charcoal identifications from the two lower layers at Site O1 for illuminating general vegetation patterns in the Expansion to Proto-Historic periods. Finally, the broader implications of our revised chronology are considered for the prehistoric sequence of O‘ahu Island and in the larger context of the settlement sequence for the Hawaiian archipelago.

Keywords: chronology, settlement sequence, Hawaiian Islands, wood charcoal identification, vegetation patterns

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REVIEW

HIGGINS, Nancy and Claire Freeman (eds): *Childhoods: Growing Up in Aotearoa New Zealand*. Dunedin: Otago University Press, 2013. 344 pp, colour photos, $49.99 (paper).

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In popular myth, Aotearoa New Zealand is often portrayed as a great place to be a child. However, the book *Childhoods: Growing Up in Aotearoa New Zealand* (hereafter *Childhoods*) complicates this view. As Keith Ballard notes in his foreword to the book, Aotearoa New Zealand has the dubious distinction of being the OECD (Organisation for Economic Cooperation and Development) country with some of the highest rates of child poverty and child suicide and some of the worst indicators of child health. Aotearoa New Zealand Ministry of Education (2010) statistics reveal striking disparities in children's educational outcomes. For example, Māori children are stood down or suspended from school at around three times the rate of Pākehā and Asian children, and Māori and Pacific children gain university entrance at a significantly lower rate than other groups (Ministry of Education 2010). The book *Childhoods* addresses such disparities while emphasising the need to read them in relation to the bigger story of growing social inequality in Aotearoa New Zealand *and* children's resilience, agency and diverse perspectives.

In my view, the book *Childhoods* has been published at a critical juncture in Aotearoa New Zealand, given increased public concern about child poverty, the Government's 2012 publication of the "White Paper for Vulnerable Children" and associated legislative changes (see http://www.childrensactionplan.govt.nz). The book's 26 authors and 19 chapters problematise simplistic imaginaries of childhoods while stressing the value and importance of listening to children's perspectives on their own lives. *Childhoods* is wide-ranging in terms of the academic disciplines that it represents, the topics that it canvases, the kinds of research it discusses and the children/childhoods that it discusses. The book is carefully structured around three broad sections. The first provides a theoretical and ethical framework for thinking about children and childhoods in Aotearoa New Zealand and a contextual background for the remainder of the book. The second highlights the diversity of childhoods in Aotearoa New Zealand, drawing on historical, geographical, disability studies, indigenous studies, legal studies, social work, education and media studies perspectives, and addressing topics as wide-ranging as early twentieth century schooling, urban children's play, being Māori and disabled, multicultural childhoods, children and family law, the needs of adopted and fostered children, children and work and technology and children. The third section foregrounds children and young people's voices in relation to a range of issues, including early childhood education

settings, having parents in prison, understandings of success, building queer-straight alliances in high school contexts, and transitioning to work.

I found the first section of *Childhoods* to be particularly strong. In their introductory chapter (Chapter 1), Claire Freeman and Nancy Higgins provide a justification for the book's focus, problematising popular myths about Aotearoa New Zealand as a children's paradise and highlighting the diversity of children and childhoods in Aotearoa New Zealand from a demographic perspective. In Chapter 2, Anne Smith then situates the remainder of the book theoretically, discussing the key concerns of childhood studies, specifically, its understanding of childhood as "as a social construction rather than a natural state" (p. 30), its interest in how discourses of childhood (or beliefs about children) shape children's lives, and its recognition of children as social actors in their own right (rather than adults-in-the-making) whose "voice" or "point of view" should inform all policy and practice that affects them (p. 33). Smith also situates both childhood studies and the book's focus in relation to the United Nations Convention on the Rights of the Child (UNCRC), in particular, its focus on the need to recognise children as people, to broker their participation in matters relevant to them, to privilege their perspectives on their own lives, and to recognise their voices as multiple rather than singular. These threads are continued throughout the remainder of the book. Smith concludes her chapter by discussing a key debate in childhood studies as being between those who advocate for attention to the multiplicity of childhoods and those who advocate for a focus on "commonalities that cut through class, ethnicity and gender" (p. 42). She argues that attention to both issues is important, a view that is echoed elsewhere in relation to social research more generally (for example, see Fine and Weis 2005). The remaining introductory chapters provide an environmental and an ethical perspective on children and childhoods in Aotearoa New Zealand. In Chapter 4, Claire Freeman considers children's changing environmental worlds and the impact these changes have on children's everyday lives and opportunities for play. In Chapter 5, Jude MacArthur and Margaret McKenzie note the importance of recognising ethics as a process rather than a one-off matter of 'consent', and stress the need to recognise children and young people as "*having experience* worthy of our research attention" but as "*inexperienced in the research context*" (p. 87, emphases original). MacArthur and McKenzie emphasise the need for researchers to develop their awareness of ethical issues relating to research with children, their knowledge about "national and international legal requirements about consent and context" (p. 90), and their competence in working with children, including their capacity to recognise when children are exercising agency, for example, by signalling a withdrawal of consent. Taken together, the introductory chapters provide an informative and thought-provoking basis for what follows.

