1. Burning Islands and Dampier’s Voyage: 1700

The Island all Night vomited Fire and Smoak very amazingly; and at every Belch we heard a dreadful noise like Thunder, and saw a Flame of Fire after it, the most terrifying that ever I saw.

William Dampier (1906)

Track of the Roebuck

William Dampier, former buccaneer, rounds the north-western Bird’s Head Peninsula of New Guinea Island in a British Royal Navy ‘fifth-rater’, the Roebuck at the beginning of a new century in 1700. He will subsequently record the presence of five ‘burning’ islands or mountains — volcanoes — in the New Guinea region, a not inconsiderable achievement. Indeed, this is something to envy if they were all ‘burning’ in full eruption. Dampier will not see the Bird’s ‘tail’ in the south-east where there are active volcanoes, including one later called Lamington that would produce a major disaster in 1951. Nor will he enter the waters of the Solomon Islands where a Spanish explorer, Alvaro de Mendaña, may have seen Savo Island in volcanic activity more than a century previously. But four of the ‘burning’ islands and mountains to be observed by Dampier are those of a 1,000-kilometre-long chain that contains most of the active volcanoes of this region and which, today, are known collectively as the Bismarck Volcanic Arc.

Volcano discovery is not, of course, the purpose of the Roebuck’s voyage. Dampier has been given a more strategic aim: to provide his masters in Britain with information about the eastern side of New Guinea, and about the eastern seaboard of Australia, then called ‘New Holland’. The Roebuck is on a voyage of exploration — something that, nevertheless, carries a certain amount of scientific interest. Spanish, Portuguese and Dutch explorers had all been active in the region, and Britain needed to catch up in discovering new openings for commerce and trade. Dampier was selected to lead the Roebuck expedition because of the experience he had gained in circumnavigating the globe, in incisively observing and recording his encounters with the natural world and, subsequently, in publishing in 1697 a bestseller, A New Voyage Round the World. This description of Dampier is upbeat, but the reality may have been different. Dampier is ‘in command of a cheap expedition, with a rotten ship and an inferior crew, and without a single officer of any moral quality to supply his captain’s deficiencies’.1

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Figure 1. The clockwise route of Dampier’s 1700 voyage is plotted as a dotted line in this detail from a chart in *Voyage to New Holland*. ‘Nova Britannia’ is shown much larger than the combined actual sizes of New Britain and New Ireland because both the strait between the two islands, and the northwestern coast of Nova Britannia, were unknown to Dampier. The names in boxes are those used today for some of the volcanoes seen by Dampier. Bam is the island immediately to the east-north-east of Kadovar.

Source: Adapted from Dampier (1939, fold-map between pp. 208 & 209).

The *Roebuck* is swept by favorable winds to the east, crosses the equator well to the north of both New Guinea and what would later be called the Admiralty Islands, then back across it and down to the eastern side of what is now known as New Ireland, but which Dampier calls ‘the Main’. He cruises alongside and between four island groups offshore from, and in a chain parallel to, New Ireland, evidently not recognising them as volcanoes, although, had he landed at Lihir — site today of a huge goldmining enterprise in volcanically heated rocks — or at Feni, where there are geysers and hot ground — he might have deduced that these islands too were ‘burning’. Dampier does not give names to the islands as they have been named already by the Dutch explorers, Willem
Schouten and Jacob Le Maire, on a previous voyage of discovery, but he will give names to many other geographical features during his voyage, ensuring that saints, British royalty, Royal Navy admirals, and special patrons are all acknowledged.

He names Slingers Bay, on New Ireland, after a confrontation — a ‘first contact’ — with several hundred Melanesians, many in canoes, who attempt to entice the Roebuck closer to shore. Dampier is curious about them too, offering beads, knives, and glass. He chooses prudence and starts sailing out further, but the Melanesians begin ‘… to fling Stones at us as fast as they could, being provided with Engines [i.e. slings] for that purpose; (wherefore I named this place Slinger’s Bay)’. The Roebuck carries 12 guns, 14 less than it is capable of carrying, and Dampier has already armed his crew with ‘all our small Arms, and made several put on Cartouch Boxes [for cartridges] to prevent Treachery … But at the Firing of one Gun they were all amaz’d, drew off and flung no more Stones … some of them were killed or wounded’.²

