Part II: Romanticism and the Operations of Biopolitics
Romanticism is best known for its emphasis on intensely local nature. Whether we consider the referents of William Wordsworth’s poems on local places and organisms, such as the wild green landscape “a few miles above” Tintern Abbey or the yew trees of Lorton Vale and Borrowdale; or his efforts to preserve areas of the Lake District in the form of a national park; or Gilbert White’s supremely local natural history of Selborne; or John Clare’s numerous poems on local flora and fauna, Romanticism often seems equivalent to the commitment to value, protect, and preserve the minute particulars of local spaces. Yet there is another side to Romanticism, one oriented toward transformations of our planetary sphere so extensive that they are shocking to read. The two examples that I consider in this chapter appear in Romantic-era “philosophical poems,” and both propose to alter the global climate through the application of science and technology, a process that we would now call “terraforming.” In his wildly popular *The Botanic Garden* (1791), Erasmus Darwin urged European nations to form an international fleet that would alter global weather patterns by towing icebergs from the North Pole to the southern oceans, which he believed would redirect global air currents and enable “the vegetation of [Britain] [to] be doubled, as in the moist vallies [sic] of Africa.” In *Queen Mab* (1813), P. B. Shelley proposed an even more extreme scenario, suggesting not only that polar ice ought to be “loosed” in order to reform Earth’s weather and deserts but also that Earth itself could be shifted on its axis in order to produce more calm and pacific global weather. In contrast to a Wordsworthian vision of nature as local and fragile, Darwin and Shelley approach nature as global, malleable flows that can be redirected in accordance with human desire.

From the perspective of our concerns with global warming, it is difficult to know how best to approach this global side of Romanticism. It is tempting
to view Darwin’s and Shelley’s proposals both as examples of ecological naïveté and ideological mechanisms by means of which Europeans naturalized their violent conquest of non-European lands and peoples. I take a different approach here, though, for what interests me is how the Romantics came to “think globally”; that is, by means of what operations, protocols, and principles did the Romantics understand phenomena such as weather and population as intrinsically global phenomena? Such an analysis seems to me necessary insofar as many modes of contemporary critique—including forms of ecological and postcolonial critique through which we might be tempted to rap the knuckles of authors such as Darwin and Shelley—themselves depend upon this same ability to think globally. An analysis of Romantic globalization is thus an effort to consider more generally what it means, then and now, to approach questions of politics, justice, and value from the perspective of the globe.

Romantic globalization is also a way of thinking about the relationship of two kinds of global aspirations. On the one hand is a long-running liberal aspiration to transform the globe into a world-system populated by commerce-oriented, freedom-prizing individuals. On the other hand, the destructive effect of liberal growth-oriented global commerce on the natural environments upon which humans depend has encouraged an increasing number of contemporary authors in both the sciences and the humanities to imagine either significant alterations to the liberal global order or completely alternative forms of global human relations. This latter way of thinking has been captured by the concept of the Anthropocene, which, in one of its earliest and still most famous formulations, denotes a “geological epoch”—that is, an epoch analogous to the Paleocene or Pleistocene geological epochs—that is in part determined by human activity.¹ Some critics have charged the concept of the Anthropocene with encouraging “technocratic” solutions to environmental problems that then lead back to a liberal view of the world, but I suggest that comparing Darwin’s and Shelley’s different Romantic approaches to globalization helps us distinguish between liberal and nonliberal approaches to the Anthropocene.

In the first section of this chapter, I argue that the Romantics learned to think globally by considering phenomena as diverse as weather, population, and magnetism as modes of flow. They understood flow by means of two operations and two principles: the operation of untethering, by means of which phenomena such as weather were detached from local places; the principle of circular reinforcement, which stressed the effects of an untethered flow when it encircled the globe and returned upon itself; the principle of orthogonal drag, which allowed Romantics to understand why potentially
globe-spanning flows in fact were often limited; and the operation of global
network construction, which allowed the Romantics to map—and, many
hoped, ultimately to control—global flows by establishing the geographies
of orthogonal drag. In the second and third sections, I argue that Darwin’s
and Shelley’s philosophical poems participated in this Romantic global
revisioning, both because each author understood the world in terms of
flow but also because each poem sought to intervene in global flows by
inventing a new technology of contiguity. In Darwin’s case, this meant
hybridizing two existing technologies of contiguity—the botanic garden
and the book—while in Shelley’s case, it meant creating a “gravitational”
technology of contiguity that allowed a reader to be drawn back to the
terrestrial globe after imagining a plurality of globes. In the fourth section,
I argue that Darwin’s and Shelley’s approaches clarify the stakes of a recent
debate, focused around the historian Dipesh Chakrabarty’s work, about
whether globalization ought to be understood through the lens of the
Enlightenment project of freedom or, instead, in terms of limits on human
freedom seemingly implicit in the concept of the Anthropocene. In the
fifth section, I note that this debate unfortunately ignores recent neoliberal
demands that we think beyond global limits, and I address this aspect of
neoliberalism by using Shelley’s reflections on an interminable wilderness
of planets as a lens through which to read Kim Stanley Robinson’s recent
science-fiction novel Aurora (2015), a thought experiment about escaping
from earthly limits by finding another globe.

Franklin’s Fennel-Earth: Spheres and Flow

Romantic globalization is characterized above all else by the effort to think
the dynamism of flows in terms of the geometry of a sphere. “Globaliza-
tion” is an intrinsically temporal term; that is, it denotes a process, for
which one can determine axes along which change is measured and
marked, thresholds that determine the velocity and nature of change, and
an overall directionality. The Romantics tended to think globalization
through the figure of flows: flows of weather, of water, of magnetism, or
of living populations, for example. Understanding and potentially con-
trolling globalization was thus a matter of understanding how flows
behaved when they occurred within that relatively thin strip of atmo-
sphere, land, and water that encircled the globe. The Romantics sought to
understand flows by means of two operations and two principles: an oper-
ation of untethering, a principle of circular reinforcement, a principle of orthog-
onal drag, and an operation of (global) network construction.
Seeing the world in terms of flows meant, first and foremost, untethering forces from local places. This operation was evident in both Romantic-era science and political theory. Late-eighteenth- and early-nineteenth-century weather theory, for example, developed in part by separating itself from late-seventeenth-century “exhalation theory.” Where exhalation theory held that many kinds of weather were attributable to “vapors exhaled from a source within the earth which carried mineral deposits into the atmosphere,” Romantic-era observers, by contrast, tended to see “weather as a global system of exchange, something that passed from one region to another over local and national borders.” Local weather, in other words, must be understood from the perspective of the global atmosphere, which the Romantic-era natural philosopher and protometeorologist John Dalton described in 1793 as the “invisible, elastic fluid which every where surrounds the earth.” This elastic fluid was characterized by flows in multiple directions. In *The Botanic Garden* (1791), Erasmus Darwin sought to help his readers understand why “on the eastern coast of North America the north-west winds bring frost”—rather than, as in Britain, the north-east winds bringing frost—by providing instruction in the logic of flows:

When a sheet of air flowing along from the north-east rises from the [ocean] shore in a straight line to the summit of the Apalachian [sic] mountains, a part of the stream of north-east air will flow over the mountains, another part will revert and circulate spirally between the summit of the country and the eastern shore, continuing to move toward the south; and thus be changed from a north-east to a north-west wind.

In *The Climate of Great Britain; or Remarks on the Change It Has Undergone, Particularly within the Last Fifty Years* (1806), John Williams provided similar instruction, contending that the “North easterly winds, so frequently experienced in England in May and June, which and generally accompanied with haze in the Night, and a close warmth during the Day, are probably occasioned by a continuation of the stream of air which flows in a North-easterly direction from the Northern tropic at this Season.”

