Our Country, our healer: Aboriginal apothecaries of Burning Mountain

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Abstract: For millennia, the First Australians manufactured, utilised and traded mineral medicines. This places Aboriginal people as the world's first pharmacists in history and as the first ancient culture to have utilised both sulphur and alum medicinally. British colonisation resulted in the dispossession of traditional Aboriginal lands, which included many sacred Aboriginal healing sites. Aboriginal people shared the medical benefits of certain multi-use mineral medicines (lithotherapeutics) with the early settler colonists. The settler colonists readily utilised the healing benefits of these prescriptions, which were subsequently commercialised by several businesspersons and consortiums. Consequently, Aboriginal people were prevented from accessing areas containing these minerals, harshly obstructing the Aboriginal trade in these important prescriptions. Dispossession abruptly halted much of the lithotherapeutic pharmaceutical industry of New South Wales's Aboriginal people.

> So I take this word reconciliation and I use it
> to reconcile people back to Mother Earth,
> so they can walk this land together
> and heal one another
> because she's the one that gives birth to
> everything we see around us,
> everything we need to survive.
>
> – Max Dulumunmun Harrison

Prologue: Grandpa's got a cure for everything

As 1997 drew to a close, film and television writer and children's book author Roger Vaughan Carr threw out a challenge to the nation of Australia. In an article published in *The Australian* newspaper, Carr mused as to whether the scientific world was ready to embrace natural remedies such as the Aboriginal-sourced medicine his family had used and sold commercially.[1] The multipurpose traditional Aboriginal cure-all was unequalled as a disinfectant and used to treat infections, surface wounds, deep wounds, sore throats, sunburn and a wide variety of other ailments. In the case of toothache, although it blackened the inside of the mouth, it would remove the decay from the tooth.

The Aboriginal formula for this medication, sourced from an area near a small village in the Upper Hunter region of New South Wales (NSW), found its way serendipitously into the hands of Roger Carr's Victorian family. Herbert A. Halls, whom Roger Carr affectionately referred to as 'Grandpa', worked in 'the rag trade' in 'the Lane' in Melbourne. In this work, Halls had often come across a variety of discarded retail stock. Carr recalls being allowed to rifle for treasure through piles of such cast-off items 'Grandpa' had purchased.[2] Sometime in the 1940s, Halls purchased the remaining stock and rights to a time-honoured Aboriginal remedy being sold under the name 'Winjennia', following the Winjennia Remedies Proprietary Company's collapse.

Figure 1: Sulfazone jar top.
Source: Photograph by author.

In the early 1950s, Roger Carr's uncle changed the products' brand name to 'Sulfazone' and registered the product with the Victorian medical authorities. Sulfazone was sold and marketed by Herbert A. Halls's son, Beauvais Mandeville Halls, known as 'Mandy', until his death in 1964. The family continued to use the products, which Carr stated never appeared to degrade,

1 Roger V. Carr, 'Wanted: New Interest for an Old Cure-All', *Australian*, 29 December 1997, www.trove.nla.gov.au/work/62666900?q=sulfazone&c=article&versionId=75730865.
2 Carr, 'Wanted – New Interest for an Old Cure-All'.

even after Mandy's business closed. Unfortunately, much of the family's remaining stockpile of this remarkable product was lost in the 1983 Ash Wednesday fires that ripped through Victoria.[3]

Roger Carr remembered the old remedy as having added a stinging bite to his childhood when it was applied to all manner of ailments. Carr described the liquid tincture as being the shade of a good billy tea and odourless, whereas the butterscotch-coloured ointment's scent was depicted as reminiscent of a woolshed on a summer afternoon.[4] Many significant medical advances have been sourced from natural remedies, which led Carr to hope this remedy might attract the attention of modern science. Carr suggested Aboriginal people take up the development of this medicinal compound and capitalise on the remedy.[5] Sadly, Carr passed away before the cultural knowledge pertaining to this remedy could be returned to its traditional owners, and before any research was undertaken into the colonisation and commercialisation of this medical knowledge.

The commercialisation of scientific knowledge from the Aboriginal pharmacopoeia in Australia has encompassed animal, vegetable and mineral preparations. In the eighteenth century, as science became the dominant way of understanding – and therefore controlling – the world, the exploration of the Pacific had a strong scientific focus. As the colony advanced, so too did a greater scientific understanding of the possibilities of this new world. Science was central to how the colonisers defined the new colony, with science remaining at the colony's core from its inception. The colonisers were quick to commercialise Aboriginal scientific knowledge that promised marketable benefit, with some remedies still widely used today, such as eucalyptus, tea tree and goanna oils. Thus an integral part of the new colony's scientific culture and identity was built upon a foundation of knowledge obtained directly from Aboriginal people.

When the colonisers first walked upon Aboriginal land, the Aboriginal pharmacopoeia was sufficient to effectively cope with the majority of medical conditions Aboriginal people encountered and ensured Aboriginal people were in better health than the newcomers. The diseases Aboriginal people faced prior to colonisation did not include the highly infectious diseases carried by the Europeans, which led to the decimation of many Aboriginal communities across Australia.[6] Long before the arrival of the British, Aboriginal people were effectively performing cranial surgery, setting and repairing fractures, amputating limbs and delivering the long-term medical aftercare required for these patients to heal successfully.[7]

3 Carr, 'Wanted – New Interest for an Old Cure-All'.

4 This was likely because lanolin was used in the production of Sulfazone, making up part of the carrier emollient. Oleine and petroleum jelly were also used. Mrs Mary Jackson, in conversations with the author, November 2019.

5 Carr, 'Wanted – New Interest for an Old Cure-All'.

6 Webb, *Palaeopathology of Aboriginal Australians*.

7 Gascoigne and Maroske, 'Colonial Science and Technology'.

There has been significant research into the known Aboriginal pharmacopoeia, so much so that a comprehensive summary would be too large to include in this article.[8] Across the numerous studies of traditional Aboriginal medicines, plants generally feature as the main ingredients, or sole ingredient, in most remedies recorded. Despite this research, the effects of colonisation have resulted in considerable gaps in our knowledge concerning Aboriginal traditional botanicals.[9] The main ingredient in other traditional treatments is derived from animal or mineral substances.[10] To date, the Aboriginal pharmacopoeia's botanical remedies have received the most attention from scientific researchers, leaving gaps in our knowledge of Aboriginal mineral medicinals (lithotherapeutics[11]).

Aboriginal curatives were readily utilised by the early settlers to whom they were made available, including traditional lithotherapeutics.[12] Much of the knowledge regarding the Aboriginal lithotherapeutic trade of Burning Mountain, as documented by the colonisers, has remained hidden in the archives, or held in personal family records, until now.

