



# Geopoetics

## A New Political History

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*Abstract* This article presents an alternative political history of recent planetary thought through an examination of geopoetics rooted in the colonial politics of Indonesia and Cold War geosciences. This history reveals how geopoetics has not been marginal or critical of dominant scientific narratives but has been central to the development of modern theories of the earth. The article traces the roots of that history in colonial Indonesia through debates between geologists, Theosophists, and orientalists, and in colonial endeavors to suppress Javanese Islam through new geological narratives. It considers the work of Johannes Umbgrove, his theory of geopoetry, and its influence on Harry Hess and the theory of plate tectonics. Acknowledging this history shows us just how deeply connected geopoetics is to much longer religious, cosmological, and political conversations about narrating the earth. The article examines how geopoetics has long been preoccupied with understanding the connectivity of nature and catastrophic histories and points to contemporary possibilities for rethinking the relationship between humans, the earth, and cosmos.

*Keywords* geopoetics, planetarity, Johannes Umbgrove, Harry Hess, catastrophe

This article examines why two mid-twentieth-century geologists, Johannes Umbgrove and Harry Hess, thought that understanding planetarity required what they called geopoetics. To do so, I explore two instances in their texts where they invoked geopoetics. Those two instances were not marginal to the modern understanding of the earth, though until now they have been largely of interest only to specialists in the history of the geological sciences. Umbgrove and Hess's use of geopoetics was significant because it contributed to the acceptance in the 1960s of the theory of plate tectonics, which then became the prevailing metanarrative of earth's structure and evolution. That metanarrative is often uncritically invoked in contemporary environmental humanities and geohumanities debates about planetary theory and the Anthropocene. But what does it mean for modern earth theory that there was an invocation of poetics at its very center? How does the geopoetic help us think in new ways about contemporary attempts to redefine the condition of planetarity?

The first reason to consider this question is not only to help contextualize some recent discussions in the environmental and geohumanities around the planetary turn but also to tease out often-overlooked issues in the texture of modern planetary thought. For one, and most obviously, it is frequently assumed that the modern geological sciences have been a separate enterprise from poetics. A glance at a standard undergraduate degree program in the earth sciences in the United Kingdom or North America would not likely encounter mandatory courses in poetics, let alone courses on the crossovers between the history of poetry and geological thought. A student undertaking an undergraduate degree in earth sciences at my institution, for instance, would encounter the history of poetics only through an elective course taken at an entirely different college. Likewise, the standard narrative of many undergraduate history of geographic thought courses, a space that one might think would be more carefully attuned to the historical coproduction of aesthetic and scientific practices, also glosses over these connections beyond passing reference to Humboldt and Romanticism.<sup>1</sup> Turning to Umbgrove and Hess's work, however, reveals a deeper and more enduring preoccupation with understanding the earth, and planetarity more broadly, as a poetic practice in twentieth-century geological thought. What Hess and Umbgrove meant by *poetics*, though, it should be made clear, was not only a genre and technique of writing applied to planetary issues; it was a mode of thinking cosmically: *geopoetics* meant raising questions about the creation of the earth, the role of catastrophe and violence in planetary history, and the legibility of the cosmos in the materiality of the landscape. The *geopoetic* was a discursive space where the geological sciences, religious, and cosmological imaginaries converged, were negotiated, reassembled, and leveraged against each other in relation to local and global geopolitical pressures. Revisiting Hess and Umbgrove's *geopoetics* can serve as a reminder not only of the crucial function of poetics in the geological and earth sciences but also, more importantly, of how profoundly intercalated modern planetary theory is, and should continue to be, with questions often seen as belonging to religious, theological, and cosmological traditions.

Another reason that Umbgrove and Hess's *geopoetics* deserves attention here is because they both thought that *geopoetics* connected the spatial and temporal scales of the cosmic and planetary with the human. *Geopoetry* was about mapping connective lineaments between, as Umbgrove put it, "the remotest distances of the universe to the inmost depths of ourselves."<sup>2</sup> In contrast to many other dominant voices in mid-twentieth-century geology that considered the earth from a view uninterested in human presence or impact, Hess and Umbgrove, and particularly Umbgrove, speculated about the geosocial relations between humans and planetary and cosmic processes. They

1. One might draw this division between poetics and geology back to the familiar "two cultures" debate and modern disciplinary divisions between the earth sciences and humanities. See, for instance, Snow, *Two Cultures*; Burnett, "View from the Bridge."

2. Umbgrove, *Symphony of the Earth*, 213.

also broke with conventions in economic geology and its orientation to describing the earth in the service of humans, or the earth as a resource. By contrast, geopoetics came to mean, especially as Umbgrove defined it, a mode of writing through which cosmic structures could be witnessed even in the construction of human consciousness.

I do not intend here to uncritically resurrect Hess and Umbgrove as unsung heroes of planetary thought. They will appear as notably uninterested in human impact on the planet, and their mid-twentieth-century appreciation of the Great Acceleration was rudimentary. Umbgrove, though, was familiar with conversations about the Psychozoic and related discussions among geologists of an “age of man” that prefigured the Anthropocene debate. Hess’s vision of planetary history, too, was marked by the long shadow of nuclear war. However, rather than excuse the missing pieces of their arguments or relegate some parts of their work to a different cultural context, this essay teases out some of the enduring preoccupations with planetary thought as a form of poetic practice that can inform and advance current calls for a new geopoetics.

