



Book review: *The Pulse of the Earth: Political Geology in Java*

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Bobbette, A.: The Pulse of the Earth: Political Geology in Java, Duke University Press, 248 pp., ISBN 978-1-4780-2505-4, USD 26.95, 2023.

The theory of plate tectonics, after a long period of controversy within the geoscientific community, is now accepted as the paradigm for explaining the geology of the Earth. The theory has been credited posthumously to the geologist Alfred Wegener, whose work on continental drift provided a major impetus for understanding the movement of continental and oceanic plates. In *The Pulse of the Earth*, however, Adam Bobbette decenters such a Western account of the history of science by turning the former periphery of the Dutch colonial empire into a central geopolitical node of geological knowledge production and consolidation.

Bobbette's book provides a fascinating account of the geological thinking that has emerged and naturalized on the slopes of Javanese volcanoes, particularly Mount Merapi, since the late 19th century. Western geologists studying volcanism in Java were quick to recognize that volcanoes “exemplify fundamental planetary processes” (p. 21). However, in order to understand the chain of volcanoes along the so-called Pacific Ring of Fire as a manifestation of plate tectonics or plate subduction, they had to make a conceptual link between volcanoes and the ocean floor. As Bobbette argues, the spiritual geographies of Javanese volcanoes “pre-configured” (p. 56) such a link and “shaped” (p. 62) geological thinking – and the theory of plate tectonics itself. Societies in Java, he shows, have long evolved in close relationship with volcanoes as spiritual beings with the power to influence the socio-political lives of the people living on the slopes of Mount Merapi. This political geology thus set the stage for volcanology: as a “tool of European empire” (p. 2), volcanology became instrumental in protecting a colonial plantation economy within the eruptive environment of

Java, working against Javanese cosmologies and corresponding claims to political power. However, as Bobbette suggests, “modern volcanology did not simply replace an older spiritual geography” (p. 57) – it rather confirmed it. To substantiate this claim, the book's six chapters illustrate the multiple ways in which volcanology has played a role in struggles over human–volcano relations in the colonial and postcolonial eras.

After the introduction, Chap. 2 begins with an analysis of four geological maps of Java that shaped Western geological thinking during the colonial period. These maps, which served early geologists as “windows” (p. 22) into the subsurface, illustrate divergent interpretations of volcanoes as either manifestations of a cooling and shrinking earth or of continental drift – in line with competing disciplinary paradigms of the time (see also Björnerud, 2018, p. 28ff.). As such, they are representative of divergent “earth origin myths” (p. 36) competing for scientific hegemony over the understanding of the earth within the discipline. The four maps, arranged in a narrative sequence by Bobbette, also provide insights into the transformation of geological narratives in Java. They show how early geologists began to understand the Javanese volcanoes as “reconfigured ocean floor” (p. 66) and as examples of tectonic processes elsewhere. However, as geoscientists began to survey, sample and map the volcanic slopes and ocean trenches, as Bobbette's story continues in the following chapters, they were not exploring uncharted territory. Rather, they navigated within established spiritual geographies.

In Chap. 3, Bobbette delves into Javanese spiritual geographies in which the ocean and the volcano were intimately linked. The central protagonist in the first part of this chapter is the Goddess Queen of the Indian Ocean, Nyai Ratu Kidul, who revealed herself to people through seismic activity, volcanic eruptions, and tsunamis. The queen of the ocean appears as what Marisol de la Cadena (2015) has called an

“earth being” and features prominently in the spiritual geographies of Java as a central authority against which claims to sovereignty in the Javanese sultanate had to be legitimized. In honoring the queen, people ritually enacted spiritual geographies along the volcanic slopes by marching from the ocean to the volcano – along the very paths that colonial volcanologists later followed in their research. The second part of the chapter focuses on a more recent ontopolitical struggle over disaster management in the run-up to and aftermath of Mount Merapi’s 2006 and 2010 eruptions. The central protagonist in this part is the Maridjan, the guardian of Mount Merapi who challenged the government’s evacuation plans in the wake of the eruptions on spiritual grounds. The Maridjan’s battle with scientists over the authority to interpret an erupting earth came to a sad end when he was killed in pyroclastic avalanches. Nevertheless, his spiritual connection between the ocean floor and volcanic processes left an imprint, as it was subsequently articulated also by Javanese volcanologists.