Research for this examination of Burning Mountain's Aboriginal lithotherapeutic medicines included the consultation of recent studies by Ellyett and Fleming,[13] Bunny,[14] and Rattigan,[15] regional oral histories, archive materials and newspaper sources. In addition, the public relations and marketing materials published by the various commercial producers of the curative were surveyed, and personal family collections were also generously shared with the author. Illuminating an important stage in early contact race relations, this article evidences Aboriginal people shared life-imparting medicines with the early white settlers, granting the newcomers access to a significant sacred site to obtain the curative mineral resources for their own personal use.

This article contributes to broader scholarship on the commercialisation, colonisation and decolonisation of Aboriginal cultural scientific knowledge. This study specifically advances what is known regarding the Aboriginal use of, manufacture and trade in Aboriginal lithotherapeutics and the significant place these mineral medicines hold within the Aboriginal pharmacopoeia; in effect, publication will return recognition and sovereignty to the rightful custodians of this knowledge.[16]

8 Examples of regional studies include Clarke, 'Aboriginal Uses of Plants as Medicines'; Henshall et al., *Ngurrju Maninja Kurlangu*; Kyriazis, *Bush Medicine*; Levitt, *Plants and People*; and Roth, *Superstition, Magic, and Medicine*.
9 Cribb and Cribb, *Wild Medicine in Australia*.
10 Cribb and Cribb, *Wild Medicine in Australia*, 11, 17, 208–9.
11 Mineral-derived medicines, see Photos-Jones, 'From Mine to Apothecary'.
12 Cribb and Cribb, *Wild Medicine in Australia*, 10; '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.
13 Ellyett and Fleming, 'Thermal Infrared Imagery of The Burning Mountain Coal Fire'.
14 Bunny, 'The Burning Mountain, Wingen'.
15 Rattigan, 'Phenomena about Burning Mountain, Wingen, NSW'.
16 Carr, 'Wanted – New Interest for an Old Cure-All'.

Making a contribution to heritage scholarship, in particular the scholarship on Aboriginal heritage sites, this study endeavours to affirm the connection between the physical landscape and Aboriginal cultural knowledges. The author, a Worimi Biripai woman with family connections to the Yuin, Gringai and Wonnarua nations, acknowledges and understands the multifaceted connection between Aboriginal people and Aboriginal environmental knowledge, presenting Burning Mountain's heritage values from an Aboriginal perspective.

Burning Mountain has been tied to the Malamulang story – the Dharawal and Dunghutti story of the Seven Sisters. The legend of the Seven Sisters exists in many forms (including songlines, rituals and dances) across many different Aboriginal nations and, like stories relating to other unique geological formations such as the Great Barrier Reef, the story has been argued to be many thousands of years old.[17] Sacred spaces, such as Burning Mountain, are often interlinked with tribal identity and traditional knowledge. For Aboriginal people, it is imperative these sacred spaces are recognised as a living part of Aboriginal culture as they provide a lifeline between our ancestors and their way of life, Country, and our communities today.

The sacred history of the world's longest burning fire

> What you leave behind is not
> what is engraved in stone monuments,
> but what is woven into the lives of others.
>
> – Pericles

Burning Mountain, at Wingen, has long been a sacred place of healing for Aboriginal people.[18] The name 'Wingen', pronounced *win-jen*, is derived from the local Aboriginal word, 'win', meaning 'fire'.[19] Wingen, located in the Upper Hunter region of New South Wales, sits about 225 kilometres north of Sydney. Burning Mountain is positioned between Scone and Murrurundi, on the eastern side of the New England Highway.

17 See Nunn and Reid, 'Aboriginal Memories of Inundation of the Australian Coast'; Andrews, *The Seven Sisters of Pleiades*.

18 NPWS, *Burning Mountain Nature Reserve*.

19 This translation is sourced from Mitchell, 'A Journey in Search of the Kindur, in 1831–2'; Abbott, *Mount Wingen*; R. Bennett, 'Letter to the Editor of the *Argus*: Mount Wingen, near Murrurundi, New South Wales', *Argus* (Melbourne), 1883, 5; 'The Upper Hunter District. Aberdeen and Wingen. Where the Favourites are Bred. "The Devil's Smoke Stack". Australia's Solitary Burning Mountain', *Daily Telegraph* (Sydney), 8 October 1910, 15. The translation 'fire' may be a basic one, with the Wonnarua word *winya* translated 'to burn with fire, to scorch'. The Wonnarua nominal suffix: causal is *tjin*.

Burning Mountain, formerly named Mount Wingen, reaches an elevation of 653 metres and is found in Wonnarua Country, which stretches from Broke to the Liverpool Range. Now part of Burning Mountain Nature Reserve, Burning Mountain is Australia's sole naturally burning coal seam and the world's longest burning fire.[20] Around 30 metres underground, the mount's subterranean coal is slowly combusting. The fire, moving gradually south at about 1 metre per year, has been actively burning for more than 5,500 years.[21]

The first white observers mistook the mount for a volcano until it was correctly identified as a continuously burning coal seam in 1829 by Rev. C. P. N. Wilton who had a keen interest in geology.[22] As this hidden fire burns through the buried coal, it generates heat, slumping and fissures at the surface.

If you choose to visit Burning Mountain, walking up the hill from the carpark you will cross a small timber bridge and find the path past the lagoon dotted with rough-barked apple, ironbark and grey box. As you climb higher towards the smouldering summit, tea trees can be found either side of the path. You may also notice stringybark eucalypts, the bark of which the Wonnarua people used to create twine to make fishing nets, called turrila. The Wonnarua also used this twine to weave baskets and to make bags, called buakul.[23] The area around the crevices and chasms at the mount's summit is littered with ancient seashells, and fossils abound in the area – both remnants of when the mount was covered by ocean some 200 million years ago. Dunn notes:

> Like much of the east coast of New South Wales, the Hunter Valley – geologically speaking – is both old and new. Parts date back over 400 million years, laid down by ancient volcanoes and fluctuating sea levels. The great coal deposits that underlie much of the valley, popping to the surface around Singleton and in the cliffs at Newcastle, were formed during this era.[24]

Burning Mountain's fiery coal seam and vent area is devoid of flora and quite bare, being too hot for vegetation to grow. Among the rising smoke, heat haze and powerful fumes, the earth around the chimney area displays rich red iron oxides, mustard-yellow sulphur powder and stark white sinter residue made up of the mineral deposits of sulphur and alum found there. The smell of sulphur escaping from the smoky vents is quite distinct, and the surface of the ground, measuring around 350 degrees Celsius, is extremely hot underfoot. Wedge-tailed eagles often

20 See 'Guinness World Records: Longest-Burning Fire (2001)'. Guinness World Records, n.d., accessed 13 November 2020, guinnessworldrecords.com/world-records/77295-longest-burning-fire.