Dampier rounds a cape at the southern end of New Ireland, naming it Cape St George — for Dampier is an Englishman, although not of aristocratic origins — and then crosses westwards and names St Georges Bay, not realising that the bay is actually a strait separating New Ireland from New Britain. He mentions seeing high but cloudy land to the south-east, which is probably Bougainville Island where there are active volcanoes, and he may even have seen the volcanic peaks of the Rabaul area to the north-west, but he decides to set a westward course most likely because of difficult north-west headwinds at that time of year. Dampier then records the first volcano on his voyage, across low land between the Gazelle Peninsula and Nakanai Mountains in New Britain: ‘… we saw a Burning Mountain in the Country. It was round, high, and peaked at the top (as most Vulcano’s are), and sent forth a great Quantity of Smoak’.³ This almost certainly is Ulawun volcano on the north coast of New Britain, one of the most consistently active volcanoes in the region and the highest in the Bismarck Volcanic Arc.

The Roebuck continues its voyage westwards along the south-facing coastline, and Dampier at one point respectfully names Cape Orford ‘in Honour of my noble Patron’, Lord Orford, Admiral of the Fleet. Orford is ‘a gentlemen of a sanguine complexion, inclining to fat; of a middle stature’ according to a footnote quotation included by another of his editors — with some relish one assumes — in Dampier’s book of the voyage.⁴ Dampier then makes the most significant geographical discovery of his voyage: he finds a strait between the

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² Dampier (1906), p. 526.
³ Dampier (1906), p. 533.
⁴ J. Masefield, providing an unattributed quotation in Dampier (1906), p. 533.
New Guinea mainland and the landmass whose southern coastline he has been tracking. The separate landmass he calls ‘Nova Brittannia’, still believing New Ireland to be part of it, and the strait eventually receives his own name, Dampier Passage or Dampier Strait.

A crucial decision has to be made around this time. Does he take a high-risk option and continue south-eastwards in his leaky vessel and with substandard crew into unchartered waters and find the east coast of Australia, or does he cut his losses, take advantage of the strait he has just discovered and head back westwards to the Bird’s Head? The lower risk option is chosen and the east coast of Australia is not reached by the British until 70 years later when James Cook — evidently a superior captain to Dampier and in a better ship — takes the honours.

Figure 2. Ulawun is shown by Dampier in both a profile sketch and a map of St Georges ‘Bay’.

Source: Adapted from Dampier (1939; sketches 1 & 2, Table 12, between pp. 206 & 207).

Dampier makes another significant volcanological discovery — that of an island volcano in full eruption sitting within the strait west of Nova Brittannia. The
volcano eventually is named Ritter by German colonists late in the nineteenth century. This is how Dampier described the eruptive activity on the night of 24 March 1700:

At 10 a Clock I saw a great Fire bearing North-West by West, blazing up in a Pillar, sometimes very high for 3 or 4 Minutes, then falling quite down for an equal Space of Time; sometimes hardly visible, till it blazed up again.\(^5\)

And, on the next night, the intervals between the volcano’s ‘belches’:

were about half a Minute; some more, others less: Neither were these Pulses or Eruptions alike: for some were but faint Convulsions, in Comparison of the more vigorous; yet even the weakest vented a great deal of Fire; but the largest made a roaring Noise, and sent up a large Flame 20 or 30 Yards high; and then might be seen a great Stream of Fire running down to the Foot of the Island, even to the Shore. From the Furrows made by this descending Fire, we could in the Day Time see great Smoaks arise, which probably were made by the sulphureous Matter thrown out of the Funnel at the Top, which tumbling down to the bottom, and there lying in a Heap, burn’d till either consumed or extinguished; and as long as it burn’d and kept its Heat, so long the Smoak ascended from it; which we perceived to increase or decrease, according to the Quantity of Matter discharged from the Funnel.\(^6\)

