

## 2. Volcano Sightings by European Navigators: 1528–1870

... a large volume of dense white smoke [was observed] to issue forth, & continue high in the air, in the vast conical mass, which on examination with a Telescope was plainly seen to emanate from a volcano in active operation! all down the sides were numerous furrows or channels from whence the smoke arose, as though from a recent deposition of molten lava.

John Parker Wilson (1842)

### Saavedra, Retes and Mendaña

The Bible contains the following information:

And King Solomon made a navy of ships ... And Hiram sent in the navy his servants, shipmen that had knowledge of the sea, with the servants of Solomon. And they came to Ophir, and fetched thence gold, four hundred and twenty talents, and brought it to King Solomon.<sup>1</sup>

Discovering the location of Ophir and its gold was one of the factors that drove the Spanish to explore the south-west Pacific, despite both the brevity of the Bible's reference to Ophir and the absence of any hints to its actual location. The belief in Ophir was interwoven with tales of a suspected southern antipodean continent — *Terra Australis Incognita* — as well as of gold-bearing islands that the Spanish conquistadores had heard about from Incan historians. Further back still were classical references to the golden and silver islands of *Khryse* and *Argyre*. The Spanish embarked against a background of belief in the existence of Ophir — 'a loose amalgam of biblical and classical tradition, scholarly and cartographical deduction and conjecture, report and rumour, fact and fiction'.<sup>2</sup>

Gold is intimately connected with the volcanological history of Near Oceania. This is not only because volcanoes were discovered, coincidentally, in attempts to locate the metal during this Spanish 'discovery' phase of the sixteenth century, but geologically as well, for many of the economic gold and copper deposits of the region are found in the roots of geologically recent volcanoes and in the alluvial deposits derived from them. King Solomon's sources of gold were

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1 King James Bible, Chapter 9, Verses 26–28.

2 Jack-Hinton (1969), p. 27.

never found in Near Oceania, or elsewhere, but mineral-extraction companies in the twentieth century created their own mines there, such as at Panguna, Ok Tedi and Lihir, after geological exploration in volcanic areas. Furthermore, the king and the Ophir legend are now embedded in the biblical naming of the Solomon Islands.

New Guinea Island in the early sixteenth century was at the edge of Europe's known world, when the powers of Spain and Portugal were jostling for economic ascendancy amongst the spice-rich islands of south-east Asia.<sup>3</sup> Their aspirations were controlled to an extent by treaties and Papal Bulls aimed at defining two world hemispheres whose longitudinal boundary on the other side of the world from Europe — defined by the Treaty of Tordesillas — ran somewhere near the spice-rich Moluccas just north-west of New Guinea. Jorge de Meneses, the Portuguese governor-elect of the Moluccas, encountered *Ilhas dos Papuas* and the Papuans living there, at the north-western end of New Guinea in 1526.

The Spaniard Alvaro de Saavedra Cerón attempted to return to Mexico from the Moluccas in both 1528 and 1529, by sailing eastwards along the north coast of New Guinea then north-eastwards, becoming the first European to encounter Manus, the largest island of what the British would later call the Admiralty Islands. Iñigo Ortiz de Retes in 1545 also attempted to cross back across the Pacific to Spanish America by first sailing eastwards along the north coast of the island that he named *Nueva Guinea*, New Guinea.<sup>4</sup> His vessel, the *San Juan*, was twice forced northwards from New Guinea by difficult winds, but it seems to have reached about 5 °S — perhaps somewhere near Karkar volcano, where the north coast swings southwards — before the voyage was abandoned. The return voyage to Portuguese territory was through the small islands situated well to the west of Manus, where Melanesians attacked the ship wielding spears tipped with 'flint suitable for striking fire'.<sup>5</sup> One interpretation is that this is 'a clear reference to obsidian spearpoints' traded from the Admiralty Islands.<sup>6</sup>

Original documentation on the voyages of both Saavedra and Retes is not detailed, and there is no known record of volcanoes having been seen by them. The label 'Los Volcanes', however, appears in different spellings on several European maps showing the north coast of New Guinea, and which were published later in the sixteenth century and into the seventeenth century — including, for example, on Abraham Ortelius' *Typus Orbis Terrarum*, or Map of the World, the

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3 Wright (1945), Sharp (1960) and Whittacker et al. (1975, Documents B1–B9).

