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The Making of Tupaia's Map: A Story of the Extent and Mastery of Polynesian Navigation, Competing Systems of Wayfinding on James Cook's *Endeavour*, and the Invention of an Ingenious Cartographic System

LARS ECKSTEIN AND ANJA SCHWARZ

ABSTRACT

Tupaia's Map is one of the most famous and enigmatic artefacts to emerge from the early encounters between Europeans and Pacific Islanders. It was drawn by Tupaia, an *aroi* priest, chiefly advisor and master navigator from Ra'iātea in the Leeward Society Islands in collaboration with various members of the crew of James Cook's *Endeavour*, in two distinct moments of mapmaking and three draft stages between August 1769 and February 1770. To this day, the identity of many islands on the chart, and the logic of their arrangement have posed a riddle to researchers. Drawing in part on archival material hitherto overlooked, in this long essay we propose a new understanding of the chart's cartographic logic, offer a detailed reconstruction of its genesis, and thus for the first time present a comprehensive reading of Tupaia's Map. The chart not only underscores the extent and mastery of Polynesian navigation, it is also a remarkable feat of translation between two very different wayfinding systems and their respective representational models.

Key words: Cartography, first contact, wayfinding, star navigation, sea of islands, translation, Indigenous knowledges and ontologies, Tupaia

INTRODUCTION

Tupaia's Map is among the most important artefacts to have come from late 18th-century European–Indigenous encounters in the South Pacific region. Depicting, in Epeli Hau'ofa's terms,¹ a 'sea of islands' extending for more than 7,000 km from Rapa Nui in the east to

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¹ Epeli Hau'ofa, 'Our Sea of Islands', in *A New Oceania: Rediscovering Our Sea of Islands*, ed. Eric Waddell, Vijay Naidu, and Epeli Hau'ofa (Suva: School of Social and Economic Development, University of the South Pacific, 1993), 2–16.

Rotuma in the west and more than 5,000 km from Hawai'i in the north to Rapa Iti in the south, it documents the vast geographical knowledge held by master navigators of the Society Islands at the time: the result of centuries of purposeful navigation in the region. The map is also testament to the extent to which this highly specialized knowledge could be shared across cultural, political and epistemological boundaries, despite all difficulties of communication, when Tupaia joined the *Endeavour's* crew in 1769 on James Cook's first voyage to the Pacific. More than anything else, it attests to the great subtlety and sophistication of Tupaia's skills as cultural go-between and mediator between knowledges.

Its iconic status as encounter artefact notwithstanding, Tupaia's Map has posed a riddle for most of its academic history. Already the German naturalist Johann Reinhold Forster, travelling with the *Resolution* on Cook's subsequent voyage, praised the chart as a 'monument of the ingenuity and geographical knowledge of the people in the Society Isles' and had a version of it engraved for his *Observations Made During a Voyage Round the World*.² Yet, like the American-Canadian ethnographer and linguist Horatio Hale in the 1840s,³ Forster could offer only partial information with respect to the islands the map actually depicts. After the rediscovery of a fair copy of the chart in the papers of Joseph Banks and its publication in 1955,⁴ Tupaia's Map became one of the most contested items in a heated debate among historians and anthropologists about the capability of ancient Polynesians to carry out purposeful navigation across the Pacific,⁵ just as it also became an important cornerstone for Oceania's political and cultural Renaissance.⁶

The work of the late Ben Finney, more recently, encouraged viewers to assess Tupaia's Map within the context of precolonial Oceanic navigational practice, drawing both on archival research and experimental voyaging, importantly in close collaboration with Oceanic communities and navigators still practising the art of way-finding.⁷ Building on his insights, Anne Di Piazza and Erik Pearthree urged readers to acknowledge the distinct Oceanic knowledges of navigation and wayfinding that Tupaia would have brought to the drawing table, and to abandon the idea of a

² Johann Reinhold Forster, *Observations Made During a Voyage Round the World, on Physical Geography, Natural History, and Ethic Philosophy* (London: G. Robinson, 1778), 512.

³ Horatio Hale, *Ethnography and Philology. United States Exploring Expedition, 1838-42* (Philadelphia: Lea and Blanchard, 1846), 122-4.

⁴ James Cook, *Charts & Views Drawn by Cook and His Officers and Reproduced from the Original Manuscripts*, ed. R.A. Skelton (Cambridge: Hakluyt Society, 1955), viii, chart 11.

⁵ Andrew Sharp, *Ancient Voyagers in the Pacific* (Wellington: Polynesian Society, 1956).

⁶ G.M. Denig, 'The Geographical Knowledge of the Polynesians and the Nature of Inter-Island Contact', in *Polynesian Navigation: A Symposium on Andrew Sharp's Theory of Accidental Voyages*, ed. Jack Golson (Wellington: Polynesian Society, 1962), 102-53; G.S. Parsonson, 'The Settlement of Oceania: An Examination of the Accidental Voyage Theory', in *ibid.*, 11-63.

⁷ Ben Finney, 'Myth, Experiment, and the Reinvention of Polynesian Voyaging', *American Anthropologist* 93, no. 2 (1991): 383-404; Ben Finney, 'Nautical Cartography and Traditional Navigation in Oceania', in *The History of Cartography*, vol. 2, part 3, *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, ed. D. Woodward and G. Malcolm Lewis (Chicago: The University of Chicago Press, 1998), 443-94.

chart abiding exclusively by European mapping conventions.⁸ In their research, they focused on a range of traditionally important islands of departure from which distinct bearing patterns radiate to different targets on the map. Scholars today also mostly follow David Turnbull, who regards the map as the outcome of an act of translation that simultaneously articulates both European and Oceanic worldmaking systems, and thus as a unique 'knowledge assemblage'.⁹ Our own research into Tupaia's Map is deeply indebted to the work of Finney, Turnbull, and Di Piazza and Pearthree in particular, whose critical interventions and inspirations set us on various tracks which eventually enabled us to develop a conclusive interpretation of the chart as a whole. In this long essay, we set out to narrate the story of Tupaia's Map. Drawing partly on archival material that has been largely overlooked so far, we seek to explain the underlying concepts of the chart, offer a detailed description of its genesis and render Tupaia's Map readable in its entirety for the first time.

Having said this, we must also acknowledge our limits in exploring all significances of the chart. We owe our success in working toward a more comprehensive understanding of Tupaia's Map to the fact that Tupaia, as we shall step by step explore, 'crossed' the beach, in Greg Denning's famous phrase,¹⁰ and made sure to translate the complexities of his Oceanic knowledge into conceptual and representational models he thought James Cook, Joseph Banks and his other European interlocutors would understand. It is for these reasons, ultimately, that present-day audiences, too, still have conceptual access to the chart. We are aware of the difficult colonial legacies, but also of the privileges which come with our institutional positions in this context. We therefore hope that our research will find especially Oceanic readers who may productively bring Tupaia's Map in conversation again with the Oceanic traditions and worldings to which we have neither title nor access.

Tupaia's Map emerged in the context of consecutive European ventures into the Pacific at the end of the 18th century and at a time when competitive British and French imperial expansion was being rebranded as scientific as well as philanthropic endeavours. While still fundamentally motivated by the desire to extend geopolitical influence, in terms of both military and economic dominance in the wider region, voyaging was now also

⁸ Anne Di Piazza and Erik Pearthree, 'A New Reading of Tupaia's Chart', *Journal of the Polynesian Society* 116:3 (2007): 321–40; Anne Di Piazza, 'A Reconstruction of a Tahitian Star Compass Based on Tupaia's "Chart for the Society Islands with Otaheite in the Center"', *Journal of the Polynesian Society* 119, no. 4 (2010): 377–92.

⁹ David Turnbull, 'Reframing Science and Other Local Knowledge Traditions', *Futures* 29:6 (1997): 551–62; David Turnbull, 'Cook and Tupaia, a Tale of Cartographic "Méconnaissance"', in *Science and Exploration in the Pacific: European Voyages to the Southern Oceans in the 18th Century*, ed. M. Lincoln (Woodbridge, Suffolk: Boydell Press, 1998), 117–31; David Turnbull, *Masons, Tricksters, and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge* (London and New York: Routledge, 2003), 133–64; David Turnbull, 'Trails and Tales: Multiple Stories of Human Movement and Modernity', in *Arctic Geopolitics and Autonomy*, ed. M.T. Bravo and N. Triscott (Ostfildern: Hatje Cantz, 2010), 71–88.

¹⁰ Greg Denning, *Islands and Beaches: Discourse on a Silent Land: Marquesas, 1774–1880* (Carlton: Melbourne University Press, 1980); Greg Denning, *Beach Crossings: Voyaging Across Time, Cultures and Self* (Carlton: Miegunyah Press, 2004).

propagated in the name of enlightened ideals of knowledge and friendship. The *Endeavour's* voyage set the precedent for Britain in this context: along with officers, sailors and marines, a significant share of the ship's crew was made up of naturalists and draftsmen under Joseph Banks's patronage, who turned the ship into a mobile laboratory.

Tahiti was the much-anticipated key site for this production of knowledge about the South Seas. It had only recently entered British maps, after Samuel Wallis's expedition on the *Dolphin* had anchored for a little over a month in Matavai Bay in the southern winter of 1767. The encounter between Wallis's men and Tahitians was marred by excessive and lethal demonstrations of British gun-power followed, however, by successful trading and mutual hospitality. When looking for an ideal site in the South Pacific to observe an important astronomical event to take place two years later, the transit of Venus across the sun, the choice of the British Admiralty fell on Tahiti. In due course the *Endeavour* was to spend three months at anchor in Matavai Bay between 13 April and 13 July 1769, where a fort was set up for astronomical observations, while Cook charted the island and Banks and his men had ample time to observe, sketch, collect and botanize.

Tupaia, a *tahu'a*, bearer of religious knowledge and political advisor born from a long line of master navigators, soon became one of the principal local collaborators in these projects. The extraordinary life of Tupaia has been thoroughly researched and introduced to a wider audience by Anne Salmond, above all,¹¹ and can only be very briefly summarized, here. Tupaia was born in northern Ra'iaatea to a high-ranking land-holding family in the mid-1720s and would have received his early schooling at Tainui marae. We also know that he must have undergone further education in history, genealogy, astronomy, and other subjects at Ōpoa's Taputapuātea marae in the south of Ra'iaatea. It is highly likely that he was specifically trained as navigator for the *arioi*, a society of travelling performers associated with this marae, dedicated to the war god 'Oro and in charge of the preservation and replication of ancestral narratives and traditions; they were also known as fierce satirists, humourists and lovers with profound religious and political powers.¹² As a young man, Tupaia must have travelled widely within and beyond the Society Islands as an *arioi*. His fortunes changed, however, around 1760, when Ra'iaatea was invaded by Poraporan warriors: Tupaia lost his Ra'iaatean titles, was severely injured by a spear through the chest, and escaped to Tahitian exile.

In Tahiti, Tupaia established himself as *tahu'a* of the 'Oro cult, as well as lover and political advisor of Purea, who with her husband Amo ruled over the districts of Fa'a'a and Papara. Already during Wallis's visit, Tupaia operated as diplomat on several important occasions between the *Dolphin's* crew and high-ranking Tahitians, among them Purea herself. By the time Cook arrived in 1769, Purea's political ambitions had been crushed by a bloody civil war; Tupaia, however, was still a respected

¹¹ Anne Salmond, *Aphrodite's Island: The European Discovery of Tahiti* (Berkeley, Los Angeles and London: University of California Press, 2010), chs 2–10; Anne Salmond, *The Trial of the Cannibal Dog: Captain Cook in the South Seas* (London: Penguin, 2005), 38–164. There is also a more recent biography by Joan Druett, *Tupaia: The Remarkable Story of Captain Cook's Polynesian Navigator* (Santa Barbara, CA: Praeger, 2011), largely drawing on Salmond's work.

¹² See Salmond, *Aphrodite's Island*, 24–6.

political figure, and his experiences in dealing with the powerful strangers so ignorant of Tahitian custom and law were in demand once again. He increasingly spent time with the Europeans, and made himself indispensable as cross-cultural translator. He was, for instance, Banks's primary guide during the latter's participation in Tahitian mourning ceremonies, and a valuable commentator during Cook's and Banks's circuit of Tahiti. When the *Endeavour* finally prepared to leave Tahiti, Tupaia joined the ship's crew together with his disciple Taiato. In the following four weeks, he safely piloted the *Endeavour* through the Leeward Society Islands and south to Rurutu in the Austral group. For almost six months from October 1769, he facilitated the exchanges between the crew and the Māori of Aotearoa/New Zealand with whom he was able to communicate, and who probably considered him, the *tahu'a* from Havai'i, as chief of the *Endeavour*. Only in Australia did his capacities as linguistic and cultural translator end. Both Tupaia and Taiato died on the *Endeavour's* homebound voyage in Batavia.

When taken on board at Tahiti under Banks's patronage, Tupaia was lodged among the officers, scientists and draftsmen and was thus, for the months to come, at the heart of knowledge production about the South Seas. From the historical sources, among them journal entries and vocabulary lists, sketches, watercolours and charts, we know that the issues discussed among these men must have covered Tahitian religion and ritual practices, questions of social organization and land ownership, agriculture and crafts, and, importantly, Tupaia's extensive geographical knowledge and navigational practices. These exchanges and the respect for Tupaia's knowledge can only have intensified in the course of the *Endeavour's* sojourn through the Leeward Society Islands, and during the later circumnavigation of Aotearoa/New Zealand.

Images played a central role in these conversations, enabling both sides to effectively bridge significant gaps of language and knowledge. They include watercolours of ritually important subjects, such as *marae*, war canoes, *heiva* dancers and musicians, or most famously, the costume of a 'chief mourner'.¹³ There is evidence that Tupaia drew and coloured these scenes in conversation with and assisted by one of the artists of the *Endeavour*, Sydney Parkinson. And Tupaia was involved, too, in a collaborative cartographic project detailing the passages, harbours and districts of the Leeward Society Islands (Figure 7).¹⁴ Rather than regarding these artefacts predominantly as proof of Tupaia's astounding capacity to adapt to European representational conventions, we suggest that they should be viewed as part and product of a collaborative, cross-cultural communication process that by default involved at least two, if not more partners. Jointly, these visual materials are proof that those seated around the great cabin's drawing table were increasingly able to make themselves understood. Therefore, if we are to do justice to their multi-layered meanings,

¹³ Tupaia, [Chief Mourner and Dancing Girl], 1769, British Library, London, BL Add MS 15508, f.9.

¹⁴ Tupaia, [Chart of the Leeward Society Islands], 1769, British Library, London, BL Add MS 15508, f.16; see also Harriet Parsons, 'British–Tahitian Collaborative Drawing Strategies on Cook's *Endeavour* Voyage', in *Indigenous Intermediaries: New Perspectives on Exploration Archives*, ed. Shino Konishi, Maria Nugent, and Tiffany Shellam (Canberra: ANU Press, 2015), 147–67; Salmond, *Aphrodite's Island*, 204–5.

we need to return them to the moment of their production and try to reconstruct the conversations of which they formed part. While worthy of an analysis in its own right, we mention Tupaia's visual legacy here in the role of a precursor to the most intriguing of all knowledge exchanges that took place on board the *Endeavour*: for somewhere en route from the Society Islands to Aotearoa/New Zealand, Tupaia and his various European interlocutors embarked on the joint drawing – in at least three distinct stages – of a chart of almost all major Polynesian island groups in Oceania.

RECONSTRUCTING THREE DRAFT STAGES OF TUPAIA'S MAP

In order to develop an understanding of how Tupaia possibly represented his sea of islands, it was vital to know how, when, and with whom he developed and designed his map. None of the drafts 'Drawn by Tupia's own hands', as Cook himself stressed,¹⁵ has survived or been found to this date. But there are three different copies of Tupaia's Map in the archives, and together with surviving island lists (partly copied from his map at different draft stages) we argue that it is possible to reconstruct the chart's original designs together with a rough chronology of its production.

Tupaia's Map in the British Library, London

By far the best known copy of Tupaia's Map today is held by the British Library in London (Figure 1).¹⁶ This has not always been the case. Forgotten for much of the 19th century and the first half of the 20th, it was only rediscovered by John C. Beaglehole in the papers of Joseph Banks in the early 1950s, during his seminal editorial work on the journals of the *Endeavour* voyage. This chart was first published in 1955 in *Charts & Views Drawn by Cook and His Officers*, edited by R.A. Skelton and annotated by Beaglehole.¹⁷ The copy itself is usually attributed to Cook, based on a handwritten note on the bottom right, often wrongly held to be Joseph Banks's, saying: 'Drawn by Lieut. James Cook 1769'. This note is almost certainly not reliable. As we shall argue, the British Library version of Tupaia's Map is a fair copy of the third and final draft version on which Tupaia worked with different European (and Māori) interlocutors, which was not finalized before 5 February 1770, in Aotearoa/New Zealand. The fair copy was probably commissioned and kept by Joseph Banks, which makes Cook an unlikely copyist. It is Banks, at least, who personally lent it to Cook's naturalist on the second voyage, Johann Reinhold Forster, and in whose papers at the British Museum it survived.

¹⁵ James Cook, *The Journals of Captain James Cook on His Voyages of Discovery*, vol. 1, *The Voyage of the Endeavour, 1768–1771*, ed. J.C. Beaglehole (Cambridge and London: Hakluyt Society, 1955), 293.

¹⁶ Tupaia, [Tupaia's Map], 1770, British Library, London, BL Add MS 21593.C.

¹⁷ Beaglehole in Cook, *Charts & Views*, viii; Beaglehole in Cook, *Journals*, 293, n. 1 and 294, n. 1.



THE MAKING OF TUPAIA'S MAP

FIGURE 1: Tupaia's Map, 1770, British Library, London, © British Library Board BL Add MS 21593.C (T3/B).

Tupaia's Map in Johann Reinhold Forster's Observations (1778)

Before the publication of Banks's copy in 1955, the only widely known and critically researched version of Tupaia's Map was an engraving by William Fadden titled 'A Chart Representing the Isles of the South-Sea, according to the Notions of the Inhabitants of o-Taheitee and the Neighbouring Isles, chiefly Collected from the Accounts of Tupaya' (Figure 2).¹⁸ This version of the chart is certainly not faithful to Tupaia's own drafts. Johann Reinhold Forster compiled it years later and had it engraved for the publication of his *Observations Made During a Voyage Round the World*, his scientific reflections on Cook's second voyage which he had accompanied as naturalist together with his then teenage son Georg. That Johann Reinhold Forster created his own interpretation of Tupaia's Map might have resulted from the fact that he had not one, but two different models at his disposal. As he duly noted in *Observations*:

Of this chart a copy was obligingly communicated to me by Mr. Pickersgill, Lieutenant on board the Resolution ... ; I met with another copy of the chart, drawn after Tupaya's directions, in the possession of Joseph Banks, Esq. who ... permitted me to take a copy of it. I remarked that the charts both agreed in general.¹⁹

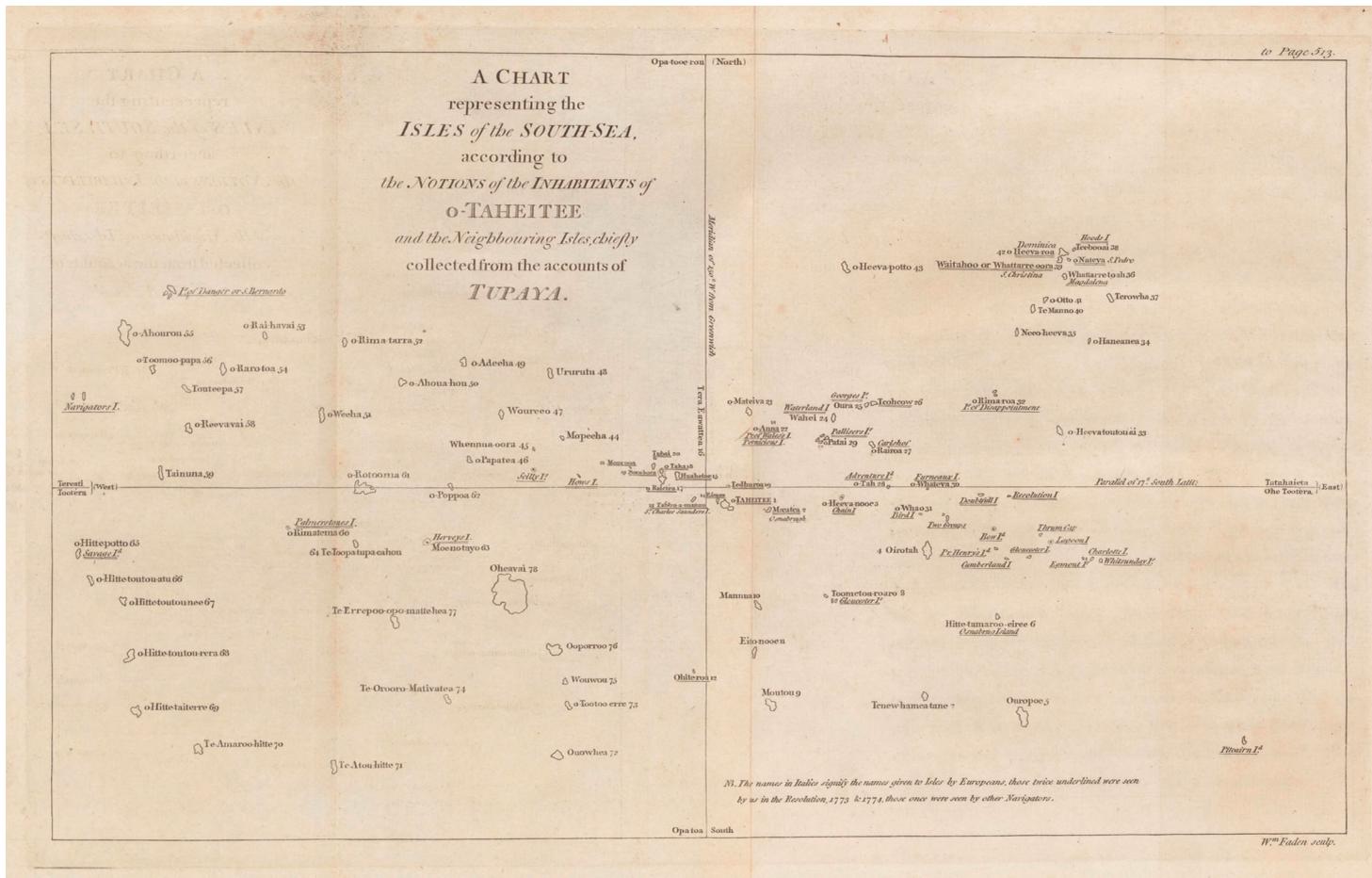
The copy obtained from Banks is no other than the very chart now held by the British Library.²⁰ The second map which the Forsters received from Richard Pickersgill has been a mystery to researchers to date; however, we believe it can be reconstructed, as argued below, from a copy made by Johann Reinhold's son Georg Forster.

In the process of creating his own interpretation of Tupaia's Map, Johann Reinhold Forster substantially interfered with the two drafts he had received. First, he fixed the chart on a scale of latitude and longitude from Greenwich, both missing from the draft maps. In this process, he significantly distorted the layout of his models, stretching them along the east–west axis. Into this new format, he then added islands and (mis)identified others based on European 'discoveries' (doubly underlined such as the Forsters themselves saw in 1773 and 1774; singly underlined such as seen by previous European expeditions). This copy of Tupaia's Map accordingly needs to be read with great caution. It is nevertheless valuable, especially in conjunction with Forster's detailed annotations for the islands on the map in both the English *Observations* and the German *Bemerkungen* (translated and critically revised by

¹⁸ J.R. Forster, *Observations*, 512–13.

¹⁹ *Ibid.*, 512.

²⁰ The British Library copy of Tupaia's Chart has pinholes in all but three islands from Forster's copying efforts, and small numbers pencilled next to some of the others, visible only with a magnifying glass. They correspond exactly with the figures Forster attributed to the islands on his own interpretation of the map, referring viewers to an island list complete with annotations and explanations in the *Observations*: he must evidently have pencilled numbers on Banks's copy and failed to erase them properly before returning it to Banks. Thanks to Anne Di Piazza and Erik Pearthree for drawing our attention to the pinholes in the chart.



THE MAKING OF TUPAYA'S MAP

FIGURE 2: 'A Chart ... of Tupaya' by Johann Reinhold Forster, engraving by William Fadden, 1778 (T1/T3/JRF).

Georg Forster).²¹ Many of them probably drew on conversations the Forsters had during the *Resolution* voyage with Hitihiti, a young Poraporan who joined the crew for several months during their sojourn through the South Pacific. Yet there are also distinct references to comments by Tupaia himself, which Richard Pickersgill must have shared with the German naturalists. Richard Pickersgill, despite his young age, had already been to Tahiti twice before, as master's mate on Samuel Wallis's *Dolphin* and Cook's *Endeavour*.

Tupaia's Map in the Braunschweig City Archive, and Johann Reinhold Forster's 'Insularium'

The third tangible copy of Tupaia's Map has survived in a letter from Georg Forster to his publisher Karl Philipp Spener, dating to 1–3 September 1776 (Figure 3). Georg Forster titled it 'Copy of a Chart made by a Native of O'Taheitee, named Tupaia. Containing about 45° of Longitude'.²² Spener was to include it in the publication of Georg Forster's German translation of *A Voyage Round the World (Reise um die Welt, 1778/1780)*, but for unknown reasons must have decided against it. This map has been almost entirely overlooked by researchers to date, which is curious, as two published versions have circulated for a long time. As early as 1878, the German comparative anthropologist Richard Andree, in whose possession the map had been before it was acquired by the city of Braunschweig, printed and briefly discussed a copy, entitled 'Tupajas Karte. Nach einer Copie G. Forster's', in his *Ethnographische Parallelen und Vergleiche*.²³ A century later, Georg Forster's letter to Spener and the map were again reproduced, this time in the (East) German Academy edition of Georg Forster's complete works.²⁴ Still, the only contemporary researchers who appear to have studied the map in Braunschweig are Ben Finney and Anne Di Piazza and Erik Pearthree.²⁵ In their interpretation, Di Piazza and Pearthree follow Finney, who concluded that Georg Forster's map is, like that of his father, an inauthentic 'third generation copy, a crude one made by Johann Forster's son Georg, in which the Tuamotu and Marquesas Islands have been left out in order to include a detailed legend in the upper right quadrant'.²⁶

²¹ Johann Reinhold Forster, *Bemerkungen über Gegenstände der physischen Erdbeschreibung, Naturgeschichte und sittlichen Philosophie auf seiner Reise um die Welt gesammelt. Übersetzt und mit Anmerkungen vermehrt von dessen Sohn und Reisegefährten Georg Forster* (Berlin: Haude und Spener, 1783).

²² Georg Forster, 'Copy of a Chart made by a Native of O'Taheitee, named Tupaia, Containing about 45° of Longitude', 1776, Stadtarchiv Braunschweig, H III 16–87.

²³ Richard Andree, *Ethnographische Parallelen und Vergleiche* (Stuttgart: Julius Maier, 1878), 207. Pinprick holes on the left, right, and top margins of Forster's letter page may go back to Andree's transposition of the islands for his own copy.

²⁴ Georg Forster, 'Briefe bis 1783', in *Georg Forsters Werke: Sämtliche Schriften, Tagebücher, Briefe*, vol. 13, *Briefe bis 1783*, ed. Siegfried Scheibe (Berlin: Akademie Verlag, 1978), 48.

²⁵ Finney, 'Nautical Cartography'; Di Piazza and Pearthree, 'New Reading'.

²⁶ Finney, 'Nautical Cartography', 448, n. 19.

However, we are very sure that Forster's map faithfully reproduces the layout of the chart that Pickersgill had lent to the Forsters. Our certainty, here, derives from a list of islands collected in an unpublished document, this time by Johann Reinhold Forster, dating to 1774 and entitled 'Insularium Maris Pacifici or a Catalogue of the Isles in the South-Sea with the Names of the Natives'. The 'Insularium' comprises five island lists and forms the last section of a book-length manuscript of the 'Vocabularies of the Language spoken in the Isles of the South-Sea ...', held by Berlin's Staatsbibliothek.²⁷ It contains all South Sea vocabularies Forster was able to obtain from the *Endeavour's* crew, as well as his own records from the *Resolution* voyage, replete with introductory remarks about the grammar of Polynesian languages. The third of the lists collected in the appended 'Insularium' names 47 islands 'taken from the report of Toopaia or Parooa who made a map of the Isles about Otahaitee' (Figure 4). The islands in this list are ordered in three sections, according to their presumed situation from Tahiti ('to the South & South East of Otahaitee', 'to the West & South West of SSW of Otahaitee'; 'from Otahaitee from W b. N. to NW. b N.'),²⁸ and they correspond precisely to the islands as shown in the lower right, lower left and top left quadrant of Georg Forster's copy. This strongly supports two arguments. First, the upper right quadrant was left empty on the original first draft of Tupaia's Map; that is, contrary to Finney's presumption, no islands were deleted by Georg Forster whilst copying it. Second, Forster accurately copied the location of the islands as he found them on the now lost first draft map.

The 47 islands in the list in Forster's 'Insularium' precisely match the number of islands on the Braunschweig copy which Cook and the crew of the *Endeavour* had not yet seen themselves when sailing in the Society group and Austral Islands in 1769. The remaining 12 islands on the chart are exactly those islands they had seen, and the position of which they thus already knew. They all appear as shaded on Georg Forster's copy, except for two: Tūpai (Tubai) and Rurutu (Oheteroa). These 12 islands must have remained unnamed on the original first draft, as they do not feature in the corresponding list in 'Insularium'. We shall argue below that they were not drawn by Tupaia himself, but that the Europeans pre-drew them when setting up the chart. Georg Forster's interference with the chart thus concerned not layout, but partially island naming. Most obviously, he labelled the originally unnamed islands in the centre of the chart

²⁷ J.R. Forster, 'Insularium Maris Pacifici or a Catalogue of the Isles in the South-Sea with the Names of the Natives', in Forster, 'Vocabularies of the Language spoken in the Isles of the South-Sea & and of the various Dialects which have an Affinity to it; with some Observations for the better Understanding of them', 1774, Staatsbibliothek zu Berlin, MS Orient Oct. 62; see also M.E. Hoare, *The Resolution Journal of Johann Reinhold Forster 1772–1775* (London: Hakluyt Society, 1982), vol. 1, 152–5. Karl H. Rensch published sections of the manuscript, but without the 'Insularium', as *The Language of the Noble Savage* (Canberra: Archipelago Press, 2000) and has commented extensively on Johann Reinhold Forster's linguistic capacities based on the manuscript; see Karl H. Rensch, 'Forster's Polynesian Linguistics', in Johann Reinhold Forster, *Observations Made During a Voyage Round the World*, ed. Nicholas Thomas, Harriet Guest, and Michael Dettelbach (Honolulu: University of Hawai'i Press, 1996), 383–400.

²⁸ J.R. Forster, 'Insularium', 6–7.

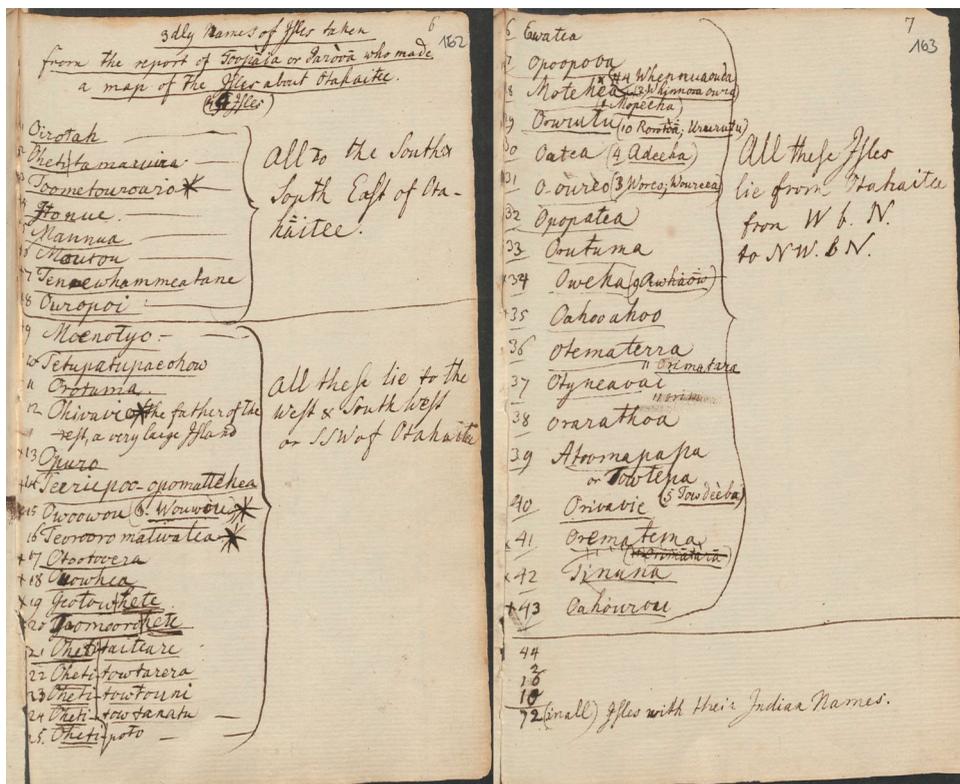


FIGURE 4: Island list transcribed from the first draft of Tupaia’s Chart (T1), recorded in Johann Reinhold Forster’s ‘Insularium’, Staatsbibliothek Berlin, MS Orient Oct. 62 (T1/JRF).