### Genealogies of Geopoetics

Many recent reflections on the history of geopoetics have begun not with the relationship between poetics and the earth sciences but with the Scottish French poet Kenneth White. White often conceived of the “geo” of geopoetics as bringing together not geology with poetics but geography with poetics.<sup>3</sup> Calls to build on White’s work and reinvigorate geopoetics have recently emerged in the environmental and geohumanities, and an edited collection published in 2020 brought together contributions from scholars, poets, visual artists, and activists to signal the diversity of practices coming together under the banner.<sup>4</sup> Debates have been unfolding within these practices about the meaning of geopoetics and what rethinking the formal and often conservative conventions of academic writing can do—through experiments with poetic and essay forms, multispecies and more-than-human autobiography—for confronting and narrating environmental and planetary crises in new and effective ways.<sup>5</sup> Angela Last has looked beyond White for an alternative history of contemporary geopoetics among postcolonial Black Caribbean writers, and in particular Daniel Maximin, who Last noted has contributed to a “(geo)political imagination to emerge from the former colonies.”<sup>6</sup> Last found in Maximin a rather different set of confluences for the term *geopoetics* than those of White: rather than between geography and poetry, geopoetics brought together poetry and geopolitics.<sup>7</sup> For Last, the tradition of Black Caribbean geopoetic thought undid dominant forms of worlding by situating at its center a volatile, unstable, and fundamentally relational

3. Magrane, “Situating Geopoetics.” See also White, “Elements of Geopoetics.”

4. See Magrane et al., *Geopoetics in Practice*, 1–14.

5. See, for instance, Magrane, “Climate Geopoetics.” See also responses to Magrane in the same issue of *Dialogues in Human Geography* by Maleea Acker, Aya Nassar, Sasha Engelmann, and Tim Cresswell.

6. Last, “Fruit of the Cyclone,” 57.

7. Last, “Fruit of the Cyclone.” See also Last, “We Are the World?”

material world. Geopoetics, in this reading, was attuned to an earth seen from the vantage of the catastrophe of colonialism, its reverberations in the postcolony, and its legacies of ruination in the present; above all, Maximin's geopoetics made legible the necessity to build an ethics and a politics with an earth that is vulnerable, prone to the shudders and pulses of tectonic drift, and the whip of cyclonic displacement.

Less common in these recent theorizations of geopoetics, though, has been an interest in the role of poetics within the geological and planetary sciences. Contemporary discussions of geopoetics often set up geopoetics in opposition to the sciences. Magrane and White have nodded perfunctorily to Humboldt as a predecessor of geopoetics because he regarded aesthetics, sensation, and situated knowledge as foundational to his notion of science.<sup>8</sup> But beyond the already familiar Humboldt, contemporary geopoets have overlooked a much more widespread concern in earth theory from the late eighteenth century to the twentieth with the fundamental role of *poiesis* in both the making of a planet and the making of human knowledge. For instance, Eduard Suess, the Viennese engineer who, in the second half of the nineteenth century, undertook a project of rethinking planetary tectonic structures and evolution, and Pierre Termier, the director of the French Geological Mapping Service at around the same time, each drew on formal strategies derived from poetry to tell scientific geological and planetary stories. They also considered *poiesis* a fundamentally material, planetary force. We could also point to Vladimir Vernadsky or Pierre Teilhard de Chardin as part of this tradition because of their fascination with the confluences of planetary theory with ideas of planetary spirit, world-soul, and human consciousness as an expression of material, planetary-evolutionary processes. For each of these authors, the world-making character of *poiesis* is material and epistemological, inscribed in the evolutionary history of the earth as much as in the knowing of those evolutionary processes. A detailed untangling of these ideas, their significance for modernity, and how they circle back to both the postcolonial tradition of Maximin or the geopoetics of White is beyond the scope of this article, but it is nevertheless worth developing one of Suess's and Termier's core themes a little more: the relationship between representation and nature.

Broadly, these geopoets were concerned with the unity of nature.<sup>9</sup> Unity should not be quickly conflated here with wholeness or totality; it can equally be understood as a preoccupation with relationality in nature. An enduring problematic for this tradition of geopoets was foregrounding and mapping these relations, while writing itself was conceived as a technological extension of the earth that could make those relations legible. In other words, poetics meant nature telling stories about itself. Consider Suess's *The Face of the Earth*, his four-volume work of earth theory, which opens with a description of Earth as if seen from space. The narrator proceeds to fall toward Earth, brush away the clouds, and remove the oceans to "gaze directly on the rocky crust of

8. Magrane, "Situating Geopoetics," 87–89.

9. Dettelbach, "Alexander von Humboldt between Enlightenment and Romanticism," 9–20.

the globe thus laid bare.”<sup>10</sup> His aim was to present the shape of the continents and the ocean in order to theorize how those structures came to be. The poetic in Suess’s work was a literary device that transformed the materiality of the printed book into a telescopic medium that transported the perspective of the reader in space and time. The goal was to reveal a connected dynamic whole planet; the technology of the book became a geopoetic time-space machine. Contemporary geopoets might balk at such strategies as a view-from-nowhere, or raise difficult questions about the political motivations behind aspiring to such a position, or draw attention to the worlds that were violently erased through exactly such totalizing, universalizing, and mononaturalist European modernist visions. Yet Suess’s view from space onto Earth went beyond a gesture of producing a one-world world: it was an act of connecting the materiality of the book to the planet; it was about telling new planetary stories while also seeing planetary processes in the act of telling.