21 Rattigan, 'Phenomena about Burning Mountain, Wingen, NSW'.

22 Wilton provided the first account of Burning Mountain, published as 'The Burning Mountain of Australia', *Sydney Gazette*, 14 March 1829, 2.

23 Royal Anthropological Society, 'Notes on the Customs and Dialect of the Wonnah-ruah Tribe'.

24 Dunn, *The Convict Valley*, 7.

employ the mount's thermal currents to elevate themselves. The NSW National Parks and Wildlife Service describes the effects of the burning coal seam on the landscape as follows:

> Combustion of the coal produces a large decrease in the volume occupied by the coal seam, resulting in the collapse of the overlaying rock, with slumping commonly between 1 and 4 metres. These rocks collapse in blocks along weak joint planes within the sandstone. Subsidence cracks open where such blocks of rock have slumped, providing ventilation, which may feed coal combustion. Hot sulphurous gases escape, effectively baking the soil and rock adjoining the vents, altering their geochemical structure, colour and texture – a process called combustion metamorphism … Rock immediately above the burning coal has been altered from kaolinite clay to a hardened, mullite mineral, apparently by temperatures between 1200C and 1750C.[25]

Burning Mountain is listed with the National Trust, the Australian Heritage Commission and the Geological Society of Australia (NSW Division) for its geological significance.[26]

Dunn asserts the Hunter region's first people arrived in this ancient terrain somewhere between 20,000 and 45,000 years ago.[27] Long before the Egyptians built their pyramids – and indeed long before there was an Egypt – Aboriginal people were using Burning Mountain as a heat source.[28] The Wonnarua people employed the continual heat generated by the smouldering coal seam for warmth, cooking and in the construction of weaponry. The heat-hardened stones of the mount's 'brickpit' area are believed to have been utilised by the Wonnarua to form armaments, such as stone tomahawks, called mogo.[29] The local Aboriginal population resourcefully utilised Burning Mountain's abundant natural supplies of sulphur and alum to manufacture multi-use medicines. While conservative estimates suggest Burning Mountain has been burning since around 3,500 BCE and, in the process, its valuable mineral resources have been deposited on the summit's surface for over 5,500 years, other estimates speculate this burning coal seam has been burning for up to 500,000 years, in which case Burning Mountain's Aboriginal mineral medicines may have been in use for tens of thousands of years more.[30]

25 NPWS, *Burning Mountain Nature Reserve*.
26 Nathan Vass, 'Burning Mountain Keeps Glowing after 500,000 Years on Fire', [*Newcastle Herald*], 22 February 1991, Living Histories, University of Newcastle, 2018, livinghistories.newcastle.edu.au/nodes/view/57916.
27 Dunn, *The Convict Valley*, 11.
28 Mihai Andrei, 'This Fire in Australia Has Been Burning for 6000 years', ZME Science, 26 January 2015, accessed 13 November 2020, www.zmescience.com/science/geology/coal-fire-australia-26012015/.
29 Royal Anthropological Society, 'Notes on the Customs and Dialect of the Wonnah-ruah Tribe'.
30 Vass, 'Burning Mountain Keeps Glowing after 500,000 Years on Fire'.

The Wonnarua people

The traditional lands of the Wonnarua people occupy most of the New South Wales Hunter Valley region and their intricate environmental knowledge was acquired over generations.[31] The Wonnarua had different tribal, or clan, regions within their Country, including the Gringai who occupied the lands along the Allen and Paterson rivers and stretching towards what is now St Clair. Other tribal groups included the Gea-Wegal, Gundigal, Tullong and Murrawon clans.

The Wonnarua were bounded by groups that included the Worimi, Nganyaywana, Wiradjuri, Awabakal and Darkinjung peoples, and had established trading and ceremonial associations with the Kamilaroi people. The Biripai were situated to the north around the Manning Valley, Gloucester and Barrington regions. These larger main groups were made up of smaller clans, connected through marriage and interlinked kinship across the region. Dunn asserts:

> The interwoven kinship encouraged a commonality of language, with local dialects, as well as linkages through trade and ceremony. The result was a certain amount of fluidity across boundaries and borders, with transition zones and areas of common passage such as trade routes or pathways to ceremonial grounds.[32]

Historian Paul Irish considers that within the 'affiliated coastal zone' of the Port Stephens, Sydney and Shoalhaven region, consistent movements and interrelated familial connections can be observed from the beginnings of British settlement and throughout the nineteenth century.[33] These connections linked these people groups to a wider Aboriginal economy and a broader depository of cultural knowledge. Dunn emphasises that both historical and archaeological evidence illustrate the interconnectedness of the Aboriginal inhabitants of the greater Hunter region, and their connections to the people groups beyond this region.[34]

Isabel McBryde's[35] observations made while surveying the New England area, situated just north of the Greater Hunter region in New South Wales, are useful when considering Burning Mountain. McBryde ceased:

> thinking of the Aboriginal past as 'a dream the world breathed sleeping and forgot' and started seeing it as a living heritage, maintained through powerful connections to country, 'preserved faithfully by a small community' and 'now the focus of a revival of interest in traditional culture and values'.[36]

31 Dunn, *The Convict Valley*, 13.
32 Dunn, *The Convict Valley*, 22.
33 Irish, *Hidden in Plain View*, 25.
34 Dunn, *The Convict Valley*, 22–23.
35 Known as the 'mother of Australian archaeology' and Professor Emerita at The Australian National University.
36 Griffiths, *Deep Time Dreaming*, 38.