4 See, for example, Sharp (1960).

5 Sharp (1960), p. 31.

6 Spriggs (1997), p. 226. Obsidian, however, is unlikely to produce a spark hot enough for fire-lighting purposes. The term 'flint', used by the Spaniards and translated by Sharp (1960) may, therefore, simply be a general reference to stone that was shaped by flaking, which would be familiar to people in the sixteenth century as gun flints and as natural flints, such as chert, used for fire lighting (J. Kennedy, personal communication, 2012).

world's first modern atlas, which was first published in 1570.<sup>7</sup> The early voyages by Saavedra and Retes, then, could be the source of this brief volcanological information. One is tempted to imagine that the youthful volcanic forms of, or even eruptions from, at least some of the islands must have been identified by Saavedra, or Retes, or both, as they passed along the north coast of New Guinea Island during their respective passages.



**Figure 8.** ‘Los Bolcanas’ lie off the north-eastern ‘corner’ of New Guinea Island in this detail from the decorative chart *Insulae Moluccae*, which is dated 1617, but is based largely on 16th century sources.

Source: C.J. Visscher (1617), ‘*Insulae Moluccae celeberrimae sunt ob maximam aromatum copiam quam per totum terrarum orbem mittunt*’. Mitchell Library, State Library of New South Wales (Safe/M2 470/1617/1).

Another sixteenth century Spanish record of volcano observation is from 1568 when Alvaro de Mendaña, ‘in a spirit of colonialism, commercialism, Catholic proselytism and romantic curiosity’<sup>8</sup> crossed the Pacific and found what would subsequently be called the ‘Islands of Solomon’. One of the islands is Savo volcano, about 35 kilometres north-west of present-day Honiara on Guadalcanal, ‘which is always throwing out a great deal of smoke’, wrote Hernando Gallego, chief pilot of the expedition.<sup>9</sup> Whether this means that Savo was in actual eruption, or was in a passive state and simply sending out a plume of water vapour, is unknown, but there are no references to either falls of ash or glows from the central crater. Gallego also referred, rather peculiarly, to what ‘appears to be a road descending from the top to the sea’. The ‘road’ almost certainly was a gully down which some sort of flowage had recently denuded the vegetation — perhaps a rush of water, or a flow of mud, or a pyroclastic flow. Thus, although Savo does not seem to have been in eruption during Mendaña’s visit, it may have been in eruption a short time before, or else Mendaña was there during a relatively ‘quiet’ phase of a longer eruptive period.<sup>10</sup>

7 Jack-Hinton (1969) and, for example, Ehrenberg (2006).

8 Jack-Hinton (1969), p. xv.

9 Tyssen-Amherst & Thompson (1901), p. 30.

10 Petterson et al. (2003).

## Schouten, Le Maire and Tasman

The motivations of the Dutch in exploring the south-west Pacific in the seventeenth century were more specifically oriented to trade and profit than were those of the Spanish. Their pragmatic mercantile ambitions and bulbous cargo ships had already led to the establishment of commercial interests, particularly in relation to the spice trade, in the form of the *Verenigde Oostindische Compagnie* or United East India Company. The Dutch had aspirations to widen their web of influence, and they would eventually colonise what is now Indonesia, including western New Guinea. The Dutch, as the governing power in the Dutch East Indies, would have to deal with disasters from volcanic eruptions, perhaps most famously from Krakatau volcano in 1883. The Spanish, in contrast, had lost a colonising interest in the region. Their power as a major maritime nation had declined by the end of the sixteenth century, although they had undertaken a second voyage to the Islands of Solomon in 1595.

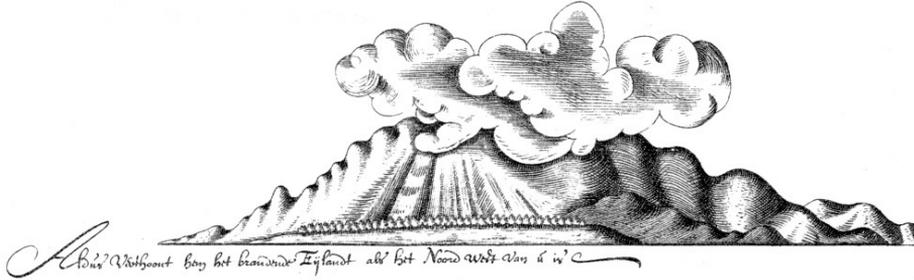
Accounts of two Dutch voyages refer to volcanoes and their activity in Near Oceania. The first of these was undertaken in 1615–1617 by Willem Cornelisz Schouten, ‘a man well experienced and very famous in navigation’, and by Jacob Le Maire — supercargo, commander of the voyage, and son of Isaack Le Maire ‘renowned merchant of Amsterdam ... being very inclined to trade in strange and far distant parts’.<sup>11</sup> Schouten and Le Maire crossed the Pacific from Cape Horn, sailed up the eastern side of New Ireland, rounded its north-western end, then crossed the Bismarck Sea to the New Guinea north coast, where Saavedra and Retes had sailed in the previous century. The Dutchmen saw, on the morning of 7 July 1616, ‘a burning island, emitting flames and smoke from the summit, wherefore we gave it the name Vulcanus. The island was well populated and full of coker-nut trees’. The volcano is Manam and this statement represents the first known European report of an unequivocal volcanic eruption in Near Oceania. Schouten was at first inclined to think the volcano might be Api, in the Banda Sea to the west of New Guinea, so similar did the sizes and shapes of Manam and Api appear to him. Large imposing stratovolcanoes such as these do indeed look alike, their great height and imposing symmetry reflective of a global constancy in the geological processes that form them.