The appeals to geopoetics that Umbgrove and Hess would later make in the twentieth century carry forward these concerns with representation and earth knowledge. In one sense, the poetic dimension of this tradition was a critical self-awareness about the technology of narrative, how to direct the gaze of a reader around the earth, modify the scale of the view, when to zoom in or out. But geopoetics was also a preoccupation with relationality, it set itself the task of examining how the parts of the earth conjoined or split, trembled together, slid past each other, and connected with human bodies and even narrative techniques. But Umbgrove and Hess also made calls for geopoetics as a response to immediate global geopolitical pressures such as nuclear war: doing geopoetics was, as it were, an attempt to wrest new narratives about the earth to intervene in geopolitical struggles. The linking up of planet-scaled narratives with local stories, stories that connected human bodies with the earth and sky, and a philosophy of excessive cosmic relationality, I argue, are what contemporary geopoets can glean from this scientific tradition. As rethinking planetarity becomes an increasingly urgent space of intervention and conceptual invention in the environmental humanities, turning back to Hess and Umbgrove might recuperate some of their work while going some way to making the tradition of the geological sciences much stranger than it is often understood to be.<sup>11</sup>

### **Geology and Spirituality in the Netherlands East Indies**

Umbgrove first developed his geopoetic method in the Netherlands East Indies from 1926 to 1928 when he was in Java to study the evolution of coral reefs in the Bay of Batavia. He also frequently traveled to Java’s many volcanic craters. It was the twilight

10. Suess, *Face of the Earth*, 1.

11. For the growing literature on planetarity, see Clark and Szerszynski, *Planetary Social Thought*; Chakrabarty, *Climate of History in a Planetary Age*; Bashford, Kern, and Bobbette, *New Earth Histories*; Elias and Moraru, *Planetary Turn*.

years of the Netherlands' colony, and geological work, like all work for the state, was defined by ethnic segregation. The Geological Survey from 1923 to 1933, for example, included thirty-seven trained geologists, most of them white Europeans, while there were more than one hundred Native Indonesian staff.<sup>12</sup> The colonial economy was driven by plantations that extended up the slopes of Java's many volcanoes. Those volcanoes periodically destroyed the plantations, and a Volcanological Survey was created within the Department of Mines to protect the plantation economy. Umbgrove's work, though, was to study the formation and evolution of reef systems to mitigate the dangers they posed to ships transporting extracted botanical products to European and Asian markets. Beyond his day-to-day work he also hoped that his studies could illuminate broader issues around the evolutionary relationship between volcanoes and the ocean floor.

An emerging interest in alternative religions also shaped Umbgrove's ideas. The Theosophical Society had been founded in 1875 in New York and later moved to Adyar, Chennai, but by 1926, when Umbgrove was in Bandung, Theosophy lodges were in major cities across Java. The organization published *The Theosophist: A Magazine of Brotherhood, Oriental Philosophy, Art, Literature and Occultism*, and a steady stream of books and periodicals that brought together mysticism with modern science (including earth theory) through discourses on lost continents such as Atlantis and Lemuria, "oriental wisdom," and modern evolutionary theory. For many Theosophists, Theosophy was a project of resisting the alienating rationalism of modern science; their goal was to re-enchant modern science by uncovering marginalized knowledges from the "Far East." Theosophy lodges also contained libraries that offered access, often for the first time, to European anticolonial and socialist literature. Sukarno, for instance, the leader of the Indonesian revolution and Indonesia's first president, had access to theosophical libraries through his father, a Muslim Theosophist. Theosophy brought these different intellectual projects together: anticolonial socialism, the re-enchantment of modern science, and orientalist claims about Asian traditional wisdom.<sup>13</sup> The movement's founding matriarch, Helena P. Blavatsky, used the concept of the occult as a literal reading of religious and sacred texts from the Christian, Hindu, and Buddhist traditions, which, she argued, had prefigured modern science and reached many of its insights before scientists had in "the West."<sup>14</sup> Alfred Percy Sinnett, a British Theosophist, framed it thus in his 1884 introduction to *The Occult World*: "Secluded Orientals may understand more about electricity than Faraday, more about physics than Tyndall."<sup>15</sup> In Blavatsky's sprawling foundational text, *The Secret Doctrine*, she argued that the Javanese were descended from a "root race" of giants that predated the evolution of modern humans.<sup>16</sup> She thought

12. Sukanto, Soeradi, and Wikarno, *Menguak sejarah kelembagaan geologi di Indonesia*, 136.

13. Bobbette, *Pulse of the Earth*, 80–113.

14. Bobbette, *Pulse of the Earth*, 87–94.

15. Sinnett, *Occult World*, 4.

16. Bobbette, *Pulse of the Earth*, 87–94. See also Blavatsky, *Secret Doctrine*, 263–71.

that Southeast Asian cultural traditions were windows onto this deep past, connected to the earliest humans, and therefore connected to ancient wisdom traditions that could be uncovered in the present. Yet this very same orientalist fascination with Javanese history also shaped the formation of the anticolonial revolution by helping to forge a new fascination with Javanese identity and nationalism through a revival of classical pre-Islamic, Hindu, and Buddhist Javanese culture. The nationalist excitement that formed the contemporary idea of “Indonesia” and drove the postcolonial movement had its roots in the Theosophical revivalism of “ancient” Java. Earth theory was central to this movement; the geological sciences were a powerful toolbox in narrating a new history of the earth linked to Javanese culture, and geopoetics was one of the tools.

