TURNING STONES

by Aimee Cass

A Critical Geomorphology for the Anthropocene

TURNING STONES: A CRITICAL GEOMORPHOLOGY FOR THE ANTHROPOCENE

Aimee Cass

A thesis submitted in partial fulfilment
of the requirements for the degree of
Bachelor of Arts (Honours)

Discipline of English, University of Sydney

OCTOBER 2024

Table of Contents

Introduction: On the Rocks **1**

Chapter One: Geomorphic Time **8**

Encountering the Archive 11

The Deep Time Pattern and the Undoing of the Human 14

The Speculative Futures of Rock 18

Chapter Two: Geomorphic Space **22**

Volcano as Literary Cartography 25

Volcanoes as Landmarks 28

Spiralling Through Geomorphic Space 30

Chapter Three: Geomorphic Matter **35**

On Sisyphus and Human Exceptionalism 38

Trans-corporeality and Reading *Through* 42

The Agentic Mesh and the Question of Difference 46

Conclusion: Towards Diffractive Reading **50**

Works Cited **54**

Introduction: On the Rocks

> It is much beyond belief, were not receding ages witness, hard and rigid stones assumed a softer form, enlarging as their brittle nature changed to milder substance, — till the shape of man appeared, imperfect, faintly outlined first, as marble statue chiselled in the rough.
> —Ovid, *Metamorphoses*

> Hurl a rock and you'll shatter an ontology, leave taxonomy in glistening shards.
> —Jeffrey J. Cohen, *Stone: An Ecology of the Inhuman*

> Is it okay to begin with the obvious? I am full of stones—
> —Ada Limón, 'The Magnificent Frigatebird'

In Greek mythology, Prometheus created humanity by shaping clay into human form. As the ages passed on Earth, humans gradually turned away from the gods and grew morally corrupt. Seeing this, Zeus decided to punish humanity by destroying them with a great flood. Prometheus warned his son Deucalion, who, with his wife Pyrrha, survived the deluge by floating inside a chest. After nine days, the waters receded and Deucalion and Pyrrha looked out across the desolated landscape and felt immense grief. They sought guidance from the oracle Themis on how to repopulate the Earth. Themis advised them to throw the bones of their mother behind their shoulders. Deucalion interpreted this as a riddle where "bones" meant rocks and "their mother" was the Earth itself, so Deucalion and Pyrrha gathered as many rocks as they could carry and threw them over their shoulders. As the rocks fell, they morphed into humans, and thus humanity was reborn from stone (Johnston 2023, 66-8; Ovid n.d., ca. 8 CE).

In many ways, humanity today is threatened with a great flood; the prospect of wide-spread planetary destruction due to our own actions. Anthropogenic climate change

is triggering the collapse of ecosystems, mass-extinction and rising sea levels, and plastics and other industrial materials and chemicals are polluting our lands and waterways and becoming lodged in the strata as future-relics of our single-use economy (Malhi 2017). Many geologists argue that anthropogenic activity is causing planetary changes that will be measurable in the geological, stratigraphic record for aeons to come, changes so significant that they herald a new epoch in geologic time; the Anthropocene (Zalasiewicz et al. 2011, 1037). Despite widespread use of the term in both scholarship and popular culture since the early 2000s, the legitimacy of the Anthropocene has been hotly debated by scientists, who either cannot agree on when exactly the epoch started, or contest that the anthropogenic changes are not yet significant enough to warrant an entirely new epoch in geological time (Fisher 2024). As such, in March 2024, the governing scientific body on the matter voted against formalising the Anthropocene (Zhong 2024). It is important to emphasise that even though the Anthropocene is not official, scientists overwhelmingly agree that anthropogenic climate change is real; the water is rising (Chakrabarty 2009, 201). Chakrabarty observes that the Anthropocene has two lives: "the scientific life involving measurements and debates … and a more popular life as a moral-political issue" (2018, 9). Likewise, Malhi posits that the Anthropocene is a "cultural zeitgeist, a charismatic mega-category emerging from and encapsulating elements of the spirit of our age" (2017, 78). As such, when I refer to the Anthropocene throughout this thesis, I do so because it is a widely understood moral-political issue and zeitgeist; it is the most succinct way in which I can speak to the ecologically dire situation—the swelling flood waters—of the *now*.

Clingerman argues that "the movement of the Anthropocene thesis inevitably rests upon an ontological and moral challenge of our very being" (2016, 231). Perhaps we too

can look to the lithic, as Deucalion did, to morally reshape ourselves. In *Making the Geologic Now*, Ellsworth and Kruse boldly announce the arrival of a geologic turn in the arts and the humanities, which they link directly to the rising awareness of the Anthropocene in popular consciousness, stating that "we are intrigued by what is arguably a growing recognition that the geologic, both as a material dynamic and as a cultural preoccupation, shapes the "now" in ever more direct and urgent ways" (2012, 7). Indeed, as the Anthropocene implicates humanity as planetary agents operating on vast spatial and temporal scales (Ginn et al. 2018, 214), many scholars are looking to the geologic to better understand what this means and how to ethically occupy such expanded frames. Jeffrey J. Cohen's 2015 book *Stone: An Ecology of the Inhuman* is one such example. Cohen argues that when reading the geologic, one experiences a "lithic-induced perspective shift [that] triggers an ontological and temporal reeling, a rocky movement of affect, cognition, horizon" (16). Throughout *Stone*, Cohen posits that "when stones are examined as something more than fixed and immobile things, as partners in errantry, then facts likewise begin to ambulate … the nature of nature changes" (12). Here, similarly, lies the project of this thesis. Like Cohen, I look to the stories of the geologic in order to argue for a more "ethically generous mode of worldly inhabitance" (250), one in which the agency of the nonhuman is given its due; where the morphic potential of the lithic, like Deucalion and Pyrrha's rocks, might offer insight into how humanity can navigate this anthropogenic deluge.

In this thesis, I build upon the turn towards the geologic in the humanities and literary studies to propose a mode of reading which I call 'critical geomorphology'. Here, I read literary texts by way of how they are *shaped* by the geologic, and in effect seek to establish a new way of talking about the stories of the earth. Given the troubling

circumstances of the Anthropocene, this is a salient endeavour, as Cantrill and Oravec argue; "the environment that we experience and affect is largely the product of how we come to talk about the world" (1996, 2, as cited in Oppermann 2019, 114). As such, this thesis is foremost a work of ecocriticism; it seeks to advocate for new ways of seeing, talking about and thus relating to the nonhuman world. Since its inception, ecocriticism has been diverse in its methodologies and outputs, but the throughline, observes Clark, is an enduring political overcurrent centred around environmental advocacy in which the majority of "ecocritics see their intellectual work as a kind of worthwhile activism" (2019, 4). More specifically, as will be discussed further in Chapter Three, this thesis is a work of *material* ecocriticism; it argues that nonhuman, geologic matter possesses narrative agency. Material ecocriticism, as set forth by Iovino and Oppermann, "examines matter both *in* texts and *as* a text, trying to shed light on the way bodily natures and discursive forces *express* their interaction whether in representations or in their concrete reality" (2014, 2, emphasis in original).

In the science of geology, there are many methods of studying the lithic, with each approach unearthing partial glimpses of the story of Earth's rocky inhabitants. Geologists take aerial photographs, use ground penetrating radars, take samples of sediment to study in the laboratory, monitor weather and water patterns, record seismic activity and split rocks with pickaxes; from wielding complex technological tools to sitting quietly *in situ* and observing their environment, geologists piece together the story of stone (Knödel, Lange, and Voigt 2008). Approaching the study of the geologic heterogeneously is necessary; rocks and their kin are a diverse crowd, to understand them we must study them as such. Likewise, I argue, literary critics should approach our study of the lithic through diverse methodologies. In this thesis, I propose critical geomorphology as one such

approach, which I hope may glean something new, expose some new surface or sediment, in our critical work with the geologic.

The word geomorphology is derived from Ancient Greek, with *geo* meaning Earth, *morphe* meaning shape or form, and *logos* meaning to study or to write about (Gregory and Goudie 2011, 2; Gutierrez 2013, 2). Thus, the science of geomorphology is defined by Gutierrez as "the study of the shape of the Earth's surface" (2). Geomorphology overlaps with geology, geography, soil science and hydrology, but what makes it distinct is that firstly, its area of study is the Earth's surface in particular, and secondly, it is concerned with the *processes* that shape the surface, as such the sub-categories of geomorphology are defined by these processes and include aeolian (shaped by wind), fluvial (shaped by water), volcanic (shaped by volcanic activity), and glacial (shaped by ice), among others (Gutierrez 2013). A geomorphic study of landforms is thus dually concerned both with the processes of the Earth that shape landforms and how landforms in turn shape the Earth.

Critical geomorphology takes the core tenets of geomorphology—as a mode of study concerned with form and formation—and extends the concept to the study of the shape and form of literary texts by way of the geologic Earth. In this way, I propose critical geomorphology as a methodology which studies or writes about (*logos*) how in-text representations of the Earth (*geo*) shape and form (*morphe*) the texts in which they are situated. In other words, critical geomorphology reads and interprets the shape of texts by way of the geomorphic processes which form them. There are a number of ways one could read the shape or form of literary texts by way of critical geomorphology. For the sake of this thesis, I will employ three formal dimensions of texts; time, space and matter. By looking at the temporal form, the spatial form and the material form of texts, I will argue that in-text geologies are morphic agents which act upon these textual dimensions,

shaping them in significant and distinct ways. In this thesis, I will refer to the altered textual dimensions produced by geologic agents as geomorphic time, geomorphic space and geomorphic matter. In this way, for example, geomorphic time is the temporal dimension of a text that is formed and informed by the geologic. It is important to stress that I do not propose these dimensions to be exhaustive and fixed areas of study under critical geomorphology, only helpful lenses which I employ in this thesis to read and understand the outcomes of in-text geomorphic processes.

In order to exemplify what it is I mean by critical geomorphology and to argue that it is a valuable interpretive methodology, I will perform a close reading of three novels, namely Joan Lindsay's *Picnic at Hanging Rock* (1967), Malcolm Lowry's *Under the Volcano* (1947), and Kōbō Abe's *The Woman in the Dunes* (1964). I have chosen these texts firstly, because they contain interesting representations of the nonhuman world which gesture beyond anthropocentrism, and secondly because they deal closely with the geologic and therefore can better demonstrate my arguments than texts in which the geologic plays a more peripheral or obscure role. Each chapter of this thesis will draw upon diverse fields of scholarship in order to locate language and theories which best serve my analysis. Given that I am taking an approach to critical geomorphology which looks at the geomorphic shaping of textual dimensions, the scholarship which I deal with is thus concerned with these textual dimensions. For geomorphic time, I look to the concept of deep time, for geomorphic space, I employ scholarship from the spatial turn and geocriticism, and for geomorphic matter, I turn my attention to new materialism. The readings which I offer in the following chapters are foremost readings of the geologic, and as such are not complete interpretations of my primary texts, which, though they are each distinctly informed by geomorphic processes, also deal with dimensions and narratives

beyond this thesis’ area of interest. As Virginia Woolf writes in *To the Lighthouse*; “the very stone one kicks with one's boot will outlast Shakespeare” (1927, 42). This thesis is interested in the story of that stone, within which the stories of Shakespeare are just a fragment.

Chapter One: Geomorphic Time

At present, the Earth is believed to be around 4.5 billion years old. This is a truly inconceivable span of time. To put this into perspective, if you were to live for 144 years, you would witness only 4.5 billion seconds go by, and all recorded human history spans a time frame that is less than just 4.5 billion minutes (Hazen 2010, 198). It is through dating and observing the geologic that scientists have calculated this age; as Hazen explains, rocks are Earth scientists' "most reliable clocks" (199). Indeed, the oldest rocks on Earth are about 4 billion years old, and they tell the story of time so incomprehensible to the human mind that it has been aptly called 'deep time'.

The concept of deep time, also referred to as geologic time, lithic time or geohistory, arose "directly from observations of nature" (Zen 2001, 5). Its "discovery" is widely credited to Scottish naturalist James Hutton, often referred to as the founder or "father" of modern geology (Heringman 2023, 6; Irvine 2014, 162), for his 1788 work *Theory of the Earth*, in which he detailed a trip to Siccar Point in Scotland, where he, mathematician John Playfair and geologist James Hall, observed the unconformity of the strata of the rock formations. Playfair, who popularised Hutton's theory, wrote of the encounter:

> We felt ourselves necessarily carried back to the time when the schistus on which we stood was yet at the bottom of the sea, and when the sandstone before us was only beginning to be deposited … an epocha still more remote presented itself, when even the most ancient of these rocks, instead of standing upright in vertical beds lay in horizonal planes at the bottom of the sea … Revolutions still more remote appeared in the distance of this extraordinary perspective. The mind seemed to grow giddy by looking so far into the abyss of time. (1805, 72–3)

This abyss of time observed by Hutton and Playfair was later termed ‘deep time’ by journalist John McPhee in 1981, and then further popularised by evolutionary biologist Stephen Jay Gould in 1987.