Within political theory, Thomas Malthus performed a similar untethering operation by globalizing the concept of population via the concept of flow. Malthus’s *An Essay on the Principle of Population* (1798) was written in large part to contest William Godwin’s claim that society could be perpetually improved through the application of individual reason. Malthus contested especially Godwin’s claims about reproduction in the more rational future: “It would be of little consequence, according to Mr. Godwin, how many children a woman had, or to whom they belonged. Provisions
and assistance would spontaneously flow from the quarter in which they abounded to the quarter in which they were deficient.” Malthus’s Essay was intended to replace what he saw as Godwin’s undertheorized account of population flows—for Godwin, spontaneous flows of provisions and assistance magically appear precisely where they are needed—with what Malthus presented as a more scientific theory of flows of populations and provisions. Though Malthus was primarily interested in influencing a specific and local polity, Great Britain, in order to produce local political effects, he cast his basic claim about population—that human population increases at a swifter rate than any possible rate of increase of the supply of food—as a principle that concerned necessarily global flows. He suggested that to understand the dynamics of the British population, one had to consider population from the perspective of the globe. In the first pages of his Essay, Malthus cited approvingly Benjamin Franklin’s reflections on the globalizing ambitions of all living beings:

> It is observed by Dr. Franklin that there is no bound to the prolific nature of plants or animals but what is made by their crowding and interfering with each other’s means of subsistence. Were the face of the earth, he says, vacant of other plants, it might be gradually sowed and overspread with one kind only; as, for instance, with fennel: and were it empty of other inhabitants, it might in a few ages be replenished from one nation only; as, for instance, with Englishmen. (14)

Population, like weather, could not be understood if one focused only on the small number of geographical locales in which a given species lived; instead, one had to begin with the implicit global aspirations of every species. That is, one had to understand population as a flow that related to “the whole earth,” from which “emigration would of course be excluded” (19).³

The Romantic operation of untethering forces from local places led to a first key principle: that in the absence of other forces, a flow on one part of a sphere would seek to assert itself everywhere. This tendency is evident in Franklin’s thought experiment of the transformation of a vacant planet into a fennel-earth (or an Englishman-earth). It could also be imagined in the case of weather, for, as Dalton observed in his Meteorological Observations and Essays, “were the whole globe covered in water, or the variations of the earth’s surface in heat regular and constant, so that the heat was the same everywhere over the same parallel of latitude, the winds would be regular also.”¹⁰ A flow that could move around a sphere unimpeded would always return upon itself and, in this way, reinforce its dominance or regularity.
Yet we do not live on a fennel-earth or upon a world on which the winds are constant, which suggested a second principle: that flows were always engendered and partially controlled by forces that acted at orthogonal or oblique angles to the flow. Actual winds, for example, were not autochthonous, self-perpetuating atmospheric phenomena but instead depended upon both solar rays that struck the atmosphere from above and the irregular surface of the earth upon which the atmosphere rested. This was true even for a relatively constant, regular wind such as the trade winds. Dalton contended that trade winds were produced partly by “rarefaction” of the air caused by the sun’s heat in the torrid zones and partly by the earth’s rotation. The sun’s heat caused “two general masses of air” to move in “both hemispheres,” yet each air mass was “deflected” as a consequence of the earth’s rotation, and “these two masses meeting about the equator, or in the torrid zone, their velocities north and south destroy each other, and they proceed afterwards with their common velocity from east to west round the torrid zone” (89–90). The trade winds were relatively regular because they flowed primarily over water. Yet the variable surface that the earth presented to the atmosphere—sometimes seas, sometimes flat earth, sometimes mountains—altered what would otherwise have been perfectly regular flows:

We find the irregularities of heat, arising from the interspersion of sea and land, are such, that though all the parts of the atmosphere in some sort conspire to produce regular winds round the torrid zone, yet the effect of the situation of land is such, that striking irregularities are produced: witness, the monsoons, sea and land breezes, &c. . . . (90–91)

Though flows might tend toward global uniformity, so to speak, they were engendered or affected by forces that promoted variability, irregularity, and difference.

From the perspective of this second principle, Malthus’s account of population is especially revealing, for he sought to illuminate the globalization of a flow, rather than simply accounting for an existing flow, such as weather, that was already global. Thus, in Malthus’s text, the tendency of a plant or animal species to expand across the globe is not the true movement that explains population; rather, the true movement of population is its tendency to “repress” itself. Population represses itself because it depends upon a force that operates orthogonally to its direction of flow. To return to Franklin’s example of the vacant earth just sown with fennel, the flow of the fennel population as a whole is horizontal, for it moves around and eventually encompasses the globe. Yet each fennel plant relies on roots that
grow vertically into the earth, and this vertical rootedness eventually represses horizontal flow. Thus, though a plant species is “impelled by a powerful instinct to . . . increase,” the “superabundant effects [of this increase] are repressed afterwards by want of room and nourishment.”

This same dynamic occurs in the case of animals, some of which are rooted to the living carpet of plants (which are rooted to the earth), while others are rooted to preying on other animals (which are either directly or indirectly rooted to plants, which are rooted to the earth). The spherical nature of the earth establishes a limit to the expansive movement of even just one species: Animated life can expand until it forms a second sphere that surrounds the earth like a skin, but it can go no further. At that point, the pressure that impelled the spread of a species across the globe presses upon animated life itself, and this repression produces the true movement of population, namely, oscillations of births and deaths within this living flow (26). This true movement is impossible to understand if one imagines that individuals can always be sent “elsewhere” (for example, to colonies), for it is only from the imaginary perspective of a global population—a population that finally encompasses the globe and thus meets itself—that one can discern its true dynamic.

This kind of global thinking emerged in Romantic texts that were not oriented toward questions of weather or population. In “Perpetual Peace: A Philosophical Sketch” (1795), for example, Immanuel Kant stressed the importance of the earth’s spherical nature for our understanding of long-term political dynamics and, specifically, the possibility of “perpetual peace.” Kant noted that though the earth is “divided by uninhabitable parts . . . such as oceans and deserts,” humans can traverse uninhabited areas to reach habitable regions. However, “since the earth is a globe, [humans] cannot disperse over an infinite area, but must necessarily tolerate one another’s company.” Moreover, “in seeing to it that men could live everywhere on earth, nature has at the same time despotically willed that they should everywhere, even against their own inclinations . . . and nature has chosen war as a means of attaining this end” (111). Like Malthus, Kant believed that the dynamics of human politics became visible only from the perspective of a spherical globe over which humans had been impelled to spread.

The second principle of flow that I have noted—namely, that flow is enabled and controlled by forces that act orthogonally to the direction of flow—implied another principle: Insofar as humans could act on these orthogonal forces, they could affect, and potentially control, global flows. Despite its pessimistic tone and conclusions, Malthus’s Essay acknowledges
this point, for he grants that advances in European agricultural techniques have indeed increased the yield of food per acre, thus facilitating the globalizing spread of population; his argument is simply that there are limits to this increase in yield. Dalton's description of the relationship between weather and the natural architecture of the earth—his claim that the "striking irregularities" of weather are a function of variations in the surface of the globe—suggested that humans might alter weather by altering land structures. As Alan Bewell notes, this implication was supported by the fact, known to late-eighteenth-century and Romantic-era authors, that weather in parts of the Americas had changed since its settlement by Europeans. Eighteenth-century scientists attributed these changes to the actions of settlers, such as the clearing of woods and marsh drainage, which presented atmospheric global weather flows with new geographic variations and irregularities. These human actions had not aimed to produce climatic change, but they suggested the possibility that humans could ameliorate their condition not simply by using small-scale architectural structures (for example, houses) to protect themselves from global weather flows but also by redirecting the flows themselves.

However, channeling and bending flows in a controlled way required that one understood more precisely the nature of the orthogonal forces upon which a specific flow depended, and this in turn required the creation of global observational networks. Observational networks were made up of three elements: (i) individual nodes at which observations could be made and samples collected; (2) links between nodes that allowed observations and samples to be transferred from one node to another; and (3) a node that Bruno Latour has called a "center of calculation," to which observations were brought together in such a way as to do work. Eighteenth-century and Romantic mapping of the magnetic flows of the earth, for example, depended upon a global network of land- and ship-based observers who tracked changes in magnetic declination, inclination, and intensity, while the Romantic science of weather depended upon an equally global network of observers who kept precise measurements about temperatures, barometer readings, and wind speeds. Ideally, a global observational network would map in skeletal form the flow itself, which meant that network nodes were more effective the more closely they were situated to points of inflection (points at which flows changed direction, speed, etc.). Yet because flows were fluid phenomena, figuring out where these points of inflection might lie was by no means a straightforward task. Knowing where to place a node depended upon previous knowledge of how orthogonal forces affected flows, yet this knowledge was precisely what the network
itself was intended to determine. Romantic-era flow hunting was thus often a matter of trying to establish sufficient measurements over the entire globe so that one could begin to intuit, through maps and tables, where points of inflection might lie. Several of Cook’s sea voyages, for example, were intended to fill in those parts of terrestrial magnetism charts, such as the Pacific Ocean, that earlier observers such as Edmund Halley had left blank.\(^\text{18}\)

If each node of the network was a point at which observations could be made and samples collected, and if nodes were connected to one another by links such as shipping routes and postal systems, the center of calculation was the point at which observations or samples were placed alongside one another in such a way as to enable what Latour calls “action at a distance.” In the case of some flows, such as those of magnetism or weather, placing observations alongside one another meant assembling tables or maps, such as the comparative tables of barometer readings and rainfall volumes that appear in Dalton’s *Meteorological Observations and Essays*.*\(^\text{19}\) For other flows, such as those of plant or animal life, contiguity was established more literally. Botanical gardens, for example, assembled plant samples that had been potted in distant locales and transported via transoceanic ship routes; these latter served as the vectors by means of which plants from multiple areas of the globe made the leap across otherwise inhospitable oceans in order to be placed alongside living plants from other parts of the globe.