The second Dutch voyage of relevance is that of Abel Janszoon Tasman who, in 1643, after mapping parts of the coastlines of Tasmania and New Zealand, entered Near Oceania, following a similar track to that of his countrymen, Schouten and Le Maire, 27 years earlier. Tasman sailed between the volcanic Witu Islands and the north coast of New Britain, and reached the offshore islands of New Guinea where, on the night of 20 April 1643, he saw ‘a large flame issue steadily from

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<sup>11</sup> Villiers (1906), p. 166.

the top of the mountain. This is the volcano which Willem Schouten refers to in his *Journal*.<sup>12</sup> ‘Vulcanis’ is Manam, and a drawing of the ‘burning island’ in Tasman’s journal is indeed a good likeness of the island volcano.



**Figure 9. An English translation of the caption seen on this drawing of Manam volcano from Tasman’s journal reads: ‘A view of the burning Island when it bears from you north-west’. The ravine on the left running from the near the top of the island down to the sea, is the south-western ‘avalanche’ valley on Manam. There are four such valleys on Manam, which deliver sediment into the sea, building up coastal fans, such as the one seen here. The billowy cloud at the summit of the volcano is not necessarily of volcanic origin and may simply be a decorative weather feature.**

Source: Tasman (1898, detail of figure opposite the journal-facsimile page containing entries for 13–14 April 1643).

Tasman noted two days later, on 22 April, ‘At this time we had the high burning mountain east-south-east and south-east by east from us at 7 miles’ distance. At night the flames were very violent’,<sup>13</sup> which, again, refers to Manam. However, *two* ‘burning islands’ are shown on the charts that were compiled by later cartographers of the Tasman voyage, including the well known ‘Bonaparte’ and ‘Eugene’ maps, one island corresponding to Manam, the other to Karkar Island. This may be a cartographic error, as Tasman refers to only one volcano in activity. In addition, one of Tasman’s recent editors, historian Andrew Sharp, concluded in his 1968 study that the active volcano seen on 20 April 1643, and illustrated, was actually Karkar and that Tasman was mistaken in identifying it as Manam. The evidence for this allegation, however, is not convincing as the volcano in the illustration closely resembles that of Manam. Tasman, in any case, would have been lucky to see any eruptive activity from Karkar during the short time he was near the island. This is because there have been only two reported observations of eruptive periods at Karkar during the past four centuries — one in the late nineteenth century, the other in the 1970s. Manam, therefore, which is much more frequently active, was more likely to have been the only volcano that Tasman saw in eruption in 1643.

<sup>12</sup> Tasman (1898), p. 46. See also Sharp (1968), pp. 229, 231.

<sup>13</sup> Tasman (1898), p. 49.

These early references to volcanoes represent all that is known from the Spanish and Dutch periods of exploration in Near Oceania. All of the descriptions are frustratingly brief and, in some cases, unclear or ambiguous, and none of them contains the descriptive detail of a volcanic eruption that William Dampier subsequently provided for Ritter Island in 1700. The voyage by Mendaña in 1568, when Savo volcano was seen, is perhaps the most convenient start to the 'historical' period of volcanic activity in Near Oceania, but the description by Schouten and Le Maire of Manam in 1616 is the least ambiguous of the few early observations of eruptive activity in the region. A 'historically active' volcano, then, is one that has been in eruption since 1616, or 1568, even though there are large gaps in the documentary record of activity during subsequent centuries.

