

Article

The Morphology of Prometheus, Literary Geography and the Geoethical Project

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Abstract: This paper explores mappings, musings and ‘thought experiments’ in literary geography to consider how they may contribute to geoethical pedagogy and research. Representations of Prometheus from the fourteenth century onwards have traveled along three broad symbolical roads: first, as the creator, and bringer of fire; second as a bound figure in chains, and thirdly, unbound. However, it was the harnessing of fire by our species a millennium prior that gave rise to the myth of Prometheus and set into motion the geophysical process of combustion which “facilitated the transformation of much of the terrestrial surface [. . .] and in the process pushed the parameters of the earth system into a new geological epoch.” As the geophysicist Professor Michael Mann observes, global warming and loss of biodiversity constitutes an ethical problem. The remediation of the Prometheus myth in Mary Shelley’s *Frankenstein; or the modern Prometheus* (1818), Jonathan Fetter-Vorm’s *Trinity: A Graphic History of the First Atomic Bomb* (2012) and William Golding’s novel *Lord of the Flies* (1954) provides the means to explore the geographical, historical and cultural contingencies of geoethical dilemmas contributing to the framing of the Anthropocene and *Gaia* heuristics. This paper argues for the necessity of scholars in the arts, humanities and geosciences to share and exchange idiographic and nomothetic perspectives in order to forge a geoethical dialectic that fuses poetic and positivistic methods into transcendent ontologies and epistemologies to address the existential questions of global warming and loss of biodiversity as we enter the age of the Anthropocene.

Keywords: literary geography; geoethics; Prometheus; Arendt; Benjamin; combustion cultures; industrial revolution; atomic bomb; Anthropocene; *Gaia*



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1. Introduction

The Greek myth of Prometheus, who sculpted humankind from clay, is both symbolic of a rebellion against power and the quest for knowledge. Prometheus’s gifting of fire to humans, after stealing it from the gods, defied Zeus, who wished to deny humans the capability of its power. As Andrew Y. Glikson notes: “Prometheus, metaphorically, had to endure punishment through eternal torture, as do humans due to repeated wars and plagues through the ages” [1]. The myth, however, signifies more than charity toward humankind, rebellion and premeditated action. It also addresses the backlash of natural forces, and speaks contemporarily to the perils of blind and amoral scientific experimentation and applications [2]. The informal age of the Anthropocene situates humans as a ‘Promethean’ geological force, with traces left by our combustion of fossil fuels, and nuclear detonations acting as signals of this new epoch [3]. In this regard, the geoethical project is timely and relevant for addressing the existential threats of anthropomorphic global warming and the loss of biodiversity. As Professor of Geophysics and Climatology Michael Mann observes, these issues are fundamentally an “ethical problem”, in that we need to carefully consider the political choices we make based upon our knowledge of science and tools we will use to either detrimentally bolster or positively mitigate and potentially reverse the effects of our human footprint on the earth’s eco, bio, and planetary

systems [4]. By remediating the myth of Prometheus, Mary Shelley's *Frankenstein; or the modern Prometheus*, (1818) serves as a metaphor to consider the ethical monstrosities of the Satanic Mills spawned by industrial revolution technology. Jonathan Fetter-Vorm's *Trinity: A Graphic History of the First Atomic Bomb* (2012) and William Golding's novel *Lord of the Flies* (1954) provide the means to meditate on the ramifications of the horrific detonation of the respective atomic bombs "Little Boy" and "Fat Man" over Hiroshima and Nagasaki in 1945—as well the nuclear disasters of Chernobyl and Fukushima. In revealing the full horror of a 'Prometheus unbound' to the planet's inhabitants, the harnessing of fire, the industrial revolution, and the Trinity atomic bomb test in the *Jornada del Muerto* desert in New Mexico illustrate political philosopher Hannah Arendt's observation that "the world we have come to live in, however, is much more determined by man acting into nature, creating natural processes and directing them into the human artifice and the realm of human affairs" [5].

Silvia Peppeloni, Nic Bilham and Giuseppe Di Capua parse geoethics from its etymological Greek roots (*gaia* + *ēthos*) and define it as a field concerned "with the ethical, social and cultural implications of geoscience education, research and practice, and with the social role and responsibility of geoscientists in conducting their activities" [6]. Subsequently, this paper's literary geography mapping draws on the Greek myth of Prometheus to reflect on how relationships between literature, philosophy, history and place can contribute to furthering the pedagogical and didactic aims of the geoethical project. This is not so much a conventional invention, as a return to the literary roots and practices of Western Geography (literarily *earth-writing*): "For ancient Greeks, and to a lesser degree for Romans as well, *geographia* represents a literary genre more than a branch of physical science. It belonged far more to the cultural mainstream than to the specialized backwaters to which we, today, have assigned it" [7] During the European enlightenment: "geography and literature were far more inclusive and more permeable categories in the eighteenth century, [. . .] so individuals often considered as eighteenth-century geographers frequently had wider interests and careers in writing comparable to individuals we now consider 'literary'" [8]. Geographer Marc Brosseau states that the revival of literary geography in the 1970s and 1980s emerged from a "humanist project designed to restore [. . .] meaning and values in geography" [9]. Engaging in philosophy and phenomenology, humanistic geographers began to consider the perceptions and representations of writers, to explore how studies of human dwelling, identity, landscape and sense of place, could provide alternate environmental models to the statistical landscapes promulgated by the discipline's 'Quantitative Revolution' of the 1950s and 1960s.

