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20 November 1998: Dawn

*two sounds you can hear at this
tucked-up hour
first this: the sound of everything
repeating
...
then this: the sound of everything
repeating*

Alice Oswald, 'Tithonus: 46
Minutes in the life of the Dawn'

In the closing years of the twentieth century a strange nativity took place, a miraculous conception that occurred when Russia launched the first module of what would eventually become the International Space Station (ISS). Like Gabriel whispering to Mary, conveying God's word that she would bear a child who would unify the heaven and earth, US Vice President Al Gore in 1993 breathed into Russian Prime Minister Viktor Chernomyrdin's ear the words that allowed Russia to gestate and deliver this module. Named *Zarya* – usually translated as 'Dawn' (though also known more prosaically as the 'Functional Cargo Block') – this module promised an age of international co-operation that would transcend the mundane and conflicted space of the world, allowing us to rise above and beyond the territorialism that has maintained an earthly disharmony. What the world had the potential to be was, in the moment of *Zarya's* launch, therefore seen to be finally within reach for humanity, not only because it provided new opportunities – a new space – for international collaboration but also because polity could become detached from the ground. At last, it seemed, humanity would be able to look down and see itself as a population united by a shared planetary inhabitation. After a long age of darkness, illumination and enlightenment had come.¹ If we want to identify the moment at which the world

was born for the first time then we could do worse than point to the genesis that occurred – the dawn that was announced – on the date that *Zarya* was launched: 20 November 1998.

This nativity is strange for a number of reasons. First, despite the idea that the arrival of inhabited orbital space would allow national divisions to dissolve, the agreement between Gore and Chernomyrdin nevertheless left the principle of national sovereignty firmly intact: Russia and the United States were to be held accountable to their particular contractual responsibilities, and the principle of the proprietary nation-state was reasserted in the agreement that the United States would own *Zarya*. Second, the narrative of unprecedented globality associated with this module's launch suggests a kind of phenomenological or ontological tension, since it would seem that it is necessary to leave the earth if we are fully to experience or perceive its unity; it suggests that the world arrives in the moment that the ground is left behind. Third, this nativity is strange because it had happened before and continued to happen afterwards. If the world was born for the first time on 20 November 1998, then it was also born for the first time on 12 April 1961, when Yuri Gagarin became the first person to orbit the planet. The ground stations with which Gagarin communicated were named *Zarya* 1, 2 and 3; the name of his craft, *Vostok*, can be translated as 'East', but also 'Dawn' and the press conference following Gagarin's flight was headlined 'The Dawn of a New Era'.²

The world was also famously born for the first time on 10 August 1966, when NASA's robotic Lunar Orbiter 1 briefly turned its cameras away from mapping the moon's surface to capture the earth within a single frame for the first time, apparently providing visual authentication of the earth as a determinate planetary body, but also establishing the cognitive foundations for conceiving the world as a complete entity that is in possession of itself. It was born again for the first time on 21 December 1968, with Apollo 8's image of the earth coming into sight over the moon's horizon, an image subsequently and memorably named 'Earthrise'. Seen for the first time in this manner – with a more advanced camera and, in what appeared to be an important development, one held by a human hand – the world once again suddenly appeared as itself. When *Time* magazine reproduced this image in 1968, Denis Cosgrove points out, 'it gave the image the caption "Dawn"'.³ Perhaps because the earth that is captured here remains incomplete (it is partly obscured and becomes an accessory to the moon that appears in the foreground of this photo), the world was born again for the first time on 7 December 1972 with image AS17-148-22727, the 'Blue Marble' photo taken by the Apollo 17 mission, which was widely treated as revealing the earth as an isolated and vulnerable biosphere, an integrated and organic ecology that

is threatened by the population that is seeing this precarity for the first time.⁴ This birth of the world for the first time happened again on 18 December 1999, with the launch of the Earth Observing Satellite *Terra* which monitors changes to surface and atmospheric conditions over time; and it happened again for the first time on 14 May 2010, with the launch of the *Rassvet* ISS module which two days later was joined to the *Zarya* module. In a strange recognition that the world did not successfully emerge when the *Zarya* module was placed in orbit, the name of the *Rassvet* module also translates as 'dawn'.

Further complicating this strangely repeated conception are the perplexing names that have been assigned to some of the ISS's other modules. In 1998 and 2007, the *Unity* and *Harmony* modules were added to the expanding architecture of the ISS, forging a narrative of togetherness that is not fully cohesive in its announcement of the world's unification from above. Dawn – *Zarya* – begins without unity, this nomenclature suggests. If the ISS promised a new dawn for humanity, then the universal or co-operative condition that it announced could not have existed beforehand, even though its construction was celebrated as the culmination of an almost decade-old, post-Cold War, internationalism. *Zarya's* dawn was, in other words, detached from the idea of an established global actuality, intimating a dawn that was to be the inspiration for, rather than the expression of, a world coming together. Furthermore, the names of the ISS modules indicate that unity arrives without harmony. And, when the togetherness and concord that the *Unity* and *Harmony* modules proclaim are eventually accomplished, a new beginning is needed. At this culminating point, the *Rassvet* module arrives and the promise of a transformative dawn is renewed. The conception and delivery of the world by the ISS are therefore repeated in acts of self-duplication or self-supplementation that constantly ground and reground earth from orbit. As well as the tension that shapes the notion of an original and total vision that is both immediately complete and ceaselessly perfectible, the ultimate machine that facilitates such a vision is similarly understood as being at once fully operative and requiring further additions that endlessly postpone its purpose of bringing the world together.

There are many other instances in which the ascent of vision to orbit is associated with the world's unprecedented appearance. Gagarin's flight is often treated as the moment in which the human eye first regarded the earth from beyond its atmosphere. 'As his spacecraft slowly rotated,' Henry Vaughan writes, 'Gagarin looked at the Earth below him ... It was not lost on him that he was seeing the Earth as spherical, with his own eyes – the first time any human had been able to do so.'⁵ The first observation of the earth from orbit and the

corresponding sense that the world could at last be seen fully have been traced to the satellites of the late 1950s⁶ and to the *Telstar* satellite's global TV transmission in 1962. The persistence of this narrative of the world's orbital origination can be found in claims that high-resolution satellite imagery and live streaming from orbit finally allow the world to be viewed intensively and as an entity that moves in time. This narrative has perhaps become most recognizable as a feature of recent debates about the tools through which global society flows. Satellites, Lisa Parks rightly notes, 'are now at the core of our global telecommunications infrastructure, and they have become a principal means through which we see and know the world and the cosmos beyond'.⁷

II

In spite of its persistence – or perhaps because of the tenacity with which it has remained essential to the discourse of seeing and being in orbit – this narrative needs to be challenged; it has never successfully launched and it cannot endlessly circulate as an account of how the world is revealed. In each instance, images from orbit deliver a world that is complete in time but incomplete in space. First, this world is born from a neglecting of the temporality through which it is revealed and in which it moves. It appears in images from orbit as an immobile object, but also there is no sense of the perceptual precedents that establish the conditions for its visualization: it is as though the immediacy of seeing the world for the first time is the same as seeing for the first time – there is no acknowledgement that the idea of the world as suddenly present requires either an existing mode of perceiving or a process of coming to presence. Second, all we see in these images is a single aspect of the earth that is delivered on a two-dimensional plane: much of the planet remains unobserved and must be assumed independently of experience and without confirmation from visual evidence. In this manner, the Apollo photos and images of earth from orbit provide an example of the 'certain *inadequacy*' that for Edmund Husserl belongs to 'the perception of physical things'. A fundamental condition of consciousness, this perceptual inadequacy for Husserl means that things can be observed, but only from one aspect. 'Of necessity', he writes in the first book of *Ideas*, 'a physical thing can be given only "one-sidedly"; and that signifies, not just incompletely or imperfectly in some sense or other, but precisely what presentation by adumbrations prescribes. A physical thing is necessarily given in mere "modes of appearing"'.⁸ Rather than presenting itself as a total entity – indeed, even as a complete sphere –

the world gives itself to representation in these photos, but only in one aspect. Even if something of its immanence becomes visible – ‘a core of “what is actually presented”’⁹ according to Husserl’s understanding of perception – this appearance is made unreliable by how it becomes comprehensible. It is observed not as an internal self-disclosing entity that can be isolated from everything else that surrounds it but as something that is seen and understood in relation to external entities. This is what Husserl describes as a ‘mode of appearance’: it ‘is apprehended as being surrounded by a horizon of “co-givenness”, which is not givenness proper, and of more or less vague indeterminateness.’¹⁰

Husserl therefore warns that we should be cautious of treating images of earth from above as capturing the fullness of something that is fixed within its own space. In *Ideas*, he also notes that repetition is fundamental to the perception of a thing, since each time it appears it acquires a new character. Although observation is unable to determine what is perceived – although it can produce only shadowy outlines and faint images – it is engaged in a perpetual effort to see fully and to know finally. For Husserl, this indeterminateness ‘points ahead to possible perceptual multiplicities which, merging continuously into one another, join together to make up the unity of one perception in which the continuously enduring physical thing is always showing some new “sides” (or else an old “side” as returning) in a new series of adumbrations.’¹¹ Images of earth from above should, then, test our credulity because they cannot provide an authentication of a world that is fully encompassed within the field of vision. But they are also not to be trusted because the world changes each time that it is conveyed by an image that is credited with finally revealing it. Despite assertions that the world as a stable facticity is revealed, this thing takes on a different character each time that it is seen to appear. A recurring production of the world’s sameness occurs in the discourse of the world’s arrival. Indeed, such a repetition is the condition of the possibility of the world’s appearance; as with all acts of repetition, however, something different is always at work, changing the thing that is treated as permanently present to itself.