Heringman argues that deep time “has a history much older than geology and broader than the field of European ideas” (2023, 1). Notably, the dominant history of the “discovery” of deep time does not account for Indigenous knowledge systems, which recognised the pre-human history of the Earth long before people like Hutton or McPhee. Likewise, it does not account for other non-scientific approaches to the concept. Literature, Heringman argues, “predates and in some ways anticipates geological time” (24). He explains that author J.G. Ballard used the term ‘deep time’ in his 1962 novel *The Drowned World*, twenty years before John McPhee supposedly coined the phrase (2-6), and that Shakespeare wrote of “the dark backward and abyss of time” in *The Tempest* in 1611, with several poets employing variations of the concept in the eighteenth century (26). Just as the history of deep time is illuminated through considering non-scientific origins of the notion, so too does our understanding of deep time in the present-day Anthropocene benefit from non-scientific approaches, as “science alone cannot reveal the fractured timespace of our present planetary moment” (Ginn et al. 2018, 214). In this way, Baishya argues that “reimagining our troubled present … is something that literary narratives, with their heterogeneous, entangled temporalities, are well-positioned to perform” (2020, 218).

Joan Lindsay’s 1967 *Picnic at Hanging Rock* (henceforth referred to as *Picnic*) is an Australian gothic, historical fiction novel set in the year 1900. The novel follows a group of students from an all-girls’ regional boarding school in Victoria who travel to a geologic monolith called Hanging Rock for a picnic. Three of the girls and one teacher

vanish at the Rock, the novel telling of the proceeding events which ripple outwards from this incident. The Hanging Rock of *Picnic* is inspired by a real-life geologic landform of the same name, located in the Macedon Ranges of Victoria, Australia, which was formed over six million years ago when stiff magma erupted through a vent in the earth's surface (Macedon Ranges Shire Council 2018, 10). Hanging Rock sits at the boundary of three different Aboriginal Australian tribal groups' land—the Wurundjeri, Taungurong and Dja Dja Wurrung—and has long been sacred for Traditional Owners, serving as an inter-tribal meeting place (14).

Much of the scholarship concerning *Picnic* is interested in how the novel deals with time; Oyarzun reads the text by way of Deleuzian time (2022), Adams interprets the mystery as the girls disappearing into another time-zone (1976, as cited in Crick 1985, 232), and Crick asserts that the novel exists "in no one place and in no one time", where the entropic laws of nature work to slowly erase all human signification (1985, 240). Indeed, the temporal dimension of *Picnic* is entangled and heterogeneous. In reading *Picnic* by way of critical geomorphology, I will argue that this entangled temporality is geomorphic in that it emerges from the text's central geologic presence, Hanging Rock. In order to give language to what geomorphic time is and how it is generated by the Rock, I will employ the notion of deep time. To make this argument, I will first identify how *Picnic* tells of a phenomenal, enchanted encounter with the archive of deep time. Then, I will discuss how this deep time encounter ripples outwards to rupture the "human" time of the novel, generating a temporality that is governed by the geologic, and finally, I will consider how the deep time of the Rock gestures towards distant futures as well as distant pasts by offering a reading of the text as speculative fiction.

Encountering the Archive

Stone, according to Cohen, is "times most tangible conveyor" (2015, 79); a "communication device that carries into distant futures the archive of a past otherwise lost" (11). Indeed, the stratigraphic record is the oldest archive on Earth; stone is inscribed with deep time. The assertion that the Earth is 4.5 billion years old is difficult to grasp, as such, teaching the notion of deep time to students of Earth-science is typically a field-work exercise that focuses on sensory engagement (Zen 2001, 5). Likewise, Irvine notes that "understanding [deep time] emerges on a phenomenal level" (2014, 164), and Cohen says that "to *touch* stone is to encounter alien duration" (2015, 80, emphasis added). Even Charles Darwin was aware of the importance of in-the-flesh observation in grasping deep time, directing readers in *Origin of Species* to "watch the rivulets bringing down mud, and the waves wearing away the sea-cliffs, in order to comprehend something about the duration of past time" (1869, 349). It is not through laboratory calculations that the lithic archive of deep time is most effectively read, but through phenomenal encounters *in situ*.

Picnic tells of such an encounter. After arriving at the picnic grounds near the base of Hanging Rock, Marion, one of the senior girls from the College, requests permission from her teacher to venture towards the Rock to "make a few measurements at the base" (Lindsay 1967, 23). She is accompanied by Miranda and Irma, two other senior girls, and Edith, a junior girl who has a reputation for being a wiseacre. The girls proceed to follow the creek upstream towards the monolith. When the Rock comes into view, "the immediate impact of its soaring peaks induced a silence so impregnated with its powerful presence that even Edith was struck dumb" (29). In the presence of deep time, Edith's cognitive faculties uncharacteristically fail her. Here, *Picnic*, in line with the Victorian gothic tradition which the novel evokes, gestures towards the sublime; "a space beyond

comprehension and understanding" (Oyarzun 2022, 115). As the girls grow nearer to Hanging Rock, the depths of the archive come closer to comprehension by way of phenomenal observation: "Those peaks … they must be a million years old," says Marion. "'A million. Oh how horrible!' Edith exclaimed. 'Miranda! Did you hear that?' At fourteen, millions of years can be almost indecent." Edith proceeds to have a physical reaction to this deep time encounter: "'And what's more, you little goose, you have already lived for millions and millions of seconds.'" Edith had gone quite white in the face. 'Stop it! You're making me feel giddy'" (Lindsay 1967, 30). Specifically, Edith's response evokes what Immanuel Kant calls the 'mathematical' sublime; the "sublimity of infinite size" (Fernandez 2020, 23), in which Edith's imagination fails to estimate the magnitude of the Rock's temporality and thus assumes infinity (28); an act which produces an affective response through the realisation that she is comparatively "fragile, small, and finite" (29). Faced with the inconceivable, and thus perceived infinite, depth of the archive, the Rock exposes the startling brevity of Edith's child-length life, giving rise to a giddiness induced by a phenomenal encounter that mirrors that of Playfair at Siccar Point, who said: "The mind seemed to grow giddy by looking so far into the abyss of time" (1805, 72–3).

Ginn et al. employs Jane Bennett's theory of enchantment as one of three proposed modes of deep time encounter, alongside violence and haunting (2018, 217), and Cohen too finds Bennett's enchantment useful in describing the affective force of stone (2015, 9). According to Bennett, enchantment involves an unexpected, surprising encounter which suspends "chronological time" (2001, 5) and "one's critical faculties", where enjoyment "eclipses the anxiety endemic to critical awareness of the world's often tragic complexity" (10). Bennett's enchantment is similar to Edmond Burke's theory of the 'astonishment' of

the sublime; a sort of “delightful horror” (1757, 217) in which “the mind is so entirely filled with its object, that it cannot entertain any other” (131). As the girls move closer to Hanging Rock, the narrator says that “at every step the prospect ahead grew more enchanting” (Lindsay 1967, 31). For Edith, her anxiety ultimately overrides any sense of astonishment or enchantment she might find in the encounter, but the older girls, less burdened by anxiety, begin to behave nonsensically. They throw away their shoes and stockings and, much to Edith’s confusion, begin to dance, “or rather to float away, over the warm smooth stones” (33). As Bennett says, to be enchanted is to be “simultaneously transfixed in wonder and transported by sense, to be both caught up and carried away” (2001, 5). The girls float closer to the Rock, “until at last the bushes began thinning out before the face of the little cliff that held the last light of the sun. So on a million summer evenings would the shadows lengthen upon the crags and pinnacles of the Hanging Rock” (Lindsay 1967, 34). Here, at the foot of the archive, the narrator gestures towards the deep time of Hanging Rock and the girls all fall into an unlikely sleep. Edith wakes in the twilight to see the senior girls moving again up towards the Rock until all three disappear “out of sight behind the monolith” (36). Edith, seeing something she cannot remember or explain—perhaps the incomprehensible depths of deep time itself—screams in terror and runs back to the picnic grounds. For the senior girls, the enchantment of their encounter with the deep time archive of Hanging Rock suspends their cognitive faculties and quite literally carries them away into some non-chronological temporality.

Ginn et al. explains that enchantment “momentarily throws one off track, out of the flow of normal time” (2018, 218). This is the last we see of Miranda and Marion, whose bodies are never found. Irma is discovered weeks later near the Rock by Mike, inexplicably alive but with total memory loss. According to the doctor, Irma “should have

been dead long ago" (Lindsay 1967, 95), and her memory loss is described as being like a clock "that stops under a certain set of unusual conditions and refuses ever to go again beyond a particular point" (112). These details, combined with the fact that no physical trace of the other girls can be found, suggests that it is not a question of *where* the girls went, but *when*. Perhaps the Irma who is found is the same Irma who was dozing under the Rock moments earlier, or perhaps she lived lifetimes in some distant past or future, experiencing a temporality so deep, so nonhuman, that it cannot be cognitively integrated upon her return to the ordinary, "human" time of the novel. The *in situ* phenomenal encounter with the archive of deep time at Hanging Rock signals the initial rupture in the text's temporal fabric; an encounter with a geologic temporality that proceeds to spread outwards through the text, infusing the story that follows with geomorphic time.

The Deep Time Pattern and the Undoing of the Human

Ginn et al. explains that a deep time encounter is not an event in which "self-contained, preformed entities meet" but rather an "indeterminate moment of 'contamination', where beings and things are brought together in interwoven rhythms" (2018, 217). In this way, the disappearance of the girls at the Rock can be read as the point of contamination from which the encounter of deep time ripples outwards throughout the text; its rhythms disrupting ordinary, "human" time and other human-born methods of perceiving, measuring and ordering the world. Mr Hussey and Miss McCraw's watches, the group's only form of time measurement while at the picnic grounds, both stop inexplicably at midday (Lindsay 1967, 22-3). For Mike, after he returns from the Rock with Irma, "timeless days melted imperceptibly into timeless nights" (96). Other forms of measurement are also rendered ineffective by the Rock. Marion, one of the girls who

disappears, tosses her pencil and notebook into the ferns before vanishing (35), and mathematics teacher Miss McCraw, who derives “a sense of power” from seeing numbers on paper (10), also vanishes at the Rock and is never found. The encounter of deep time that weaves through *Picnic* disrupts human efforts of imposing order on the world; watches stop, measurements fail, and the respected institution of Appleyard College, with its “customary clockwork precision” (51), descends into disorder.

For anthropologists, how time is conceived is connected to “the way society understands and justifies itself” (Gellner 1964, 1, as cited in Irvine 2014, 158). In light of the arrival of deep time in the everyday heralded by the Anthropocene, Irvine considers this connection between time and society and thus asks what the collapsing of human history into Earth’s long, mostly prehuman history does to society’s perception of itself (2014). A deep time reading of *Picnic* finds a similar question at the heart of the novel: What happens to society, culture and order when confronted with the depths of deep time? The answer is most evident in the unravelling of Appleyard College, where “in such an exquisitely ordered world the Hanging Rock and its sinister implications were a nightmare” (Lindsay 1967, 72). The students of Appleyard College are subjected to strict routines and cultural institutions by the headmistress Mrs Appleyard, who laments the girls’ disappearance not out of concern for their wellbeing but for the impact of the event on the social standing of the College (60). Mrs Appleyard is haunted, in true gothic fashion, by Hanging Rock, which she sees as being responsible for the ensuing failure of Appleyard College’s integrity as an institution. Indeed, the spreading encounter of the Rock slowly erodes the College; teachers leave, students are withdrawn, and scandal surrounds the school. This erosion ultimately drives Mrs Appleyard to murder one of the students, Sara, a child who feels like she is “hundreds of years old” (150). Sara is

characterised as having a strong bond to Miranda, one of the girls who disappeared at the Rock. Before Sara's body is discovered, the narrator notes that the clock in her quarters, situated next to a photograph of Miranda, has stopped ticking (169). Here, the deep time rhythms of the Rock seem to ripple through Miranda and into Sara, who is inexplicably perceived as the ultimate threat to the College's order by Mrs Appleyard; she is "contaminated" with deep time. After Mrs Appleyard murders Sara, she kills herself by jumping from a peak of Hanging Rock. As she falls to her death, the narrator observes that "an eagle hovering high above the golden peaks heard her scream" and a "spider scuttled to safety as the clumsy body went bouncing and rolling from rock to rock … until at last the head in the brown hat was impaled upon a jutting crag" (187).