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\(^5\) Dampier (1906), p. 541.
\(^6\) Dampier (1906), p. 542.
This dramatic description is illustrative of Dampier’s skill as an author, why he was widely appreciated in Britain as a travel writer as much as for being an explorer and, indeed, why in part he was chosen to lead the *Roebuck* voyage in the first place. Dampier is obviously impressed by the eruption, as well he might be for night-time ejection of incandescent material from volcanoes is always an imposing sight. More particularly, however, Dampier is here describing what may be *pyroclastic flows* — that is, hot avalanche-like ‘floods’ of volcanic blocks, ash and gas. Pyroclastic flows can originate in many ways, but in this case the flow was evidently formed by collapses of fountains of incandescent lava fragments that had been flung up from the vent, which then fell back onto the steep slopes of the island, avalanching down to the sea, and leaving a furrowed, and still hot, ‘block and ash’ deposit. Such flows have since been seen at other volcanoes of the Bismarck Volcanic Arc, including Ulawun that Dampier had viewed only a few days before.

More volcanological discoveries follow as the *Roebuck* makes its way westwards through the volcanic islands along the north coast of New Guinea, a coast that had been traversed earlier by both Spanish and Dutch voyagers. Dampier makes profile drawings of the islands and the mainland, but these are neither well labelled nor closely linked with the text of his book or his map. This is because ‘Dampier was at sea when the second part of his book was printed, and was dead when the second edition appeared in 1729’.8

Historians, geographers, and volcanologists have since made their own interpretations of what Dampier saw, and not all of them are in agreement. There is little doubt, however, about the recognition of Long and Crown Islands, which Dampier names, and between which he sails, the former described as a ‘long island with a high Hill at each end’ and both appearing ‘very pleasant, having Spots of green Savannahs mixt among the Wood-land: The Trees appeared very green and flourishing and some of them looked white and full of Blossoms …’.9 His perception also is that both islands have few people on them. Volcanologists have been intrigued by these evidently simple observations because of their implications for the date of a major eruption that devastated the island some time within the last few hundred years.

Long Island is shown on Dampier’s map as a narrow strip of low land linking the two peaks, and that certainly is the impression when the island is viewed from the east or west. But this view, today, is illusory because the low land is actually the rim of a 13-kilometre-wide *caldera*, or large crater, and the island is roughly hexagonal in outline. The caldera also has a lake that was not

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7 Unavoidable volcanological terms used for the first time are shown in bold italics and are listed with acronyms in the Appendix.
9 This, and the remaining quotations in this section, are all from Dampier (1906), pp. 545–48.
 discovered by Europeans until the late 1930s when it was named Lake Wisdom by Australians, after an administrator of the Territory of New Guinea. Calderas of this size represent collapse of the roofs of large, shallow, magma reservoirs, and their formation is accompanied by powerful and voluminous explosions of pumice, ash and gas. Melanesians now living on Long Island have stories about the most recent catastrophic eruption on the island. This was a volcanic disaster of widespread impact which, were it to happen today, would have significant consequences to life and property in the region. A fuller story can be told about this catastrophic eruption at Long Island.

Figure 4. These two island profiles from Dampier’s book are of Long Island (left) and Crown Island, but are here switched around so that the coordinates are consistent from left to right.

Source: Adapted from Dampier (1939; Sketch 4, Table 13, between pp. 216 & 217).

On Tuesday the 2d April, about 8 in the Morning, we discovered a high peaked Island to the Westward, which seem’d to smoak at its Top. The next Day we past by the North-side of the Burning Island, and saw a Smoak again at its Top; but the Vent lying on the South-side of the Peek, we could not observe it distinctly, nor see the Fire.

Dampier is here describing the impressive and towering stratovolcano of Manam, one of the most active volcanoes in the region. The name ‘Burning Isle’ on Dampier’s map presumably refers to Manam, even though the label is shown closer to Karkar. Two volcanologists were killed on Karkar in 1979, and the people of Manam suffered a major eruption in 2004–2005 that covered the entire island leading to its evacuation. Pyroclastic flows, such as those witnessed by Dampier at Ritter, have been observed many times at Manam since the 1950s.