(that these names are a late addition is also evidenced by the fact that their spelling corresponds with the respective island names in *Bemerkungen*, where the Forsters for instance corrected Cook’s ‘Ulietea’ to ‘O’ Raiatea’). Georg Forster also changed two names (Motehea to Mopehea, and Owrurutu to o’Rorotoa), and adjusted the spelling of a few others which were already there on the model he copied.²⁹

To summarize: while the layout of the Braunschweig copy permits a reliable reconstruction of the spatial arrangement of islands on the map in Pickersgill’s possession, it must nevertheless be read alongside the corresponding island names as

²⁹ The two name changes were directly motivated by the events on the *Resolution* voyage that prompted the Forsters’ access to the chart in Pickersgill’s possession. On 10 September 1773, Johann Reinhold Forster’s journal recounts receiving accounts of altogether 11 islands from 3 different sources at Ra’iātea. To verify them, the Forsters requested Tupaia’s Map from Pickersgill and subsequently tried to locate the islands on it; Johann Reinhold Forster observed with satisfaction that out of the 11, ‘9 Isles are on the Map’ (Johann Reinhold Forster, ‘Journal of a Voyage on Board the Resolution, 1772–1774’, Staatsbibliothek zu Berlin, Ms. germ. qu. 227, 132; Hoare, *Resolution Journal*, 160). In the same context he noted how the bearings of Maupihā’a were pointed out to him twice, and muses: ‘Ururutu ... I believe is the same as Rarotoa’.

recorded in Johann Reinhold Forster's 'Insularium'. In combination, these archival resources allow us to reconstruct the lost first draft of Tupaia's Map.

Island lists and Tupaia's Map as recorded by James Cook

The second set of indispensable archival resources next to the surviving map copies are thus island lists recorded in the journals of European voyagers. They are important for three different reasons and purposes, the first two of which will only be relevant later in our argument. The first is identification. Given that the command of Tahitian, especially, among the English on Cook's expeditions and their linguistic capacities more generally were rather poor, island identification often depends on comparative reading between various island lists and the island names on the remaining copies of the map. The second is sequence. Tupaia dictated the island names he shared, especially with the ship master Robert Molyneux (discussed below), in meaningful sequences, based on traditional voyaging paths for island-to-island travel which can be tracked on his chart. The third is reconstruction. The island lists copied from Tupaia's original drawings allow the reconstruction, from the surviving copies, of the different draft stages of the mapping process, as already seen for Georg Forster's copy and the first draft of the chart. With the help of Cook's journal, we now reconstruct the second and third drafts.

While in Tahiti, Cook had already obtained an extensive list of islands from Tupaia, which he eventually decided not to enter into his journal. Contrary to prior assumptions, this original list has most likely survived in copy, again in Johann Reinhold Forster's 'Insularium', headed 'A List of Isles from an imperfect Catalogue of Tupaia, from Capt. Cook's List'.³⁰ More important for our argument is the list of islands Cook eventually did include at the end of his 'General Description of New Zealand', copied into the journal for 31 March 1770, just after the *Endeavour* left Aotearoa/New Zealand (Figure 5). This list differs widely from Cook's initial list as recorded in the 'Insularium', and the explanation is simple: Cook did not reproduce the island list he had first recorded on Tahiti, but took the names from a chart Tupaia had in the meantime drawn. He remarked: 'The above list was taken from a Chart of the Islands Drawn by Tupaia's own hands, he at one time gave us an Account of near 130 Islands but in his Chart he laid down only 74'.³¹ Contextual evidence discussed below suggests that Cook's 'General Description of New Zealand', including the island list, had already been drafted during the *Endeavour*'s three-week anchorage in Queen Charlotte Sound (Tōtaranui) between 15 January and 6 February 1770. Its placement in the 'General Description' remains puzzling nevertheless, and this is not the only perplexing aspect of this entry: which version of Tupaia's Map did Cook actually transcribe in Tōtaranui? The list in his journal not only does not

³⁰ J.R. Forster, 'Insularium', 9.

³¹ James Cook, 'Journal of H.M.S. Endeavour, 1768–1771' [Canberra MS], National Library of Australia, Canberra, MS 1, 220v; Cook, *Journals*, 294.

Names of the Islands	Bearings from Obahite	Names of the Islands	Bearings from Obahite
N.E. Quarter	Obahite	N.W. Quarter	Obahite
Copako	Between the N & NNE	Whareva	NE
Uasa		Whaterero	
Tehicou		Tehio	
Oryroa		Tehinechava	
Chewajato		Torouwhak	
Maata	NNE to NEN	Whaoa	NNE
Chewara		Whatehuanah	
Semanno		Whaneanea	
Salla		Cheratuwai	EN

Names of the Islands	Bearings from Obahite	Names of the Islands	Bearings from Obahite
N.E. Quarter	Obahite	N.W. Quarter	Obahite
Moutou	South to S	†Tathuroa	NW
Tooniharoora		Oagouh	
†Touacushamataa		Obaha	
Ohitahamaruere		Maataah	
Uuropoc	E & East	†Huhine	between the N & West
†Mytea or Oombuag		†Ulictea	
Cheyanue		†Obaha	
Cheratak	†Palabala		
†Imao or Yaha Island	†Subai		
†Tapiocahamua or Oandoo	†Maurua		
†Manua	Orooproa		
†Honue	Oropatea		
†Ohiteoa	†Whannuaoua		
Orawhaa	†Matahea		
Ohitrooa	†Oourio		
Opeoro	†Orurotu		
Coocou	†Oatohi		
Touoromatihatea	Oahooahoo	Between the NW & West	
†Tealowhite	Owcha		
Phavie	Orotuma		
Comathethea	Tenuna		
Tamoochete	between the Oroavie		
Ohitahateae	SW & WSW		
Ohitaseva	Toutepa		
Ohitahouura	Orarathoa		
†Maocanayo	Oryawai		
†Tahapahamachou	Oahourou		
Ohitahoumahu			
Ohitepoto	West		

FIGURE 5: Island list transcribed from the second draft of Tupaia's Chart (T2), recorded in James Cook's 'Journal' (T2/C), here as copied by his clerk Richard Orton [Mitchell MS], State Library of New South Wales, Sydney, Safe 1/71. Note that we generally refer to the island list in Cook's holograph journal [Canberra MS] when discussing the island names on T2, which in a few instances slightly differs in spelling from Orton's copy in the Mitchell MS, as well as from Beaglehole's transcription in 'Journals', 291-4. The Canberra MS is available for download and viewing online at <http://nla.gov.au/nla.obj-228958440/view>. We chose to reproduce the Mitchell MS here, as it documents an increased number of islands marked by Cook as such 'Tupaia himself has been at'. This will be vital for our discussion of the extent of Tupaia's voyaging concluding this essay.

match the first draft map kept by Richard Pickersgill; but different from what is commonly assumed, it also does not converge fully with the island names recorded on Banks's copy in the British Library.

Compared with Banks's copy, at least 32 island names in Cook's holograph manuscript are spelled with slight variations; one island name is completely changed ('Tetioo' in the list becomes 'Tebooi' on the map); one island in Cook's list, 'Tethuroa' (Teti'aroa, north of Tahiti) is absent from Banks's copy (but appears on Georg Forster's copy of the first draft); and finally, one island name, placed next to 'Ohevatoutouai' (the southern Marquesas), is on Banks's map only, but not in Cook's list.³² This is 'Oremarora', a name which entered the conversation only on the day the *Endeavour* prepared to depart from Tōtaranui. Banks recorded it in his journal on 5 February 1770 as 'Olimarora',³³ Cook on 6 February as 'Olhemarora',³⁴ in the context of an account shared by an elderly Māori informant named Topaa about one (Cook) or two (Banks) vessel(s) which had arrived from this island in ancestral times.

The three draft stages of Tupaia's Map

We conclude from this conundrum that there were (at least) three tangible draft stages of Tupaia's Map. The first major draft stage, as yet without the islands in the Tuāmotu group was kept by Richard Pickersgill and faithfully copied, with some alterations of island names, by Georg Forster. This first draft was probably begun shortly after the *Endeavour* left Rurutu on 15 August 1769, the island in the Austral group to which Tupaia had navigated the ship from the Leeward Society Islands. It is unlikely that work on the map started earlier, since Georg Forster's copy of the first draft suggests that not Tupaia, but a European hand began drawing it, by entering all islands in the Society and Austral groups that the *Endeavour* had passed, roughly in Mercator projection (the shaded islands in the map centre, plus Tūpai and Rurutu). Tupaia would then have been asked to take over and enter other islands he claimed he knew.

The likely prompt would have been 15 August: it was on this day that Cook decided not to follow Tupaia's navigational instructions through his sea of islands any longer, even though he recorded detailed conversations with Tupaia on the very same day about islands in the vicinity of Rurutu to the east, as well as the possibility of voyaging westward as far as to the Tongan archipelago. Yet, by his instructions from the British Admiralty, Cook was to find the Great Southern Continent after visiting Tahiti or, if unsuccessful, proceed to and map Tasman's New Zealand. His journal entry accordingly closes: 'If we meet with the Islands to the southward he [Tupaia] speaks off it well if not I shall spend no more time searching for them. being now fully resolved to Stand directly to the Southward in search of the Continent'.³⁵ It must have been then, or not long afterwards, that Cook suggested that Tupaia

³² Cook, [Canberra MS], 119v–220v.

³³ Joseph Banks, *The Endeavour Journal of Joseph Banks 1768–1771*, ed. J.C. Beaglehole (Sydney: Angus and Robertson, 1962), vol. 1, 463.

³⁴ Cook, *Journals*, 245.

³⁵ Cook, [Canberra MS], 108r.

draw a map, to indicate the location of all those islands he was no longer inclined to find. While this had to be a communal project, involving a number of Tupaia's interlocutors including Cook himself, it was probably Richard Pickersgill who was assigned the task of assisting Tupaia in the drawing of the chart. Our reasons for proposing this are threefold: first, the English transcription of Tahitian island names on the first draft corresponds well with Pickersgill's other transcriptions of Tahitian words or phrases in his journal; second, Pickersgill's own chart of the Tuāmotu Archipelago and the Society Islands (Figure 8),³⁶ as we argue below, served as a point of departure; and third, it was Pickersgill in whose hands this first draft remained and who allowed the Forsters to make their own copy.

When exactly work on the second draft stage of Tupaia's Map would have begun is difficult to pin down. We think it probably commenced right after the first draft was abandoned, probably still in August 1769. That Cook himself collaborated in the making of the second draft together with Tupaia and Pickersgill is likely. Yet the frequent changes in the way island names are spelled from the first draft to the second suggest the additional involvement of a more talented linguist – Banks, Banks's fellow naturalist Daniel Solander, or the artist Sydney Parkinson come to mind. The close correspondence between the island list in Cook's journal and Banks's copy suggests that the second draft of the map looked like a basic version of Banks's fair copy in the British Library. From the way in which Cook ordered his list of islands according to their 'respective situations from Otaheite',³⁷ it is evident that the positions would have been the same, albeit still depicting Teti'aroa, and not yet including 'Oremaroa'. However, since Cook's journal is conspicuously silent about anything but the islands and their bearings from Tahiti, we believe that a number of characteristic elements of Banks's copy were entered at a later, third and final, stage of the mapmaking process.

Work on the third major draft only began on, or some time after, 5 February 1770. The addition of 'Oremaroa' strongly suggests that on this day Cook and Banks had the map on the drawing table once more and asked Tupaia to locate the island. There is evidence that it was also in this context that Banks, Pickersgill, or another European interlocutor recorded and transcribed Tupaia's Tahitian annotations. As we argue below, against the drift of all previous research, certainly not all and possibly none of the five captions on Banks's copy of the map may allude to previous European ships in the region. Instead, they comment on Oceanic navigational knowledge, as well as on Tupaia's own voyaging genealogy. We shall argue that Tupaia's Tahitian commentaries as recorded by a European interlocutor were directed primarily at Topaa, and thus a Māori audience rather than a European one.

³⁶ Richard Pickersgill, [Chart of the Tuāmotu Archipelago and the Society Islands] National Archives Kew, London, Adm 352/468; Andrew David, with Rüdiger Joppien and Bernard Smith, *The Charts & Coastal Views of Captain Cook's Voyages*, vol. 1, *The Voyage of the Endeavour, 1768–1771* (London: Hakluyt Society, 1988), 1.74.

³⁷ Cook, [Canberra MS], 119r.

Finally, the sketches of three European ships and the Tahitian names for the cardinal directions were apparently not yet on the draft from which Cook worked. These, too, were probably only added on or after 5 February 1770, in the third and final stage of mapmaking, a moment when also all island spellings would have been double-checked with Tupaia and in many cases adjusted. It is impossible to know whether all this was done on a new sheet or drawn on to the same draft map from which Cook had presumably copied the island names into his journal only a few days earlier. After all, we only have access to a fair copy of this map, probably created during the return voyage. It is difficult to say who would have been the driving force behind this third and final stage of the mapping process. It might well have been a collective effort. Yet that Banks played a part is almost certain, given his larger ethnographic interest, given that his journal holds the most detailed account of Topaa's lore of ancestral ships from 'Olimaroa', and given that the fair copy of this third and final draft remained in his possession.³⁸

The island list recorded by Robert Molyneux

So far we have tried to establish a rough chronology for the three distinct stages in which Tupaia's Map was collaboratively developed between the Ra'iatean master navigator and members of the *Endeavour's* crew. But what if we could also approximate the chronology of how Tupaia drew the first two drafts in their own right, thereby reconstructing, step by step, how each draft stage evolved and in which sequence the islands were positioned and named? Sequences, we argue below, are indispensable for understanding Tupaia's Map, which does not depict an ocean abstracted from the traveller but invites viewers to follow distinct voyaging itineraries through the sea of islands. The indispensable guide to these voyaging routes is yet another island list recorded in the journal of the *Endeavour's* ship master Robert Molyneux (Figure 6), which we have so far refrained from discussing.

Like Pickersgill, Molyneux had already been master's mate on the *Dolphin* under Wallis and first met Tupaia in Tahiti in 1767. Promoted to master for the *Endeavour* voyage, he was not only in charge of executing Cook's sailing directions but also assisted in the production of charts. Little is known about him and he died on the return voyage at the Cape of Good Hope. Yet Molyneux's *Endeavour*

³⁸ Whereas none of the officers was entitled to keep any of the drawings, maps or journals produced on the voyage, which by right belonged to the Admiralty, Banks, as a civilian, appears to have been exempted from this rule. He returned home with a number of maps as precious memorabilia of his Grand Tour to the South Seas, among them a map of Tahiti, in the same hand as his copy of Tupaia's Map, that bears traces of yet another collaboration with Tupaia. This is 'A Plan of King Georges Island or Otaheite', wrongly attributed to James Cook and Isaac Smith in David with Joppien and Smith, *Charts*, 1.116. Together with Tupaia's Chart it formed part of a 'collection of 14 ... manuscripts [f]rom the collection of Sir Joseph Banks [and was] [t]ransferred to the British Museum with the rest of his manuscripts in 1827'. Andrew David, 'Introduction', in David with Joppien and Smith, *Charts*, lix.

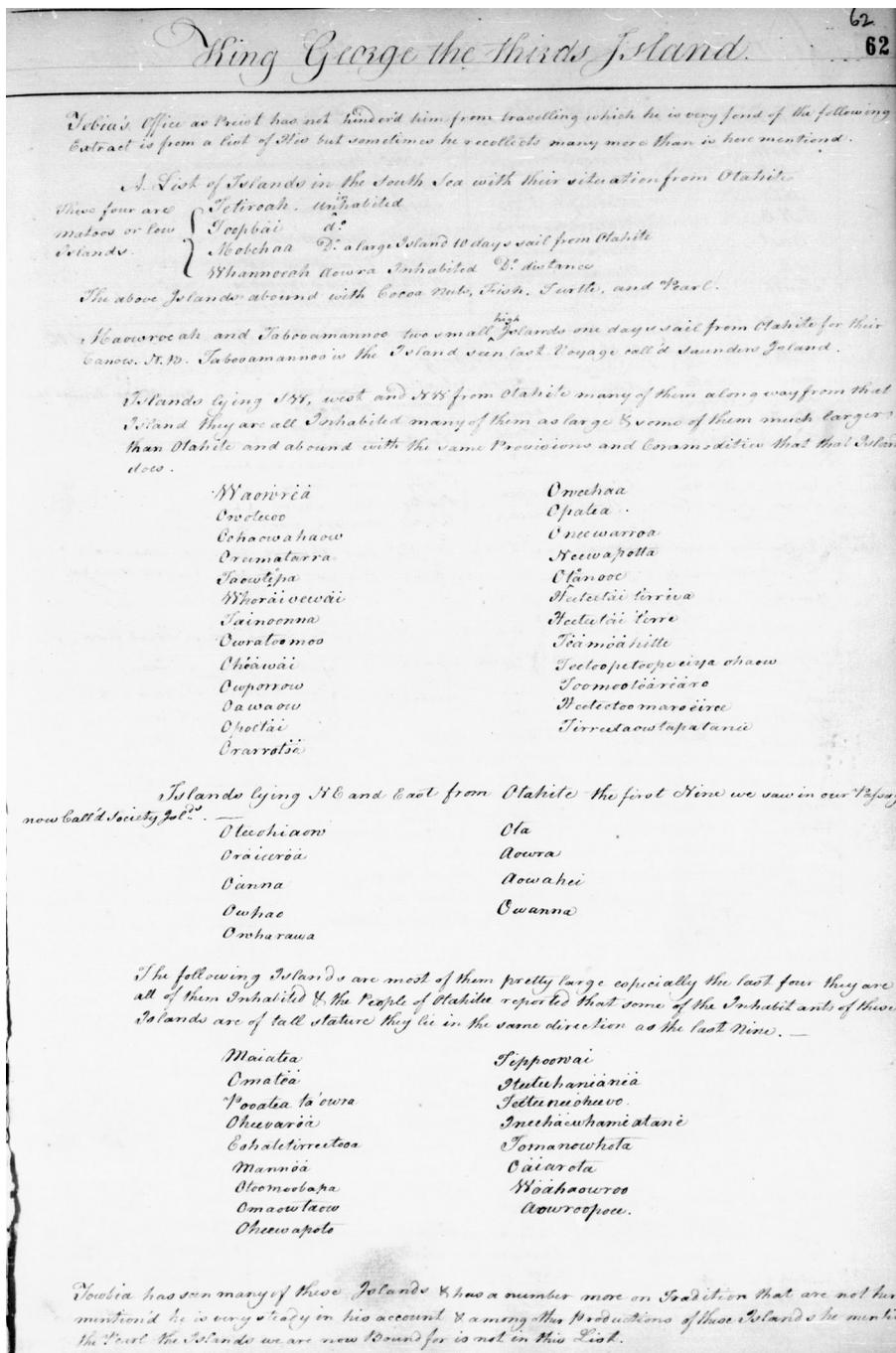


FIGURE 6: List of islands recorded from Tupaia in Robert Molyneux's Master's Log, National Archives Kew, London, Adm 55/39, 61v (M).

journal reveals that he and Tupaia must have spent substantial time together, discussing navigation, geography and Tahitian society, as well as Tupaia's life. It is Molyneux of all crewmembers who expressed the warmest and most unreserved praise for the master navigator, noting in his journal on 13 July 1769, one day before the *Endeavour's* departure from Tahiti: 'Tobia during our acquaintance with him has appear'd always to be infinitely superiour in every Respect to any other Indian we have met'.³⁹ Curiously, Beaglehole's transcription of Molyneux's journal breaks off there, and what follows on the next page has thus remained largely overlooked to date⁴⁰ – a list of 57 islands, segmented into four different sections, and framed as follows:

Tobia's Office as Priest has not hinder'd him from travelling which he is very fond of the following extract is from a list of His but sometimes he recollects many more [islands] than is here mentioned ... Towbia has seen many of these Islands & has a number more on Tradition that are not here mention'd he is very steady in his account & among the other Productions of these Islands he mentions⁴¹

What lends Molyneux's island list its vital importance is that he must have attempted to reproduce the islands in the sequence in which Tupaia initially recited them. While there surely remain inconsistencies and probably misunderstandings, his island list is definitely much more attentive to island sequences than Cook's first island list preserved in Forster's 'Insularium'.

Narrative sequence was of major importance in precolonial Oceanic navigation which neither used nor needed manifest maps or instruments. In Oceania's oral culture, narrative was the primary tool to memorize and transmit complex accounts of interconnected voyaging routes through the sea of islands. These accounts would have been replete with their respective star (and sun) courses, with bearings, instructions for seasons for travel, the expected quality of swell, winds, sea marks and other indispensable information for reckoning and island finding.⁴² In other words, Oceanic geography was, like Oceanic history, genealogy and all other matters of education, a narrative art, taught and memorized at specialized *marae* primarily through the recitation of chants.⁴³ As shown below, some sequences of inter-island travel that can be read from Tupaia's Map with the help of Molyneux's island list suggest that

³⁹ Robert Molyneux, 'Master's Log', 26 August 1768–20 October 1769, National Archives Kew, London, Adm 55/39, 61v.

⁴⁰ Anne Salmond briefly commented on this list in *Aphrodite's Island*, 204. She also reproduced the island names, albeit, crucially, not in their original sequence, in the appendix to her essay 'Voyaging Exchanges: Tahitian Pilots and European Navigators', in *Canoes of the Grand Ocean*, ed. Anne Di Piazza and Erik Pearthree (Oxford: Archeopress, 2008), 23–46.

⁴¹ Molyneux, 'Log', 62r.

⁴² Finney, 'Nautical Cartography'; David Lewis, *We, the Navigators: The Ancient Art of Landfinding in the Pacific*, 2nd ed. (Honolulu: University of Hawai'i Press, 1994 [1972]).

⁴³ Teuira Henry, *Ancient Tahiti, Based on Material Recorded by J.M. Orsmond* (Honolulu: Bernice P. Bishop Museum, 1928), 154.

legends of famed ancestral voyagers like Rātā or Hono'ura were used as mnemonic blueprints for active navigational purposes.⁴⁴

All this particularly matters, as Molyneux's list was evidently a blueprint from which Tupaia and whoever else was involved in the mapping processes systematically worked to draw the map in its different draft stages. That Molyneux himself contributed to the creation of these drafts is very likely. Yet the transcription of Tahitian names in his island list differs substantially from the names allocated to the islands on the map, and thus it is probable that someone else, presumably Pickersgill, transcribed the names next to the islands Tupaia drew on the first draft.

In what follows, we use a system of abbreviations (see [Tables 1 and 2](#)) to differentiate the draft stages and archival sources discussed in this chapter.

THE FIRST DRAFT OF TUPAIA'S MAP (T1) IS SET UP

When work on Tupaia's Map began, European cartography was no longer alien to the Ra'iātean. Already while still in Tahiti, he had joined Cook and Banks on their circuit of the island for two days along the west coast of Tahiti Nui. He would have observed Cook's method of measuring the coastal outline and of transposing these measurements on to a draft chart of Tahiti and Mo'orea.⁴⁵ Later he assisted in the process of drafting the clean copy, correcting the pronunciation of the names of local *fenua*, as well as of harbours and other geographical features that Cook and Banks had collected en route. Tupaia was also an important collaborator in the production of a fascinating chart of the Leeward Society Islands focusing on ethnographic information and not following European models of cartographic projection ([Figure 7](#)).⁴⁶ It has been shown in a wonderful essay by Harriet Parsons that Banks, Cook, Pickersgill and Tupaia worked on the chart together over an extended period of time.⁴⁷ Tupaia provided the names of passages, harbours and *fenua* on Ra'iātea, Taha'a, Porapora and Maupiti; yet he was more than a mere informant in this project: the different and slightly messy quality of the wash at the southern tip of Ra'iātea suggests that the Europeans also invited Tupaia to draw sections on the map where they themselves lacked geographical information.⁴⁸ In the process of contributing to this map and seeing this information translated into Cook's own 'Chart of the Society Isles' in Mercator projection,⁴⁹ Tupaia would have acquired increasingly detailed insights into European mapmaking conventions.

⁴⁴ See also Serge Dunis, 'Bathymétrie légendaire', in *D'île en île Pacifique*, ed. Serge Dunis (Paris: Klincksieck, 1999), 127–72.

⁴⁵ James Cook, 'A Chart of King George's Island', 1769, British Library, London, BL Add MS 7085, f.7; David with Joppien and Smith, *Charts*, 1.118.

⁴⁶ Tupaia, et al., [Chart of the Leeward Society Islands], 1769, British Library, London, BL Add MS 15508, f.16; see also Salmond, *Aphrodite's Island*, 204–5.

⁴⁷ Parsons, 'Collaborative Drawing'.

⁴⁸ See also *ibid.*

⁴⁹ James Cook, 'A Chart of the Society Isles in the South Sea', 1769, British Library, London, BL Add MS 7085, f.11; David with Joppien and Smith, *Charts*, 1.132.

TABLE 1: Island lists, surviving copies of Tupaia's Map, and reconstructed draft stages.

Island lists which preceded the work on Tupaia's Map

M	Tupaia's list of islands as recorded in Robert Molyneux's journal, archived in the National Archives, London (Adm 55/39) (Figure 6)
C/JRF	Tupaia's list of islands recorded by James Cook but not included in his journal, transcribed in Johann Reinhold Forster's 'Insularium' at the Staatsbibliothek Berlin (MS Orient Oct. 62)

Island lists copied from draft stages of Tupaia's Map

T1/JRF	Island list transcribed from the first draft stage of Tupaia's Chart in the possession of Richard Pickersgill (T1); recorded in Johann Reinhold Forster's 'Insularium' at the Staatsbibliothek Berlin (MS Orient Oct. 62) (Figure 4)
T2/C	Island list transcribed from the second draft stage of Tupaia's Map (T2), as recorded in James Cook's holograph journal, now held by the Australian National Library in Canberra (Canberra MS); copied by Orton (Mitchell MS) (Figure 5)

Surviving copies of Tupaia's Map

T1/GF	Georg Forster's copy of the first draft stage of Tupaia's Map (T1) archived in the Stadtarchiv Braunschweig (H III 16-87) (Figure 3)
T3/B	Fair copy of the third and final draft stage of Tupaia's Map (T3), originally owned by Joseph Banks, now held by the British Library (Add MS 21593.C) (Figure 1)
T1/T3/JRF	Johann Reinhold Forster's interpretive compilation of the first draft stage (T1) and fair copy of the third draft stage of Tupaia's Map (T3/B), engraved by William Fadden and published in 1778 in Forster's <i>Observations</i> (Figure 2)

The reconstructed three draft stages of Tupaia's Map (all lost)

T1	The first draft stage of Tupaia's Map; as reconstructed from T1/GF (island positions) and T1/JRF (island names)
T2	The second draft stage of Tupaia's Map; as reconstructed from T3/B (island positions) and T2/C (island names)
T3	The third and final draft stage of Tupaia's Map; as copied on T3/B

TABLE 2: A very short history of Tupaia's Map.

Before the map

- July 1769 Molyneux records a list of islands (M) on 13 July as part of his 'Remarks in Port Royal Bay in King George the Thirds Island'.
Cook plans to include an island list (C) in his 'Description of King Georges Island' but ultimately refrains from doing so.

The first mapmaking moment

- August 1769 15 August, Rurutu: Cook, Banks, Pickersgill and Clerke record exchanges with Tupaia about a number of islands in the larger region. These trigger Tupaia's Map. Those involved in the mapping processes soon draw on Molyneux' island list (M).
T1 is abandoned and remains in Pickersgill's possession.
Work on T2 commences.

The second mapmaking moment

- Jan./Feb. 1770 Late January, Tōtaranui: Cook copies the island names from T2 into his 'General Descriptions of New Zealand' (T2/C).
5 February, Tōtaranui: Conversations between Tupaia and Topaa prompt work on a revised draft version of the map (T3).
Cook revises his entries on Tupaia's navigational knowledge in the process and updates the list of islands visited by Tupaia in the Mitchell MS.

Later copies of the map

- 1770/1771 A fair copy of T3 is produced for Banks (T3/B), presumably on the *Endeavour's* return voyage to Britain.
1773 On Cook's second voyage, the Forsters copy T1 from Pickersgill, probably while at anchor in Ra'iātea on 11 September.
1774 Still on board the *Resolution*, J.R. Forster copies the island names from T1 into his 'Insularium' (T1/JRF), as well as Cook's original island list (C/JRF).
1776 In early September, G. Forster includes a copy of T1 in a letter to his publisher (T1/GF).
1778 J.R. Forster compiles and publishes his own version of Tupaia's chart in his *Observations*, based on T1/GF and T3/B.

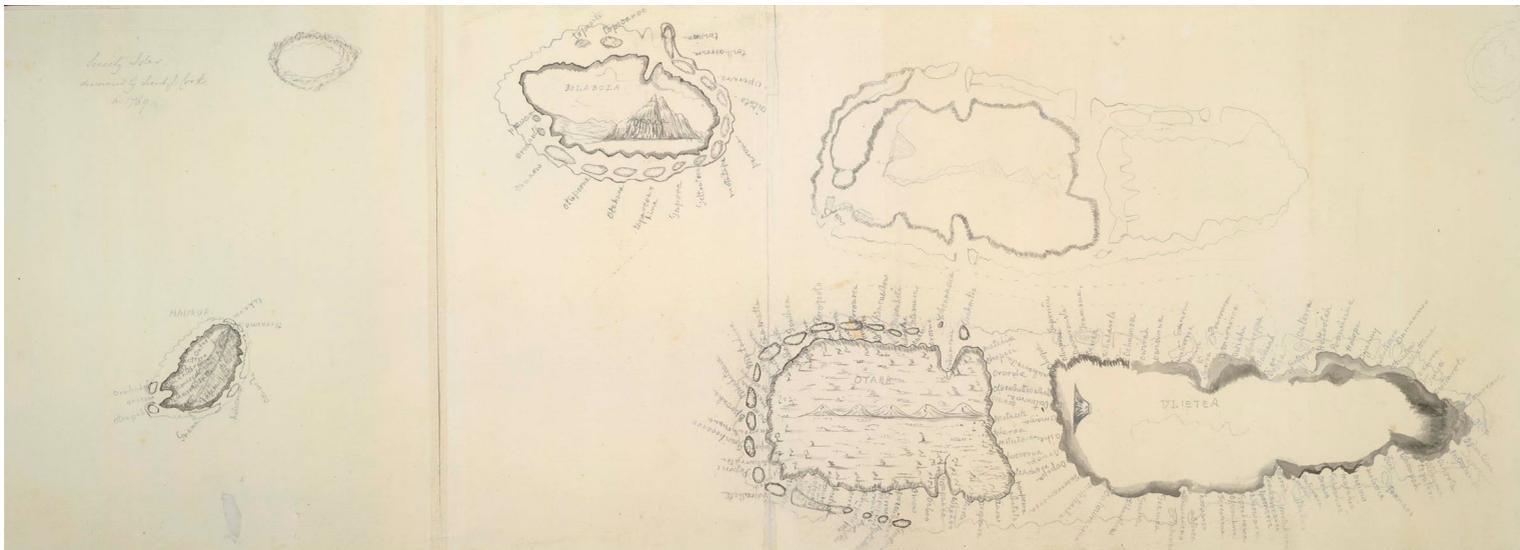


FIGURE 7: Tupaia et al., Chart of the Leeward Society Islands, 1769, British Library, London, © British Library Board BL Add MS 15508, f.16.

Yet another chart to which Tupaia contributed is Richard Pickersgill's chart of the Tuāmotu Archipelago and the Society Islands (Figure 8).⁵⁰ The map is large (510 × 745 mm), using a small Mercator scale (1° of longitude = 1 inch), and overwhelmingly empty. Its emptiness is a powerful reminder of how little the Europeans knew of the South Pacific in 1769 and throws into relief Tupaia's teeming sea of islands as eventually represented on his map of Oceania. On this chart, Pickersgill successively entered the islands passed by the *Endeavour* in relation to the islands he had seen on his previous voyage with Captain Wallis. A northern route through the Tuāmotu group via Hao (Cook's Bow Island) and 'Ana'a (Chain Island) follows the *Endeavour*, the southern route via Nukutavake (Wallis's Reine Charlotte) and Paraoa (Gloucester Island) tracks the course of the *Dolphin*. Also not seen by Cook were two of the three outliers of the Leeward Society group, Maupiha'a (Wallis's Howe Island) and Manuae (Scilly Island). The remaining islands on Pickersgill's map follow the sightings of the *Endeavour* between April and August 1769: Meheti'a, Tahiti, Mo'orea, Maiao, Teti'aroa, Huahine, Ra'iātea, Taha'a, Porapora, Tūpai, Maupiti, and, finally, on the southern fringes of the chart, Rurutu in the Austral group.