The narrator of *Picnic*, an omniscient third, plays a crucial role in mapping the deep time encounter as it spreads throughout the text. The narrator explicitly refers to the unfolding temporal rhythms of the Rock as a "spreading pattern" which affects both human and nonhuman players:

> The reader taking a bird's eye view of events since the picnic will have noted how various individuals on its outer circumference have somehow become involved in the spreading pattern … so too have the lives of innumerable lesser fry – spiders, mice, beetles. (111)

The narrator's omniscient status is imparted to the reader, granting them access to perspectives beyond the human characters of the novel. When the girls first encounter the Rock, the narrator says; "confronted by such monumental configurations of nature the human eye is woefully inadequate. Who can say how many or how few of its unfolding marvels are actually seen, selected and recorded by the four pairs of eyes now fixed in staring wonder at the Hanging Rock?" (29). By explicitly identifying the inadequacies of

the "human eye", the narrator invites the reader to peer beyond human frames of reference in a way that, as Baishya argues, is made possible by literary narratives (2020, 218). Similarly, the narrator invites the reader to question the reliability of "ordinary", human time in order to make way for other temporal possibilities: "There is no single instant on this spinning globe that is not, for millions of individuals, immeasurable by ordinary standards of time: a fragment of eternity forever unrelated to the calendar or the striking clock" (Lindsay 1967, 120). Shifting into deep time throughout the text, the narrator tells the story of the Rock; "huge boulders, originally spewed red hot from the boiling bowels of the earth, now come to rest, cooled and rounded in the forest shade" (29). Likewise, later in the novel: "Outcrops of prehistoric rock and giant boulders forced their way to the surface above layers of rotting vegetation and animal decay … some with jagged horns and jutting spikes … others smoothly humped and rounded by the passing of a million years" (78). In this way, we can see how the deep time rhythms of Hanging Rock act upon the text's temporal dimension *through* the narrator's voice. The narrator is, in effect, a temporal translator; a literary bridge that weaves the depths of geologic time into the text's temporality by way of their omniscience. By slipping into nonhuman timescales and perspectives, the narrator infers, in Cohen's words, that "stone's time is not ours … the world is not *for* us" (2015, 16, emphasis added). Though this sentiment is not inherently horrifying, the narrator makes it so by anthropomorphising Hanging Rock and ultimately depicting it as the true villain of the story; as responsible for the tragedies of the text by way of its "spreading pattern". Herein lies the shortcomings of the novel, which, though it plays with the idea of nonhuman agency and gestures towards the limits of human

perspectives and temporalities, ultimately cannot break free of its Victorian and gothic sensibilities to see Hanging Rock as anything but a horrifying and threatening Other.

The Speculative Futures of Rock

In his book *The Planet in a Pebble,* Jan Zalasiewicz, tells the story of the Earth by way of observing a single pebble of Welsh slate. The pebble, he says, like its "myriad of kin, is a capsule of stories", and just as it tells of the deep past of our planet, "something of the Earth's future, too, may be glimpsed beneath its smooth contours" (2012, 13). Likewise, Irvine notes that deep time dissolves time horizons, collapsing distant pasts and futures into the present (2014, 167), and lithic time, argues Baishya, is an "inhuman dimension of temporality [which] opens portals for the contemplation of abyssal scales of time beyond the temporalities of the *anthropos*" (2020, 217, emphasis in original). What is most unnerving about deep time beyond its sheer scale is its human-less-ness. To stare into deep time is to see the history of the Earth, living, thriving and evolving, without humanity. It is also to see a distant—or perhaps not-so-distant—future in which the same may be true; this possibility further legitimised by the implications of the Anthropocene, which "brings the prospect of human extinction into the present" (Ginn et al. 2018, 220). Narrative, according to Cohen, is particularly effective at imagining "a world indifferent to us, a world that excludes us" (2015, 36). I argue that *Picnic* is such a narrative. The narrator sets the tone of a world indifferent to its human inhabitants, and plays with the idea of the nonhuman, of ceasing to exist in the face of deep time and "nature". In this way, *Picnic* gestures towards and speculates on the unknowns of the deep future. This is signalled early in the text when Mr Hussey first enters the picnic grounds with the schoolgirls and their mistresses in tow in a carriage, the narrator saying that he "guided the five bay horses

out of the known dependable present and into the unknown future" (Lindsay 1967, 19). While it speculates on the unknown future and a world indifferent to the human, *Picnic* is also anxious about such a fate; an anxiety which gives rise to the gothic elements of the text.

After returning from the *when* of her disappearance, Irma exists somewhere between ordinary, human time and deep, geologic time. While recovering, she wakes in Mike's house as the clock strikes five and sees in her mind Hanging Rock in the grey light of early morning, she then slips in time and suddenly "it is sunset … it is the afternoon of the picnic and the four girls are approaching the pool" (129). Irma's *when* is entangled with the Rock's *when*; she is "contaminated" by the encounter, haunted by deep time. After she recovers, she visits Appleyard College to say goodbye to the other girls before returning to her family home. In this scene, the anxiety provoked by an unknown, nonhuman future is most evident. In seeing Irma, as if seeing a ghost, the girls become hysterical. They enter a trance-like state, affixed by a "communal vision" in which they are transported through space and time to Hanging Rock; "they see the walls of the gymnasium fading into an exquisite transparency, the ceiling up like a flower into the brilliant sky above the Hanging Rock. The shadow of the Rock is flowing, luminous as water, across the shimmering plain and they are at the picnic" (135). Here, Irma is like an overflowing container of nonhuman temporality. Through her, the Rock morphs the temporal dimension of the text, converging distant pasts and futures to create a geomorphic time that is indifferent to the human. The crowd of girls see the shadow of the Rock lengthening and darkening, becoming a "dreadful monster lumbering towards them" (136). Notably, the girls, like the narrator, cannot help but anthropomorphise and villainise Hanging Rock. As the Rock nears, they see "the lost girls lie rotting in a filthy cave" and a

junior girl, "remembering how the Bible says the bodies of dead people are filled with crawling worms, is violently sick on the sawdust floor" (136). Miss Lumley, the supervising teacher, describes the girls as laughing and sobbing simultaneously, and fears that at any moment "they will lose control and tear [Irma] to pieces" (137). In a deep time reading of *Picnic*, this is the sheer anxiety that accompanies an encounter with what Cohen calls "the vertigo of inhuman scale" (2015, 24). In facing the Rock and the implications of deep time, the girls face a world indifferent to them; they face the death of the human.

Despite being critical of European culture and Victorian identity (Oyarzun 2022), *Picnic* falls short of imagining beyond this to consider Indigenous knowledge systems, cultures and histories. Steele argues that "if one reads the disappearance of the girls as an attempt to assimilate a European presence into the bush, one finds … that such assimilation may only be possible through the death of European consciousness" (2010, 49). Similarly, I argue that it is because of the inability to look beyond Eurocentric notions of "nature" that the text's encounter with deep time through Hanging Rock comes from a place of fear and Other rather than the expansiveness of mutuality. McKay argues that to inhabit deep time imaginatively, as *Picnic* does, is to "give up mastery and gain mutuality" (2012, 53), but I argue that *Picnic* only gives up its mastery of nature and lingers, fearful, in this loss. Likewise, Cohen notes that the "ecological project of thinking beyond anthropocentricity requires enlarged temporal and geographical scales. Yet expanded frames risk emphasising separations at the expense of material intimacies" (2015, 9). *Picnic* lands here, at the point of separation. In effect, Hanging Rock shapes the temporal dimension of the text, threading deep time through human time to generate a geomorphic temporality, but this temporality is irreconcilable with the entrenched European and colonial sensibilities of the novel. As such, the text is considered an example of Australian

Gothic or what Rosemarie Miller calls the "ecoGothic" in which white people vanish into the haunted Other of the Australian landscape; a place of "loss, disorientation and death" (2017, 154). But to embrace and acknowledge Indigenous knowledges might have allowed an intimacy between the human and nonhuman to emerge in the way that it has done for millennia between Aboriginal people and Country. Instead of fear, there might have been respect; a speculative deep time future emphasising not death, decay and loss of the human, but an expansive reframing of the human within the much broader and older nonhuman world.

Chapter Two: Geomorphic Space

My argument for geomorphic space as a spatiality generated by the geologic finds its theoretical footing in the discipline of literary spatial studies and literary cartography, areas of study which build upon the broader movement towards space in the humanities dubbed the 'spatial turn', which encompasses overlapping fields such as human geography, geocriticism, geopoetics, literary geography and the spatial humanities (Tally 2017, 2). In a 1967 lecture, which was translated to English in 1986, Michel Foucault proclaimed a new "epoch of space"; declaring a departure from the "great obsession of the nineteenth century [which] was, as we know, history" (22). Foucault characterised this epoch of space as one defined by simultaneity and juxtaposition; an "epoch of the near and far, of the side-by-side, of the dispersed" (22). Robert Tally credits the new attention to spatiality in criticism in the 20th century to the rise of the aesthetic sensibilities of postmodernism, fuelled by shifts towards postcolonialism and globalisation and the advancement of informational technologies (2017, 2). For geocritic Bertrand Westphal, it was the aftermath of the Second World War which shattered the "former unity of language and representation" (3), causing "the concept of temporality that had dominated the prewar period" to lose its legitimacy (2007, 13-14).

In literary studies, the spatial turn saw an increased interest in the spatial dimensions of literature, such as the spatial structure and content of texts (Frank 1945), how texts produce, revise and inform the spaces of the world (Thacker 2017; Westphal 2007) and how reading texts can be considered a "spatial event" (Hones 2008) or a type of mapping (Ljungberg 2017). Despite the spatial turn's association with postmodernism, there has been significant spatial analysis of key modernist texts. For Thacker, James

Joyce's *Ulysses* and Virginia Woolf's *Mrs Dalloway* are novels in which the cities of Dublin and London respectively are central presences in the texts, where "the insistent hum of the city" intrudes upon "almost every page" (2017, 28). Likewise, Frank contends that Joyce's *Ulysses*, along with the work of other modernist writers, is "moving in the direction of spatial form" and should be read "spatially, in a moment of time, rather than as a sequence" (1945, 225).

What is most notable in these spatial analyses of modernist fiction, and indeed much of spatial literary studies, is a distinct emphasis on urban, social and cultural spaces, with "natural" nonhuman spaces left either unconsidered or relegated to the realm of anthropomorphic metaphor or picturesque backdrop. In the introduction to their 2016 edited book *Ecocriticism and Geocriticism,* Tally and Battista highlight that geocriticism "does not have a clearly visible political constituency or program", which differs sharply from that of ecocriticism, which is a field fuelled and united by environmental advocacy (1). However, the mounting urgency of the climate crisis and threat of environmental collapse has heralded a blurring of boundaries between the social and natural worlds and their respective fields of study, with Alexander and Cooper observing that "there has been an increased consideration of how literary geographical research might be imbricated with thinking on the Anthropocene condition" (2024, 7). This shift has seen a rise in posthumanist geography, an area of study which challenges the fundamental assumption of the broader geographical canon that humans somehow "occupy a separate and privileged place among other beings" (K. Anderson 2014, 4). By employing language and ideas sourced from spatial studies and the discipline of geography and applying them to the nonhuman, my argument for geomorphic space in Malcolm Lowry's 1947 novel *Under the*

Volcano (henceforth referred to as *Volcano*) is thus posthumanist and located in the emerging overlap between ecocriticism and geocriticism.

To demonstrate the spatial morphology of the geologic, this chapter will enact a close reading of Lowry's *Volcano* by way of its geologic entities, its two titular volcanoes, Popocatépetl and Ixtaccihuatl. *Volcano* is a disorienting novel. Spanning the events of a single day, the novel is centred on Geoffrey, a British Consul, his ex-wife Yvonne, his half-brother Hugh and his friend-turned-enemy Laurelle, all of whom are granted narratorial perspectives throughout the text's twelve chapters as they traverse, in wayward, meandering fashion, the small Mexican city of Quauhnahuac and its surrounding topographies on the Day of the Dead in 1938. The events of the day ultimately lead to the violent deaths of both Geoffrey and Yvonne. Though the plot is deceivingly simple—hinging mostly on interpersonal tension between the characters as they internally sift through the past events which lead to Yvonne and Geoffrey's divorce, namely Yvonne's infidelity—the novel's potent disorientation arises firstly from Geoffrey's serious addiction to alcohol, which permeates the prose so significantly that the pages effectively reek of mescal, and secondly from the text's multilayered cartographies and maximalist use of spatial language. In this chapter, I will first argue that *Volcano* is a literary cartography, a novel where the dominant logic is spatial rather than temporal. I will then demonstrate how Popocatépetl and Ixtaccihuatl are landmarks which work to orient and bind the otherwise spatially disparate elements of the text's multilayered cartography together. After which, I will argue that the text's spatial dimension can be envisaged as an inverse cone in which the characters spiral downwards, towards the geologic. As such, I will posit that the space of *Volcano* is geomorphic in that it emerges from, is centred around and is dominated by Popocatépetl and Ixtaccihuatl.

Volcano as Literary Cartography

In the introduction to the Penguin Classics edition of *Volcano*, Schmidt argues that the novel's syntax is architectural; “it is ‘vertical’, balanced, stilled in time, not ‘horizontal’, in flow” (2000, vii). Likewise, Di Gennaro describes the text as one of “filmic simultaneity” (2015, 130), and Arac argues that the novel is like a wheel with no real beginning or end, highlighting that Lowry himself described the novel spatially: “He says of Chapter xii, ‘This chapter is the easterly tower, Chapter I being the westerly, at each end of my churrigueresque Mexican cathedral’” (Lowry 1965, 85, as cited in Arac 1977, 488). Indeed, *Volcano*’s principal dimension is space. The majority of the text unfolds through the mapping of Quauhnahuac by way of the characters’ movement through space; as Di Gennaro observes, the core theme of *Volcano* is that of the journey (2015, 121). The text’s journey, in its most literal sense, is told through spatial language; the characters are always turning left or right, going uphill or downhill, facing north or west or north-east, and various landmarks and reference points are referred to by way of their directional location and proximity to the characters; “over the plains to their right wound now the interminable narrow-gauge railway" (Lowry 1947, 239); “down the southwest stood the moon itself … On their left, through the trees beyond the stream appeared low hills” (318); and Chapter VIII opens with the single word “Downhill” followed by three ominous ellipses (234).