## **Carteret, Hunter, D'Entrecasteaux and Parker Wilson**

The French and British together took an interest in Near Oceania after, and to an extent because of, Dampier's 1700 voyage. Both nations had similar longer term global interests in the expansion and securing of empires, colonies, and power — interests that at times brought them into direct military conflict in Europe during the French Revolutionary and Napoleonic Wars of 1792–1815. The respective characteristics of their expeditions to Near Oceania in 1700–1870 were similar too, at least to the extent that scientific objectives were articulated together with the broader aim of 'discovery', and that their ships of exploration carried natural scientists. 'Rediscovering' the Solomon Islands and locating them more precisely also featured strongly in the aims of the eighteenth century voyages. These goals were a reflection of the emergence of science during the Enlightenment movement of eighteenth century Europe, when the rational faculties of the human mind were expected to deliver a greater understanding of the world at large.

Philip Carteret undertook a round-the-world voyage for the British Crown in 1766–1769 in the *Swallow*. It was a remarkable effort because of the endurance of its long-suffering crew and because the vessel was a decrepit and heavy man-o'-war — both slow and difficult to handle. The *Swallow* was in the northern Solomon Sea on 9 September 1767 when Carteret found the channel or strait between New Britain and New Ireland that his countryman, Dampier, in 1700, had thought to be a bay. Carteret was assisted in finding the strait by the south-east trade winds prevalent at that time of year, September; whereas Dampier, who sailed there in March, found that the north-western monsoon had set a south-easterly current which stalled any northwards track into the 'bay'.

Carteret gave the name Duke of York's Island to the largest of the cluster of islands in the middle of the St Georges Channel, which would be used as an important base for European settlement more than a century later. More particularly, however, Carteret noted that on the western side of St Georges Channel were 'three remarkable hills close to each other, which I called the Mother and Daughters. The Mother is the middlemost and largest, and behind them we saw a vast column of smoke so that probably one of them is a volcano'.<sup>14</sup> The three hills are prominent, peaked, and inactive volcanoes in the Rabaul area of north-east New Britain. The 'smoke' was evidently from one of the smaller unseen volcanoes that nest inside the protected natural harbour at Rabaul and which may have been either Rabalanakaia or Tavurvur. Carteret was the first European to notice parts of the Rabaul volcanic complex, which, today, is regarded as the highest risk volcanic centre in Near Oceania.



**Figure 10. The volcanoes of the Rabaul area are highly exaggerated in this sketch from the Carteret voyage to the area in 1767. They are certainly steep, but do not overhang as shown here.**

Source: Hawkesworth (1773, 1, detail from figure facing p. 368). Clifford Collection (RB CLI 3561), National Library of Australia, Canberra.

French aristocrat and voyager, Louis-Antoine de Bougainville, reached the Solomon Islands from the south-west on 28 June 1768 and, in early July, he sailed north-westwards along the eastern coast of what would become recognised as the largest island of the Solomons. His was not a volcanologically significant exploration because, unlike Carteret the year before, Bougainville evidently did not see any eruptions in the region during his voyage, or recognise volcanoes on the island named after him.<sup>15</sup> This, however, is not surprising because the volcanoes there, when viewed from the east, form the high central spine of the island, which during the day is commonly covered by cloud.

The year 1788 is a pivotal one for the volcanological story of Near Oceania. This is not because of any particular volcanic happening, but rather because the British 'First Fleet', under the command of Captain Arthur Phillip, arrived that year at Botany Bay on the east coast of Australia with its cargo of convicts, marines,

<sup>14</sup> Hawkesworth (1773), p. 376. See also Wallis (1965).

<sup>15</sup> Bultitude (1981).

officers, and crew. It is, therefore, the year that marks the beginning of European settlement of the eastern coast of Australia and, gradually, establishment of regular shipping lanes northwards through Near Oceania to China, south-east Asia and India, and to London via Batavia, capital of the Dutch East Indies. Both Dampier Strait and St Georges Channel were used for this purpose although, for safety reasons, many ships would sail the longer routes east of Bougainville Island.<sup>16</sup>

Ships stopped in Near Oceania to take on fresh water and food, the number of 'first contacts' between Melanesians and Europeans thus increasing.<sup>17</sup> Europeans intent on trade and resource exploitation stopped over, too, later including those involved in the infamous 'blackbirding' of Melanesian labour for the sugarcane fields of Queensland. Whalers arrived, working grounds near Bougainville Island for example, and missionaries were attracted to the region by the prospect of spreading the Word of God and saving needy souls amongst the godless 'savages'. Adventurers and naturalists were drawn in search of excitement, uncertainty and discovery of the unknown in a part of the world still distant, mysterious and isolated from Europe. Beachcombers and men stranded by shipwreck found their own refuges amongst the islands. All of these people are potential sources of volcano observations — at least, those of them who were sufficiently literate and sufficiently motivated to record them.