The identity of the next ‘burning’ island along the chain that Dampier mentions has been the subject of even more uncertainty. Dampier writes: ‘We also saw another Isle sending forth a great Smoak at once; but it soon vanished, and we saw it no more’. The island is one of a cluster known today as the Schouten Islands, amongst which Bam has been the only known historically active volcano — in the mid-1950s when the islanders were evacuated, with tragic results. Perhaps, therefore, Bam is Dampier’s ‘other’ island. This view, however, was not supported by R.J.S. ‘Rob’ Cooke who in the 1970s was head of the Rabaul Volcanological Observatory. Cooke, one of the volcanologists killed at Karkar in 1979, promoted the view persuasively, if not adamantly, to many of us as a result of an analysis of Dampier’s records, that the island must be Kadovar. The label
‘Burning I.’ on the map in this case is directly on Kadovar and definitely not on Bam. A prominent area of hot ground appeared on Kadovar in 1976, leading to fears of an eruption, but none has followed — at least, not so far.

Figure 5. William Dampier’s portrait was painted by Thomas Murray in 1697–1698, just before his voyage to Melanesia, and after Dampier had achieved favourable recognition from the British establishment as naturalist, navigator, explorer and writer — his early buccaneering, if not piratical, days in the Caribbean notwithstanding. Dampier brought the leaky Roebuck back to the south Atlantic via the Cape of Good Hope, after his final rounding of the Bird’s Head of New Guinea, but the vessel foundered and sank off the volcanic island of Ascension, without loss of life.

Source: The portrait shown here is a copy painted from the Murray original by Edmund Dyer in about 1835. National Library of Australia, Canberra.

Dampier is now about to complete his loop journey through the New Guinea region. He returns westwards to the Bird’s Head part of the island and sees on 17 April ‘a high Mountain on the Main, that sent forth great Quantities of Smoak from its Top: This Vulcano we did not see on our Voyage out’. There are no young volcanoes in this part of New Guinea, so the implication is that Dampier has mistaken the ‘smoak’ for weather clouds on a peak that was not a volcano. The question, then, may be asked: what kind of ‘smoak’ did Dampier see at
Kadovar, Manam, and Ulawun? Or, more specifically, were these volcanoes in actual eruption, such as Dampier saw undeniably at Ritter? A volcano can be described as ‘active’ in a general sense if it is one that has been seen, and noted to be, in eruption previously, or one that has the potential to produce another eruption. White vapour emerging from an ‘active’ volcano, however, which is more prominent after heavy rain or during cooler times of the day anyway, does not mean that the volcano is in actual eruption — that is, emitting volcanic ash or extruding a lava flow. Ash-laden clouds from volcanoes in full eruption are densely dark grey to brown — colours that Dampier does not mention — and white vapour can emerge from active volcanoes when they not in eruption but only passively degassing or ‘drying out’ between eruptions.

The conclusion, therefore, is that Dampier may have seen only one volcano, Ritter, in full eruption during his voyage; the ‘smoak’ of three others was not necessarily ash-laden, so the volcanoes may not have been in eruption; and, the fifth volcano was a misidentification.

Near Oceania, Melanesia and Melanesians

Dampier did not write that the people he encountered at Slingers Bay were Melanesians because the name ‘Melanesia’ was not used until after 1832 when the French navigator Jules Sebastien César Dumont D’Urville introduced it. Jorge de Meneses, Portuguese governor-elect of the Moluccas, in 1526 had described the inhabitants of the New Guinea region as ‘black people with frizzled hair’, and Melanesia therefore means ‘black islands’. ‘Melanesian’, far from meaning a distinctive racial type, simply refers to the people of several different origins who live on the following islands:

- New Guinea, the largest island, together with some smaller islands nearby immediately to the west
- the Bismarck Archipelago, including the largest islands of New Britain, New Ireland, and Manus
- the Solomon Islands chain, including Bougainville Island
- the Santa Cruz Islands in the far east of the modern-day Solomon Islands
- Vanuatu, Fiji, New Caledonia and the Loyalty Islands.