Frank’s seminal three-part essay ‘Spatial Form in Modern Literature’, which was published two years before *Volcano*, speaks to the trend of spatially motivated modernism, arguing that modernist texts are based on a “space-logic” (1945, 229). For Frank, literary spatial form takes shape in references and cross-references which “relate to one another independently of the time-sequence of the narrative; and, before the book fits together into any meaningful pattern, these references must be connected by the reader and viewed as a

whole" (232). In 'Elements Towards a Spatial Reading of Malcolm Lowry's *Under the Volcano*', Doyen aptly applies Frank's thesis to analyse the "complex metaphorical structure" of the text (1969, 72). Indeed, *Volcano* is a referential web of inner and inter textual references. Ackerley and Clipper's 1984 *A Companion to Under the Volcano* seeks to map this web, "page by page and point by point" (x), and fittingly, the book was later transformed by Ackerley and Large into a hypertext—a mode of electronic literature that allows extensive cross-referencing through its use of hyperlinks—called *Under the Volcano: A Hypertextual Companion* (2012). As Arac observes, understanding *Volcano* is much simpler if we can see it as a "here and here and here, rather than read it as then and then and then" (1977, 488).

Where the projects of Doyen, Ackerley, Clipper and Large seek to map the *here and here and here* of the text's metaphoric and symbolic spaces, I take Frank's theory of spatial form more literally by applying it to the "geography" of the text: the fictional space generated by the text's "locations, settings, places, and the shifting network of spatial relations between them" (Alexander and Cooper 2024, 2). Crucially, I posit that the fictional geographies of literature are *formed* by their mappings; where "real" spaces exist whether mapped or not, fictional spaces arise in the mind of the reader by way of cartographic signs and spatial references within texts. In this way, we can see that textual geographies cannot be separated from their cartographic representations. Of course, there are a number of other variables that contribute to a reader's construction of textual space, but that discussion lies beyond the scope of this chapter. Herein, I argue that *Volcano* is a map, a literary cartography, in which the spatial dimension of the text arises from and through its cartographic lexicon and spatial language. In order for the reader to generate a "meaningful pattern"—a legible map of *Volcano*—she must hold all spatial references and

cartographic fragments of the text in her mind at once; a task which is near impossible on the first reading, given that *Volcano* is teeming with spatial language (Bulson 2017, 2). Though the text's cartography is complex, a thread of coherence is found through Popocatépetl and Ixtaccihuatl, which work to organise and bind the spatial references of the text together, in which a legible *here* of *Volcano* emerges from and through the geologic.

The title of the novel, *Under the Volcano*, is the first spatial reference of the text. As Wilsmore explains, titles are "an orientation on the literary work, an indication of how it is to be taken, of how it is meant to be read" (1987, 403). In *Volcano*'s title, the word *under* serves as the initial mark on the literary map. According to the *Cambridge Dictionary* (*CD*), to be *under* is to be below or lower than something; it is to be separate in space from something else. This first word establishes the text as cartographic—it is in the practice of constructing maps—and thus prompts the first unfolding of the text's spatial dimension in the mind of the reader. Crucially, the title is not *The Town Under the Volcano* or *Tragedy Under the Volcano*; what is *under* is not specified, thus in this initial cartographic image what is *under* is everything in space that is not *the volcano*; space itself is defined in relation to *the volcano*. Furthermore, *under*, as well as meaning to be below something else, means happening "as a result of" something (*CD*). These definitions gesture towards the significance of the volcanoes in *Volcano*'s spatial dimension.

As the novel begins, the spatial significance of the volcanoes is stressed further. *Volcano*'s opening sentences locate the town of Quauhnahuac, the setting of the novel, in such a way that one might imagine the reader to be holding the book in one hand and an atlas in the other:

> Two mountain chains traverse the republic roughly from north to south, forming between them a number of valleys and plateaux. Overlooking one of these valleys, which is dominated by two volcanoes, lies, six thousand feet above sea-level, the town of Quauhnahuac. It is situated well south of the Tropic of Cancer, to be exact, on the nineteenth parallel, in about the same latitude as the Revillagigedo Islands to the west in the Pacific, or very much farther west, the southernmost tip of Hawaii – and as the port of Tzucox to the east on the Atlantic seaboard of Yucatan near the border of British Honduras, or very much farther east, the town of Juggernaut, in India, on the Bay of Bengal. (Lowry 1947, 9)

Here, the map of *Volcano* is outlined; the edges of the text's spatial dimension demarcated. Notably, this passage employs predominantly neutral verbs: traverse, form, lie, situate. The most evocative word in the passage—*dominated*—is used to introduce the two volcanoes, Popocatépetl and Ixtaccihuatl. According to the *Cambridge Dictionary*, to *dominate* means "to be the largest, most important or most noticeable part of something" or "to have control over a place or person". In literary cartography, this persuasive, authoritative verb is the textual equivalent of enlarging or emboldening a point on a visual map. It indicates that Popocatépetl and Ixtaccihuatl are central to reading and generating the spatial dimension of *Volcano*; that the geologic is morphic to the text's spatiality.

Volcanoes as Landmarks

In cartography and spatial studies, the largest, most important or most noticeable points in space are called landmarks. In his seminal 1960 work *The Image of the City*, urban theorist Kevin Lynch explores the way in which people observe and create mental images and maps of their environment. Landmarks, according to Lynch, are an external point-reference that usually contrast with their background, which "for all practical purposes symbolise a constant direction" and are key to orientation and navigating through topographical space (48). Likewise, Richter and Winter define landmarks as "geographic objects that structure human mental representations of space" (2013, 205, as cited in

Yesiltepe et al. 2021, 370). They are anchor points, points of reference, and/or geographical information which people use to organise "their spatial knowledge and locate themselves" (Couclelis et al. 1987, as cited in Yesiltepe et al., 370). The two volcanoes of *Volcano* function as landmarks and points of orientation throughout the text for both the characters and the reader. They are repeated spatial references which are mentioned in all twelve chapters a number of times, thus assisting the reader to thread together the disparate cartographic fragments of the text to generate, organise and structure a legible mental representation of the text's fictional space.

Laurelle locates the volcanoes using cardinal language in the opening pages of the text: "Far to his left, in the northeast, beyond the valley and the terraced foothills of the Sierra Madre Oriental, the two volcanoes, Popocatépetl and Ixtaccihuatl, rose clear and magnificent into the sunset" (Lowry 1947, 11). As the text unfolds, the volcanoes are often described by way of their spatial relationship to the characters; Geoffrey turns and they come into view in the south-south east, or, he ponders "was it north-north west?" (132); for Hugh, on the bus to Tomalín, "Ixtaccihuatl had sideslipped out of sight but as, descending, they circled round and round, Popocatépetl slid in and out of view continually, never appearing the same twice, now far away, then vastly near at hand, incalculably distant at one moment, at the next looming round the corner" (254-5). Indeed, the characters always seem to end up either facing the volcanoes or being described as facing away from them. The volcanoes are, in this way, the centre of the text's map; they are consistent landmarks which *dominate* the literary cartography.

Threaded into the detailed cartography of Quauhnahuac are the characters' memories of spaces and of their past and of their desired futures. As Laurelle walks the hills of Quauhnahuac, he recalls the landscape of his childhood in Wales (23). When Hugh

and Yvonne traverse Quauhnahuac by horseback, Hugh explains his plans for future travel: “Havana, perhaps Nassau and then … down to the West Indies and Sao Paulo” (106), and in the moments preceding his death, Geoffrey draws a map of Spain in spilled liquor on a bar countertop (344). These interior spaces of the characters are mapped in detail alongside the exterior setting of the novel. *Volcano* is, in effect, a series of fragments of maps and spaces embedded within and layered upon a broader map of Quauhnahuac. But even these cartographic fragments of interior spaces often find the volcanoes at their centre. For Geoffrey, the volcanoes remind him of the Himalayas, how his “father went up into the White Alps alone and failed to return” (82), and shortly afterwards, he encounters paintings of his birth country Kashmir and reflects on how the mountain Nanga Parbat “might well have passed for old Popo” (Popocatépetl) (87), and for Yvonne, who was born in Hawaii, “Popocatépetl and Ixtaccihuatl [are] remote ambassadors of Mauna Loa, Mokuaweoweo” (63). Thus, the disparate cartographic fragments of the text are bound together and *dominated* by the volcano landmarks, which provide a sense of centre and orientation amid the text’s maximalist spatial references. Thus, to understand the volcanoes as central to the cartography of *Volcano* is to acknowledge that they are central to the forming of the text’s spatiality in the mind of the reader; the spatial dimension of *Volcano* is formed, in part, from the geologic — it is geomorphic space.

Spiralling Through Geomorphic Space

To further illustrate how Popocatépetl and Ixtaccihuatl are morphic to the spatial dimension of *Volcano*, I turn my attention to the second definition of *dominate*, which is “to have control over a place or person” (*CD*). This definition lends Popocatépetl and Ixtaccihuatl an anthropomorphic, spatial agency in the cartography of the text; the sort of

agency which is notably lacking in the human characters. Much of the scholarship on *Volcano* observes that Geoffrey, Hugh and Yvonne are lost, homeless, wayward, or otherwise directionless. For Di Gennaro, *Volcano* is characterised by inertia; she argues that Geoffrey is a literary Cain who is in a "self-imposed 'wandering stasis'" (2015, 106). A. J. Miller's reading of the text is one of postnationalism and deterritorialization in which the characters all possess a sense of transcendental homelessness (2004, 8). Goodall explains that, for Guy Debord and the Situationists, *Volcano* epitomises the "ceaseless drifting" and wandering without destination of the psychogeographic practice of *dérive* (2016, 18), and Lane and Mota note, "as much as the protagonist "finds" or locates himself in Lowry's fiction through an intense awareness of space, he also at the same time "loses" himself in the poetics of space" (2016, 5). Indeed, Geoffrey himself predicts this in Chapter V when he sees "the day before him stretched out like an illimitable rolling wonderful desert in which one was going, though in a delightful way, to be lost" (Lowry 1947, 143).

In *Why People Get Lost*, Dudchenko explains that lost people wander in circles and spirals, called "veering", caused by an innate spiralling mechanism; an ongoing internal drift in our subjective sense of direction (2010, 67-74). In *Volcano*, the characters spiral through space in a consistently downward direction. In the opening chapter, Laurelle walks gradually downhill (Lowry 1947, 16) and reading Geoffrey's book of Elizabethan plays carries his "mind downward into a gulf" (40). As Yvonne and Geoffrey walk home after Yvonne's arrival, Yvonne notes that the road "ran with increasing steepness downhill" (63). In Chapter III, a drunk Geoffrey "glided down the Calle Nicaragua" (86). When Yvonne and Hugh ride horses through the countryside, Hugh observes that "the road declined sharply below them" (102), and that "they were all plodding downhill" (112). In

Chapter VII Geoffrey and Laurelle go "down the iron spiral staircase together" (212), and later, when Geoffrey, Hugh and Yvonne are on a bus to Tomalín, "where they were going was immediately down" (235); "downhill… The driver kept his hand on the screaming emergency break as they circled down" (254). As the volcano landmarks occupy the cartographic centre of *Volcano*, we can thus visualise the shape of the spatial dimension of *Volcano* as an inverse cone—or an upside-down volcano—in which Geoffrey, Hugh and Yvonne spiral downwards towards the inverted summit, the nadir. As the wheel of the novel turns, the spiral tightens until the final tragedies of the narrative take place, as the title suggests, at the nadir point: *Under the Volcano*.

Towards the end of the novel, Geoffrey flees into the forest after a conflict with Hugh and Yvonne, seeing that "before him the volcanoes, precipitous, seemed to have drawn nearer" (316). Here, Geoffrey's downward spiralling leads him closer to the nadir. Yvonne and Hugh follow Geoffrey into the forest, where "before them, Popocatépetl and Ixtaccihuatl continued to dominate the north-east" (318). Yvonne and Hugh become disoriented in the twilight and thus they too spiral towards the volcanoes; "the whole precipitous bulk of Popocatépetl seemed to be coming towards them, travelling with the clouds, leaning forward over the valley" (324). This language, where the volcanoes *draw nearer* to Geoffrey and *travel towards* Yvonne and Hugh, lends a liveliness to the geologic in these final, tragic scenes of the novel; here we can see how they *dominate* not only as noticeable landmarks, but also by exerting a sort of agency, a gravitational, narrative force proportional to their mass, which contrasts with the lack of spatial autonomy the human characters possess; Geoffrey, Yvonne and Hugh do not *dominate* space but are *dominated* by it.