**Figure 11. Canoes of the Duke of York Islands decorate this drawing from John Hunter's account which uses the volcanoes of the Rabaul area, somewhat disproportionately, as a backdrop. The large central cone is Kabiu or the Mother volcano. Tovanumbatir, or North Daughter, is to its right, and what appears to be Watom Island is on the extreme right. Tavurvur is shown in eruption, in 1791, between Turagunan or South Daughter, on the left, and the Mother. The caldera wall of Rabaul volcano is shown on the extreme left behind Turagunan.**

Source: Hunter (1968 (1793); Plate 11). National Library of Australia, Canberra.

<sup>16</sup> Whittacker et al. (1975, Documents C1–C11).

<sup>17</sup> See, for example, Thomas (2010).

John Hunter was Phillip's second-captain in the First Fleet and in command of the armed tender *Sirius*. He returned to England on the hired Dutch vessel *Waaksamheid* by way of St Georges Channel and, between 22–25 May 1791, was anchored at the Duke of York Islands. Hunter wrote in his account that 'The hills mentioned by Captain Carteret ... by the name of Mother and Daughters are very remarkable. A little way within the south-eastermost Daughter there is a small flat-topped hill, or volcano, which all the time we were within sight of it, emitted vast columns of black smoke'.<sup>18</sup> The volcano is Tavurvur, the black smoke is ash laden and Hunter, therefore, saw the volcano in full eruption.

Comte de La Pérouse and his ships the *Boussole* and *Astrolabe* were at Botany Bay in January 1788, even as the British First Fleet's convicts and crew were being settled at Sydney Cove. Jean-Francois de Galaup de La Pérouse was on a major voyage of discovery for the French, supported by King Louis XVI, and aimed at rivalling the British successes of Captain Cook. La Pérouse left Sydney in March 1788, but he was wrecked in the Santa Cruz Islands, never to be seen again — at least by Europeans. A search mission in 1792–1793, supported by a now post-Revolution government — the Bastille had been taken on 14 July 1789 — was led by Contre-Amiral Antoine-Raymond-Joseph Bruny-d'Entrecasteaux, who undertook two voyages into Near Oceania using the *Recherche* and the *Esperance* — 'search' and 'hope' respectively.<sup>19</sup>

The first voyage was in mid-July 1792 when D'Entrecasteaux sailed up the western side of Bougainville Island, but nothing of volcanological significance was reported, and the first known and recorded claim of seeing volcanic activity on the island was not until four years later. Captain Hogan of the *Marquis Cornwallis* was sailing en route from Port Jackson to Canton, China, when he saw on 6 July 1796 'a great quantity of black, or rather sulphureous smoke of matter emitted from the earth'.<sup>20</sup> The coordinates given by Hogan for the emission, however, correspond to a point near the north-eastern coast of the island where there are no volcanoes. The report may therefore be spurious, but this did not stop a 'Cornwallis volcano' being marked on later charts, even into the twentieth century.<sup>21</sup>

A voyage along the western coast of Bougainville by the *Margaret Oakley*, sometime after October 1834, and possibly in 1835, resulted in the frustratingly brief statement that '... the summit of a mountain was crowned by what appears to be two extinguished volcanic craters'.<sup>22</sup> And the French naval explorer

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18 Hunter (1968), p. 155.

19 Labillardiere (1800), Beautemps-Beaupré (1807), Rossel (1808) and Duyker & Duyker (2001).

20 Hogan (1801). See also Jack-Hinton (1969) and Bultitude (1981).

21 Guppy (1887) appears to have been the first to cast doubt on the validity of the Hogan report. Bultitude (1981) gave examples of the later false mapping of Cornwallis volcano.

22 Jacobs (1844), p. 221. See also Bultitude (1981).

Jules Sebastien Cesar Dumont D'Urville in December 1838 made an even more intriguing observation that the highest of the island's summits 'expose to view some hues which, from the reflection of the sun, resemble piles of snow in the gullies'.<sup>23</sup> This may refer to the bare solfataric area on the summit of Balbi volcano, although Dumont D'Urville did not refer to any volcanoes as such.

