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HAUNTED GEOLOGIES
SPIRITS, STONES, AND THE NECROPOLITICS OF THE ANTHROPOCENE

Nils Bubandt

IF YOU TRAVEL SOUTH BY CAR FROM SURABAYA, Indonesia's second-largest city located on the sweltering north coast of Java, toward the cool mountain town of Malang, you will, after about twenty-five kilometers, come upon a vast elevated landscape of mud. From the road, your view will be blocked by the massive dikes that have been erected to stem the mud. But if you climb to the top of the twenty-meter containment walls, you will see a barren and flat landscape, stretching eastward toward the horizon and the shallow coastline of the Madura Strait. The smell of petrol, emanating from the petroliferous components in the mud, is mixed with a faint but distinctive smell of rotten eggs.[1] If you scan the horizon, you will see, off in the distance to the right, the source of the smell: a plume of steam, pulsating at irregular intervals, at the center of the mudflat. The plume, consisting of methane mixed with hydrogen sulfide and sulfur dioxide, comes from the main vent, one of five initial eruption sites of the mud volcano that since May 2006 has spewed out enormous amounts of gas, water, and mud. Eleven meters of sludge over an area of seven square kilometers now bury what used to be twelve villages. The mud has displaced 39,700 people and caused damage estimated to be 30 trillion rupiah (US$2.2 billion).[2] As mud has built up within the containment walls,

underground cave-ins have occurred. In one such event, in November 2006, the natural gas pipeline to Surabaya ruptured and exploded, killing thirteen.[3] Initially projected to continue for centuries, recent estimates suggest that the mud volcano may self-plug within the next two decades.[4] By this time, however, the weight of the 140 million cubic meters of mud from the volcano will likely have caused the affected area to subside at least ninety-five meters.[5] Except for some species of coliform and thermophile bacteria, nothing today lives in the sulfuric and heavy metal–rich mud.

The mud volcano is not only the largest of its kind in the world. It is also by far the most controversial, and it has experts, residents, politicians, activists, and industrialists split into two camps. Some people claim the mudflows were triggered by an earthquake, whereas others maintain that it was caused by oil drilling. As such, the mud volcano is a tragic and dystopic, but also illuminating, illustration of the Anthropocene, conventionally described as the geological period in which human activity exceeds the forces of nature.[6] What better example of such excess than if humans caused a disastrous volcanic eruption? The Indonesian mud volcano, however, also highlights another, equally important and unsettling feature of the Anthropocene, namely, the increasing impossibility of distinguishing human from nonhuman forces, the *anthropos* from the *geos.* For the volcano is simultaneously a national disaster at the center of a continuing political scandal and

Figure G7.1. The mudflats in East Java. The plume of the main vent is visible on the right. Photograph by Nils Bubandt.

the object of an ongoing geological dispute about whether its eruption was, in fact, anthropogenic or natural. An undecidability haunts the mud volcano. Is it an effect of human industry or of tectonic forces? Is it an effect of life or of nonlife? It is the undecidability of the mud volcano, and of the Anthropocene, that is the subject of this chapter. For undecidability, I will argue, is simultaneously the signature characteristic, the curse, and the promise of our current moment.

Spirits and the Necropolitics of the Anthropocene

The different names of the mud volcano index its undecidability. Some people refer to the volcano as Lumpur Lapindo ("Lapindo Mud"), after the oil company, PT Lapindo Brantas Incorporation, that drilled for petroleum nearby and that may have caused its eruption.[7] Lumpur Lapindo names an anthropogenic and political event tainted by industrial greed, mismanagement, and corruption. A second, equally used name for the mud volcano is Lumpur Sidoarjo ("Sidoarjo Mud"), after the sprawling nearby district capital. If the first name highlights the human agency and political liabilities of the mud disaster, Lumpur Sidoarjo is a geographical name used to denote where a "natural disaster" happened to strike. But "natural" figures awkwardly here, for not only is this name as political as the previous one but the name also points directly to the world of spirits. The name Lumpur Sidoarjo is thus frequently shortened into the portmanteau "Lusi." Pronounced like the common woman's name "Lucy," it names an earth being with