Some geologists were more active Theosophists than others. For instance, the director of the Mining Service, A. C. de Jongh, was a member of the local lodge and published “On the Valency of the Chemical Atoms in Connection with Theosophical Conceptions Concerning Their Exterior Form” in the Occultism section of the 1914 *Theosophist Magazine*.<sup>17</sup> The article attempted to give a chemical explanation for Charles Leadbeater and Annie Besant’s “occult chemistry” experiments from 1908, in which they claimed that through clairvoyant powers they could “actually see a molecule of physical matter.”<sup>18</sup> They then used the method to map and describe the molecular world. De Jongh’s article was his attempt to add scientific authority to Besant and Leadbeater’s work by combining it with the mainstream understanding of the structure of atoms. While De Jongh was speculating about occult chemistry, he was also overseeing the growth of mining in the Netherlands Indies. Royal Dutch Shell had formed in 1907 with interests in Sumatra, while Borneo was being exploited for petroleum by the Batavia Oil Company.

Umbgrove was not wholly convinced by the Theosophists. “Theosophy may in principle have some good in it,” he wrote, “but in practice it is quite a delirious movement. Here in the Indies, especially in Bandung, it is flourishing, and their ‘lodge’ has many members, including [de Jongh,] who is better informed about it than he is about geology.”<sup>19</sup> Umbgrove instead turned to geopoetry as an alternative to Theosophy in his attempt to bring together Javanese Hindu revivalism, modern science, and a new vision of the earth.

Like the Theosophists, Umbgrove was fascinated with the classical period of Java, particularly its Hindu-Buddhist empires of the early modern period. Many colonial elites believed that Java had entered a period of cultural decline with the ascendance of Islamic empires in the fourteenth century before the arrival of European colonialism. Dutch colonialism, Umbgrove thought, had modernized and improved the Indies. He wanted to contribute to this liberal project by helping to revive classical Hindu Javanese civilization to leverage against what they saw as the “scourge” of Islam.<sup>20</sup> The sultanates of

17. De Jongh, “On the Valency of the Chemical Atoms.”

18. Besant and Leadbeater, *Occult Chemistry*, 1–6.

19. Umbgrove, letter to his mother, May 15, 1928.

20. Bobbette, *Pulse of the Earth*, 123.

central Java were seen by many colonial elites and even some Javanese members of the sultanates themselves as remnants of a pre-Islamic golden age. Umbgrove saw in the sultanates the ancient traditions of India that produced the philosophy of the Upanishads, which he understood as advocating a cosmic theory of the interrelatedness of nature. For Umbgrove, earth theory was an intervention in narratives about Javanese culture and its relation to the earth; it was a discourse that rejected the cultural significance of Indonesian Islam in favor of ideas of liberal colonial modernization.<sup>21</sup>

The geopolitics of Umbgrove's earth theory comes most clearly into focus if we witness his 1927 visit to the Hindu and Buddhist ruins of the Dieng plateau and Borobudur. Borobudur, at the base of Mount Merapi volcano, was then known as the largest stupa in the world and represented the center of an influential empire that was mysteriously abandoned in the early modern period. For many colonists, it represented the golden age of pre-Islamic Java. The purpose for Umbgrove's visit was to "geologize"—that is, develop a new history linking landscape, volcanism, culture, and the earth. On the same trip he also geologized the Hindu ruins at the Dieng plateau and showed that they were the remains of a series of catastrophic volcanic eruptions.<sup>22</sup> For the first time, he connected the destruction of the Hindu city with volcanism and folded social history within natural processes. Later, sitting alone on the steps of Borobudur one night, he reflected that the scene was "full [of] indescribable splendor."<sup>23</sup> "It is a pity," he continued, "that this high culture and high religion has now completely disappeared here and has left us only a few lifeless monuments."<sup>24</sup> Like the Theosophists in Bandung, he thought that the ruined culture persisted: "For even now that nauseous Mohammedanism is no more than an external and thin shell, and much of the old lives on in the countless histories of the gamelan-long nights. Arjuna is still respected today and in some places, flower offerings are still made [to] the old Buddha images."<sup>25</sup>

It was significant that Umbgrove referred to Islam as "an external and thin shell." The expression was familiar among Europeans and reflected their understanding that the Javanese were in their essence Hindus and Buddhists, not Muslims. The surge of enthusiasm for the Hindu past was a way to undermine that "thin shell." The geologizing that Umbgrove undertook with his colleagues showed how Hindu Java was destroyed by cataclysmic volcanic eruptions and therefore was a product of natural history. This was crucial because it legitimated a way of thinking about Javanese culture itself as a ruin and colonial geology as a science of connecting people with their own forgotten histories. Geology, in other words, reunited people with their essences and therefore performed the progressive, developmentalist project of colonialism. This was crucial

21. Bobbette, *Pulse of the Earth*, 114–41.

22. Bobbette, *Pulse of the Earth*, 123–29.

23. Umbgrove, letter to his mother, November 19, 1927.

24. Umbgrove, letter to his mother, November 19, 1927.

25. Umbgrove, letter to his mother, November 19, 1927.



to Umbgrove's early conception of geopoetics: its purpose was to trace culture back to its earthly origins, to show that culture was the product of planetary and even cosmic processes and therefore that culture too was cosmic.