In *Apollo’s Eye*, Cosgrove documents some of the ways in which a variable character has been assigned to the world following its photographic capture from orbit. ‘The lunar view of the earth’ provided by Apollo 8’s ‘Earthrise’ image was seen finally to allow ‘a true gauging of human proportion and relations with the planet.’¹² As Chapter 3 argues, the idea that such a measurement discloses the actuality of the world needs to be placed within the persistent quantification of the earth as a home that is spherically at one with itself, nurturing its populations, and retaining its own astronomical self-presence. This is an

image of a complete space, but also one that surpasses the mundane interests and conflicts that preoccupy those on the ground; it produced, he writes, ‘an unconscious but perhaps predictable set of responses – marvel at a vast yet tiny earth, reflection on the insignificance of self, and yearning for human unity’.¹³ However, as much as the earth is here projected as a single space that is shared by its human inhabitants, for Cosgrove ‘Earthrise’ also triumphantly conveys the exceptionality of those who were able to make the world appear for the first time. This image ‘frees its imperial inclusiveness from all contingency’; it establishes the sovereign right to envisage a shared planet by providing ‘visual confirmation of American democracy’s redemptive world-historical mission, namely, to realize the universal brotherhood of a common humanity’.¹⁴

In contrast, Apollo 17’s ‘Blue Marble’ photo appeals to a familiar sense of how the world has been imagined, locating and illuminating ‘a perfectly circular earth within a square frame, mimicking the *mappa mundi* or the hemispheric planisphere’.¹⁵ Recalling images of the earth depicted in medieval maps or in star charts that situate the world in astral space, ‘Blue Marble’ has become so celebrated because it represents the world as a collection of recognizable geographical features. However, Cosgrove notes that ‘while the photo can readily be matched to the mapped image of the earth, it upsets conventional Western cartographic conventions’.¹⁶ Stripped of the cartographic graticule – the grid used by geographers and map makers to divide the world into linear co-ordinates – the earth ceases to conform to the notion of a containable and measurable regularity that earlier images have sought to establish. Appearing ‘to float free as a *sui generis* organism’,¹⁷ it has become a smooth, vital, and autonomous place, a self-governing ecology rather than captured and revealed by the exceptional and heroic efforts of a particular nation. Furthermore, Cosgrove points out that the ‘Blue Marble’ has Africa and Antarctica at its centre and removes Western regions from view. This aspect therefore displaces the centres of global social and political authority, coinciding, he writes, ‘with a broader political and cultural thrust to imagine and articulate a globe without a privileged center and subordinated periphery, in which all voices across a decolonized globe, regardless of location, claim equal rights to announce their unique place, memory, and vision’.¹⁸ This symbolic function shifted when ‘Blue Marble’ was subsequently taken up as the image that would accompany the emerging environmentalism of the 1970s. What Cosgrove suggests, then, is that between these two images – between Apollos 8 and 17 – the world changed. If it appeared in 1968 as a distributed and shared space (although one where seeing from above is claimed as an exclusive right by those who first gain this

perspective), then it arrived in 1972 with a different character, as the motivation for a politics that both refused the co-ordinates of power and set a new course for social action and intervention.

Similarly, although Gagarin's flight was proclaimed as the moment in which the earth was first viewed from orbit, the earth that he witnessed does not match that of other accounts by those who have ascended beyond the atmosphere. During the flight, Gagarin triumphantly declared that he had indeed gained an unprecedented perspective – 'I see Earth,'¹⁹ his flight transcript records – but subsequent comments by him point to a less complete vision. 'The Earth's surface looks approximately the same as seen from a high-flying jet plane', Gagarin reported after returning to the ground, 'Clearly distinctive are large mountain ranges, large rivers, large forest areas, shorelines, and islands.'²⁰ Gagarin's voyage has also been understood not as the moment in which a human eye first regards the earth, but as the point at which humanity became celestial. 'Humans, for the first time, caught a god's eye view of the planet they live on,'²¹ Shawn William Miller remarks, suggesting that visualization of the earth makes people less worldly. Rather than gaining a new sense of proportion, seeing ourselves merely as inhabitants of a larger ecosystem or as well-intentioned internationalists who are seeking a solution to nationalism and regionalism in the realm above the planet, the divine gaze attained by those in orbit renders the world containable by the human eye. It therefore establishes an order of mastery and subjection that becomes refigured by the Apollo 8 and 17 images, both of which work ambivalently both to contain the world as a grounded positivity and to convey the sense of something greater than its human inhabitants.

It would be possible, of course, to reach for a technical-evolutionary explanation of the difference in perspective between Gagarin's description of the earth and the sense of a planetary wholeness that is associated with the Apollo images. Gagarin's flight reached an altitude of between 300 and 400 km, Apollo 8 orbited the moon and Apollo 11 was the final mission to place astronauts on the lunar surface. In other words, we might suppose that as the technology of space travel advanced and greater distances were travelled from the earth, it became possible to attain a more complete picture of the planet in its entirety. What troubles such an explanation is that leaving the earth is no longer (or, at least, not currently) associated with intrepid missions to other astronomical bodies and going further is no longer treated as a condition for seeing better.²² If anything preserves the association of heroic odyssey – and exceptional world unification – with travelling into space then, as this chapter has observed, it is the ISS that fulfils this function. Embedded in the assembling of this station is the

promise of a new internationalism that takes as its premise the idea that the world is globalized from above and proceeds on the assumption that only this station can deliver such a shared sense of planetary community.

And yet, the narrative of orbital image-making that has emerged in the context of the ISS is closer to Gagarin's vision than to the insight that has been attached to the Apollo images. The pictures that descend from this place are not of the earth captured by a human eye that has gained a sovereign or divine perspective; they are not of the world itself, but of partial fragments and topographical details, of features rather than an ecosphere, of clouds and oceans, of coastlines and horizons, of deserts and glacial plains, and of the chiaroscuro effects of light and shade. The world that they indicate is not self-evident or orderly but an atomized composition that is repeatedly forged from bits of planet. Often, these images evoke a sense of the uncanny by making the earth both recognizable and outlandish, showing its familiar contours but also revealing places that seem fantastic and improbable. And, whereas missions of the 1960s and 1970s delivered only a few iconic images, photography on the ISS has resulted in an abundant array of images that are just as captivating to those who view them even if, ultimately, they cannot be seen to capture the earth as a decolonized globe, fragile organism, sanctuary or world. Chris Hadfield, the Canadian astronaut who became commander of the ISS in 2012 and 2013, is perhaps most often credited with this sudden proliferation of photos from orbit. Across various social media platforms, in particular Twitter, Hadfield has distributed many striking photos (about 45,000, according to his own estimate²³) that have revealed the world as a hypnotically weird place. When introducing these images, Hadfield indicates that the world does not immediately present itself to the orbital gaze, but is a 'strange'²⁴ place that can be caught only through 'methodical planning'.²⁵ 'Some places eluded me', he remarks, proposing not a vision that encompasses, but a non-absolute and inessential perspectivism: 'I didn't want my pictures to look like satellite images ... I wanted them to have a human element, to express a point of view'.²⁶