a will of its own, and victims of the mud disaster speak its name with as much deference as political acerbity. Lusi is, in other words, equal parts spirit name and political critique. In a play on the name of the Malaysian capital, Kuala Lumpur (literally "Muddy Estuary"), people in East Java, for instance, joke that Lusi is their Kualat Lumpur, literally their "Cursed Mud." The cursed mud is clearly the inverse image of the shining cosmopolitan dream conveyed by the Malaysian capital: a stinking, muddy, and failed modern. But more than metaphors are at play here, for "curses" *(kualat)* belong to a very real realm of the world in Indonesia, namely, that of occult forces and spirits *(batin)*. *Kualat* is a calamity you bring upon yourself by behaving inappropriately. The curse of the mud volcano is in that sense a response to a moral transgression of some sort, an explanation that encapsulates condemnation of industrial mismanagement, critique of political corruption, and anxieties about cosmological punishment.

Like Fukushima, Bhopal, Chernobyl, and other contemporary disasters where the forces of nature and human politics act to exacerbate each other, Lusi is the name for a monstrous geography haunted by the natural as well as the unnatural.[8] But more so than other recent disasters with an anthropogenic component, the ontologies of the natural and the unnatural (whether human or spiritual kinds of "unnature") coalesce in Lusi's muddy ferment. On the mudflats of East Java, the realms of geology, politics, industry, divination, lawsuits, spiritual revenge, and corruption are inextricably entangled in each other. Indeed, the inability to separate one from the other—nature from politics, geothermal activity from industrial activity, human corruption from spiritual revenge—is a constituent part of the volcano's necropolitics.

Achille Mbembe, in his founding article on the term, defined necropolitics as the subjugation of human life to the powers of death in the context of war, terror, and weapons of mass destruction.[9] But in a time of global warming, ocean acidification, and mass extinction, I suggest necropolitics has come to cover a much broader and much more stochastic politics of life and death. Humans, animals, plants, fungi, and bacteria now live and die under conditions that may have been critically shaped by human activity but that are also increasingly outside of human control. I use the notion of a necropolitics of the Anthropocene to indicate the life-and-death effects—intended as well as unintended—of this kind of ruination and extinction. Nature may

increasingly be human-made, but humans have not only lost control of this nature making and unmaking; we have increasingly lost the ability to tell the difference between our own world and the natural worlds we make and destroy. As each new scientific discovery reveals more details of the complex interplay between human worlds and natural worlds, we are also increasingly faced with our inability to tell these worlds apart. In the Anthropocene, necropolitics operates under the sign of metaphysical indeterminacy rather than certainty, unintended consequences rather than control.

As it so happens, spirits exist under the same conditions of uncertainty and possibility. Spirits are never just "there." They are both manifest and disembodied, present and absent. Spirits thrive, as a result, in conditions of doubt rather than belief.[10] "I do not believe in ghosts, but . . ." is, after all, the conventional start to accounts of experiences with ghosts and spirits. How striking, in light of this, that the Anthropocene is so clearly associated with spirits. Take the figure of Gaia, the self-regulating, sympoetic superorganism of earth's biosphere named after a Greek goddess by climate scientist James Lovelock and biologist Lyn Margulis.[11] Or take Donna Haraway's *chthulus,* those earthly "myriad intra-active entities-in-assemblages" that inhabit the Anthropocene.[12] These tentacular beings of the earth are so named by Haraway to point to the overlap between indigenous spirits—from Pachamama, the Incan goddess of fertility, to A'akuluujjusi, the mother creator of all animals in Inuit thought—and new biological insights into the evolutionary co-becoming of life (see the chapters by Haraway and Gilbert in *Monsters*). In the Anthropocene, both climate science and biology seem to bring spirits, once thought to have been killed by secular thought, back to life. This chapter argues that geology in similar ways brings spirits into being. By paying attention to the spirits that abound in and around the Lusi mud volcano, we may yet learn to see, and live with, the ghosts that abound in the necropolitical landscapes of the Anthropocene.