The chapters in the second and third sections of *Childhoods* are also richly informative and likely to appeal to wide audience, but I found several chapters particularly compelling. These included Nicola Taylor and Megan Gollop's account of children and young people's participation in family law decision-making (Chapter 10), Anita Gibbs' discussion of the needs of adopted and foster children (Chapter 11), Ruth Gasson and James Calder's chapter on being young and working (Chapter 12), Julie Lawrence's chapter on children of prisoners (Chapter 15), and Kathleen Quinlivan's

chapter on queer-straight alliances in high school contexts (Chapter 17). Each of these chapters provide a full account of the issues at stake, situate the Aotearoa New Zealand context in relation to the broader international context, connect children's perspectives with broader structural factors (in line with Smith's argument, earlier), and provide a full enough account of the research project and research "data" (where relevant) to ensure that the stated implications are both nuanced and compelling. Other chapters are effective for their foregrounding of children and young people's agency alongside broader structural factors that shape or have shaped their lives. Examples include Judith Sligo and Karen Nairn's consideration of children's understandings of success (Chapter 16) and Moana Mitchell and Hazel Phillips' chapter exploring *rangatahi* Māori (young Māori's) experiences of transitioning to work (Chapter 18). Helen May (in Chapter 6) and Christina Ergler, Robin Kearns and Karen Witten (in Chapter 7) provide rich historical insights into children's experiences of school and urban children's play respectively.

I have three criticisms of *Childhoods.* The first is that it would have been helpful if the editors had explicitly articulated who are included as "children" either near the beginning of the book or in its title. This may be self-evident for those familiar with UNCRC (which includes as "children" all those under 18 years of age), and the editors do make mention in their introductory chapter of the provision of "free" schooling in Aotearoa New Zealand "for children from 5-18 years" (p. 23), however, I worry that some people with an interest in older children or "youth" may not recognise the book's relevance to them. (In reality, *Childhoods* contains some very rich material that would likely be of great interest to those who work in secondary schools or other contexts involving older children). My second criticism is that a few of the chapters make extensive reference to research that the authors have already published elsewhere, or broad statements about research findings, without providing sufficient detail for the reader to judge the credibility of the analytic/interpretive judgments made. As a result they feel a little long on interpretation and short on "evidence". All of the chapters deal with interesting and important topics, but some are more comprehensive, compelling and convincing than others. Finally, given that in Chapter 1, the editors position Aotearoa New Zealand as "a Pacific country in location and increasingly in orientation" (p. 18), I was surprised that *Childhoods* contains no chapters that explicitly focus on Pacific children's perspectives or issues relating to Pacific children specifically.

Overall, however, this book is both timely and important. It offers a useful resource for students, scholars and practitioners working in areas such as health, education, law and social work along with anyone who is interested in matters relating to children and childhoods (including "youth" or older children) in Aotearoa New Zealand. I am currently using Anne Smith's theoretical chapter as required reading in a Masters level education course and I anticipate using other chapters as course readings in future. International readers will find that the book offers a comprehensive and informative insight into childhoods in the Aotearoa New Zealand context and that, in many cases the authors also make comparative links to contexts elsewhere. In addition, many of the chapters in *Childhoods* are likely to be useful from a policy-development perspective, providing refreshing and unique insights into children's perspectives on issues that affect them in Aotearoa New Zealand.

WANHALLA, Angela: *Matters of the Heart: A History of Interracial Marriage in New Zealand.* Auckland: Auckland University Press, 2013. 316 pp., bib., illustrations, index, notes. $49.99 (paper).