As with other beginnings, the sudden production and mass distribution of a profusion of images from orbit had occurred previously, and certainly before Hadfield started to post pictures to social media platforms. NASA astronaut José Hernández in 2009 used Twitter to distribute photos of the earth from the ISS, as did JAXA astronaut Soichi Noguchi between 2009 and 2010. As with those taken by Hadfield, the images produced by Hernández and Noguchi document only fragments of the world. This sense of a partial or impossible vision continues in Tim Peake's 2016 collection *Hello, Is This Planet Earth? My*

View from the International Space Station, which describes a planet that ‘reveals itself as a vast geological puzzle,’²⁷ is marked by divisions and permits both seeing and not seeing. This world stuns, overwhelms and mesmerizes. Dominating Peake’s account is not the celebration of an encounter with the earth itself, but an explanation of the practical and technical considerations that apply when taking photos in orbit. Lenses, reflections, lighting conditions, radiation and camera degradation, Internet speed and the unavailability of Google Earth shape this view from the ISS. Peake defers to the legacy of Apollo 8’s ‘Earthrise’, and he reproduces the idea of a unique perspective from above, but more pronounced here is ‘the discovery of a new-found passion for photography’. Less a declaration of the earth’s epiphanic revelation, this is more a story of personal development: ‘Looking back now’, Peake writes, ‘it seems strange that I didn’t expect taking pictures to have a major impact on me. How wrong I was.’²⁸ Peake’s account seems almost to have given up on the idea of a world that is disclosed in its full actuality, and instead it seems to resonate with Marshall McLuhan’s claim that with ‘the capsule and satellite ... the planet has become an anti-environment, an art form, an extension of consciousness, yielding new perception of the new man-made environment.’²⁹ Peake’s narrative is not of a world caught within an astronautic gaze, but of image-making, of the artifice of seeing, recording and conveying. It is reflexively captivated by the procedures for recognition that need to be observed before looking can take place in orbit. Accompanying the recent proliferation of images of the earth from orbit is, therefore, a departure from the mythification of the world that occurred with Apollo-era photography and a return to the partial vision that Gagarin describes.³⁰

III

The term *orbit*, according to the *OED*, is an ambivalent signifier, deriving from the Latin *orbita* (the course of a celestial object) and the Middle French *orbite* (the eye socket). Present-day usage retains both the astronomical and anatomical roots of this term: it continues to refer to ‘the bony recess of the vertebrate skull that contains the eye and its associated structures’ and to ‘one complete circuit made by an object around the orbited body’; it is also used figuratively to refer to ‘a fixed course or path; (also) the sphere of activity, influence, or application within which a person or thing normally moves or operates’. Furthermore, its morphology points to a collision of meanings. This term has functioned as a nominalized adjective: it describes a movement and denotes an entity, it has (in

a now-obsolete usage) been the name for a celestial sphere and it is used (mainly in poetic contexts) to refer to the eyeball. These senses collide in the current association of planetary circumnavigation and observation of the world, and the ambivalence of this term reflects the uncertainty that seems to result from perception from above. Declarations of a new dawn in orbit appeal to the notion of the world's dramatic disclosure, and yet they do so anxiously. The world that appears in orbit is a disjunctive and unencompassable place; the proliferating images of the earth's spectacular appearance indicate a world that is, in or of itself, impossible to see; and it is the eye and its supplementation by optical instruments that fascinates the orbital gaze. When we look from this place, we hear what Alice Oswald describes as 'the sound of everything repeating';³¹ this sound resonates with Jacques Derrida's observation that 'Death is at the dawn because everything has begun with repetition'.³² For these reasons, a more cautious watchfulness is needed in narratives of the world's revelation from above.

To associate knowledge of the planet with a newly achieved orbital perspective is to neglect the deep conceptual bond between the concepts of dawn and world. 'In a dawn that took centuries', Peter Sloterdijk writes, 'the earth rose as the only and true orb, the basis of all contexts of life'.³³ To associate knowledge of the world with its visualization in orbital photography is, of course, to preserve the long history of an ocularcentrism that privileges sight as the primary source of knowledge. Among the earliest, and most cited, examples of where the world's observation is seen to coalesce with its comprehension are Plato's middle and later dialogues. In *Timaeus*, for example, he formulates a cosmology that conceives planetary bodies as spherical, rather than flat as pre-Socratic thinking had largely assumed. The earth is 'subjected to the revolution of the Same and uniform',³⁴ Plato writes, although (as Chapter 7 will argue) this dialogue does not consistently describe the earth as a planetary body that moves within its own orbit. Furthermore, for *Timaeus*, planetary rotation bifurcates time ('day and night came into being'³⁵ because of the earth's revolution), but this movement also provides us with a single numerical unit that acts as the guarantor of measurement and calculation. Turning within its own space, then, the earth's character becomes disclosed not in the revelation of a new dawn – through the uncertain and inexact experience of being between darkness and light – but in the repetitive daily cycle that comprises two separate states which combine to forge a perfectly quantifiable unit in time.

In *Phaedo*, Plato similarly asserts that the earth exists 'in a uniform state',³⁶ it is 'round and in the centre of the heaven',³⁷ although humanity does not possess

the perspective that would allow this spherical sameness to be recognized. Dwelling on the surface of the world limits our capacity truly to see and understand the shape and dimensions of this place, and to disclose this confined condition *Phaedo* proposes an analogy. We are oblivious to the fact that we live in the earth's 'hollows' and mistakenly assume that restricted experience of our surroundings allows us to fully know the world. This misrecognition, Plato writes, can be compared to that of someone who lives on the seabed, seeing the sun and stars through the water but assuming that the sea is heaven. Because of 'slowness and weakness'³⁸ this person does not attempt to rise to the surface, and so does not gain a true vision of the world. 'Now this is just what has happened to us,' *Phaedo* continues:

Living in some hollow of the earth, we think we live above it, and we call the air 'heaven,' as if this were heaven and the stars moved through it; whereas the truth is just the same – because of our weakness and slowness, we are unable to pass through to the summit of the air; for were anyone to go to its surface, or gain wings and fly aloft, he would stick his head up and see ... and if his nature were able to bear the vision, he would realize that this is the true heaven, the genuine light, and the true earth.³⁹

Gaining wings and flying aloft would permit a vision of the earth as an absolute ground and essential finitude. Put otherwise, only transcendence can expose the world's immanence. Surpassing the distractions of sensory experience would allow us to escape the corroded and imperfect realm of stones, rocks, sand, mud and mire that seduces us into a misplaced understanding of where truth and being are to be found. Such a perspective, Plato proposes, would endow us with an awareness of the actuality of heaven and earth.

Plato does not, however, conclude these cosmological speculations with the assertion that we will come to know the one true earth after we have abandoned mere empiricism and risen above. He conjectures still further by imagining how the earth would look to those who have soared to this privileged place: 'The true earth, if one views it from above, is said to look like one of those twelve-piece leather balls, variegated, a patchwork of colours, of which our colours here are, as it were, samples that painters use. There the whole earth is of such colours, indeed of colours far brighter still and purer than these ... its general appearance is of one continuous multi-coloured surface.'⁴⁰ From above, then, the global sphericity of the world comes into view: it can be regarded, Plato speculates, in a manner that is inaccessible on the ground. It becomes recognizable as a place adorned with beauties and wonders (trees, flowers, fruit, mountains, islands, landmasses) that exist in a state of orderliness

and in proportion to each other, corresponding to the realm of pure being that exceeds the domain of grounded experience.

Imagining a determinate planetary body, a collection of topological features that combine to form an ecosphere and a place that communicates a sense of universal being, *Phaedo* in this manner prefigures both the total planetary vision and discovery of its various features that are associated with the more recent observation of the earth. Plato's account suggests that a new perspective has not been gained as a result of travelling beyond the planet's atmosphere. Rather, a sense of the world's shape and character was in place long before the first view of it descended from orbit; rather than discovered because it has been seen from above, 'the true earth' was known before it was seen. Looking down on the planet from Vostok, the Apollo spacecraft, or the ISS has merely confirmed what Plato's speculative act of perceptual displacement had apparently already established: the earth as both a uniform domain and an integrated biospherical system.