Islands of the first three of these categories are generally larger and more closely spaced, and therefore more likely to be inter-visible from sea level, than are the islands to the south-east and out to Polynesia. These three sets of islands represent an eastward extension of island South-East Asia. They have been

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10 Dumont D’Urville (1832).
called ‘Near Oceania’, which is separated from ‘Remote Oceania’ by an important biogeographical boundary running between the Santa Cruz Islands in the east and the Solomon Islands chain, including Savo, in the west. This boundary in prehistoric and geological times has restricted the movement of flora, insects, and fauna, including people.11

The islands of Near Oceania formed as a result of two near synchronous, geologically recent, tectonic collisions. One is the northwards collision of the Australian continent with an arc of islands, causing a major uplift of what is now New Guinea Island. The other is a westwards collision of the huge, submarine, Ontong Java Plateau, with what is now the Solomon Islands chain. Near Oceania today is literally squashed between these two colliding masses. The region closely matches a geologically diverse area of active tectonics and volcanism — a unified tangle of interconnecting tectonic plate boundaries and volcanic provinces of remarkable complexity in comparison with the areas around it and, indeed, with anywhere else in the world. The name ‘Near Oceania’ is not used widely outside of academic circles, but its brevity is of considerable convenience here because it encompasses precisely the area of volcanoes of interest. The name covers, in terms of modern political boundaries, the two independent Melanesian states of Papua New Guinea and most of the Solomon Islands, together with the province of Papua in eastern Indonesia.

Dampier would not have known that Melanesians represent an aggregation of different periods of immigration by different peoples. The first journeys of humankind out of East Africa evidently included people whose descendants travelled along the Indian and Indonesian coastlines to East Asia, Taiwan, New Guinea, and Australia. These descendants have been in Near Oceania occupying volcanically active areas for at least 35,000 years,12 meaning that their experience with volcanic eruptions covers not only the most recent 11,700 years of the Holocene, but at least another 23,000 years of the preceding Pleistocene.

The human inhabitants of Near Oceania have left no calendars, hieroglyphics, alphabets, or writings. Their culture is based on a paradigm that links past and present with place and belonging, rather than favouring the present over a separate, historical past. Nevertheless, non-documentary knowledge about significant events in the past, such as volcanic eruptions, is passed down from one generation to the next by means of oral history. Knowledge in Melanesian society is transferred by an extraordinary range of languages and dialects. Near Oceania is ‘the most linguistically diverse part of the planet. Here, in an area

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11 Pawley & Green (1973) and Green (1991). Note that the Santa Cruz Islands — including the active volcano Tinakula — are in Remote Oceania in the far east of the maritime territory of the nation-state of the Solomon Islands. They are part of a separate tectonic setting to the islands of Near Oceania and relate more closely to the islands of Vanuatu.

12 Torrence et al. (2004) and Ballard (2010).
that has less than one per cent of the world’s land mass, we find almost 20 per cent of the world’s languages — roughly 1,100 mutually unintelligible tongues which average only 2,000–3,000 speakers each’. These languages are divisible into two groups. The first is an older, diverse, ‘Papuan’ or Australo-Melanesian group that dominates New Guinea Island, but which is found in some of the smaller islands too. The second is a younger Oceanic Austronesian group. These people appear to relate, at least in part, to the incursion about 3,500 years ago of seafarers, who may have left behind distinctive, dentate-stamped ‘Lapita’ pottery along shorelines and coastal areas, including the volcanically active zones of Near Oceania, and who may be the ancestors of Polynesians. A boundary between the Austronesian and Papuan language groups even divides the island people of Karkar volcano into two parts. The most modern migrations to Near Oceania include not only ‘reverse’ immigrations of Polynesians, but also, most recently, incursions of European and Asian people.

Figure 6. The contorted pattern of sea floor depths shown by the different shades of blue reflects the complex modern tectonics of the New Oceania region, which is shown here together with Australia in the south-west and — in Remote Oceania — modern-day Vanuatu in the south-east. Near Oceania includes the modern-day Indonesian province of Papua in western New Guinea. Note, especially, the deep, and bent, submarine trench seen immediately south of Ulawun on New Britain Island. The three main sources of obsidian used traditionally for trade and exchange are shown by the white-filled circles. These are, from north to south, Lou-Pam-Hahie, Talasea-Mopir and Fergusson-Sanaroa. OJP is the submarine Ontong Java Plateau.