The first unequivocal observation of an active volcano on Bougainville Island by a European was not until 50 years after D'Entrecasteaux's visit, when John Parker Wilson, ship's surgeon on board the British whaler *Gypsy*, described and sketched Bagana. The volcano was near the centre of the island and Parker Wilson saw it from the south-west on 15 March 1842.<sup>24</sup> His description of 'numerous furrows and channels' marking the sides of the volcano is typical of Bagana today, where masses of slowly moving lava spill imperceptibly down its flanks from a central, vapour-producing crater, creating a strongly 'furrowed' appearance to the sides of the mountain, and sending off water vapour at cool or wet times of the day. The description is also the first recorded observation of probable lava extrusion at a volcano in Near Oceania. *Lava flows* are distinct from 'pyroclastic flows'. They represent the down-slope movement of a coherent stream of hot 'sticky' liquid — much more viscous than, say, water — which cools gradually on the outside producing a rough rocky exterior and eventually freezes. This is in contrast to faster moving pyroclastic flows, which are hot, highly mobile avalanches of hot rock, dust, and gas. Lava flows are usually easy to walk away from. Pyroclastic flows are not.

The second voyage by D'Entrecasteaux, in 1793, was somewhat more volcanologically significant than his first one the year before. He sailed through the Louisiade Archipelago off the south-eastern tip of New Guinea, which had been named previously by his countryman Bougainville, then north-westwards through islands that received his own name — the D'Entrecasteaux Islands — and on to Dampier Strait. The islands of both the Louisiade and D'Entrecasteaux groups include youthful volcanoes, but these eruptive centres are small or inconspicuous and would easily have been overlooked. Then, in Dampier Strait on 29 June 1793, a volcano in eruption is spotted. Two expedition accounts of this eruption are available. D'Entrecasteaux himself wrote of seeing:

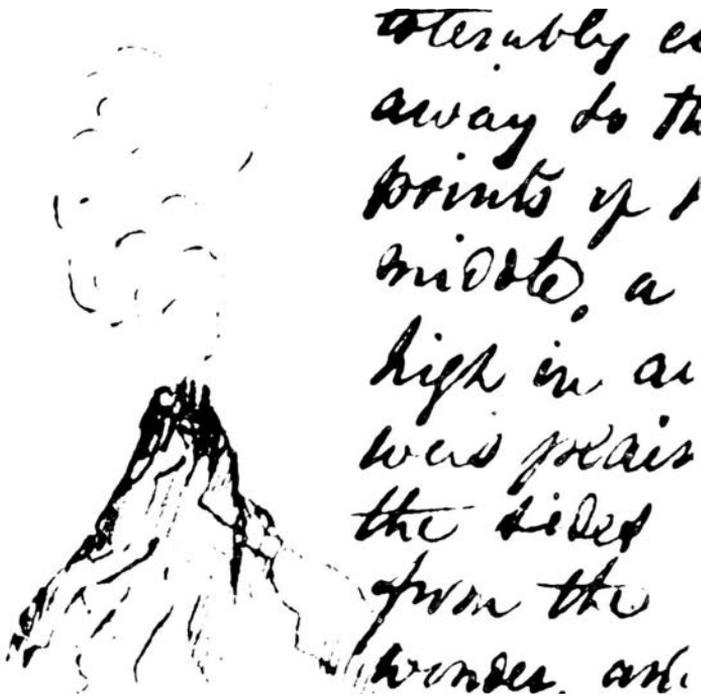
an enjoyable spectacle: a sudden eruption of a volcano on the island closest to the coast of New Britain. The flames were not visible, as it was daytime. But masses of thick smoke could be seen coming out of the summit of the mountain; and a flow of lava was dashing to the sea, forming several cascades, from which columns of white smoke could be seen rising at different heights, even on the sea-shore.<sup>25</sup>

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23 Dumont D'Urville (1843), p. 93. The English translation is from Bultitude (1981, p. 232).

24 Wilson (1839–1843).

25 Duyker & Duyker (2001), p. 258.



**Figure 12.** Dr Parker Wilson in 1842 drew, in the margin of his diary, this simple sketch of Bagana showing impressionistically the channels formed by the steep-sided, blocky, lava flows that make up the volcano.

Source: Wilson (1839–1843), Royal Geographical Society (RGS-IBG Collections, reference 'ar JWI/1/15031842').

The naturalist Jacques Labillardiere provided another witness account, referring to the

great quantity of burning substances [being] thrown out of the aperture of the volcano, which lighting upon the eastern declivity of the mountain, rolled down the sides till they fell in the sea, where they immediately produced an ebullition in the water, and raised it into vapors of a shining white colour. At the moment of the eruption, a thick smoke, tinged with different hues, but principally of a copper colour, was thrown out with such violence, as to ascend above the highest clouds.<sup>26</sup>

These two accounts are remarkably similar, both to each other and to the one given by Dampier from his 1700 voyage in that, again, some form of pyroclastic flow was seen racing down the flanks of a steep island into the sea. The Frenchmen, however, did not realise that the volcano they were observing

<sup>26</sup> Labillardiere (1800), pp. 447–48.

was the same one, later named Ritter, that Dampier had seen nearly a century before. Labillardiere, particularly, thought incorrectly that Dampier's volcano was another nearby but inactive volcanic island, and that they had witnessed eruptive activity from a different and hitherto unknown volcano.