Rurutu is labelled 'Ohitirouah' on Pickersgill's chart, a version of Oheteroa (Hiti-roa), the name Tupaia chose for Rurutu when communicating with the officers of the *Endeavour*. Pickersgill's map notes in ink next to the island: 'In the Neighbourhood of the Island a Native of Otahite describes 12 or 13 other islands'. There is no doubt that this refers to Tupaia, who is explicitly named in Pickersgill's journal of 15 August 1769: 'At this time Tobiea Describes nine Islands lying between WNW and SSW the most distant no more than 2 Days sail and one very large one lying E 4 Days sail'.⁵¹ In fact, not only Pickersgill, but also Banks, Clerke and other officers record a version of this event, as does Cook himself, whose journal on 15 August details conversations he had with Tupaia about routes to Tonga and other Austral Islands, as already discussed above. All this indicates that Pickersgill's chart of the Tuāmotu Archipelago and the Society Islands was likely to have been on the drawing table at Rurutu, and part of the very conversations which started Tupaia's Map.

The Society Islands and Rurutu

Georg Forster's copy (T1/GF) of the first draft (T1) of Tupaia's Map indicates that in its earliest stages the chart was not drawn by Tupaia himself, but set up for him by a European hand: Pickersgill, or another draftsman took an empty sheet of paper and placed in its centre the islands of the Society group through which Tupaia had piloted them in the previous weeks. In drafting the map of the group, the artist probably had recourse to Pickersgill's chart of the region (Figure 8) as well as to the draft maps Cook had compiled together with his wife's cousin Isaac Smith, who sailed on the *Endeavour* as an able seaman. The layout of the Leeward Society Islands on T1/GF corresponds

⁵⁰ Pickersgill, [Tuāmotu Archipelago]; David with Joppien and Smith, *Charts*, 1.74.

⁵¹ Richard Pickersgill, 'Journal', 10 June 1768–6 October 1769, National Archives Kew, London, Adm 51/4547/140, 39; Richard Pickersgill, [Photocopy of] *Journal*, 10 June 1768–6 October 1769, State Library of New South Wales, Sydney, A 3408, 39.

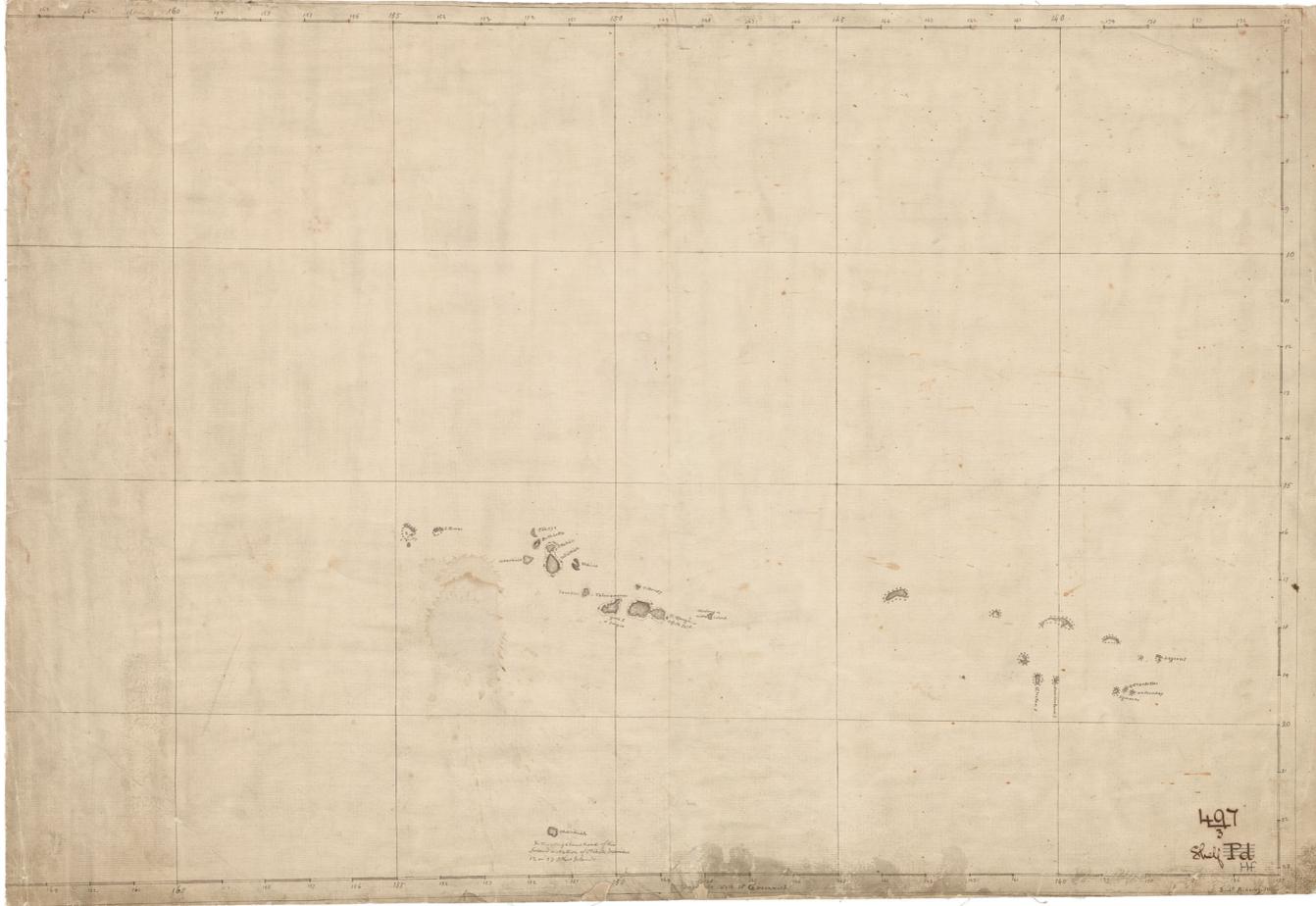


FIGURE 8: Richard Pickersgill, Chart of the Tuāmotu Archipelago and the Society Islands, National Archives Kew, London, Adm 352/468.

well with Cook and Smith's chart of the region;⁵² and this is also true for Tahiti and Mo'orea in the Windward group, including the characteristic misrepresentation of Mo'orea's leeward coast on Cook and Smith's well-known map of these islands.⁵³ For Maiao, Teti'aroa, Meheti'a, and Rurutu, the charts of Pickersgill, including a large-scale map of Rurutu,⁵⁴ were certainly a major point of reference.

The islands thus pre-drafted by the Europeans when setting up for Tupaia, presumably all unnamed on the first draft (T1), are (Figure 9):⁵⁵

Tahiti (T2: Otaheite; T3: Otaheite)
 Mo'orea (T2: Imao; T3: Imao)
 Maiao (T2: Tapooamanue; T3: Tapooa-mannu)
 Meheti'a (T2: Mytea; T3: Mytea)
 Teti'aroa (T2: Tethuroa; not on T3)
 Huaheine (T2: Huiheine; T3: Huaheine)
 Ra'ia'tea (T2: Ulietea; T3: Ulietea)
 Taha'a (T2: Otaha; T3: Otahah)
 Porapora (T2: Bolabola; T3: Bola-bola)
 Tūpai (T2: Tubai; T3: Tupi)
 Maupiti (T2: Maurua; T3: Maurua)
 Rurutu (T2: Oheteroa; T3: Oheteroa)

AVATEA, OR: TUPAIA'S INGENIOUS CARTOGRAPHIC SYSTEM

Once the chart had been set up with all the islands in the Society group and the Austral Islands already known to the *Endeavour's* crew, Tupaia would have been invited to enter all the other islands in the larger region he had repeatedly mentioned. There is little doubt that Tupaia understood how the Europeans had set up the map for him, using a cardinal system for orientations to north, east, south and west and then positioning the islands in relation to each other accordingly – after all, this was not Tupaia's first mapping collaboration with Cook, Pickersgill, Molyneux and other officers. However, it is at this moment of mapmaking that Tupaia evidently made a crucial and deliberate decision to abandon the cartographic model the

⁵² James Cook, 'Chart of the Society Isles'.

⁵³ Cook, 'King George's Island'.

⁵⁴ Richard Pickersgill, [Chart of Rurutu], National Archives Kew, London, Adm 352/469; David with Joppien and Smith, *Charts*, 1.160.

⁵⁵ All islands which the Europeans pre-drafted for Tupaia when setting up the map can be clearly identified. However, there is one island in the very centre of this region on Georg Forster's copy (T1/GF) which remains a mystery: Taboo-nooe, situated roughly between Tetiaroa and Huaheine. The island only appears on T1/GF; it is no longer part of the second (T2) or third (T3) draft stage of the map, and nor is it listed in Johann Reinhold Forster's 'Insularium'. There is no island in the seas between Tetiaroa and Huaheine. Our best guess is to assume that *Tapu-nui* (literally: great land[s] of *tapu*) is a reference to a mythical or cosmogonic entity or space Tupaia discussed with the Europeans.

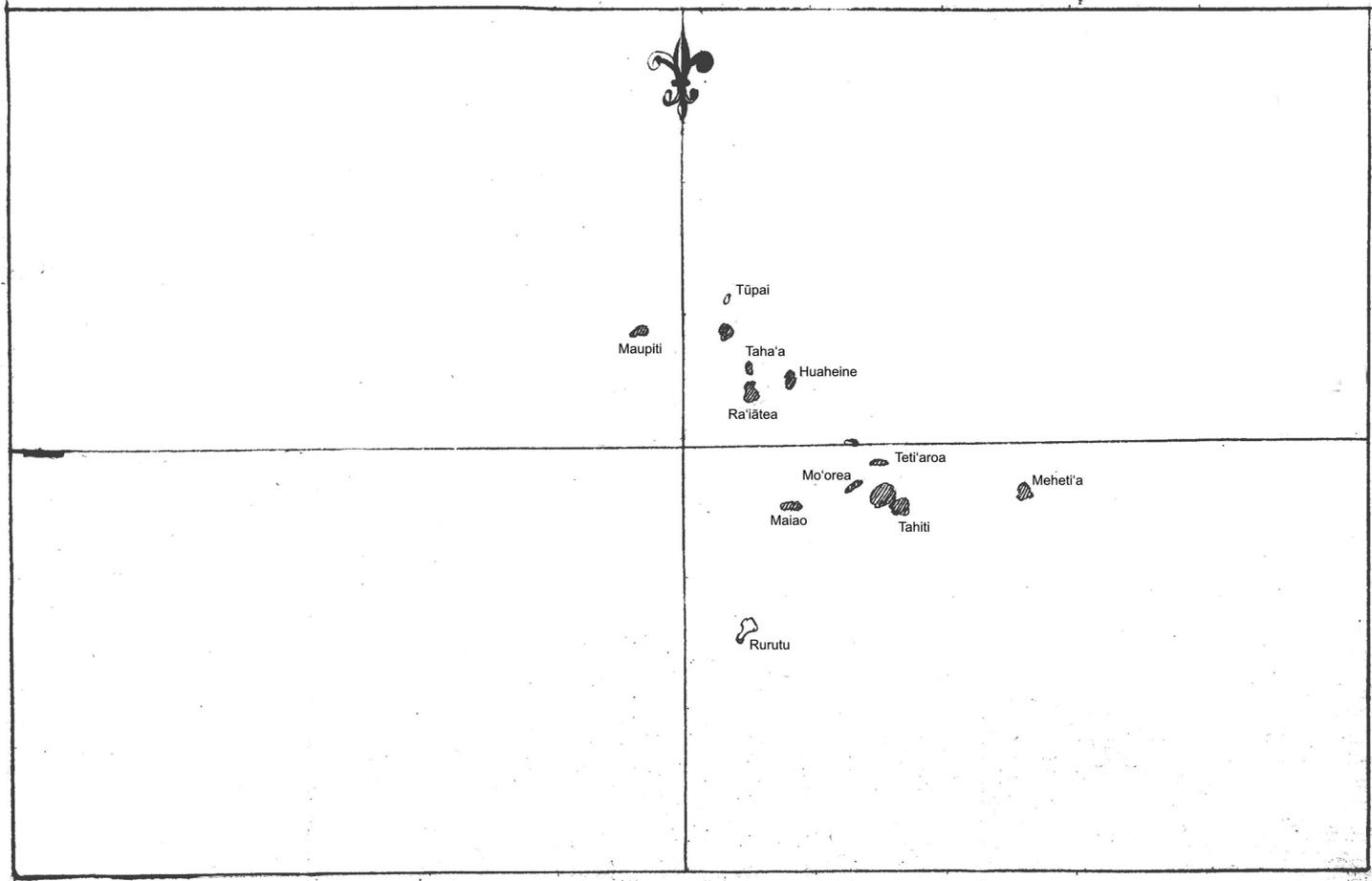


FIGURE 9: Mapping stage 1 (the Society Islands and Rurutu), drawn by a European hand, as shown on T1/GF.

Europeans had set in place for him: not, presumably, for reasons of incomprehension, but because the European model was incompatible with his own voyaging experience, strategies of wayfinding, navigational knowledge, and, ultimately, Oceanic cosmogony. Instead, we argue, Tupaia invented from scratch a completely new and ingenious cartographic system. For these purposes, he requested a little word to be placed at the very centre of the map, just where the cardinal axes cross: *avatea* (Figure 10(a–c)).

The different worldings of European and Oceanic geography

The two geographical and navigational knowledge systems brought to the chart by Tupaia and the Europeans obviously did not gel. This did not so much concern actual navigational practice, which could be worked out situationally in the act of sailing together,⁵⁶ as the *Endeavour's* journey through the Leeward Society Islands had already successfully proven. In producing the chart, however, their fundamental cognitive and representational models of conceiving the relation between traveller and world must have come to the fore.

We have become so naturalized to the Western approach to modelling geographical space that it is important to remind ourselves how artificial it actually is. It conceives of a world that is abstracted from the traveller, objectivized and fixed in two-dimensional cartographic representations. In order to be able to represent larger geographic surfaces in small scale, it needs to flatten out the earth's spherical shape by using one or the other of a whole range of possible projection techniques. Nautical navigation to this day relies on the so-called Mercator style of projection, as it is faithful to angles and concomitant bearing patterns that are paramount for navigational orientation (while it distorts the size and shape of spatial surfaces). The ship's movement can then be traced by determining its position in the spatial geography, ideally by means of objective measurement. For these purposes, the earth's surface is imagined to be covered by a grid of invisible lines of two orientations: the first marking the distance or latitude from the earth's poles, the second marking the longitudinal distance from an arbitrarily fixed meridian. The prime meridian with which the *Endeavour's* crew operated was not accidentally set on Greenwich, London. It was in London, after all, in the Admiralty's headquarters, that all knowledge collected on Britain's voyages of exploration (geographical, yet also geological, biological, ethnographic) was archived, new maps were compiled, and new explorers were instructed. The entanglement of state, science and cartography, of which the choice of Greenwich is evocative, was the outcome of joint processes of cognitive and social ordering that were exerting increasing power in the closing decades of the 18th century, when the *Endeavour* embarked on its voyage.⁵⁷

⁵⁶ Turnbull, *Masons*, 234.

⁵⁷ See also *ibid.*, 91–131.

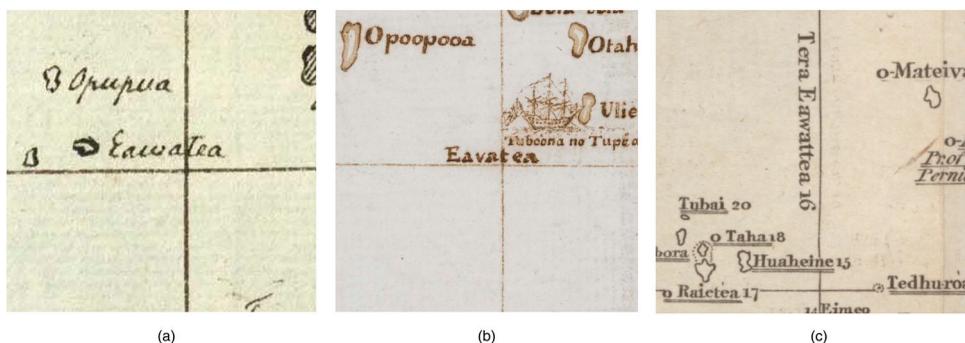


FIGURE 10: *Avatea* as represented on T1/GF, T3/B, and T1/T3/JRF.

Tupaia's conception of the relation between traveller and world, and his concomitant strategy of navigational orientation were clearly very different. As authors, we must acknowledge here that our own access to this knowledge is limited. We are pretty much landed creatures, without hands-on insights into Oceanic navigation or deeper knowledge of Polynesian languages. In our recuperation of Tupaia's navigational knowledge, we have depended primarily on the accounts of other Westerners who sailed with traditional navigators from Oceania, most notably Ben Finney and David Lewis,⁵⁸ as well as on ethnohistorical research into Polynesian astronavigation, such as in the vital work by Jean-Claude Teriierooiterai.⁵⁹ We have also benefited greatly from personal conversations in the Society group, the Austral Islands, and in Aotearoa/New Zealand. This especially concerns the profound insights into Tahitian astronomy shared by Libor Prokop of the Association Culturelle Haururu in Tahiti in long and patient conversations. Hinano Teavai-Murphy of the University of California at Berkeley's Gump Station in Mo'orea offered oral histories of ancestral Tuāmotan wayfinding next to translations of the Tahitian island names and captions on Tupaia's Map which we discuss in detail in a later section. Not least, we owe much to master carver, canoe builder and experimental voyager Matahi Brightwell of Gisborne, Aotearoa, who generously imparted his insights into traditional *va'a* construction and Oceanic wayfinding.⁶⁰

We understand that Oceanic navigation did not abstract the world from the navigator and did not fix it from an abstract exterior focal point of orientation. On the contrary, the geographic centre of navigational orientation was inevitably the navigator, and the *pahi*, the voyaging canoe (in Society Islander terms), which was imagined as fixed, surrounded by an animate world of ocean, sea life, wind, current, sun, stars,

⁵⁸ Finney, 'Myth'; Finney, 'Nautical Cartography'; Lewis, *Navigators*.

⁵⁹ Jean-Claude Teriierooiterai, 'Mythes, astronomie, découpage du temps et navigation traditionnelle: l'héritage océanien contenu dans les mots de la langue tahitienne', PhD thesis, Université de la Polynésie française, Tahiti, 2013.

⁶⁰ Between 1979 and 1985, Matahi Brightwell built the double-hulled voyaging canoe *Hawaiki Nui*, using only customary tools and traditional materials. With his father-in-law Frances Cowen, he sailed the *Hawaiki Nui* from Tahiti to Rarotonga and on to Gisborne in Aotearoa.

planets, and ultimately islands. Wayfinding in this system crucially depended on precise information about the situational bearing of target islands, to be constantly reconfigured in the process of voyaging by closely observing the stars at night, the course of the sun in daytime, and the directions of wind and swell, by observing the wake for current drift and leeway and a range of other factors.⁶¹ At the core of Tupaia's system was an elaborate astronomy which, as compellingly argued by Libor Prokop, was probably closely tied to the lunar calendar. This is supported by the *Endeavour* journals and notebooks especially of Banks (but also Molyneux), with whom Tupaia must have discussed lunar phases and the corresponding terms for days and months, while exchanging distinctly navigational information, such as the wind and sun compass.⁶² The Tahitian lunar calendar structured the shifting azimuth positions not only of the moon, but especially also of the sun at a given latitude, as well as their times of appearance and disappearance. At the same time, it would have indicated in which season which *pou*, ritually significant pillar stars, traverse the night sky at set latitudes, and in which season set star sequences appear in specific azimuth positions in the east, and sink again in the west.⁶³ These stars, rising (and setting) in sequence over the course of a night and named after a principal star defining the azimuth bearing (*rua*), marked the star courses for distinct target islands on voyaging routes.⁶⁴ It needs to be stressed again that the concomitant star and sun courses for purposeful island to island travel were remembered not visually, that is in the form of compasses or maps, but through narrative: Tupaia would have known a vast set of narratives or chants replete with information about the seasonal viability of travel, providing exact bearings on traditional voyaging routes.⁶⁵ Strategies of 'expanding the target', involving the observation of homing seabirds, changing swell patterns, cloud formations, reflections on the underside of clouds, deep sea phosphorescence and other factors, were then vital to ensure that target islands were not missed.⁶⁶

Even if Cook did not fully comprehend Tupaia's navigational system, he would nevertheless have observed and appreciated how it worked – how else would he have conceivably allowed Tupaia to pilot his precious ship for four weeks through the Society Islands and onwards to the south, across open waters, to the Australs? How much Pickersgill or Banks learned about Tupaia's wayfinding system in the processes of collaborating with him on the map is also hard to tell. Yet one of them

⁶¹ Finney, 'Myth'; Finney, 'Nautical Cartography'; Lewis, *Navigators*; Turnbull, 'Reframing Science', 556.

⁶² Banks, *Endeavour Journal*, 368; Joseph Banks, 'Observationes de Otaheite &c.', 1769, SOAS, University of London, MS 12892, 9, 13; Molyneux, 'Log', 62r.

⁶³ Henry, *Ancient*, 359–63; Teriierooiterai, 'Mythes', 156–65.

⁶⁴ Teriierooiterai, 'Mythes', 146–54.

⁶⁵ Salmond, *Aphrodite's Island*, 204.

⁶⁶ Lewis, *Navigators*, 195–276. The different ontological and epistemological approaches to voyaging and representing the Oceanic 'world' used by Tupaia and James Cook, respectively, resonate with Tim Ingold's distinction between *wayfinding* and *navigation*. Wayfinding, Ingold argued, 'more closely resembles storytelling than map-using'. Tim Ingold, *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (London: Routledge, 2000), 219.

must have informed the Forsters about Tupaia's accomplishments. Their description of Oceanic wayfinding and Tupaia's mastery is worth quoting in full in this context:

These divisions of time [of the year into lunar months, months into lunar days, days into day and night times] enable these islanders to observe the heavenly bodies for their several purposes. They know that the fixed stars do not change their position in regard to one another, and have by long experience discovered which stars rise and set at certain seasons of the year; and by their help they determine the progressive motion of the planets, and the points of the compass during the night. *Tupaia* was so well skilled in this, that wherever they came with the ship during the navigation of nearly a year, previous to the arrival of the Endeavour at Batavia, he could always point out the direction in which Taheitee was situated.⁶⁷

Placing avatea, or a positional north, in the map's centre

The challenge confronting Tupaia at the current stage of mapmaking was this: how could he translate the complexities of his navigational knowledge into the geographical model which the Europeans had set up for him? Or, more specifically, how could he transfer a whole set of wayfinding chants centred on the position of the *pahi* and informed by precise astronomical bearings, as well as a whole range of additional situational information, into the singular representational model of a chart?

Tupaia's stroke of genius was to override the absolute cardinal orientation prefigured for him. From this stage of mapmaking onward, north would no longer be 'up', independent of one's position on the map, east no longer 'right', south no longer 'down', west no longer 'left'. Instead, Tupaia placed north – indicated by the little word *avatea* – in the centre of the map and thus quit the abstract cartographic space set up by the Europeans. Every island which he would from now on enter on the first draft of his chart was a centre in its own right, a centre from which a *pahi* could depart on a specific traditional voyaging path. Viewers of the map are accordingly invited to abandon their aloof, singular, abstracted bird eye's perspective and to situate themselves in Tupaia's three-dimensional sea of islands, to climb the platform of a *marae* or a *pahi* at any of the islands drawn by him. From here, they need to take two different bearings: first, to the north, located in the map's centre; second, to the following island on a defined voyaging route. The angle between the two sets the course.

In the vocabulary lists collected by Banks, Solander, Monkhouse and others, *avatea* is consistently translated as 'noon' (*e avatea* = the noon) and determined by the highest elevation of the sun on its daily course. A sketch of the sun course in Bank's Tahitian notebook, with the Tahitian names for respective sun positions dictated by Tupaia, is particularly evocative here: the noon position is marked by the phrase 'o'whawatea te Mahanna' ('this is the noon/zenith of the sun').⁶⁸ On Georg Forster's copy of the first draft (T1/GF) (Figure 10(a)), *avatea* appears as 'Eawatea' in the centre

⁶⁷ J.R. Forster, *Observations*, 509.

⁶⁸ Banks, 'Observationes', inside back cover.

of the map, with what seems to be an island next to it; on the third draft copied for Banks (T3/B) (Figure 10(b)), the island has disappeared. What is left is the term 'Eavatea', evidently labelling the crossing of the two cardinal axes. Finally, on Johann Reinhold Forster's interpretive copy of the two drafts of the map he received from Pickersgill and Banks (T1/T3/JRF) (Figure 10(c)) *avatea* is shifted to label the vertical axis marking what Forster calls the 'meridian'. Forster adds *te rā* (the sun). In his *Observations*, he accordingly explained: 'the line whereon the sun comes closest to their zenith and upon it or the meridian, they call T-erà-whattèa'.⁶⁹ There is little doubt, then, that on all drafts and copies of Tupaia's Map *avatea* marks the noon position of the sun. We hold it to be very likely that the island drawn on T1 next to 'Eavatea' was not meant to be an island at all, but perhaps an illustration of the ball of the sun. On T2 and T3 the shape is deleted, to mark unambiguously the crossing of the cardinal lines as the point where the sun is at its highest point. Tupaia thus made effective use of the two-dimensional cartographic design set up for him. Yet Bank's drawing of the sun course also suggests that, when looking at the map, what Tupaia would have seen was also in tune with Polynesian cosmographies. He would have seen the surface of a bowl with openings on the sides through which winds, but also the sun and heavenly bodies, could enter *oa*, the visible world, and disappear again into *po*, the underworld, attached to and traversing their respective layer of ten skies which arch over the sea of islands.⁷⁰

The question remains, how can we identify *avatea* with a positional bearing to the north? The hardest evidence for this claim is the arrangement of voyaging routes on the first draft of Tupaia's Map to be discussed in detail in the next sections. However, we also find it supported by the historical sources. Johann Reinhold Forster's description of *avatea* as meridian in his *Observations* continues: 'The Northern point of this imaginary line on the horizon, they name Too-erou [north], and the opposite point Toà [south]'.⁷¹ Moreover, since this information is provided in the context of Forster's discussion of Tupaia's chart, it is highly likely that he would have acquired it from conversations with Pickersgill on board the *Resolution* about Tupaia's mapping practices.

In the Southern Hemisphere, and without any exception south of the Tropic of Capricorn, the noon position of the sun marks due north. Within the tropics things are less clear cut. The closer to the equator, the longer the period around the southern summer solstice on 21 December when the sun at noon is in zenith position, or even slightly south. With the exception of O'ahu in the Hawaiian Islands, all islands on Tupaia's map are south of the equator, ranging between roughly 8° S (Nuku Hiva) and 27° S (Rapa). In the Society Islands, which lie around 17° S, the sun at noon is clearly north, except for a period from mid-November to the first days of February. Tupaia joined the crew of the *Endeavour* in mid-July, and thus when the *avatea* sun was very clearly north. If we are correct in assuming that Tupaia began his map around 15 August, this would clearly still have been the case; and the following

⁶⁹ J.R. Forster, *Observations*, 503.

⁷⁰ Henry, *Ancient*, 359–64.

⁷¹ J.R. Forster, *Observations*, 503.

day, upon leaving Rurutu, the *Endeavour* crossed the Tropic of Capricorn. We are convinced that *avatea* marks a northern bearing from all islands Tupaia set out to draw at this stage of mapmaking (T1). The more pressing question, at this juncture, is why he would have chosen this category as a unifying point of reference for all island routes he was to enter on the chart – for it would not have been a very significant variable in his own tradition of Oceanic wayfinding.

Avatea in Oceanic and European navigation

The sun at noon was doubtlessly used in Polynesian navigation. David Lewis noted that the ‘north–south axis can be ascertained at noon by the shadow of a vessel’s mast which points either due north or south depending on the latitude and the season’,⁷² and referenced examples from the Marshall Islands and Tonga. Yet it would have been a relatively imprecise category of observation that needed to be confirmed by more reliable variables. The lunar calendar, with necessary adjustments to changing latitudes (which vary by less than 10° for most islands on the map), would have provided reliable data for the azimuth position of the sun at sunrise and sunset and accordingly helped to specify its meridian position. More importantly, however, Tupaia’s Map supports the assumption that, next to using characteristic winds, Polynesian wayfinding operated with an elaborate (mental and narrative) star compass, where a range of bearing patterns correspond to the azimuth positions of aligned star sequences or star paths (*rua*).⁷³ The night-time observation of *rua* must have closely tied in with the day-time observation of the sun to stay on a specific star course. Experts in Tahitian astronavigation such as Libor Prokop confirm that it would have been easy for Tupaia to determine the position of the *avatea* sun from a range of other astronomical variables he had at hand and thus find his bearing to the north, just as he was able to point out the direction of Tahiti at any point of his voyage on the *Endeavour*.

So why did Tupaia choose *avatea* as a uniting point of reference for all voyaging paths he was about to set down? He almost certainly did so because the sun at noon was a major category in Cook’s own system of navigation and cartography. Tupaia must have been struck by the elaborate rituals he observed every day around midday on board the *Endeavour*. Just before noon, officers and marines were to report on deck along with the instruments for navigation, among them the treasured compass and sextant. From instructions about the use of the magnetic compass, Tupaia must have learned that Cook and his crew inevitably measured their bearings by identifying the angle between the actual course taken and a bearing to the north. The sextant, in turn, was employed for three interrelated purposes, each achieved by measuring the height of the sun above the horizon at noon-time (*avatea*). First, it helped to confirm the exact timing of local noon, a moment that was then marked by eight strikes of the ship’s bell. Second, since the sun in its meridian position points duly to the true geographic, rather than the magnetic north (or south in the northern Hemisphere), it served to correct the compass bearings for magnetic variation. Finally, it helped to establish the exact latitude of the ship’s coordinate position.

⁷² Lewis, *Navigators*, 384 n. 3.

⁷³ See also Di Piazza, ‘Reconstruction’.

Longitude could not be determined with one instrument alone, yet also significantly depended on *avatea*. While at sea, the two astronomical methods to approximate longitude available to Cook on the first voyage (the so-called lunar, and the moons-of-Jupiter methods) were immensely time-consuming and rather unreliable because of the movement of the ship.⁷⁴ Cook therefore still relied on reckoning, which combined the noontime measurements of compass and sextant with a calculation of the ship's speed, in conjunction with some allowance for current and leeway. Reflecting the centrality of noontime, the *Endeavour's* logs accordingly extended not from midnight to midnight, but from noon to noon, when the ship's position was determined and its course was recorded, together with observations of winds, current, soundings, and other occurrences.⁷⁵

Tupaia was a regular witness to these noon-time events on deck throughout the four-week excursion through the Leeward Society Islands and on towards Rurutu. Given the spectacle of *avatea* and the ritual observation of the sun's northern bearing day after day, Tupaia must have assumed that his European interlocutors understood this category best. And he was generous enough to translate his knowledge of star and sun courses replete with all other variables of Polynesian wayfinding into something drastically less complex: the rough bearing for island-to-island travel set in relation to a positional north which provides a common reference point for all of his voyaging paths.

HOW TO READ TUPAIA'S MAP

Before discussing these island routes drawn by Tupaia himself in the following sections of the essay, we conclude this section with a few words of explanation on the larger design of his map.

Island location

In Tupaia's system, it does not matter where an island is placed in the absolute cardinal logic set up by the Europeans – a voyaging route can basically begin anywhere

⁷⁴ See David, 'Introduction', xvii–lxiv. Only on the second voyage did Cook have a Harrison chronometer on board, which allowed him to know the exact time of Greenwich at any moment during the voyage and thus calculate longitude quickly and reliably when at sea.

⁷⁵ In the cartography of Cook, Smith, Molyneux and Pickersgill, too, noon or *avatea* was a paramount category. The coastlines which were to be mapped on to charts were also typically recorded when the ship's movement was arrested at noon. The abstract coordinates of latitude and longitude determined by compass and sextant were then transposed on to a draft chart as the so-called 'ship station'. David, 'Introduction', xxxi. From such ship stations, the bearing to prominent landmarks on the coast was measured and noted. The next day at noon, the ship was again stopped, the position determined and mapped as the next ship station; the same landmarks were found again and their bearing recorded. Using the method of triangulation, this then allowed Cook and his fellow cartographers to determine the coordinate positions of the landmarks, and to map the coastline between them.

on the map. What matters instead is the relational position of islands within given sequential voyaging paths and their bearing from *avatea* in the map's centre.