Romantic global networks differed from early- and mid-eighteenth-century naturalist networks insofar as Romantic networks reconfigured the local from the perspective of the global. As Vladimir Janković notes for the case of meteorology and weather observations, for example, where “the eighteenth-century meteoric tradition” had established networks that bound together “provincial naturalists who derived their scientific authority from parochial affiliations and access to local facts”—especially local facts that were anomalous or remarkable—Romantic-era networks depended upon “civil servants and professionals who, by the nature of their occupations, moved between places or had a ‘stationary residence’ in an alien environment [e.g., a colony] in which their judgment of what counted as ‘remarkable’ mattered far less than back home.”\(^\text{20}\) Instead of describing anomalous phenomena narratively, observers were instead to employ standardized equipment to record averages, which were sent back to the center of calculation. From this latter perspective, knowledge of local weather was not an end in itself but rather a “prerequisite for a knowledge of globally evolving systems. . . . A rain-gauge in Cornwall was not intended to describe Cornwall, but to aid in a construction of a map of European isoleines” (167).
The recursive capacity of the network—the fact that information and samples flowed not only in toward the center of calculation but also outward back to the other nodes—made it possible to exert some control over the material flows themselves. Fulford, Kitson, and Lee emphasize, for example, the ways that the botanical gardens encouraged by the Romantic-era naturalist Joseph Banks served as a center of calculation that enabled the operations of empire:

A vast trawl of plants came from the newly explored lands to London and to Kew [Gardens], where Banks turned the royal gardens into a centre for classification and cultivation. These specimens gave botanists their first encounter with thousands of plants that had previously been unknown to them. . . . His network of botanic gardens that spread across the empire allowed plants to be taken from one colony and then cultivated under scientific supervision so that they could be transported to another colony. This scientific practice was to intervene in global agriculture on a systematic pattern never before seen by white people. It harnessed exploration and pure science to imperialist priorities.21

The same data-gathering network, in other words, that allowed scientists to determine precisely where natural variations of land and water checked the otherwise global spread of a specific plant or animal species also enabled the creation of new, “artificial” flows of plant and animal species, which brought these latter into new geographies. In similar fashion, tables and maps of wind and magnetic flows not only enabled more efficient and predictable shipping (and hence more finely calibrated mappings of magnetism and weather) but also potentially revealed more precisely how changes to landscape caused changes in weather. In this sense, maps and tables—or, more generally, books—could perform the same function as botanical gardens; rather than simply “representing” an external reality, books also functioned as technologies of contiguity that allowed individuals to expand and deepen their ability to act at a distance.22

Darwin’s Icebergs: Hybrid Technologies of Contiguity

In a globalized world, then, every movement along the sphere could be understood as the result of an interplay of flows: in the case of weather, for example, flows of and within water, flows along land, and flows within the pressurized atmosphere. While some flows were more difficult to bend and channel than others, this was for some Romantics simply a technical problem; that is, simply a problem of establishing the right network with the right
center of calculation. Might it not then be possible to intervene in, for example, weather at a global scale?

A number of Romantic-era authors certainly thought so. The implications for approaching local control through global flows were hinted at by Williams in *The Climate of Great Britain*. Williams outlined a system that he argued would allow Britons to control the weather of their entire island and thus “render the Seasons more propitious to the health of our growing crops”—a particularly timely consideration, given a series of bad harvests and attending political unrest in Britain in the 1790s. Williams argued that weather was at least partially dependent upon the electrical state of the atmosphere and that the latter was itself partially dependent upon the vegetation that covered the land underneath the atmosphere, since, he claimed, vegetation served as a conductor. Thus, for example, the

great cause of our clouded Atmosphere, and frequent storms of thunder, in Summer, arises from the exhaled vapour being partially deprived of its Electricity by the great number of conductors which exist in the form of points, on marginal Extremities of leaves, the bearded ears of corn, and various other appendages which serve to constitute the organization and attire of the vegetable world.

Williams suggested that one could control the weather by reforming the nature of the vegetable surface against which the atmosphere pressed. However, since humans depended upon vegetable crops and thus were limited in the ways that they could control this surface, another method was to present the atmosphere with a different, more powerful, conducting surface. Williams proposed constructing two buildings in every county, each outfitted with an enormous electrical device, which—when used in concert with one another—would “electrize the whole Atmosphere of Great Britain one mile in height” and in this way control the weather (349). Williams noted that such control would itself require development of a new network: “A [meteorological] Board . . . would be united with other Agricultural Establishments for conducting the process; and the machinery should be made to act simultaneously, and under telegraphic signals; otherwise one county would be counteracting another” (351).

Despite the breathtaking scope of Williams’s proposal, his belief that one could alter British weather simply by altering the *British* atmosphere still shows a vestige of the earlier, more localist, understanding of weather. A better example of the Romantic approach to flow, which seeks to dispense with this localist prejudice, is Erasmus Darwin’s proposal in *The Botanic Garden* to change British weather by altering global weather flows. *The Botanic Garden* is divided into four cantos, each of which provides scientific
explanations of the natural processes that underlie the traditional four elements: Canto I focuses on natural processes involved in the “fiery” parts of nature (for example, volcanoes and electricity); Canto II focuses on earthy processes; Canto III, watery processes; and Canto IV, air processes. In Canto I, Darwin outlined a proposal that he believed would simultaneously decrease the heat of the torrid zones and increase the heat of overly cool zones. In the text of the poem, Darwin commanded the “NYMPHS!” to “alight” in the polar regions and

array your dazzling powers,
With sudden march alarm the torpid Hours;
On ice-built isles expand a thousand sails,
Hinge the strong helms, and catch the frozen gales.
The winged rocks to feverish climates guide . . .

These otherwise cryptic lines are explained in a footnote, in which Darwin provided a crash course in fluid dynamics and weather formation. Darwin argued that scientific research, as well as accounts of European explorers, suggested that the total volume of ice on the earth was increasing. Darwin also reminded his readers of Robert Boyle’s “famous experiment” in the preceding century that proved that “ice evaporates very fast in severe frosty weather when the wind blows upon it” and also reminded them that “ice, in a thawing state, is known to contain six times more cold than water at the same degree of sensible coldness” (I: 59, note to Canto I, l. 529). Darwin concluded from this that one “cannot doubt but that the northern ice is the principal source of the coldness of our winters, and that it is brought hither by the regions of air blowing from the north” (I: 60, note to Canto I, l. 529). That fact, combined with the increase of the total ice volume of the earth, indicated to him that the climate of Britain would become cooler and cooler.

Darwin suggested, though, that knowledge of these processes of weather formation enabled a project of weather reformation. While it would clearly require enormous volumes of ice to change global weather patterns in ways that would affect Britain, Darwin claimed that such a project was not impossible:

If the nations who inhabit this hemisphere of the globe, instead of destroying their seamen, and exhausting their wealth in unnecessary wars, could be induced to unite their labours to navigate these immense masses of ice into the more southern oceans, two great advantages would result to mankind; the tropic countries would be much cooled by their solution, and our
winters, in this latitude, would be rendered much milder, for perhaps a century or two, till the masses of ice become again enormous. (I: 60, note to Canto I, l. 529)

Darwin suggested that a cosmopolitan project of ice relocation would simply mimic natural processes, for natural ice “islands” often float from the north or south pole on their own, and he recalled for his readers a recent floe encountered by a ship near Botany Bay in 1789 (I: 61, note to Canto I, l. 529).

Darwin suggested that an international project of weather reformation would have two primary effects. First, it would increase agricultural productivity in Britain. In the “Additional notes” that follow the fourth Canto, for example, Darwin took up again the topic of weather reformation and there recommended further research into the chemical basis of the “wonderful contrivance” (I: 411, note XXXIII) that connects all of the earth’s weather with the goal of creating a perpetual good wind for Britain (I: 208–9, note to Canto IV, l. 320). The result of creating such a wind, Darwin claimed, would be that “the vegetation of this country [Britain] would be doubled, as in the moist vallies [sic] of Africa, which know no frost” (I: 208, note to Canto IV, l. 320). Second, Darwin implied that the benefits of weather reformation would not be limited to Britain, for changing the global system of weather flows might ameliorate landscapes afflicted with “contagious vapours” (I: 207, Canto IV, l. 306) or with the “pestilential winds of the east” (I: 207, note to Canto IV, l. 306). Darwin’s interest in unhealthy landscapes was part of what Bewell describes as “medical geography,” which emerged in the eighteenth century as a scientific project of locating, describing—and, if possible, altering—those kinds of landscapes that produced illness. The practice of medical geography was tied to a utopian vision, for, as Bewell notes, “once these ‘pathogenic places’ had been identified, they could be modified and human beings might rid the earth of disease.” In general, pathogenic places were understood as those in which Europeans got sick, and the tropical, or “torrid,” areas were of especial interest. Darwin’s plan to ameliorate the “tropic countries”—that is, the countries along what he calls the “burning line” (I: 62, Canto I, l. 545)—was part of this larger project of “humanizing” torrid landscapes.