Source: Google Map base.

13 Pawley (2005), p. xii.
14 See, for example, Kirch (1997) and Spriggs (1997).
Dampier would not have known that the Melanesians of his time are both maritime and montane peoples, as they are today. They live in villages and hamlets on island coasts and tiny islands, on forested inland ridges and valley slopes, on edges and flood plains of rivers including major riverine systems like the Sepik, Ramu and Fly, on lake shores, and in cold-weather highland regions where intermontane valley floors are used for successful experiments in agriculture — indeed, amongst the earliest anywhere in the world. Melanesians also live on volcanoes. Ridges, where they exist, are favoured for settlement for defensive purposes. There are no towns or cities, kings or kingdoms, princes or fiefdoms, no centralised systems of government. Homes are made from ‘bush’ materials. Food is obtained from the sea, rivers and forests.

Melanesian men gained status and became ‘big men’ and leaders through success in intertribal battles and by acquiring wives, gardens, pigs and the heads of victims, rather than inheriting positions of leadership. There are rich cultural traditions of myth, dance and body decoration, as well as in sculpture in places like the Sepik. Kinship ties and lines of descent form the unity of community relationships. Land is not owned, bought, and sold in the European way of freehold or other forms of individual titles, but rather is passed on through a complex system of customary land tenure based on rights and obligations at tribal, clan, family and individual levels.

Trade-and-exchange arrangements underpin intercommunity dealings — perhaps most famously the ‘Kula ring’ in the Trobriand Islands, documented subsequently by pioneer anthropologist Bronislaw Malinowski. More relevant here, however, is the distribution throughout Melanesia and beyond of quality obsidian from different sites in three main volcanic areas in Near Oceania: the Admiralty Islands, including the Lou and Pam Islands; the Talasea-Mopir area of New Britain; and Fergusson Island and adjacent islands in the D’Entrecasteaux Islands. The concept of ‘exchange’ and reciprocity is rooted even more deeply in the world view of some Melanesian groups, and is thought to have determined attitudes to meaning and explanation amongst the Orokaiva, for example, following the catastrophic volcanic eruption at Lamington volcano in 1951.

Belief systems strongly integrate the natural world with the ghosts of ancestors and through acknowledgement of the reality of a wider spirit world. Spirits are sources of knowledge, danger and protection. They influence human lives and need to be shown deference, but may be controlled in some circumstances, or at least assuaged, through ritual. Sorcery is practiced. Spirits live in many places,
including the craters of volcanoes. An especially striking example of the volcanic spirit world is from Manam volcano where the terrifying female spirit Zaria lives and who is regarded as the volcano itself, its eruptions an expression of her moods:

She is described as a wild-looking creature who spews fire from her armpits and vagina. When she walks about she wears an incandescent skirt aglow with flickering flames .... When humans provoke her or she becomes angry, Zaria emerges from her cavernous home in the crater’s depths and roams the slopes of the volcano, leaving a trail of fire and burning lava in her wake.\(^{18}\)

Zaria is the origin of fire, which represents an important traditional aspect of transformative female power. She is a force of destruction and renewal, represents both death and life and, even more broadly, ‘is a symbol of the cyclical process of destruction, transformation, and renewal that characterises human life and the natural world.’\(^{19}\)

European settlement and colonisation would cause the disintegration and disappearance of some Melanesian culture, and other parts of it would be altered and redefined in the form of cargo cultism, particularly during the twentieth century. Cargoism represents the belief that European wealth in the form of material goods or ‘cargo’ will arrive if people become cult members and perform prescribed rituals. Cults have a range of expression, many of them bizarre to the Europeans, but invariably they are focused on the belief that the cargo will arrive supernaturally by ship, aeroplane, helicopter, or by some other means. Comparisons have been made by one anthropologist between Britain in the seventeenth century and cargo cultism in the southern Madang Province of twentieth century New Guinea. He wrote that cargoism is the ‘devastatingly reasoned’ outcome of a belief that true knowledge is attributable to divine revelation, rather than to secular and empirical knowledge.\(^{20}\) This situation was not too dissimilar to beliefs in the Britain of Dampier’s time, when secular science eventually replaced many magical explanations of ‘reality’ that were previously associated with, and endorsed by, Christianity. Volcanoes at this time, for example, were a reminder to Christians in Europe of the fires of Hell burning below, a place where sinners are incarcerated.