The Story of a Mud Volcano—in Two Parts

The Lusi mud volcano is a geological event with two histories. The volcano is essentially a two-part story. Part one, the "unnatural history" of the volcano, as it were, begins in 2006. In the early hours of the morning on May 29, the mud volcano erupted, shortly after the oil

company PT Lapindo Brantas Incorporation had begun exploratory drilling for gas in a late Miocene stratum twenty-eight hundred meters below the surface of the earth. Studies later showed that the drilling operation fractured a high-pressure aquifer, allowing the rapid influx of formation fluids and gases into the open drill hole, which, contrary to standard practice, lacked a protective steel casing over a one kilometer stretch.[13] The pressurized gas, liquids, and mud, mainly from the Pleistocene period, that filled the drill hole eventually caused a series of blowouts 150 meters away from the drilling rig Banjar Panji-1. It is from these blowout vents that an unstoppable flow of mud has since been burying the surrounding landscape.

This first part of the story is a very recognizable Anthropocene. It is an Anthropocene in which human activity (in this case, an oil company) exacerbates the forces of nature, causing what has been called "the first humanly-made volcanic eruption in planetary history."[14] The eruption is in this account an anthropogenic perversion of the historical relationship between mud and oil. For oil and gas exploration has always been intimately tied to mud volcanoes. In the nineteenth century, early prospectors discovered that mud volcanism was related to active underground petroleum systems, and they began to use mud volcanoes as indicators for potential oil fields.[15] Now, it seemed, this historical relationship had been turned on its head. Instead of mud volcanoes being the sign of a petroleum system ready for extraction, fossil carbon extraction was itself perversely creating mud volcanoes.

Until recently, the notion that humans could have an impact on the tectonics of the earth itself was laughable. Not so anymore. Industrially produced tectonics have become an increasingly recognized anthropogenic risk, since fracking and high-pressure injection wells have been shown to generate an increase in earthquake activity in the United States.[16] But Lusi was the first case in which conventional drilling was established as the cause of geothermal activity. As a result, the East Javanese mud volcano quickly became the global icon for a carbon-craving world gone awry, testimony to an oil industry that characterized by mismanagement, greed, and corruption was inadvertently tampering with the very makeup of the earth itself. Indeed, the link between cooperate greed and tectonic disaster seemed embarrassingly obvious. Lapindo Brantas, the oil company linked to the blowout, was controlled by the Bakrie Group, a consortium in which Aburizal Bakrie, then Indonesia's richest man, was a key stakeholder. The fact

that Aburizal Bakrie was also minister for people's welfare (Menkosra) in the coalition government of President Susilo Bambang Yudhoyono, but refused to visit the site or assume any cooperate responsibility for the damages, made the disaster a striking example of the hypocrisy of capitalist carbon extraction. An "unnatural disaster," the magazine *National Geographic* called it.[17]

But there is also a second part to the story of Lusi. This part—its "natural history"—paradoxically only adds to Lusi's uncanny nature. This second part of the story begins in the early morning of May 27, 2006, roughly forty-eight hours before the eruption of Lusi, when a massive earthquake measuring 6.3 on the Richter scale shook the ground near Yogyakarta, killing 5,749 people and injuring more than thirty-eight thousand. Mud volcanoes, a global phenomenon, are often caused by seismic activity, and some studies therefore argued that the near-synchronicity of the earthquake and the volcanic eruption indicated that the two were causally linked.[18] The island of Java is traversed by a geological depression along its east–west axis.[19] The depression, which has been filled with sediments over the last 23 million years, closely follows a subduction zone between the Indian Oceanic and the Eurasian continental plates. This has created one of the world's most seismically active areas but also the conditions for the presence of rich underground petroleum resources that have been exploited for a hundred years. The same region is home to numerous naturally occurring mud volcanoes associated with the presence of petroleum. The Sidoarjo mud volcano, in this scenario, was a "natural" event in an unstable geothermal region: the earthquake near Yogyakarta caused a so-called strike-slip movement of the Watukosek fault, one of many tectonic fault lines in this area, triggering the eruption of the mud volcano some 250 kilometers away.[20]