Burning Mountain: A sacred Aboriginal place

In the early nineteenth century, the missionary Reverend Lancelot Threlkeld observed in the Upper Hunter region what he described as a 'volcano'. The 'volcano' was called Kopurraba[37] by the Aboriginal people of Lake Macquarie, who utilised the mount's clay-like mineral ore, known to them as Ko-pur-ra.[38] Threlkeld noted Kopurraba was the name of the place:

> from which the [A]borigines obtain the ko-pur-ra, a yellowish earth which they wet, mould up into balls, and then burn in a strong fire in which it changes into a brilliant red, something like red ochre.[39]

The Wonnarua people would mix Ko-pur-ra with kidney fat from the kangaroo, emu oil or another carrier emollient. The Wonnarua people were likely the first culture on earth to utilise sulphur medicinally, pre-dating sulphur's use by the ancient Egyptians.[40] The Wonnarua were noted to have plastered cuts and wounds with the wet Ko-pur-ra.[41] Both the men and the women would also utilise this substance as a body paint worn during ceremonial dances;[42] it was also noted as used around Newcastle to paint bodies for ceremonial occasions.[43]

The moulding and roasting of clay-like balls described by Rev. Threlkeld is echoed in several historical descriptions of the manufacturing process that Aboriginal doctors, called karadji, used to produce prescription pills and tablets. Burning Mountain's various pharmaceuticals were traded to Aboriginal people groups from many nations.[44] Dunn asserts:

> the use of Ko-pur-ra around Lake Macquarie and Newcastle which was first gathered from the upper reaches of the valley is further evidence of trade routes and connections across the region.[45]

37 Or Ko-pur-ra-bar (Threlkeld, 'Aboriginal Place Names', 13) or Kuparrpa (Lissarague, *A Salvage Grammar and Wordlist of the Language from the Hunter River and Lake Macquarie*, 63).
38 Kuparr is the Wonnarua word meaning ochre, red.
39 Threlkeld, 'Aboriginal Place Names', 13.
40 An important Egyptian medical papyrus called the Ebers Papyrus, dated 1550 BCE, mentions the first recorded use of a sulphur ointment used by the Egyptians to treat blepharitis, a common ocular condition.
41 Royal Anthropological Society of Australasia, 'Notes on the Customs and Dialect of the Wonnah-ruah Tribe'.
42 Threlkeld, 'Aboriginal Place Names', 13.
43 Brayshaw, 'Aborigines of the Hunter Valley'; Dunn, *The Convict Valley*, 15.
44 *Winjennia: The Story of Australia's Burning Mountain*.
45 Dunn, *A Valley in a Valley*, 61–62.

Figure 2: The sulphur and alum evident on the surface surrounding the thermal vent on Burning Mountain.
Source: Photograph by the author.

Aboriginal people have a deep understanding of various minerals and their properties, having utilised stone and high-quality mineral deposits for trade over great distances, such as ochre.[46] Historically, the location of valuable rock and mineral deposits, such as Burning Mountain's mineral ore, were well known to Aboriginal people. These locations played a significant role in trade transactions between different people groups. Aboriginal people groups travelled hundreds of kilometres to Burning Mountain to seek out a variety of healing treatments, which were likely utilised as an item of trade by the Wonnarua for as long as the mountain has been burning and the Wonnarua people were present.[47]

46 Western Australia's Wilgie Mia is the world's oldest continuous mining operation, and while an example of deep underground mining, Aboriginal people historically used the techniques of both quarrying and mining using sophisticated extraction techniques where necessary.
47 *Winjennia: The Story of Australia's Burning Mountain*.

Burning Mountain, considered sacred in Aboriginal lore, was held in high esteem for the healing properties of the mineral substances deposited there. The Wonnarua people, who traditionally wore possum skin cloaks, girdles made from spun possum hair and a nautilus shell necklace cut into an oval shape and fastened by a length of string,[48] welcomed people from other Aboriginal nations to the mount for trade and ceremonies. Aboriginal art adorned some of the mount's rock surfaces, depicting kangaroos, wallabies, birds, snakes and other animals.[49] The ethnographic record suggests continual Aboriginal occupation of Burning Mountain and the surrounding land.[50] Tribal life on the mount saw work delineated by gender: the Wonnarua men would hunt, and the Wonnarua women spent their days crushing the ore in a traditional mortar and pestle, afterwards mixing it with water or animal fat[51] so that it was ready for pharmaceutical use.

Brayshaw notes 'very little archaeological research has been undertaken in the Hunter Valley'.[52] Yet, while the Australian archaeological database is sparse, greater Australia has been occupied for more than 50,000 years.[53] According to Photos-Jones, archaeologically ancient medicinal products – and any waste by-products of their manufacture – often become indistinguishable from their environments as, over time, they simply return to the soil upon exposure to the elements.[54] A report authored by the NSW National Parks and Wildlife Service states while tools used by the Wonnarua people may remain as potential archaeological finds, no systematic survey for Aboriginal sites of Burning Mountain Nature Reserve has been undertaken.[55] Given the potential longevity of Burning Mountain's Aboriginal occupation, an archaeological survey seems an urgent next step towards discovering more of this unique site's history.

Burning Mountain has given rise to Aboriginal legends, in particular the legend of the Wingen Maid. The Wingen Maid is the name given to the southern rockface of the Wingen Maid Nature Reserve, found to the west of Burning Mountain. This distinctive rockface is formed of a large outcrop of sandstone that, viewed from certain vantage points, resembles the profile of a seated woman. The legend of the Wingen Maid tells of the Kamilaroi people, who resided north of the Liverpool Range, who sent a wife-raiding party to kidnap Wonnarua women from the south. The Wiradjuri people, situated in the west, warned the Wonnarua of the Kamilaroi

48 Royal Anthropological Society of Australasia, 'Notes on the Customs and Dialect of the Wonnah-ruah Tribe', 18.
49 'The Upper Hunter District. Aberdeen and Wingen. Where the Favourites are Bred. "The Devil's Smoke Stack". Australia's Solitary Burning Mountain', *Daily Telegraph* (Sydney), 8 October 1910, 15.
50 Evidence of several ceremonial grounds, carved and scarred trees, a burial, a stone arrangement, an engraving site and open sites have been privately documented.
51 Usually kidney fat from the kangaroo (Threlkeld, 'Aboriginal Place Names', 13) or emu oil.
52 Brayshaw, 'Aborigines of the Hunter Valley'.
53 Lourandos, *Continent of Hunter-Gatherers*, 326.
54 Photos-Jones, 'From Mine to Apothecary'.
55 NPWS, *Burning Mountain Nature Reserve*.

plans. Elite Wonnarua warriors went out to meet the Kamilaroi's raiding party; however, one Wonnarua woman's husband did not return. Devastated, the new widow asked the creator, Biame, to end her life. Instead, Biame set the bereft woman in stone. Oral tradition states the desolate widow ignited Burning Mountain's flaming coal seam with tears of fire shed grieving for her husband, lost while defending her in battle.[56] An Aboriginal oral history speaks of a severely wounded Wonnarua warrior who, retreating to Burning Mountain after battle with wounds that would normally prove fatal, bathed in and drank from the mountain's mineral-infused waters. The wounded warrior soon noticed his bleeding had ceased and, within a few days, all his wounds had healed. His miraculous recovery was credited to the mount's rare curative mineral deposits.[57] This oral history is of immeasurable value and likely depicts the events that first alerted the Wonnarua to Burning Mountain's unique medicinal mineral resources. Patrick Nunn and Nicholas Reid have presented evidence of collections of Aboriginal oral stories that may date back 7,000 years and assert:

> Given the range of current threats to oral traditions, globally as well as in Aboriginal Australia, it would seem to be a priority to rediscover these stories.[58]

The waters of Burning Mountain's creeks and waterholes have high sulphur levels and contain various other minerals.[59] Burning Mountain's gases precipitate naturally on the edges of the crevices, and rain dissolves these minerals and washes them into the nearby creek. As the oral history of the wounded warrior suggests, Aboriginal people traditionally bathed in these healing, mineral-infused waters, cognisant of their healing properties.[60]

The lithotherapeutic medicines of Burning Mountain

The manufacture of Burning Mountain's lithotherapeutic medicinal items required the unique mineral ore to be milled and levigated[61] for use in the liquid extract, tablet formation and the production of the ointment. The key therapeutic products produced from the ore included healing waters (used as a drink and/or as an external wash or disinfectant), ointment (made with an emollient such as emu oil and traditionally applied with a feather) and mud packs (made from a mixture of

56 *Winjennia: The Story of Australia's Burning Mountain*; 'The Stone Woman of Wingen', Lake Wakatip Mail (NZ), no. 2446, 31 December 1902, 6; NPWS, *Burning Mountain Nature Reserve*.

57 This oral history, relayed to the colonists in the Wingen region, was published in Winjennia Remedies Proprietary Company's (one of the remedy's commercial producers) booklet, *Winjennia: The Story of Australia's Burning Mountain*.

58 Nunn and Reid, 'Aboriginal Memories of Inundation of the Australian Coast', 42.

59 NPWS, *Burning Mountain Nature Reserve*.

60 'The Winjennia Remedies: Analytical Records from the Lancet Laboratory', *The Lancet*, 751–52.

61 Reduced to a fine powder or smooth paste.

water and the levigated ore that was applied to treat burns and surface wounds). The process, Rev. Threlkeld noted, was like the production of medicinal tablets using the powdered ore. Traditionally, sulphate clay would be wet, often with mineral substances added to the mixture, before the combination was moulded into balls or large tablets and then roasted.[62] The karadji would generally provide a prescription to the patient noting how many tablets should be taken, when, and for how long.[63]

The area around the chasms of Burning Mountain was littered with naturally formed sulphur crystals. Crystallised sulphur would have proven itself convenient to both store and carry. Medicinal crystals, and those used for medical purposes such as sharpened quartz crystals used like a scalpel, were traditionally safeguarded by the karadji. The sulphur crystals could be easily crushed and used as needed, with water or emollient added before use. Burning Mountain offered Aboriginal people a profusion of both alum and sulphur of astounding purity that collectively formed the mount's unique mineral ore. This ore offered immense medical benefit to Aboriginal people and was an essential part of the formula used to produce a variety of pharmaceutical items at the site.[64]

The Wonnarua's pharmaceutical items healed a vast array of health complaints, making them extremely valuable items of trade. Aboriginal people groups that possessed an abundant supply of a mineral in high demand occupied an enviable trading position.[65] Trade in ancient lithotherapeutic medicinal items required detailed economic organisation, including specific infrastructure, logistics of storage, packaging and transport; the guarding of intellectual property and facilitating the impartation of empirical knowledge to the end consumer. Generation after generation of Aboriginal people from Queensland's Cape York to the Great Australian Bight were acquainted with Burning Mountain and its healing substances. Among the many tribal groups that were known to visit the smoking summit for its healing elements were the Kamilaroi[66] and the Yugilbar.[67] For centuries prior to the invasion of the Europeans, the wounded, injured, sick and suffering would be brought to the mountain from great distances and from neighbouring Country alike. Men, women and children came to the mountain seeking healing for a variety of ailments.

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62 E. S. Sorenson, 'Bobby Budgeree, M.D.; An Aboriginal Doctor's Methods', *Land* (Sydney), 23 April 1937, 16.

63 E. S. Sorenson, 'Bobby Budgeree, M.D.; An Aboriginal Doctor's Methods', *Land* (Sydney), 23 April 1937, 16; 'Outdoor Australia', *Sydney Mail*, 28 July 1926; 'Strange Ways of the Aborigines: Native Chemistry', *Sydney Mail*, 4 March 1936, 46; Cribb and Cribb, *Wild Medicine in Australia*; Roth, *Superstition, Magic, and Medicine*, 1–42.

64 NPWS, *Burning Mountain Nature Reserve*.

65 Buchester, *Popular Prospecting*.

66 One of the four largest Indigenous nations, the Kamilaroi people's lands extended from New South Wales to southern Queensland.

67 'Around the District. Wingen', *Scone Advocate*, 8 September 1905, 2; 'The "Burning" Mountain at Wingen: Australia's Unique Phenomenon', *Sydney Mail and New South Wales Advertiser*, 1925, 14; *Winjenia: The Story of Australia's Burning Mountain*. The reference to the Yugilbar may refer to the people of Yugilbar Station, which is found on the upper reaches of the Clarence River. According to one article, the Kamilaroi and Yugilbar are stated to have inhabited opposite sides of the Liverpool Range. See 'Around the District', *Scone Advocate*, 8 September 1905, 2.

After tribal wars, the slopes of Burning Mountain were covered in Aboriginal shelters as the wounded sought out the mount's healing minerals. The local settler colonists considered it remarkable that, despite the many different tribal groups gathering at Burning Mountain, any conflict ceased and all met like family on its inclines.[68]

'Discovery', dispossession, displacement and degradation

In March 1820, the first British colonists arrived at Milbrodale, reaching the Upper Hunter Valley after travelling overland from the Hawkesbury River and Windsor. John Howe and Benjamin Singleton, like many colonists, were travelling inland in search of terrain suitable for agriculture, they found land in the Hunter Valley that was described as having the appearance of a natural parkland. At the beginning of 1822 the Hunter Valley was the realm of its traditional owners. Only a few years later, in 1827, settlers in the area were managing more than 80,000 sheep and over 25,000 head of horned cattle.[69]

Settler colonists flooded the area between 1822 and 1826, which disrupted, disturbed and ultimately dispersed Aboriginal groups in the region.[70] Government surveyor Henry Dangar is believed to be the first European to visit the Wingen area. In 1824, Dangar was confronted by the Wonnarua's Gea-Wegal clan, after which he made his retreat. Early white settlers noted an annual pilgrimage[71] would be made to Burning Mountain by local Aboriginal clans and Aboriginal people groups who journeyed from great distances. The Cambridge-educated Rev. Wilton's observations were published in *The Australian* in 1829:

> The area of the mountain, near which the fire is at present raging, may be about half an acre in extent. There are throughout it several chasms varying in width, from which are constantly emitted sulphurous columns of smoke, the margins of these being beautied with efflorescent crystal of sulphur, varying in colour from the deepest red orange … to the palest straw colour, where alum predominates.[72]

68 *Winjennia: The Story of Australia's Burning Mountain*; 'The Burning Mountain at Wingen', *Albury Banner and Wodonga Express*, 29 April 1887, 38.