Geoffrey's spiralling ultimately leads him to a cantina located under Popocatépetl, where, after a series of drunken misunderstandings, he is targeted by corrupt police officers as a political radical and shot dead; the gun shot spooking a horse which flees and goes on to trample Yvonne to death as she is wandering, lost on a dark path through the forest looking for Geoffrey. Geoffrey's body is thrown down the *barranca*, the ravine under the volcano. In his last moments, he sees above him "the shape of Popocatépetl, plumed with emerald snow and drenched with brilliance" (373). As he dies, Geoffrey first imagines he is in the Himalayas, then that he is ascending Popocatépetl with Yvonne and Hugh, and afterwards that he is in an ambulance being taken to the peak of the volcano. He looks down, expecting to see "Pico de Orizabe, Malinche, Cofre de Perote", various volcanoes of Mexico, all converging at this spatial centre, but instead he sees nothing; "no peaks, no life, no climb. Nor was this summit a summit exactly: it had no substance, no firm base", then he envisions that he is falling into the volcano, and then into the void of nothingness (374-5). Here, at the inverse summit of the volcano, Geoffrey gazes down into the spatial absence of death; he is not at the peak, but is bursting through nadir, like a downwards eruption into the void beyond the dimensions of space:

> [T]hough now there was this noise of foisting lava in his ears, horribly, it was in eruption, yet no, it wasn't the volcano, the world itself was bursting, bursting into black spouts of villages catapulted into space, with himself falling through it all, through the inconceivable pandemonium of a million tanks, through the blazing of ten million burning bodies, falling, into a forest, falling— (375-6)

Here, much like in *Picnic*, to encounter the geologic is to confront the death of the human, but it is also to see beyond it. To read the novel as a wheel, an "instrument of eternal recurrence" which Lowry himself said is "the form of the book" (1965, 71, as cited in Arac 1977, 487), is to trace the meandering spiral of the wayward human characters towards death and back to life again and again, through disorientation, conflict, despair

and anxiety, all the while, the volcanoes remain steadfast at the centre of the wheel like a hub around which all else rotates and is anchored by. Thus, *Volcano* invites us to look past fleeting, human-centred space into the enduring spacetime of the geologic.

Ultimately, reading the spatiality of *Volcano* by way of critical geomorphology finds the geologic rather than the human at the centre of the text's fictional space. It is, thus, an example of what Gerlach calls posthuman cartography in which the capital-G of Geography, that is the Earth, is reinstated as central to the field of spatial studies (2024, 63). Where humanist cartography, according to Gerlach, is a cartography "in which the Earth is rendered mute, static and elegiacally passive", posthumanist cartography accentuates "the significance of non-human forces … in the modulation of existence" (65). Thus, understanding the space of *Volcano* as geomorphic in that it emerges from, is centred around and is dominated by Popocatépetl and Ixtaccihuatl, is to acknowledge the agency of the geologic in literary cartography and spatial studies. Lo Presti posts that the cartographic imagination is "a beguiling entryway not just to understanding the past of the Anthropocene or to acting upon its present but also to fantasising about its future and inviting us to move beyond the limits of our current imagination" (2023, 401). By embracing a posthuman literary cartography through critical geomorphology, we can look beyond the current human-centric cartographic imagination to consider how the geological, rather than the human, structures and influences literary spaces. This approach gives rise to an awareness of Earth as a morphic agent; an understanding which can be extended beyond the page and into the world itself.

Chapter Three: Geomorphic Matter

The emerging field of new materialism sets forth a lively new ontology, asserting that "matter is not a static being, but a generative becoming" (Iovino and Oppermann 2012, 453), or, in the words of Donna Haraway, that "to be one is always to *become with* many" (2008, 4, emphasis in original). New materialism departs sharply from the old materialisms, which advance a mechanistic and passive understanding of matter—underscored by "a belief that the world and its operation are knowable, predictable and controllable" (Benson 2019, 257)—which arose from Newtonian physics and Cartesian epistemology which took precedence in European philosophy during the Enlightenment. The old materialist ontology continues to shape contemporary thought, giving theoretical footing to the notion of human exceptionalism and what Bruno Latour calls the Great Divide between humans and nonhumans; between "nature" and society (1993, 99). Human exceptionalism, explains Haraway, "is the premise that humanity alone is not a spatial and temporal web of interspecies dependencies" (2008, 11), and perhaps most dangerously, human exceptionalism permits a view of the nonhuman world as a "compliant resource" fit for human consumption — a notion which has given rise to the troubling circumstances of the Anthropocene (Cohen 2015, 138). As such, there is an urgency inherent to new materialism, as Coole and Frost state; "foregrounding material factors and reconfiguring our very understanding of matter are prerequisites for any plausible account of coexistence and its conditions in the twenty-first century" (2010, 2).

New materialism is, at its core, transdisciplinary; arising, in part, from the developments of twenty-first century science, in particular quantum physics, which according to theoretical physicist and feminist theorist Karen Barad, "undoes the

Newtonian assumptions of separability and metaphysical individualism" (2017, 110). Barad's theory of agential realism is seminal to the field of new materialism, which she, along with a number of scholars, considers to belong to the broader framework of posthumanism (2007, 32). For Barad, posthumanism is not about the death of the human or the next stage of humanity, but instead, more humbly, "does not presume that man is the measure of all things … it is not held captive to the distance scale of the human but rather is attentive to the practices by which scale is produced" (136). Despite the concept of the Anthropocene seemingly supporting the idea that nature is something that humanity acts upon, scholars suggest that the Anthropocene offers an opportunity "to embrace a new ontology" (Benson 2019, 252) through its positioning of human life as a force of nature; offering "reconstructions that point to a new way of thinking humanity-in-nature, and nature-in-humanity" (Moore 2016, 5, as cited in Roelvink 2020, 136).

New materialism and other posthuman approaches are quickly emerging as favoured modes of thought in the humanities and social sciences (Hazard 2019, 629), with the field of literary ecocriticism being no exception (Oppermann 2016, 90). This is unsurprising, given that ecocriticism seeks "to restore significance to those manifold more-than-human phenomena that exist beyond the page" (Rigby 2022, 126). Ecocritics find new materialism to be a useful framework for reading the nonhuman both *in* texts and *as* a text, beyond anthropocentrism and the dichotomies of the Great Divide. Operating at this intersection, Iovino and Oppermann have developed an interpretive practise which they call 'material ecocriticism' which posits that "the world's material phenomena are knots in a vast network of agencies, which can be "read" and interpreted as forming narratives, stories" (2014, 1), thus extending the expressions of new materialism to read

“the representations of agentic matter’s expressive power in literary, cultural, and visual texts” (Oppermann 2019, 111). Furthermore, Oppermann argues that literary texts:

> [O]pen up the vitality inherent in matter and extend it over time, endlessly producing a performative mirror that does not just reflect the world, but creates worlds. Like the stories of matter, literary stories shed light on the intra-action of human creativity and the creative expressions of material agencies … One of the implications of this view is that our stories are never disconnected from the stories of matter. (111)

As such, critical geomorphology, that is the study of the morphic, agentic potential of material geologic entities within literary texts, is a form of material ecocriticism; it is an interpretive practice grounded in the core premises of new materialism which seeks to understand how representations of matter enact narrative agency; how geologic matter is ‘storied’.

This final chapter will both explore geomorphic matter as a potential dimension of critical geomorphology and contextualise the broader thesis as a work of material ecocriticism through a close reading of Kōbō Abe’s *The Woman in the Dunes* (henceforth referred to as *Dunes*), originally published as *Suna no Onna* in Japanese in 1964, and translated to English by E. Dale Saunders in 1964. *Dunes* is a novel about amateur entomologist and schoolteacher Niki who travels to a remote seaside village in hopes of discovering a new species of beetle. Niki is tricked and taken captive by the villagers and is trapped at the bottom of a deep sand pit in a dilapidated house with an unnamed woman villager where they must both shovel sand all night to prevent the house and the village from succumbing to the ceaseless and destructive flow of the sand dunes. The woman is accustomed to the way of life in the village, but Niki cannot reconcile his situation and is determined to escape. *Dunes* takes an allegorical tone and is often compared to the myth of Sisyphus, with dominant interpretations reading the text as an exploration of the human

condition and an example of existentialist literature (Gandy 2012, 203; Marroum 2007, 173; Marroum 2008, 136; Ueno 2017, 84). My reading of *Dunes* by way of critical geomorphology will first consider the Sisyphean myth in light of human exceptionalism, demonstrating how the geologic exposes the limits of human agency in the face of nonhuman materiality. I will then examine how sand works in the text to erode boundaries and binaries, looking at the interplay of sand and the body to demonstrate how sand is intra-active and trans-corporeal. Finally, I will move on to consider the notion of agency itself as a mesh in which the question of difference is key to understanding the generative potential of matter.

On Sisyphus and Human Exceptionalism

The rubric of agency set forth by new materialism does not so much contend that the nonhuman is "filled" with agency, rather, it poses that agency is distributive and relational, arising through the interfacing of many bodies and forces; as Bennett notes, "there was never a time when human agency was anything other than an interfolding network of humanity and nonhumanity" (2010, 31). Barad describes this distributive theory of agency by way of what she calls 'intra-action'. Where 'interaction' "assumes that there are separate individual agencies … intra-action recognises that distinct agencies do not precede but rather emerge through, their intra-action" (2007, 33), that is, agency is entangled and mutually constitutive. It is important to note that new materialism's definition of agency is not bound up in the anthropomorphic concept of intentionality, as Giddens suggests, "we have to separate out the question of what an agent 'does' from what is 'intended' or the intentional aspects of what is done. Agency refers to doing" (1985, 10, as cited in Opperman 2019, 110). When agency is conceived of as a *doing*, and

when it is understood that all matter, not only that which is “alive” or that which is human, can *do*, and furthermore, that this *doing* is distributive and intra-active rather than localised, the fantasy of human exceptionalism is called sharply into question.

In the opening chapter of *Stone*, Cohen introduces a new materialist approach to the lithic by reframing the myth of Sisyphus, asking the reader what it might look like if they were to consider the boulder in the myth as “a protagonist rather than prop” (2015, 5). This reframing is a potent way for Cohen to introduce his theory of human-lithic enmeshment; he ponders:

> What if the tale of Sisyphus is not only about a human and a stone, each in its solitude, vying for the status of chief character, but a multifaceted narrative of cross-taxonomic relation: a human who attempts to grasp a boulder that never ceases to tumble, hands upon hard surface, rock against hands, an epochal embrace? (5)

Reading *Dunes* as a play on the myth of Sisyphus—as an existential exploration of the meaningless or absurdity of human existence—is a well-trod interpretation (Gandy 2012, 203; Marroum 2008, 136-37; Ueno 2017, 84). Indeed, the endless labour of shovelling the falling sands and Niki’s repeated and futile attempts to escape his entrapment is very Sisyphean. In his first escape attempt, Niki tries to scale the forty-five-degree sand slope with his hands; “with each step forward he slid back a half step” (Abe 1964, 47). When he fails to make progress, he attempts to scramble up on all fours. He thinks he has made headway, only to realise that “he had come not even five yards”; frustrated, he wonders “what exactly had he accomplished by all this effort?” (48).

Niki’s initial outlook on his Sisyphean situation is grounded in human exceptionalism, and as such he interprets it as a meaninglessness that must be overcome. He cannot fathom why the woman is content in shovelling sand, asking her; “but this

means you exist only for the purpose of clearing away the sand, doesn't it?" (39). Matter, as viewed through the lens of old materialism and human exceptionalism, is inert, a resource for human use and consumption. In this ontology, if matter cannot be bent to human will—if Sisyphus cannot keep the boulder at the top of the hill—then engaging with it repeatedly in the same manner is seen as a meaningless pursuit; a punishment that is dehumanising in that it highlights the limits of human agency in the face of nonhuman forces. In this way, Niki feels dehumanised by his circumstances, and he begins to compare himself to the insects which he captures, asking; "was it permissible to snare, exactly like a mouse or an insect, a man who had his certificate medical insurance, someone who had paid his taxes, who was employed, and whose family records were in order?" (51). Confronted with sheer scale of the sand dunes' geologic materiality, and with the fact that the *doing* of the dunes takes place beyond his control, Niki is beset by a sense of his own insignificance; he begins to realise that what he thought made him distinct from an insect, his human exceptionalism, is a fantasy. This loss of exceptionalism is distressing for Niki, and he spends much of the novel attempting to restore his status by overcoming the dunes. He almost succeeds on his final attempt, scaling the pit with tools and fleeing through the village in the night, only to end up trapped to his waist in quicksand (200). Desperate, Niki calls for help from the villagers, thinking "what was the use of individuality when one was on the point of death?" (201). The villagers rescue him and return him to the pit where he laments his failure; all sense of himself as exceptional evaporates; "he was nothing more than a punching bag to be knocked around" (203).