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Wanhalla has written an essential history of interracial relationships in New Zealand that begins from the first interactions between Māori and Europeans through to contemporary society. Throughout the book Wanhalla provides evidence from her extensive national and international research on this topic. This evidence allows her to articulate New Zealand experiences with an understanding and knowledge of interracial relationships that occurred within other colonised countries, although there may have been different outcomes.

Matters of the Heart covers all significant differing views on interracial relationships within New Zealand society, including views of acceptance, social disapproval, necessity for assimilation policies, and views that these relationships could not and would not last. The acceptance and disapproval of interracial relationships appears to have gone in and out of fashion. Wanhalla begins in 1769 with the arrival of European explorers, whalers, traders and missionaries, then European settlers and finally the arrival of other immigrant groups. She discusses the acceptance of temporary or permanent relationships between Pākehā men and Māori women. Of importance is her in-depth discussion explaining that sexual contact between Māori women and European men was not necessarily prostitution. Although prostitution did occur, Wanhalla explains that it was more common that faithful intimate relationships were formed between these couples, at least until the man was required to leave – a form of marriage, therefore, rather than prostitution. Wanhalla also discusses how during this same period it was uncommon and rarely accepted that there would be any type of relationship between Pākehā women and Māori men. Wanhalla writes of how some early interracial relationships were part of a process for acquiring Māori land, but she also provides evidence that these unions were more than a form of land transaction. Through her research on inheritances Wanhalla has discovered that many of these European men left provision not only for the children, but also for their Māori wives, providing some evidence that these were relationships between two people who loved and cared for each other.

Matters of the Heart also explores the importance, significance and treatment of the "half caste" offspring which resulted from interracial relationships. It was not uncommon for the European father to care for his children and raise them with an understanding of both Māori and European worldviews. As a governmental system developed in New Zealand some of these "half caste", especially those who were raised and educated within the European centres, became beneficial employees of the government. And the acceptance of Māori within the newly established European centres was observed so long as Māori were married to a European and conformed to European custom and mannerisms, such as dress and the use of the English language.

Wanhalla discusses the establishment of different assimilation and amalgamation policies that began from early colonial days through the 1960s. Interracial relationships

were encouraged as an essential process for the amalgamation of cultures and it was seen to be good for race relations, although largely supported so Māori could be amalgamated into Pākehā culture and way of living. These interracial relationships, however, were not always accepted within general European society. It was believed, especially in the twentieth century, that the notion of an interracial marriage would be doomed from the beginning.

Matters of the Heart covers a history of interracial relationships not only between Māori and Pākehā. Wanhalla has carefully and skilfully acknowledged and included the relationships between other immigrant groups and Māori or Pākehā. Even though these relationships were not as common as those between Māori and Pākehā, they are, nevertheless, still an important part of New Zealand history and contribute to a number of identities that exist in today's society. The relationships she discusses are both temporary and permanent, and involve other European, Asiatic, African, Indian and American immigrant groups. Wanhalla explores several issues that surrounded these unions.

Wanhalla has produced a well-written and easy to read book. She has incorporated a number of stories that reference some of New Zealand's prominent characters. Therefore, the reader who has some knowledge of New Zealand historical figures would understand the significance of their relationships and find this book most enjoyable. Wanhalla has also included a vast number of impressive images that have been placed into five groups within the book, almost like albums, for the reader to glance through. These images themselves tell interesting stories and Wanhalla has enhanced this by including excellent commentary with each.

Any person who has an interest in the social history of New Zealand would find this book most beneficial. This review has only touched on some of the many interesting and engaging topics that Wanhalla has researched. From the Preface to the Epilogue, Wanhalla holds the attention of the reader as she tells of intricate and intimate stories of interracial relationships that began with the arrival of the first Europeans to New Zealand through to relationships of today. She debunks the sensationalism of other historians whose writings of New Zealand history have focused on Māori women as promiscuous and used for prostitution. *Matters of the Heart* focuses on the significance interracial relationships had, and continue to have, on the formation of New Zealand society. Wanhalla does this through exploring personal stories, describing societal acceptances and disapprovals, and providing explanations and outcomes of government policies. *Matters of the Heart* is an excellent resource for any academic or student and is a book that anyone who has an interest in New Zealand social history should consider having on their bookshelf.

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