Arguing for the salience of such humanistic methods, Douglas C. Pocock, one of the pioneering literary geographers of the late twentieth century, observed that "literature is the product of perception, or, more simply is perception [. . .] providing thereby a basis for a new awareness, a new consciousness" [10]. The philologist and literary scholar Edward Said, echoing the tropes and methods of humanistic geography, noted that literary and aesthetic engagement with "geography stimulates not only memory but dreams and fantasies, poetry and painting, philosophy (as in Heidegger's *Holzwege*), fiction (think of Walter Scott's Highland novels), and music (as in Sibelius's *Finlandia* or Copland's *Appalachian Spring*)" [11]. Integrating literary and humanistic geography methods with the environmental humanities and the natural sciences can provide geoethical scholars and students with "new ways of seeing literature, ecology and geography, as well as the world that necessarily subsumes and contains them" [12].

2. Materials and Methods

Peppeloni and Di Capua argue that the field of geoethics is committed to "exploring philosophical problems", plotting a "constellation of concepts to be used to understand the world" [13], and providing new methods of analysis and interpretation to be employed in geoeducation curricula. Accordingly, this paper maps how an aphoristic mythical archetype of Western culture has been transposed to different historical eras, and addresses

the unique, but commensurate geoethical dilemmas perceived and represented by writers in their specific temporal, cultural and environmental milieus.

Claude Lévi-Strauss's concept of bricolage, first formulated in *La Pensée sauvage* (1962), mused on how mythical thought was woven from the strands of multiple beliefs, ritual practices, perceptions and representations. In turn, Walter Benjamin's work on mythography posits that "the temporal measure for the experience of the symbol [*Symbolerfahrung*] is the mystical instant [Nu]" [14]. In other words, (parsing Lévi-Strauss and Benjamin), the symbol and message of the myth is a phenomenon that is dynamic—mobile, fluid, and transposable. It can re-appear in different literary, historical and cultural guises. In particular, Benjamin's concept of literary montage (the re-assembly of fragments, texts, citations, and other sources to create new insights and understandings) can help us understand how the myth of Prometheus elucidated by Greek poets Hesiod and Aeschylus has been remediated and extended to different historical, geographical and environmental spheres. (Figure 1). The myth re-emerges as a trope in Shelley's novel *Frankenstein*, Fetter-Vorm's *Trinity* and Golding's *Lord of the Flies*. This paper's exploration of the remediation of the Prometheus myth and its historical and geographical teleology is guided by humanistic geographer Yi-Fu Tuan's ideas on how literature can promote a better understanding of the world and the human condition. Firstly, literature offers the foundations for 'thought experiments' on the "possible modes of human experience and relationship[s]" including environmental ones. Secondly, literature reveals "the environmental perceptions and values of a culture: it serves the geographer [and geoscientist] who is also a historian of ideas" Thirdly, "as an ambitious attempt to balance the subjective and the objective [literature] is a model for geographical synthesis" and mixed-methods research efforts to integrate qualitative and quantitative theories, scholarship and techniques [15]. In classical geomythical literature, "Plato thought the gods created humans from earth and fire, where the mastery of fire explained human dominance on the basis of pyro-technology, the key for the evolution of human intelligence and beliefs [. . .] But it is around fires that pre-historic people developed their concept of the gods, admired through a complex system of beliefs and rituals" [1].

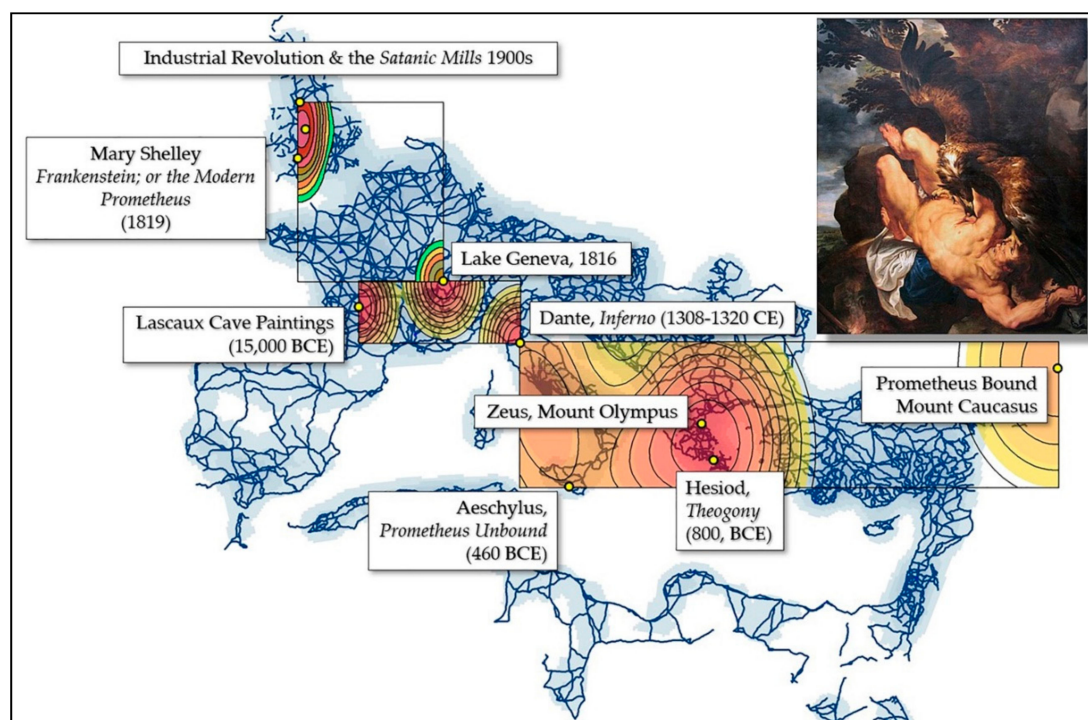


Figure 1. European Literary and Historical Montage Mapping. The Morphology of the Promethean Landscape and Roman Imperial Road Network. **Image:** Peter Paul Reubens, *Prometheus Bound*, 1618 (Wikicommons). Map by Charles Travis.