### **Geopoetics, Relationality, Differentiation**

In the 1940s, after returning to the Netherlands to teach, and with time to spare because universities were shut for extended periods during World War II, Umbgrove set about writing two expansive theories of the earth and life. The first was *The Pulse of the Earth*, published in 1942; its sequel, *The Symphony of the Earth*, appeared in 1950. In the opening pages of *The Pulse of the Earth*, Umbgrove explained for the first time that his project was geopoetic. What he meant by "geopoetry" was that it was a method of connecting the smallest entities with the largest, and the swiftest temporal events in earth history with the expanse of geological time.<sup>26</sup> It was also a method of harvesting insights from disparate knowledges ranging across biology, seismology, chemistry, astronomy, stratigraphy, religion, and cosmology.

The geopoetic vision of the earth that Umbgrove developed was one in which biological and psychic evolution could not be separated from planetary and galactic evolution. It was a vision of, as he put it, galactic "complementarity," a term he developed from his own experiences with Hindu revivalism in the Netherlands East Indies. He stated that complementarity "remarkably enough . . . reminds one of certain aspects of the Brahmanese Upanishads."<sup>27</sup> Umbgrove had encountered the Upanishads not only in the Indies but also through the work of Paul Deussen, a close friend of Nietzsche's and a disciple of Schopenhauer, who in a series of works argued that the Upanishads, not the ancient Greeks, were the founding moment of the Western metaphysical tradition.<sup>28</sup> It was by reading Deussen's *Philosophy of the Upanishads* that Umbgrove came to more subtly appreciate the intersections between his own geology and Hinduism.<sup>29</sup> He thought that his geopoetics, like the Upanishads, insisted on the connectivity of all things, the indivisibility of mind, earth, and universe. This was, in other words, a repetition of the Theosophical move: seeing an ancient Asian tradition as prefiguring modern science. It was also an extension of the anti-Islamic Hindu revivalism he had learned in Java.

Umbgrove pursued the logic of complementarity to radical conclusions. He came to understand that the history of the earth was defined by pulses he called "epochs of compression," in which the great mountain chains were built in the Cambrian and end of the Paleozoic.<sup>30</sup> Compression caused not only mountain building and increased volcanism but also the lowering of the ocean floors and complementary movements that

26. Umbgrove, *Pulse of the Earth*, 1–20.

27. Umbgrove, *Symphony of the Earth*, 147.

28. Umbgrove, *Leven en Materie*, 122–33. See also Deussen, *Philosophy of the Upanishads*, 40–45.

29. Umbgrove, *Leven en Materie*, 122–33.

30. Umbgrove, *Pulse of the Earth*, 26.

catalyzed the warming of environments and sped up biological differentiation and diversification. In his view, these periods corresponded with the roughly 250-million-year cycles it took for the galaxy to rotate.<sup>31</sup> Umbgrove then came to suspect that there was an underlying discernible periodicity in these patterns that connected galactic rotation with movements in the earth and, finally, species differentiation: “When more than 3,000 million years had passed without witness by human beings and when the galaxy had revolved twelve times around its center—there begins an era which is called the Psychozoic. This term received its name from the fact that Man, the specialist of spiritual and intellectual differentiation, appeared on the stage and began to extend his supremacy over the world.”<sup>32</sup>

What Umbgrove was grasping was that periods of differentiation may result from some “common deep-seated cause” in the earth. By invoking the Psychozoic, he was referencing the work of the US geologist and physician Joseph LeConte, who in 1877 wrote, “The geological importance of the appearance of man is not due only or chiefly to his transcendent dignity, but to his importance as an agent which has already very greatly, and must hereafter still more profoundly, modify the whole fauna and flora of the earth.”<sup>33</sup> There is no doubt that the Psychozoic prefigured the Anthropocene in its acknowledgment that humans were geological agents. But less obvious, and perhaps more profound, was that Umbgrove drew from LeConte’s conception of the Psychozoic a notion that human impact on earth was a result of processes of intellectual and spiritual differentiation that were themselves connected to differentiation in the earth and galaxy.

*The Pulse of the Earth* and *The Symphony of the Earth* were well-known among European and US geologists. They were read by geologists who were, by and large, fixists, meaning that they thought the continents had remained in place over geological time. What was novel about Umbgrove’s work was that he brought together diverse strands of knowledge into a new synthesis, and while he was not a proponent of Alfred Wegener’s theory of continental drift from 1912, he was nevertheless sympathetic to theories that came very close. Due partly to his early work on corals and volcanoes in Java, Umbgrove learned to think about the relationship between continents and oceanic processes more dynamically and horizontally than many US and European geologists. *The Pulse of the Earth*, for instance, drew clear attention to the similarity between rift valleys and mountain structures on land and those that were then being discovered in the oceans. He proposed that those structures ought to be thought together. For US geologist Bruce Heezen, this came as a revelation: he would later produce some of the world’s most comprehensive maps of the ocean floor, which revealed submerged mountain chains at the midocean ridges.<sup>34</sup> Umbgrove also worked extensively with Felix Vening Meinesz, who

31. Umbgrove, *Pulse of the Earth*, 152–56.

32. Umbgrove, *Symphony of the Earth*, 29.

33. LeConte, “On Critical Periods in the History of the Earth, and Their Relation to Evolution,” 556.

34. Doel, Levin, and Marker, “Extending Modern Cartography to the Ocean Depths.”

produced the first maps of massive underwater trenches off the south coast of the Indonesian archipelago. Vening Meinesz speculated that those trenches were the results of massive horizontal movements of the earth's surface caused by thermal convection currents in the crust. Vening Meinesz then found the same underwater trenches in island arc systems around the world, which suggested to him that the edges of continents were in fact horizontally unstable: the ocean floors were being driven into them.<sup>35</sup> Umbgrove and Vening Meinesz went to the United States a number of times to teach US geologists their geophysical methods and new concepts about the relationship between the continents and the ocean.<sup>36</sup> It was by way of these encounters that the geopoetic enterprise of Umbgrove was transmitted to North American geologists and their planetary thought began to shift to a new vision of wandering continents.