This second account of the eruption was favored by a number of Indonesian experts, including the senior drilling advisors of the oil company, who published their findings in the same prestigious journals as their opponents.[21] It was also supported by a number of the Indonesian government's own geological experts, allegedly under the influence of the investors behind the oil company, who were eager to establish the mud volcano as a "natural disaster" in a bid to evade legal responsibility.[22] Opponents of this explanation countered that synchronicity in itself failed to establish a causal link between the earthquake and the mud volcano and that the geographical distance

between the two events exceeded other known cases in which mud volcanism had been triggered by seismic activity.[23] The pedigree of those who sought to establish that the mud volcano was a "natural fact" suggested that they were "merchants of doubt," scientists paid by industry to deny the truth of global warming, the harmful effects of smoking, or, in this case, the anthropogenic origins of volcanism.[24] Indeed, the theory that Lusi was caused by tectonic activity was haunted by accusations of poor science and corrupt politics.

As a result, the truth of the anthropogenic origin of Lusi seemed secure. Until recently, that is, when independent, computer-based studies showed that the curved underground rock formation in the area could have focused the seismic waves of the Yogyakarta earthquake to produce enough seismic stress on the fault line to trigger the eruption, even if it was more than two hundred kilometers away.[25] This analysis seriously challenges those who maintain that the volcano was triggered by drilling and lent credibility from an unexpected and unbiased source to the industrial merchants of doubt. In its wake, uncertainty rules more than ever.[26] As one geologist concludes, "we may never know what the final trigger was, whether it would have happened anyway, nor even if an early trigger averted a greater disaster, had pressures continued to build up."[27] When it comes to Lusi, geology, the science behind the concept of the Anthropocene, is haunted by undecidability. This epistemological undecidability is coupled with high political stakes: the oil company wants the eruption to be a natural disaster to escape liability, while victims want it to be an industrial disaster to enforce payment of compensation. The question essentially is whether Lusi is a political event with a geothermal afterlife or a geothermal event with a political afterlife. At the moment, it is both.[28] I suggest calling this a "spectral moment," a time of undecidability but also a time of spirits and ghosts.

The Hope of Stones

On quiet afternoons, you are likely to see people scour the Lusi mudflats. Once in a while, they will stoop to pick up a pebble and inspect it closely before either dropping it again or putting it in a fanny pack around their waist. People say the stones are just trinkets, children's marbles. And yet, they keep collecting them, carefully polishing them smooth with sandpaper in an evident labor of love and dedication to

bring out the proper contours, the shades of meaning that hide within. Some stones come to assume the shape of a dolphin, others a human face. Yet others have organic filaments or veins of quartz that take the shape of a dragon or a lion or the eye of a dead king. Mas Hadi is one of the people collecting stones. He is also a descendant of royalty from the mythical Majapahit empire and a diviner *(waskitó)* with "spirit eyes" that see into the otherworld *(mata batin).* Having spirit eyes also enables Mas Hadi to distinguish ordinary stones from unique treasures, a skill in high demand on the mudflats.