It is this logic which has confused most interpreters of the map to this day and led to speculations about Tupaia's incompetence or severe misunderstandings between Tupaia and his European interlocutors. Already Georg Forster noted in *A Voyage Round the World*, in words much less flattering than in *Observations* or *Bemerkungen*:

if his drawing had been exact, our ships must have sailed over a number of these islands which he [Tupaia] had set down. It is therefore very probable that the vanity of appearing more intelligent than he really was, had prompted him to produce this fancied chart of the South Sea, and perhaps to invent many of the names of islands in it.⁷⁶

What Georg Forster, Andrew Sharp and all of Tupaia's other critics failed to see is that it is paramount to know which islands on the map are set on a path, and which are not.

Voyaging distance

The spatial distance between islands on a voyaging route as set down on the map is not a marker, or is at best a tentative marker, of true distance. It is vital to remember in this context that distance, in Tupaia's narrative geography, is a function not of space, but of time. It is measured in days, or rather nights of travel, and thus dependent on the experience of the voyage itself, as Banks noted: 'but when they speak of distances from one place to another they have no way but time of making themselves understood, but by the number of days it takes them in their canoes to go the distance'.⁷⁷ For these reasons, it cannot be stable as in the Europeans' geography, where it marks the distance between two coordinate positions in an abstracted and objectively fixed ocean. This is especially true for voyages along the east–west corridor in which most of Tupaia's islands are to be found. As the trade winds very consistently blow from the east in this region of Oceania, voyages to the west were typically much shorter than those towards the east, and would have been possible almost throughout the year. Voyages to the east were longer, less predictable, and viable only during a relatively short period in the southern summer when 'otherlies', or westerly winds blew. Cook confirmed this with reference to Tupaia himself, in a passage which appears as a postscript, with varied wording, to his 'Description of the Islands, Ulietea, Otaha, and Bolabola' in the different manuscript versions of Cook's journal. The Admiralty MS contains the longest entry:

Tupia tells us that during the months of Nov. Dec. and Jan. Westerly winds with rain prevail and as the inhabitants of the Islands know

⁷⁶ Georg Forster, *A Voyage Round the World in His Britannic Majesty's Sloop, Resolution, Commanded by Capt. James Cook, During the Years 1772, 3, 4 and 5* (London: White, 1777), vol. 1, 398.

⁷⁷ Banks, *Endeavour Journal*, 370.

very well how to make the proper use of the winds there will be no difficulty arise in Trading or Sailing from Island to Island even tho they lie in an East and West direction.⁷⁸

Beaglehole convincingly argued that discussions between Cook and Tupaia on the navigational information contained in this sentence must have commenced in August 1769, while the *Endeavour* was anchored at Rurutu. Here, Tupaia had told Cook that a voyage from Rurutu to the Tongan group would take '10 or 12 days in going thither and 30 or more in coming back' evidently in another season, with changing winds.⁷⁹ Beaglehole showed that Cook's additional entry on westerly winds was begun around the time he drafted his 'General Description of New Zealand' and was rewritten at least twice.⁸⁰ It hardly seems accidental that this ties in exactly with the temporal logic of the two historical moments of mapmaking we have reconstructed.

The different seasons and distances for 'going thither' and 'coming back' recorded by Cook on 15 August 1769 also make it evident that Oceanic navigators like Tupaia were hardly pressed for time: Lewis noted in a different context that '[t]his is a typical pattern in Oceania – roving, circuitous routes taking full advantage of seasonal weather and allowing ample opportunity for prolonged visits'.⁸¹ This approach to time and voyaging, however, was impossible to map on to a two-dimensional chart, but would have been part of its detailed narrative annotation. What matters on the map, therefore, is again less the spatial distance between islands than their *avatea* bearing, which sets the course irrespective, or less respective of the direction in which the route is travelled.

Island shape and size

The shapes of islands drawn by Tupaia do not follow any kind of representational logic recognizable by European cartography. The perspective is clearly grounded in the *pahi*, probably more interested in landmarks, passes and ports than in geographic outlines; it also seems rather random, as suggested by the outline of islands which appear twice, such as Rotuma on the first draft (T1). Some outlines, we are certain, depict not single islands, but island groups forming a block or screen, especially in the Marquesas group.⁸² Location is thus much more important than shape. This seems also to be the case for island size, even though there are some indicators that islands which featured large in Tupaia's genealogy or cosmology are also represented larger on the map. This is true, for instance, for the geographically quite small Rotuma which, however, looms large in the histories of the Society Islands.⁸³ It

⁷⁸ James Cook, 'Official Copy of Journal Kept by Captain James Cook' [Admiralty MS], 27 May 1768–10 July 1771, National Archives Kew, London, Adm 55/40, 121.

⁷⁹ Cook, [Canberra MS], 108r.

⁸⁰ J.C. Beaglehole, 'General Introduction', in Cook, *Journals*, xxi–cclxxvii, ccxvii.

⁸¹ Lewis, *Navigators*, 271.

⁸² *Ibid.*, 195–9.

⁸³ Henry, *Ancient*, 122–3.

is also true for Savai'i in Samoa, which Tupaia is reported to have called 'the father of all the rest' (cf. the third annotation on T1/GF), thus referring to its status as the first Havai'i of creation in a cosmogonic system which was progressively translated to other regions during the settlement of Oceania (to Ra'iātea in the Society Islands; to Fakarava in the Tuāmotus; to Hawai'i in the Hawaiian Islands). The size of other islands, such as Rarotonga,⁸⁴ which play an important part in the genealogies of the Society group, however, is very ordinary, and thus the pattern does not really hold.

Avatea bearings

All routes which Tupaia set down on the first draft of the map (T1) are clearly oriented toward *avatea*. Viewers are invited to situate themselves in one of the islands on the chart and to trace two imaginary lines from their position: one to *avatea*, their positional north (the sun at noon) marked by the crossing of the cardinal axes, and the other to their target island. The angle measured clockwise from the first to the second line is the *avatea* bearing used by Tupaia to position his islands, either as radiating out from one island of departure, or, more frequently, set in sequence on a voyaging path. It can be expressed in degrees from 0° to 360°, and thus translated into the terms of the Western compass.

The degree of convergence between the bearings for island-to-island travel on Tupaia's Map and a Mercator map is amazingly precise (see Figures 19 and 20), especially for the first dozen or so islands Tupaia drew, with deviations well under 5°. In his later sequences, deviations are sometimes bigger. This can in some instances be attributed to sloppier drawing, while in others it suggests that Tupaia's wayfinding knowledge in certain regions was more vague than in others (for example, for the easternmost path from Pitcairn to Rapa Nui, as well as for one of the westernmost connections between Rotuma and the Niua group in Tonga).⁸⁵

Two more aspects need to be considered in this context. First, the majority of Oceanic star courses typically were not set on the true geographical bearing of target islands, but factored in seasonal winds, leeway and current set. This particularly affected bearings toward north and south, where current set and leeway in the South Pacific are particularly strong. Tupaia's *avatea* bearings were no doubt informed by the experience of practical island-to-island voyaging which, as discussed above for the dimension of distance and time, is intricately difficult to map on to the representational model of a chart where island sequences are fixed, irrespective of the seasonal weather conditions or the direction in which the route is travelled. The second aspect

⁸⁴ See *ibid.*, 121–2.

⁸⁵ David Lewis showed that, varying with island distance, as well as factors which allow navigators to 'expand the target' such as island height, the kind and amount of homing birds, cloud patterns etc., the arc for successful landfall on a single island in the region would be around 15°. Arcs of landfall were substantially expanded by the fact that often several neighbouring islands and the (expanded) target form an 'island block' much less likely to be missed. See Lewis, *Navigators*, 268–76.

is that *avatea* was a fairly marginal category in Tupaia's system of wayfinding. Tupaia 'crossed' the beach and adapted his system to the instrument-based navigation of his European interlocutors. His chart suggests that he very generously translated each Polynesian star and sun course into bearings as shown on the *Endeavour's* compass, and vital variables of Oceanic wayfinding were certainly lost in the translation. The high precision of *avatea* bearings on Tupaia's Map for the majority of the paths he drew is therefore all the more breath-taking.

Island names and identification

The English transcriptions of Tahitian island names are often in need of substantial interpretation due to the limited linguistic capacities of the *Endeavour's* crew. This is additionally complicated by the fact that a range of names are composites of Tahitian definite articles and island names, or include directional phrases. Most famously, 'o' as in 'Otahite' and most other island names commencing with this letter simply signifies 'it is': 'it is Tahiti'. Yet Hinano Teavai-Murphy also pointed out less obvious cases to us, such as *fa'atere*, occurring in two cases in the eastern Tuāmotu on the second draft map (T2) and roughly signifying 'go to', giving further evidence of the sequential logic of Polynesian voyaging. Linguistic and ethnographic research, as well as the careful comparison between island transcriptions of one and the same island in various lists and on the different versions of the map, enables identification of roughly two-thirds of the names on the chart. We nonetheless believe that we can identify all islands on the map with fair reliability. Key to the remaining identifications are the island sequences recorded in Molyneux's list and Tupaia's *avatea* system, which allows us to ascertain islands with untraceable names based on their sequential location on a set voyaging route, and/or their respective *avatea* bearings from familiar islands.

TUPAIA ENTERS THE FIRST TWO VOYAGING PATHS

With his own system in place, Tupaia could begin to set down voyaging routes through his sea of islands in a way that was both meaningful to him and, he must have assumed, recognizable to his European interlocutors. This returns us to Rurutu Island in the Austral group on 15 August 1769, the place and time we established as the probable beginning of Tupaia's Map. As already discussed, it is here that Tupaia mentioned a number of islands lying to the east- and westward, as recorded in the diaries of several officers and not least on two maps by Richard Pickersgill – a large-scale chart of Rurutu, and his small-scale map of the Tuāmotu Archipelago and Society Islands (see [Figure 8](#)). The most detailed account of the conversations between Tupaia and the crew of the *Endeavour* in this context, however, is set down in Cook's diary entry for 15 August, which should be quoted in full:

Tobia Tupia says that their are several Islands laying at different directions from this, that is from the south to the west and N.W

and that 3 days sail to the NE is an Island called *Mannua* that is Bird Island and that it lies four days sail from Ulietea which is one day less then from Ulietea to Ohetiroa from this account I shall be able to find the situation of *Mannua* pretty well. Sence we have left Ulietea ~~Tobia~~^{Tupia} hath been very disireous for us to steer to the westward and tells us if we will but go that way we shall meet with plenty of Islands the most of them he himself hath been at and from the description he gives of two of them they must be those discover'd by Captain Wallice and by him call'd Boscawen and Kepple Islands, and these do not lay less than 400 Leagues to the westward of Ulietea; he says that they are 10 or 12 days in going thither and 30 or more in coming back and that their Paheas, that is their large Proes sails much faster than this Ship; All this I beleive to be true and therefore they may with ease sail 40 Leagues a day or more —

The farthest Island to the southward that ~~Tobia~~^{Tupia} hath been at or knows anything of lies but two days sail from Ohetiroa and is called *Moutou* but he says that his Father once told him that their were Islands to the southward of it, but we can not find that he either knows or ever heard of a Continent or large track of land. I have no reason to doubt ~~Tobia's~~^{Tupia's} Tupia[']s information of these Islands, for when we left Ulietea and steer'd to the southward, he told us that if we would keep a little more to the East / which the wind would not permit us to do / we should see *Mannua*, but as we then steer'd we should see Ohetiroa which happend accordingly.⁸⁶

To break down this passage, Cook and Tupaia evidently discussed potential voyaging targets from Rurutu on 15 August, neither of which Cook followed up, 'being now fully resolved to Stand directly to the Southward in search of the Continent'.⁸⁷ The first was to an island roughly to the eastward which Cook refers to as 'Mannua'. This island is almost definitely Ra'ivavae in the Austral group. A closer look at the different versions of Cook's journal reveals that the names 'Mannua' and 'Moutou' only entered Cook's journal at a much later stage of revision. In the original entry dating to 15 August, Cook left a blank for both island names (a frequent practice whenever he thought he needed to verify information). In all likelihood, his resource for eventually filling the gaps was the chart itself and the entry of these island names can be dated to around late January 1770, when the ship moored at Tōtaranui. He must have picked 'Moutou' as the southernmost island from Rurutu by his own cartographic standards, and nearby 'Mannua', vaguely east – if SE rather than NE – from Rurutu, as the island Tupaia desired to navigate the *Endeavour* to from Ra'ia'atea, 'which the wind would not permit us to do'. In Tupaia's own cartographic logic, however, these two islands are Manu'a and Motu O Manu (also known as Rose Atoll) in eastern Samoa, as we subsequently discuss.

⁸⁶ Cook, [Canberra MS], 107r, 108r.

⁸⁷ Ibid., 108r.

From Rurutu to Ra'ivavae

What matters for now is that the first route Tupaia entered on the chart 'in [his] own hand' was highly likely to set a course from Rurutu to Ra'ivavae. There are only two likely options for target islands lying ahead slightly to the east of the *Endeavour's* southern course from Ra'iātea: Tupua'i and Ra'ivavae. That Ra'ivavae is the island mistaken as 'Mannua' is indicated by Banks's journal, which already on 12 August mentions that '[Tupaia] tells us that it is *etōpa* (we are past it) for the same word is used by them for the setting of the sun and the leaving behind of an Island'.⁸⁸ Banks's linguistic observation here is fascinating, as it offers a glimpse of Tupaia's narrative geography: a geography of 'moving islands',⁸⁹ where not the world but the *pahi* is imaginatively fixed at the centre of a thoroughly dynamic universe. On a set star or sun course target islands may then emerge from the ocean and move toward the traveller, or move away and sink again into the sea when no longer en route. The fact that Tupaia remarked already two days before sighting Rurutu (and the day after they left Ra'iātea) that his desired target sank beyond their arc of landfinding indicates that it was Ra'ivavae, the more remote from Rurutu in the Austral chain.⁹⁰ Yet the strongest evidence that Tupaia was talking about Ra'ivavae is the chart itself.

Let us retrace in detail how Tupaia placed the first two islands in his own hand, on what only from this moment onwards would really become 'his' map. Once he established his *avatea* system, Tupaia must have begun by drawing a new island shape for Rurutu in the upper left quadrant. He thus deliberately chose not to work with the last island the Europeans had sketched for him when setting up the map, which already contained Rurutu. The Rurutu drawn by a European hand presumably remained unnamed on the first draft, but was later labelled T2/3: Oheteroa when Tupaia copied his islands on to a new draft sheet. Drawing Rurutu again, almost diagonally from where the Europeans had previously mapped it, was a statement: it marks the moment of rejection of the European mapping system and the beginning of a new cartographic logic. Tupaia requested that the new shape be labelled Rurutu, thus assigning the island its local ancestral name rather than the Tahitian variant Hiti-roa (long-border) he had so far used in all recorded conversations with Cook and his officers. It is important, here, not to be confused by the name on Georg Forster's copy of the first draft (T1/GF), where the island is labelled o'Rorotoa (Figures 3 and 11). As discussed before, Forster adjusted the spelling of many island names and completely changed two in the copying process. It is vital, therefore, to always check the names on T1/GF against the list of original island names which Georg's father Johann Reinhold Forster recorded in his 'Insularium' (T1/JRF) (Figure 4). From this, we can reconstruct that the actual island name on

⁸⁸ Banks, *Endeavour Journal*, 329.

⁸⁹ Elizabeth DeLoughrey, *Routes and Roots: Navigating Caribbean and Pacific Island Literatures* (Honolulu: University of Hawai'i Press, 2010), 3.

⁹⁰ Pickersgill's diaries support this, too, noting on 15 August that Tupaia spoke of 'one very large [island] lying E 4 Days sail', indicating a sailing distance much more in tune with Ra'ivavae than Tupua'i. Pickersgill, "Journal", 39.

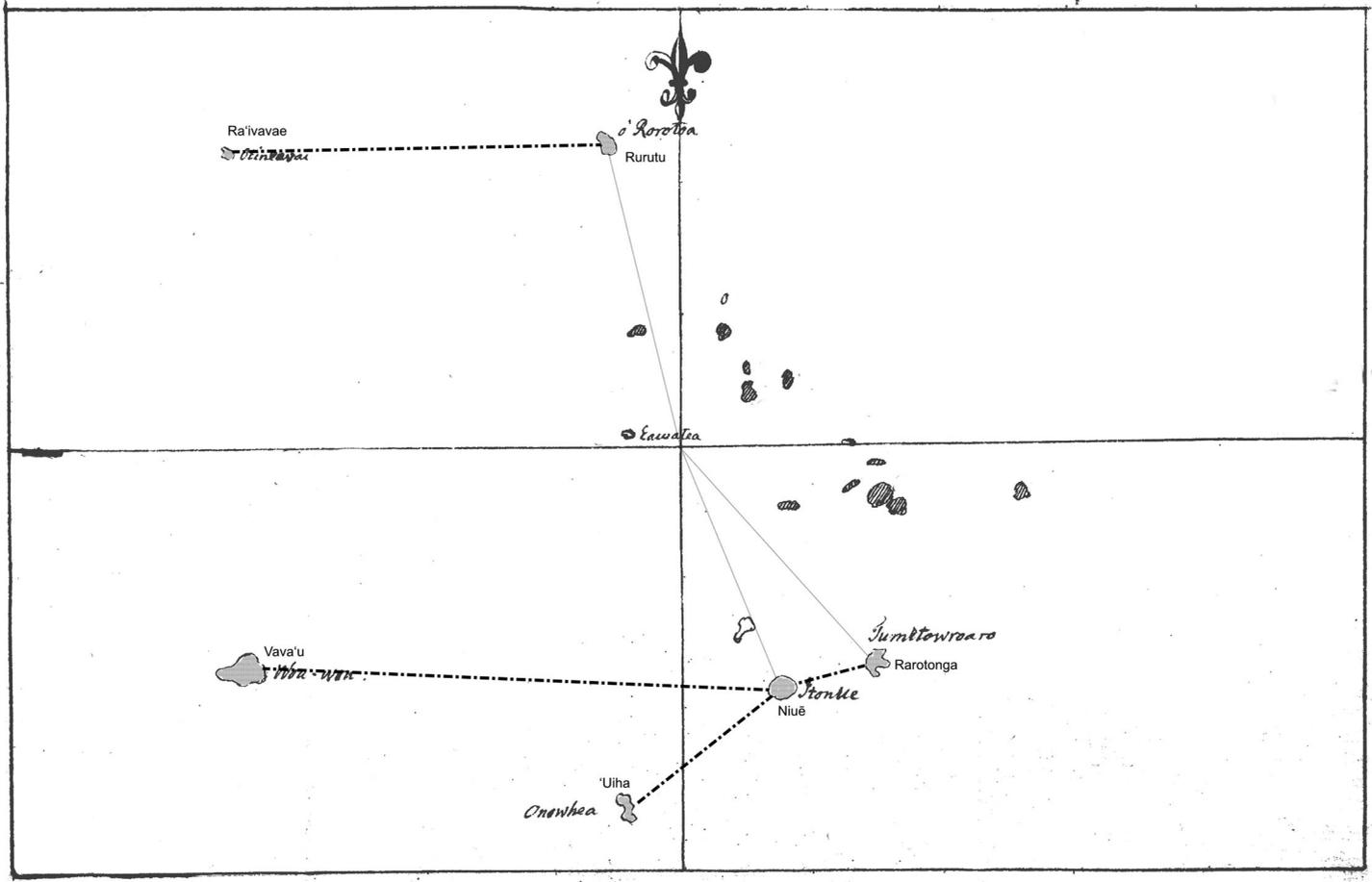


FIGURE 11: Mapping stages 2 and 3 (Rurutu to Ra'ivavae, and Rarotonga to Tonga) as shown on T1/GF.

the first draft was T1: Orwrurutu. For the second and third draft stages the spelling was slightly adjusted to T2/3: Orurutu (Figures 1 and 19).

Once Tupaia had placed T1: Orwrurutu (T2/3: Orurutu) on the map, he must have explained to Cook and his crew how to sail from here to Ra'ivavae. He accordingly drew a second island shape, and requested it to be labelled. Johann Reinhold Forster copied the name T1: Otyneavae into his 'Insularium'. When Tupaia and his European team worked on the second draft, this rather awkward transcription was corrected to a fairly accurate T2/T3: Oryvavai. But much more important than matters of spelling is Tupaia's choice of placing Ra'ivavae, the target island on the voyaging path at stake, in relation to Rurutu, the island of departure. Their relationship on the map provides an excellent case to illustrate the workings of the new cartographic system Tupaia had set in place: he would have invited Cook and the other Europeans around the table of the grand cabin to situate themselves in the island he first drew (Rurutu), placed rather randomly on the chart, and then to draw two imaginary lines – one to the second island he drew (Ra'ivavae), one to the crossing of the two cardinal axes marking a positional north (*avatea*) (Figure 11). The angle between the two measured clockwise from the latter on both T1 and T3 is roughly 110°; and by the logic of Cook's compass, 110° ESE sets an exact course to Ra'ivavae:

Rurutu (T1: Orwrurutu; T2: Orurutu; T3: Orurutu).

Ra'ivavae (T1: Otyneavae; T2/T3: Oryvavai) *avatea* bearings from Rurutu on T1:
 c. 110° ESE; on T3: c. 110° ESE; bearings on a modern Mercator Map (MC)
 c. 110° ESE; distance c. 400 km.

From Rarotonga via Niue to Tonga

As part of the same conversations at Rurutu on 15 August, Tupaia would next have entered another set of four islands, relevant to the section in Cook's diary entry which talks about 'plenty of Islands' to the westward of Rurutu. From the accounts of direction and sailing distance received from Tupaia, Cook speculated that two of them 'must be those discover'd by Captain Wallice and by him call'd Boscawen and Kepple Islands' (Tafahi and Niuatoputapu in northern Tonga).⁹¹ Tupaia's chart suggests that Cook was not too far off, for Tupaia indeed drew two major island groups in the Tongan chain in the lower left quadrant labelled as T1: Owoowou (T2: Ooouow; T3: Oouow) and T1: Ouowhea (T2: Onawhaa; T3: Onowhea). They are Vava'u (some 300 km south of Niuatoputapu) and 'Uiha, south of Vava'u, about halfway to Tongatapu (Figures 11 and 19).⁹²

⁹¹ Cook, in his account of Wallis's 'discovery', was unaware of the fact that these islands had already been visited by the Dutchmen Schouten and Le Maire in 1616 and called Cocos Eylandt and Ver-raders Eylandt, respectively. See Bronwen Douglas, 'Naming Places: Voyagers, Toponyms, and Local Presence in the Fifth Part of the World, 1500–1700', *Journal of Historical Geography* 45 (2014): 12–24.

⁹² See also Dening, 'Geographical', 135.

When setting down a route to Tonga on the chart, Tupaia would have first begun by drawing the outline of Rarotonga in the southern Cooks in the lower right quadrant, as the traditional island of departure. He called it Tumu-te-Varovaro, an old name still in use in the region (T1: Toometouroario; T2: Toometoaroaro; T3: Tometoaroaro).⁹³ From here, he first set a course WNW to Niuē (T1/2/3: Honue), an isolated high target significantly breaking down the long distance to the Tongan chain. Rehearsing Tupaia's new cartographic logic once more, the clockwise angle between two imaginary lines from Rarotonga to *avatea* in the map's centre, and from Rarotonga to Niuē is roughly 295° on both T1 and T3 – a near-perfect match with the true geographic bearings from Rarotonga to Niuē.

From Niuē, Tupaia then continued the course to Vava'u at 295° WNW by his *avatea* system on both T1 and T3, just marking the northernmost outliers of the Vava'u archipelago (Fonualei), and to 'Uiha respectively, at roughly 255° WSW on T1, and 250° WSW on T2, just en route to the southernmost outliers of 'Uiha. What Tupaia presumably outlined on the chart, therefore, constitutes less two distinct routes to Tonga than an arc of landfall extending between 295° WNW and 250° WSW, indicating that any bearing in-between allows for safely hitting the Vava'u-'Uiha screen extending from north to south. When revising the first draft of the chart (T1) and setting up the second (T2), Tupaia relocated the position of Vava'u closer to, and roughly north of 'Uiha. This is the composite route:

Rarotonga (T1: Toometouroario; T2: Toometoaroaro; T3: Tometoaroaro).

Niuē (T1: Honue; T2: Honue; T3: Honue) bearings from Rarotonga on T1:

c. 295° WNW; on T3: c. 295° WNW; on a modern Mercator map (MC)

c. 293° WNW; distance c. 1,050 km.

Vava'u (T1: Owoowou; T2: Ooouow; T3: Oouow) bearings from Niuē on T1:

c. 295° WNW; on T3: c. 295° WNW; MC c. 295° WNW to the northern outliers; distance c. 420 km.

'Uiha (T1: Ouowhea; T2: Onawhaa; T3: Onowhea) bearings from Niuē on T1:

c. 255° WSW; on T3: c. 250° WSW; MC c. 250° WSW to the southern outliers; distance c. 450 km.

To summarize: the first two routes which Tupaia himself entered on to his chart are very likely to have been triggered by the conversations Cook and other members of his crew had with Tupaia on 15 August 1769, before setting a course to the south. They respond directly to Cook's own diary entry of the day. The conversations it recorded in all likelihood motivated the making of the chart in the first place, and ultimately inspired Tupaia to install his own cartographic logic in order to be able to translate his Oceanic wayfinding knowledge into a representational form he expected his European interlocutors might understand. The first two routes to Ra'ivavae and Tonga already testify to two things: not only was Tupaia's geographic knowledge of many Polynesian islands, both near and far from the Society group, extremely exact; but

⁹³ Dening, 'Geographical', 133; W.G. Coppel, 'About the Cook Islands: Their Nomenclature and a Systematic Statement of Early European Contacts', *Journal de la Société des Océanistes* 38:29 (1973): 23–56, 43.

he also managed to translate his embodied and narrative geography with amazing accuracy and precision into the representational model he conceived from scratch. Whether any of the officers and gentlemen around the drawing table really understood what Tupaia meant when he began drawing voyaging routes using his *avatea* system is difficult to tell. Cook's journal entries suggest that he did not fully follow Tupaia's logic, and this also holds true for the surviving logs and manuscript journals of all other Europeans on board. Still, they must have agreed that Tupaia's actions were potentially useful, for they decided to continue the project.

It was at this mapmaking moment that Robert Molyneux, Richard Pickersgill or one of the other officers must have produced a copy of the extensive island list Tupaia had already shared with Molyneux in Tahiti and which he recorded in his log on 13 July 1769 (see [Figure 6](#)).

ENTER ROBERT MOLYNEUX'S LIST OF ISLANDS

Both the first (T1) and the second and third (T2/3) drafts of Tupaia's Map bear traces that strongly support the idea that from this moment of mapmaking onwards, Tupaia and his European collaborators worked their way quite systematically through the list of islands as recorded by Molyneux on leaving Tahiti. When this happened is open to speculation, but we assume that not much time, if any, had lapsed between the drawing of the first two voyaging routes related to the conversations on 15 August at Rurutu, and those which now followed.

Before working step by step through the different sections of Molyneux's list, like Tupaia, Cook and his other collaborators would have done, we shall briefly explain our system for documenting the voyaging paths. Since sequence is paramount to trace the routes both on the charts and in Molyneux's list, we numbered the 57 islands in Molyneux's log in the sequence in which they appear (abbreviated M1–57). When listing the voyaging paths, we always begin with the modern island name. We then provide the number and name in Molyneux's list, the island names on the three different versions of the chart (T1/2/3), and the *avatea* bearings on T1 and T3 from the island of departure. We conclude with the respective true geographical bearings on a modern Mercator map (MC), and the geographic distance. In cases where we cannot identify an island name on the charts on the basis of linguistic evidence, this is marked immediately after the modern island name: (av) denotes that our island identification relies on its *avatea* bearings from (an)other island(s); (s) denotes that identification relies on the position of the island in the sequence of a known voyaging path; (av/s) accordingly indicates that both *avatea* bearings and sequence back up the identification.

The leeward outliers of the Society group

The first set of three islands which Tupaia would have entered on the first draft of the map (T1) after the Rurutu to Ra'ivavae-route and the passage from Rarotonga to

Tonga are the three leeward outliers in the Society group: Manuae, Maupihā'a and Motu One. We assume as much since Molyneux's list (M), headed 'A List of Islands in the South Sea with their situation from Otahite' (Figure 6),⁹⁴ begins with a first section of six, all of which are smaller islands in the Society group. Four were seen from the *Endeavour* during its sojourn though the archipelago and had been already placed on T1 by the Europeans when they set up the chart: M1: Tetiroah (Teti'aroa), M2: Toopbai (Tūpai), M5: Maowroeah (Maupiti) and M6: Tabooamannoo (Maiao). Yet the third and fourth were not yet there: M3: Mobehaa (Maupihā'a) and M4: Whannoeah Aowra (Manuae or Fenua Ura), described in the log as low islands, uninhabited, at '10 days sail from Otahite'. Only the latter can be clearly identified by name on the charts. It is hard to imagine that Tupaia would have drawn and named Manuae only, without also locating Maupihā'a and the third leeward outlier, Motu One (not listed in M). Without reliable linguistic evidence, then, their identification hinges on the question whether islands surrounding Manuae (T1/2/3: Whennuaouda) match their respective bearings.

The true geographical bearings from Manuae to Maupihā'a range between 110° and 120° ESE; to Motu One, between 10° and 20° N. Both find a perfect match on Tupaia's chart. Within the *avatea* system, T1: Opopatea ranges precisely 120° ESE (T3: Opopotea at 110° ESE) from Manuae; Opoopooa is positioned at 10° N on T1, and 20° N on T3. We hold it to be very likely, then, that these are Maupihā'a and Motu One respectively, and that Tupaia used names for these atolls which are no longer widely known. As in all cases where we identify islands based on the logic of bearings and/or sequence only, we sincerely hope that such identifications can be further supported or contradicted in the future by persons who still have access to ancestral tradition and names.⁹⁵ The three Leeward Society outliers on the chart are thus very probably:

- Manuae (M4: Whannoeah Aowra; T1: Whennuaouda; T2: Whennuaouda; T3: Whennuaouda) also Fenua Ura.
- Maupihā'a (av) (M3: Mobehaa; T1: Opopatea; T2: Opopotea; T3: Opopotea) also Mapetia; *avatea* bearings from Manuae on T1 c. 120° ESE; on T3 c. 110° ESE; on a modern Mercator map (MC) c. 115° ESE; distance c. 70 km.
- Motu One (av) (not in M; T1: Opoopooa; T2: Opoopooa; T3: Opoopooa) bearings from Manuae on T1 c. 10° N; on T2 c. 20° N, MC c. 15° N; distance c. 80 km.

⁹⁴ Molyneux, 'Log', 62r.

⁹⁵ T3: Opoopooa has been identified as Pukapuka in the northern Cook Islands by Denig, 'Geographical', 135, who is followed by most researchers of the chart (the voiceless velar stop /k/ of other Polynesian languages does not feature in Tahitian). We hold this identification to be highly unlikely, however, not necessarily because of the very long distance from either the southern Cooks or the Leeward Society Outliers, but rather because we find it impossible to identify a plausible departure island for this identification within the *avatea* system. The Tahitian *pua* signifies 'coral rock' which applies well to Motu One; also note that rather than *pupua* the charts label the island as *pupua*.

The southern Cook Islands

This brings us – presumably replicating the trajectory of Tupaia and his collaborators – to the second section of Molyneux's list, comprising 25 islands and headed:

Islands lying to the SW, west and NW from Otahite, many of them along way from that Island they are all Inhabited many of them as large & some of them much larger than Otahite and abound with the same Provisions and Commodities that that Island does.

The cardinal directions in Molyneux's heading are misleading: the islands listed range from Rotuma in the far west, probably to Rapa Nui far to the eastward of Tahiti.

The central crossroads for a whole set of interconnected voyaging routes along this axis are the southern Cook Islands (Figure 12) and it is with three islands in this group that the second section in Molyneux's list begins: M7: Woaowrea, M8: Owoteeco, and M9: Oohaowahaow. They appear as T1: O-oureo (T2: Oourio; T3: Ooureu), T1: Oatea (T2/3: Oateeu) and T1/T2: Oahooahoo (T3: Oahoo-ahoo) on the chart. The latter two can be clearly identified as 'Ātiu and Mangaia (formerly known as A'ua'u⁹⁶). This leaves the first, an island which by its *avatea* bearings should be N from Mangaia and roughly NE from 'Ātiu. The only island fitting the bill is Miti'āro, the first target within the Nga-Pu-Toru group ('the three roots' consisting of Ma'uke, Miti'āro and 'Ātiu) on a southwestern course from the Society group. The logical departure island for this trip would be the westernmost outlier of the Societies, Manuae (just drawn in the session before). Indeed, the *avatea* bearings are quite accurate: From Manuae to Miti'āro, they are about 200° SSW on T1 and 190° S on T3 respectively, not far off the true geographical bearings of 220° SW. We suggest that the deviation of 20–30° was not a mistake, but factored in the current drift and leeway to the west encountered by navigators in this part of the ocean when voyaging to the south.