On the one hand, Darwin’s reflections on weather reformation were clearly continuous with British imperial aspirations and with the globalization of capitalism. Darwin’s hope that weather reformation might eliminate disease, for example, was part of a narrowly nationalist colonial biomedical discourse in which Britain justified its commercial involvement
in other countries with the claim that it was a British duty to help “cure” intrinsically diseased places. Darwin’s image of reciprocal cooling in the tropics and warming in Britain was also at least in part an attempt to naturalize the project of British colonization. More generally, Darwin’s view of nature as “inseparably bound up with novelty, fashion, and change” represented, as Bewell notes, a “new consumerist commercial vision of nature that would underpin Britain’s emergence as an imperial nation.” Insofar as this “enlarged vision of nature is in keeping with that of a nation whose strength increasingly lay in its control and management of global natures,” it was not simply a means to dominate other cultures but also a way to incorporate them into a global system of exchange.

On the other hand, both Darwin’s text itself and his specific weather reformation proposals emphasize the ways that the same networks that enabled the work of empire and capital could channel utopian aspirations less bound to a nationalist frame. As I have noted, both botanical gardens and books functioned as technologies of contiguity, for both brought samples or observations sufficiently close to one another that new relationships and possibilities could be imagined and fed back into the network. Darwin’s *The Botanic Garden* sought to hybridize these separate technologies of contiguity by creating a textual “botanic garden” that would amplify the imaginative potential of a technology of contiguity—or, as Darwin put it in his Advertisement, “enlist Imagination under the banner of Science.”

Thus, even if Darwin’s weather reformation resonated with colonial and capitalistic projects, they were also premised on modes of international cooperation that operated in excess of narrowly colonial or capitalistic projects (or, at any rate, cannot be seamlessly aligned with either project). For Darwin, the process of altering all of the earth’s weather was simply too big for one country to take on by itself, and it thus not only required the cooperation of multiple countries but also enabled such cooperation, precisely because weather was something that so clearly overflowed national boundaries. For Darwin, understanding existing weather patterns and reimagining new flows of wind forced one to imagine the whole of humanity as an active element within natural processes of transformation.

**Shelley’s Reformed Ecliptic**

While Darwin’s terraforming plans were monumental and global in scope, they pale in comparison to the transformation of nature outlined by Percy Bysshe Shelley in his first major poem, *Queen Mab.* This poem, like Darwin’s *Botanic Garden,* is supplemented with an imposing number of notes, most quasi-scientific in character. However, where Darwin hoped that his
poem would change praxis by popularizing scientific knowledge, Shelley sought in *Queen Mab* to enlist science in a radical philosophy of political and intellectual liberty.

The “Spirit” narrator of *Queen Mab* is given a dream tour of the past, present, and future of humanity. In the poem’s final sections, which allows the Spirit a glimpse of the “sweet . . . scene” that the earth will become, Shelley developed the image of a terrestrial paradise, highlighted by the image of the lion “sheathing” his claws and becoming lamb-like in his nature. Yet this transformation of predator–prey relationships seems to depend upon massive changes to the earth’s surface, for humans must first “coalesce” with nature and “undertake regeneration’s work,” which involves a complete transformation of the planet (75 [Canto VI]). The polar caps are “unloosed” and the poles warmed (102 [Canto VIII]); the deserts of the world become wooded, habitable, and pacific (102–3 [Canto VIII]); and the formerly “illimitable plain” of the ocean is humanized, as “those [previously] lonely realms bright garden-isles [now] begem” (103–4 [Canto VIII]). As in the case of Darwin’s account of terrestrial weather reformation, Shelley’s narrator emphasizes that the transformation of the globe results in the destruction of “sick” places, enabling a utopia free of disease: “Health floats amid the gentle atmosphere” (104 [Canto VII]).

Perhaps most dramatic, even the axis of the earth will become straightened, so that the entire globe enjoys a temperate climate year round. In the period in which “man, with changeless nature coalescing, / Will undertake regeneration’s work” the “ungenial poles” of the earth “no longer point / To the red and baleful sun / That faintly twinkles there” (75 [Canto VI]).

Shelley’s notes at the end of the book explain that the last two lines refer to

> the north polar star, to which the axis of the earth, in its present state of obliquity, points. It is exceedingly probable, from many considerations, that this obliquity will gradually diminish, until the equator coincides with the ecliptic: the nights and days will then become equal on the earth throughout the year, and probably the seasons also. (152)

In support of this claim, Shelley cited the work of authors such as the astronomer and mathematician Pierre-Simon Laplace and the astronomer Jean-Sylvain Bailly, and he cited as well the physiologist and philosopher Pierre Jean George Cabanis to argue that “there is no great extravagance in presuming that the progress of the perpendicularity of the poles may be as rapid as the progress of intellect; or that there should be a perfect identity between the moral and physical improvement of the human species”
Shelley thus offered what we might call a maximalist vision of terraforming, which involves not just transformations of specific terrestrial surfaces that channel and direct flows but a reorientation of the earthly sphere itself. Yet if Shelley’s vision of terraforming is more extensive than Darwin’s, it is also more intensive, for in Shelley’s account, terraforming reaches into humanity itself. In Shelley’s note about the earth’s ecliptic, it is not clear whether the climate changes that he describes are the result of human actions or if they occur independently and provide the foundation for human technical developments. This ambiguity is emphasized in Canto IX, which outlines a process in which

human things were perfected, and earth,
Even as a child beneath its mother’s love,
Was strengthened in all excellence, and grew
Fairer and nobler with each passing year. (117 [Canto IX])

Shelley’s phrasing suggests that perfection is not achieved through technocratic acts of willful agency but through modes that combine activity and passivity and that alter humans as much as the earth. Humans do not actively perfect their things, but rather, human things “are perfected.” In the analogy that follows, the earth itself grows into excellence, though only because humans provide it with a maternal-like nurturing atmosphere. Both of these combinations of activity and passivity underscore the “coalescing” of humans and nature that occurs with the improvement of science and the progress of liberty. Human actions are in this sense not separate from nature but rather a portion of nature—a vector—through which nature improves itself. While this process eventuates in a state in which “every shape and mode of matter lends / Its force to the omnipotence of mind,” such mental omnipotence is possible only when humans have so fully “coalesced” with nature that they have become completely transformed from the state in which they existed in Shelley’s own time (235–36 [Canto VIII]).

Shelley emphasized the implications of terraforming for human reformation by suggesting that this process would begin in his present with the transformation of the flows of food that pass through the individual human body. More specifically, terraforming begins when people switch from meat eating to a purely vegetable diet and abstain from alcohol consumption. Shelley suggested that these steps are more effective than any “mere reform of legislation” precisely because each individual functions as a
material nexus through which various flows—flows of food and passion, for example—pass, and thus each individual is a point at which economics, politics, and nature can be reconfigured. A reform of diet thus “strikes at the root of the evil” and has the potential to end colonialism, which Shelley described as the process by which “every corner of the globe is rifled” for commodities.

Shelley’s depiction of individual human beings as nexus points through which various flows pass pursues the principle of global flows even further than had Darwin. For Darwin, global flows happen around—and can potentially be controlled by—humans, yet for reasons that he does not explain, this world of flow seems not to reach into human beings themselves. For Shelley, by contrast, global flows do not simply pass over and around humans; they also move through them. (Or, as Shelley put it a few years later in “Mont Blanc,” the “everlasting universe of things / Flows through the mind.”) As a consequence, every reformation of global flows is simultaneously a reformation of the flows that pass through, and determine the nature of, human beings. Timothy Morton suggests that in Shelley’s early poetry, nature is presented as “an ‘economy of the globe,’ a homeostatic system of regulated flows, [that] has overwhelmed any final, arbitrating signifier to which it could be referred.”

This description is correct in spirit, but Morton’s emphasis on “homeostasis” conflicts with his basic point. We can better describe Shelley’s understanding of global flows as oriented toward ecstasis, that is, self-transforming flows, rather than homeostatic standing waves.