### Harry Hess: Cold War Geopoetics, Catastrophe, and Plate Tectonics

Harry Hess used his position as a submarine officer during World War II to map the ocean floor. He continued his research at Princeton after the war and in the long shadow of nuclear explosions and anxieties about Mutually Assured Destruction. The United States had strategic nuclear interests in the seas, and they were increasingly mobilized as mediums for warfare. Communications technologies were also expanding along the seafloor and connecting continents with telephone cables; the underwater geography of ocean space was coming sharply into focus.<sup>37</sup> In a 1962 article, "The History of Ocean Basins," Hess set out a radical new vision for the evolution of sea space by folding together Cold War imaginaries of catastrophe and ideas about the earth's ability to remake itself. He opened his argument with the following: "Like Umbgrove, I shall consider this paper an essay in geopoetry."<sup>38</sup>

What Hess meant by geopoetry diverged from Umbgrove's conception. Hess meant fabulation, fiction, and new earth origin story for the nuclear age: it was a way for him to grapple with destruction, violence, and regeneration—a Cold War fascination with creative destruction. Like Umbgrove, Hess carried forward an interest in ruins—not the ruins of Hindu temples in Java, but the earth itself as a ruin of great catastrophic events. As he saw it, we were all living among ruins. In "The History of Ocean Basins," Hess told an earth origin story heavily influenced by Umbgrove's colleague Vening Meinesz called "the great catastrophe," an event in earth's history when the first "primordial single continent" emerged. It separated ocean basin from continental material for the first time. Then it was suddenly torn apart; its fragments were sent wandering by a convective current that had emerged from within the body of the earth.<sup>39</sup> The present position of the continents on the globe was the result of that primordial

35. Bobbette, *Pulse of the Earth*, 30–43.

36. For a more detailed account of this history see Bobbette, *Pulse of the Earth*, 20–51.

37. See, for instance, Oreskes, *Science on a Mission*, 138–93.

38. Hess, "History of Ocean Basins," 599–620.

39. Hess, "History of Ocean Basins," 600–601.

catastrophe: from one continent to many; the “thrownness” of the planetary condition. The convective cells that created the great catastrophe—currents of heat that circulated between the core of the earth to its surface—continued to drive the continents along their path. Massive seams in the earth’s crust (the midocean ridges), which he had mapped as a sailor-soldier, were the sites where the convective currents pushed the ocean floor toward the continents. As Hess put it, “Ocean ridges are ephemeral features.”<sup>40</sup> The geopoetic enterprise that Umbgrove had originally developed to reconnect the Javanese with their essential pre-Islamic selves, to make links between oceans and land and across vastly different spatial and temporal scales, was being invoked in this new context by Hess to tell a story about the catastrophic origins of the modern earth in the nuclear age.

Hess’s fascination with catastrophe was not completely new for geologists. As Sumathi Ramaswamy has shown, imaginaries of catastrophe, loss, and displacement have been central concerns for modern geologists.<sup>41</sup> Hess was even invoking a narrative arc familiar to the Abrahamic religions: catastrophe as the origin of history; fall, breakup, and exile; from one to many. Hess was also invoking nineteenth-century geologists’ penchants for imagining all manner of natural calamity, such as floods, earthquakes, or volcanic eruptions, as the driving force behind geological form. These much older narratives were filtered through the scientific instruments of modern war and planet-scaled communications technologies. What was new for Hess and his American and European colleagues was the idea that the earth was not only made by catastrophes but was also remaking itself. Hess’s argument that the ocean floor was being created at the midocean ridges and crashing into the continents meant that the continents were moving. It also meant that the earth surface was destroying and creating itself at the same time. The theory of plate tectonics brought together two accounts: the role of catastrophe in shaping the earth and geologists’ long-held belief that the earth could create new surfaces from its depths. Hess’s geopoetic narrative combined religious narratives with the optimism for a system in a nearly steady state, remaking itself—an earth undergoing creative destruction and renewal.

Hess’s account soon became the orthodox understanding of ocean floor spreading and a key element in the theory of plate tectonics in the 1960s and 1970s. By 1970, David White, who was then working for Esso, proposed the term *subduction* to describe how one lithospheric slab was driven beneath another by sea floor spreading.<sup>42</sup> He sought to explain what was happening in island arc conditions like those Vening Meinesz had described off the coast of Indonesia. Subduction soon came to be seen as a fundamental process of the new global tectonics; Indonesia, the Caribbean, and Japan were afterward understood as spaces where the lithosphere created and destroyed itself; and volcanic arcs were sites at which new land was produced. The Indonesian archipelago, for

40. Hess, “History of Ocean Basins,” 599.

41. See Ramaswamy, *Lost Land of Lemuria*, 19–96.

42. White et al., “Subduction.”

instance, came to be understood by many geologists as a laboratory in which to witness lithospheric processes that had long ago come to completion in Europe. Indonesia was, in other words, at the vanguard of earthly evolution, a place where processes of creative destruction could be witnessed in situ.