Accounts of orbital vision, including those by astronauts who reflect on what they have seen, often reference moments in the long history of the world's circumnavigation and observation, providing compelling counter-narratives to the established story of a dawning recognition in the mid to late twentieth century. Jay Apt, Michael Helfert and Justin Wilkson open their volume *Orbit: Nasa Astronauts Photograph the Earth* with the acknowledgement that observing the world from above begins with the cosmological vision that Plato describes in *Phaedo*:

Socrates said that if we could rise above the Earth we would realize 'this is ... the true Earth' – and only then would we fully understand the world in which we live. Now, in our time, 25 centuries after Socrates, we have built ships that fly hundreds of miles above the planet ... and no astronaut has been without a camera since.⁴¹

In *Apollo's Eye*, Cosgrove too finds in images from orbit a recent manifestation of a deeper and more archaic conceptualization of the world. For him these images extend the long history of a cosmography that begins with the figure of Apollo, the sun god in whose celestial eye the earth becomes a harmonious regularity. 'The Apollonian gaze, which pulls diverse life on earth into a single vision of unity, is individualized', he writes,

a divine and mastering view from a single perspective. That view is at once empowering and visionary, implying ascent from the terrestrial sphere into the zones of planets and stars. The theme of ascent connects the earth to cosmographic spheres, so that rising above the earth in flight is an enduring element of global thought and imagination.⁴²

If such a fantasy of ascent, mastery and perceptual unification insistently returns in the images produced by NASA's Apollo missions, then this fantasy begins in Greek mythology, cosmology and theology. It continues, Cosgrove proposes, in Cicero's dream of cosmic unity, Seneca's projection of an empire that would reach to the ends of the earthly sphere (*ad termini orbis terrarum*), Ortelius's 1564 map of the world *Typus orbis terrarum* and in modernity's development of a cartographic sensibility that would chart, encompass and know the world.

In addition to continuing this long Apollonian tradition, Apollo 8's mission in December 1968 – spanning the Christmas period – is notable for Cosgrove because it allows pagan cosmology to be appropriated by a Christian understanding of universal order. The timing of this mission allowed audiences watching on earth to harness 'to the Apollo mission the complex meanings attached to this key Christian festival – of peace and good will among all peoples, of domesticity and harmony, of rebirth and renewal'.⁴³ This mission's assimilation into a Christian discourse of universal kinship might be explained as the result of chance and an incidental timing that aligned it to one of the major dates in the Christian calendar. However, any such explanation must be dismissed because of the decision of Apollo 8's crew to establish the significance of their journey in terms of a Biblical account of the origins of the universe. Taking turns to read from the opening passages of Book of Genesis, William Anders, James Lovell and Frank Borman 'recit[ed] from lunar orbit the Genesis cosmogonic narrative' that, Cosgrove writes, reaffirmed 'the same lines conventionally illustrated in the opening pages of medieval chronicles and Renaissance cosmographies'.⁴⁴

In Hadfield's *You Are Here*, it is Ferdinand Magellan's 1519 voyage from Spain and nautical circumnavigation of globe, rather than a Platonic or Apollonian imaginary, that provides the conceptual frame within which orbital travel is to be situated and understood. Hadfield briefly points to the discovery of the world as a result of this voyage ('Logbooks from the voyage were a revelation, the most complete record yet of our planet's infinite variety'⁴⁵), challenging the claim that observation of the earth only truly begins when humanity rises above the confines of the planet. He continues this rejoinder by suggesting that orbital circumnavigation is not qualitatively different to Magellan's voyage. Rather, it is speed – the acceleration of an established trajectory – that distinguishes today's passage around the planet. 'Nearly 500 years later, the International Space Station completes an orbit of our planet every 92 minutes – 16 circumnavigations a day',⁴⁶ Hadfield writes, and the impulse to document this world-encompassing experience 'is one that Magellan and his crew would recognize: to record – and share – the wonders of the Earth'.⁴⁷

It would seem, then, that a strange and unsettling ambivalence accompanies announcements of the world's unprecedented observation from orbit. For the first time it appears to the eye as a complete planetary body, and yet this perception is meaningful only insofar as it confirms earlier accounts of the earth as a uniform state that moves within divinely ordered space. Its appearance is once immediately captivating and the culmination of an ancient cosmotheology. It is forged for the first time when observed from above, and yet such a perspective is claimed millennia before the first satellite or cosmonaut left the planet. Perfectly capturing this ambivalence is the name given by the UK Space Agency to the first mission by a British Astronaut to the ISS: 'Principia'.⁴⁸ Simultaneously conjuring the sense of an origin or fundamental beginning and referring to canonical thinking about the nature of the universe (Newton's 1687 study of motion and gravity, *Philosophiæ Naturalis Principia Mathematica*), this name once again suggests a dawn that has been witnessed before.

IV

As well as providing Hadfield with a context that allows orbital circumnavigation to be conceptualized, Magellan's voyage is also the point of departure for Joyce E. Chaplin, whose *Round About the Earth* assembles an expansive history of how around-the-world travel has produced many perceptions of the earth as a planetary space. Pointing to how this expedition was itself not an origin, Chaplin notes that Magellan's attempt to circle the globe was only possible because of the untested assumption that the world was spherical. The legacy of this voyage continues, she writes, in 'accumulating round-the-world voyages' that resulted in the idea that 'a definitive, total knowledge of the world' can be achieved:

Certainly, the overlapping routes and repeated observations of the eighteenth-century navigators gave that totalizing impression. For the first time, and with growing force, 'around the world' implied a complete vision of the planet, as if the multiple tracks that individual ships had laid around it had collectively generated the most detailed image of the globe ever seen.⁴⁹

As well as the cartographic, trade and social changes that resulted from this journey and the world's subsequent visualization, *Round About the Earth* also traces some of the many literary responses to circumnavigation that followed

Magellan's voyage. An imaginary circuit of the world is proposed by Puck, the mischievous imp in Shakespeare's 1595/96 *A Midsummer Night's Dream*. Puck's promise to 'put a girdle round about the earth/In forty minutes' is 'a timely joke' for Chaplin, perhaps pointing to mathematical theories of acceleration that were circulating among Shakespeare's contemporaries, or possibly 'wonderfully loopy nonsense' about the geographical co-ordinates of longitude but not latitude, where there are minutes but not degrees.⁵⁰ For Daniel Defoe's 1725 *A New Voyage around the World*, circumnavigators 'were ten-a-penny',⁵¹ and Jules Verne's 1873 *Around the World in 80 Days* 'merged several literary genres, including the circumnavigator's just-the-facts narrative, to create the first novel that ... made readers consider the costs, human and material, of constructing a globe capable of sustaining such fast travel'.⁵² And, she writes, travel writing of the nineteenth and twentieth centuries (by, among others, Ivan Bunin, Lewis Carroll, Jean Cocteau, Jack London and Mark Twain) conveys the sense of a planet that could be traversed because it had become a space that was open to tourists seeking to become more worldly.⁵³

On other occasions, writers have reflected on circumnavigation in ways that extend from Magellan's voyage, but also on the concept of orbit that Plato compellingly invoked centuries earlier. Cosgrove's *Apollo's Eye* emphasizes the cartographic imagination that shaped perceptions of the world, but he also describes a 'poetics of the globe'⁵⁴ – what might be termed a cosmologography or a cosmographopoeisis – that includes John Donne, John Milton, Samuel Taylor Coleridge and Joseph Conrad. He cites Donne's 'Good Friday 1613. Riding Westward' as an example of how this poetics contributes to the cosmic (and imperial) dream of a world that is grasped and held within an encompassing gaze:

Could I behold those hands which span the Poles,
And turn all spheres at once, pierced with those holes?
Could I behold that endlesse height which is
Zenith to us, and to our Antipodes
Humbled below us?⁵⁵

Alongside the examples that are cited by Cosgrove, Alfred Tennyson's 1849 elegy to his friend Alfred Hallam, 'In Memoriam A.A.H.', similarly ruminates on the theme of a heightened regard. This poem adheres to the idea of a cosmos that is ordered hierarchically; within this order, orbital observation is both transcendent and allows a more profound view of an earth and a humanity that are both beneath and enclosed:

So mayst thou watch me where I weep,
 As, unto vaster motions bound,
 The circuits of thine orbit round
 A higher height, a deeper deep.

Tennyson's poem proceeds in part as a study of the relationship between consciousness and religious understanding. It yearns for a higher understanding, but for 'In Memoriam' to be on the ground is to be in the realm of restricted knowledge. Such a confinement – being at the centre of an orbit that can be attained only after a withdrawal from the secular world – is formally confirmed by the simple *abba* structure that circumscribes each quatrain and circulates throughout Tennyson's poem.