One day I sat with Mas Hadi when a *tukang ojek,* a driver of a motorbike taxi, dropped by with an object he had found on the mudflat. It looked like a fossilized shark tooth. The concavity of the labial face, the lack of serration along the edges, and the robustness of the root suggested it was from a mako shark (L. *Isurus oxyrinchus*), probably one who lived and died around 2 million years ago to became part of the Pleistocene stratum from where most of the volcanic mud originates.[29] To Mas Hadi, however, it was something else. For along the center of the crown of the tooth was the outline of something, a pointed object. "This," he declared after some pause, "is special. Do you see the *kris* inside? It comes from the Majapahit empire." What the *ojek* driver had inadvertently stumbled upon was a double *kris,* a

Figure G7.2. Shark tooth containing a magical double *kris.* Photograph by Nils Bubandt.

dagger associated with royalty and a powerful magical object. "Take it, and keep it safe," Mas Hadi instructed the man, closing the man's palm with his own around the object.

Objects such as this tooth-dagger become personal treasures, part of one's arsenal of heirlooms and amulets. Such objects are kept hidden or are fitted and worn in rings for protection. In particular, they are seen to have a magical capacity *(khasiat)* to confer upon the finder good fortune *(rezeki).* The objects are precious because they are full of life, fossilized proof of a spirit life that thrives in an otherwise toxic landscape. The stones are said to come from Lusi's main vent. A giant spirit snake, it is said, dwells within it. Or more accurately, the vent itself is a snake, the guardian spirit *(penunggunya)* of the volcano, from whose belly deep underground the stones and objects emerge. The treasures are essentially bezoars from a spirit snake. Traded from Asia to Europe for medicinal purposes since the Renaissance, snake stones *(mustika ular)* and other bezoars are regarded as powerful magical antidotes throughout Indonesia.[30] The petrified objects that are spewed from the giant snake spirit at the center of the mud volcano are like such bezoars, objects that hold potentially great spiritual power *(kesaktian).*

Searching for spirit shapes in the stones on the mudflats is one among a panoply of means through which you may acquire good fortune through magical means in Java. Good fortune or *rezeki* can take many forms, not all of which are financial. *Rezeki* may be to acquire a spouse, a child, a job, recognition, success, or money. It is about leading the good life, about being fulfilled, calm, and happy. *Rezeki* is about destiny. It is existential and social rather than merely financial. The pursuit of *rezeki* by magical means is called *pesugihan* and can be acquired from a veritable multispecies salon of spirits. On the sacred mountain of Kawi, you may, for instance, acquire good fortune if you observe a leaf of the *dewandaru* tree (L. *Eugenia uniflora*) fall to the ground. Or you may take up relations with the black boar spirit called *babi ngepet.* The spirit will enable you to turn into a black boar that inconspicuously can steal from other people. Trees, boars, and snakes may all provide good fortune, but they also require compensation, a reciprocal payment *(tumbalan),* to be pacified. The black boar is said to ask for a human baby in return for its riches. Mas Hadi claimed that the children's graves vandalized in a Sidoarjo cemetery in 2012 had been emptied of human remains by people in search of such compensation gifts.

Spiritual anxiety has been the constant companion of dreams of

good fortune at Lusi since its eruption in 2006. While engineers from global mining consultancies have dropped hundreds of cement balls and iron chains into the vent in an unsuccessful attempt to plug it, people throughout Indonesia worry that human heads—procured by government headhunters—have also been surreptitiously thrown into the vent as reciprocal payment *(tumbalan)* to its spirit guardian.[31] For like most volcanoes in Indonesia, the Lusi mud volcano is a spiritual as well as a geothermal entity—a vengeful and angry geospirit.[32] Calming the spirit of such a massive disaster requires magic of a special kind. A hundred mystics from all over Java thus participated in a locally organized event in 2006 that attempted to use "paranormal" powers, reciprocal payments, and soothing ritual offerings *(sesajen)* in an effort to stop the mudflow.

The Politics of Mud

The search of good fortune through magical means is one of many strategies that people pursue to offset the disastrous effects of the mudflow on their lives. Mas Hadi is fifty-one years old and makes a meager living as a self-appointed parking guard at a local school. He spends his afternoons on the mudflats, and when he does not divine stones, he is one of a few dozen men, all displaced by the mud, who sell pirated DVDs about Lusi's eruption and offer paid motorbike rides to the mainly Indonesian disaster tourists who come to see the mudflats. Mas Hadi is married for the second time. His first wife died, "of stress" as he puts it, when social obligations forced the family to share with distant relatives the money they had received as the first installment of a compensation payment from the oil company. The money gone, the family had been unable to build a new house, and Mas Hadi's wife had died of grief.