There is therefore good evidence to argue that T1: O-ourèo (T2: Oourio; T3: Ooureu) on the chart is Miti'āro and that Tupaia placed it as the first target from the Society Islands, as the gateway to the major islands of Mangaia and 'Ātiu in the southern Cooks. If our reading is correct, Rarotonga had already been placed elsewhere on the map by that time as departure island for the Tongan connection, leaving only one unidentified island in this section of the chart, labelled T1/2: Motehea (T3: Motuheua). Motu-hea (*motu* simply denoting 'island') offers few linguistic clues; yet given that the only logical departure island on the chart is Miti'āro, the two likely candidates are either Manuae (in the southern Cooks, not to be confused with the Society outlier) or Aitutaki, both situated at 300° NW from Miti'āro – a close match to the roughly 310° NW shown on both T1 and T3. The islands in the southern Cooks presumably drawn in this session are:

⁹⁶ Alphons M.J. Kloosterman, *Discoverers of the Cook Islands and the Names They Gave* (Rarotonga: Cook Islands Library and Museum, 1976), 16–19.

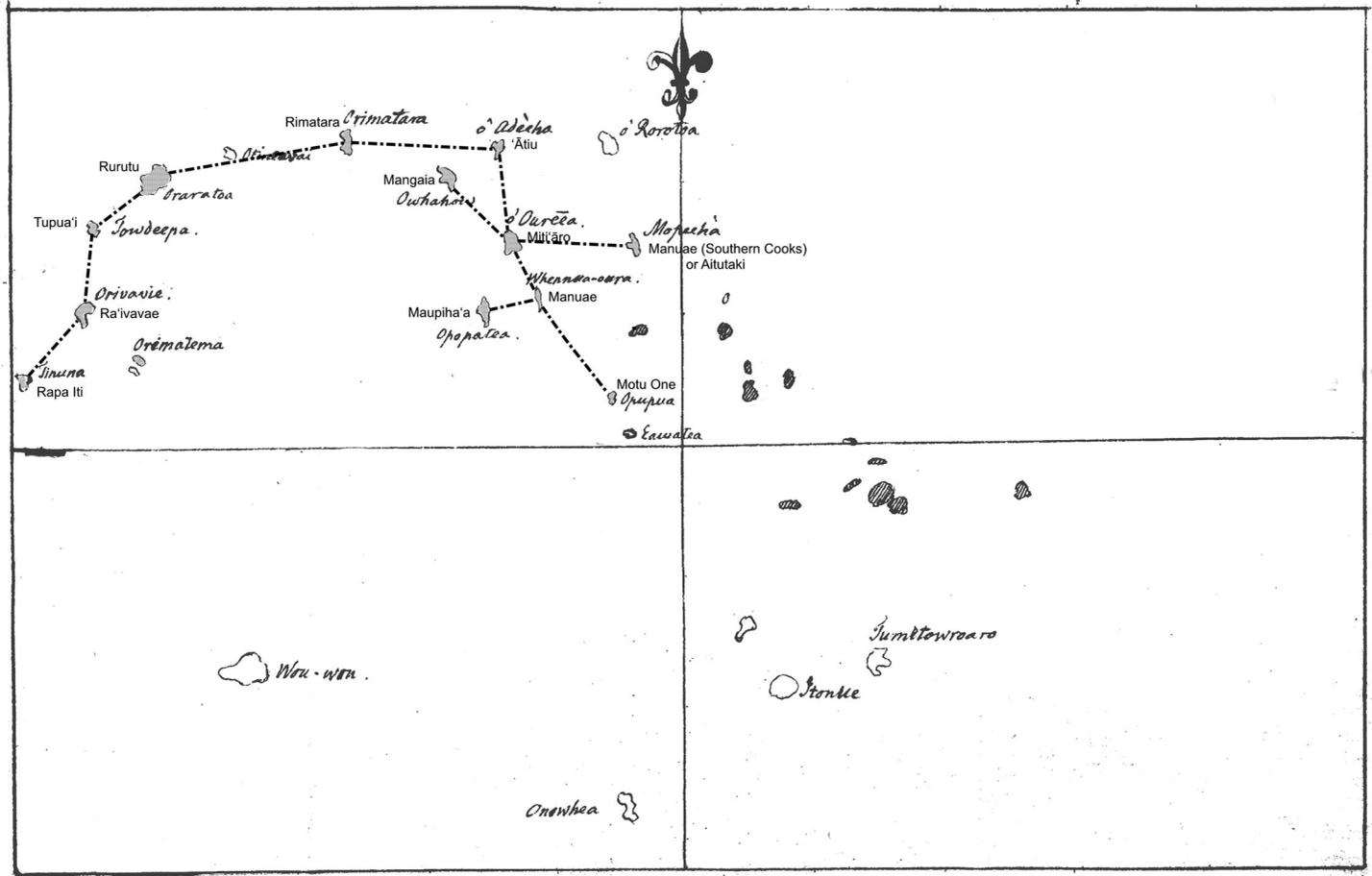


FIGURE 12: Mapping stages 4, 5 and 6 (the Leeward Outliers of the Society group, southern Cook Islands, and the Austral group) as shown on T1/GF.

- Miti'āro (av) (M7: Woaowrea; T1: O-oureo; T2: Oourio; T3: Ooureu) bearings from Manuae on T1: c. 200° SSW; on T3: c. 190° S; MC: c. 220° SW; distance c. 490 km (deviation may account for leeway and drift to the west).
- Ātiu (M8: Owoteceo; T1: Oatea; T2: Oateeu; T3: Oateeu) bearings from Miti'āro on T1 and T3: c. 220° SW; MC c. 250° WSW; distance c. 40 km.
- Mangaia (M9: Oahaowahaow; T1: Oahooahoo; T2: Oahooahoo; T3: Oahooahoo) bearings from Miti'āro on T1: c. 170° S; on T3 c. B c. 150° SSE; MC c. 185° S; distance c. 220 km (deviation may account for leeway and drift to the west).
- Manuae (southern Cooks) or Aitutaki (av) (not in M; T1: Motehea; T2: Motehea; T3: Motuheā) bearings from Miti'āro on T1 and T3 c. 310° NW; MC c. 300° NW; distance c. 160 km (Manuae) / 240 km (Aitutaki).

From the southern Cooks to the Austral Islands

From here, Tupaia and his team resumed working their way through Molyneux's list which continues to the Austral Islands (Figure 12). Of the following four islands in the list (M10: Oreematarra; M11: Toawtepa; M12: Whoraivewai; M13: Tainoonna), two, Rimatarā and Ra'ivavae, can be clearly identified as major targets in the Austral chain.⁹⁷ It needs to be remembered in this context that, by this stage, two Austral Islands had already found their way on to the chart, presumably the first that Tupaia drew himself, to mark the bearings for a course from Rurutu to Ra'ivavae. In this new session, Tupaia set out to detail the larger route of which the Rurutu to Ra'ivavae leg forms part. It is for this reason also that Rurutu and Ra'ivavae appear twice on the chart (Rurutu, in fact, occurs three times, counting the Rurutu pre-drafted by the Europeans and later labelled Oheteroa on T2). Within Tupaia's narrative geography, such doublings were perfectly normal: the same islands are bound to reappear in a range of voyaging chants detailing ancestral routes through the sea of islands. It is only within the singular representational model of a (Western) chart that they appear illogical. It is vital, therefore, to read Tupaia's Map not as a singular spatial arrangement, but as a sequential narrative of different voyaging routes ultimately creating a visual palimpsest, united only by their joint reference to *avateā* in the centre of the chart.

The first draft (T1) indicates that Tupaia first experimented with Mangaia as island of departure for a route to the Australs, placing Rimatarā (T1: Oreematarra) at a perfect 110° ESE from there. However, he then decided to start again. This Rimatarā was accordingly not transposed to the second draft (T2). Instead, he must have settled on Ātiu as point of departure in a second attempt, placing Rimatarā anew at 125° SE (T1 and T2) from there (the true bearings are at 120°; from Ma'uake, a logical first stop, they are near-perfect). From there, the route clearly continues via T1/2/3: Rarathoa and T1: Towtepa (T2/3: Toutepa) to T1/2/3: Orivavie and T1/2/3: Tinuna.

⁹⁷ Denning, 'Geographical', 135–6.

The island identifications are relatively straightforward: Raratoa is an old name for Rurutu,⁹⁸ and the logical target in sequence from Rimatara; the bearings, however, are off by some 30° (T3) to 40° (T1). Halfway between Rurutu and Ra'ivavae is Tupua'i, the only logical identification for T1: Towtepa (T2/3: Toutepa), even without supporting linguistic evidence. While the *avatea* bearings to Tupua'i are fine on T1 and T3, they are again quite discrepant from Tupua'i to Ra'ivavae (by 25° on T1 and 40° on T3, respectively). However, it could be argued in this case that Tupaia allowed himself some sloppiness because he had already set a precise course from Rurutu to Ra'ivavae (implicitly via Tupua'i). The last target en route, labelled T1/2/3: Tinuna, is highly likely to be Rapa Iti. We lack linguistic evidence, but the *avatea* bearings at 120° SE on T1, corrected to 140° SE on T2, are perfect for a voyage from Ra'ivavae to Rapa. The new Austral route in its entirety is:

Rimatara (M10: Oreematarra; T1: Olematerra; not in Cook's list?; T3: Olematerra) bearings from 'Ātiu on T1 and T3: 125° SE; MC c. 120° E; distance c. 620 km (Nororotu en route after c. 400 km).

Rurutu (not in M; T1: Orarathoa; T2: Orarathoa; T3: Orarathoa) bearings from Rimatara on T1: 125° SE; on T3 c. 115° ESE; MC c. 85° E; distance c. 145 km.

Tupua'i (av/s) (M11: Toawtepa; T1: Towtepa; T2: Toutepa; T3: Toutepa) bearings from Rurutu on T1: c. 120° SE; on T3 c. 100° E; MC c. 112° ESE; distance c. 200 km.

Ra'ivavae (M12: Whoraivewai; T1: Orivavie; T2: Orivavie; T3: Orivavie) bearings from Tupua'i on T1: c. 80° E; T3 c. 65° NE; MC c. 105° ESE; distance c. 180 km.

Rapa Iti (av/s) (M13: Tainoonna; T1: Tinuna; T2: Tinuna; T3: Tinuna) bearings from Ra'ivavae on T1: c. 120° SE; on T3: c. 140° SE; MC c. 136° SE; distance c. 600 km.

We should point out the sheer aesthetics of the elegant arch Tupaia produced for the composite route from the Leeward Society outliers all the way to Rapa (especially in the revised version of T2/3; see [Figure 19](#)). The arch is a consequence of the persistent re-orientation towards *avatea* from island to island in the map's centre, whereas in the representational model of a Western Mercator projection, the course reveals a fairly linear progression to the ESE from 'Ātiu onward (see [Figure 20](#)).

From Rotuma to Samoa (direct, and via Futuna and the Niua group)

The next island in Molyneux's list is M14: Owratoomoo (T1/2/3: Orotuma). This is without a doubt Rotuma,⁹⁹ more than 4,000 km to the west of where the previous route through the Austral Islands set off. It clearly starts a new path in the list, which leads to Samoa: to Savai'i (M15: Ohiawai) and 'Upolu (M16: Owporrow)

⁹⁸ Johann Reinhold Forster mused, after discussing the chart with three chiefs in Ra'iātea in September 1773: 'Ururutu ... I believe is the same as Rorotoa'. Hoare, *Resolution Journal*, 160. J.R. Forster, 'Journal', 132.

⁹⁹ Dening, 'Geographical', 135.

(Figure 13). Interestingly, the first draft (T1) has two Rotumas. Despite its geographical distance from the previous route, Tupaia must have first entered Rotuma just beyond Ra'ivavae and Rapa, the last two islands he drew (underscoring that what matters alone in Tupaia's system is the relational position of islands on voyaging paths, while proximity between islands on different routes is irrelevant). Tupaia must have then decided to shift the position of Rotuma, either to disambiguate the beginning of a new route, or because he thought he needed more space to outline an extended eastward voyage. And so he drew Rotuma again, in the upper left quadrant. On the second and third drafts (T2/3), this doubling is cleaned up, and Rotuma only appears in its corrected position.

On the first draft (T1), Tupaia certainly began by drawing the route that is also set down in Molyneux's list, from Rotuma to Savai'i (T1: Ohiavie; T2/3: Oheavie) and 'Upolu (T1: Opuro; T2/3: Opooroo). The bearings for the long voyage to the east are quite accurate (about 95° E), if difficult to precisely establish on the chart as the outlines of both Rotuma and Savai'i are very large. 'Upolu ranges more S than ESE from Savai'i on T1, but this matters little as they are in clear sight of each other. Instead, of greater navigational import, is that Tupaia decided to add one of Rotuma's near outliers, positioned west of the island in the *avatea* system; this is Uea (T1/2/3: Oweha), which at first glance seems far too insignificant and close to Rotuma to merit an independent representation. However, as David Lewis remarked, it was of primary importance for navigational purposes:

Rotuma is 840 feet high and also includes in its group a smaller island [Uea], 860 feet high, situated six miles farther to the west. The two summits would be visible in favorable conditions from 40 miles away to the east or west, and 35 miles away from the north or south.¹⁰⁰

Tupaia must therefore have added Uea to facilitate landfinding on a long westward course from Samoa aiming at a fairly small target very easy to miss. This underscores two things: first, that Tupaia's Map is very likely grounded on continued, practical navigation throughout the sea of islands rather than mere memories of long-ago mythical voyages; and second, that Tupaia appears to have discussed the specific practicalities and challenges of wayfinding with Cook and his crew whilst setting down the paths on the chart.

It is precisely reflecting upon the practicalities of wayfinding in the sea of islands that would have motivated Tupaia to pause before continuing with the subsequent islands in Molyneux's list, and to first enter a second route from Rotuma to Samoa (Figures 13 and 14). While knowledge of the summit of Uea in the Rotuma archipelago was paramount for westward voyages, the voyage east from Rotuma to Samoa would have posed even greater challenges. First, because the journey is upwind for most of the year, and even during a short period in the southern summer when westerlies or otherlies were likely, the winds would have been much

¹⁰⁰ Lewis, *Navigators*, 274.

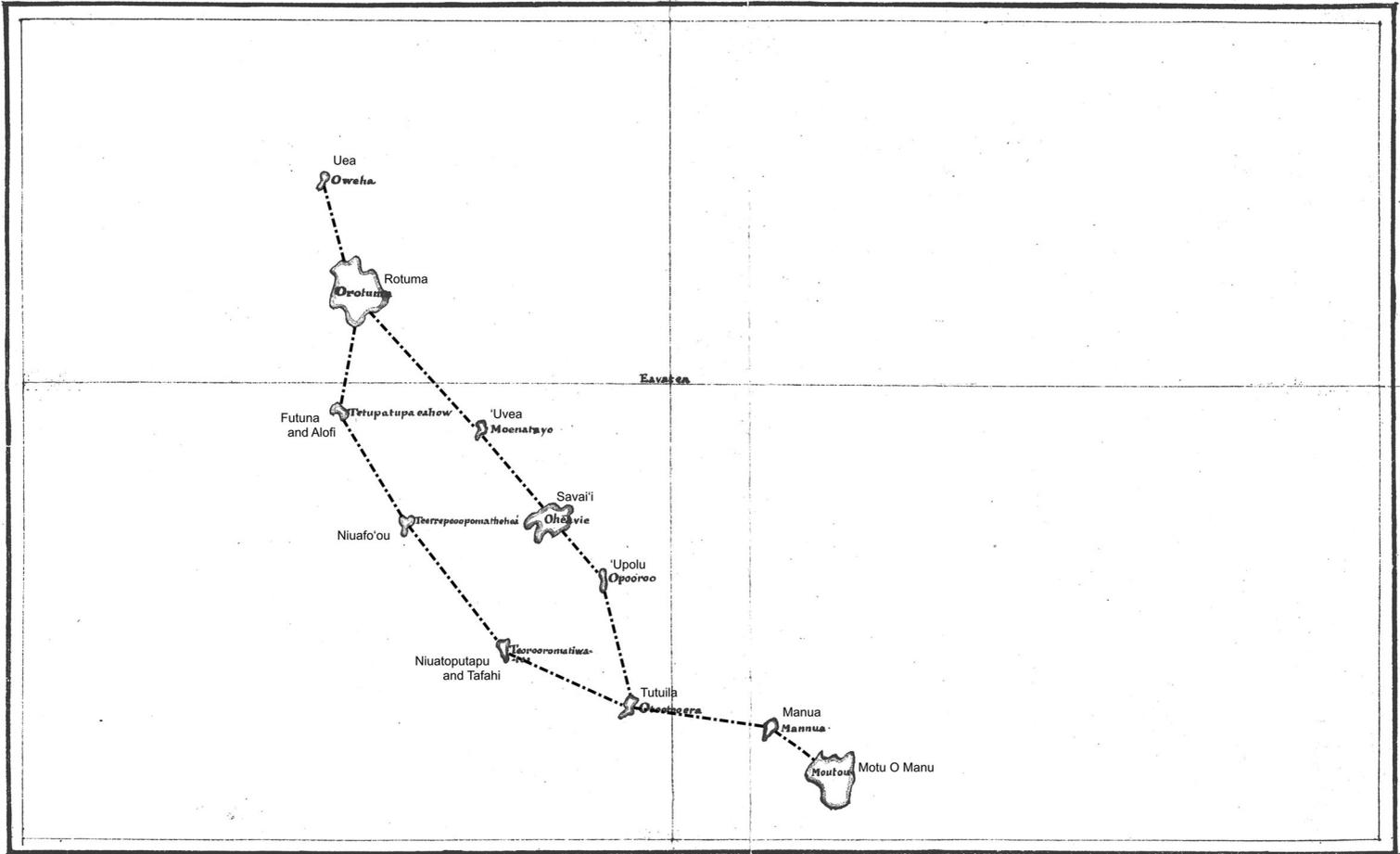


FIGURE 14: Corrected voyaging paths from Rotuma to Samoa as shown on T3/B.

less constant. Second, the Samoan chain is aligned roughly from east to west, and thus forms a quite small target for the navigator approaching on a straight eastern course. It would have been very attractive, therefore, to break down the distances against the prevailing winds into shorter legs and to aim at the Samoan chain from an angle. We argue that it is for these purposes that Tupaia detailed a new path (not in Molyneux's list) from Rotuma to Samoa via Futuna and the Niua group to Tutuila (the third major Samoan island beyond Savai'i and 'Upolu), and continuing from there to Manua and Motu O Manu in eastern Samoa.

The suggested route is clearly discernible, both on the first (T1) and the second and third drafts (T2/3). Only the latter three islands in the Samoan chain, however, can be identified on linguistic grounds alone. The fourth stop on the route from Rotuma is clearly Tutuila (T1/2/3: Ootootoera), followed by Manua (T1/2/3: Mannua), ranging at a perfect 90° E, and the easternmost island in the Samoan chain, the small atoll of Motu O Manu (T1/2/3: Moutou), at about 130° SE from Manua on T1 and T3 and thus about 30° off to the south. We can only speculate why Tupaia chose to draw Motu O Manu so large given its tiny geographical size. There is one hint in Molyneux's list, though, where the path from Manua to Motu O Manu is oddly interspersed into a completely different context (a longer sequence in the Tuāmotuan islands in the fourth and last section). It is set down as M46: Mannoa, M47: Ootoomobapa and M48: Omaowtaow. The second term in this sequence, *tumu-papa*, is unlikely in fact to be a name of an island, but seems to be a qualifier for Motu O Manu. Anne Salmond inferred that it refers to 'the sexual union of Tumu and Papa',¹⁰¹ and thus to a key cosmic event in Society Islander creation myths and genealogies. If Tupaia indeed located this event in Motu O Manu, this would explain its size correlating to its mythical and historical importance.

None of the first three stops en route from Rotuma to Tutuila – that is T1: Tetupatupaeahow (T2: Tetupatunaeohew; T3: Tetupatupa eahow), T1: Teeriepoo-opomatthehea (T2: Pooreomatthehea; T3: Teerrepoopomatthehea) and T1: Teorooro-matwatea (T2: Teorooromatiwhatea; T3: Teorooromatiwatea) – can be identified by their names. However, quite strong evidence suggests that these names refer to Futuna and Alofi, Niuafo'ou, and Niuatoputapu and/or Tafahi respectively. Our argument again relies on the joint logic of sequence and, if less precise in this section of the chart, *avatea* bearings. Rotuma – Futuna and Alofi – Niuafo'ou – Niuatoputapu/Tafahi are set on a fairly straight star and sun course which, in Western terms, ranges at about 110° to the ESE. This correlates only roughly with the respective bearings for island-to-island travel as set down on the chart, ranging between 70° and 90° E rather than ESE, and suggesting that Tupaia might have drawn on tradition in this segment rather than experience. Still, the three islands in question clearly appear on a sequential path from Rotuma to Tutuila on the chart, breaking down distances at a slightly more favourable angle to the trade winds. Moreover, voyaging this route to the Niua group massively expanded the target of the Samoan chain, now ranging NE and impossible to miss. The respective *avatea* bearings

¹⁰¹ Salmond, 'Navigators', 44.

from Tafahi to Tutuila on the chart are 65° NE on T1 (80° ENE on T3) and thus well on target.

The most conclusive corroboration of the identifications on this route, however, is the way in which Tupaia chose to transpose the Samoan islands of Savai'i and 'Upolu from the first draft (T1) to the second (T2). On T3, Savai'i and 'Upolu have been shifted considerably to the right, most probably to effect two things. First, Tupaia made it clear that the indirect route from Rotuma to Tutuila via Futuna and the Niua group ranges south from the Samoan chain. Second, by transposing Savai'i and 'Upolu he also reunited the Samoan chain, indicating a connection between 'Upolu and Tutuila. This, finally, also suggests a solution to the mystery of T1: Moenotayo (T2: Mooenotayo; T3: Moenatayo), the only island still unidentified in this section of the chart. On T3, it is now just en route between Rotuma and Savai'i, on a course which continues via 'Upolu and Tutuila to Manua and Motu O Manu. We hold it very likely that this is 'Uvea (Wallis Island).

These are the composite routes from Rotuma to Samoa, both direct via 'Uvea, and indirect, via Futuna and the Niua group (see [Figures 13](#) and [14](#)). From Rotuma to Samoa direct [with 'Uvea and Tutuila in sequence only on T3]:

Uea (not in M; T1: Oweha; T2: Oweha; T3: Oweha) c. 10 km W of Rotuma.

Rotuma (M14: Owratoomoo; T1: Orotuma; T2: Orotuma; T3: Orotuma).

['Uvea (av/s) (not in M; T1: Moenotayo; T2: Mooenotayo; T3: Moenatayo) bearings from Rotuma on T3 only: c. 35° NNE; MC: 95° E; distance c. 720 km (bearings to 'Uvea are much more precise, for example from Niuafo'ou)].

Savai'i (M15: Ohiawai; T1: Ohiavie; T2: Oheavie; T3: Oheavie) bearings from Rotuma on T1 c. 90° E; MC c. 95° E; distance c. 1,100 km; bearings from 'Uvea on T3 c. 70° ESE; MC c. 95° E; distance c. 370 km.

'Upolu (M16: Owporrow; T1: Opuro; T2: Opooroo; T3: Opooroo) c. 20 km E of Savai'i (in sight).

[Tutuila (not in M; P: Otootooera; C: Otootooera; B: Otootooera) bearings from 'Upolu on T3 only c. 145° SE; MC c. 110° SE; distance c. 70 km].

The route continues to Manua and Motu O Manu as below [on T3 only].

From Rotuma to Samoa via Futuna and the Niua group:

Uea (not in M; T1: Oweha; T2: Oweha; T3: Oweha) c. 10 km W of Rotuma.

Rotuma (M14: Owratoomoo; T1: Orotuma; T2: Orotuma; T3: Orotuma).

Futuna and Alofi (av/s) (M 28: Teetooopetooereiva ohaow; T1: Tetupatupaeahow; T2: Tetupatunaeohew; T3: Tetupatupa eahow) bearings from Rotuma on T1: c. 90° E; on T3 c. 95° E; MC c. 110° SE; distance c. 550 km.

Niuafo'ou (av/s) (not in M; T1: Teeriepoo-opomatthehea; T2: Pooreomatthehea; T3: Teerrepoopomatthehea) bearings from Futuna on T1: c. 80° E; on T3: c. 65° ENE; MC c. 120° ESE; distance c. 300 km (bearings are much more precise, for example from Savai'i on T3).

Niatoputapu and Tafahi (av/s) (not in M; T1: Teorooro-matwatea; T2: Teorooromatiwatea; T3: Teorooromatiwatea) bearings from Niuafo'ou on T1: c. 60°; on T3 c. 80° E; MC c. 90° E to Tafahi; distance c. 200 km.

Tutuila (not in M; T1: Otootooera; T2: Otootooera; T2: Otootooera) bearings from Tafahi on T1: c. 65° NE; on T2: c. 80° ENE; MC c. 65° NE; distance c. 350 km.

Manua (M46: Manno; T1: Mannua; T2: Mannua; T3: Mannua) bearings from Tutuila on T1 c. 90° E; on T3: c. 90° E; MC c. 90° E; distance c. 100 km.

Motu O Manu (M48: Omaowtaow; T1: Moutou; T2: Moutou; T3: Moutou) bearings from Mannua on T1: c. 130° SE; on T3: c. 130° SE; MC c. 105° ESE; distance c. 140 km.

Only once he had accomplished drawing both routes from Rotuma to the Samoan chain, would Tupaia and his team have returned again to Molyneux's list. At this stage, however, Tupaia must have decided to skip two segments. The first segment of three islands (M17: Oawaow; M18: Opoetai and M19: Orarrotoa) marks a path from Vava'u in Tonga, presumably via Niuē (M18?) to Rarotonga in the southern Cook Islands. If our reading of the mapping process is correct, this route had already been entered at an earlier mapping stage (see [Figure 11](#)). Nevertheless, Molyneux's sequence is important here, as it clearly indicates that the routes from Rotuma to Samoa and the connection from Vava'u to the southern Cook Islands were part of one composite, longer voyaging path. Even if the charts do not clearly indicate this, Niuatoputapu and Tafahi would thus not only have served as key stopovers from Rotuma to Samoa, but also as turnoff to the Tongan chain in the south.

It is this Tongan chain which is likely to form a sequence in the second segment of five islands in Molyneux's list (M20: Oweehaa; M21: Opatea; M22: Oneewarroat; M23: Neewapotta; M24: Otoanooe). Only the first and the last can be clearly identified as 'Uiha and Tongatapu (*O-to'a-nui*, it is the great land of Tonga / the south), which makes the middle three likely candidates for Tongan islands between 'Uiha and Tongatapu. 'Uiha, we presume, had already been entered at an earlier stage. Why Tupaia then refrained from adding Tongatapu, especially, is open for debate. He might simply have preferred not to, just as he did not set down other islands and archipelagos which he knew, among them no doubt the Fijian Islands, which were possibly beyond his ultimately genealogical interest in the region based on 'kin-based replication'.¹⁰² But the reasons might also have been more prosaic, as there simply was not much space left on the first draft sheet to enter four more islands south of 'Uiha.

From Mangareva to Pitcairn and Rapa Nui

The next three islands in Molyneux's list set Tupaia back on track. But let us pause for a moment to consider what he had achieved thus far. He had built up, step by step, a composite voyaging route of several segments which extends all the way from Rotuma in the west to Rapa Iti in the Austral group in the east, via Samoa, Tonga, the southern Cook Islands and the Austral chain. This, however, is not where Tupaia's knowledge of the eastern extension of Polynesian voyaging ended, for the next segment in Molyneux's list stretches to the Pitcairn group ([Figure 15](#)).

¹⁰² Turnbull, 'Trails', 81.

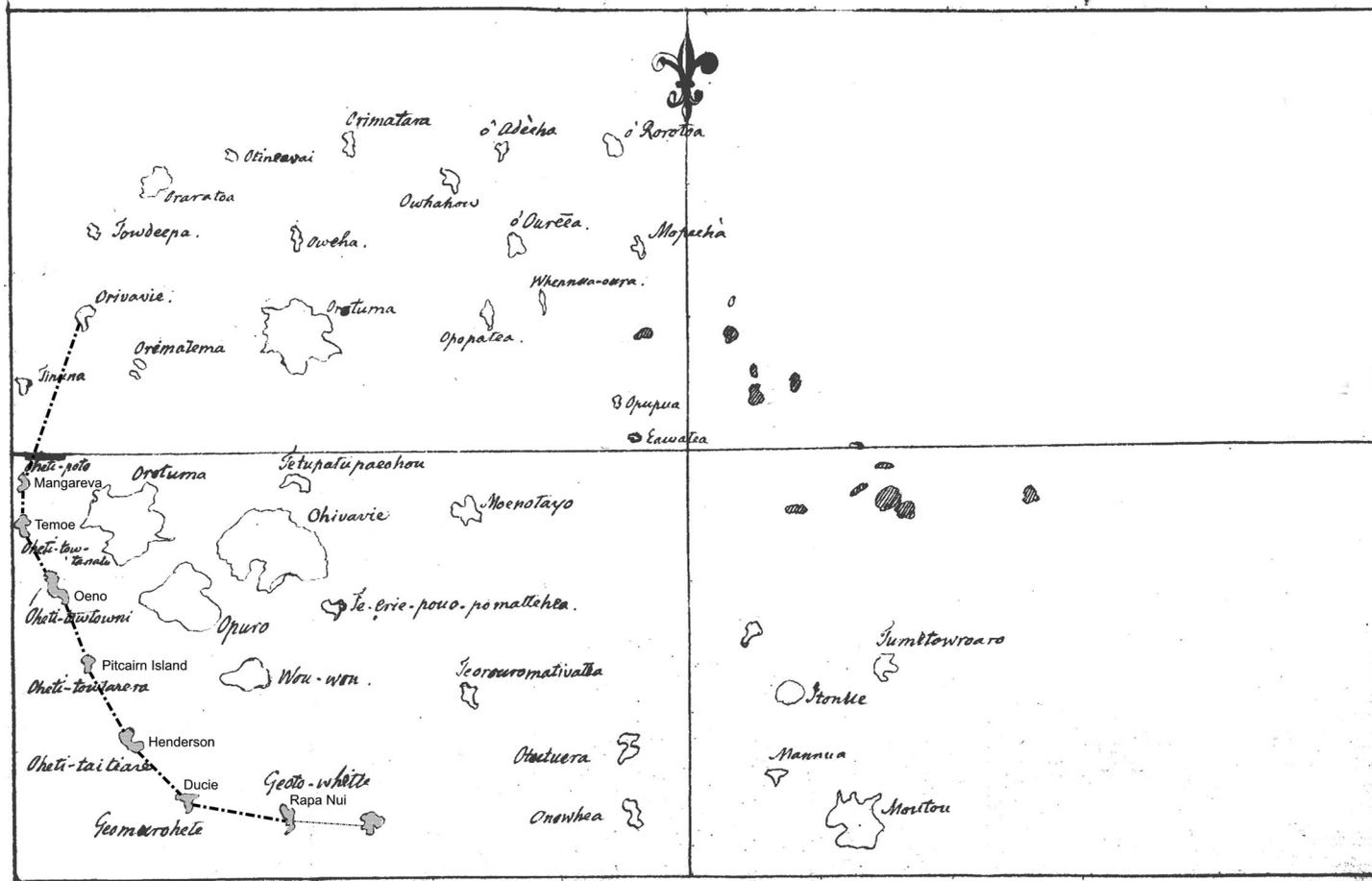


FIGURE 15: Mapping stage 9 (Mangareva to the Pitcairn group and Rapa Nui) as shown on T1/GF.