Images of encirclement return with the figure of the circumference that regularly appears in Emily Dickinson's poetry. 'No matter where the Saints abide/They make their Circuit fair',⁵⁶ she writes in poem 1576, preserving the association of orbital movement with a celestial being that occupies 'a higher height'. This circumferential poetics continues in Hart Crane's 1930 'Cape Hatteras', a poem that synthesizes a defence of Walt Whitman's writing with a celebration of the potential for technology to restore humanity's wholeness. Scientists and engineers possess technical ability for Crane, but the domain of the poet is abstraction and sublimation. This means that the poet alone is able to render technical achievements in the form of the universal. Aviation provides 'Cape Hatteras' with one such achievement; although conscripted into the service of warfare, aviation is an expression of a will to connect with the infinite. 'Stars scribble on our eyes the frosty sagas,/The gleaming cantos of unvanquished space',⁵⁷ Crane writes. Inscribed by the verses of the infinite, this elevated vision is able to access the celestial realm and discern the spherical nature of the cosmos – to perceive 'that star-glistened salver of infinity,/The circle, blind crucible of endless space'.⁵⁸ In moments such as these, the idea of an ultimate vision provides writing with an imaginary perspective and the sense of an encompassed world. This idea has subsequently become literalized in texts which reflect on how the satellite as a technical apparatus seems to actualize the possibility of earth observation. In Chapter 4, this book will consider some instances in which satellite imagery has been drawn into the production of a multimodal textuality which functions as another manifestation of the poetics of the globe because it is the satellite that now scribbles on our eyes.

The association of the earth's circumnavigation by ships, planes and satellites with a sense of complete understanding of the world needs to be questioned for

various reasons. As this chapter has noted, there is something unreliable about claims that the world appeared for the first time when photographed from space. The world's appearance has repeatedly been assigned to captivating images (and, indeed, continues to be attached to the multitude of images that now descend from orbit), but this appearance was also projected before *Sputnik's* celebrated journey. Rather than providing an exceptional revelation of the world, satellite photography offers yet another epiphanic revelation of the world: it confirms an ancient philosophical vision of the world's shape, dimensions and character. It also extends the epiphanic revelation of the world that, as Chapter 2 notes, can be traced back to a medieval collision of poetry and cosmology, and in particular to Dante's separation of the world from the universe.

The association of the earth's circumnavigation with the world's disclosure also troubled Martin Heidegger (for whom satellite broadcasts and images can only result in a dangerously flawed and deracinating cosmology) as well as others who, like Heidegger, associate being in orbit with the deficiencies and dangers of technical thinking. The satellite as a technical instrument is mentioned only rarely – and on each occasion, very briefly – by Heidegger, who proposes that the satellite should not be treated as merely one technology among others. This device occupies a particular function in the intensification of technoscientific understanding and epitomizes a moment in which humanity has sacrificed its relationship with the world. Heidegger's most famous remarks about the satellite are to be found in his 1966 interview with *Der Spiegel*, 'Only a God Can Save Us'. In this interview, Heidegger seeks to clarify his association with National Socialism while rector of Freiburg University between 1933 and 1934, and in the context of this discussion he offers an elaboration of the technicity that, for him, defines modernity. 'We have not yet found a way to respond to the essence of technicity',⁵⁹ he proclaims, and this essence for him takes the form of a logic that would disclose being and subject the world to a systematized and rationalist determination. In the modern epoch, this technoscientific condition has reached its apotheosis. In this moment, the earth is becoming congealed, hardened and regulated, and technicity is proceeding to alienate humanity from the unresolved relationship with the ground that it once experienced.

Orbit for Heidegger (and for others, as discussed in Chapter 5) is therefore the site of a catastrophe. Technicity today 'increasingly dislodges man and uproots him from the earth',⁶⁰ and its capacity to effect an unearthly displacement is exemplified by the alarming event of the world's observation from space:

I was shocked when a short time ago I saw the pictures of the earth taken from the moon. We do not need atomic bombs at all [to uproot us] – the uprooting of man is already here. All our relationships have become merely technical ones. It is no longer on an earth that man lives today.⁶¹

The timing of this interview suggests that Heidegger is referring to photos taken by Lunar Orbiter 1, and he finds such images to be particularly disturbing because of the functionalist perspective that they produce. With these photos, humanity becomes detached from the vital provocation of being on an earthly ground; they provide visual evidence of a humanity that is no longer thinking about what it is but is instead captivated by the impression that it has conquered space. With the ascent of perception to orbit, and with the images of the planet that these devices offer, the earth becomes lost as a primordial site that casts beings into the world.⁶²

‘Only a God Can Save Us’ condemns the coercive force that this technical perception has come to exercise over the earth. Such a perception needs to be understood as the elevation and intensification of what he describes in his earlier writings as ‘the law of machination’⁶³ that requires ‘the accordance of everything with producibility’, and in which ‘the unceasing, unconditioned reckoning of everything is pre-directed’.⁶⁴ This systematized production – this measuring, making manifest and encoding – of the planet is, he writes, an ‘ongoing *annihilation*’.⁶⁵ However, while ‘Only a God Can Save Us’ is notable because it situates orbital photography within a despotic rationalism, this interview is also significant because, immediately after issuing this condemnation, it associates orbit with writing. What Heidegger sees as annihilated by technicity’s victorious assumption of power is a poetic thinking that would not seek to contain and know the earth. ‘Recently I had a long dialogue in Provence with René Char – a poet and resistance fighter’, he remarks, in the same moment aligning himself to those who fought Nazism and lamenting the decline of the poetic:

In Provence now, launch pads are being built and the countryside laid waste in unimaginable fashion. This poet, who is certainly open to no suspicion of sentimentality or of glorifying the idyllic, said to me that the uprooting of man that is now taking place is the end [of everything human], unless thinking and poetizing once again regain [their] nonviolent power.⁶⁶

For Heidegger, the bond between orbit and writing is both essential and conflictual; satellites and poetizing are placed in apposition in a state of structural dependence that this interview understands as the expression of an archaic tension between creation and control. The tragic loss of home – the ontological

crisis – that Heidegger laments is a direct consequence of the ascension of technicity and the attendant imperative to crush the poetic. Writing continues, he recognizes, but it no longer allows a new sense of the world; the conclusion that he reaches is that ‘Contemporary literature ... is largely destructive.’⁶⁷

‘Only a God Can Save Us’ is where Heidegger’s most recognized comments about orbit are to be found, although his 1962 lecture ‘Traditional Language and Technological Language’ provides a more elaborate overture on the relationship between the satellite and the poetic. One of the principal tasks of this lecture is to arrive at concepts of language and technology that do not succumb to the pitfalls of instrumentalist thinking. According to this lecture, received thinking about language finds its distinctiveness in a human capacity to speak; underpinning this principle is the proposition that ‘only language enables humans to be those living beings which they are as humans. As the one who speaks, the human being is: the human being.’⁶⁸ Against the doctrine that has developed around this association of human being with language (in which speech is understood as a tool that either externalizes thoughts or allows the nature of reality to be communicated), Heidegger offers an alternative definition: ‘speaking is properly saying.’⁶⁹ ‘Saying’ – an active verb – does not point to the accomplishment of the true or the proper in language. Instead, its operations are indicated by the infinitive form – to say (*Sagen*) – which more precisely reveals the repeated and perpetual articulation or projection of actuality: “‘*Sagen*’ means to show ... It means to let something be seen and heard, to bring something into appearance ... what is present [*Anwesendes*] comes into appearance through saying, that and how it presences [*anwest*].”⁷⁰ Saying as bringing-forth exposes showing not as a revelation of what is, but as a constitutive process that ceaselessly attaches sense to what presents itself. Furthermore, he states that ‘what is absent [*das abwesende*] as such also comes into appearance in saying’. Speech therefore reveals that things are shaped in thought, but it also discloses an unsayable beyond of language.⁷¹

‘Traditional language’ is the name that Heidegger gives to such a bringing-forth by speech. This language is traditional not because it would establish a permanent, and perfectly referential, system of communication; it is traditional because it operates as a ‘non-technologized everyday language’ that ‘grants the unspoken.’⁷² Preserving this ordinary and original language – ‘safeguarding ... the new possibilities of the already spoken language’, and protecting the ability for ‘the human being to say the world anew’ – is, Heidegger proposes, ‘the poet’s task.’⁷³ However, just as ‘Only a God Can Save Us’ laments the departure from the poetic, so this lecture too describes a contemporary moment so captivated

by technology that language can no longer say the world anew. Heidegger rejects the idea that all technologies function in essentially the same way as tools that assist human action – what he describes as ‘anthropological-instrumentalist conception of technology’⁷⁴ – as well as the idea that technological progress is resulting in a greater capacity for human action. The instruments of modernity have a specific – though not evolutionary – function and effect, and to illustrate this claim he refers to a satellite that had been launched a little over a week before he delivered this lecture:

One can claim ... within the horizon of the anthropological-instrumental conception of technology that there is fundamentally no essential difference between a stone ax and the newest product of modern technology, the ‘Telstar’. Both are instruments, means produced for definite ends ... The former, the stone ax, serves for splitting and hewing a few of the hard bodies that can be found in nature. The latter, the satellite, serves as a switch station for a direct transatlantic exchange of television programs.⁷⁵

Comparing these devices at the instrumental level can result only in a ‘general and vacuously grasped’ understanding of their character, and such a banal approach would fail to determine ‘what is peculiar to modern technology and its products.’⁷⁶ There is something distinctive about the satellite, and about modernity more generally for Heidegger, and it is in the corruption of traditional language that this distinctiveness is to be observed. No longer the realm of a saying which allows new possibilities for both speech and sense, language has become the domain of machinic communication. It has become technological, Heidegger contends, because ‘it is from the technological possibilities of the machine that the instruction is set out as to how language can and shall still be language.’⁷⁷ This means that, in the age of automation, technology holds dominion over nature and language has become merely an instrument for conveying data and declarations relating to nature. More alarmingly, however, putting language in the service of information means that speech and saying – that is, conceptual invention and an awareness of the possibilities that are offered by conceptual invention – are no longer permitted. This intensification of the technological is ‘the severest and most menacing attack on what is peculiar to language: *saying* as showing and as the letting-appear of what is present and what is absent.’⁷⁸ To resist this attack – to fight the rise of the satellite – a return to the poetic is needed, for ‘a poem does not, on principle, let itself be programmed.’⁷⁹ If, with the satellite, the world has become encoded and mechanical then a restoration of the poetic would allow it again to be a site of becoming.

The challenge to technology and technicity that unfolds in Heidegger's interview and lecture (as well as elsewhere in his writing) has shaped a critical legacy that inherits the same sense of both a social and an ontological disaster, and in which the question of technology is the question of being (and of being in the world).⁸⁰ Often, a similar disaffection for the satellite persists. For Paul Virilio, satellites work to enhance state authority: they are, for him, among the various vision machines that are industrializing and militarizing sight, displacing the power to see from the body onto machines and peripheralizing the human as the agent of knowing, but also altering the speed at which perception and cognition occurs.⁸¹ A sense of uprooting from the world appears when Jean Baudrillard diagnoses a contemporary condition of atomized living, a 'private "telematics"' in which 'each person sees himself at the controls of a hypothetical machine, isolated in a position of perfect and remote sovereignty, at an infinite distance from his universe of origin.'⁸² This machine is *Sputnik's* descendent, and for Baudrillard it encapsulates the detachment that we now experience; no longer understood as an immanence that is defined by the world's interiority, the subject is 'in the exact position of an astronaut in his capsule, in a state of weightlessness that necessitates a perpetual orbital flight and a speed sufficient to keep him from crashing back to his planet of origin.'⁸³ This projection of an elevated, isolated and accelerated condition places the private sphere in an ungrounded domain, but it is also an eviction of actuality from the mundane space of the world. 'This realization of a living satellite, *in vivo* in a quotidian space, corresponds to the satellitization of the real', Baudrillard writes, and this is 'the end of metaphysics.'⁸⁴

Heidegger's association of satellites with a despotic technicity that disrupts the relationship between humanity and the world resurfaces in Jean-Luc Nancy's *The Creation of the World or Globalization*. Nancy opens by considering how modernity has abandoned the Christian concepts of world and the city, *orbi* and *urbi*, and he describes a 'network cast upon the planet – and already around it, in the orbital band of satellites along with their debris.' This network

deforms the *orbis* as much as the *urbs*. The agglomeration invades and erodes what used to be thought of as *globe* and which is now nothing more than its double, *glomus*. In such a *glomus*, we see the conjunction of an indefinite growth of techno-science, of a correlative exponential growth of populations, of a worsening of inequalities of all sorts within these populations ... and of a dissipation of the certainties, images, and identities of what the world was with its parts and humanity with its characteristics.⁸⁵

Where the world was once understood as a changeable space that acquires meaning through a sense of belonging and attachment, it is now experienced as an ordered and unvarying totality. For Nancy (as Chapter 6 discusses), the distinction between *globe* (here indicating a space produced by sense) and *glomus* (a spherical self-presence) points to a transformation that has resulted both in an ontological error and in the degradation of the social sphere. Luce Irigaray also extends Heidegger's account of technicity's coercive operations when she refers to 'the domination of the world by all the technologies which aim to get a general view of it from on high, the most obvious example being that of satellites sent to observe the earth and its planetary system.'⁸⁶ Again, this for her is both a cosmological and an ontological threat, but it also extends a theological and paternal tradition – 'The father is a kind of meta-man – God being here the model'⁸⁷ – in which authority is attached to observation.

Against the conception of satellites as instruments that reveal the ground of being, these devices are therefore seen after Heidegger to have a technical function that allows anything but world disclosure. Their purpose is to circumscribe, determine and command the world, and as such they intensify the delusion of grounded being. They also maintain the world as a discrepant space in which orbital observation operates as a governing or regulatory mechanism. What they do not do is forge a planetary community or establish a generalized cosmopolitanism that surpasses the territorialism and geopolitical interests that delineate terrestrial space.

Initial responses to the world's appearance from orbit resulted in a sense of the co-presence of populations and spaces, and of an environment and an ecology that provides humanity with a shared home. Satellites have been seen, in other words, as the instruments through which global community is attained. Anthony Giddens, for example, states that 'if one wanted to fix [globalization's] specific point of origin, it would be the first successful broadcast transmission made via satellite. From this time onwards, instantaneous electronic communication across the globe is not only possible, but almost immediately begins to enter the lives of many millions.'⁸⁸ Clearly, such a perspective is at odds with the description of satellites as the tools of an ontological coercion, but it is also contested by claims that these instruments preserve the uneven distribution of global power and normatively uphold an order in which the world is divided.

When viewed in terms of transnational exchange, orbit is often seen not as a place where power becomes dispersed, but where power is heightened, not where authority is transcended but where authority becomes transcendent. They are devices through which the globalizing West or North broadcasts

its vision of the world, its sense of the relative status of nations, of cultural influence in the new transnationalism and of the ethics, politics and structure of global governance. For Gayatri Chakravorty Spivak, satellites transmit values unidirectionally. In *Death of a Discipline* she offers a reminder that relates to how transnational authority is broadly configured: 'Borders are easily crossed from metropolitan countries, whereas attempts to enter from the so-called peripheral countries encounter bureaucratic and policed frontiers, altogether more difficult to penetrate.'⁸⁹ Spivak is primarily concerned in this text with how this discrepant transfrontierism shapes definitions of World Literature in Comparative Literary Studies (the discipline for which this book serves as a requiem), although she describes how it is consolidated by other cultural instruments, including those that circulate above the planet: 'In spite of the fact that the effects of globalization can be felt all over the world, that there are satellite dishes in Nepalese villages, the opposite is never true.'⁹⁰ Peter Dicken and James S. Ormrod similarly associate satellites with the escalation of global divisions. 'The benefits that satellite technology offers to Western businesses and social organizations', they write in *Cosmic Society: Towards a Sociology of the Universe*, 'heighten the "digital divide" or "information gap" between North and South, exacerbating inequalities between the two.'⁹¹

V

The term *satellite* derives in the first instance from the Latin *satelles*, and when used in a way that is faithful to its etymology this term suggests (as Chapter 7 discusses) a secondary or peripheral position in relation to (sometimes guarding) a core or centre that possesses primacy and power. Such a usage is invoked by Spivak (the idiom of a marginalized culture 'does not come up into satellite country',⁹² she writes) as well as Ngũgĩ wa Thiong'o, who in 1968 described the treatment of Africa and African writing 'as an appendix or satellite of other countries and literatures.'⁹³ This peripheralization can be seen in acts of self-satellitization that occur when colonial and formerly colonial nations attach themselves to the modernity that the satellite symbolizes. The field of astrophilately is intriguing here, since stamps have often been used to mark the status of those countries – in particular, China, Russia and the United States – that have the power to reach orbit. But satellites are also celebrated by countries that would appear not to be served by these machines: in 1965, the Wallis and Futuna Islands, a French overseas territory, issued stamps that

commemorated the launch of first French satellite (albeit one that was launched in Algeria). The Democratic Republic of Congo in 1981 celebrated the principle of conquest ('Conquête de l'espace') on stamps that carried images of a Space Shuttle orbiter launching a satellite. Sometimes these images seem to declare a national independence that is attained through attachment to orbital and international space; Djibouti, for example, marked its entry to the UN in 1980 with stamps that commemorated the Apollo-Soyuz test project that acted as a forerunner to the ISS. The Station itself provides Palau with confirmation of the principle of sovereign internationalism, a principle that frames its status as both a presidential republic and in a relationship of free association with the United States.