69 Nolan, '"We Want to do What They Did"', 16.

70 Miller, *Koori, a Will to Win*, 31.

71 In 'Witana and the Ochres' it is noted Aboriginal people groups made an annual pilgrimage to Wataku-wadlu to gather ochre. Mountford, *The Dreamtime Book*.

72 'The Volcanic Mountain', *Australian* (Sydney), 20 March 1829, 3.

Figure 3: J. H. M. Abbott, 'Boiling the billy on Burning Mountain, using heat from the ground' – Wingen, NSW, At Work and Play.
Source: Image courtesy of the State Library of NSW (03896).

In 1829 Sir Thomas Mitchell, who was then Surveyor-General Mitchell, visited Burning Mountain, returning again in 1831. Mitchell details this visit in his report, 'A Journey in search of the Kindur, 1831–2'.[73] Mitchell's most valuable contribution to the historical literature relating to Burning Mountain today is found in his sketched plan of the summit, detailing the position of the furnace. When this drawing is consulted alongside the description proffered by Wilton, Mitchell's sketch allows us to determine the exact position of the central furnace when Burning Mountain was first observed by white men. Around 1847, Bennett witnessed 'a large tribe' camping a few miles from the mountain.[74] From the older tribesmen Bennett learned that the fiery mountain had been burning before they were born, and long before the white man had appeared. W. E. Abbott, a local grazier, studied the mountain continuously and his 1918 book, *Mount Wingen and the Wingen Coal Measures*, contains pertinent details about the movement of the Burning Mountain's chimney, or vent, area.

73 Mitchell, 'A Journey in Search of the Kindur, in 1831–2'.
74 R. Bennett, 'Letter to the Editor of the Argus: Mount Wingen, near Murrurundi, New South Wales', Argus (Melbourne), 1883, 5.

The first settler colonists to the district surrounding Burning Mountain learned directly from the Aboriginal people of the medicinal value of the mountain's ore, which they used on themselves and their livestock with efficacious results.[75] The settlers used this traditional Aboriginal cure to great effect on foot rot[76] and on the sore shoulders and backs of their horses. For Aboriginal people, colonisation brought with it the harsh realities of dispossession, devastating disease and the destruction of their traditional life. Despite this, the Aboriginal people in the Wingen region generously shared life-giving traditional medical knowledge with the usurpers.[77]

On cold nights, the settlers' livestock, like the kangaroos, were drawn in by the summit's warmth. Cattle, sheep and native wildlife alike would gather on the summit, the various animals found indiscriminately dotted around the edges of the smoking fissures.

Common ground: Cultural knowledge, colonisation and commercialisation

Enterprising colonists and interested investors sought to commodify Burning Mountain's Aboriginal remedies and were attempting to profit from these mineral medicaments as early as the mid-1870s. Around 1875 Messrs Muston & Co. formed what came to be known as 'the Sydney syndicate'. After some difficulty, a mining lease was granted over the mountain in 1876.[78] Lynn Mills, the daughter of one of the men in Muston's Sydney syndicate, stated:

> My father and Mr Musten [sic] found that the [A]borigines of all this colony came from far and near to the mountain when suffering from any wounds or ills and would take a course of treatment from the earth, making mud packs and washes, and would stay there until cured.[79]

In 1876 two members of the Sydney syndicate, W. Muston and J. Y. Mills, commissioned a chemist to perform tests on Burning Mountain's curative earth. Their ointment and liquid extract, named 'Wingen', were both based on Aboriginal therapeutic formulations and sold to relieve tonsilitis, ulcers and open wounds.[80] Decades later, another syndicate would have Burning Mountain's ore tested. The Lancet Laboratory analysed specimens of the ointment and lotion:

75 '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.
76 Infectious pododermatitis, or foot rot, is a painful and contagious hoof infection that can affect cattle and sheep.
77 '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.
78 'Extraordinary Mineral Discovery at Wingen', *Dunstan Times* (NZ), issue 748, 18 August 1876.
79 'Burning Mountain: Interesting Details', *Southern Mail* (Bowral), 30 April 1948, 8.
80 'Burning Mountain: Interesting Details', *Southern Mail* (Bowral), 30 April 1948, 8.

> The powder on analysis proved to contain chiefly the sulphates of iron and alumina, which are soluble in water, while the insoluble portion contained silica associated with alumina and ferric oxide. The ointment and lotion contained the soluble salts described.[81]

Messrs Muston & Co. made an application to have the leasehold converted into a mineral conditional purchase; however, the Minister of Mines refused this application. The minister took the additional step of sending a letter to the Department of Lands requesting that no alienation be permitted, asking that the land be kept reserved for public purposes.[82] Despite this, the tenants and their employees obstructed both settlers and Aboriginal people from accessing Burning Mountain's ore.[83]

In 1876 huts were under construction on the mount and it was anticipated that, when the huts were completed, around 50 or 60 men would be employed to extract the medicinal ore.[84] A decade later, atop the summit sat the hut of one speculator with a notice affixed warning visitors against removing any of the mount's mineral substances.[85]

Aboriginal lithotherapeutics were often site-specific. Thus, dispossession severely interrupted the impartation of traditional lithotherapeutic knowledge through instruction and on-site educational training. Preventing Aboriginal people from accessing Burning Mountain's mineral ores effectively terminated Aboriginal people's ability to demonstrate the empirical processes of mineral extraction, beneficiation, preparation, storage and trade.