Molyneux's list features a sequence of three islands in this context (M25: Heeteetai t'erriva; M26: Heeteetai't'erre; M27: Teamoahitte), the first of which can be clearly identified as Pitcairn Island.¹⁰³ On Tupaia's Map, however, Pitcairn Island (T1: Oheti-towtarera; T2: Ohetetareva; T3: Ohetetoutoueva) appears in the centre of a much longer route, consisting of a total of seven named islands. Extending east by the *avatea* logic are the subsequent two (M26 and M27) in Molyneux, followed by a third island not in the list. The three islands ranging west of Pitcairn are also not part of Molyneux's list. However, the first two at least can be clearly identified as Mangareva (T1: Oheti-poto; T2/3: Ohetepoto) and Temoe (T1: Oheti-towtanatu; T2: Ohetituetenatu; T3: Ohetitoutou-atu) in the Gambier group.¹⁰⁴ The source of identification in this context is the legend of the ancestral voyager Rātā, as recorded by Teuira Henry in *Ancient Tahiti*. The legend comes in various guises and forms.¹⁰⁵ Yet its Tahitian variant treats subsequent voyages across three generations between Tahiti and Pitcairn, full of adventures and calamities. What matters most in this context is that Rātā and his family before him steer their *pahi* on a set eastward voyaging sequence connecting 'Hiti-tautua-mai, Hiti-poto, Hiti-tautau-atu, and Hiti-au-revareva [Hiti-au-rereva] that rises to the sky' – islands Henry identifies as Moruroa, Mangareva, Temoe and Pitcairn.¹⁰⁶

It is clear, then, that at this stage of mapmaking Tupaia entered a voyaging route from Mangareva, a major high island just beyond the southern atolls of the Tuāmotu group, to Pitcairn Island, also high, and the major target in the Pitcairn group. The location of the path on the maps suggests that it connects with the eastward route through the Austral chain, and indeed, the *avatea* bearings from Ra'ivavae on a continued course to Mangareva are very good.

One problem remains when setting Henry's identifications of the stations of the Rātā myth against the sequence of the chart, for here the route commences at Mangareva (T1: Oheti-poto; T2/3: Ohetepoto) and leads on to Pitcairn Island with two stops, the first of which is Temoe (T1: Oheti-towtanatu; T2: Ohetituetenatu; T3: Ohetitoutou-atu). The second stop on the map is labelled T1: Oheti-towtouni (T2/3: Ohetetoutou-mi), which Henry identifies as Moruroa, a Tuāmotuan island WNW from Mangareva (and thus in the opposite direction). We regard it as very likely that Tupaia's T1: Oheti-towtouni (T2/3: Ohetetoutou-mi) is not Moruroa, but Oeno, the western outlier of the Pitcairn group and the only logical target en route to Pitcairn Island. It is possible in fact that the name was in use for both Moruroa and Oeno, since Tahitian *hiti-toutou-mai* simply signifies something like 'the border floating or leaning toward' (the Society Islands). This holds true for Moruroa as seen from Mangareva as much as for Oeno as seen from Pitcairn.

There are two more islands in the Pitcairn group, both due east of Pitcairn Island, and their position in the sequence suggests that T1: Oheti-taitiare (M26; T2: Ohetetaetare; T3: Oheteitare) and T1: Toomoorohete (M27; T2:

¹⁰³ See Henry, *Ancient*, 447; Beaglehole in Cook, *Journals*, 293 n. 1; Denning, 'Geographical', 134.

¹⁰⁴ See Henry, *Ancient*, 447; Beaglehole in Cook, *Journals*, 293 n. 1.

¹⁰⁵ See Henry, *Ancient*, 468–94; Dunis, 'Bathymétrie'.

¹⁰⁶ Henry, *Ancient*, 477.

Tiamoorohete; T3: Teamoorohete) on Tupaia's Map are Henderson and Ducie. Their Polynesian names have not survived and the identification therefore relies entirely on Tupaia's logic of routes and bearings. That they would have been within Tupaia's horizon of navigation is backed up by archaeological evidence suggesting that both islands were once included in an extensive Polynesian trading network hinged on Mangareva and extending to the Austral and Society Islands.¹⁰⁷

This leaves the seventh and final island in this sequence as the ultimate destination of an eastward route from the Gambiers through the Pitcairn group: T1: Geotowhete (T2: Teatowhite; T3: Teatowhete) (on T1, where the route is even more evident, there is still an unnamed island beyond, not transposed on to the second draft).¹⁰⁸ As far as we can see, there is only one plausible identification: Rapa Nui, since there is no other significant island between Ducie and the South American continent. Admittedly, though, the *avatea* bearings to Rapa Nui, pointing NE instead of E, are more than 50° from the true geographical bearings. This may again have more a prosaic reason, as Tupaia ran short of space on the bottom left of his chart. But it also suggests that beyond the Pitcairn group, Tupaia's knowledge of the eastern seas relied more on tradition than on active voyaging knowledge. This is the extended route in its entirety:

Mangareva (not in M; T1: Oheti-poto; T2: Ohetepoto; T3: Ohetepoto) bearings from Ra'ivavae on T1: c. 95° NE; on T3: c. 90° E; MC c. 88° E; distance c. 1,300 km.

Temoe (not in M; T1: Oheti-towtanatu; T2: Ohetituetenatu; T3: Ohetitoutou-atu) bearings from Mangareva on T1 and T3 c. 90° E; MC c. 105° ESE; distance c. 45 km.

Oeno (av/s) (not in M; T1: Oheti-towtouni; T2: Ohetetoutou-mi; T3: Ohetetoutou-mi) bearings from Temoe on T1: c. 70° ENE; on T3: c. 80° E; MC c. 102° ESE; distance c. 380 km.

Pitcairn Island (M25: Heeteetai t'erriva; T1: Oheti-towtarera; T2: Ohetetareva; T3: Ohetetoutoureva) bearings from Oeno on T1: c. 80° E; on T3 c. 100° ESE; MC c. 150° SSE; distance c. 140 km.

Henderson (av/s) (M26: Heeteetai t'erre; T1: Oheti-taitiare; T2: Ohetetaeteare; T3: Oheteiteare) bearings from Pitcairn Island on T1: c. 80° E; on T3 c. 100° ESE; MC c. 68° ENE; distance c. 195 km.

Ducie (av/s) (M27: Teamoahitte; T1: Toomoorohete; T2: Tiamoorohete; T3: Teamoorohete) bearings from Henderson on T1: c. 80° E; on T3 c. 85° E; MC c. 99° E; distance c. 350 km.

¹⁰⁷ Marshall I. Weisler, 'Centrality and the Collapse of Long-distance Voyaging in East Polynesia', in *Geochemical Evidence for Long-Distance Exchange*, ed. Michael Glascock (London: Bergin and Garvey, 2002), 257–73.

¹⁰⁸ There is indeed a small rocky island a little less than 400 km ENE of Rapa Nui, namely Motu Motiro Hiva (Isla Sala y Gómez). However, we would not with any confidence propose this identification for the last unnamed island en route on T1. Yet another vague possibility could be a reference to (a section of) the South American mainland.

Rapa Nui (s) (not in M; T1: Geotowhete; T2: Teatowhite; T3: Teatowhete) bearings from Ducie on T1: c. 45° NE; on T3: c. 40° NE; MC 100° ESE; distance c. 1,900 km.

The Marquesas group

After the sequence in the Pitcairn Islands, only four more islands remain in the second section of Molyneux's list. The first two we believe had already been entered on the chart at this stage: those identified as Futuna and Alofi (M28: Tee-toopetooopereiva ohaow) and Rarotonga (M29: Toomootoorearo). For the remaining two islands in the section, M30: Heeteetoomaro eiru and M31: Tirreetaotapatanu, we have not found linguistic evidence to facilitate identification. However, we shall argue that they finally take us to the (northern) Marquesas. M31: Tirreetaotapatanu, which we assume to be 'Ua Huka, does not correspond with any name on the chart, and yet M30: Heeteetoomaro eiru clearly does, as T1: Ohititamaruirā (T2: Ohetimaruire; T3: Ohete maruiru). We are confident that this is Nuku Hiva (Figure 16).¹⁰⁹

Our identification of Nuku Hiva primarily relies on identification of the three surrounding island names which (together with a big island in the upper left corner of the chart named T1/T2/T3: Oahourou) are the only ones still missing from the first draft of Tupaia's Map (T1) at this stage. They are T1/3: Oirotah (T2: Ohirota); T1: Ouropoi (T2/3: Ouropoe) and T1: Tennewhammeatane (T2: Tennenhammeatane; T3: Tennewhammeatane). They all form part of another sequence in Molyneux's list, consisting of the last six islands in the fourth and last section. Let us then jump, just as Tupaia and his European collaborators would have done at this stage, to this set.

¹⁰⁹ Why these four islands appear in sequence in Molyneux's list is difficult to tell. One way of making sense of this, however, is to consider that it again builds on the travels of an important ancestral voyager, just as the previous sequence we discussed had drawn on Rātā. The likely candidate here is Hono'ura (or Onokura in the Cook Islander tradition), an ancestor with strong genealogical ties to the *arioi* of the Society Islands, whose exploits would have loomed large in Tupaia's education at Taputapuātea *marae*. See Henry, *Ancient*, 516–39; Dunis, 'Bathymétrie'. It will have to suffice, here, that especially the Cook Islander versions suggest that the giant hero migrated from Tonga to the Southern Cook Islands. W. Wyatt Gill, *Myths and Songs from the South Pacific* (London: Henry S. King, 1876), 84. In Tuāmotuan records of his adventures, he later travelled with a Tahitian campaign against a Marquesan clan, via Ra'īātea and the Tuāmotus to 'Ua Huka and 'Ua Pou, the two major neighbours of Nuku Hiva. It was here that Hono'ura's son eventually married the daughter of a local *ari'i*, consolidating genealogical ties across Tupaia's sea of islands. See Henry, *Ancient*, 536. Another legendary voyager might come in, too, calling up the extensive travels of the famous siblings and earliest ancestral master navigators Hina and Rū across the sea of islands. It might be Rū (who in Tahitian creation myth is also credited for raising the sky from the earth, see *ibid.*, 459–64), whose exploits are possibly written into the name Tupaia chose for Nuku Hiva: *Hiti-(te)-maru-i-Rū* – loosely translating into something like 'the frontier of the followers of the path of Rū'.

Leaving out the penultimate island name, they appear as follows in Molyneux's list: M52: Teeteenuoheevo, M53: Ineehaewhameatane, M54: Tomanowhota, M55: Oaiarota, M57: Aowroopou. The first two do not reference individual islands but are generic terms for the entire archipelago of the Marquesas group. In identifying M52 in this way, we follow Teuira Henry who translates 'Nuuhiva' not as Nuku Hiva Island, but as 'Fleet-of-Clans, the Marquesas'.¹¹⁰ We argue similarly that with M53, Tupaia offered yet another alternative name for the entire archipelago, as if saying 'this is also called'. It appears as T1: Tennewhammeatane (T2: Tennenhammeatane; T3: Tene-whammeatane) on the charts. *Te-fenua-tane* (the land of Tane / of men) is still used as a collective term for the Marquesas group in the region (in southern Marquesan, *'enata* replaces the Tahitian *tane*). This leaves the three final islands in the sequence. Molyneux's phonetic transcriptions of Tupaia's Tahitian are poor in this section but it is still evident that what is laid out is a northbound course through the Marquesan Islands, starting at either Fatu 'Iva or Tahuata (M54: Tomanowhota), and leading via Hiva 'Oa (M55: Oaiarota) to 'Ua Pou (M57: Aowroopou). The next logical island en route would be Nuku Hiva. We presume that it no longer appears at the end of Molyneux's list because, together with its neighbour 'Ua Huka, it had already been listed before, at the end of the second section: as M30: Heeteetoomaro eiru.

The most conclusive evidence that this is really Nuku Hiva is again provided by the logic of *avatea* bearings. On Tupaia's Map, Nuku Hiva features as T1: Ohititamaruira (T2: Ohetimaruire; T3: Ohete maruiru). It must have been set down as the first island in the Marquesas. From here, we assume that Tupaia set a course due SE to the major target in the southern Marquesas, Hiva 'Oa (T1: Oirotah; T2: Ohirota; T3: Oirotah), and to the second major island in the northern group, 'Ua Pou (T1: Ouropoi; T2/3: Ouropoe), due S of Nuku Hiva. The *avatea* bearings within the Marquesas are indeed very precise and would pose no challenge to island finding, given the relatively short distances and the altitude of more than 1,000 m of each target:

Nuku Hiva (av) (M30: Heeteetoomaro eiru; T1: Ohititamaruira; T2: Ohetimaruire; T3: Ohete maruiru).

Hiva 'Oa (M55: Oaiarota; T1: Oirotah; T2: Ohirota; T3: Oirotah) bearings from Nuku Hiva on T1: c. 120° SE; on T3: c. 110° SE; MC c. 125° SE; distance c. 140 km.

'Ua Pou (M57: Aowroopou; T1: Ouropoi; T2: Ouropoe; T3: Ouropoe) bearings from Nuku Hiva on T1: c. 190° S; on T2: c. 180° S; MC c. 180 S; distance c. 50 km.

From the Marquesas to Hawai'i

At this stage of our reading of the mapmaking process, the first draft (T1) is almost complete. Only two islands have not yet been accounted for: on the bottom right, T1: Tennewhammeatane (T2: Tennenhammeatane; T3: Tene-whammeatane),

¹¹⁰ Henry, *Ancient*, 399–401.

already identified as *Te-fenua-tane* and thus a collective term for the Marquesas group; and in the top left corner, at the very other end of Tupaia's Map, T1/2/3: Oahourou. The latter corresponds to the penultimate island in Molyneux's list, M56: Woahaowroo. We are very confident that this is no other than distant O'ahu (*Oahu-roa*) in the Hawaiian archipelago. The *avatea* bearings from where Tupaia situates the point of departure from the Marquesas (*Te-fenua-tane*) to O'ahu are very good, deviating from the true geographical bearings by only a few degrees (Figure 16):

Marquesas group (M53: Ineehaewhameatane; T1: Tennewhammeatane; T2: Tennewhammeatane; T3: Tennewhammeatane).

O'ahu (M56: Woahaowroo; T1: Oahourou; T2: Oahourou; T3: Oahourou) bearings from *Te-fenua-tane* on T1: c. 335° NW; on T3: c. 338° NNW; MC c. 330° NNW, distance c. 3,850 km.

The choice of O'ahu as final destination of a composite route from the Society group through the Tuāmotus to the Marquesas and on to Hawai'i strongly resonates with a surviving voyaging and creation chant from Ra'īātea, recorded by the London Missionary Society missionary John Muggridge Orsmond in 1817 as 'The Birth of New Lands', 'from the lips of Aramoua and Vara, Raiatean Scholars'. There is good reason to suggest that a related version of the chant actually formed the blueprint for the course Tupaia laid out in the fourth and last part of Molyneux's list.

We quote the sequence in 'The Birth of New Lands' detailing the passage from the Marquesas to Hawai'i at some length, first because it provides a powerful illustration for the narrative geography of Pacific navigation discussed above. In that geography, targets are 'cast up' by the sea in set sequences as indicated by swell patterns (towering wave), sea life (sooty tern, parrot fish), star constellations (Orion), and *pou* (pillar stars, such as Aldebaran). Yet the chant is also particularly interesting as, unlike the chart, it lists several land and sea marks en route:

The sea casts up the distant Nuuhiwa (Fleet-of-clans, Marquesas) / Of the waves that rise up / Into towering billows! / Bear thou on to the north-west! / Strike where? / Strike the towering wave! / The sea casts up Hotu-papa (Surging-rock) / Of the towering wave. / Bear thou on! and still and strike towering wave. / There comes Tainuna (Mixed-up-shoal), land / Beyond Hotu-papa. / Sea of Potuninamu (Sooty-tern) casts up; / Ma-ahu-rai (Cleared-by-the-heat-of-Heaven) is the land; / There is cast up again, Outu-taata-mahurei (The-people's-verdant-headland). / The sea of the Nuu-marea (Host-of-parrot-fish) / Casts up Fatu-pu (Clustering-pile). / Tai-o-Manunu (Sea-of-cramps) casts up Te-varo-ia (Fish-producing-storm) Island. / Bear thou on! / Bear on and strike where? / Strike north. / The sea casts up Matai-rea (Breez-of-plenty), / Land of the long beating drum; / Taputaputea is the temple with the long court yard. / Strike where? Strike north. / The sea casts up Arapa (Basket, island), alone; Raparapa (Angular, island) alone. / Just over the sea is Tai-Rio-aitu (Weeping-for-god-Rio, Aldebaran). / Bear thou on! And swim where? / Swim toward the declining sun,

/ Swim toward Orion. / Distance will end at thine approach, / Redness will grow, / It will grow on the mountain figurehead / At thine approach / Where the mountain is the boundary over there, O! / Angry flames shoot forth; / Redness grows, it grows upon the figurehead / Bounding in / The ocean over there! / That is Aihi (Bit-in-fishing), Land of the great fishhook; / Land of raging fire kindling / Angry flames; / Land drawn up, / Through the undulation of the towering wave, / From the Foundation! / Beyond is Oahu.¹¹¹

None of the seamarks and islands in the chant – perhaps initially within the Marquesas group, then surely en route to volcanic Hawai‘i – have been linked to existing islands to date. Yet that these are not ‘vanished’ islands as is often suggested,¹¹² but mark a course via roughly Starbuck, Malden, Christmas Islands and Kingman Reef is supported by other evidence, not least the chant ‘Birth of the Heavenly Bodies’ from Poropora as recited by Rua-nui in 1818.¹¹³ It lists ten ‘pillars of the sky’ (*pou*), fixed stars which in their zenith position define latitudes which must have been of paramount importance to navigators when voyaging along the latitudinal extension of the sea of islands. Lewis observes that of these stars, two (Phact and Antares) mark the latitudes of Aotearoa and Rarotonga respectively. Two would be directional stars indicating north (Dubhe and Polaris). Since Polaris was only visible from about halfway to Hawai‘i, its ritual importance in Society Islander astronomy underscores that voyages to and from Hawai‘i must have been a regular event for a substantial period of time. Of the remaining six stars, five indicate latitudes between the Marquesas and Hawai‘i, while only one (Arcturus) would have been in zenith position even further north. And with the exception of Aldebaran (5° S of Hawai‘i), these stars coincide with the latitudinal position of different Line Islands: of Starbuck (Spica), Malden (Alphard), and Kingman Reef (Betelgeuse and Procyon).¹¹⁴

Since none of these islands is mentioned in any of Tupaia’s island lists nor was inscribed on the chart, we shall not discuss them further. What matters is that with the route to Hawai‘i, the first draft of Tupaia’s Map was complete. Still missing from the chart are the remaining islands in Molyneux’s list (M31–M51), detailing routes from Tahiti to and through the Tuāmotus and on to the Marquesas. For these purposes, however, Tupaia and his European interlocutors must have decided to start a new draft, on a clean new sheet.

THE SECOND DRAFT OF TUPAIA’S MAP (T2) BEGINS

Tupaia’s main motivation to start the second draft map (T2) must have been to revise the routes from Rotuma to Samoa. When transposing the islands from the first draft to

¹¹¹ Ibid., 401–2.

¹¹² See, for instance, Patrick D. Nunn, *Vanished Islands and Hidden Continents of the Pacific* (Honolulu: University of Hawai‘i Press, 2009).

¹¹³ Henry, *Ancient*, 359–63.

¹¹⁴ Lewis, *Navigators*, 284, 372.

the second, he made sure to delete the first positioning of Rotuma and then to shift the location of Savai'i and 'Upolu so that they connect with both 'Uvea and Tutuila. Other mistakes were corrected. The first attempt to draft a route to Rimatara (T1: Orematema) from Mangaia disappears, as well as the unnamed island next to Rapa Nui and two further, small, unmarked outlines in the centre and upper left of the chart. Perhaps the most significant 'island' to disappear, finally, is the small circular shape next to 'Eawatea' on T1, which, as we argued above, probably represents not an island but the ball of the sun. On the new second draft, *avatea* now unmistakably marks the crossing of the two cardinal axes.

A final interesting change concerns the Society group which, we believe, had been pre-drafted for Tupaia roughly in Mercator projection when the first draft (T1) began. We understand this change as attesting to Tupaia's confidence and pride, as well as to the trust that his European interlocutors must have put in him at this stage, for now Tupaia obviously chose not to faithfully transpose this set of islands to the second draft. Instead, he decided to change the shapes of the Society Islands and to slightly shift island positions. In Tupaia's new layout of this island group, the European cardinal logic is adjusted to a logic of routes. The second draft clearly marks an itinerary from Mo'orea and Tahiti via Huahine to Ra'iātea and from there via Taha'a and Porapora to Tūpai and Maupiti. Since these islands had almost certainly not been labelled on the first draft (T1), Pickersgill or another European would have added their established names on the new chart (T2) once Tupaia had finished drawing them in their new shapes and locations. In the same manner, the pronunciation of all other island names from the first draft must have been double-checked with Tupaia and more often than not corrected, before setting them down on the new sheet.

Once the second draft of the chart was thus set up, Tupaia, Cook and whoever else was involved could now return to Molyneux's island list and resume where they had left off. This eventually brought them to the third section, headed: 'Islands lying NE and East from Otahite the first Nine we saw in our Voyage [to the] now call'd Society Islands'. The nine names listed under this heading can all be clearly attributed to islands in the Tuāmotu, a vast archipelago of low atolls ranging from north to east and southeast of the Society group. It is important to pay special attention to Molyneux's claim, here, that these islands had all been seen by the crew of the *Endeavour* on their voyage to Tahiti. It suggests that their entry into Molyneux's list has a different history, especially from the entry of islands in sections two and four, which we presume recorded voyaging sequences Tupaia had recited, drawing, at least in part, on ancestral voyaging traditions (as in the legend of Rātā or 'The Birth of New Lands'). Instead, the islands in the third section evidently result from discussions between Molyneux and Tupaia about the *Endeavour's* itinerary through the Tuāmotu archipelago. This inference allows us to speculate about the reasons for a significant peculiarity of Tupaia's chart: that all voyaging *within* the Tuāmotu group no longer follows the *avatea* system. This is really exceptional, given that Tupaia diligently worked with his system for all other voyages he had hitherto drawn. We assume it involved critical exchanges between Tupaia, Cook and others at

the drawing table about the locations of islands which, for the first time since Tupaia had taken over the drawing, both parties thought they knew. We shall take it step by step.

From Tahiti Iti to ‘Ana‘a

We assume that the making of Tupaia’s Map continued on the second draft (T2) with a route from Tahiti Iti to ‘Ana‘a, which is listed twice among the nine islands in the third section of Molyneux’s list (M34: Oanna; M40: Owanna). The doubling underscores the contemporary importance of the atoll as a political and economic centre whose power extended as far as Tahiti Iti. J.L. Young noted in 1899: ‘The Anaa people were the most powerful tribe in Paumotu, and most other islands were tributary to them. It is said they owned more canoes than all other islands combined’.¹¹⁵ ‘Ana‘a would have been the first target that Tupaia set down in the Tuāmotu group and he chose the easternmost district of Tahiti Iti as point of departure: Pari, or Tepari, set down on the chart as T2: Oopate (T3: Oopati). The island shape is thus misleading, as it really refers to a section of the Tahitian mainland and its lagoon, suggesting the pass of Aiurua as the gateway to the eastern ocean.¹¹⁶ Evidently, Tupaia still operated with the *avatea* system at this stage as he placed ‘Ana‘a at 85° E from there, perfectly on target (Figure 17):

Tepari (Tahiti Iti) (not in M; T2: Oopate; T3: Oopati).

‘Ana‘a (M34: Oanna and M40: Owanna; T2: Oannah; T3: Oanna) bearings from Tepari on T3 c. 85° E; MC c. 85° E; distance c. 380 km.

From the northwestern to the central Tuāmotus

After placing ‘Ana‘a, Tupaia temporarily abandoned his *avatea* system – but why? Surely, the officers and gentlemen around the drawing table must have communicated to Tupaia that, with the third section of Molyneux’s list, they had reached a moment of some excitement in their joint project – the point where the course the *Endeavour* took through the Tuāmotu group should be placed on the chart. It might have irritated Cook and his crew in this context that Tupaia placed ‘Ana‘a north of

¹¹⁵ J.L. Young, ‘Names of the Paumotu Islands, with the Old Names So Far as They Are Known’, *Journal of the Polynesian Society* 8:4 (1899): 264–8, 268.

¹¹⁶ The name Tepari is still in use for the easternmost village of Tahiti Iti; the name of the ancient district extending between Tautira and Teahupoo tends to be recorded as ‘Tepari’, ‘Tepati’ or ‘Te Pari’ in the colonial archive. In Tupaia’s days, the Tepari district was much less isolated than it is today (in the absence of roads). José Garanger documents a whole range of significant archaeological sites in the valley of Aiurua and nearby Vaiote in particular, among them petroglyphs and several *marae*, as well as in the lagoon extending the valley. There are, for instance, the remains of a *marae* in the very centre of *motu* Fenuaino, which supports the inference that the Aiurua pass was indeed a traditional gateway to the east. José Garanger, ‘Prospections archéologiques de l’îlot Fenuaino et des vallées Aiurua et Vaiote à Tahiti’, *Journal de la Société des Oceanistes* 66–67 (1980): 77–104. Thanks also to Flora Devantine for sharing local knowledge of the region.

Tahiti, by their own geographical reckoning, since the *Endeavour* had taken a nearly straight western course from 'Ana'a to Tahiti. Knowing from Wallis's visit in 1767 that Tahiti is situated a little under 18° S and roughly 150° W, Cook's strategy of way-finding was to work his way gradually north from Cape Horn until hitting the approximately right latitude (which he did at around 130° W), and then holding it on course to the westward, knowing that Wallis' calculations of longitude, like his own when traversing open ocean, were not very reliable.¹¹⁷ Cook clung to around 19° to 18° S on his continued voyage toward Tahiti, entering the Tuāmotus just a little north of the route Wallis had taken before him. The Tuāmotuan islands thus passed, named, and not least mapped en route by Cook and Smith, but also Molyneux and Pickersgill (see Figure 8), were Vahitahi (Lagoon Island), Akiaki (Thrum Cap Island), Hao (Bow Island), Ravahere and Marokau (The Two Groups), Reitoru (Bird Island) and 'Ana'a (Chain Island).

Two things must have happened at this stage of mapmaking. First, the officers and gentlemen would have questioned Tupaia's placement of 'Ana'a on the chart, since they did not fully understand the logic of *avatea* he had set in place. They probably explained to him again how they conceived the layout of the map, and pointed out the cardinal orientation of east and west in particular. Tupaia, in what followed, must have decided to give in to European insistence on their own cartographic logic. Second, Tupaia must have cleared up a misunderstanding, for the islands listed in the third section of Molyneux's list do not correlate at all with the course taken by the *Endeavour*. Only two islands in the list were actually seen from the *Endeavour*, 'Ana'a and Hao, while the others were certainly not.

Beyond 'Ana'a, the third section in Molyneux's list provides a distinct route consisting of five islands extending from Tikehau (M32: Oteohiaow; T2/3: Teoheow) and Rangiroa (M33: Oraiceroa; T2: Oyroa; T3: Oryeroa) via Toau (also Taha-a-titi) (M37: Ota; T1/2: Otaah) and Fakarava (M36: Owharawa; T1/2: Whareva) to Hao (M35: Owhao; T2: Whaoa; T3: Whoaw).¹¹⁸ While not listed in this sequence in Molyneux's list, on Tupaia's chart they clearly mark a course. Geographically, the five islands are roughly aligned on a single star and sun path which, in Western terms, is set at about 115° ESE, from Tikehau in the NNE to Hao about 850 km east of Tahiti. Tupaia would have been pressed to explain to Cook and his crew, and in terms they understood, that this was not the westward course the *Endeavour* took toward Tahiti. We assume it is for this reason that he ultimately placed the route on the chart in the way he did: by clearly catering to the expectations the Europeans had formulated around the drawing table and by generously abandoning, for the moment, his *avatea* system. He placed the departure island of Tikehau duly NNE from the Tahiti originally positioned by the Europeans in the centre of the chart. The

¹¹⁷ Cook's fame as master navigator partly rests on the fact that he was the first European to be able to locate a target as small as Tahiti in an ocean as vast as the Pacific, using latitudinal and longitudinal measurement and charts – throwing the longstanding Western dismissal of the much older histories of Oceanic wayfinding into sharp relief.

¹¹⁸ Note that the /k/ in other Polynesian languages does not feature in Tahitian, where, like /tʃ/, it is replaced by a glottal stop.

final target, Hao, is placed squarely on the cardinal axis pointing to the east, with the remaining islands ranging between. This is the route (Figure 17):

Tikehau (M32: Oteeohiaow; T2: Teoheow; T3: Teoheow).

Rangiroa (M33: Oraiceroa; T2: Oryroa; T3: Oryeroa) c. 10 km ESE from Tikehau.

Toau (M37: Ota; T2: Otaah; T3: Otaah) also Taha-a-titi; c. 130 km ESE from Rangiroa.

Fakarava (M36: Owharawa; T2: Whareva; T3: Whareva) c. 15 km SE from Toau.

Hao (M35: Owhao; T2: Whaoa; T3: Whoaw) c. 500 km ESE from Fakarava.

We presume that two remaining islands in the third section of Molyneux's list, M38: Aowra (T2: Ooura; T3: Ooura) and M39: Aowahei (T2: Oboha?; T3: Oo-ahē), are part of a different route entered on the chart slightly later, to be discussed shortly. At this point, though, Tupaia did his best to give the Europeans what they wanted – the path on which they had entered his world some six months earlier, in early April 1769.

From the eastern Tuāmotuan outliers to Āmanu and Hao

How exactly the conversations around the drawing table discussing the true course of the *Endeavour* through the Tuāmotus took place can only be conjectured. Cook might have explained that he kept his latitude on a fairly straight course to the west. He might also have produced the draft sheets executed by Isaac Smith mapping the actual route and the islands they passed. Like Cook, Molyneux might also have shown Tupaia the detailed, large-scale charts of Lagoon, Thrum Cap, Bow, First Group, Second Group and Bird Island, respectively, which he had copied into his log.¹¹⁹ Whatever the conversations, we are convinced that they motivated Tupaia to enter four new islands on the chart which – unlike all others yet to come – are not in Molyneux's list. They are T2/3: Terouuhah, T2/3: Whatterreero, T2/3: Ootto and T2/3: Temanno, positioned in the chart's upper right corner and aligned, in Cook's cartographic logic, roughly from east to west.

The latter two islands can be clearly identified as Tatakoto (also known as Tekoto) and Āmanu (also Timanu). Āmanu is the immediate neighbour of Hao (fewer than 20 km S of Āmanu), to which this route evidently connects.¹²⁰ The identification of the first two islands is slightly trickier, but there is little doubt that they are Rēao and Pukarua, the easternmost outliers of the Tuāmotus. They are the only plausible islands of departure on a westward course past Tatakoto to Āmanu and Hao, always assuming that Tupaia still catered to the cartographic logic of the Europeans. The linguistic evidence is not fully conclusive, but also supportive. Terouuhah (Te-roua?) resembles Rēao. The term *fa'atere*, Hinano Teavai-Murphy explained, signifies 'go to'; thus *fa'atere-i-r(ar)o* (Whatterreero) would

¹¹⁹ Molyneux, 'Log', 55–6.

¹²⁰ Tupaia might conceivably have identified drawings by Smith or Molyneux of the 'Two Groups' (Ravahere and Marokau) as Āmanu and Hao.

translate as ‘go to’ *rāro*, this is toward the sunset, or west. The European hand taking down the island names on the chart might have mistaken Tupaia’s directions for, or identified them with, the actual name of Pukarua. This is the route, as travelled westward:

Rēao (not in M; T2: Terouuhah; T3: Terouuhah).

Pukarua (s) (not in M; T2: Whatterreero; T3: Whatterreero) c. 50 km WNW from Rēao.

Tatakoto (not in M; T2: Ootto; T3: Ootto) also Takoto; c. 170 km NW from Pukarua.

Āmanu (not in M; T2: Temanno; T3: Temanno) also Ti-manu; c. 230 km ESE from Tatakoto.

We suggest that this path marks the course which Tupaia thought the *Endeavour* had taken en route to Tahiti, based on the evidence they presented to him, including presumably their own charts of the region.¹²¹ The route follows a course only a fraction further north from that actually taken by the *Endeavour*; and like the previous route from Tikehau to Hao, Tupaia drew it by catering to the cardinal orientation of the models shown to him, rather than follow his own *avatea* system.

From Makatea to the northeastern Tuāmotuan outliers

This accomplished, Tupaia and his team of cartographers could return to Molyneux’s list: to the two islands not yet accounted for in section three and to the 17 island names in the fourth and final section, headed:

The following Islands are most of them pretty large especially the last four they are all of them inhabited & the People of Otahitee reported that some of the Inhabitants of these Islands are of tall stature they lie in the same direction as the last nine [the Tuāmotuan islands in section three].