As this chapter has indicated, and this book will continue to propose, the idea of a controlling and globalizing technicity is not wholly convincing: both images from orbit and a more enduring orbital imaginary themselves confirm that the world cannot be contained as an entity that occupies in its own space. 'We must question our investments in the whole earth fantasy',⁹⁴ Kelly Oliver writes. Moreover, just as being and writing in orbit must be seen as denying the technical operation that for Heidegger represents the height of modernity, so the claim that satellites function exclusively as the tools of remote governance needs to be questioned. That satellites operate as instruments of global surveillance and regulation should not be disputed, but what must be challenged is the idea that power can be fully systematized, possesses a unitary character or, indeed, is able fully to realize the control that it incessantly seeks. These instruments function not only unilaterally to fortify a global North which, despite its domination of the international sphere, can successfully eliminate a minoritarian or interventionist recoding either of the satellite's function or of what orbit signifies for the world.

Global power results not from a consistent articulation and regulation of planetary space, and authority is not attained after the world has been successfully fixed as a unitary concept or representation. This power is not effected through the banishing of discourses that refuse either the image of the world that descends from orbit or the mastery that the satellite is seen to signify. If the satellite is to be associated with the production of authority then this must be understood as an equivocating production: it is through acts of peripheralization and domination, rather than a purging of other identities and perspectives, that the world becomes established as an orderly and uniform domain, even when the eradication of populations, languages or traditions is attempted. Global authority, in other words, results from a doubled and divided discourse that integrates nations into a standardized narrative of transnational community and

sanctions the orthodox sense of an observed (and therefore governed) world, but which must also maintain the world as a variable and discrepant space in order for power to take the form of mastery and subjection. This is not power dissolved or authority dispersed, but power divided at its point of origin and authority as a conflictual site of adversarial articulations. Such a structural necessity prevents orbital circumnavigation from operating as an unassailable governance, with the world captured as a wholeness within the satellite's potent gaze. Indeed, it is this essential equivocation that allows authority to be resisted and displaced, since it confirms both that the satellite's ascendant power and apparent omnipotence can be contested and that alternative conceptualizations of the world are possible. It opens a space in which both orbit and the satellite are able to acquire a different symbolic value.

Examples of this disruptive recoding of the world circulate throughout literature, theory and cultural criticism. Before the launch of the first orbiting instrument, Walter Benjamin records a disquieting episode in his childhood in which he experienced the unsettling effects of the moon. The light cast by the moon produced in him an anxious sense of the unearthly and the uncanny. 'The terrain it illuminates so equivocally seems to belong to some counter earth or alternate earth,' he writes, 'It is an earth different from that to which the moon is subject as a satellite, for it is itself transformed into a satellite of the moon.'⁹⁵ This perverse reversal results in Benjamin's surroundings becoming unrecognizable to him, and yet, although the strangeness of this episode initially makes him apprehensive, it eventually results in a reassessment of the world that he had assumed as merely there. The moon's light provokes in him a fundamental question: 'Why is there anything in the world, why the world? With amazement I realized that nothing in it could compel me to think the world. Its nonbeing would have struck me as not a whit more problematic than its nonbeing.'⁹⁶ For Emmanuel Levinas too, the satellite wrests us from our habitual treatment of the world as the site of our groundedness. In his 1961 essay 'Heidegger, Gagarin, and Us,' Levinas provocatively asserts that 'the enemies of industrial society are in most cases reactionary', and he associates this enmity with 'Heidegger and Heideggarians' who 'would like man to rediscover the *world*'.⁹⁷ Rather than seeking nostalgically to reacquire our proximity to world or place, Levinas acknowledges the potential of technology as a force that 'wrenches us out of the Heideggarian world and the superstitions surrounding *Place*'.⁹⁸ Gagarin is an exemplary figure for him because 'he left the Place. For one hour, man existed beyond any horizon – everything around him was sky or, more exactly, everything was geometrical space. A man existed in the absolute of homogenous space.'⁹⁹

According to Parks, the satellite's disruptive potential is to be found not in an ontological displacement, but in seizing the social power that is granted by the ability to observe from above. For her, images produced in, and dispersed from, orbit should not be understood wholly in terms of the application of force by those who regulate global society. 'As satellite use expanded to other parts of the world', she writes in *Cultures in Orbit*, 'those who programmed and watched satellite television adopted tactics for ameliorating some of its imperializing tendencies and effects.'¹⁰⁰ Among the tactics that Parks describes are the development of satellite television networks by Chicago's Chinese community, Aboriginal Australians and indigenous groups in Canada. Similarly recognizing that the satellite should not be understood solely in terms of a panoptic assertion of power, David Howard describes how this device has been used to contest the imperial cartographies of the world:

Over the last five years, new community initiatives have meshed local qualitative and quantitative data collection with satellite imagery, building collaborative projects to remap local spaces ... Maps first produced by colonial authorities have been independently redrawn using Global Positioning Systems to incorporate local learning and to recognize incorrectly delineated indigenous territories.¹⁰¹

Media responses in South Africa to *Sputnik*, according to Thembisa Waetjen, demonstrate an appropriation of narratives of modernity and innovation, drawing Cold War space technologies 'into local struggles and rivalries over ecclesiastical authority and political rights and power' and 'both confirm[ing] and subvert[ing] boundaries between secular and enchanted readings of nature and their respective attribution to colonial and colonized subjects.'¹⁰² In his 1986 Nobel prize acceptance lecture, Wole Soyinka situates the satellite in the history of the 'jealously guarded sovereignty of Nature and Cosmos'.¹⁰³ And yet, he writes, 'From the heart of jungles, even before the aid of high-precision cameras mounted on orbiting satellites, civilizations have resurrected, documenting their own existence with unassailable iconography and art'.¹⁰⁴ There is, in other words, something like an orbital perspective that not only anticipates the satellite's remote gaze but also provides an alternative visualization and another memory of places that Europe had sought to know.

Like Soyinka, Derek Walcott is not so much interested in how the satellite might be repurposed as an instrument that can be activated otherwise. He too is concerned with how the concept of the satellite might be thought otherwise, but also with how this term signifies an ambiguous relationship between centre and periphery. 'North and South', a poem written in 1981 following Walcott's move

from Trinidad to the United States, displaces the term *satellite* by shifting it from an astronomical to a colonial context:

Now, at the rising of Venus – the steady star
that survives translation, if one can call this lamp
the planet that pierces us over indigo islands –
despite the critical sand flies, I accept my function
as a colonial upstart at the end of an empire,
a single, circling, homeless satellite.¹⁰⁵

In this poem, the satellite provides an image of neither circumferential containment nor a remote and authoritarian monitoring, but of an unruly nomadism that does not know its place. Indeed, this figure – the satellite as itinerant colonial subject – in ‘North and South’ is simultaneously formed in the context of imperial subjection, a witness to the failure of a social order that would encompass the world, and a disruptive outsider who dismantles narratives of transnational power.