Mas Hadi's story is a common one. The victims' struggle to receive compensation for their lost livelihoods has been long and frustrated. In response to the mudflow, a presidential decree from 2007 (Perpres 14/2007) divided the disaster area in two. The decree required the Lapindo oil company to pay 3.8 trillion rupiah (US$338 million) in compensation to people who used to live inside the so-called affected area map. Meanwhile, the state agreed to pay almost twice as much (6 trillion rupiah, or US$534 million) from the state budget to villagers living outside of the "affected area." The decision was widely

considered part of a politically brokered deal between the government of Susilo Bambang Yudhoyono (SBY) and its coalition partner, Golkar. Aburizal Bakrie was thus not only co-owner of Lapindo but also a key figure of Golkar.[33] The suspicion was that SBY protected the Bakrie conglomerate from full liability, asking the Bakrie Group to pay only a tenth of the overall estimated cost of the disaster in exchange for Golkar's support for SBY's shaky government.[34] Deals such as these are standard in Indonesian politics and the basis for widespread accusations of corruption.[35]

Despite the generous political deal, Lapindo sought through a variety of political, legal, and strong-arm tactics to defer payment of the government-ordered compensation to the victims. The company set up a subsidiary, PT Minarak Lapindo Jaya, to handle the compensation, but locals feel that the company's main purpose has been to infiltrate the victims' protest groups and divide them internally by paying full compensation to the most vocal victims in return for political loyalty. For the people looking for stones on the mudflats, their informal motorcycle taxi association, which takes tourists around the site, doubles as a political organization. It is the only remaining victims' group, so they say, that has resisted company payoffs.

Other stakeholders, including the police and courts, have been less stalwart. In 2009, the regional police in East Java gave up its criminal investigation against Lapindo, a decision that was widely suspected of being made under pressure and influenced by oil company bribes.[36] The Constitutional Court in 2014 upheld the 2007 decree allowing the new parliament, led by President Joko Widodo, to put pressure on Lapindo to pay the remaining 781 billion rupiah (US$65 million) that the company still owes to the victims.[37] A victory for democracy, one might claim, but the court's decision maintains the injustice of the initial decree in which the government essentially exonerated the oil company in exchange for political support—Indonesian "politics-as-usual" *(politik seperti biasa),* as one of the victims told me indignantly in a text message.

A Multiplicity of Ghosts

Deprived of adequate compensation, the victims now make a living and seek good fortune on top of the toxic mud that covers what used to be their villages. In their struggle for compensation, mud has become

Figure G7.3. Indonesian disaster tourists pose in front of a papier-mâché replica of Aburizal Bakrie. Dressed in the yellow jacket of the Golkar Party, of which he has been a longtime member and, since 2009, chairman, Aburizal Bakrie is popularly held responsible for the mudflow. Photograph by Nils Bubandt.

a frequent symbol of political protest, and demonstrators regularly smear their bodies in mud as a sign of protest against a cynical oil company and a corrupt government. But mud is not just a symbol of political corruption; it is also an index of it. The mud at the vent will boil more violently, it is said, when government bureaucrats come to visit. The higher the position and moral liability of the official, the more violently the mud will boil.[38]

Mud is cosmopolitical: at once a political symbol and a cosmological agent. The political agency of mud is deeply entangled with the world of spirits. The popular narrative that the eruption of Lusi was the result of spiritual revenge from a murdered labor activist highlights this cosmopolitical agency.