The last four ‘pretty large’ islands (M54–M57) in Molyneux’s list, as we have already shown, are Fatu ‘Iva or Tahuata, Hiva ‘Oa, O‘ahu and ‘Ua Pou in the Marquesas and Hawai‘i. Except for the first, they had already been placed on the first draft of the chart and their positions were duly transposed to the second. The preceding two names in the list (M52 and M53) mark generic terms for the Marquesas screen, yet only the second, Te-fenua-tane (M53; T1: Tennewhammeatane; T2: Tennenhammeatane; T3: Tennewhammeatane) had already been put on the map, setting the point of departure for the long NNW voyage to O‘ahu. Another three names, finally, have also been accounted for: M46: Mannoa, M47: Ootoomoobapa and M48: Omaowtaow, all in eastern Samoa. They are completely out of place in the

¹²¹ Should Tupaia have interpreted the ‘Two Groups’ (Marokau and Ravahere) on Cook’s, Pickersgill’s or Molyneux’s charts as the twin islands of Āmanu and Hao, his best choices for Bow (Hao), Trum Cap (Akiaki) and Lagoon (Vahitahi) Islands were bound to be Tatakoto, Pukarua and Rēao respectively.

final section of Molyneux's list which otherwise resonates very coherently with the legend of 'The Birth of New Lands' discussed above, detailing a cosmic voyage starting in the Society Islands and working its way through the Tuāmotus and Marquesas to O'ahu in Hawai'i.

The remaining islands in Molyneux's list can all be located in the Tuāmotuan group (with the exception of M41: Maiatea, Meheti'a in the Society group east of Tahiti, which the Europeans themselves had drawn on the first draft, and labelled T2/3: Mytea on the second). Moreover, they detail a connection from Makatea, the nearest Tuāmotuan island from Tahiti and the only high island in the archipelago, to most probably Tepoto and Nāpuka. The route, we will show, skirts the northern border of the archipelago, with stopovers at the twin atolls Ahe/Mānihi and Takapoto/Takaroa, plus an optional stop at Tikei (Figure 18). It is the third and last route which Tupaia entered without adhering to the system of *avatea*, for reasons we can again only speculate about. But mapping it would have posed a final conceptual impasse. Tupaia still needed to show how Tahiti and the near Tuāmotus, already placed by him in the upper right quadrant of his chart, connect with the Marquesan islands, already placed in the lower right quadrant. Within the *avatea* system, there was basically no way to achieve this consistently within the remaining available space. And so Tupaia must have opted to compromise: he would work without *avatea* one last time for the course to the Tuāmotuan outliers; however, once back in range he would return to the *avatea* system to mark the precise bearings from there for the voyage out to the Marquesas.

Tupaia's Map suggests that the route commences at Makatea (M42: Omatea; T1/2: Maataah), and from there continues to the NE, to the twin atolls of Ahe (M39: Aowahei; T2: Oboha?; T3: Oo-ahe) and Mānihi, also known as Paeua (M38: Ooura and M43: Pooatea ta'owra; T2: Ooura; T3: Ooura).¹²² Here, Tupaia must have chosen to set off and continue the route further north on the chart (in Cook's cartographic logic, to indicate that it runs north from the Rēao-to-Āmanu route?), leading from the twin atolls of Ahe and Mānihi to the next twin, Takapoto (M49: Oheewapoto; T2/3: Ohevapoto) and Takaroa (M44: Oheevoroa; T2/3: Oheva roa).¹²³ And the final target on a continued eastward course along the northern fringes of the archipelago is also a twin atoll: Tepoto and Nāpuka, which (together with Pukapuka, still further to the east) served as the traditional departure islands to the Marquesas.

¹²² See Young, 'Names', 266. M38: Ooura might also refer to Kaukura, situated between Rangiroa and Toau on the first Tuāmotuan route Tupaia drew. On the chart, however, the position of T3: Ooura next to Ahe suggests that it probably marks Mānihi and corresponds with M43: Pooatea ta'owra.

¹²³ To date, the latter island has been identified as Hiva 'Oa in the Marquesas Group (see Denning, 'Geographical', 104). Yet not only was Hiva 'Oa, as discussed above, already placed elsewhere on the chart, but Hinano Teavai-Murphy explained to us that the replacement of 'ta'a' for 'hiva' would have been common practice to indicate the set target on a course, here, toward *Nū'u-hiva*, the 'Fleet of Clans' in the Marquesas. In making this identification, we are also indebted to Anne Di Piazza and Erik Pearthree, who first indicated this possibility to us.

Our identification of Tepoto (M45: Eohatetirreetooa; T2: Whaterretaah; T3: Whaterretuah) and Nāpuka (M51: Heetechaneanea; T2/3: Whaneanea) rests on their bearings from the Marquesan group (discussed in the next section), and the logic of sequences. Molyneux's list indicates that Tupaia outlined two parallel voyaging paths to Nāpuka: one with stopovers at the more northern of the twin atolls en route, from Mānihi (M43: Pooatea ta'owra) to Takaroa (M44: Ohevaroa) and Tepoto (M45: Eohatetirreetooa); the other tracing the southern twins, from Ahe to Takapoto (M49: Ohewapoto) and Nāpuka (M51: Heetechaneanea), with a stopover at Tikei (also Tiku) (M50: Tippoowai), entered on the chart as T2: Tetioo (T3: Tebooi). There is also some linguistic evidence: T2/3: Whaneanea may be a corrupted version of *fenua-niu*, land of the coconut, and refer to a widely known legend connected to Nāpuka which credits Maui with the mythical creation of the first coconut tree.¹²⁴ The label given to Tepoto, Eohatetirreetooa (*fa'atere-tua*) roughly signifies 'go to *tua*', that is, to the open ocean beyond the archipelago. By thus naming Tepoto, the phrase marks Nāpuka/Tepoto as the departure islands for the voyage out to the Marquesas. This is the complete route from Makatea to Nāpuka (Figure 18):

Makatea (M42: Omatea; T2: Maataah; T3: Maataah).

Ahe (M39: Aowahei; T2: Oboha?; T3: Oo-ahe) c. 240 km NE from Makatea (passing Rangiroa at c. 100 km).

Mānihi (M38: Ooura and M43: Pooatea ta'owra; T2: Ooura; T3: Ooura) also Paeua, c. 15 km ENE from Ahe.

Takapoto (M49: Ohewapoto; T2: Ohevapoto; T3: Ohevapoto) c. 70 km ESE from Mānihi.

Takaroa (M44: Ohevaroa; T2: Oheva roa; T3: Oheva roa) c. 10 km NE from Takapoto.

Tikei (M50: Tippoowai; T2: Tetioo; T3: Tebooi) also Tiku; c. 70 km SE from Takaroa.

Tepoto (av/s) (M45: Eohatetirreetooa; T2: Whaterretaah; T3: Whaterretuah) c. 350 km ENE from Tikei; c. 370 km E from Takaroa.

Nāpuka (av/s) (M51: Heetechaneanea; T2: Whaneanea; T3: Whaneanea) c. 16 km ESE from Tepoto.

From Nāpuka to the Marquesas

With the route to Nāpuka, the second draft stage of Tupaia's Map is almost complete. Only three island shapes on the chart, placed roughly between the eastern and north-eastern Tuāmotuan outliers in the upper right quadrant and the Marquesan islands

¹²⁴ The story of the origin of the coconut sprouting from the buried head of Te Tuna, the God of Eels, is widely known across Oceania, and often linked to legends of Maui and Hina. The Catholic missionary Hervé Audan distinctly links it to Nāpuka for the larger Tuāmotuan region. 'Traditions of and Notes on the Paumotu (or Tuamotu) Islands. Part III', trans. R.H. Rockel, *Journal of the Polynesian Society* 27:107 (1918): 132–6, 134.

which had already been set down on the first draft map in the lower right, have not yet been accounted for. They are T2: Tetineohva (T3: Tetineoheva); T2/3: Ohevatoutouai; and T2/3: Ohevanui. We believe that neither of these actually label single islands.

Tahitian *hiva-toutou-mai* signifies something like the clans (*hiva*) or Marquesan Islands ‘floating towards’ the voyager (approaching from the Society group).¹²⁵ This phrase would thus reference the nearest islands on a course to the NNE from Nāpuka: Fatu Hiva, Tahuata (M54) and Hiva ‘Oa (M55) in the southern Marquesas. Similarly, *hiva-nui* (T2/3: Ohevanui) translates roughly into ‘the great land(s) of the Clans / the Marquesas’, referring probably to the largest island and political centre of the group, Nuku Hiva (M30) and its equally large neighbours ‘Ua Huka (M31) and ‘Ua Pou (M57) in the northern Marquesas. Their placement on the chart suggests that T2/3: Ohevatoutouai and T2/3: Ohevanui continue the elegant arch Tupaia drew to mark a course outward from Makatea through the northern Tuāmotus and Nāpuka to, first, the southern, and then on to the northern Marquesas groups.

Note in this context how T2/3: Ohevatoutouai is placed roughly above T1: Oirota (T2: Ohirota; T3: Oirota), or Hiva ‘Oa, the main island in the southern Marquesas which Tupaia had already entered on to the first draft of the chart. Note also how T2/3: Ohevanui ranges roughly above T1: Ohititamaruira (T2: Ohe-timaruire; T3: Ohete maruira), or Nuku Hiva, the main island in the northern group, likewise entered before. This positioning indicates two things. First, the placement underscores that Tupaia really wished to outline a composite long route strongly resonating with ‘The Birth of New Lands’ and ranging from the Society Islands via Makatea and the northern Tuāmotus to the southern and northern Marquesas, and from there on to distant Hawai‘i. Second, Tupaia roughly copied the bearings from Hiva ‘Oa to Nuku Hiva for the voyage from the southern (T2/3: Ohevatoutouai) to the northern Marquesas (T2/3: Ohevanui), and thus managed to eventually return to the system of *avatea*. This surmise also helps explain why he would have drawn the Makatea-to-Nāpuka route in an arch extending to the right fringes of this chart: namely to get back in range to be able to work with the cartographic system he had set in place.

It is in this context that we also read the entry of the island shape he presumably entered last on the second draft of the map: T2: Tetineohva (T3: Tetineoheva). We have already briefly discussed this name as it features in Molyneux’s list as M52: Teeteenuohevo. We argued that Tupaia employed it to introduce the Marquesas screen (*Te-nu‘u-hiva*, ‘The Fleet of Clans’, as translated by Teuira Henry in ‘The Birth of New Lands’). On the chart, it appears as T2/3: Tetineoheva.¹²⁶ Why, then, does yet another island shape on the chart denote the Marquesas group at large? We are sure that with this last entry, Tupaia marked the precise *avatea* bearings to the Marquesan islands. The absence of such bearing

¹²⁵ See also H.A.H. Driessen, ‘Outtriggerless Canoes and Glorious Beings: Pre-Contact Prophecies in the Society Islands’, *Journal of Pacific History* 17:1 (1982): 3–28, 27.

¹²⁶ Hinano Teavai-Murphy reads this term as *te-tini-o-hiva*, with *tini* roughly translating into ‘the many islands’ or multitudes.

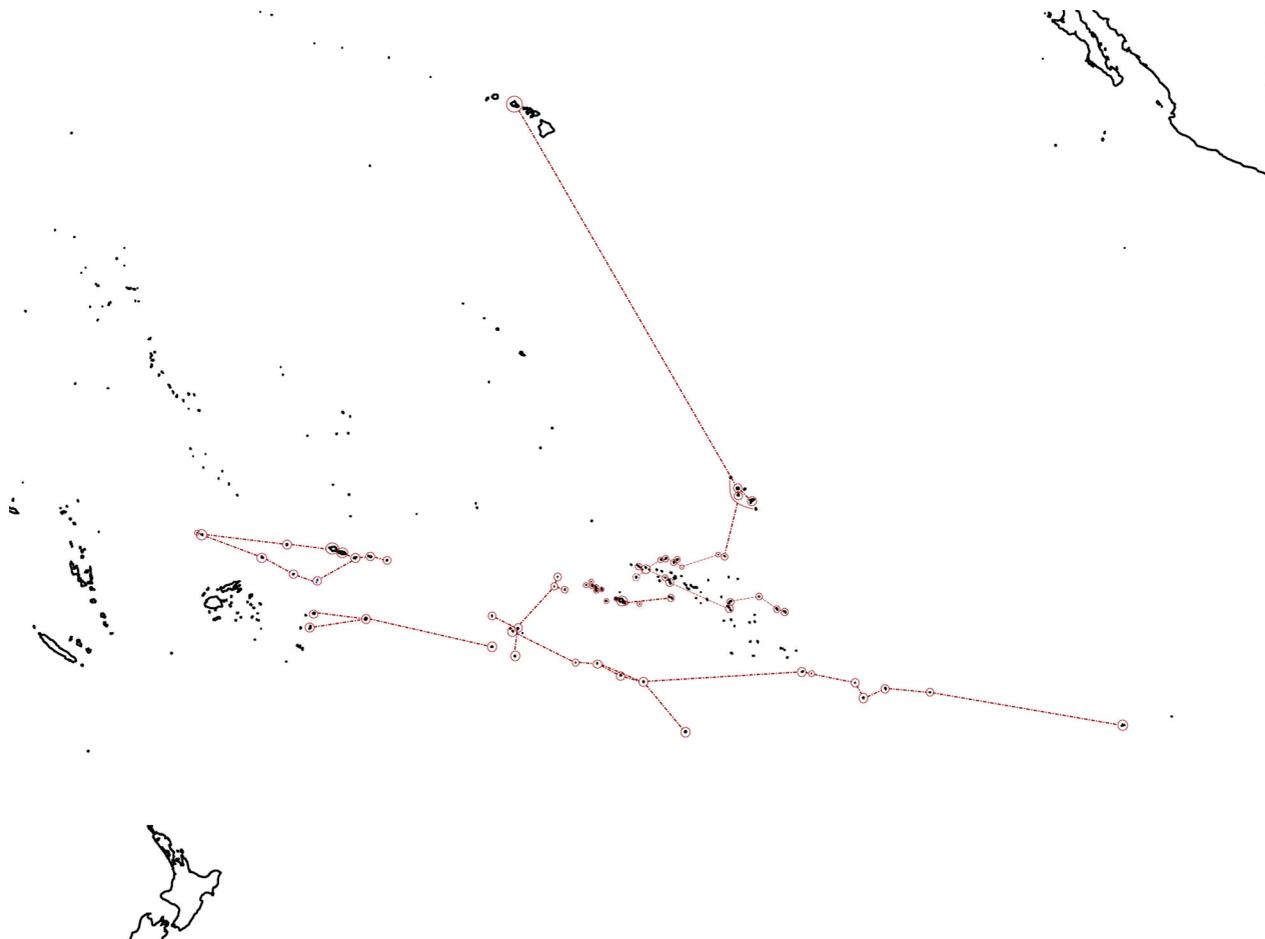


FIGURE 20: Voyaging paths on Tupaia's Map, as shown on a Mercator Map of Oceania.

patterns would have been tolerable, perhaps, within the clustered archipelago of the Tuāmotus, but surely his chart was incomplete without precise sailing directions for the voyage beyond. And indeed, the *avatea* bearings from Nāpuka (T2/2: Whaneanea) to the Marquesan screen (T2: Tetineohva/T3: Tetineoheva) at 25° NNE are just on target:

The southern Marquesas (not in M; T2: Ohevatoutouai; T3: Ohevatoutouai) c. 500 km NNE from Nāpuka.

The northern Marquesas (not in M; T2: Ohevanue; T3: Ohevanue) bearings from the southern Marquesas on T3: c. 40° NE; MC c. 40° NE for the straight between Nuku Hiva and 'Ua Huka; distance c. 120 km NW from Hiva 'Oa.

The Marquesas group (M 52: Teeteenuoheevoo; C: Tetineohva; B: Tetineoheva) bearings from Nāpuka on T3 c. 25° NNE; MC c. 25° NNE; distance c. 550 km.

When exactly Tupaia and his European collaborators thus finished the second draft of the chart (T2) is difficult to pin down. However, as we think it likely that the first and the second draft were part of the same ongoing effort, the second was probably completed within the second half of August 1769, certainly not long after leaving Rurutu and crossing the Tropic of Capricorn to the south. If this is the case, then Tupaia's Map lay dormant in Cook's papers for the months to follow. But its story continued about half a year later in Aotearoa/New Zealand.

TŌTARANUI: THE THIRD DRAFT OF TUPAIA'S MAP (T3) BEGINS

Conversations on board the *Endeavour* returned to Tupaia's Map while the ship lay at anchor in Tōtaranui (Queen Charlotte Sound) from 15 January to 6 February 1770. Cook appears to have used this extended period to develop his 'General Description of New Zealand'. While the 'Description' enters the journal on 31 March, the day the *Endeavour* left Aotearoa/New Zealand, it was clearly composed weeks in advance. Beaglehole characterizes this entry, together with a number of other descriptive passages from Cook's journal, as 'something like set pieces', the result of a 'great deal of writing, drafting and re-drafting' which would have required concentrated work over a longer stretch of time, preferably while mooring.¹²⁷ Also at Tōtaranui, Cook thoroughly revised and enlarged his long 'Descriptions' of Tahiti and the Leeward Society Islands, and sought to provide detail for a number of entries in his daily account of occurrences in the South Seas. These revisions can be dated to Tōtaranui by comparing the holograph (Canberra) MS of Cook's journal with the copy produced by his clerk Richard Orton (Mitchell MS) that appears not to have been begun before the *Endeavour's* stay in the Sounds. Whereas the revisions are clearly visible in the holograph MS, with crossed-out passages and numerous later amendments in small script, the same passages appear as clean text in the Mitchell MS. This dating is also supported by the fact that it was only at Tōtaranui that Cook gradually switched to writing 'Tupia' instead of 'Tobia', again a change

¹²⁷ Beaglehole, 'General Introduction', cciii.

incorporated into Orton's copy from the outset.¹²⁸ Cook almost certainly adopted this spelling from Banks. In his daily entries in the holograph MS, it appears unaltered for the first time on 29 January 1770. It is presumably only around this date, then, that he also systematically went through the records of his previous conversations with Tupaia, crossed out 'Tobia', and wrote 'Tupia' on top.

As part of these systematic processes of revision in the final days of January 1770, Cook must have retrieved Tupaia's Map from his papers, copied the island names ordered by their 'respective situations from Otaheite', and eventually attached them to the 'General Description of New Zealand' (T2/C) (see Figure 5 for Orton's copy of this list).¹²⁹ As discussed above, Cook had initially planned to publish the list of islands he had collected at Tahiti (C/JRF), based on the account of Tupaia and another unnamed source: in his 'Description of King George Island' he had already announced 'an account of upwards of seventy [island names]'. In Tōtaranui, however, Cook decided to abandon this list, copy the names instead from the map Tupaia had since drawn, and revise the earlier diary entry accordingly.¹³⁰ The interplay between the chart and the revision of different parts of Cook's journal is also evidenced by Cook's return to his entries on Rurutu for 15 August 1769, quoted at some length before. Here, Cook had left blanks for island names in the vicinity of Rurutu (T2: Oheteroa) which he had discussed with Tupaia but remained uncertain about. Only when or after he had copied the names from the chart did he then opt for 'Mannua' and 'Moutou' (ranging east and south from Oheteroa in Cook's understanding of the map) to fill the gaps. The fact that he thus mistook two Samoan islands for islands in the Austral group indicates that Tupaia was probably not involved in these early stages of revisiting the chart. We also assume that the map itself remained unchanged in the process. The moment when Tupaia for the first time revisited the chart he had presumably drawn almost six months earlier can be rather clearly dated to 5 February 1769, the day before the *Endeavour* set sail from the Sounds. It is on this date that the third draft stage of Tupaia's Map (T3) began.

Rima-roa

On 5 February 1770 Banks's journal records the farewell visit to the *Endeavour*, of 'Our Old Man Topaa', a local chief with whom Tupaia, Cook and Banks had been in fairly regular conversation since his first visit to the ship on 17 January. In this instance,

¹²⁸ Ibid., ccx–ccxx.

¹²⁹ Cook, [Canberra MS], 119r–220v.

¹³⁰ As part of his 'Descriptions of King Georges Island', entered into his journal for July 1769, Cook noted and later revised, presumably at Totaranui: 'I have before hinted that these people have an extensive knowledge of the Islands situated in these seas – ~~Tobia~~ Tupia as well as several others hath given us an account of upwards of seventy ~~their names are as follows of them Tobia~~ ^{Tupia} says he himself hath been at and thos mark'd with an obelist – but as the account they have given of their situation is so vague and uncertain I shall reftar giving a list of them untill I have learnt from Tupia the situation of each Island with a little more certainty'. Cook, [Canberra MS], 91r.

Tupaia, instructed by Cook and Banks, returned to two of the recurring topics of conversations with Topaa and questioned him about the geography of the wider region, as well as his knowledge of other European ships that might have visited the Strait. Both these questions were informed by the Europeans' larger geopolitical agenda: their desire to ascertain the potential existence of a Great Southern Land somewhere nearby and their worry about prior European claims to the land of which they had taken formal possession a few days earlier, on 31 January, in Topaa's presence. Topaa's response, while to the point, was informed by another logic. He confirmed, in Banks account:

that he knew of no other great land than that we had been upon ... ; that he beleivd his ancestors were not born there but came originaly from *Heawye* (the place from whence Tupia and the Islanders also derive their origin) which lay to the Northward where were many lands; that neither himself his father or his grandfather ever heard of ships as large as this being here before, but that [they] have a tradition of 2 large vessels, much larger than theirs, which some time or other came here and were totaly destroyd by the inhabitants and all the people belonging to them killd.¹³¹

Banks appears unsure whether he should take this account of two large vessels to refer to Abel Tasman's violent encounter in 1642 with the Ngāti Tūmatakōkiri tribe in Golden Bay (Mohua), northwest of the Sounds. Tupaia, however, as Topaa's prime addressee, firmly related this information to their shared Oceanic genealogy, a context also suggested by Topaa's prior comment on ancestral Hawaiiki. And it is at this moment that a new island enters the conversations around Tupaia's chart. Banks continued: 'This Tupia says is a very old tradition, much older than his [Topaa's] great grandfather, and relates to two large canoes which came from Olimaroa, one of the Islands he [Topaa] has mentiond to us'.¹³²

'Olimaroa' is not marked on the first (T1) or second draft stage (T2) of Tupaia's Map, but appears on the third draft (T3) only, as 'Oremaroa' (Rima-roa), a name placed next to T2/3: Ohevatoutouai, and thus in the region of the southern Marquesas.¹³³ Clearly prompted by the conversation with Topaa, a new stage of further inscriptions on Tupaia's Map began. The close connection between these final adaptations and Tupaia's exchange with Topaa is evident, also, in the Tahitian annotations that were added to the chart in this context (Figures 21(a–e)).

¹³¹ Banks, *Endeavour Journal*, 462–3.

¹³² *Ibid.*, 463.

¹³³ Tupaia's identification of Olimaroa/Oremaroa as located in the southern Marquesas contradicts recent research by Jan Tent and Paul Geraghty, who, on the basis of linguistic evidence and (European) cardinal directions, identify Ulimaroa as New Caledonia. Jan Tent and Paul Geraghty, 'Where in the World Is Ulimaroa?', *Journal of Pacific History* 47:1 (2012): 1–20.

FIVE TAHITIAN CAPTIONS, FOUR CARDINAL DIRECTIONS AND THREE SHIPS

There are five Tahitian captions on Banks's fair copy (T3/B) of the third draft of the chart (T3), appearing next to Ohevatoutouai (the southern Marquesas), Orivavae (Ra'ivavae), Otaheite (Tahiti), Ulietea (Ra'iātea) and Oanna ('Ana'a). The latter three are moreover illustrated by large, evidently European ships. These ships have sparked the imagination of Western researchers and commentators on the map from the time of the Forsters, since according to official historical records no European ships had visited any of the islands in question before the *Dolphin* in 1767.¹³⁴ However, we argue that all previous discussions of the depictions of European ships on the chart are misleading. Rather than recording previous European visits, most if not all the captions describe Oceanic voyaging traditions which Tupaia would have shared and discussed with Cook and his crew, but particularly with Topaa and thus local Māori while the vessel was anchored at Aotearoa/New Zealand. That is, the representation of European ships on the map has inspired European observers to make erroneous, sometimes problematic translations of the captions. In what follows, we systematically address all five Tahitian captions and provide alternative translations which we worked on in French Polynesia, in authoritative collaboration with Hinano Teavai-Murphy.

The southern Marquesas (T3: Ohevatoutouai)

The caption here reads '*Māa te ta ta pahei rahie ete te pahei no Brittanē*' (Figure 21(a)). The first translation was offered by Johann Reinhold Forster. We do not underestimate its authority, since it might have drawn on communications with Pickersgill who would have been present when the captions were set down (or even set them down himself). Forster noted: 'to this island *Tupaya* added the following remark, 'that the inhabitants

¹³⁴ Reinhold Forster, for instance, assumed that the ship drawn next to Tahiti could refer to the expedition of Pedro Fernández de Quirós and accordingly concluded that the Spaniard was, 'in the year 1606, its first discoverer'. J.R. Forster, *Observations*, 513. Beaglehole rightly refuted this claim as 'not at all tenable'. Beaglehole, 'The Legends on Tupaia's Chart of Polynesian Islands', in Cook, *Charts & Views*, viii. Robert Langdon later proposed that all ships on the map, as well as the caption in the Marquesas, referred to the *San Lesmes*, a Spanish caravel which disappeared in the eastern Pacific after a storm in 1526. We shall not expend more ink on Langdon's spurious thesis that Polynesian cultural advancement since the 16th century was due to contact with this 'lost caravel'. Robert Langdon, *The Lost Caravel* (Sydney: Pacific Publications, 1975). It will suffice to say here that, when H.A.H. Driessen came up with well-documented evidence that at least the ship at 'Ana'a is more likely to be a reference to Jacob Roggeveen's *De Africaansche Galei* which ran aground on the reef of Takapoto in 1722, Langdon launched an angry riposte. Driessen, 'Outtriggerless'; Robert Langdon, 'Of Time, Prophecy and the European Ships of Tupaia's Chart', *Journal of Pacific History* 19, no. 4 (1984): 239–47. In response, Driessen thoroughly disassembled Langdon's meagre evidence. H.A.H. Driessen, 'Outtriggerless Canoes and Glorious Beings Revisited: A Reply to Robert Langdon', *Journal of Pacific History* 19:4 (1984): 248–57.

are men-eaters, that their ships are large, and that the ship from Britain (the *Endeavour*) was but little in comparison”¹³⁵. Beaglehole followed Forster in proposing, slightly more cautiously: ‘Food [is] men, canoes large, small [in comparison] the ship of Britain’.¹³⁶

Beaglehole noted that he translated all captions with ‘varying degrees of confidence’, given that they present ‘an English spelling of what Englishmen thought they heard’. This limitation, we add, is compounded by the problem that Tahitian is a notoriously polysemic language and that the interpretation of words very much depends on context. The word *ma’a* is a case in point: Beaglehole argues that it denotes provisions (albeit only applying to vegetable food) and thus *maa* (food) *te ta’ata* (men) could imply men-eating.¹³⁷ However, Teavai-Murphy points out that *ma’a* can denote ‘very much’ or, ‘very large’, when pronounced with emphasis, especially in comparative contexts.¹³⁸ So *ma’a ... rahi* (larger, bigger) *te ta’ata* ([of the Marquesan] men) *pahi* ([are the] canoes) *iti* (smaller by comparison) *te pahi* (the ships) *no Britani* (of Britain) probably has nothing to do with cannibalism, but comments on the great size of certain canoes from the Marquesas. In Teavai-Murphy’s translation: ‘The canoes of the people [here / in the Marquesas] are bigger than British ships’.

Doing justice to Tupaia’s caption for the southern Marquesas is of particular importance here as it allows further reconstruction of the moment and the context in which the captions would have entered the chart. As Cook does not mention them in his journal, it is very probable that they were added after he drafted his ‘General Description of New Zealand’. It is striking, here, that T2/3: Ohevatoutouai was chosen both as the rough location for the placement of T3: Oremaroa, and for the caption just discussed. Hardly coincidentally, this falls into place in the context of Bank’s diary entry for 5 February. We suppose that the chronology of the event was roughly this: Tupaia translated for the Europeans Topaa’s response to their inquiries after previous European ships, including Topaa’s account of ‘2 large vessels, much larger than theirs’ that came from ‘Olimaroa’ in ancestral times. Tupaia was then invited to locate *Rima-roa* on his chart, surely in conversation with Topaa, and did so next to T3: Ohevatoutouai. Finally, Banks or another European must have asked Tupaia to formulate the gist of the discussions between the two Polynesians justifying

¹³⁵ J.R. Forster, *Observations*, 519.

¹³⁶ Beaglehole, ‘Legends’, viii.

¹³⁷ Mai, the Ra’iātean who joined Captain Furneux on the *Adventure* during Cook’s second voyage, supposedly also commented on Marquesan cannibalism, as noted by James Burney: ‘Omy mentions an Island called Oevah where are men of gigantic Size & who are Cannibals’. James Burney, *With Captain James Cook in the Antarctic and the Pacific: The Private Journal of James Burney, Second Lieutenant of the Adventure, on Cook’s Second Voyage 1772–1773*, ed. Beverley Hooper (Canberra: National Library of Australia, 1975), 71.

¹³⁸ This understanding of the term is supported by an entry in Johann Reinhold Forster’s 1774 vocabulary: ‘The word *māā* is used to form the *Comparative* / thus *māā-rāhy* signifies greater. *māā-eteē* less. / or thus *Ofāhāitēā whennooa arahy māā / Huahaine Otahaitee is a greater Land than Huahaine*’. J.R. Forster, ‘Vocabularies of the Language’, 29r.

this placement and the information on two large ancestral canoes from the Marquesas was then written down on the chart, in Tahitian as the English heard it.

We accordingly conclude that this caption was the first to be entered on the map. But more importantly for our further argument, we assume that this and all further captions were recorded in the context of conversations around the drawing table of the great cabin where Tupaia discussed his chart not only with Cook, Banks, Pickersgill and other Europeans, but primarily with Topaa, his Māori collaborator. The Europeans would have listened in on Tupaia and Topaa's conversation, still hoping to learn more about previous European ships (and conflicting imperial claims) in the larger region. When Tupaia suggested adding more Tahitian captions on the map, they would have readily complied. Tupaia, however, had more important things to share with the Māori chief.

Ra'ivavae (T3: Orivavie)

The caption at Ra'ivavae is straightforward, reading: '*toe miti no terara t'e rietea*' (Figure 21(b)). Johann Reinhold Forster translated it as 'fine hatchets come from thence to *Raiedea*',¹³⁹ a rendition also corroborated by the first annotation on Georg Forster's copy of Tupaia's Map (T1/GF). The note is for Ra'ivavae and reads: 'Tupia said, they had good hatchets there'. Teavai-Murphy confirms that *toi maitai no tai rara tu'i Ra'iatea* signifies something like 'good adzes are dispersed a far way to Ra'iatea', which ties in well with more recent archaeological evidence. Both Tupua'i and Ra'ivavae featured specialized *marae* for the large-scale production of basalt stone tools which were exported widely in the larger region.¹⁴⁰ Tupaia thus highlighted the connected networks of trade structuring his sea of islands, themselves sustained by genealogical ties of kinship. Considering again the local context of this pronouncement, it may take on an even more specific meaning.

From their arrival in New Zealand, the *Endeavour's* crew, Tupaia included, had been fascinated by Māori *pounamu* (greenstone) ornaments and stone tools, most importantly their tall axes. Repeated attempts to trade for them had failed and Cook accordingly had to record in his 'Descriptions of New Zealand': 'There green tall axes that are whole and good they set much value upon and never wold part with them for any thing we could offer'.¹⁴¹ Tōtaranui was located at the intersection of multiple trade routes between the North and South Islands, where *pounamu* and *pakohe* (argillite) were traded northwards.¹⁴² Tupaia's comment on Ra'ivavae's 'good adzes' might thus also be read as a response to conversations on the ground about the

¹³⁹ J.R. Forster, *Observations*, 522.

¹⁴⁰ See Aymeric Hermann, 'Production et échange des lames d'herminette en pierre en Polynésie centrale: Les dynamiques techno-économiques dans l'île de Tubuai (Archipel des Australes)', in *La pratique de l'espace en Océanie: Découverte, appropriation et émergence des systèmes sociaux traditionnels*, ed. Frédérique Valentin and Guillaume Molle (Paris: Société préhistorique française, 2016), 205–21.

¹⁴¹ Cook, [Canberra MS], 214r.

¹⁴² Anne Salmond, *Between Worlds: Early Exchanges between Maori and Europeans, 1773–1815* (New York: Viking, 1997), 141; Hillary Mitchell and John Mitchell, *Te Tau Ihu o te Waka: A*

exceptional quality of Māori stone tools in which Tupaia wanted to highlight the related quality of Ra'ivavae's productions.