Where Darwin sought to direct global flows by creating a hybrid technology of contiguity—a textual botanic garden that placed side by side as many results of the sciences as possible—Shelley’s more intensive understanding of flows required a more fundamental revisioning of textual form. As in the case of Darwin’s poem, the notes of Queen Mab assemble various results of the sciences alongside one another. However, in Queen Mab, the perspective or view from which the results of science are contiguously aligned is neither quite a terrestrial view nor that “view from nowhere” that Thomas Nagel later diagnosed as the key to scientific objectivity. Rather, it is what I will describe as a gravitational view: A view of the earth as one of many spheres, but with the center of gravity positioned such that this view brings us back to our own globe. Shelley’s poem thus begins with an ascent upward through the earth’s atmosphere (“The atmosphere in flaming sparkles flew”) and outward through interstellar space, until
Earth’s distant orb appeared  
The smallest light that twinkles in the heaven;  
Whilst round the chariot’s way  
Innumerable systems rolled,  
And countless spheres diffused  
An ever-varying glory. (13–14 [Canto I])

This is neither an indifferent survey of the universe as a whole nor a covetous view of other solar systems that humans might one day conquer. Rather, this is an image of an “interminable wilderness / Of worlds”: a view, that is, of the earth disappearing into a potential infinity of many spheres, and thus a view from which one must ultimately turn away in order to refocus attention upon our terrestrial globe.39

For Shelley, writing long before the era of space travel, such a view is possible only from the perspective of poetry; it is a view that cannot be seen in fact but rather only by imagining our globe just at the point of its disappearing, perhaps forever, into a wilderness of other globes. Shelley’s image is not original, for it calls to mind Anna Letitia Barbauld’s closing image in “A Summer Evening’s Meditation” (1773), in which the narrator is impelled through our solar system

To the dread confines of eternal night,  
To solitudes of vast unpeopled space,  
The desarts of creation, wide and wild;  
Where embryo systems and unkindled suns  
Sleep in the womb of chaos[.]40

Barbauld’s image of “solitudes of vast unpeopled space” works in the service of the Christian goal of refocusing the reader back on this earth (this “mansion fair and spacious for its guest, / And full replete with wonders”; 138) and, even more important, encouraging the reader to develop a practice of patience, by means of which the reader can, “content and grateful, wait th’ appointed time” when he or she makes the transition to that eternal afterlife in which “the glories of the world unknown” shall be revealed.41 Shelley’s “wilderness of worlds” also encourages us to value properly the one sphere on which we live and from which—for Shelley as much as for Malthus—no emigration is possible. However, where Barbauld’s image of infinite worlds orients us toward the afterlife, Shelley’s wilderness of worlds focuses attention on the future of this earth. For Shelley, this refocusing requires both the images of the poetry and the sciences referenced in the notes. In the case of Queen Mab, the genre of
philosophical poem does not simply assemble the results of the sciences alongside one another in order to amplify the role of imagination in science. Rather, this philosophical poem brings the results of the sciences back to earth, which allows us to orient the project of terrestrial terra-forming toward values such as the reduction of violence and suffering and the elimination of political and economic inequity. The Shelleyan philosophical poem treats the work of science itself as a global flow, and it seeks to locate—and ultimately, to direct—the orthogonal forces upon which science and technology depend.

**Globalization, Provincialization, and the Anthropocene**

Darwin’s image of an international fleet of iceberg-bearing ships and Shelley’s image of a reformed planetary ecliptic help us approach productively a recent debate about the relationship of aspirations for human freedom to the limits on freedom that seem inherent in the concept of the Anthropocene. Within the humanities, the historian of India Dipesh Chakrabarty’s essay “The Climate of History: Four Theses” has focused this debate, in part because this essay seemed to many critics to reject the project of human freedom for which Chakrabarty had strenuously advocated in his earlier postcolonial theory. In his influential *Provincializing Europe: Postcolonial Thought and Historical Difference* (2000), for example, Chakrabarty argued that the image of historical progress leading to freedom—an image common to the European liberal and Marxist traditions and also to most postcolonial movements and theory—must be retained, for only this image allows us to orient ourselves toward the telos of global justice. Yet this image of history also implied that areas of our globe outside of Europe, and everyday practices that do not conform to European bourgeois patterns of behavior, are archaic, prehistorical, or anachronistic. For liberal theorists, for example, this image of history justified, in the name of freedom, both enslaving populations of other areas of the globe or treating these as children who must be tutored in the European model of liberal citizenship.\(^{42}\) Though one might see such liberal imperialism as simply bad faith—that is, as providing ideological cover for various forms of domination—Chakrabarty stressed that precisely this same image of history unfolding from Europe also underwrites most Marxist accounts of the possibilities for human freedom.\(^{43}\) Chakrabarty’s critique was not intended to dismiss Marxist (or liberal) aspirations for global human freedom but to link their orientation toward global justice to other ways of understanding human social relations that do not conform to the bourgeois/liberal model. He
thus argued in favor of another mode of writing history, which both stresses the extent to which local and indigenous patterns of life cannot be judged within the terms of progressive history (from which perspective they will always appear anachronistic) and contests and decentralizes the liberal-Marxist progressive model of time.

Roughly a decade after the publication of *Provincializing Europe*, Chakrabarty published “The Climate of History: Four Theses.” Focusing on the implications of global warming for history, this essay seemed to undo—or at least change significantly—the aspirations for freedom and justice that were the point of *Provincializing Europe*. Chakrabarty’s basic claim in “The Climate of History” is simple: Given the “current planetary crisis of climate change or global warming,” the fate of humanity likely depends on renouncing many of those aspirations for freedom that are part of both the liberal and Marxist traditions (197). The problem, Chakrabarty contends, is that “the mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use,” for “most of our freedoms so far have been energy-intensive” (208). Though this does not mean that “analytic frameworks engaging questions of freedom by way of critiques of capitalist globalization” are therefore “obsolete,” “these critiques do not give us an adequate hold on human history once we accept that the crisis of climate change is here with us and may exist as part of this planet for much longer than capitalism or long after capitalism has undergone many more historic mutations” (212). Chakrabarty suggests that we can address the fact that the collective actions of the human species now constitute a planetary force only by framing aspirations for freedom within those limits that are part and parcel of being a biological species that can affect the entire globe (212–20).

For postcolonial scholars such as Ian Baucom, “The Climate of History” does not so much reframe postcolonial theory and its concept of freedom as abandon the latter. “The Climate of History,” Baucom claims, no longer “orient[s] us toward a future measured against the promise of freedom,” as was the case for *Provincializing Europe*, but instead “direct[s] us to (and desperately against) a future marked by the threat of extinction.” In his response, Chakrabarty in essence grants Baucom’s point, noting that where he had earlier stressed the need to interrupt the premise of progressive history by engaging the experiences of groups understood within progressive history as anachronistic, the ecological limits inherent in species existence that are underscored by the concept of the Anthropocene cannot be experienced and hence can only be included in our considerations as scientific statements of limits. Chakrabarty sees the collective activity of
humans in the age of the Anthropocene as leading us to collective extinction and hence—if we wish to avoid that fate—necessitating collectively shared limits on what counts as freedom. Baucom, by contrast, sees Chakrabarty’s replacement of “freedom” with “survival” as the means by which Chakrabarty falls prey to the same universalizing move that he criticized in his earlier work. Baucom’s solution is to continue the project of *Provincializing Europe* by retaining the historical telos of freedom but ensuring that the content of freedom remains open *both* to that “ontological plurality of the human” stressed by Chakrabarty in his earlier work (which ensures that the Eurocentric version of the history of freedom will always be “extensively interrupt[ed] and modif[ied]” by the experiences and knowledges of non-European peoples) and “the post-natural actors, agents, and actants of cyclones, heatwaves, and melting ice” characteristic of the Anthropocene (139).  

Though it is tempting to take sides here by opting either for survival or freedom, Shelley’s approach to climate change offers us another path, one that brackets the question of survival from discussions of the Anthropocene. In our era of global warming and species extinction, what is perhaps most striking about Shelley’s terraforming proposal is the *optimism* that underwrites it. Shelley valorizes events, such as the melting of the polar ice caps, that we now intensely fear. It is certainly possible that this optimism was grounded in a massively deficient understanding of the nature of global ecological processes. Though Shelley, like the other Romantic-era authors I have considered, understood global processes such as weather in terms of flows, their understandings of these were coarse in comparison with our contemporary knowledge of the interdependencies and feedback loops intrinsic to global ecological dynamics. Given these deficiencies of Shelley’s knowledge, we might be tempted to see his poem as an early instance of the technocratic belief that, just as humans could build ships to guide them across the oceans, they could also successfully engineer the entire global environment.  