3. The Morphology of the Promethean Landscape

It can be argued that the harnessing of fire by our species gave rise to the myth of Prometheus and set into motion the geophysical process of combustion, which “facilitated the transformation of much of the terrestrial surface and in the process pushed the parameters of the earth system into a new geological epoch” [16]. The Magdalenian (c.a. 17,000–12,000 BCE) peoples of the present-day Dordogne region of France serve as an example of an early combustion society. In addition to providing the benefit of cooked food, which helped homo-sapiens’ evolutionary development, fire light allowed the Magdalenians to create pre-historic “art galleries” in the caves where they dwelled. After the re-discovery of their habitats in 1958 the stone chambers were given the names *Hall of the Bulls*, *Chamber of Felines*, and *Passageway*, leaving us a window into the first early pre-literate cultures of combustion. With the advent of inscription and literature, Aeschylus’s drama, *Prometheus Desmotes* (460 BCE), depicts how the trickster-god “stole the very blossom of your craft, the blazing flame, the spark of every art and gave it to the mortals. Such is the crime for which we, gods, must receive recompense” [17]. Earlier, in *Theogony* (800 BCE), Hesiod painted a picture of Prometheus’ punishment for the thievery of fire:

*In cruel chains, unbreakable, chained round
A pillar, and Zeus roused and set on him
An eagle with long wings, which came and ate
His deathless liver. But the liver grew
Each night, until it made up the amount
The long-winged bird had eaten in the day.* [18]

Read contemporarily, Hesiod’s aphoristic metaphor imparts the dangers of ‘playing with fire.’ With the emergence of Christianity in the Levant and its spread from Rome after the fall the empire established by Romulus and Remus, fire rather than being viewed as a gift of from the gods, becomes a source of torment and punishment. The plotting of the nine circles of hell in Dante Alighieri’s *Inferno* (1308–1320 CE) transformed the “historical world, in essence-along a vertical axis” [19] (prefiguring the practice of stratigraphy in nineteenth century Geology) to reveal a “vision of the universe that perfectly satisfied both the approved religious and the accepted scientific notions of his time” [20]. In Canto XIV, Dante and his guide, the Roman poet, enter the seventh circle, ford a river of blood and come to witness penitents scampering across burning sands under a scouring rain of flames that calls to mind the clouds of detritus from the collapse of the World Trade Center towers on 9/11, or the fall out of a nuclear winter:

*Above the plain of sand, distended flakes
Of fire showered down; their fall was slow-
As snow descends on also when no wind blows.* [21]

However, from between the sixteenth and eighteenth centuries, modernity and Cartesian dualism emerged to supersede religious dogma in intellectual spheres and conspired in radically splitting the mind from the human body and surrounding environment of the earth—relegating the latter as an ecological subaltern:

... the long arc of history demonstrates the degree to which natural-versus-human distinction is untenable at best; worse, it is an intentionally obfuscatory tactic designed to prevent meaningful consideration of the inextricably intertwined fates of natural and social spaces. [22]

In studies of Western civilization, many cultural histories have situated the French mathematician René Descartes “as the thinker who marks the dividing point between the medieval and the modern world views [and] a convenient symbol of the breakup of the unitary world view of [Thomas] Aquinas and Dante” [23]. With the modern age and secularism looming on the horizon of history, English poet and cleric John Donne (1572–1631) rued in *An Anatomy of the World* (1611) how

*A new Philosophy calls all in doubt,
The Element of fire is quite put out;
The Sun is lost and th'earth, and no mans wit
Can well direct him where to looke for it . . .* [24]

Three centuries after *Inferno* was published, the Protestant and Counter Reformation transformed and redefined the concepts of capital, commerce, property, the role of the nation-state, and the accumulation of private, rather than sovereign wealth. Donne shuddered at the impact the 'revelations' of the new modern scientific perspective 'invented' by Galileo and Copernicus would have on the world, as translated into tropes of scientific rationalism by Descartes, Newton and others. In 1608, the invention of the telescope, to Donne's chagrin, revealed the "secrets of the universe" to "human cognition" symbolizing the new Galilean ontology of nature and technology that recalibrated and refocused "the earth from the viewpoint of the universe" [25]. Despite Donne's protest, an eighteenth-century 'Clockwork Universe' emerged within which a Cartesian globe soon orbited in 'absolute' sequential time, based upon the new language of Copernicus' cosmology, Newton's physics, and a grid of coordinates conjured by Descartes' marriage of Euclidian geometry and algebra. The Enlightenment and Scientific Revolution had dawned. However, by no means did the new language of the scientific revolution possess a monopoly on the geographies of imagination, as writers emerged to explore the human and ethical implications of this new world view.