In Ch. 4, volcanology is examined as part of the cultural politics of colonialism through which understandings of geology and Javanese culture converged. It focuses on a controversy among colonial elites over whether a volcanic eruption in 1006 AD could explain the decline of the Javanese world in the pre-colonial and pre-Islamic era. The question seemed tangible in a landscape where volcanologists had interpreted volcanoes as “ruins” (p. 20) of a cooling earth, and where ruins of Hindu and Buddhist settlements appeared as remnants of a pre-Islamic past. At the time, the ambition to explain cultural history through catastrophic events in a geodeterministic way reflected the colonial anxiety about cultural decline and underlined the fragility of the late colonial project in which vulcanology was enrolled. It also reflected the colonial search for a myth of origin in the context of late-colonial nation-building – a political myth in which volcanoes appeared as non-human subjects (see also Emmenegger, 2021; Luisetti, 2023). Zooming in on the anti-colonial struggle and Javanese nationalism, the chapter also looks at the theosophist movement, which sought to reconnect with a pre-Islamic Javanese past. The nuanced discussion of Javanese theosophy makes the end of the chapter a difficult read for an audience unfamiliar with the finer details of Java’s political history and philosophy. And yet it allows Bobbette to demonstrate not only the blurred line between science and theology but also how volcanology allowed theological narratives to be secularized and naturalized in the “physicality” (p. 113) of the earth.

In Ch. 5, the geopoetics of the Dutch geologist Johannes Umbgrove and the method he proposed “for the development of new earth narratives” (p. 115) are examined. It speaks to an established body of literature on the Romantic origins of geology and its unfolding as not only an epistemic but also an essentially aesthetic project (see, for example, Heringman, 2004). In contrast to an understanding of geopoeity as an imaginative literary genre, geopoetics served Umbgrove as

a speculative method for “tracking down the connections” (p. 135) between cosmic rhythms entangled in volcanoes. Viewing fieldwork as an “overwhelming aesthetic experience” (p. 117), Umbgrove used speculation to move beyond the limits of modern scientific epistemology and its attachment to capitalist extraction and world views. As Bobbette shows, however, geopoetics was not “counter to the tradition of the modern sciences”, but rather central to the formulation of the theory of plate tectonics as a “new earth history” (p. 137). Umbgrove’s geopoetics thus reveal geology’s deep connection “to much larger religious, cosmological and political conversations about narrating the earth” (Bobbette, 2023, p. 235). This insight has probably inspired Bobbette to name his book after Umbgrove’s concept of a “pulsing cosmos” (p. 176) and his 1942 publication of the same title – *The Pulse of the Earth*. And yet, the following chapter of the book takes our understanding of a pulsing earth far beyond Umbgrove’s geopoetic account.

The ground-breaking Ch. 6 fundamentally challenges our understanding of the materiality of earthly relationships. In a first episode, Bobbette explains how the invention of the galvanometer – a tool originally designed to measure human heartbeats – enabled wireless communication across the Dutch colonial empire and led to space–time compression. As a technology for communicating over distance, it also offered volcanologists in Java a new way of sensing, providing a better “ear” to “hear” (p. 153) what was happening inside volcanoes before they erupted. In the second episode, Bobbette shifts attention to spiritual forms of communication and “mythical devices” (p. 157), both modern and traditional, used to “create and connect worlds” (p. 157). His ethnographic focus is on the practice of Kejawen, an “ethno-Javanese metaphysics” (p. 161) used to communicate and transmit. Kejawen is based on the assumption that all human and non-human beings “broadcast” (p. 161), meaning that the challenge of communication is to learn how to “tune in” (p. 161) to the particular signal of beings such as volcanoes. In the third episode, Bobbette follows a French seismologist, his understanding of geopolitical relations, and his attempt to pick out and filter the signals of volcanoes in a wavescape of “noise” (p. 173). Through the sequence of these episodes, the chapter provides insight into different, sometimes conflicting, systems of volcanic sensing and how they operate in modern and mystical observatories within Java’s political geology. By highlighting their common metaphysical underpinnings, however, Bobbette’s analysis reconciles scientific and mystical epistemologies of the earth, illustrating that both seek to “overcome the material world” (p. 162) and to register “the very pulses . . . from the volcano” (p. 162).

Bobbette’s new book marks again an important contribution to an emerging scholarship that blurs the boundary between geological and social history, following the edited volume *Political Geology* (see Bobbette and Donovan, 2019). Particularly intriguing is Bobbette’s proposal to use “political geology as [a] method” (p. 1) to link the material di-

mension of earthly politics with the formation of geological knowledge about the material world. Bobbette does this convincingly, as Nigel Clark underlines in his inscription on the back cover, through his rather “balanced ... treatment of Western science and non-Western thought”. Even more thought-provoking, I would stress, is Bobbette’s appropriation of the geoscientific concept of “intercalation” (p. 79) to capture the ways in which divergent “earth knowledges” (p. 79) collide, transform, and intermingle. In doing so, Bobbette succeeds, not only in centering “the *geo* in geopolitics” (p. 8; italics in original) but also in unearthing the geosocial tectonics through which different earth knowledges are folded and through which geopower operates.

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