The district of Sidoarjo is a densely populated area of East Java, and the abundance of cheap labor has for decades attracted numerous companies, foreign and domestic. East Java has also always been a political hot spot, and it has a long history of labor disputes as well. One of the twenty-five factories that now lie buried under the mud is PT Catur Putra Surya (CPS), a manufacturer of wristwatches made infamous for being the employer of labor activist Marsinah, who was kidnapped, raped, and killed by unknown assailants in 1993. Although the murder was never solved, it was likely ordered by a New Order network of military, government, and employer representatives to silence labor protesters.[39] However, Marsinah's murder galvanized the Indonesian labor movement during the 1990s, and Marsinah herself posthumously became a national celebrity.[40] Mas Agus, one of the *ojek* drivers and stone prospectors on the mudflats, told me that the mudflow was Marsinah's curse against her murderers. Indeed, Mas Agus claimed that the Chinese owner of the watch company went insane after the mud drowned his factory. In the Lusi mud, environmental

Figure G7.4. A protester smears mud on the logo of the Bakrie Group at its Jakartan head office. Photograph by Sapariah Saturi Harsono.

disaster, political protest, and the curses of spirits are remolded. The power of geothermal mud to speak through spirits to an unjust political world is legendary; its power is, as the victims put it, "strange but true" *(aneh tapi nyata).* The 2012 movie *Hantu Lumpur Lapindo* (The ghost of the Lapindo mud) exploits this idea. An example of *film mistik,* a popular movie genre that combines soft eroticism with horror stories featuring the many varieties of spirits and ghosts in the Indonesian mystical universe, *Hantu Lumpur Lapindo* is the story of a striptease dancer who is murdered by a gang of organ thieves after they have removed her heart. The gang dumps her body in the Lapindo mud, but the ghost rises, smeared in mud, to haunt the gang and kill its members one by one. In the movie, mud is the spiritual index of vengeance against capitalist murk, personal greed, and social betrayal.

From Necropolitics to Symbiopolitics

Lusi's muddy landscape is haunted. Her "cursed mud" *(kualat lumpur)* is the mark of a necropolis, and people see in it an explicit contrast to the metropolis of Kuala Lumpur, a betrayal of people's dream of modernity. In this ruined landscape, destroyed by a heady mix of greedy industry, corrupt politics, tectonic forces, and chthonic spirits, body politics fuse with geopolitics: protesters smear their bodies in mud, while a murdered labor unionist turns into a muddy avenging ghost; an employer goes mad when his factory drowns in mud; the government employs headhunters whose prize heads are used to plug what the cement balls of international engineers were unable to stop; a snake guardian in a geothermal vent offers gifts of good fortune, while the mud itself is strangely alive and seems to be able to tell corrupt politicians from those who are honest.

The strange life of stones and mud speaks to a spectral moment in Indonesia in which geology is political, politics is corrupt, and corruption is haunted by spirits. But the life of mud and stone is also the sign of a spectrality that characterizes the Anthropocene more generally. The Anthropocene, after all, invites us to imagine a world in which an alien geologist from the future detects in the strata of the ground evidence of the presence of humans long after we have gone extinct.[41] This science fiction–like character of the concept of Anthropocene opens up to a retrospective reading of the current moment, a "paleontology of the present" in which humans themselves have become

geological sediments or ghosts.[42] In the Anthropocene, life is already geologic. In this geological ghost vision, the present proceeds from the future, because the possibility of co-species survival depends crucially on what we humans are going to do now, in the midst of an increasingly given fate of ruination and extinction.