D'Entrecasteaux passed through Dampier Strait and sailed eastwards along the north coast of New Britain, passing the Witus Islands, and noting on 3 July three peaked islands in a chain running north from New Britain. These he named Willaumez, Raoul and Gicquel, after members of the voyage.<sup>27</sup> The 'islands' are part of Willaumez Peninsula, a 60-kilometre-long chain of volcanoes that runs northwards from the north coast of New Britain. Some commentators have concluded that there must have been modern uplift of the islands and emergence of the sea floor between them.<sup>28</sup> A more likely explanation, however, is that D'Entrecasteaux did not realise, because of his low and distant vantage points, that the high points which he thought were islands were actually linked by low land. D'Entrecasteaux also recognised another island to the east, which he named Du Portail after another expedition member, but which is now known to be Lolobau volcano, a true island. Pic Deschamps on the mainland was named too — the feature is Likuruanga or North Son volcano. None of the many peaks and islands given French names during the D'Entrecasteaux expedition were recognised as being volcanoes.

European voyages through Dampier Strait and along the north coast of New Guinea continued throughout the nineteenth century and reports from them contain some mention of volcanoes. Dumont D'Urville, for example, gave the dimensions of Ritter Island in 1827, confirming its exceptionally steep slopes, but not recording any eruptive activity.<sup>29</sup> Captain Benjamin Morell saw Manam activity in 1830, and made the doubtful claim that he had seen seven active volcanoes in all, five of which were in eruption and the other two 'smoking'.<sup>30</sup> His book is an example of an entertaining style of nineteenth century travel reporting in which inaccuracies and exaggerations, such as this, cast doubt on the veracity of other observations that may in fact be accurate.

An early and remarkably bold attempt at European settlement was made in 1848 on the northern coast of Umboi Island in Dampier Strait by French missionaries of the Roman Catholic Marist order. Ritter was seen producing '... thick smoke which emerges from three places almost at the highest point of the cone'.<sup>31</sup> The mission was withdrawn in 1849, re-established in 1852–1855, but apparently

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27 Duyker & Duyker (2001), pp. 259–60. Jean-Baptiste-Philibert Willaumez was *enseigne de vaisseau* on the *Recherche*.

28 Stanley (1923).

29 Dumont D'Urville (1832).

30 Morrell (1832).

31 Cooke (1981), pp. 117–18. See also Laracy (1976).

without any further significant records being made of Ritter or its eruptive activity. This is not surprising as the would-be missionaries had other concerns on their mind: they were plagued by malaria and other physical hardships, and were singularly unsuccessful in convincing the local Melanesians of the biblical messages of salvation they wished to impart. Significant European settlement by missionaries and traders would not take place until the 1870s, more than 300 years after the Spanish first entered Near Oceania. Melanesians themselves during these 300 years and indeed for the previous tens of millennia, had seen volcanoes in a quite different light.

## European and Melanesian Viewpoints

What can be drawn from the preceding review of European volcano observations from 1528 up to the start of European settlement beginning after about 1870? First, eruptions were reported for five volcanoes — Manam, Karkar, Ritter, Rabaul and Bagana — although the Karkar observation is questionable because of the probable misinterpretation of Tasman's reports, and Parker Wilson may not have realised that the lava on Bagana was flowing, although it probably was. Ritter is perhaps the best known volcano of the period on account of its conspicuous position in the middle of the navigable Dampier Strait, and Dampier's record of its 1700 activity and cascading pyroclastic flows is the most insightful from a volcanological perspective. Plumes or clouds of vapour and gas were being emitted from another three volcanoes during 1528–1870 — Savo, Ulawun, and possibly Kadovar — but whether these contained ash and whether, therefore, the volcanoes were in actual eruption, is unclear.