If survival—whether of humans as a species or of humans in combination with their institutions—is absent from Shelley’s (and Darwin’s) accounts, it may seem that this is because neither took seriously enough the consequences of human action becoming a geological force. Yet such a critique does not fit Shelley well, for it misses the ecstasy and exuberance that mark his vision of transforming humans merging with transforming nature and that better explain the absence of survival from his account. For Shelley, the becoming elemental of humans is part of a process of “perfection.” Yet perfecting names, paradoxically, a process of employing the ruins and wreckage of human history as elements for
recuperation. In the just future to come, the earth’s inhabitants are surrounded by the wreckage of past human injustice, such as ruined castles and dungeons, yet

These ruins soon left not a wreck behind:
Their elements, wide-scattered o’er the globe,
To happier shapes were moulded, and became
Ministrant to all blissful impulses:
Thus human things were perfected, and earth,
Even as a child beneath its mother’s love,
Was strengthened in all excellence, and grew
Fairer and nobler with each passing year. (117 [Book 9])

This is not a technocratic vision of humans becoming elemental by enslaving the blind forces of an external nature to their will, nor is it a survival-oriented project of protecting humans from a threatening earth. Rather, perfecting names for Shelley the redemption of those ruins that have emerged from human history.48

For Shelley, the project of redemptive perfection begins in the experience of sympathetic joy. Following Spinoza, Shelley understood joy as a modality of love that is both other oriented and transformative of the self. More specifically, joy signals the expansive transformation of the self by means of elements that are common to the self and something beyond it—or, as Marjorie Levinson puts it, “the awareness of becoming joined to another body harmonious with one’s own.”49 For Shelley, the redemption of past injustices requires creation of a common element that enables such transformation. In Queen Mab, for example, after surveying past and present injustices in the first parts of the poem, the Spirit looks toward a redemptive future, which enables the experience of joy:

Joy to the Spirit came.
Through the wide rent in Time’s eternal veil,
Hope was seen beaming through the mists of fear;
Earth was no longer hell;
Love, freedom, health had given
Their ripeness to the manhood of its prime,
And all its pulses beat
Symphonious to the planetary spheres.50 (99–100 [Book 8])

Perfection names for Shelley, as for Spinoza, a dynamic process of humans and earth moving together into a common future, and this is a movement that will lead to—or just is—human freedom. For Shelley, such a movement
can neither be guided by advanced Europeans who know what freedom really is, nor does it require that humans compromise their pursuit of freedom in the face of the threat of extinction. Rather, it names the joyful process of redeeming the ruins of history by resolving these into their elements and molding these elements into “happier shapes.”

From One to Many Spheres

I flesh out this Shelleyian vision of a joyful Anthropocene in what follows, but to clarify why such a vision is even more necessary now than in Shelley’s time, I return to another of his images, that of the earth amid an interminable wilderness of worlds. This image helps us locate a development in global thinking that is registered by neither Chakrabarty nor his critics. Chakrabarty noted that “The Climate of History” originated in his recognition that the kind of economic and political globalization addressed in Provincializing Europe had little to say about the different kind of globalization revealed by climate change and global warming. Yet we now live in an era that, perhaps paradoxically, seems to be distancing itself from concepts of globalization altogether. Such a claim may seem counterintuitive, since we tend to think of the present as the real era of globalization, that is, the period in which processes of global networking and economic interconnectedness that were only just beginning in the eighteenth century have finally reached their full intensity and force. Yet many of these processes of contemporary globalization are encouraged by a waning of the belief that we must understand flows in terms of the logic of a globe from which no emigration is possible.

Hannah Arendt had already pinpointed the peculiar contemporary status of globalization in her discussion, at the start of The Human Condition (1958), of the implications of the 1957 launch of the Sputnik satellite, an “event, second in importance to no other, not even to the splitting of the atom.” What this event signified, according to Arendt, was not only a literal but, more importantly, an existential movement away from the earth, which latter she defined as that “habitat in which [humans] can move and breathe without effort and artifice” (and hence, “the very quintessence of the human condition”) (2). Arendt noted that many observers expressed enthusiasm about this movement of Sputnik into outer space, seeing in it a “first step toward escape from man’s imprisonment to the earth,” and she argued that this movement may have signaled the end—or at least a massive transformation—of the human condition (1). “The most radical change in the human condition we can imagine,” Arendt wrote,
would be an emigration of men from the earth to some other planet. Such an event, no longer totally impossible, would imply that man would have to live under man-made conditions, radically different from those the earth offers him. Neither labor nor work nor action nor, indeed, thought as we know it would then make sense any longer.

Though these “hypothetical wanderers from the earth” would still be human beings, their human condition would differ radically from that of those living on the earth upon which humans first emerged (9).

Whether or not one adopts the rest of Arendt’s analysis, the Sputnik launch seems indeed to have marked the end of the Romantic understanding of globalization, for from 1957 on, “flow” no longer had to be understood as limited to the one sphere upon which we currently live. The earth is now one sphere of many, though in a decidedly un-Shelleyan sense. Earth may be the one sphere on which we currently happen to live, but it is also one from which some can emigrate, at least in principle, should we embrace the technological ability to “escape from [our] imprisonment to the earth.” When Earth is no longer understood as a globe from which, as Malthus put it, “emigration would of course be excluded,” this alters how the global flows of the earth are understood.

The contest that has been waged since the 1970s over the ecological implications of those population-flow dynamics that Malthus sought to identify and describe exemplifies this transformation of the meaning of terrestrial global flows. As I noted in Chapter 2, the politics of Malthusianism have always been difficult to pin down. Though many Romantics saw Malthus’s book as propaganda for an antidemocratic, class-stratified status quo, ecologically oriented thinkers of the 1960s and 1970s saw in it a resource for critiquing the liberal commitment to economic growth. The famous 1972 Club of Rome report, for example, which argued that the dominant Fordist model of manufacture was producing ecological and social crises, grounded its claims in rigorously Malthusian logic. As Melinda Cooper notes, the report’s authors suggested that “the exponential growth of population and industry could not continue indefinitely without running up against the limits inherent in the other variables under study—namely, agricultural production, energy supplies, and pollution” (16). In other words, there are limits to economic and industrial growth precisely because “the earth is finite.”

As I also noted in Chapter 2, what is perhaps more surprising than this (vaguely) leftist embrace of Malthusianism was the neoliberal response, which involved a rejection of this global understanding of flows and
ultimately a rejection of the very concept of globalization. “Postindustrial” thinkers such as Daniel Bell argued that this Malthusian-cum-ecological reasoning assumed a “closed system” — the Malthusian sphere from which no emigration was possible — whereas new technological advancements contested precisely this assumption. Julian Simon’s *The Ultimate Resource* (1981, 1996), for example — a book supported in the 1980s and 1990s by politicians such as US president Ronald Reagan — pointed to the moon as a place from which resources could be derived.54 The authors implied that the mere fact that we could escape the earth in order to mine moon metals allowed us to rethink our relationship to our own globe by realizing that all Malthusian “limits” were in fact illusory:

Each epoch has seen a shift in the bounds of the relevant resource system. Each time, the old ideas about “limits,” and the calculation of “finite resources” within the bounds, were thereby falsified. Now we have begun to explore the sea, which contains amounts of metallic and perhaps energy resources that dwarf the deposits we know about on land. And we have begun to explore the moon. Why shouldn’t the boundaries of the system from which we derive resources continue to expand in such directions, just as they have expanded in the past?55

The passage exemplifies the change in global thinking that the Sputnik satellite launch introduced: As soon as humans could reach another sphere, our coordinates and assumptions for understanding the flows that occur upon our sphere were thrown into flux. Flows are no longer necessarily restricted to globes but can now occur simultaneously on and between globes.

Shelley’s mode of global thinking harbors resources for countering the centrifugal force of this neoliberal commitment to thinking “beyond globalization.” Shelley’s vision of planetary adjustments and a plurality of globes ties globalization to a perspective of the earth as one of many spheres, yet his many-sphere image emphasizes that contemporary visions of an unbounded “open” system — a universe of interminable globes and a lack of any ultimate limits — is ultimately a vision of un conquerable, irredeemable wilderness, rather than of plenitude. For Shelley, there are indeed other spheres, but their function is to focus us back on this one earth upon which we can live. Shelley’s image thus suggests that the criterion for determining our lived relationship to questions of limits is not that of truth — that is, the (ultimately undecidable) question of whether current limits are “really” final limits or not — but rather a linkage of freedom, justice, and beauty, that is, the question of the kind of life we want to live on the one earth upon which we have evolved.
Neoliberalism, Seeds, and Robinson’s *Aurora*

We can begin to clarify what a Shelleyan version of the Anthropocene in the age of neoliberalism might mean by turning to the contemporary (and arguably neo-Romantic) science fiction of Kim Stanley Robinson, in particular his novel *Aurora* (2015). *Aurora* takes up all of the topics I have discussed in this chapter, including the operation of untethering, the possibility of emigration from Earth, the question of flows across bounded surfaces, network construction, and the relationship of our earthly globe to what Arendt called the human condition. Reading Robinson’s novel through the lens of Shelley’s image of a wilderness of worlds also helps us understand more fully the extent to which recent neoliberal efforts to overcome limits transform the operation of untethering into a new principle, by reimagining human reproduction and relations in terms of plant modes of dissemination such as seeds and spores.