The shift from the human exceptionalism of the old materialisms to new materialism is one of perspective; nothing changes, matter is still what it has always been. It is a shift from seeing the world as one of interaction to intra-action. In the final pages of

Dunes, Niki discovers that there is water in the sand which he can access by digging a bucket with holes in it down into the sand. Though the joy and sense of meaning this discovery brings him can be read as the joy of his exceptionalism being restored because he has found a way to utilise his material environment, what is more interesting is the shift in perspective that follows the discovery:

> The fact that he was still just as much at the bottom of the hole as ever had not changed, but he felt quite as if he had climbed to the top of a high tower … He was still in the hole, but it seemed as if he were already outside … You can't really judge a mosaic if you don't look at it from a distance. If you get really close to it you get lost in detail. You get away from one detail only to be caught in another. Perhaps what he had been seeing up until now was not the sand but grains of sand. (235)

Here, Niki comes to comprehend and find meaning in the intra-active web of agency that he is enfolded within. He sees himself and his environment as part of a material mosaic in which meaning emerges not from the individual pieces but from their relationship to one another. The villagers observe this change in Niki, choosing to return the rope ladder to the edge of the sandpit. Niki is then free to leave, but he chooses not to, as; "the change in the sand corresponded to a change in himself. Perhaps, along with the water in the sand, he had found a new self" (236). The conditions of the story are no different, Sisyphus is still pushing the boulder, Niki must continue to shovel the sands, but for Niki, there is no longer a meaninglessness to this pursuit, and the meaning he has found is not derived solely from human exceptionalism but instead gestures toward something more expansive, something more in line with a new materialist ontology.

Bennett crucially states that "the topic of material agency … is like quicksand, a sinkhole that threatens to suck even the boldest ecomaterialist back into a human-centered burrow" (2013, 111). In this way, the question of whether Niki, or Sisyphus, find meaning

in their engagement with nonhuman matter is perhaps missing the point, as material ecocriticism posits that meaning is inherent in matter itself, regardless of whether it is believed to be so by the human (Opperman 2019). Likewise, for Barad, matter and meaning are “inextricably fused together, and no event, no matter how energetic, can tear them asunder” (2007, 3). In the ontology of new materialism, the story of Sisyphus and the boulder has always been a story of meaningful, entangled *doings*; of a generative, shared becoming where the material agency of the geologic emerges intra-actively *through* the human. But to disregard whether the human is cognisant of this shared becoming is to stop short of the ethical implications of new materialism. Niki’s shift away from human exceptionalism towards a newfound sense of shared, relational meaning is ultimately what new materialism seeks to achieve. Furthermore, as I will discuss in greater detail in the next section, human thought and knowledge do not sit outside of the entangled web of matter. It is in this way that the material agency of the sand in *Dunes* gives rise to a new dimension of materiality in the text beyond human exceptionalism; a geomorphic materiality in which the text’s geologic *doing* occurs across both the human and nonhuman material dimensions where, for Niki, “the change in the sand corresponded to a change in himself” (Abe 1964, 236).

Trans-corporeality and Reading *Through*

To further illustrate what I mean when I say the geologic emerges intra-actively *through* the human, I look to Stacy Alaimo’s theory of trans-corporeality. Alaimo draws upon new materialism, feminist corporeal theory, disability studies and environmental activism to argue that there is an ongoing, trans-corporeal “movement across bodies”, “in which the human is always intermeshed with the more-than-human world” (2010, 2). By centring the

body, Alaimo speaks to the lineage of body-politics in theory, a lineage which largely views the body as a social or cultural construction that is discursively produced, rather than a biological or material site (3). For Alaimo, speaking on the body allows her to argue for a "trans-corporeal ethics" that extends the lineage of scholarship on the body at the same time as subverting it to create an ethics that "is centered neither in individual humans nor in an external nature, but instead in the flows and interchanges between them" (136). In a similar vein, I argue that the human body is a fitting site in which to locate and read the geologic matter of *Dunes*. Material ecocriticism posits that human and nonhuman stories are inherently entwined; they must be read not in isolation from each other, "but *through* one another" (Iovino and Oppermann 2014, 5, emphasis in original). Reading the nonhuman *through* the human implicates the human more thoroughly in the ethics of new materialism; it locates the human in the entangled, intra-active becoming of the world. Though this approach risks devolving into anthropomorphism, Oppermann aptly notes that this is not inherently bad, as anthropomorphism can play a "strategic role in our narrative encounters with material agencies" (2016, 98). As such, to further identify the ways in which the geologic morphs the material dimensions of the text, I turn my attention to the bodies of *Dunes*. Here, the porosity of the material and biological, the human and nonhuman, is most evident, and the material agency of the geologic is shown to exist not only in the world external to Niki and the woman as a relentless flowing of sand into the pit, but also as something that moves across and through their bodies in a trans-corporeal, entangled flow.

It is important to reiterate that for new materialism, agency is not bound up in intention, but an intra-active *doing* that "is shaped through encounter; it does not have a prior existence" (E. Anderson 2020, 207). Reading sand as what Iovino and Oppermann

call "storied matter" is not about identifying some concealed anthropomorphic trait, rather, as Opperman explains, "talking of storied matter means to recognize patterns of signification in the agency of things" (2019, 112). So, to locate the story of the sand's agency in *Dunes* is to ask what its pattern of intra-active *doing* is in the text, which, as I will demonstrate, is defined by its manner of material expression. To put it simply, sand *moves*.

While pondering the nature of sand near the beginning of *Dunes*, Niki thinks "the sands never rested. Gently but surely they invaded and destroyed the surface of the earth … the barrenness of sand, as it is usually pictured, was not caused by simple dryness, but apparently was due to the ceaseless movement" (Abe 1964, 14). Later, Niki credits this destructive power of sand to its formlessness; "things with form were empty when placed beside sand. The only certain factor was its movement; sand was the antithesis of all form" (41). In *Dunes,* sand rots; sand dissolves; sand disintegrates; sand liquidates (27; 55; 130; 200). In this way, the sand of *Dunes* is geomorphic because it shapes the material dimensions of the text by crossing the boundaries of bodies, demonstrating that the perceived edges where one thing ends and another begins are not concrete but porous — the *doing* of sand is trans-corporeal. All non-sand bodies in the text are subject to this doing—the village, the house, the contents of the house—but most of all this trans-corporeal transit takes place across and through the human bodies and minds of the text.

Despite Niki's distrust towards the woman, there is a sexual undercurrent to their interactions, an erotic exchange between bodies that is subject to the trans-corporeal transits of sand. Niki first sees the woman's naked body "covered with a coat of fine sand, which hid the details and brought out the feminine lines" (44). Here, the sand mingles with

the woman's corporeality to produce a body that cannot be read as entirely human or entirely sand but as trans-corporeal, entangled matter. The couple's first sexual encounter is likewise a melding of bodies that is inseparable from the *doing* of the sand. Sand slides over Niki's erect penis as he undresses (139), and then an avalanche of sand interrupts their foreplay; Niki and the woman hold each other close as they wait for it to pass, Niki observing that "a mistlike sand [had] covered the woman's head" (140). When the avalanche stops, they brush the sand from each other's bodies, an act which is increasingly erotic until it becomes sex (141). Later, as Niki attempts to escape the village, he remembers how he had scraped away "with a finger he had wet in his mouth, the sand like burnt rubber that had gathered on the dark lips of her vulva" (191). The erotics of the text is mediated by the sand itself, arising from and through the intra-active becoming of human and nonhuman bodies. In this way, the story of Niki and the woman's bodies *is* the story of the sand; one cannot be read without the other.

Just as the sand moves through the bodies of Niki and the woman, it moves through Niki's mind. For new materialism, the mind is not separate from the entangled, agentic becoming that is the world; as Barad states, minds too are "material phenomena that emerge through specific intra-actions" (2007, 361). Though the question of consciousness in the ontology of new materialism is beyond the scope of this thesis, for the sake of this analysis I will consider Niki's 'mind' to be his perceived interior of his body, an extension of his corporeality. Niki becomes "covered with sand" almost immediately (Abe 1964, 25), and throughout *Dunes* Niki's skin is either encrusted with sand or is in the process of being wiped clean, and by the end "it was as if the sand had filled his whole skin" (208). Rapidly, this trans-corporeal *doing* of sand crosses the threshold of Niki's skin and begins to morph his mind; "the sand which clung to his skin

was seeping into his veins and, from the inside, undermining his resistance" (34). When he closes his eyes, he sees ripples of sand floating towards him (41), and the ceaseless moving of the sand is like a "file on the tips of his nerves" (93). Here, we can read the sand as moving through the porous edges of Niki's body and into his mind in much the same way that it sifts through the ceiling of the house, rotting the wood and the walls (26; 31; 51). As Barad explains, it is "through the enfolding of phenomena, as part of the dynamics of iterative intra-activity, [that] the domains of ''interior'' and ''exterior'' lose their previous designations" (2007, 181). Niki's mind and body intra-actively become *with* the sand through trans-corporeal movement; he sees "with the eyes of the sand" (Abe 1964, 99). Barad says that to insist upon bodily boundaries is to fail to recognise "the body's specific situatedness in the world", and that "bodies in the making are never separate from their apparatuses of bodily production" (2007, 159). As such, sand *produces* Niki's mind/body through his specific situatedness, his thoughts arise from a bodymind that is neither human nor sand, but something trans-corporeal; something in between. As Niki observes, "things with form were empty when placed beside sand" (Abe 1964, 41). Sand intra-actively moves *through* and becomes *with* all forms, shapes, dimensions and bodies in *Dunes* to create a geomorphic materiality in which no corner of the text can be read without reading the story of sand's intra-active, geomorphic becoming.

The Agentic Mesh and the Question of Difference

The new materialist ontology understands the world to be a dynamic, intra-active web of "thingly agencies" (E. Anderson 2020, 207); a web which has been called various names, including assemblage, network, meshwork, agentic swarm and even Empire (Bennett 2010, 23). Given this totalising language, it is easy to misunderstand this *mesh* to be a

mush of sameness in which the difference between material expressions gets lost in ideas like intra-activity and trans-corporeality. Crucially, however, new materialism sees difference as giving rise to matter's generative dynamism. For Iovino and Oppermann, phenomena are volatile knots in the mesh that are sometimes at odds with one another (2014, 1), for Bennett, each member-actant in an assemblage "maintains an energetic pulse slightly "off" from that of the assemblage" which mediates the agency of the assemblage as a whole (2010, 24), and for Barad, matter has a "differential intelligibility" and a "differential responsiveness" that is a core feature of the world's "differential becoming" (2007, 335). Though these approaches are not homogenous, they gesture towards the importance of different material expressions in the new materialist ontology; as Barad explains, it is through matter's "differential intelligibility" that the "the world articulates itself *differently*" (335, emphasis added).

In order to explore this generative, differential intelligibility, I offer a close reading of a passage from *Dunes*:

> There was a woman . . . there was sand . . . there was an empty water jar . . . there was a drooling wolf . . . there was a sun . . . And, somewhere, he knew not where, there must also be a storm center and lines of discontinuity. Where in God's name should he start on this equation filled with unknowns? (Abe 1964, 125)

This passage is read by Marroum through the lens of entropy and chaos theory as the moment in which Niki comes to understand his life to be subject to probability and chance (2008, 150). Indeed, the passage evokes the boundless, incalculability of matter's generative intra-action. We are presented with an image of the agentic mesh in which different material expressions are emphasised without hierarchy. A woman, sand, an empty jar, a drooling wolf and the sun all occupy the same material dimension in which they are one *becoming with* many, to use Haraway's words (2008, 4). Crucially, these

material expressions are separated by ellipses; their difference is marked, though they all *are* together. Introduced to this image are sites of converging differential intelligences; the centre of a storm and the lines of discontinuity in rock, points where intra-acting matters meet to express *through* one another in narratively rich bursts of generative dynamic relations. Storm centres are converging points of different atmospheric pressures and air temperatures; wind currents born from various corners of land and ocean which are then spun by the rotation of the Earth into spiralling systems which generate, through manifold differential intelligences, heavy rainfall, powerful winds and lightning (Anthes 1982). Likewise, lines of discontinuity, which are fault lines in continuous rock caused by sudden environmental changes, are meeting points of the immense forces of the Earth which intra-act to form earthquakes, generating powerful electric fields that squeeze quartz so tightly that it turns to gold (Sample 2024). Bennett explains that the emergent properties of an assemblage are "distinct from the sum of the vital force of each materiality considered alone" (2010, 24); the whole is greater than the sum of its parts. As such, Niki realises that to calculate the vital force of converging differential intelligences is impossible; no equation can predict the generative excess of agency that emerges through intra-active becoming. In effect, we have an image of the agentic mesh in both its differential intelligences and intra-active potentialities. This image situates sand within the mesh, only one material expression in a sea of intelligences, but one in which its difference is meaningful and underlies its generative potential. Though this reading is generous, it underscores why difference matters; why the woman, the sand, the jar, the wolf and the sun are worthy of linguistic and material distinction.