4. The Modern Prometheus

Peppeloni and Di Capua assert that the conceptual foundations of geoethics "can be traced back to the eighteenth and nineteenth centuries when anthropogenic impacts on nature began to be recognized and documented" [6]. Likewise, the early nineteenth century was shaped by climatic, social and cultural disruptions resulting from geohazard events, as well as epistemological, scientific, political and industrial revolutions in America and Europe. Indeed, climactic events colored many of the plays, paintings and poems of the period which were often pre-occupied with world-ending and cataclysmic themes, such as the biblical flood and the collapse of great, ancient civilizations [26]. In 1815, the eruption of Mount Tambora (the most powerful in recorded human history) in the Dutch East Indies (present-day Indonesia) ejected a tremendous column of sulfur and other particles that circulated in the earth's atmosphere, dropping temperatures, causing harvest failures and a 'volcanic winter' witnessed by millions across wide regions of Asia, North America and northern Europe. The effects of this phenomena contributed to a thaw in the polar region between 1815 and 1818 due to changes in air stream and oceanic current circulation. New open water channels through the icepack sparked a race in Europe and North America to map the location of the North Pole, and find the elusive, fabled northwest passage to establish shorter trade routes and facilitate explorations for natural resources [27].

It is in this early nineteenth century arctic milieu that Mary Shelley opens her epistolary novel *Frankenstein; or the Modern Prometheus* (1918), with Captain Walton's Arctic Circle expedition encountering a 'monster' and its creator in the barren polar landscape while searching for a route to the Pacific Ocean. The latter turns out to be Victor Frankenstein, who after assembling a 'human being' from expropriated body parts and organs finds that his creation has turned against him. In doing so, the creature provides prescient observations on the political economic conditions that can be seen to characterize class divisions of the Anthropocene: "the strange system of human society was explained to me. I heard of the division of property, of immense wealth and squalid poverty; of rank, descent, and noble blood" [28]. Just as fires from erupting volcanoes were word-painted by Greek poets into the image of Prometheus, the early industrial age spawned its own mythical images that resonated with verses spun by Hesiod and Aeschylus. *Frankenstein* critiques the hubris of human discourses which frame the sciences as offering the paths to utopia. While attending lectures at the University of Ingolstadt, Victor listens as a professor declares in a

panegyric on modern chemistry that scientists can now “command the thunders of heaven, mimic the earthquake and even mock the invisible world with its own shadows” [28] Anne K. Mellor notes that Shelley’s novel “distinguishes between that scientific research which attempts to describe accurately the functioning of the physical universe and that which attempts to control or change the universe through human intervention” [29].

In this sense, *Frankenstein* anticipates the Anthropocene’s reconstitution of the human condition as a geological force. The awakened ‘creature’ is spurned by civilization, and in turn leaves a wake of vengeful murders, which Victor attempts to mitigate by engineering a solution—the creation of a female partner for his ‘monster’ by utilizing similar methods. However, the “remains of the half-finished” subject stitched together from “the living flesh of a human being” brings Victor only revulsion, and he tosses the body parts into the Atlantic Ocean [28]. A current analogy can be made between the scientific processes contributing to the Anthropocene, and dangerous geo-engineering solutions proffered to mitigate global warming. It also speaks to the plight of the physicist J. Robert Oppenheimer, architect of the atomic bomb. In this regard, Victor “can be said to be a modern Prometheus. The frequent references in the novel to electricity and lightning remind us that Prometheus incurred the wrath of the gods by stealing fire for mankind” [30]. On his deathbed in the freezing cabin of a vessel stranded in Arctic ice floes, Victor has a last meeting with his creation. A prescient image of polar ice cap melting can be read in *Frankenstein’s* depiction of the monster’s imminent self-immolation:

*I will ascend my funeral pile triumphantly and exult in the agony of the torturing flames.
The light of that conflagration will fade away; my ashes will be swept into the sea by the
winds.* [28]

It is well known that the inspiration for *Frankenstein* occurred in 1816—known as the Year Without a Summer—when the poet and English peer Lord George Gordon Byron residing in the Villa Diodati at Lake Geneva in Switzerland witnessed “fowls roosting at noon” and candles being “lighted as at midnight” [31] due to the sulfate cloud ejected from Mount Tambora a year earlier. His poem *Darkness* (1816) captures the primordial nature and power of geological agency of a volcanic eruption:

*Forests were set on fire -but hour by hour
They fell and faded -and the crackling trunks
Extinguis’d with a crash -and all was black . . .* [32]

During that summer at Lake Geneva, Byron famously held a ghost-story contest with Mary Shelley and her husband Percy Bysshe, which eventually led to the publication of the novel *Frankenstein*. At first a bit mystified by the task, Shelley took to bed one night at the “witching hour” after discussing Dr. Darwin’s experiments with electrical galvanism that induced involuntary movement in “a piece of vermicelli in a glass case” [28]. For Arendt, ‘dreaming’ provides both the rationale and cultural and cognitive frames within which to situate emerging technologies [33]. Reflecting on whether a human corpse could be reanimated in a similar manner, an image of Victor Frankenstein assembling expropriated body parts in the university town of Ingolstadt, Bavaria, came to Shelley in a dream-like fugue state:

*... I saw the pale student of unhallowed arts kneeling beside the thing he had put
together. I saw the hideous phantasm of a man stretched out, and then, on the working of
some powerful engine, show signs of life . . . to mock the stupendous mechanism of the
Creator of the World.* [28]