Most of Robinson’s novels fall within the subgenre of so-called hard science fiction, which draws heavily on the work of—and seeks to restrict itself to the boundaries of the possible established by—existing communities of scientists, such as physicists, biologists, geologists, and climatologists. Much of Robinson’s work has focused on the question of how human political, social, and biological relations would be transformed if, indeed, it became possible for some people to emigrate to another nearby sphere, such as Mars, while the vast majority of the human population remains on a globally warming Earth. Though *Aurora* also takes up these questions, it departs significantly from Robinson’s earlier novels about emigration from our globe, in which humans ventured outward toward different parts of our solar system but remained tethered to the umbilical center of Earth through political, scientific, and economic relations. *Aurora*, by contrast, considers emigration to a sphere so far away—one of the potentially habitable planets circling Tau Ceti, a real star system located twelve light-years from Earth—that the humans living there could no longer remain connected to Earth in any meaningful way. Though the spaceship—or, perhaps more accurately, ark—represented in *Aurora* travels at up to one-tenth the speed of light, the vast distance between Earth and Tau Ceti means that it still takes 160 years for the ship to reach its destination, and, once it has arrived, radio transmissions traveling at the speed of light from Earth nevertheless take twelve years to reach them. The distance between Earth and Tau Ceti required Robinson to cast this story within the science-fiction subgenre of the “generation ship,” which is based on the premise that multiple generations of humans would have to
live and die within the confines of a spaceship before it could reach its destination.\textsuperscript{57}

What is perhaps most striking about Robinson’s version of the generation-ship novel is that \textit{Aurora} ultimately narrates a \textit{failed} attempt to emigrate from Earth. The novel begins 160 years after the original generation of travelers departed from Earth, as the roughly 2,100 descendants of that original crew are arriving at Tau Ceti.\textsuperscript{58} Though the ship is immense and contains twenty-four different biomes, the travelers have encountered constant problems trying to keep the biomes and their plant and animal inhabitants (including humans) healthy. This is in part because bacteria and viruses mutate more quickly than other forms of life on the ship and in part because of the extraordinary difficulty of taking into account every ecological cycle upon which living beings depend.\textsuperscript{59} It is, as a consequence, not clear that humans will be able to survive on the ship much longer. Yet when a contingent from the ship tries to establish a base on one of the planets of Tau Ceti, many of the landing party are killed by something indigenous to the planet’s soil—perhaps a new kind of prion, but in any case, something so different from earthly categories of threat that it is not even clear what it is or how to combat it. The inhabitants of \textit{Aurora} are then faced with a hard choice: continue on toward yet another (possibly) inhabitable planet within the Tau Ceti system or admit failure and head back to Earth, which would mean seven more generations of humans living out their existence on the ship before it arrives. This choice provokes a civil war, which results in the ship—which was designed to be split in two—dividing, one half headed outward in search of another inhabitable planet and the other half returning to Earth. The narrative follows only those who return to Earth. Unhappily for this group, the ship’s ecology seems to be failing for good, rendering it unlikely that another seven generations of humans could survive until the ship reaches Earth. Luckily—albeit also as something of a narrative deus ex machina—the ship receives radio transmissions from Earth that document advances in suspended-animation techniques, with the result that the ship’s denizens are able to freeze themselves for the duration of the return voyage.

Yet the ship’s inhabitants “return” to an Earth that they themselves have never known and that has largely forgotten about the original voyage outward of these emigrants. Nor are the various Earth governments particularly interested in these survivors. However, the latter are at one point asked to present their thoughts at an international forum devoted to the possibility of sending out new ships to even more distant star systems. In
response to this proposal, Aram, one of the survivors, delivers a speech with an Arendtian ring:

No starship voyage will work. . . . This is an idea some of you have, which ignores the biological realities of the situation. We from Tau Ceti know this better than anyone. There are ecological, biological, sociological, and psychological problems that can never be solved to make this idea work. The physical problems of propulsion have captured your fancy, and perhaps these problems can be solved, but they are the easy ones. The biological problems cannot be solved. And no matter how much you want to ignore them, they will exist for the people you send out inside these vehicles. . . . The bottom line is the biomes you can propel at the speeds needed to cross such great distances are too small to hold viable ecologies. The distances between here and any truly habitable planets are too great. And the differences between other planets and Earth are too great. Other planets are either alive or dead. Living planets are alive with their own indigenous life, and dead planets can’t be terraformed quickly enough for the colonizing population to survive the time in enclosure. Only a true Earth twin not yet occupied by life would allow this plan to work, and these may exist somewhere, the galaxy after all is big, but they are too far away from us. Viable planets, if they exist, are simply too—far—away. (459–60)

Where Arendt had granted the possibility of humans emigrating to another planet, Aram argues that, for practical reasons, this is not in fact possible. While both *Aurora* and Robinson’s other novels about terraforming suggest that humans can live on other spheres within our solar system, humans in that case remain in a fundamental sense tethered to Earth, the globe of human origin. But to travel from Earth to another inhabitable planet, humans would require a spaceship nearly the size of Earth itself, for anything smaller will not allow for biomes with “viable ecologies.” As a consequence, Aram concludes—and one senses that this is also Robinson’s conclusion—that it makes no sense to try to send humans to other stars. To return to Shelley’s *Queen Mab*, though “the countless spheres” of the universe present an image of “ever-varying glory,” any attempt to reach other planets transforms them into a wilderness.

The discussion’s moderator objects to Aram’s statement, however, and his counterargument reveals the inhuman logic that stands behind aspirations to colonize the cosmic wilderness. The moderator contends that no general conclusions should be drawn from the individual case of Aram and his fellow survivors, and one ought instead to view this from a broader perspective:
There are really no physical impediments to moving out into the cosmos. So eventually it will happen, because we are going to keep trying. It’s an evolutionary urge, a biological imperative, something like reproduction itself. Possibly it may resemble something like a dandelion or a thistle releasing its seeds to the winds, so that most of the seeds will float away and die. But a certain percentage will take hold and grow. Even if it’s only one percent, that’s success! And that’s how it will be with us— (460)

Before the moderator can finish his sentence, Freya, the novel’s main protagonist, runs up to the moderator and begins to pummel him with her fists (461). Later, when Freya has calmed down and Aram asks her to explain her actions, she stresses the latter’s comparison of human beings to seeds or spores:

> It isn’t just foolish, it’s sick. Did you hear what he said? Dandelion seeds? Ninety-nine percent sent out to die, as part of the plan? Die a miserable death they can’t prevent, children and animals and ship and all, and all for a stupid idea someone has, a dream? Why? Why have that dream? (462)

Through her act of spontaneous violence, Freya seeks to oppose the extraordinary transformation of the operation of untethering from the earth that the moderator proposes. In Malthus’s foundational images of populations covering the globe, vegetation played a paradigmatic role, for he exemplified population growth with the image of the earth being encircled by flows of fennel and urged his readers to imagine human populations as motivated by this same basic drive. Malthus also claimed that population questions should not be considered from the perspective of individuals but rather with a view of the species as a whole: “In reasoning upon this subject, it is evident that we ought to consider chiefly the mass of mankind and not individual instances.” Yet Malthus also ultimately undid his initial identification of human and plant populations, both by stressing the orthogonal drag of the less intensive growth of human food sources on human population growth and (in later editions of his text) by noting human capacities of “moral restraint” that enabled humans consciously to moderate human population growth.

In *Aurora*, by contrast, the moderator pushes even further the operation of untethering that underwrote Malthus’s opening image of vegetative reproduction. For both Malthus and the moderator in *Aurora*, humans and plants have a blind reproductive drive that propels them to cover every available territory. However, the moderator suggests that human reproduction should be consciously and actively reconceived and modeled on the
reproductive strategies of plants such as dandelions, which cast off as many seeds as possible so that at least one or two will survive. As a distant descendant of one of the original emigrants to leave Earth several centuries earlier, Freya is well aware that this transplantation of human reproduction and survival into a plant model can never be restricted to the choices of those individuals who choose to leave Earth but of necessity also forces all their progeny into this same mold.

As both Freya’s initial anger and subsequent incomprehension—“Why have that dream?”—underscore, the moderator’s dream of transforming humans into seeds is ultimately incoherent. Though dandelions and thistles indeed release “seeds to the winds, so that most of the seeds will float away and die,” plant species do so within the flows and orthogonal drag of the earth; neither dandelions nor thistles send seeds into space. This vegetable mode of propagation only makes sense, in other words, as a kind of flow around a globe. Though the moderator partially acknowledges this through his use of analogy—the movement of humans to the stars would only be “like” the thistle’s release of seeds—it is unclear to Freya (and likely to many of Robinson’s readers) what kind of human goal would be served by this transformation of human reproduction. Even if 1 percent of those human “seeds” survive, they will remain effectively isolated, even in terms of communication, by the vast interstellar distances between Earth and the 1 percent who survive. This is no longer colonization, which presumes some communication between origin and colony, but simply mute dissemination. It is for this reason that sending humans beyond the solar system turns what Shelley described as the “ever-varying glory” of the stars into an “interminable wilderness/ Of worlds.” And hence Freya’s question: Why have that dream at all?