I stress the significance of difference in order to explain why critical geomorphology is a useful subset of material ecocriticism. Because, given the entangled

nature of the new materialist ontology, there lingers the question: How is it that critical geomorphology can ask how a specific geologic material can be a morphic agent to any dimension of a text if the agency of that material only emerges intra-actively *through* various non-geologic materialities? To answer this question and support critical geomorphology as a worthwhile interpretive framework, I look to Sullivan's 2012 article 'Dirt Theory and Material Ecocriticism', in which her explicit goal is to "give dirt its due" (517). Sullivan treads similar paths to this chapter, highlighting human enmeshment with dirt and the fact that dirt is composed of numerous material components and is transported by various human and nonhuman forces (516). Despite gesturing towards the broader entanglements of new materialism, she argues that dirt in particular deserves our attention and study, specifically because its agentic power is differently articulated and as such often overlooked (529). Similarly, Cohen's mapping of human-lithic enmeshment in *Stone* posits that "stone's force is exorbitant yet intimate … eroding the boundary between organic and inorganic" (2015, 171). Sullivan and Cohen justify material specificity firstly, because their chosen materialities express differential intelligibility and secondly, because they are overlooked and presumed inert by the lingering effects of the Newtonian-Cartesian paradigm. Ultimately, if the most seemingly passive materialities of dirt, stone and sand are proven to be lively, "storied" material expressions through which the "world becomes eloquent" (Oppermann 2019, 112), then the broader nonhuman material world may, in turn, be rightfully conceived of as inherently meaningful and agentic in political, cultural and ethical discourses and models. As such, critical geomorphology's ethical implications extend the ethics of material ecocriticism, which, as Iovino states, is one which incites "a more inclusive vision of the earthly dynamics" (2012, 144).

Conclusion: Towards Diffractive Reading

If you were to travel to the real-life monolith of Hanging Rock in the Macedon Ranges of Victoria, you would be greeted with a sign that reads "Experience the Mystery". Here, you could hike up to Hanging Rock itself, have a picnic at the grounds below, or visit the Hanging Rock Discovery Centre, where you would find educational exhibits detailing the Rock's geological formation and Indigenous history alongside quotes and graphics drawn from Lindsay's 1967 *Picnic at Hanging Rock* and Peter Weir's 1975 film adaption of the same name. There is even a statue of an enchanted Miranda wandering between a series of jagged upright boulders. The Macedon Ranges Shire Council notes that Hanging Rock has been captured extensively by artists in "numerous mediums and formats" (2018, 64). William Ford's 1875 painting 'At Hanging Rock', is referenced in *Picnic* (1967, 31) and is said to have partially inspired the novel (McCulloch 2017). For the Taungurung Traditional Owners, the Council writes that "their connections to Hanging Rock are, quite literally, embedded within its craggy face" (2018, 62). In the Taungurung story, Hanging Rock's vertical blocks are *wiylak*, young boys who were turned to stone because they were misbehaving during important ceremony preparations (Ash 2017, as cited in Macedon Ranges Shire Council 2018, 62). The stories of Hanging Rock are many and they are tangled up in one another and in the Rock itself.

The story of Lowry's volcanoes in *Under the Volcano* (1947) is also bound up in other stories and legends which mingle together with the real-life Popocatépetl and Ixtaccihuatl. In Aztec myth, Popocatépetl and Ixtaccihuatl were lovers who met a Romeo and Juliet-esque fate. The warrior Popocatépetl went to battle and Ixtaccihuatl was falsely told that he had met his death. Ixtaccihuatl died of grief and Popocatépetl returned to find

his lover dead. He wept over her, heartbroken. The gods covered their bodies in snow and transformed them into mountains while Popocatépetl was still alive. Popocatépetl is an active volcano, and this story suggests his periodic eruptions are cries of grief over his dead, dormant lover, Ixtaccihuatl (Huck 2017, 10). Lowry refers to this myth throughout *Volcano*, likening Geoffrey and Yvonne's story to the tragedy of the lovers. For the Nahua people who live in the Hueyapan village under Popocatépetl, the volcano is a personification of an old man called don Gregorio who is sometimes seen wandering the volcano's slopes. According to this legend, Popocatépetl is "situated at the centre of the world" (Hlúšek 2017, 19), a story which lends itself well to my reading of Lowry's volcanoes as occupying the centre of the text's spatial dimension. Similarly, Abe's *The Woman in the Dunes* (1964) was allegedly inspired by the story of a village in Japan near the coastal city of Sakata, "an area whose villagers' problems Abe became fascinated with after reading an article about them in *Asahi Graph*" (Pollack 1992, 129). Though there is little scholarship about this particular area of Japan and any other stories which might be bound up in the dunes, Abe's sands are nonetheless entwined with the stories of "real" materiality.

This thesis has introduced critical geomorphology as a mode of material ecocriticism which reads in-text geologies as morphic agents which act upon textual dimensions in distinct and meaningful ways. Crucially, material ecocriticism, as set forth by Iovino and Oppermann, is not restricted to reading in-text matter, rather it is an expansive methodology that reads *all* matter as storied (2014, 7). Furthermore, as Iovino and Oppermann note, material ecocriticism is a "diffractive" methodology which reads "the discursive and the material, the cultural and the natural" not in separation but *through* one another (9). In this light, there is an opportunity for critical geomorphology as outlined

in this thesis to be developed into a diffractive reading methodology. Here, a critical geomorphologist might wade deeper into the other stories and myths that its geologic entities of study are tangled up within and cross disciplinary boundaries to work with geologists and geomorphologists. In essence, a diffractive critical geomorphology would read the morphic agency of the geologic as it shapes both textual worlds and the text that *is* the world; asking how the shape of the Earth and the shape of the texts are formed and informed intra-actively by geomorphic processes. If we understand meaning and matter to be "inextricably fused" as Barad does (2007, 3), then this is an interesting question. A diffractive critical geomorphology might consider, for example, how the in-text representations of Hanging Rock seen in *Picnic,* the creation stories of the Wurundjeri, Taungurong and Dja Dja Wurrung people, the various artistic depictions of the Rock and the Peter Weir film adaption are morphic to the "real" Hanging Rock; how they are, to use the Macedon Ranges Shire Council's phrasing, "embedded within its craggy face" (2018, 62). Layered into this diffractive critical geomorphology would be the scientific geomorphological study of Hanging Rock, which would ask how the Rock was shaped by the volcanic processes of the Earth and how its geology continues to shape the Earth around it. Ultimately, this diffractive reading would ask how Hanging Rock, in all its expressions, is morphic *to* and in turn morphed *by* the broader natural, social and cultural dimensions of the worlds in which it occupies, and these layers of entangled matter and meaning would be read diffractively through one another to produce a study of Hanging Rock's morphology that is interdisciplinary, panoptic and fractal. Such an undertaking would be well-situated within the emerging trend towards practice-based research seen in the humanities, as the forms of knowledge this methodology might unearth may be best communicated through non-traditional or creative means, such as a multimedia exhibition or a series of artefacts accompanying written research.

Though a diffractive approach to critical geomorphology is aspirational and poses some practical challenges due to the level of interdisciplinarity it demands, asking such questions is pertinent in the Anthropocene. Theoretical physicist David Bohm says that "our action towards the whole universe is a result of what it means to us" (1987, 98, as cited in Oppermann 2019, 114). Although the nonhuman does not need us to interpret its stories, it *is* "influenced by our interpretations" (Oppermann 2019, 114); how we read the stories of the nonhuman world is important. In the Anthropocene, anthropogenic actions are giving rise to the dire ecological situation of the *now*. As such, if we are to approach the nonhuman world differently, as is called for, our current ways of interpreting the world must be urgently revised. This is an undertaking that is not only beyond the scope of this thesis but is beyond the scope of any one discipline, community or culture. Nevertheless, developing a diffractive critical geomorphology—with a humble reverence for rocks and their kin—might play a small yet vital role in this endeavour.

Works Cited

Abe, Kōbō. 1964. *The Woman in the Dunes.* Translated by E. Dale Saunders. Penguin Classics, 2006.

Ackerley, Christopher, and David Large. 2012. "Under the Volcano: A Hypertextual Companion." *The University of Otago*, edited by Paul Tiessen, Patrick McCarthy, Miguel Mota, Victor Doyen, and Colin Dilnot. Updated June 2012. https://www.otago.ac.nz/english-linguistics/english/lowry/index.html.

Ackerley, Christopher, and Lawrence J. Clipper. 1984. *A Companion to Under the Volcano*. University of British Columbia Press.

Alaimo, Stacy. 2010. *Bodily Natures: Science, Environment, and the Material Self*. Indiana University Press.

Alexander, Neal, and David Cooper, eds. 2024. Introduction to *The Routledge Handbook of Literary Geographies*. Routledge.

Anderson, Elizabeth. 2020. "Reading the World's Liveliness: Animist Ecologies in Indigenous Knowledges, New Materialism and Women's Writing." *Feminist Modernist Studies* 3 (2): 205-16. https://doi.org/10.1080/24692921.2020.1794458.

Anderson, Kay. 2014. "Mind over Matter? On Decentring the Human in Human Geography." *Cultural Geographies* 21 (1): 3-18. https://doi.org/10.1177/1474474013513409.

Anthes, Richard A. 1982. *Tropical Cyclones: Their Evolution, Structure and Effects*. American Meteorological Society. https://doi.org/10.1007/978-1-935704-28-7.

Arac, Jonathan. 1977. "The Form of Carnival in Under the Volcano." *Publications of the Modern Language Association of America* 92 (3): 481–89. https://doi.org/10.2307/461710.

Baishya, Amit R. 2020. "Postcolonial Lithographies." *KronoScope: Journal for the Study of Time* 20 (2): 215–38. https://doi.org/10.1163/15685241-12341469.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press. https://doi.org/10.1215/9780822388128.

Barad, Karen. 2017. "No Small Matter: Mushroom Clouds, Ecologies of Nothingness, and Strange Topologies of Spacetimemattering." In *Arts of Living on a Damaged Planet*, edited by Anna Lowenhaupt Tsing. University of Minnesota Press.

Bennett, Jane. 2001. *The Enchantment of Modern Life: Attachments, Crossings, and Ethics*. Princeton University Press. https://doi.org/10.1515/9781400884537.

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Duke University Press.

Bennett, Jane. 2013. "The Elements." *Postmedieval: A Journal of Medieval Cultural Studies* 4 (1): 105–11. https://doi.org/10.1057/pmed.2012.39.

Benson, Melinda H. 2019. "New Materialism: An Ontology for the Anthropocene." *Natural Resources Journal* 59 (2): 251–80. https://www.jstor.org/stable/26800037.

Bulson, Eric. 2017. *Novels, Maps, Modernity: The Spatial Imagination, 1850-2000*. Taylor and Francis. https://doi.org/10.4324/9780203944066.

Burke, Edmond. 1757. *Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful; With an Introductory Discourse Concerning Taste*. Project Gutenberg, 2005. https://www.gutenberg.org/files/15043/15043-h/15043-h.htm#A_PHILOSOPHICAL_INQUIRY.

Chakrabarty, Dipesh. 2009. “The Climate of History: Four Theses.” *Critical Inquiry* 35 (2): 197–222. https://doi.org/10.1086/596640.

Chakrabarty, Dipesh. 2018. “Anthropocene Time.” *History and Theory: Studies in the Philosophy of History* 57 (1): 5–32. https://doi.org/10.1111/hith.12044.

Clark, Timothy. 2019. *The Value of Ecocriticism*. Cambridge University Press. https://doi.org/10.1017/9781316155073.

Clingerman, Forrest. 2016. “Place and the Hermeneutics of the Anthropocene.” *Worldviews: Global Religions, Culture, and Ecology* 20 (3): 225–37. https://doi.org/10.1163/15685357-02003002.

Cohen, Jeffrey Jerome. 2015. *Stone: An Ecology of the Inhuman*. University of Minnesota Press.

Coole, Diana H., and Samantha Frost, eds. 2010. Introduction to *New Materialisms: Ontology, Agency, and Politics*. Duke University Press.

Crick, Malcolm. 1985. “Corsets, Culture and Contingency: Reflections on Joan Lindsay’s Picnic at Hanging Rock.” *Mankind* 15 (3): 231–42. https://doi.org/10.1111/j.1835-9310.1985.tb01409.x.

Darwin, Charles. 1869. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life.* 5th ed. London: John Murray.

Di Gennaro, Paola. 2015. *Wandering through Guilt: The Cain Archetype in the Twentieth-Century Novel*. Cambridge Scholars Publishing.

Don McKay. 2012. “Ediacaran and Anthropocene: Poetry as a Reader of Deep Time.” In *Making the Geologic Now*, edited by Elizabeth Ellsworth, and Jamie Kruse. Punctum Books.

Doyen, Victor. 1969. “Elements Towards a Spatial Reading of Malcolm Lowry's Under the Volcano.” *English Studies* 50 (1-6): 65-74. https://doi.org/10.1080/00138386908597326.

Dudchenko, Paul. 2010. *Why People Get Lost: The Psychology and Neuroscience of Spatial Cognition*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199210862.001.0001.

Ellsworth, Elizabeth, and Jamie Kruse, eds. 2012. Introduction to *Making the Geologic Now*. Punctum Books.

Fernandez, Jose L. 2020. “Kantian Sublimity and Supersensible Comfort: A Case for the Mathematical Sublime.” *Journal of Comparative Literature and Aesthetics* 43 (2): 22-32.