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\(^{20}\) Lawrence (1982), p. 66.
Early Ideas about Volcanic Activity

‘Smoak’ is only one word in Dampier’s vocabulary that intimates what people at the beginning of the eighteenth century thought about the cause of volcanic eruptions. Dampier also uses, as seen in the above quotations, ‘burning’, ‘blazing up’, ‘fire’, ‘flame’, and ‘funnel’ — words that are indicative of combustion. Volcanology today includes terms such as pyroclastic — meaning fire-broken — as well as ash, as part of its established vocabulary. The title of this book is also fixed in the language of combustion.

A combustion theory of volcanism emerged from the Mediterranean region where the development of Greek and Roman civilisations involved accounting for the origin of natural events, including both the earthquakes and volcanic eruptions of the region. The theory evolved from an even earlier concept proposed by Anaxagoras, a Greek natural philosopher of the fifth century BC, who said that eruptions were caused by great winds stored inside the Earth. Aristotle (384–322 BC), said to be the father of natural history, also believed that earthquakes and volcanic eruptions were formed by subterranean winds — underground ‘weather’ — forcing their way out to the surface. He drew comparisons with human flatulence: ‘For we must suppose that the wind in the earth has effects similar to those of wind in our bodies whose force when it is pent up inside can cause tremors and throbblings’.

Other ‘ancients’, and even naturalists well into the eighteenth century, added that the winds ignited underground flammable substances, such as sulphur, or pyritic and combustible stones, even oils and fats from buried animals. This volcanism was thought to have been caused by the Earth’s internal combustion. Dampier’s account of burning islands reflects acceptance of this origin by combustion — a theory, however, that has long since disappeared. Chemists of the seventeenth century pointed out that huge amounts of air would be required to continue the burning and that any combustion likely would be choked off deep in the essentially airless interior of the Earth. The chemists themselves favoured volcanism being caused by heat-producing chemical reactions that did not require fuelling by air. This ‘chemical theory’ of volcanism is also outdated, but it lasted even into the twentieth century.

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21 See, for example, Sigurdsson (2000).
23 Curiously, however, the chemical theory of volcanism does emerge again in accounting for a volcanic crisis on the New Guinea mainland at Wau in 1967.
1. Burning Islands and Dampier’s Voyage: 1700

Figure 7. The ancient Greeks, like the Melanesians, had a rich mythology concerning volcanoes and their eruptive activity. A mythical giant Enkelados, also known as Typhon or Typhaeus, is seen here lying on his back beneath Etna volcano, north-eastern Sicily, in this copperplate by Bernard Picart from 1731. Enkelados in Greek mythology was one of the giants who battled the gods on Mount Olympus, and who became paralysed when a spear struck him in battle. The gods buried him beneath Etna, but he was not quite dead. Subsequent eruptions at Etna were believed to be the breathing of Enkelados, and there were earthquakes every time he stirred. The aerial figure in the upper right is Zeus hurling lightning bolts at the monster buried beneath the volcano.

Source: Sigurdsson (2000; frontispiece of *Encyclopedia of Volcanoes*). Haraldur Sigurdsson also provided the detail for this caption.

Rocks exposed at the Earth’s surface had been regarded for centuries as products of a former world of supernatural violence and gigantic convulsions, of mysterious cataclysms and floods of biblical proportions, including Noah’s Deluge, and of supernatural extinctions and creations of life. Such catastrophism regarding the world’s origin still prevailed in Europe at the time of Dampier’s
voyage. Yet, one British historian of science has, with good reason, portrayed
the course of the seventeenth century as ‘one of the great episodes in human
experience, which ought to be placed … amongst the epic adventures that have
helped to make the human race what it is … [Since] the rise of Christianity,
there is no landmark in history that is worthy to be compared with this’.24 The
power of the Church and State, and the ‘magic’ embedded in Christianity, were
both challenged by this Scientific Revolution as the seventeenth and eighteenth
centuries progressed. Witchcraft was still punishable by law in seventeenth
century Europe when Dampier was born. The seventeenth century in Europe
also included the development of politically separate ‘nation states’, a concept
that would later, in colonial times, split Near Oceania into different countries
separated by the most arbitrary of territorial boundaries.