**Building Beaches: Joy and the Allegory of the Tube**

Treating the plot of *Aurora* as an allegory for contemporary neoliberalism helps us expand on the connection between ecstatic joy and the joint transformation of humans and the earth that Shelley proposed in *Queen Mab*. Reading *Aurora* allegorically suggests that the novel describes not the future of contemporary neoliberalism—for example, some stage that occurs after the neoliberal desire to mine the resources of other planets in our solar system has been realized—but rather our present. The parallels between *Aurora* and the present are illuminated by the fact that the spaceship’s inhabitants occupy a tube, not a globe; that is, they live within a container,
not upon a sphere. The premise of this enclosed form of living is that it would enable complete control of the environment, in contrast to the relative lack of such control that characterizes human existence lived on the surface of the earth. As the urban historian Chris Otter has noted, tube-living has in fact become the current state of affairs for a sizable minority of humans, for the development of a “technosphere” of infrastructure and devices

allows humans to progressively abandon a largely outdoor existence, and to retreat into increasingly sealed, climate-controlled spaces. . . . Air conditioning, for example, has transformed American housing, energy use and demography. . . . Air conditioning has facilitated a “great enfolding” of humans. One recent study found that Americans spent only 7.6 per cent of their time outdoors. . . . The technosphere is a new phase in the history of human niche-construction. It is ruthlessly cleansed, with sanitized surfaces, vacuum cleaners, disinfectants and antibacterial soaps.62

The great enfolding enabled by devices such as air conditioning and antibacterial cleansing has created vast *Aurora*-like tubes on Earth. Though Erasmus Darwin had hoped to create a fully air-conditioned globe, it has turned out that his dream could only be realized by enfolding a significant amount of human life on Earth within interconnected tubes, which allow humans to move from air-conditioned, sterilized houses to air-conditioned, sterilized cars, to air-conditioned, sterilized work spaces, and then back again to houses.63 However, just as the tube-existence of the *Aurora*‘s inhabitants is ultimately unviable within Robinson’s novel, so too, it turns out, is our actual mode of living within tubes on Earth, as the fact of global warming makes clear.

The return of *Aurora* to Earth is thus an allegory not only for our need to exit contemporary tube-life and step into the exposed and far less physically comfortable position of globe dweller but also for the necessity of taking the elements of this ruined earth and molding these into “happier shapes.” For Freya, who has never known anything but tube-life, the movement out of her container is literally overwhelming, and for many months she is unable to bear the vastness of the earthly horizon and sky and must remain in enclosed spaces. Moreover, when Freya is finally able to emerge from her Earth-tube, it is onto a globe that has been massively damaged by global warming. Freya is only able to begin to live on the earth without fear of its vast spaces after a conversion experience that follows the path of joy. On Freya’s Earth, “there are no beaches,” for
Sea level rose twenty-four meters in the twenty-second and twenty-third centuries of the common era, because of processes they began in the twenty-first century that they couldn’t later reverse; and in that rise, all of Earth’s beaches drowned. Nothing they have done since to chill Earth’s climate has done much to bring sea level back down; that will take a few thousand more years. (468)

Freya and other survivors of *Aurora* join a group that creates new beaches. This group uses technology to reform elements of the ruined earth—in this case, the relationship of water and sand—into happier shapes. They do so not for the sake of survival or to align the globe with the climatic ideal of a specific geographic region, as in Darwin’s desire to make the entire world conform to the standard of a comfortable British summer day. Rather, they do so to enable an affective connection to that “lifeway that went right back to the beginning of the species in south and east Africa, where the earliest humans were often intimately involved with the sea” (468).

This form of beach building draws out the implications of the strange Platonic–Spinozan allegory of the tube that results from reading Robinson through Shelley. In Plato’s allegory of the cave, Shelley’s spiritual journey in *Queen Mab*, and Robinson’s allegory of the tube, the achievement of earthly justice requires emergence from an enclosed space, and this emergence enables a new, redemptive vision. Yet in Shelley’s *Queen Mab*, this vision does not move the Spirit away from the earth and toward the eternal Forms but instead requires a reenvisioning of the earth and its polar coordinates:

> man, with changeless nature coalescing,  
> Will undertake regeneration’s work,  
> When its ungenial poles no longer point  
> To the red and baleful sun  
> That faintly twinkles there.

In the late eighteenth and early nineteenth century, “regeneration” was a theological term that meant “rebirth,” or “the act of being born again by a spiritual birth, or becoming a child of God.” For Shelley and Robinson, regeneration requires an embodied realignment of the relationship between human bodies and the earth’s polarities, but this itself requires a reorientation toward the injustices of the past and possibilities of a just future. To emphasize the coalescence of humans and nature, Shelley describes this as a literal reorientation of the earth’s poles in their relationship to the sun, while Robinson stresses the “subjective” side of this reorientation through
his representation of Freya’s hard-won ability to endure the earth’s immensity. Shelley’s Spirit and Robinson’s Freya orient themselves toward the forms of Beauty, Truth, and the Good, but such a project is understood as reparative rather than utopian, that is, a matter of taking relationships among humans and between humans and nonhuman nature both as they have been and as they are now, and seeking to redeem these through joy. *Aurora* suggests that there are two sides, or slopes, to this kind of reparative beach building. On the one hand, the rebuilt beach is a scene of corporeal instruction, through which one learns to locate elements common to one’s own bodily capacities and the forces of waves and sand, which in turn enables a reorientation toward the earth. The novel illustrates this slope of the beach in its extended final scene, in which Freya nearly drowns in the waves close to the shore before learning how to coordinate her body sufficiently to the rhythm of the waves so that she can crawl back out of the water. Yet even as the literal slope of the rebuilt beach is oriented toward the individual human body, the project of creating a beach commons is also “sloped” toward a long history of historical and even prehistorical human ancestors. This latter, more metaphorical slope of the beach is the surface along which questions of justice are engaged. As I have noted, Chakrabarty’s critics worry that the concept of the Anthropocene unjustly blames “humans in general” for our current situation and thus encourages solutions to global warming that are unjust to those already suffering the most from the specific kinds of human relations—capitalist, racist, and sexist—which are responsible for these problems. Freya’s project of beach building orients itself toward these questions of justice by creating a contemporary commons, rather than an enclosed beachfront property, that also forms a commons with past patterns of human existence. This is not a commons with all past forms of human existence; as the narrator notes, the rebuilt beach makes common cause only with “the joy of the relatively few humans who were lucky enough to live on the strand” (469). It is, rather, a very specific commons that aims to mold specific ruins into specific happier forms. Yet the rebuilt beach enables joy because it is both a corporeal commons established at the interface of water and sand and a transhistorical commons that connects with the long history of human beach dwellers.

**Conclusion**

The project of rebuilding beaches on a massively damaged Earth may seem like an unhelpfully playful, even capricious, image with which to end a discussion of how to respond to the overwhelming threats of the
As Bill McKibben has noted, for all intents and purposes we no longer live on that Earth that was inhabited by humans for the last two million years; instead, we now live on what McKibben calls, to capture its strangeness, “Eaarth.”67 Where for the last ten thousand years, Earth had a stable average temperature range warm enough that “the ice sheets retreated from the centers of our continents so we could grow grain, but cold enough that mountain glaciers provided drinking and irrigation water to those plains and valleys year-round,” Eaarth is, by contrast, growing much hotter and is characterized by increasingly acidic oceans; a greater number of huge, unpredictable storms; more and more disease-bearing ticks, mosquitoes, and other pests; declining grain yields; and expansion of areas of the globe that are simply uninhabitable for humans. Lost beaches, it seems, will be the least of our worries as we determine whether large and complex human cities and societies are actually compatible with Eaarth.

Yet the problem with McKibben’s description, however accurate it may be, is that—like Chakrabarty’s approach—it orients us toward questions of survival and its associated logics of defense, limits on freedom, violence, and immunity. Robinson’s description of beach building, by contrast, turns us toward Shelley’s understanding of what it can mean for humans to coalesce joyfully with nature and encourages us to imagine and invent other projects that would enable the kind of serious play involved in reparative beach building, that is, the kind of play that produces joy because it combines an individual scene of instruction with transhistorical projects of justice and redemption. These projects keep the injustices of racism, sexism, and capitalist exploitation in the foreground, for it is only by acknowledging long and multiple histories of injustice that we can approach the ruins of history as elements—that is, starting points that cannot be dissolved away into the abstraction of “the human”—which can then be remolded into happier shapes.68 The projects that McKibben champions, such as a turn toward local food and energy production, might indeed be other examples of this approach.69 However, for them to be so, “the local” must then name a site of both individual corporeal instruction and historical redemption. This would mean, for example, keeping in the forefront, and seeking to redeem, the long history of injustices associated with each locality within which new practices of “the local” are to be developed. (To take an example from my own locale, Trees Durham is a nonprofit organization that seeks to readdress a long historical relationship between city-sponsored tree planting and racial redlining practices in Durham, North Carolina, by guiding future city-sponsored tree-planting
Though it seems to me unlikely that all of the more contentious projects advocated by Stewart Brand, which range from increasing urbanization to more nuclear power to transgenic crops and even to geoengineering projects such as placing sulfates in the stratosphere, could participate in the coalescence of humans and nature to which Shelley pointed, even these extreme possibilities should not be rejected out of hand. However, the burden should be on those who advocate these measures to show how, concretely, such projects engender joy by engaging the two slopes of individual instruction and historical redemption exemplified in Robinson's project of beach building.