As interest in the commercial exploitation of the mount's resources increased, Messrs Muston & Co. refused an offer for the 'privilege of sale alone' from a Melbourne firm of £1,000 per annum.[86] W. Muston's refusal of this offer may have been due to the mount's potential to produce iron ore. After a discovery of what was considered to be 'the richest iron ore in the world'[87] on Burning Mountain, many men were set to work for months seeking a larger lode that did not eventuate.[88] By 1881, Muston applied to have the mineral leases at Wingen that had been provided to Messrs Moore cancelled on the grounds of non-fulfilment of conditions.[89] Lynn Mills

81 'The Winjennia Remedies', *The Lancet*, 751.
82 'A Burning Mountain in New South Wales', *Colonist* (NZ), vol. XXVII, no. 3800, 28 December 1883, 3.
83 'Australia's Burning Mountain', Advertiser (Hurstbridge, Vic.), 19 August 1927, 3; 'The Burning Mountain at Wingen', *Albury Banner and Wodonga Express*, 29 April 1887, 38.
84 'Extraordinary Mineral Discovery At Wingen', *Dunstan Times* (NZ), 18 August 1876.
85 'The Burning Mountain at Wingen', *Albury Banner and Wodonga Express*, 29 April 1887, 38.
86 'Australia's Burning Mountain', *Advertiser* (Hurstbridge, Vic.), 19 August 1927, 3; 'Extraordinary Mineral Discovery at Wingen', *Dunstan Times* (NZ), 18 August 1876.
87 '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.
88 'Latest Mining. Evening News Office. Tuesday', *Evening New* (Sydney), 6 February 1872, 2; 'Insolvency Court – Wednesday (Before Mr. Chief Commissioner Deffell.) Meetings of Creditors', *Empire* (Sydney), 26 March 1874, 4; '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.
89 NSW Legislative Assembly, *Votes and Proceedings*, no. 1, 1881.

recalls a large wholesale firm purchased the Aboriginal prescription from Messrs Muston & Co.[90] This was likely Winjennia Remedies Proprietary Company who launched their products in the early 1900s.[91]

In 1884 an interested party applied for conditional purchase of the Burning Mountain with the intention of building a health sanatorium to treat asthma and consumption with the vapours, and vapour baths to treat rheumatism and skin diseases.[92] The unsuccessful applicant was likely Quirindi chemist Charles Allen who trademarked his product Charles Allen's Black Wingen Oils in 1885.[93] Allen's product was advertised as being available from 'any chemist or storekeeper'.[94] In late March of that year 1,000 ounces of Charles Allen's product was donated to soldiers headed to the Soudan War. This unstinting donation received press attention speculating the remedy would:

> become known to the hospital and ambulance corps of the British force, and its fame spread, and its use extended throughout the whole military world.[95]

Commercial interests were aroused and interest shown from more than one sector when the effectiveness of the cures from Burning Mountain became known abroad.[96] In 1905:

> a report got abroad that the so-called medicinal extract of Mount Wingen had not nearer origin to the mountain than the chemist's own backyard in Quirindi, where, it is said, he used to mix linseed oil and sulphuric acid in an oil drum.[97]

Prospector H. Healy, who was familiar with Burning Mountain, asserted Charles Allen's product was sourced from Burning Mountain.[98] With strong investor interest in commercially exploiting Burning Mountain's unique minerals and gases, these salacious claims about Allen were likely an act of sabotage. Allen had profitably sold this product from 1885 until the mid-1890s; however, these allegations triggered the downfall of Allen's business.[99]

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90 'Burning Mountain: Interesting Details', *Southern Mail* (Bowral), 30 April 1948, 8.

91 NPWS, *Burning Mountain Nature Reserve* states the lease was for the mining of 'silinite, a white by-product of sulphur'; however, they likely meant *selenite* (commonly referred to as gypsum), which is a white sulfate mineral. 'Wingen's Burning Mountain', *Australiana: The World's News* (Sydney), 1948, 22; Vass, 'Burning Mountain Keeps Glowing after 500,000 Years on Fire'.

92 'Around the District', *Scone Advocate*, 8 September 1905, 2; 'Mount Wingen: Australia's Burning Mountain', G*eelong Advertiser*, 21 April 1906, 41.

93 Advertising records show 'Charles Allen's Black Wingen Oils' or 'Chas. Allen's Black Wingen Oils'; 'Around the District', *Scone Advocate*, 8 September 1905, 2. 'Trade-mark', *New South Wales Government Gazette*, 5 May 1885, 3028.

94 Advertising, *Bulletin* (Sydney), 3, no. 129, 31 October 1885, 13.

95 'Valuable New Discovery: Black Wingen Oils', *North Australian* (Darwin), 3 April 1885. 7.

96 'Valuable New Discovery', *North Australian* (Darwin), 3 April 1885. 7; '"The Burning Mountain": Its Origin and History', *Tamworth Daily Observer*, 10 June 1911, 3.

97 'Around the District', *Scone Advocate*, 8 September 1905, 2.

98 H. Healy, 'To The Editor Of Walcha Witness', *Walcha Witness and Vernon County Record*, 2 November 1895, 2.

99 'Around the District', *Scone Advocate*, 8 September 1905, 2; NPWS, *Burning Mountain Nature Reserve*; Advertising, *Bulletin*, 31 October 1885; 'Quirindi', *Maitland Daily Mercury*, 6 August 1895, 6.

Figure 4: The Winjennia Remedies' Exhibit, Todd and Dimant, Clarence Street, Agents, the Winjennia Display, The Sydney Easter Show, 1902.
Source: Original image from *The Sydney Mail*, 5 April 1902, 858.

At the beginning of the twentieth century, a Melbourne syndicate, The Winjennia Remedies Proprietary Company (Winjennia Co.), began selling products made from Burning Mountain's ore under the brand name Winjennia.[100] Winjennia Co. had secured a mineral lease at Wingen from the government and by 1906 were exploring the idea of establishing a health sanatorium and vapour baths on the

100 NPWS, *Burning Mountain Nature Reserve*, 4.2 incorrectly states the brand name as 'Wingenia'. It was instead, 'Winjennia' – with 'Wingen' spelt as it is pronounced phonetically. The word 'Winjennia' was trademarked in 1901 by Winjennia Proprietary Limited, see 'Trade Marks', *Government Gazette of the State of New South Wales*, 26 November 1901, 9114; Winjennia Remedies Pty Ltd, *Winjennia: Australia's Wonderful Natural Remedy and Tonic Soap*; Winjennia Advertising, 1920; Abbott, *Mount Wingen*.

mount.[101] The company extracted the ore using long flumes that trapped the hot gases escaping from Burning Mountain's crevices. These flumes held the fumes until they cooled, thereby precipitating their solid content.[102]