Development of science in the seventeenth century was underpinned by
an understanding of the influence of gravitational attraction between the
Sun and planets and their relative motions, as theorised by Isaac Newton
(1642–1727). This and other theories led to establishment of the foundation
principles of mathematics and physics when Newton, the founding father of
science, published in 1687 his monumental *Principia Mathematica*, arguably
the fundamental publication in the history of science. Development of today’s
many scientific sub-disciplines and specialisations would follow, but geology
— and therefore a clearer understanding of the origin of volcanoes — would
not begin to emerge strongly until late in the eighteenth century. Solid-earth
tides, as opposed to ocean tides, generated by the gravitational attractions of
Earth, Moon and Sun, as proposed by Newton, would later be regarded by some
volcanologists as a possible mechanism for the triggering of volcanic eruptions
in Near Oceania.

Newton was the personification of the Enlightenment during what has been
called the ‘long eighteenth century’. This intellectual and idealistic movement,
which started late in the seventeenth century and ended in the early nineteenth
century, was an empirical methodology guided by the light of reason and logic,
and claimed as a new way of thinking by its proponents, the *philosophes* —
scientists, philosophers, and writers. Its methodology was not in fact entirely
new, but the expectation was that new knowledge of the natural world and
derived universal and absolute truths would provide liberation from ignorance
and superstition leading to progress, freedom and the happiness of mankind.
Whether such ambitious ideals have been reached is debatable, but the
Enlightenment nevertheless did stimulate the global exploration of the natural
world. Dampier, in this context, may be regarded as the first Enlightenment
voyager in Near Oceania, and his observations and records as pioneering
contributions to the nascent history of volcanological studies in the region.

Preview

This book is about how an understanding of the volcanoes of Near Oceania has gradually unfolded. The historical coordinates and navigational waypoints of the enterprise are a series of significant volcanic disasters, but different histories are interwoven between them. First is the discovery, exploration, settlement and colonial history of Europeans, together with postcolonial events — that is, a political and military history. Then there is the history of volcanology, particularly the ways in which key discoveries and interpretations of major eruptions elsewhere in the world have impacted on an understanding of volcanic eruptions in Near Oceania — a history of volcano science. A much longer and largely undocumented history of Melanesians in the region, is revealed to some extent by the results of volcanological archaeology and anthropology, including oral traditions, myths and stories — a prehistory of the modern independent states of Near Oceania. Care will be taken, however, in the interests of focus and length, not to expand into the larger histories of the development of geological theories in general and the related discovery of mineral resources in volcanoes, or to divert into the equally fascinating evolution of petrological ideas of how magmas form deep within the Earth and how these relate to tectonic structure in this remarkably complex region. Similarly, description and discussion of the modern technologies and instrumentation that can be used to monitor volcanoes will have to be avoided, as will delving into the engrossing and extensive sociological literature on risk perceptions and community vulnerabilities to natural hazards.

Stories are presented of volcanic crises and disasters, of lessons learnt and mistakes made, and of the key players who have made advances in volcano understanding. There are questions of community vulnerability to, and risk from volcanic eruptions; of the difference between hazard and risk; of the value of traditional knowledge and oral history; of the application of concepts and suitably sustainable technologies for volcanic disaster risk reduction (DRR) in Third World countries; of recognition that volcanic eruptions are only one kind of natural hazard and that, as such, they fit into the broader theatre of international natural hazard disaster risk reduction. This book is not a volcanological text or systematic source book, directory, or gazetteer of volcano-related information written in specialist scientific language, but rather a history — imperfect as all histories are — with loose ends, dead ends and gaps, filtered knowledge and uncertainties, and opportunities still to be explored. The history, still, has the potential to be rich and potentially important for ongoing volcanic disaster risk reduction work in two of the contemporary nation states of Near Oceania — Papua New Guinea and the Solomon Islands.
References