Mas Hadi and the other people looking for fossil spirits in a haunted landscape are in that sense not unlike contemporary geologists. Take Jan Zalasiewics, the geologist who, in his book *The Planet in a Pebble,* discovers in a single pebble the ingredients for all life on earth.[43] Zalasiewics is not any geologist; he is chair of the Anthropocene Working Group of the International Commission on Stratigraphy, the organization in charge of deciding whether to accept "Anthropocene" as the scientific name for our time. When he is not busy with this work, Zalasiewics looks at stones. And for him, too, every pebble is full of ghosts.[44] Like fossil fuel, the building blocks of every pebble are constituted—in addition to minerals—by a complex of amorphous organic matter, traces of the ancient and strange biology trapped within: acritarchs, chitinozoans, graptolites. Zalasiewics, like Mas Hadi, is interested in the ghostly contours of life in stones not merely because they are telltale remnants of a past but because stones allow him to dream of a different future at the brink of disaster, a future in which livelihood and good fortune do not come at the expense of devastation and death. Geology here performs the job of *pesugihan,* the magical pursuit of good fortune, in a ruined landscape. In the necropolitics of the Anthropocene, geology is as entangled with politics as it is with ghosts. In the same movement that the Anthropocene is being established as a geological fact, geology itself is becoming political. As geologists have to choose which of the many radioactive, industrial, and chemical signals in the ground, in the sea, and in the air define our time, it is also becoming increasingly apparent that geology can no longer perform what Donna Haraway has famously called the "god trick" of remaining outside of what it studies. Like the other sciences of the Anthropocene, geology's diagnosis of our time mires it in contemporary politics.

The question is what kind of politics to choose: the ghostly necropolitics of the current moment or a politics informed by other kinds of spirits. It seems to me that the spectrality of the Anthropocene is full of ghosts of many kinds. There are the old ghosts of carbon-based industry, the specters of corrupt politics, and the God-tricks of conventional science, to be sure. But there are also the spirits of a

different, emergent kind of politics, a symbiopolitics. The Anthropocene presents us with the geological possibility that humans are the graptolites of the future, fossil colonial animals that are engineering our own demise. This shift in perspective is important. If modernity dreamed of the future, the Anthropocene dreams of the present as seen from the future, a perspectival shift that makes our necropolitics apparent to ourselves in the starkest of lights. As the deep time of geology becomes the political history of the present, this also changes what geology, along with other sciences, can and should be.[45] We are all inhabitants of the same mudscape, the same geological sludge, as it were. Anthropocene landscapes of death and extinction are, however, also inhabited by emergent and unexpected constellations of life, nonlife, and afterlife. Before mud becomes our only future, we need to learn from stones to notice all the forms of life and possibility that exist in the midst of death: that, as I see it, is the message and the magic of the geology of the present. It is also the message of East Javanese people's engagement with spirits, as I read it.

The spirits that reside in the stones and mud of Lusi remind us that the scientific, political, and legal inability to differentiate the *anthropos* from the *geos* has its own metaphysics. This metaphysics may be the brainchild of our current troubles and thus the product of a long history of exploitation, colonialism, and extermination. But a metaphysics that has lost the ability to distinguish the *bios* from the *geos,* the human from the nonhuman, also holds a promise. For the kind of symbiopolitics that this metaphysics makes visible offers the chance for a novel kind of collaboration between science and the politics of the otherwise, a politics that we might learn from spirits. The indigenous spirits of the Indonesian mud volcano and the secular spirits of the Anthropocene seem to me to form an awkward alliance here. For both indigenous spirits and the spirits of the new geological idea of the Anthropocene ask us to notice the magic of the forces, human and nonhuman, that shape the atmosphere, biosphere, and lithosphere. The spirits highlight how the inexorable logic of carbon-based business-as-usual that brought us into our current predicament is inherently spectral. But they offer a dissenting voice to this conjuring as well, and here is the basis for a common front between indigenous spirits and the emergent sciences of the Anthropocene, one that grows from a shared recognition of the magic of being-with, the magic of symbiopolitics.

As an anthropologist, **NILS BUBANDT** has learned to be equally at home with witches, protesters, and mud volcanoes. Co-convener of Aarhus University Research on the Anthropocene (AURA), with Anna Tsing, he is professor at Aarhus University and editor in chief of the journal *Ethnos* (with Mark Graham). His books include *The Empty Seashell: Witchcraft and Doubt on an Indonesian Island* and *Democracy, Corruption, and the Politics of Spirits in Contemporary Indonesia*.

Notes

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