After taking out five first honours in their initial showing at the 1902 Sydney Royal Easter Show, Winjennia Co. heavily advertised their range of products that included a medicinal soap, a cream (for conditions such as eczema), an ointment (for scalds, cuts and burns), a liquid extract (for sore throats, blight and so forth) and a specific remedy for use on horses and cattle.[103]

Winjennia Co.'s products were an Australian success and, soon after their launch, their medicinal items were sold at all chemists.[104] The company's extensive advertising openly acknowledged the Aboriginal pharmacopoeia and Mount Wingen, as it was then known, as the origin of their products. Their advertisements heralded that Winjennia products would cure a startingly long list of ailments – 44 in total – that included everyday problems such as nappy rash, insect bites, bruises, cuts, boils, carbuncles, eye complaints and burns and stretched to more exotic afflictions like Barcoo rot, Whitlows and fistulas.[105] The list evidences the wide range of ailments treated by Burning Mountain's multi-use Aboriginal lithotherapeutics.[106]

Rapid expansion saw Winjennia Co. survive a brush with the auditors in 1904.[107] Decades later, despite their early success, the company diversified into other products and faltered. The well-regarded products left the marketplace after the firm's collapse, with Herbert A. Halls scooping up the therapeutic formulas and remaining stock at the subsequent fire sale.[108]

Sometime in the late 1940s[109] or early 1950s,[110] Mandy Halls decided to resurrect two of Winjennia Co.'s products, an ointment and the liquid extract, rebranding them Sulfazone. Faithful to the traditional Aboriginal formulation, the ore was levigated with nothing else added to it. Afterwards, the liquid extract was mixed with lanolin, olein and petroleum jelly to form the ointment in the same way the Wonnarua people had produced the ointment using animal fat.[111]

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101 'Mount Winjet [*sic*]. Australia's Burning Mountain. Winjennia, What It Is And All About It'., *Geelong Advertiser*, 22 April 1906, 1.

102 NPWS, *Burning Mountain Nature Reserve*.

103 'The Winjennia Remedies' Exhibit. Todd And Dimant, Clarence Street, Agents', *Sydney Mail and New South Wales Advertiser*, 5 April 1902, 842.

104 *Freeman's Journal* (Sydney), 31 January 1907, 19.

105 Winjennia Advertisement, *Benalla Standard*, 10 May 1927, 4.

106 Gasciogne and Maroske, 'Colonial Science and Technology'; Webb, *Palaeopathology of Aboriginal Australians*.

107 'Matter of Winjennia Proprietary Limited', 1904, Public Record Office Victoria, VPRS 12024/P1, unit 66, item 1380.

108 M. Day, 'One Tube to Cure All', *Herald Sun* (Melbourne), 10 January 2018, Home Magazine 18; Carr, 'Wanted – New Interest for an Old Cure-All'.

109 NPWS, *Burning Mountain Nature Reserve*.

110 Carr, 'Wanted – New Interest for an Old Cure-All'. This possibly occurred after the death of Herbert Alfred Halls in 1945 (Victorian Death Cert. No. 5212/1945).

111 Mary Jackson, pers. comm., 2019; Carr, 'Wanted – New Interest for an Old Cure-All'.

The ore used to produce Sulfazone was collected manually and often dug out using large sticks, as the stones were simply too hot to move by hand. In 1964, while in the process of extracting the ore from Burning Mountain, Mandy Halls suffered a heart attack and passed away on the side of the mount whose medicinal products he had resurrected.[112]

Both Mandy Halls and his nephew Roger Carr would be encouraged at the prospect of potential scientific investigation into Burning Mountain's curative ore. Mandy put the products forward for testing as a cure for cancer, only to be bitterly disappointed at his request's rejection. Exciting new medicinal research exploring thermal vents for new pharmaceutical leads is being undertaken at the Center for Pharmaceutical Research and Innovation.[113] Soil microbes have previously led to the discovery of new and effective drugs. While no analysis of Burning Mountain is currently underway, the researchers at the Center for Pharmaceutical Research and Innovation believe such sites offer unique ecological environments that may be the source of new medical discoveries.

Conclusion

In the thousands of years before colonisation, Aboriginal people were manufacturing, utilising and trading multi-application lithotherapeutics, and their value and importance to Aboriginal people cannot be overstated. Projecting this knowledge into the deep past of Aboriginal people suggests a long history of use of the medicinal mineral resources of Burning Mountain – perhaps the first ancient culture to have utilised both sulphur and alum pharmaceuticals.

Colonisation delivered devastating disease, dispossession and the destruction of Aboriginal social, economic, political and religious structures. This included preventing the Wonnarua people from passing on their ways of knowing, doing and being on Country and hindering their ability to protect and care for the sacred site of Burning Mountain.

Dispossession involved the dual distresses of displacement and the subsequent degradation of the land. Denying Aboriginal people access to Burning Mountain prevented them from obtaining the mount's mineral ore and from transmitting valuable scientific knowledge regarding its use. As Burning Mountain's valued mineral ores were commercialised by the settler colonists for their own financial gain, the ancient pharmaceutical industry of the Wonnarua people was put to an end.

112 Mary Jackson, pers. comm., 2019.
113 College of Pharmacy, at the University of Kentucky, United States.

The Wonnarua people have a strong, unrelenting and deep continuing connection to Country. The ancestors of the Wonnarua – along with the ancestors of the Worimi – used Country as their healer, manufacturing and trading pharmaceutical products, produced using the Greater Hunter region's sulphur and/or sulphate minerals, back through millennia.

This study decolonises the Aboriginal scientific knowledge pertaining to Burning Mountain's mineral ore commodified by the colonisers and gives voice to important aspects of Aboriginal identity and culture.

Already recognised as a unique geological formation, Burning Mountain deserves to be acknowledged as an important and unique cultural heritage site for Aboriginal people. A sacred place of healing, in addition Burning Mountain provided Aboriginal people of the greater Hunter region with an economic base as an Aboriginal pharmaceutical production site. Aboriginal people's impartation of traditional lithotherapeutic medicinal lore to the colonisers was a generous, life-giving gift and should be counted as one of the first major acts of reconciliation by Aboriginal people.

Burning Mountain's significance to Aboriginal people can no longer be overlooked. It is time Burning Mountain received due attention from the New South Wales Office of Environment and Heritage and be declared an Aboriginal Place. It is the author's belief that the 14.5-hectare Burning Mountain Nature Reserve is of such import and significance that it also warrants listing with UNESCO (United Nations Educational, Scientific and Cultural Organization) as a World Heritage site. An archaeological survey should be carried out, in partnership with the Aboriginal community, as a prelude to these moves.

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