Fisher, Richard. 2024. "Why it's Proving Difficult to Define the Official Dawn of the Anthropocene." *BBC*, March 7. https://www.bbc.com/future/article/20240306-why-its-proving-difficult-to-define-the-official-dawn-of-the-anthropocene.

Foucault, Michel. 1986. “Of Other Spaces.” Translated by Jay Miskowiec. *Diacritics* 16 (1): 22–27. https://doi.org/10.2307/464648.

Frank, Joseph. 1945. “Spatial Form in Modern Literature: An Essay in Two Parts.” *The Sewanee Review* 53 (2): 221-40. https://www.jstor.org/stable/27537575.

Frank, Joseph. 1945. “Spatial Form in Modern Literature: An Essay in Three Parts.” *The Sewanee Review* 53 (3): 433-56. https://www.jstor.org/stable/27537609.

Frank, Joseph. 1945. “Spatial Form in Modern Literature: An Essay in Three Parts.” *The Sewanee Review* 53 (4): 643-53. https://www.jstor.org/stable/27537640.

Gandy, Matthew. 2012. “The Texture of Space, Desire and Displacement in Hiroshi Teshigahara’s Woman of the Dunes [Suna No Onna].” In *Envisioning Landscapes,*

Making Worlds Geography and the Humanities, edited by Stephen Daniels, Dydia DeLyser, J. Nicholas Entrikin, and Doug Richardson. Routledge. https://doi.org/10.4324/9780203839287.

Gerlach, Joe. 2024. "Posthuman Cartographies." In *The Routledge Handbook of Cartographic Humanities*, edited by Tania Rossetto, and Laura Lo Presti. Routledge. https://doi.org/10.4324/9781003327578.

Ginn, Franklin, Michelle Bastian, David Farrier, and Jeremy Kidwell. 2018. "Introduction: Unexpected Encounters with Deep Time." *Environmental Humanities* 10 (1): 213–25. https://doi.org/10.1215/22011919-4385534.

Goodall, Mark. 2016. "Under the Volcano . . . the Beach: Malcolm Lowry and the Situationists." In *Malcolm Lowry's Poetics of Space*, edited by Richard J. Lane, and Miguel Mota. University of Ottawa Press.

Gregory, Kenneth J., and Andrew S. Goudie, eds. 2011. Introduction to *The Sage Handbook of Geomorphology*. SAGE Publications.

Gutierrez, Mateo. 2013. *Geomorphology*. CRC Press. https://doi.org/10.1201/b12685.

Haraway, Donna J. 2008. *When Species Meet*. University of Minnesota Press.

Hazard, Sonia. 2019. "Two Ways of Thinking About New Materialism." *Material Religion* 15 (5): 629–31. https://doi.org/10.1080/17432200.2019.1666585.

Hazen, Robert M. 2010. "How Old Is Earth, and How Do We Know?" *Evolution Education & Outreach* 3 (2): 198–205. https://doi.org/10.1007/s12052-010-0226-0.

Heringman, Noah. 2023. *Deep Time: A Literary History. Princeton*. Princeton University Press. https://doi.org/10.1515/9780691235806.

Hlúšek, Radoslav. 2017. "Hueyapan - Life Under/With the Volcano: Ritual Landscape of a Nahua Community." *Axis Mundi* 12 (1): 16-26. https://fphil.uniba.sk/fileadmin/fif/katedry_pracoviska/kpr/axismundi/AxisMundi_2017___1_studia_Hlusek.pdf.

Hones, Sheila. 2008. "Text as It Happens: Literary Geography." *Geography Compass* 2 (5): 1301–17. https://doi.org/10.1111/j.1749-8198.2008.00143.x.

Huck, James D. Jr. 2017. *Modern Mexico*. Bloomsbury Publishing. https://doi.org/10.5040/9798400686795.

Iovino, Serenella. 2012. "Review Essay: Steps to a Material Ecocriticism. The Recent Literature about the 'New Materialisms' and Its Impact on Ecocritical Theory." *Ecozon@* 3 (1): 134-45. https://doi.org/10.37536/ECOZONA.2012.3.1.461.

Iovino, Serenella, and Serpil Oppermann. 2012. "Theorizing Material Ecocriticism: A Diptych." *Interdisciplinary Studies in Literature and Environment* 19 (3): 448–75. https://doi.org/10.1093/isle/iss087.

Iovino, Serenella, and Serpil Oppermann, eds. 2014. Introduction to *Material Ecocriticism*. Indiana University Press.

Irvine, Richard. 2014. "Deep Time: An Anthropological Problem." *Social Anthropology* 22 (2): 157–72. https://doi.org/10.1111/1469-8676.12067.

Johnston, Sarah Iles. 2023. *Gods and Mortals: Ancient Greek Myths for Modern Readers*. Princeton University Press. https://doi.org/10.1515/9780691239880.

Knödel, Klaus, Gerhard Lange, and Hans-Jürgen Voigt, eds. 2008. *Environmental Geology: Handbook of Field Methods and Case Studies*. Springer-Verlag.

Lane, Richard J., and Miguel Mota, eds. 2016. *Malcolm Lowry's Poetics of Space*. University of Ottawa Press.

Latour, Bruno. 1993. *We Have Never Been Modern*. Harvard University Press.

Limón, Ada. 2022. "The Magnificent Frigatebird." *Poetry Foundation*. https://www.poetryfoundation.org/poems/162175/the-magnificent-frigatebird.

Lindsay, Joan. 1967. *Picnic at Hanging Rock*. Penguin Group, 2009.

Ljungberg, Christina. 2017. "Reading as Mapping." In *The Routledge Handbook of Literature and Space*, edited by Robert T. Tally Jr. Routledge. https://doi.org/10.4324/9781315745978.

Lo Presti, Laura. 2023. "One Map Closer to the End of the World (as We Know It): Thinking Digital Cartographic Humanities with the Anthropocene." In *Routledge Handbook of the Digital Environmental Humanities*, edited by Charles Travis, Deborah P. Dixon, Luke Bergmann, Robert Legg, and Arlene Crampsie. Routledge. https://doi.org/10.4324/9781003082798-32.

Lowry, Malcolm. 1947. *Under the Volcano*. Penguin Classics, 2000.

Lynch, Kevin. 1960. *The Image of the City*. The M.I.T. Press.

Macedon Ranges Shire Council. 2018. *Hanging Rock Strategic Plan: September 2018*. Victoria State Government: Environment, Land, Water and Planning. https://www.forestsandreserves.vic.gov.au/__data/assets/pdf_file/0019/512470/Final-Hanging-Rock-Strategic-Plan.pdf.

Malhi, Yadvinder. 2017. "The Concept of the Anthropocene." *Annual Review of Environment and Resources* 42 (1): 77–104. https://doi.org/10.1146/annurev-environ-102016-060854.

Marroum, Marianne. 2007. “Sands of Imprisonment, Subjugation, and Empowerment: Reading Foucault in Kobo Abe’s The Woman in the Dunes.” *The Comparatist* 31 (1): 88–104. https://doi.org/10.1353/com.2007.0010.

Marroum, Marianne. 2008. “Water and Sand: The Dialectic of Entropy and Negentropy in Kobo Abe’s The Woman in the Dunes.” *Concentric: Literary and Cultural Studies* 34 (1): 135-56. http://www.concentric-literature.url.tw/issues/Water/7.pdf.

McCulloch, Janelle. 2017. "The Extraordinary Story Behind Picnic at Hanging Rock." *The Sydney Morning Herald*, March 30. https://www.smh.com.au/lifestyle/the-extraordinary-story-behind-picnic-at-hanging-rock-20170328-gv7upc.html.

Miall, Andrew D. 2022. *Stratigraphy*. 2nd ed. Springer International Publishing AG.

Miller, Andrew John. 2004. “Under the Nation-State: Modernist Deterritorialization in Malcolm Lowry’s Under the Volcano.” *Twentieth Century Literature* 50 (1): 1–17. https://doi.org/10.2307/4149251.

Miller, Rosemarie. 2017. “Return to Hanging Rock: Lost Children in a Gothic Landscape.” *Green Letters* 21 (2): 152–66. https://doi.org/10.1080/14688417.2016.1233822.

Oppermann, Serpil. 2016. "Material Ecocriticism." In *Gender/Nature*, edited by Iris van der Tuin. MacMillian-Gale Cengage Learning. https://www.researchgate.net/publication/320281024_Material_Ecocriticism.

Oppermann, Serpil. 2019. “How the Material World Communicates: Insights from Material Ecocriticism.” In *Routledge Handbook of Ecocriticism and Environmental Communication*, edited by Scott Slovic, Swarnalatha Rangarajan, and Vidya Sarveswaran. Routledge. https://doi.org/10.4324/9781315167343-10.

Ovid. n.d., ca. 8 CE. *Metamorphoses.* Translated by Arthur Golding. London: W. Seres, 1576.

Oyarzun, Eduardo Valls. 2022. "Deleuzian Time and the Elemental Rhythms of Nature in Joan Lindsay's Picnic at Hanging Rock (1967)." *English Studies* 103 (1): 113–37. https://doi.org/10.1080/0013838X.2021.2021673.

Playfair, John. 1805. "Biographical Account of the Late Dr James Hutton, F. R. S. Edin." *Transactions of the Royal Society of Edinburgh* 5: 33-99. https://doi.org/10.1017/S0263593300090039.

Pollack, David. 1992. *Reading against Culture: Ideology and Narrative in the Japanese Novel*. Cornell University Press.

Rigby, Kate. 2022. "Ecocriticism." In *Introducing Criticism in the 21st Century*, edited by Julian Wolfreys. Edinburgh University Press. https://doi.org/10.1515/9780748695300-008.

Roelvink, Gerda. 2020. "The Anthropocene." In *After the Human*, edited by Sherryl Vint. Cambridge University Press. https://doi.org/10.1017/9781108874427.010.

Sample, Ian. 2024. "Scientists Find Seismic Role in Formation of Large Gold Nuggets." *The Guardian*, September 3. https://www.theguardian.com/science/article/2024/sep/02/scientists-find-seismic-role-in-formation-of-large-gold-nuggets.

Schmidt, Michael. 2000. Introduction to *Under the Volcano*. Penguin Classics.

Steele, Kathleen. 2010. "Fear and Loathing in the Australian Bush: Gothic Landscapes in Bush Studies and Picnic at Hanging Rock." *Colloquy: Text, Theory, Critique* (20): 33-56. https://www.monash.edu/__data/assets/pdf_file/0011/1763885/issue20.pdf.

Sullivan, Heather I. 2012. “Dirt Theory and Material Ecocriticism.” *Interdisciplinary Studies in Literature and Environment* 19 (3): 515–31. https://doi.org/10.1093/isle/iss067.

Tally, Robert T. Jr., and Christine M. Battista, eds. 2016. Introduction to *Ecocriticism and Geocriticism*. Palgrave Macmillan.

Tally, Robert T. Jr., eds. 2017. Introduction to *The Routledge Handbook of Literature and Space*. Routledge. https://doi.org/10.4324/9781315745978-1.

Thacker, Andrew. 2017. “Critical Literary Geography.” In *The Routledge Handbook of Literature and Space*, edited by Robert T. Tally Jr. Routledge. https://doi.org/10.4324/9781315745978-3.

Ueno, Toshiya. 2017. “Abe Kõbõ in Ecosophy.” In *Ecocriticism in Japan*, edited by Hisaaki Wake, Keijirō Suga, and Masami Yūki. Lexington Books.

Westphal, Bertrand. 2007. *Geocriticism: Real and Fictional Spaces*. Translated by Robert T. Tally Jr. Palgrave Macmillan. https://doi.org/10.1057/9780230119161.

Wilsmore, S. J. 1987. “The Role of Titles in Identifying Literary Works.” *The Journal of Aesthetics and Art Criticism* 45 (4): 403-08. https://doi.org/10.2307/431331.

Woolf, Virginia. 1927. *To the Lighthouse.* Penguin Books, 1964.

Yesiltepe, Demet, Ruth Conroy Dalton, and Ayse Ozbil Torun. 2021. “Landmarks in Wayfinding: A Review of the Existing Literature.” *Cognitive Processing* 22 (3): 369–410. https://doi.org/10.1007/s10339-021-01012-x.

Zalasiewicz, Jan, Mark Williams, and Richard Fortey, et al. 2011. “Stratigraphy of the Anthropocene.” *Philosophical Transactions A* 369 (1938): 1036–55. https://doi.org/10.1098/rsta.2010.0315.

Zalasiewicz, Jan. 2012. *The Planet in a Pebble: A Journey into Earth's Deep History*. Oxford University Press.

Zen, E-an. 2001. "What Is Deep Time and Why Should Anyone Care?" *Journal of Geoscience Education* 49 (1): 5–9. https://doi.org/10.5408/1089-9995-49.1.5.

Zhong, Raymond. 2024. "Geologists Make It Official: We're Not in an 'Anthropocene' Epoch." *The New York Times*, March 20. https://www.nytimes.com/2024/03/20/climate/anthropocene-vote-upheld.html.