The philosopher Gaston Bachelard, inspired by the nineteenth-century Romantic poets and writers William Blake, Shelley and Byron, notes that as we sleep, the “bird of our dreams” carries our imagination into “the dynamic eye of the storm” created by our waking impressions of events occurring in our daily lives and cultural milieu. Bachelard observes that to realize the vision of the dream, the sleeper needs to “climb back up towards the day” in order to articulate its contents and message to their waking consciousness [34]. In

such a fashion, Shelley retired to the old Roman colony of Bath, in England, to write her dream-induced version of the myth of Prometheus. In this regard, her novel provides the means for a geoethical ‘thought experiment’ to consider ideas about the self and nature, and how Western modernity and Cartesian dualism has created an abyss between the mind, the human body and the earth. *Frankenstein’s* “initial plotting [. . .] systematically places” Shelley’s “Gothic horrors within the geographical and political particularities of European and world history” illustrating “forces that cannot be confined by [. . .] political control or geographic space” [35]. Endeavoring to “preserve the truth of the elementary principles of human nature” in her story, Shelley listed her classical and early modern influences: “*The Iliad*, the tragic poetry of Greece, Shakespeare in *The Tempest* [. . .] and most especially Milton in *Paradise Lost*” [28]. In distinction to Shakespeare’s early modern rendering of the magical Ariel, the ‘beastly’ Caliban, controlled by Prospero’s alchemical powers in *The Tempest*,

... *Frankenstein’s ‘being’ is the monster of modernity. As the first ‘science-fiction’ novel, Frankenstein marks a departure from traditional ghost stories or tales of the supernatural to stories about the potential horrors of science and technological development.* [36]

Again, Shelley’s ‘vision’ is informed by Arendt’s observation that science and culture are intimately interwoven. Science is not only anticipated in dreams, but also in science-fiction writing [. . .] and vernacular culture [33]. In the early nineteenth century, when Shelley was composing *Frankenstein*, new technologies were ushering in the industrial revolution in Britain and powering the ‘satanic Mills’ of Birmingham, and Manchester. Thomas Newcomen’s (1663–1729) invention of a “surprising machine for raising water by fire”—improved in 1776 by James Watt’s innovation—created a “little engine did nothing less than unleash the Industrial Revolution” [37]. By pumping water from flooded mines, the engine facilitated the extraction of coal, which fueled factories and railroads to produce and transport ‘modern goods’ while shooting unprecedented levels of CO₂ into the earth’s atmosphere [37]. In tandem, a monstrous level of energy consumption rose as industrial age humans began to use “four or five times as much energy as their agrarian predecessors, who in turn used three or four times as much” as their “hunting and gathering forebears” [3]. Byron’s *Darkness* seems to have presciently anticipated the massive extractions and environmental destruction caused by industrial levels of fossil fuel combustion. Like a Greek oracle, Byron laments the human exploitation of Prometheus’ gift, and the birth of a new extraction-based society:

*For an unholy usage; they rak’d up,
And shivering scrap’d with their cold skeleton hands
The feeble ashes, and their feeble breath
Blew for a little life, and made a flame
Which was a mockery; . . .* [32]

Darkness and *Frankenstein* illustrate that nineteenth-century Romantic writers prophesized “the Enlightenment episteme—a valorization of reason at the other aspects of self and nature” would create “an ecological crisis for futurity [. . .] culminating in a long historical process that anteceded both the scientific and industrial revolutions” [38]. In this regard, the phantasmagorical landscapes of Byron’s poem and Shelley’s novel intimate the anthropogenic re-assemblage of the human condition into a primal and geological force which reached its monstrous apogee with the detonation of the first atomic bomb on 16 July 1945 near the Trinity Test Base Camp over the New Mexican desert known as the *Jornada del Muerto* (Journey of Death). (Figure 2).



Figure 2. Trinity Test Base Camp, edge of *Jornada del Muerto* desert, New Mexico, May 1945. (Wikicommons).

5. The Anthropocene Prometheus

On 16 July 1945, a powerful and unprecedented human-made shockwave preceded the blossoming of an enormous nuclear, polychromatic mushroom cloud over the high desert landscape near Trinity, New Mexico. The *Jornada del Muerto* desert, which erupted with nuclear Promethean fire, was home to the indigenous Pueblo and Apache peoples and was named by Spanish *conquistadores* in the sixteenth century as they established the route of the Camino Real, the imperial highway of the Spanish kings. During the Manhattan Project, the geography of the New Mexican desert imparted a “sense of wonder” among Los Alamos physicists and “its striking and vexed status as ‘nature’ bears heavily upon how their secret work -and how science in general- purports to be about the manipulation of nature” [39]. The physicist J. Robert Oppenheimer, architect of the atomic bomb, explained the impetus behind its construction. In doing so, he illustrated the quandary of a geoethical dilemma:

The reason we did this job is because it is an organic necessity. If you are a scientist you cannot stop such a thing. If you are a scientist you believe that it is good to find out how the world works; that it is good to find out what the realities are. [40]

Such a dilemma echoes the predicament that Shelley placed her character, Victor Frankenstein in, as he grappled with the consequences of his creation. Subsequently, Jonathan Fetter-Vorn depicts Oppenheimer in his graphic novel *Trinity: A Graphic History of the First Atomic Bomb* (2012) as a “gaunt, obsessive brooding, solitary ‘hero,’ akin to the Romantic and/or Byronic” [41]. The novel stands as an example of Benjamin’s concept of “historiophoty” or the representation of history and our dialogues and reflections about

its themes in visual images like a filmic discourse [42]. (Figure 3). In one of the novel's illustrated panels, Oppenheimer is pictured in a car traveling towards the Trinity test site, regaling his driver about the ancient myth of Prometheus. In the upper half by of the panel and image of Zeus condemning Prometheus, who, chained to Mount Caucasus, is having his liver ripped from his belly by an eagle.