The observations at all of these named volcanoes were brief and were made in transit from points at sea. The records, too, are fleetingly short and some are inaccurate and confusing, which is hardly surprising bearing in mind the concerns of earlier voyagers in particular — ship safety, navigation in uncharted waters, the deteriorating condition of hulls and rigging, onboard discipline, inadequate diet, polluted food and water, odorous bilge waters, disease, and fear and apprehension of indigenous people. Neither is there any indication in the reports of the dangers posed by such volcanoes to either indigenous Melanesians or to future potential settlers from Europe. Nevertheless, these limitations notwithstanding, the European voyagers demonstrated in their records that Near Oceania was clearly a volcanically active area, and that the chain of islands off the New Guinea north coast contained many of the active volcanoes of the region. They were also, in the main, able to relate the times of their observations to a day on the calendar.

Melanesian viewpoints throughout the period 1528–1870 were rather different from European ones. Information about past volcanic activity can be transferred by Melanesians from generation to generation through the verbal telling of memorable events, but the absence of a traditional Melanesian calendar means that ‘dates’ cannot be assigned to specific happenings, except possibly in a general way by counting back the number of generations. Generations potentially can ‘drop out’ or be added to such sequences, although this is not so much of a problem for recent eruptions that are fresh in community memory. The accuracy of information transferred through long, even multiple, genealogical chains is also an issue in which content and emphasis change. The volcanological historian seeking so-called ‘hard’ facts in these stories must remember, too, that their genesis lay in a purpose different to the scientific recording of events.<sup>32</sup> Volcanological oral history, nevertheless, has significant value, particularly where stories can be checked for veracity against the geological record.

Two examples may be given here. Both refer to eruptions in the mid-nineteenth century that were not witnessed by Europeans, yet which are consistent with the geological record. The first example is a metaphoric story of battling spirit beings from the Rabaul area. A Roman Catholic priest in 1937 informed the *Rabaul Times* about meeting elderly villagers who remembered the volcanic activity that produced Sulphur Creek volcano to the north-west of Tavurvur and west of the Mother. His main source was a prominent village leader, To Mulue, who said in the retelling by the priest:

All that land rose during a heavy earthquake. I was a young man when it happened, and now I am, but for an old woman at Davuan, the only living witness ... the earth broke in eruption. The crater is called Kururung maqe — it is close to the hot water creek in Rabaul. A big crab had a quarrel with a snake and caused the eruption. Stones were thrown inland ... [and] new land rose on the mainland ...<sup>33</sup>

This young volcano, Sulphur Creek, is clearly identifiable today at the head of the straight, canal-like inlet that runs eastwards from the harbour. The priest estimated that the eruption must have taken place sometime in 1845–1850. Other recorders of the same eruption have suggested 1840.

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32 See, for example, the discussion of Tolai stories of Rabaul eruptions by Sack (1987). Neumann (1992), in particular, uses oral narratives to reconstruct Tolai history and reviews some of the development of oral history as a discipline of serious inquiry.

33 Boegershauser (1937), p. 15. The same eruption is also mentioned in an earlier account by Boegershauser (1906), in which he said that the Sulphur Creek eruption took place at the same time as activity from Rabalanakaia volcano. The two reported eruptions, however, may refer to the same one, as Sulphur Creek and Rabalanakaia are close together, and there are no other known eyewitness records of an eruption at Rabalanakaia at this time.

Oral traditions about an eruption on Savo Island sometime in 1830–1840 have been collected by at least three people. The most recent collection was by Thomas Toba, a Solomon Islands seismologist, who was born on the island and who documented *kastom* stories about Savo eruptions through a series of villager interviews.<sup>34</sup> All of the accounts of the eruption are broadly consistent with one another. There were periods of total darkness over the island caused by ash clouds that spread as far the north-western coast of Guadalcanal Island and which continued for a long time. Savo villagers evacuated to Guadalcanal. Explosions and ‘great fiery rocks’ were observed, and flows down valleys on Savo produced the smooth surfaces that, from the sea, looked like roads leading to the middle of the island. Pyroclastic flows burned people and other villagers sank into mudflows. Information about another, even more catastrophic event several generations previously, has also been handed down, and many people were killed as a result of it. The eruption is referred to as *toghavitu* meaning 7,000 or 1,007 — depending on translation — and referring to the number of fatalities. This oral history from Savo is a particularly rich one — much richer than the Sulphur Creek example — and is consistent with what is known about the volcanic geology of Savo.

An interweaving of traditional knowledge and scientific observations characterises the reconstructed histories of other volcanic eruptions in Near Oceania. Documentation of oral traditions started to emerge as European settlement and, eventually, colonisation by the Germans and British began to take hold in the region. They would be incorporated also with the results of later, twentieth century geological studies of the deposits of eruptions.

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<sup>34</sup> Toba (1993). See also Petterson et al. (2003).

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