'Ana'a (T3: Oanna)

The caption for *'Ana'a* reads: *'Tupia tata re pahē matte'* (Figure 21(c)). Johann Reinhold Forster's translation is that 'according to Tupaya's account', 'a ship was wrecked, and some men perished' at this island, suggesting a reference to Roggeveen's *De Africaansche Galey*.¹⁴³ Beaglehole again follows Forster with the translation: 'Tupaia [says] the people of the ship were killed'.¹⁴⁴ However, he believed the island to be Makatea rather than *'Ana'a*, where Roggeveen lost ten men in a violent encounter in 1722. As Driessen compellingly argued, the evidence that the *'Ana'a* caption refers to Roggeveen is strong,¹⁴⁵ and is reinforced by a Tahitian account already recorded by Molyneux on 9 May 1769 of a:

White men[s ...] Ship being Stranded some years agoe upon a Reef belonging to a small Island adjacent the Crew defended themselves bravely for some time but being either wearied or Starv'd out or their ammunication failing they were at last overpower'd & Kill'd every man of them, A Canoe coming soon after with two dead men & some Iron Bolts from the Wreck to this Island, where they were so well receiv'd that they never since have return'd Home & I saw two of them some days agoe.¹⁴⁶

Even though Molyneux did not mention Tupaia's name, his return to Matavai Bay that day with Puraea makes it very likely that Tupaia himself shared this narrative with Molyneux.

We nonetheless consider an alternative reading prompted by Beaglehole's mis-transcription of the caption as *'Tupaia taata no pahē mate'* (Tupaia men of ship dead), whereas the third word of the caption clearly reads 're', or *ri*, signifying to hang, to be suspended from in Tahitian. Hinano Teavai-Murphy accordingly translates *Tupaia ta'ata ri pahē mate* as 'Tupaia [says here] men hang from death-ships'. Rather than talking about a European ship, she argues, the caption most likely refers to the widely feared warriors of *'Ana'a*, the *Parata*, whose influence extended across the western Tuāmotu as far as Tahiti Iti in the 17th and 18th centuries. When returning from their campaigns, the *Parata* were known for trailing the skulls of their enemies on long ropes behind their canoes as ritual food for the sharks which were at the centre of their cosmology.¹⁴⁷ It is thus not at all unlikely that, like

History of Māori of Nelson and Marlborough, vol. 1, *Te Tangata me te Whenua: The People and the Land* (Wellington: Huia Publishers, 2004), 53–5, 94.

¹⁴³ J.R. Forster, *Observations*, 517.

¹⁴⁴ Beaglehole, 'Legends', viii.

¹⁴⁵ Driessen, 'Outriggerless'; Driessen, 'Outriggerless ... Revisited'; see note 134.

¹⁴⁶ Molyneux in Cook, *Journals*, 557.

¹⁴⁷ Frédéric Torrente, *Buveurs de mers, mangeurs de terres: Histoire des guerriers de Anaa, atoll des Tuamotu* (Papeete: Te Pito o te fenua, 2012).

the previous two captions, the caption for ‘Ana‘a does not reference a singular event or encounter, such as the Tuāmotuan incident involving Roggeveen. Instead, Tupaia would have drawn Topaa’s attention to a longstanding rival power near Tahiti, and perhaps dictated a more general security advice for travel in the wider region.

With the remaining two captions at Ra‘iātea and Tahiti, Tupaia turned from ethnographic annotations about select regions in his sea of islands to his own genealogy.

Tahiti (T3: Otaheite)

The caption for Tahiti reads: ‘*Meduah no te tuboona no Tupia pahei tooa*’ (Figure 21(d)). Johann Reinhold Forster noted: ‘Tupaya mentioned that in the life time of his great grandfather (*Medoàa no the Tooboòna*) a hostile ship (*Pahee-tòà*) had been there’.¹⁴⁸ Beaglehole likewise offered: ‘(In the time of) the father of the grandfather of Tupaia a hostile ship’.¹⁴⁹ These translations are again problematic. With respect to the phrase *metua no te tupuna*, Teavai-Murphy argues that *tupuna* indeed denotes grandfather as well as, more generally, ancestor, while *metua* is father or parent(s). Yet in combination as a set phrase, the only valid signification is literally ‘the parents of the ancestors’, or figuratively the ancestral origins. A second problem involves *pahi tua*. Forster, Beaglehole and all other interpreters so far have read the phrase as *pahi toa*.¹⁵⁰ However, the letter between the ‘t’ and the ‘a’ in the latter word appears to be not a single, but a double ‘oo’, corrected in a darker ink and overwriting what probably would have been ‘w’ (‘twa’) in the original hand. The word, in modern transcription, is therefore *tua*, meaning the sea beyond the reef, or the open ocean (as seen already in *fa‘atere tua*). *Metua* (parents) *no te tupuna* (of the ancestors) *no Tupiaia* (of Tupaia) *pahi* (voyaging canoe) *tua* (the open ocean) thus roughly translates as: ‘The first ancestors in Tupaia’s line [arrived at Tahiti in a] canoe [from across] the open ocean’.

This caption, then, records Tupaia’s genealogical origins or, in Māori terms, his *whakapapa*. An integral part of Tahitian as well as Māori protocol, the recital of his *whakapapa* would have enabled Tupaia to situate himself meaningfully vis-à-vis Topaa and to contextualize the 1770 encounter between the *Endeavour*’s crew and the people of Tōtaranui within the *longue durée* of Pacific history. Topaa’s *whakapapa* would have reached back across 20–30 generations, to the first ancestor of his people who arrived from Hawaiki. It would have named also the group’s ancestral *waka* (canoe) and its specific landing place, both central to Māori genealogy. Tupaia must have responded in kind, by naming the first ancestor in his own genealogical line, possibly

¹⁴⁸ J.R. Forster, *Observations*, 513.

¹⁴⁹ Beaglehole, ‘Legends’, viii.

¹⁵⁰ Even if read as *pahi toa*, the translation as ‘hostile ship’ remains problematic. The word *toa* in Tahitian has a range of related meanings depending on context, yet ‘hostile’ is none of them. It is a generic term for south; more literally, it signifies ironwood tree, and in a related meaning, war. A *pahi toa* could thus be a ship made of ironwood, or more likely, a battle ship. Neither of the interpretations, however, makes good sense in the context of the entire phrase.

the voyaging canoe that arrived from far overseas, and the original landing place (seemingly at Tahiti). And Tupaia, too, must have named Havai'i as the origin of the ancestral *pahi*, as indicated by Bank's diary entry quoted above: 'he [Topaa] belevd his ancestors were not born there but came originally from *Heawye* (the place from whence Tupia and the Islanders also derive their origin)'. There is strong evidence that Tupaia's Havai'i and Topaa's Hawaiki were similar places within their respective cosmologies, yet, contrary to Banks's interpretation, they would have been geographically different. Whereas in Māori tradition, Hawaiki is commonly associated with Ra'iātea in the Society Islands, Tupaia himself clearly located the Havai'i of his own ancestral tradition in Samoa. He reserves the name Havai'i for the Samoan island of creation, Savai'i, on all versions of his chart (T1: Ohiavie; T2: Oheavie; T3: Oheavie). Moreover, both Johann Reinhold and Georg Forster independently recorded that Tupaia identified Savai'i on the chart as 'the father of all the other islands',¹⁵¹ or 'the father of all the rest'.¹⁵²

If our reading and interpretation of the caption at Tahiti is correct, this would not only underscore Tupaia's deep genealogical memory of his own history of migration across several dozens of generations. Read together with the information recorded by the Forsters, it would further support theories of migration postulating direct settlement of the Society group from the west and continued exchange between Samoa, Tonga and the Society Islands, rather than merely indirect settlement via the Marquesas. Moreover, in the moment Tupaia asked his European interlocutors to commit his *whakapapa* to writing, something else might have been going on: at this stage of mapmaking, Tupaia seems to have anticipated an afterlife of his chart in which not just *popa'a* (foreigners, now particularly Europeans), but Polynesian audiences would retrace his voyaging paths through the sea of islands. This hypothesis is confirmed by the final caption.

Ra'iātea (T3: Ulietea)

The caption here reads: 'Tuboona no Tupia pahei tayo' (Figure 21(e)). Johann Reinhold Forster translates it as 'Tupaya said that in his grandfather's time a friendly ship had been there',¹⁵³ and Beaglehole supports this reading by proposing '(In the time of) Tupaia's grandfather a friendly ship'.¹⁵⁴ The problems, again revolve around *tupuna*, which may denote grandparent, as well as any ancestor more remote than a parent. *Taio* proposes another challenge, as Beaglehole explains: '*pahi taio* is not good Tahitian for 'a friendly ship', though *pahi* means ship and *taio* means friend'.¹⁵⁵ Vanessa Smith accordingly notes: '*Taio* was a Tahitian mode of bond friendship, forged between

¹⁵¹ J.R. Forster, *Observations*, 524.

¹⁵² See the third annotation on T1/GF.

¹⁵³ J.R. Forster, *Observations*, 516.

¹⁵⁴ Beaglehole, 'Legends', viii.

¹⁵⁵ *Ibid.*

particular individuals through the exchange of names and entailing further exchanges of goods, services, even sexual partners'.¹⁵⁶ It is commonly assumed that Tupaia struck a *taio* bond with Banks in Tahiti which would have facilitated his decision to eventually join the crew of the *Endeavour*. The meaning is specifically limited to describe a relationship between human subjects and the translation of *pahi taio* as 'friendly ship' therefore does not really hold. Moreover, there is no meaningful way of connecting the first part of the phrase *Tupuna no Tupaia* (Tupaia's ancestors) with the second *pahi taio* (ship of *taio* friend). Teavai-Murphy argues accordingly that the only way to solve this problem is to view both parts separately in the context of the island where the caption was placed, as well as the ship drawn next to it. This would leave us with, first: *Tupuna no Tupaia* [*Ra'iaatea*], translating as: 'The ancestors of Tupaia [are here / are at Ra'iaatea]' (probably pointing at Ra'iaatea on the chart to indicate the location for Topaa). And second: '[*Tupaia*] pahi taio', meaning: '[Tupaia is now on] the ship of (a) *taio* friend(s)'.

The ships

This, finally, also allows us to comment on the ships drawn on the chart. The caption below Ra'iaatea makes it highly likely that the ship placed next to the island depicts the *Endeavour*, the only European ship to have anchored there, with Tupaia on board. This surmise is supported by a small detail: only this ship clearly wears an oversized Union Jack and is thus generically marked as British (the *Endeavour* itself hoisted the red ensign, on which the Union Jack only featured in the upper left corner on otherwise red ground).

The other two vessels also appear to be tall ships. In the light of our new translations of the captions it is conceivable, however, that at least the ship sketched below Tahiti, if not both, were originally meant to symbolize Polynesian *pahi*. It is not surprising that this meaning could have been lost. After all, it is unlikely that the Europeans fully grasped the meaning of Tupaia's Tahitian annotations. If instructed to sketch the vessels, they would therefore have resorted to generic representations of European sailing ships. In fact, such a misrepresentation of Tupaia's intended message is possible even if he drew the crafts originally himself.¹⁵⁷ After all, the map in the British Library (T3/B) is only the fair copy of Tupaia's third and final

¹⁵⁶ Vanessa Smith, 'Banks, Tupaia, and Mai: Cross-Cultural Exchanges and Friendship in the Pacific', *Parergon* 26:2 (2009): 139–60, 151. For more extensive discussions of *taio*, see also Vanessa Smith, *Intimate Strangers: Friendship, Exchange and Pacific Encounters* (Cambridge: Cambridge University Press, 2010), 61–103; Ben Finney, 'Notes on Bond-Friendship in Tahiti', *Journal of the Polynesian Society* 73:4 (1964): 431–5; and Douglas L. Oliver, *Ancient Tahitian Society* (Canberra: Australian National University Press, 1974), vol. 2, 842–50.

¹⁵⁷ Tupaia was no novice in these matters: after all, he had already produced an elaborate water-colour scene featuring three canoes before the backdrop of a Tahitian longhouse and local flora. Tupaia, [Longhouse and Canoes in Tahiti], 1769, British Library, London, BL Add MS 15508, f.14.

draft map (T3), produced by an unidentified draughtsman on the return voyage to Britain. This copyist might have simply misinterpreted Tupaia's rough sketches of *pahi* as rudimentary representations of European sailing ships.

The cardinal directions

With the addition of *Rima-roa*, the five captions and the three sailing vessels to the chart, the third draft stage of Tupaia's Map (T3) was almost complete. The only items not so far accounted for are the Tahitian terms for the four cardinal directions. On Banks's fair copy of the chart (T3/B), they mark the end points of the cardinal axes which, we believe, had been pre-drawn for Tupaia when the chart's first draft was set up. In the moment of setting up the map, the abstract and absolute orientation provided by the cardinal axes would have helped Tupaia's European collaborators to situate the islands they had either visited or seen themselves on the *Endeavour's* course through the Society group in the vast expanse of the Pacific Ocean. We have already discussed at length how Tupaia himself abandoned this mode of representing geographical space in favour of his *avatea* system. We also assume that while the map was drawn, the cardinal axes remained in fact unnamed. The names are missing both from Georg Forster's copy of the first draft (T1/GF) and from Cook's list copied from the second draft (T2/C) of the chart. They are thus in all likelihood a later addition, dating to the third mapmaking moment in February 1770 or even later. While Molyneux, Solander and other Europeans also recorded Tahitian names for cardinal directions in their journals, an entry in Banks's notebooks on 'Winds' comes closest to the terms eventually inscribed on the chart (Opatoërao, Oapatoa, Tehitia-otera, Tetoa-otera).¹⁵⁸

All this is not to argue that the Tahitian cardinal directions did not resonate at all with Tupaia's system of wayfinding. They certainly would have mattered to him, but not in relation to an abstract and absolute orientation of space as in the representational model of European charts. For Tupaia, the directions would have been part of a conceptual framework centred on the navigator and his or her *pahi* on a specific voyaging path. In Tahitian oral history, the ancestral names for cardinal directions form part of a chant memorizing the first cosmic voyagers Rū and Hina. The legend 'Rū and Hina explore the earth', recorded by Orsmond as '[t]old by Papeau, a Tahitian scholar, in 1824', opens as follows:

Rū (Transplanter), who raised the sky from the earth, prepared his canoe, Te-apori (The-hull), to circumnavigate the earth with his sister Hina-fa'auru-va'a (Hina-the-canoe-pilot). As Rū prepared his canoe, he looked around and observed the appearance of the world, and he marked the boundaries in rotation as follows:

The east he called Te-hitia-o-te-ra (The-rising-of-the-sun);
The west Tetoa-o-te-ra (The-setting-of-the-sun);

¹⁵⁸ Banks, 'Observationes', 13.

The south Apato‘a;
 The north Apato‘erau;
 The southeast Hitia-i-to‘a;
 The northeast Hitia-i-to‘erau;
 The southwest he named Tooa-i-to‘a;
 The northwest Tooa-i-to‘erau.¹⁵⁹

Rū’s terms for east, west, south and north in the legend closely resemble those on the chart, and are nearly identical with those Banks recorded from Tupaia in his notebook. The tradition of Rū and Hina may thus well have been Tupaia’s point of ancestral and cosmogonic reference when sharing the terms with Topaa, Cook, Banks and the other Europeans. While only the names for east and west draw on the course of the sun, all other directions, including north and south, refer to characteristic winds.¹⁶⁰ Note especially, however, that the directions are observed ‘as Rū prepared his canoe’. Matahi Brightwell explained to us that it would have been paramount for master navigators like Tupaia to construct their *pahi* in alignment with a specific voyaging path in mind and to closely observe and memorize the angles of the sun and specific star constellation courses, as well as of the winds in relation to the various properties of the *pahi*’s construction (including mast [*tira*], claw sail [*ie*], stern and bow [*rei muri* and *rei mua*], crossbeam [*paepae*], dagger board [*hoe puta*] and the flying feathers [*manurere*]).

THE EXTENT OF TUPAIA’S VOYAGING

While or after Tupaia, Topaa, Cook, Banks, possibly Pickersgill, Molyneux, Smith and more hands collectively worked on the third draft stage of Tupaia’s Map (T3), Cook continued to revise pertinent entries in his journal relating to the mastery and extent of Polynesian navigation. One already briefly discussed is a postscript note at the end of Cook’s ‘Description of the Islands, Ulietea, Otaha, and Bolabola’, in which he credited Tupaia for information about westerly winds in the southern summer months allowing Oceanic ‘Trading or Sailing from Island to Island even tho they lie in an East and West direction’.¹⁶¹ This information was crucial for Cook’s famous assessment that Oceania must have been settled from the west to the east.¹⁶²

¹⁵⁹ Henry, *Ancient*, 495.

¹⁶⁰ John Davies, *A Tahitian and English Dictionary, with Introductory Remarks on the Polynesian Language, and a Short Grammar of the Tahitian Dialect* (Tahiti: London Missionary Society’s Press, 1851), defines *to‘erau* as ‘a northwesterly wind’ and *tapatoa* as ‘a strong southerly wind’. See also Hale, *Ethnography*, 122–3; Henry, *Ancient*, 459; Oliver, *Ancient*, 215–16.

¹⁶¹ Cook [Admiralty MS], 121.

¹⁶² *Ibid.* Cook remarks at the end of his ‘Description of the Islands of Ulietea, Taha and Bolabola’, just before the postscript on westerly winds in the Admiralty MS: ‘In these Proes or Pahees as they call them from all the accounts we can learn, these people sail in those seas from Island to Island for several hundred Leagues, the Sun serving them for a compass by day and the Moon and Stars by night. When this comes to be prov’d we shall be no longer at a loss to know how the Islands lying in those Seas came to be peopled, for if the inhabitants of Uleitea have been at Islands laying 2 or 300

Beaglehole dates the original drafting of this passage to the time of the 'General Description of New Zealand'. The passage appears to have undergone at least two further revisions,¹⁶³ and we are certain that its final re-evaluation occurred in the context of the renewed discussions about Tupaia's Map during its third draft stage (T3). About six months after Tupaia's initial remark on the seasonal variation of voyaging times from Rurutu to the Tonga Group was first recorded on 15 August 1769 (when we assume Tupaia's Chart began), Tupaia's and Cook's capacities to communicate with each other had much increased. Tupaia's command of English seems to have been quite substantial by then – it needs to be remembered that the Europeans had almost exclusively relied on Tupaia's translations in all communications with Māori people in the previous four months – and Cook would have had enough confidence in Tupaia's account by the time. It was in this context, then, that Cook must have added crucial information about the sustained practice of travels in east-western direction to the clean copy of his journal that he would personally hand over to the Admiralty (while Orton's copy had already been sent ahead from Batavia and the holograph MS remained in his possession).

We close our argument, however, with Cook's notations about the extent of Tupaia's personal voyaging. This takes us back to the island names which Cook copied from the second draft version of the chart (T2), around 29 January 1770, presumably without Tupaia being present. For what we have not discussed so far is that Cook marked such islands he thought 'Tupaia himself has been at' with a cross.

Research on Tupaia has so far largely relied on the information recorded in Cook's holograph journal (Canberra MS) and Beaglehole's transcription of it. Here, a mere 12 islands have been marked with a cross, all in the Society group, plus Rurutu and Ra'ivavae in the Austral Islands; 'Honue' (Niuē) appears to have been marked at first but then crossed out again at second thought. What is striking is that all these islands had been seen from the *Endeavour* on its course, except 'Manua', which Cook erroneously took to be the island which Tupaia hoped to reach on the *Endeavour's* course south from Ra'iātea, and which we hold to be Ra'ivavae.¹⁶⁴ Cook's conservative markings in the Canberra MS thus exclusively relied on the hard evidence he could establish on the basis of his own journal entries in the moment of copying the island names, as would have been quite typical of Cook's method. Yet we assume that he must already at this stage have intended to verify the number with Tupaia, seeing how blatantly this limited list contradicts the extensive knowledge of the region that Tupaia had displayed in the process of drawing the chart. And indeed, he did.

We assume that Cook raised the issue of Tupaia's own voyaging again during the extensive conversations around the third draft stage (T3), and eventually revised the number of crosses on the island list he had copied from the chart (T2). He must have failed to transfer these changes into his own running journal (Canberra MS),

Leagues to the Westward of them & so we may trace them from Island to Island quite to the East Indias'.

¹⁶³ Beaglehole, 'General Introduction', ccxvii.

¹⁶⁴ Cook, [Canberra MS], 107r, 108r.

but they clearly appear in Orton's copy (Mitchell MS) that was to be sent back to London from Batavia. According to Beaglehole, this is not surprising, in that Cook, in proof-reading Orton's copy, frequently inserted 'words that Orton had omitted' and 'filled in a few place-names'. Sometimes these revisions are only 'supplied in the copy and not the original'.¹⁶⁵

In the Mitchell MS, the number of islands marked as visited by Tupaia is substantially expanded (Figure 5).¹⁶⁶ It now also includes 'Tennowhammeatane' (the Marquesas), 'Teatowhite' (Rapa Nui), and 'Moenotayo' ('Uvea), as well as 'Whennuaouda' (Manuae), 'Motehea' (Manuae [Cook Is] or Aitutaki), 'Ourio' (Miti'āro), 'Orurutu' (Rurutu) and 'Oateeu' ('Ātiu). The latter part of this extended list suggests that Tupaia travelled beyond the Society and Austral Islands to all major targets in the southern Cooks. Yet it is the first three additions which are particularly breathtaking. Read in the light of Tupaia's comprehensive knowledge of wayfinding and narrative geography documented by the map, these islands mark the most remote points Tupaia claimed that he had himself travelled to, on the composite paths that he had outlined for Cook and his crew on the chart: to the Marquesas in the northeast, via the Tuāmotus; to Rapa Nui in the east, via Mangareva and Pitcairn; and to 'Uvea in the west, via Rarotonga, Tonga and Samoa. If true, it would leave only Rotuma and Hawai'i beyond his personal horizon of successful wayfinding.

CONCLUSION

Our reading of Tupaia's Map fully rehabilitates Tupaia against the denigrating early interpretations of Georg Forster or, most notoriously, of Andrew Sharp in the late 1950s, who held his own incomprehension of the chart against all Oceanic traditions of purposeful voyaging throughout the Pacific region. We have built on and extended a long history of practical and intellectual work on Polynesian voyaging in general and Tupaia in particular. Not only has Tupaia been rehabilitated as a master navigator whose navigational knowledge of the sea of islands encompassed the entire Polynesian triangle, with the seeming exception of only Aotearoa, the site where his chart received its final touches. Our reading also foregrounds him as a unique cultural intermediary whose ability to translate one highly complex system of wayfinding, of

¹⁶⁵ Beaglehole, 'General Introduction', cccix–ccxx.

¹⁶⁶ James Cook, 'A Journal of the proceedings of His Majesty's Bark Endeavour on a voyage round the world, by Lieutenant James Cook, Commander' [Mitchell MS], 25 May 1768–23 October 1770, State Library of New South Wales, Sydney, Safe 1/71, n.p. To our knowledge, only Greg Denning has commented on this discrepancy and suggested that 'until someone more expert on the question of Cook's journals solves the problem, we suggest that the number of islands marked on the Mitchell MS. is due to an interpreted identification of those 'islands to the west' which Tupaia claimed to have visited, but which are not otherwise noted on the list'. Denning, 'Geographical', 132.

representational world-making and ultimately of cosmology into a very different order of knowledge far exceeded the abilities of any of his European interlocutors.

Drawing on surviving archival evidence, we have reconstructed and roughly dated two distinct moments of mapmaking (around 15 August 1769 and 5 February 1770, respectively) and three distinct draft stages (T1, T2 and T3) in which the map was produced. Drawing on both the traditions and techniques of European and Polynesian wayfinding, we attempted to trace the expectations and conceptions brought to the map by Tupaia, Cook, Isaac Smith, Pickersgill, Molyneux, Banks and whoever else was involved in the collaborative project undertaken around the drawing table of the *Endeavour's* great cabin, and how these were negotiated in the mapping processes. We established that once the Europeans set up the chart for him, Tupaia introduced an ingenious cartographic system: using the concept of *avatea* (the sun's position at noon), he marked a positional north in the centre of the chart as a unifying point of directional reference for the voyaging paths he subsequently entered through the sea of islands. These routes, when taken together, form two composite long voyages: the first extending between Rotuma and Rapa Nui (covering a fifth of the circumference of the earth), the other between Tahiti and Hawai'i, replete with bearings for island-to-island travel, except within the Tuāmotu group. In its final stage of revision in Aotearoa/New Zealand, when the *Rima-roa* of Māori ancestral traditions was entered on the map, Tupaia eventually annotated his chart, not least by asserting his own genealogy as master navigator and by affirming his new alliance with the British.

This begs the question of why Tupaia agreed to draw the chart: after all, his knowledge as *arioi* navigator was highly specialized and ritualized within a strictly stratified society, to be transmitted only between master and a chosen disciple. An often reiterated argument to explain why Tupaia joined the crew of the *Endeavour* and so readily parted with his knowledge is that the world as he knew it was coming to an end.¹⁶⁷ However, we do not subscribe to this familiar trope of colonial first contact narratives. Tupaia's Map suggests that there must have been regular and extensive exchange across the islands it depicts, and Society Islanders doubtlessly had heard detailed accounts of contact with Spanish and Dutch ships in the 200 years preceding Cook's voyages, from the Marquesas, the Tuāmotus, Pitcairn, northern Tonga and beyond. None of these 'outriggerless canoes'¹⁶⁸ had brought about the end of the world as they knew it.

In the light of scholarship by Pacific historians like Anne Salmond, we prefer to believe that Tupaia's world had changed as a consequence of domestic political upheavals.¹⁶⁹ This first concerns the loss of his Ra'iatean titles after the invasion from Porapora. The excessive and lethal demonstration of British fire power in the first days of Wallis's sojourn at Matavai Bay must have convinced Tupaia that an alliance with the new arrivals was attractive. The *Endeavour* journals indeed suggest that, two years later, when piloting the ship through the Leeward Society group, Tupaia repeatedly attempted to convince Cook to partake in an attack on Porapora, which

¹⁶⁷ See for example Lala Rolls, dir., *Tupaia's Endeavour* (Māori Television, 2017).

¹⁶⁸ Driessen, 'Outtriggerless'.

¹⁶⁹ Salmond, *Aphrodite's Island*, chs 2–10.

Cook refused to do.¹⁷⁰ Tupaia's political position in his Tahitian exile, too, had become tenuous after the defeat of Pūrea in a civil war against the clan of Tutaha. When the *Endeavour* arrived and Tupaia chose to ally himself with Banks and the British, partly against the designs of Tutaha, it might have become precarious.¹⁷¹

Still, we assume that Tupaia's actual decision to sail with the *Endeavour* can only partly be explained by all this. We should not forget that Tupaia was a master navigator. If his account of the extensions of his own previous voyages is only nearly correct, ranging across the seas between 'Uvea, Rapa Nui and the Marquesas, he must have spent many years of his life navigating the South Pacific, perfecting the art of wayfinding and refining the ancestral narrative geography and the star paths he was taught at Taputapuātea *marae*. When the opportunity arose to travel with Cook and Banks, Tupaia must have been ready and keen to extend his horizon once again, both in the sense of trying to further understand how the strangers managed to navigate his seas, and in the sense of voyaging on and beyond the ancestral routes. Tupaia was not exceptional in this respect. The Tahitian Ahutoru had already joined the crew of Louis Antoine de Bougainville a year earlier and thus became the first Pacific Islander to visit Europe. On Cook's second voyage to the Pacific, the Poraporan Hitihiti joined the *Resolution* and became a confidant of the Forsters, while the Ra'iaŋtean Mai travelled on board the *Adventure* to become a London celebrity. All these Oceanic travellers exchanged their knowledge and understanding of the world with the Europeans on whose ships they travelled. Some, like Hitihiti and, most notably Puhoro, a Tuāmotan who in 1774 sailed to Lima with José de Andía y Varela, also openly discussed island lists, astronomy and navigational practice.¹⁷²

Tupaia's case is exceptional nevertheless by the extent of his knowledge, which far exceeds what earlier and later Oceanic voyagers shared with European interlocutors, and by the degree to which he was willing and able to experiment with European representational models. It seems highly unlikely that he received, or would have responded to orders to set down his world in a chart. His participation in the joint project was certainly of his own free will, while *taiō* bonds with Banks permitted him to part with his knowledge. Tupaia was fascinated by European models of representation, as is evident also from his striking watercolour sketches of scenes in the Society Islands, Aotearoa/New Zealand and Australia, and he had already collaborated in diverse mapmaking endeavours with Cook, Smith, Pickersgill and Banks. The Europeans' invitation to collaborate on a new map depicting Oceania at large must have been, first and foremost, a challenging but fascinating intellectual enterprise. How could one possibly squeeze a whole world of interconnected voyages,

¹⁷⁰ *Ibid.*, 208.

¹⁷¹ *Ibid.*, 201.

¹⁷² B.G. Corney, *The Quest and Occupation of Tahiti by Emissaries of Spain during the Years 1772–1776* (London: Hakluyt Society, 1913–1919), vol. 2, 284–7. Already 170 years earlier, at Taumako (Temotu Province, Solomon Islands) in 1606, Quirós had been given information about extensive Indigenous knowledge of islands in the western Pacific. G.S. Parsonson, 'The Problem of Pouro and Manicolo', in *La Australia del Espíritu Santo*, ed. Celsus Kelly (Cambridge: Hakluyt Society, 1966), vol. 2, Appendix 2, 377–9.

each replete with distinct star and sun paths, a range of astronomical markers, the specificities of lunar season, the directions of currents, swell, winds, cloud formation, sea life, birds, ancestral traditions, a whole cosmology and way of navigational life, on a single flat sheet of paper? It was a challenge that Tupaia was ready to take on. The rest is the history we have attempted to minutely trace in this overly long essay.

We conclude by again acknowledging the limits of our position in discussing Tupaia's Map. We write in Berlin, far from Oceania, trained and working in (post-colonial) literary and cultural studies within the bounds of the Western academy. This vantage point continues to be a privilege in many ways, facilitating our access to the archives and everything that circulates around the chart in writing and audiovisual media (such as Lala Rolls' outstanding documentary film *Tupaia's Endeavour*).¹⁷³ However the privilege also builds on a colonial legacy and needs to be made reflexive. Part of this consists in acknowledging the many things we do not know.

We of course hope that our reading of Tupaia's Map will resonate with other research from and about Oceania in other disciplines: with linguistic, phylogenetic and archaeological findings about the settlement and exchange in the wider region, but also with historical and anthropological research. What our reading of Tupaia's Chart really supports is not only that there was a continued tradition of Polynesian voyaging across the sea of islands probably well into the 19th century; it also underscores the historicity of ancestral voyaging legends like that of Rātā or 'The Birth of New Lands', and their pragmatic use value for subsequent navigational practices.

What we really hope, though, is that Tupaia's Map will resonate in Oceanic communities within and beyond the confines of academia: that it speaks to those who still sail, or have again begun to sail the old routes as part of a continued Pacific Renaissance, drawing on traditional voyaging knowledge and practical experiences to which we have no access; that it may be of use in the recovery of distinctly Oceanic cosmogonies and astronomies underway in various cultural associations in the region; that it echoes with local stories and traditions of exchange, travel and encounter across Oceania. What we, from our European vantage point have attempted to do, is to show how Tupaia translated his world into modes of representation which, he assumed, were recognizable to his European interlocutors. We now hope to find readers with access and title to knowledges to reverse this translation, by re-translating Tupaia's Map into Oceanic worldings.

We give the last word to a European who, it seems, was willing to take seriously Oceanic worldings. John Marra, who joined the *Endeavour* at Batavia only after Tupaia's death and sailed with the Forsters on the *Resolution*, remarked:

As their whole art of navigation depends upon their minutely observing the motions of the heavenly bodies, it is astonishing with what exactness their navigators can describe the motions and changes of those luminaries. There was not a star in their hemisphere fixt or erratic but Toobia could give a name to, tell when and where it would appear and disappear; and what was still more wonderful,

¹⁷³ Rolls, *Tupaia's Endeavour*.

could foretell from the aspect of the heavens the changes of the wind, and the alterations of the weather, several days before they happened. By this intelligence he had been enabled to visit most of the islands for many degrees round that of which he was a native. By the sun they steer in the day, and by the stars they steer in the night; and by their skill in presaging the weather, they can without danger lengthen or shorten their voyage as appearances are for or against them.¹⁷⁴

Tupaia's Map is manifest testimony to the mastery and extent of Polynesian navigation which Marra reported here. And it is a living document of the enlarged world of Oceania before it was segmented by the dynamics of mission, colonial rule, nationalism and neo-colonial dependency; a world which, in the vision of Epeli Hau'ofa, is on the way again to become a veritable sea of islands, rather than islands in a far sea.¹⁷⁵

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¹⁷⁴ John Marra, *Journal of the Resolution's Voyage: in 1772, 1773, 1774, and 1775* (London: F. Newbery, 1775), 217.

¹⁷⁵ Hau'ofa, 'Our Sea of Islands'.

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