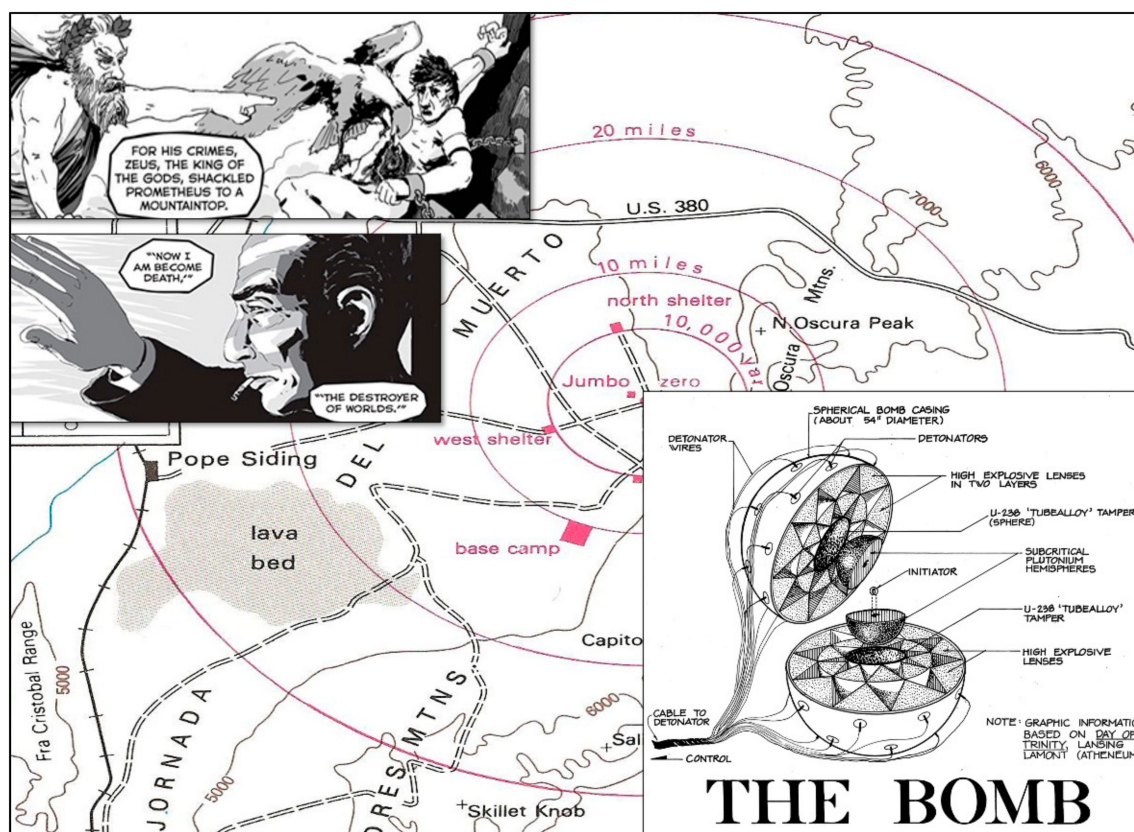


Figure 3. Historiophoty Bricolage Map of the Trinity Test Site in the Jornada Del Muerto desert of New Mexico, U.S.A. **Sources:** Jones, *Manhattan: The Army and the Bomb* (1985) p. 479; White Sands Missile Range, Trinity Site, Vicinity of Routes 13 and 20, White Sands, Dona Ana County, NM. Library of Congress. (Wikicommons) Review of Jonathan Fetter-Vorm's *Trinity: A Graphic History of the First Atomic Bomb: The Appendix, The End?* December 2012-Vol. 1. No. 1. <<http://theappendix.net/issues/2012/12/not-so-funny-pages-excerpt-trinity-a-graphic-history-of-the-first-atomic-bomb>>; Berkun, S., *Trinity* (Review) 28 June 2012 <<https://scottberkun.com/2012/trinity-a-graphic-history-of-the-atomic-bomb-review/>>.

After Hiroshima and Nagasaki, the more powerful hydrogen bomb test on atolls in the Pacific Ocean demonstrated the ethical abyss posed by one of the Anthropocene's most dire geoethical dilemmas. In October 1949, four years after the Trinity test, Oppenheimer's advisory committee on the hydrogen bomb met with the United States Atomic Energy Commission (AEC). During the meeting, strong opposition was voiced against the development of the more powerful weapon by a member of the AEC on the grounds that the U.S. government had already "built one Frankenstein" [30].