Geopoetics had shifted its meaning between Umbgrove and Hess from a project of leveraging liberal colonialism against Islam, a vision of galactic differentiation, and finally a narrative of planetary creative destruction. Umbgrove's work was largely ignored after the Cold War, but more recently earth scientists have begun to look again at the possibility that the earth has "pulses" of creativity.<sup>43</sup> The theory of plate tectonics, on the other hand, became the orthodox narrative of earth's evolutionary history and structure. The synthesis of catastrophist narratives with ideas about the earth's ability to remake itself remains, in its broad strokes, the contemporary framework for understanding earth's structure. While the Anthropocene may denote for many earth scientists the signal of human activity in the planetary system, it is nevertheless understood to refer to a planet that is structured by plate tectonic evolution, which in turn was defined by the long shadow of Cold War nuclear anxieties.

### **Geopoetics Now**

As I noted earlier, we have returned to a time calling for geopoetics. Humanists are again thinking about planetary catastrophes, how to tell their stories, identify their causes and designate those responsible. Umbgrove and Hess's geopoetics should no longer be of interest only to historians of the geological sciences; they are now relevant as guides for planetary theorists and environmental humanists looking to contextualize geopoetics and articulate its stakes. I would like to conclude with a few reflections on how Umbgrove and Hess might help us think through what a contemporary geopoetics can do.

Planetary thought is converging again with theological questions that would have seemed off the radar to many environmental humanities scholars only a few years ago.<sup>44</sup> The renewed urgency around understanding planetary catastrophes creates an opportunity for planetary thinkers to return, as it were, to scripture, to see how ancient narratives and cosmologies persist or are invoked in new permutations today; but scripture and cosmologies can also provide sources of inspiration for constructing new planetary narratives, new tools for connecting scales from the body to the earth and cosmos. Returning to more contemporary thinkers such as Hess and Umbgrove can demonstrate how the planetary models that Anthropocene discourses often rely on—including ideas of plate tectonic evolution—were not forged in a secular knowledge system but were deeply engaged with older religious and cosmological narratives.

Umbgrove's geopoetics was prescient in this regard and provides, perhaps, the more enduring insights for planetary thought. We should be cautious of his orientalism,

43. Rampino, Caldeira, and Zhu, "Pulse of the Earth."

44. See, for instance, Szerszynski, "Gods of the Anthropocene," 253; Szerszynski, "From the Anthropocene Epoch to a New Axial Age"; Kotva, "Attention in the Anthropocene."

yet his work also decentered Western planetary thought and championed global traditions. Such a path is worth pursuing in greater detail: How do other than European and North American planetary knowledges open up earth theory to new insights? Can geopoetics now become a space where planetary thought creates new hybrid cosmologies? What, for instance, is there to learn about planetary structure and evolution from classical Vedic cosmologies, and how can the theory of plate tectonics be inflected by ideas of reincarnation? Umbgrove's geopoetics was inspiring precisely because of his omnivorous embrace of multiple world traditions. Invoking geopoetics was a way for him to push planetary thought forward by making it more syncretic and reviving its roots in religious and cosmological speculation.

Umbgrove also prefigured planetary theory's interest in differentiation. When Clark and Szerszynski write that "our Earth is replete with otherness, that a new planet might suddenly be visited upon us," we can recognize the resonance with Umbgrove's celebration of "pulses"—grand forces of differentiation that separated mountains from sea, plants from animals, in a galactic, ever-complicating polyphony.<sup>45</sup> One of geopoetics' meanings for Umbgrove was to come face-to-face with a planet that had the capacity to become otherwise than it is, and that ultimately this was also a human power. The human capacity for differentiation was what made the human of the earth, and the earth of the cosmos. In our moment of renewed calls for geopoetics, we might benefit from keeping in view this attention to differentiation as a foundational universal fact, and as a source of cosmic hope.

For Umbgrove, geopoetics was ultimately a narrative strategy of making connections. Such strategies are not something new to scholars of the environmental humanities; often they are our everyday practice. What was unique about Umbgrove's strategy, though, was his vertical orientation. His aim was to understand how cosmic powers of differentiation traveled between scales, from the galaxy, to the inner earth, through humans. Many planetary theorists are rightly preoccupied with the human relationship to the surface of the earth, and much Anthropocene theory is justifiably horizontal and surficial in its orientation; its scope tends not to expand deeper than the lithosphere or above the atmosphere. But how are our planetary entanglements galactic, and what are our geo-social-cosmic relations? Umbgrove's idea that periods of galactic rotation seemed to cause pulses of earthly compression, mountain building, and species differentiation, and to create new mental capacities, remains thrilling. We are familiar with thinking about how we are made by the earth, but the galaxy? How would the geopoet today develop a narrative strategy that did not lose sight of how we are newly and unprecedentedly wrapped up not just with the planet but also the slow revolutions of the Milky Way? What kind of new political praxis would emerge by attending to, tapping, running with, the pulses of the earth, from the inmost depths of ourselves to the remotest distances of the universe?