In 1954, William Golding published the *Lord of the Flies*, a novel that tells the story of British schoolboys marooned on a tropical island in the fall out of an atomic war. The boys are thrust into a technological environment similar to one experienced by the Magdalenians: "In many ways it is a terrifying parable about what happens when civilizations crumble and all moral directions are lost" [43]. The boys elect a leader, set a division of labor and form an expedition to map the island's topography. Soon a struggle emerges between Ralph, who symbolizes civilization, and Jack, chief of the 'hunters' who engage in recrudescence violence

and nihilism. A meeting between the two camps (which can be read contemporarily as the political clash between proponents on either side of the global warming divide) is called:

Ralph—*Things are beginning to break up. I don't know why. It all began well. Then people started forgetting what really matters. The most important thing for all of us is getting rescued. So now let's discuss who does what, and when we have decided, we can start again . . . and be careful about things like the fire.*

Jack—*[Cheers from the choir/hunters.] All right, so the fire went out. But hunters. We got you meat. And if there is a beast, it's my hunters who protect you from it. [43]*

The Promethean trope of fire again emerges and the schoolboys soon descend into barbarity, voting democratically on a 'belief in ghosts,' worshipping the severed head of a boar stuck on a post ('the Lord of the Flies'), engaging in tribalism, bloodletting and hunting their own before being ironically rescued by a warship, itself a technology involved in savage warfare. The myth of Prometheus is employed as a central theme in the *Lord of the Flies* and manifests in the character of "Piggy, the fat, asthmatic, myopic friend of the protagonist Ralph" [44]. It is with the lens of Piggy's spectacles that the boys are able to light a fire to provide comfort and security, in addition to acting as a signal for their rescuers. Like Prometheus, Piggy suffers a terrible fate; he is killed, and his body is washed out to sea after being struck by a rock and hurled down a cliff by a member of Jack's hunting party. In spite of the technological progress exhibited by the construction of the atomic bomb, Golding concluded that "We are today essentially what we were in the past, heroic and sick though we have inherited the earth we remain hunters, using our weapons with the same seriousness and blind conceit that possessed the first of our kind" [45]. In 1958, Golding published a drama titled the *Brass Butterfly*, a historical fantasy set in Imperial Rome, where Caesar is fancifully offered modern inventions such as a pressure cooker, a steamship and an exploding missile by Phanocles, a Greek inventor who believes the universe is a giant machine which can be harnessed. However, Caesar is wary of such gifted progress. He advises the inventor:

A steam ship, or anything powerful, in the hands of a man, Phanocles, is like a sharp knife in the hands of a child. There is nothing wrong with the knife. There is nothing wrong with the steamship. There is nothing wrong with man's intelligence. The trouble is his nature. [46]

The drama "satirizes the naive rationalism of science and the unquestioned faith of true believers" [47]. Like Golding's characterization of Caesar's skepticism, Oppenheimer emerged at the height of the Cold War as an opponent to the development of the hydrogen bomb. Pleading for more 'candor' from the U.S. government, he argued for officials to share information on the nature of the weapon with the American people and the Soviet Union in an attempt to stop the nuclear arms race [48]. In a television interview in the 1960s, Oppenheimer recalled that after viewing the bomb's detonation, a verse from the Hindu holy scriptures rose into his consciousness:

We knew the world would not be the same. A few people laughed, a few people cried. Most people were silent. I remembered the line from the Hindu scripture, the Bhagavad Gita; Vishnu is trying to persuade the Prince that he should do his duty and, to impress him, takes on his multi-armed form and says, "Now I am become Death, the destroyer of worlds." I suppose we all thought that, one way or another. [49]

Oppenheimer's literary reference is but one example of how some scientists have come to embrace the perspective of nineteenth-century Romantic writers such as Blake, Wordsworth and Shelly. With the detonation over the *Jornada del Muerto* desert, the dualistic, mechanistic philosophy of Cartesian thought became obsolete as an ethical heuristic. In the aftermath of the Trinity test, a new homo-sapiens-planetary system hybrid model emerged, described by Bruno Latour as having "no clear boundaries, no sharp separation between their own hard kernel and their environment" [50]. The traditional Cartesian perspective of the West had adopted an "objective" separation between the perceiver (subject) and the

perceived (object). In contrast (to borrow from the Czech author Milan Kundera), within a phenomenological perspective:

Man and the world are bound together like the snail to its shell: the world is part of man, it is his dimension, and as the world changes, existence (*in-der-Welt-sein*) changes as well. [51]

A new model of the cosmos, one echoing phenomenological tropes and informed by the theory of relativity, sub-atomic principles of quantum dynamics and genomics, emerged in the half century after-glow of the first nuclear explosion over the *Jornada del Muerto* desert in 1945: “science [. . .] found a new relevance for the type of thought experiments that define romantic poetics, which helps explain why scientists, with increased frequency have turned to literature for names, concepts, and images” [52]. Not surprisingly, it was Golding—the writer—who suggested the mythical name of *Gaia*—the ‘earth goddess’—to geophysicist James Lovelock as the name for his new model that geo-biologically reframed Earth Systems Sciences in 1972. Lovelock posited that our planet is a living, self-regulating ‘organism’: “a biological cybernetic system able to homeostat the planet for an optimum physical and chemical state appropriate to its current biosphere” [53]. Ironically, Lovelock’s concept of *Gaia* derived from research he conducted under the sponsorship of the multinational oil and gas company Royal Dutch Shell “to identify organisms whose biological activities might double as climate-stabilizing mechanisms.” [54]. As a literary-scientific heuristic, *Gaia*—which is contested in a few quarters of scientific thought—constitutes an environmental Rorschach test that is seen as “equally appealing to free-market evangelists, Earth-systems scientists, ecofeminists, and science-studies scholars alike” and the model’s “displacement of human exceptionalism can be leveraged equally for a doctrine of neoliberal environmental governance or for an embrace of radical biological alterity” [54]. In such a reading, Prometheus (*homo-sapiens*) is being chained again by the gods (*Gaia*) to Mount Tartarus for his anthropomorphic transgressions. Donna Haraway, drawing on Isabelle Stenger’s notion of *Gaia* as an ‘intrusive force’ that is slowly eroding the foundations of the “tales and refrains of modern history” states:

This intrusion threatens not life on Earth itself -microbes will adapt, to put it mildly-but threatens the livability of Earth for vast kinds, species, assemblages, and individuals in an “event” already under way called the Sixth Great Extinction [. . .] *Gaia* does not and could not care about human or other biological beings’ intentions or desires or needs, [. . .] *Gaia* is not about a list of questions waiting for rational policies. [55]

In this light, it can be argued that Golding’s *Lord of the Flies* anticipated Bruno Latour’s dire prognostication on a war between two opposing camps—*moderns* who believe it is possible to go on living in the rational, united and apathetic nature of the Holocene, and *terrans*, the people of *Gaia*—in a war for the ‘soul’ of the earth which would destroy both camps [56].

6. Results/Conclusions

Representations of Prometheus from the fourteenth century onwards have traveled along three broad symbolical paths: first, as the creator, and bringer of fire; second, as a tragic figure, chained and bound; and thirdly, unbound and freed [57]. However, in Lovelock’s *Gaia* model, Prometheus is well on his way to being once again bound in chains forged by his actions. This paper has explored the transposition of the Promethean figure in nineteenth- and twentieth-century literature as a ‘thought experiment’ and a means to broaden the scope of geoethical pedagogy and research by exploring the “contingency, contradiction and oscillation” of mythical transposition over time and space [58]. Given the current environmental crises of global warming and loss of biodiversity, hard political choices will need to be made, many with the need of nuanced, scientific input. What types of geo-engineering solutions are feasible, if any? Is a re-examination of nuclear fission as a viable means to produce a non-carbon source of energy necessary, and what are its

geoethical implications? In this regard, all academic (arts, humanities, sciences) ‘hands need to be on deck.’ In making the case for a literary-humanistic geographic approach to geoethics, we can draw on questions posed by Tim Ingold:

How can we make a space for art and literature, for religion, or for the beliefs and practices of indigenous peoples, in an economy of knowledge in which the search for the true nature of things has become the exclusive prerogative of rational science? Do we suffer the imagination to persist in our midst, or tolerate its penchant for fantasy, out of a compensatory wish for enchantment in a world that has otherwise ceased to enthrall? [59]

In light of this, it must be recognized that there are translational issues between the arts, humanities and sciences, as addressed by C.P. Snow in his now famous lecture, *The Two Cultures and the Scientific Revolution* (1959). Even within these distinct epistemes of the humanities and sciences, there are issues. One the one hand, in the humanities, as J.M. Schaeffer notes in *Fictional vs. Factual Narration* (2013), “mimetic representation is [. . .] considered by Aristotle to be superior to history because poetry expresses the general (i.e., the verisimilar or necessary relations between events), while history only expresses the particular (that which has happened)” [60]. On the other hand, long-standing perspectives in the sciences are exemplified by Galileo in *The Assayer* (1623), in which he posits the natural universe as a ‘grand book’ that though, accessible to all, is unintelligible without a knowledge of mathematics and its lexicon of “triangles, circles, and other geometrical figures without which it is humanly impossible to understand a single word” [59]. Such inter- and transdisciplinary translation issues harken back to the predicament symbolized by the biblical story of the Tower of Babel. In *The Human Condition*, Arendt stresses that our actions are primarily symbolic in character, with the web of human relationships sustained by communicative interaction—not only on an interpersonal level, but collectively through the production of literature, film, art and scientific knowledge. In *Between Past and Future* (1968), Arendt states that the:

. . . political function of the storyteller-historian or novelist is to teach acceptance of things as they are. Out of this acceptance, which can also be called truthfulness, arises the faculty of judgment. [5]

In this regard, the study of literary geography in concert with geoethics helps us to consider how we, humans (as writers, readers, storytellers, and scientists), employ language, narrative, imagination and different cognitive-semiotic models in the arts, humanities and sciences to cope, understand and solve problems and face ethical dilemmas [4]. Human geographers Trevor Barnes and James Duncan note that texts can be conceived of as landscapes, ref. [61] and conversely as Peirce F. Lewis observed in *Axioms for Reading the Landscape*, cultural, vernacular and physical landscapes can be read like a book [62].

Jonathan D. Phillips notes that geoscientists are beginning to recognize that these “landscape interpretation” methods employed by literary, cultural and humanistic geographers can provide geoscientists with a “critical skill” and are becoming a “necessity” for “understanding Earth surface systems” [63]. Indeed, geoscientists are now starting to pay renewed and increased attention to the “historical and geographical contingency” of various physical landscapes and natural phenomena as revealed in literary, cultural and critical texts [63]. In light of this, the sharing and exchange of idiographic and nomothetic perspectives between scholars in the arts, humanities and geosciences must be encouraged to forge a geoethical dialectic that fuses the poetic and the positivistic into transcendent ontologies and epistemologies. By doing so, holistic methods to address the existential questions of global warming and loss of biodiversity may emerge as we enter the age of the Anthropocene.

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