45. Clark and Szerszynski, *Planetary Social Thought*, 22.

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### References

- Bashford, Alison, Emily Kern, and Adam Bobbette, eds. *New Earth Histories: Geo-cosmologies and the Making of the Modern World*. Chicago: University of Chicago Press, 2023.
- Besant, Annie, and Charles W. Leadbeater. *Occult Chemistry: Clairvoyant Observations on the Chemical Elements*. London: Theosophical Publishing House, 1919.
- Blavatsky, H. P. *The Secret Doctrine: The Synthesis of Science, Religion, and Philosophy*. Vol. 2, *Anthropogenesis*. 1888. Reprint, Pasadena: Theosophical University Press, 1977.
- Bobbette, Adam. *The Pulse of the Earth: Political Geology in Java*. Durham, NC: Duke University Press, 2023.
- Burnett, D. Graham. "A View from the Bridge: The Two Cultures Debate, Its Legacy, and the History of Science." *Daedalus* 128, no. 2 (1999): 193–218.
- Chakrabarty, Dipesh. *The Climate of History in a Planetary Age*. Chicago: University of Chicago Press, 2021.
- Clark, Nigel, and Bronislaw Szerszynski. *Planetary Social Thought: The Anthropocene Challenge to the Social Sciences*. Cambridge, UK: Polity, 2021.
- de Jongh, A. C. "On the Valency of the Chemical Atoms in Connection with Theosophical Conceptions Concerning their Exterior Form." *Theosophist*, July 1914, 535–71.
- Dettelbach, Michael. "Alexander von Humboldt between Enlightenment and Romanticism." *North-eastern Naturalist* 8, no. 1 (2001): 9–20.
- Deussen, Paul. *The Philosophy of the Upanishads*. Edinburgh: T. and T. Clark, 1908.
- Doel, Ronald E., Tanya J. Levin, and Mason K. Marker. "Extending Modern Cartography to the Ocean Depths: Military Patronage, Cold War Priorities, and the Heezen-Tharp Mapping Project, 1952–1959." *Journal of Historical Geography* 32 (2006): 609–10.
- Elias, Amy J., and Christian Moraru. *The Planetary Turn: Relationality and Geoaesthetics in the Twenty-First Century*. Evanston, IL: Northwestern University Press, 2015.
- Hess, H. H. "History of Ocean Basins." *Petrologic Studies: A Volume to Honor A. F. Buddington* (November 1962): 599–620.
- Kotva, Simone. "Attention in the Anthropocene: On the Spiritual Exercises of Any Future Science." In *Political Geology: Active Stratigraphies and the Making of Life*, 239–62. Cham, Switzerland: Palgrave, 2019.
- Last, Angela. "Fruit of the Cyclone: Undoing Geopolitics through Geopoetics." *Geoforum* 64 (2015): 56–64.
- Last, Angela. "We Are the World? Anthropocene Cultural Production between Geopoetics and Geopolitics." *Theory, Culture and Society* 34, nos. 2–3 (2017): 147–68.
- LeConte, Joseph. "On Critical Periods in the History of the Earth, and their Relation to Evolution: On the Quaternary as Such a Period." *American Naturalist* 11, no. 9 (1877): 540–57.
- Magrane, Eric. "Climate Geopoetics (The Earth Is a Composted Poem)." *Dialogues in Human Geography* 11, no. 1 (2021): 8–22.
- Magrane, Eric. "Situating Geopoetics," *GeoHumanities* 1, no. 1 (2015): 86–102.
- Magrane, Eric, Linda Russo, Sarah de Leeuw, and Craig Santos Perez. *Geopoetics in Practice*. London: Routledge, 2020.
- Oreskes, Naomi. *Science on a Mission: How Military Funding Shaped What We Do and Don't Know about the Ocean*. Chicago: University of Chicago Press, 2021.

- Ramaswamy, Sumathi. *The Lost Land of Lemuria: Fabulous Geographies, Catastrophic Histories*. Berkeley: University of California Press, 2004.
- Rampino, Michael R., Ken Caldeira, and Yuhong Zhu. "A Pulse of the Earth: A 27.5-Myr Underlying Cycle in Coordinated Geological Events over the Last 260 Myr." *Geoscience Frontiers* 12, no. 6 (2021): 1–7. <https://doi.org/10.1016/j.gsf.2021.101245>.
- Sinnett, Alfred Percy. *The Occult World*. 4th ed. London: Trübner, 1884.
- Snow, C. P. *The Two Cultures*. 1959. Reprint, Cambridge: Cambridge University Press, 2012.
- Suess, Eduard. *The Face of the Earth*. Vol. 1. Oxford: Clarendon, 1904.
- Sukanto, Rab, Tjoek Soeradi, and R. Wikarno. *Menguak sejarah kelembagaan geologi di Indonesia: Dari kantor pencari bahan tambang hingga pusat survei geologi*. Bandung: Badan Geologi, 2006.
- Szerszynski, Bronislaw. "From the Anthropocene Epoch to a New Axial Age: Using Theory Fictions to Explore Geo-Spiritual Futures." In *Religion and the Anthropocene*, 35–52. Eugene: Cascade Books, 2017.
- Szerszynski, Bronislaw. "Gods of the Anthropocene: Geo-spiritual Formations in the Earth's New Epoch." *Theory, Culture and Society* 34, nos. 2–3 (2017): 253–75.
- Umbgrove, Johannes H. F. Letters to his mother, June 24, 1926–July 30, 1929. 173 letters. Personal collection of Frederik van Veen, Groningen, Netherlands.
- Umbgrove, Johannes H. F. *Leven en Materie*. 'S-Gravenhage: Martinus Nijhoff, 1943.
- Umbgrove, Johannes H. F. *The Pulse of the Earth*. The Hague: Martinus Nijhoff, 1942.
- Umbgrove, Johannes H. F. *The Symphony of the Earth*. The Hague: Martinus Nijhoff, 1950.
- White, David, Dietrich H. Roeder, Thomas H. Nelson, and John C. Crowell. "Subduction." *Geological Society of America Bulletin* 81 (1970): 3431–32.
- White, Kenneth. "Elements of Geopoetics." *Edinburgh Review* 88 (1992): 172.