If the satellite in literature and theory becomes an equivocating signifier of authority and resistance then the concept of orbit functions in a similarly ambivalent manner. Orbit exerts a gravitational force on writing.¹⁰⁶ It shapes visions of spherical orderliness and of a grounded home, but it also provokes the uncanny sense of a world that is not at home with itself and cannot be subjugated either by circumnavigation or remote observation. Donne’s ‘Good Friday 1613. Riding Westward’, this chapter has already noted, meditates on the spherical oneness of a self and world that are observed from an ‘endlesse height’. But this poem also offers an account of planetary motion that departs from Donne’s Platonic sympathies, and from a conception of the world as a geocentric, self-governing and self-identical unity. ‘Good Friday’ opens with the solicitation ‘Let man’s soul be a sphere’, but as this poem proceeds it indicates a state of spherical co-dependence and incompleteness: ‘As the other spheres, by being grown/ Subject to foreign motion, lose their own/ ... so, our souls admit/For their first mover, and are whirld by it.’¹⁰⁷ Dickinson invokes a sense of celestial orbit in the image of a saintly arc that encompasses the world, although she is perhaps most renowned as a poet who celebrates the oblique. ‘Tell the truth but tell it slant –’, she writes in poem 1263, and this negation of language as a referential system extends to her contention that ‘Success in Circuit lies/Too bright for our infirm Delight/ ... The Truth must dazzle gradually/Or every man be blind –’.¹⁰⁸ Circumferential – orbital – knowledge for Dickinson is possible, then, only with a perspective that regards indirectly. Crane’s ‘Cape Hatteras’ looks to Whitman

when associating technology with human perfectibility, although this poem also recalls Whitman's assertion that 'this orbit of mine cannot be swept by a carpenter's compass'¹⁰⁹ when it states that the sphere (as the symbol of cosmic perfection) can be 'subjugated never'.¹¹⁰

Orbit, in these instances, refers not to a determinate and determining domain from where the world is surveyed, governed and standardized as a global terrestrial sphere. Rather, preserving and extending the morphology attached to the term *orbit*, these texts work to dismantle the association of this term exclusively with a controlling circumnavigation or an authoritative observation. In them, orbit becomes a signifier of both knowing and unknowing, of perception and the imperceptible. Indeed, there is something like a tradition of writing in which such a vertiginous sense of orbit – as a movement and a place that at once demand representation and remain unsayable – is evident. For example, one chapter of George Eliot's *Daniel Deronda* opens with an epigraph that floats above this story's narrative and reflects on the limits of the writing. In this moment, Eliot asks readers to look to the cosmos:

Men, like planets, have both a visible and an invisible history. The astronomer threads the darkness with strict deduction, accounting so for every visible arc in the wanderer's orbit; and the narrator of human actions, if he did his work with the same completeness, would have to thread the hidden pathways of feeling and thought which lead up to every moment of action, and to those moments of intense suffering which take the quality of action.¹¹¹

Writing in this passage is equated with astronomy, and for Eliot this means a shared need to weave a text that is an 'account' of what meets the eye. As much this novel petitions for a reliable stitching together of the evidence available, it also points to the impossibility for any narrative – literary or astronomical – fully to calculate the extent of the real. To document 'the hidden pathways of feeling and thought' is to combine analysis with speculation, and to do this 'the narrator of human actions' is obliged to engage in the act of interpretation. 'Threading', in other words, is fabrication. Eliot's epigraph (as with other moments in her writing) discloses the novelistic staging of the real and departs from the factualist account of the past that is often attached to the nineteenth-century historical novel. As such, *Daniel Deronda* anticipates a burgeoning *fin-de-siècle* perspectivism and Modernism's insistence that nature will fend off rationalism's efforts to subdue it. Orbit is central to this meditation on writing and the real, signifying for Eliot the threshold between representation and what the novel cannot see.

The theme of orbit as threshold is picked up again in James Joyce's *Ulysses*: 'Ever would he wander, selfcompelled, to the extreme limit of his cometary

orbit',¹¹² he writes of Leopold Bloom. Orbit works thematically here to indicate a journey away from astronomical charts and cosmological measurement (Bloom moves 'beyond the fixed stars and variable suns and telescopic planets') and from distinctions between earthly and unearthly space (these excursions take him 'to the extreme boundary of space, passing from land to land, among people, amid events'¹¹³). After 'incalculable eons of peregrination', Bloom travels home, although his passage back is associated not with the consistency, order or uniformity of the world. Instead, he 'reappear[s] reborn' and as 'an estranged avenger'.¹¹⁴ Furthermore, Joyce's novel itself undertakes an uncanny orbital journey, circling around many mythical and other textual sources but (contrary to Modernism's experiments with machine aesthetics) without enclosing the texts that motivate it. Like Bloom's journey, *Ulysses* traces an arc that does not submit literary history to exposition, and this novel does not ground being in a world that is subject to technical comprehension.

In his unfinished story 'Agathe', Paul Valéry also turns to the figure of orbit when considering the disjunction between what thought seeks to know and what can be known. This story describes a yearning for 'some entity exceedingly desired by the mind' which 'once seen ... would ingest into its own splendid mutability every thought capable of pursuing it'.¹¹⁵ Valéry's narrator moves hesitantly around the idea of this entity, as though orbiting it but never coming into contact with it. 'I have seemed to linger about the rim of an impenetrable circle within which I feel sure that there is something that would provide me with long enjoyment', she or he writes, 'something brief, something universal'.¹¹⁶ Indeed, this elusive something is seen to be undeniable as a spectral presence that insistently haunts, but never fully appears to, this story's narrator. 'Whether it be a great brightness, always in the tail of the eye, or a being as inviolate as the center of an orbit, its dwelling yields neither image nor doubt ... it lies buried in simple certitude outside all metaphor and resemblance'.¹¹⁷ Yielding neither image nor doubt, assuredly there but refusing attempts to unearth it, a hidden entity that eludes both mimesis and symbolism, this 'imminent pearl'¹¹⁸ is within an orbit that for Valéry (like Joyce) signifies the limits of the visible and the measurable.

VI

With Eliot, Joyce and Valéry, as with other writers, references to satellites and orbit point to a different poetics of the world than the one associated with planetary circumnavigation or efforts to determine the dimensions and contours

of the earthly sphere. This other cosmographopoeisis certainly contrasts with what is often considered to be significant in the relationship between writing and technologies of orbit. Most technical histories of the emergence of space travel trace its roots to the late nineteenth- and early twentieth-century cosmonautics and astronautics, and specifically to work by Konstantin Tsiolkovsky, Hermann Oberth and Robert Goddard that formulates principles for rocket design and calculates the velocity needed to reach orbit. What such accounts often emphasize is that these visionaries found their primary inspiration not in precursor work in the fields of chemistry, mathematics, physics or engineering (the disciplines that together allow the building of extra-planetary craft). Doug Millard explains that 'Verne had kindled Tsiolkovsky's curiosity as a boy with stories of space flight.'¹¹⁹ According to David Meerman Scott and Richard Jurek, 'The "founding fathers" of modern rocketry ... drew inspiration from fictional tales of interplanetary travel,' and they record Tsiolkovsky's remark that 'My interest in space travel was first aroused by the famous writer of fantasies Jules Verne', as well as the fact that 'Oberth read Verne's lunar voyages so many times he finally knew them by heart, and Goddard read and re-read *From Earth to the Moon*'.¹²⁰ For Margaret Lazarus Dean, it is this shared obsession with Verne that explains the apparently coincidental appearance in different countries of the idea of rockets as the vehicle for reaching orbit and beyond. Tsiolkovsky, Oberth and Goddard, she writes, 'were following what they had learned from a French science fiction writer.'¹²¹ Writing, according to these accounts, carves out an imaginative space that inspired innovators who possessed the technical knowledge to actualize this vision and for the first time to reach space beyond the terrestrial world.

Such a sense of the relationship between writing and orbital space is significant because it acknowledges the role of writing in the development of orbital instruments, and in acknowledging that the world is viewed as though from orbit before the first flights by Gagarin, John Glenn and others. One possible reading of this alternative archaeology of the relationship between orbit and writing is that literature functions as a prehistory to planetary circumnavigation, projecting the new territories for human inhabitation (including orbital space itself as a new territory) that subsequently become realized as a result of technological progress. However, as this chapter has argued, and as subsequent chapters of this book will maintain, writing does not only inspire new experiences. Literature also forces us to consider how we visualize and conceptualize the world. Verne and other writers not only prophesy orbital technologies of the twentieth century. They also contribute to the long history of thinking and writing that establishes the conditions for how we make sense of the world. Put otherwise, the heights of

orbit are reached because of literature: it is only after the production of orbit as an imaginative space that planetary circumnavigation became possible. There may indeed be a literary inspiration for the first circuits around the world, but orbit moves through and around literature over a longer and more sustained history, not only anticipating the work of visionary engineers and technologies but interrupting the technicity that would observe and know the world. It engages in an elevated making of the world before *Sputnik*, *Telstar* or Lunar Orbiter 1 or the Apollo missions left the ground. It is this creation and recreation of the world that *Orbital Poetics* traces.

Notes

- 1 The development of the ISS, particularly with regards to early discussions between US, Canadian, Japanese and European space agencies prior to Russia's involvement, is documented in John M. Logsdon, *Together in Orbit: The Origins of International Participation in the Space Station* (Washington, DC: NASA, 1998). Also see Peter Bond, *The Continuing Story of the International Space Station* (Chichester: Springer/Praxis, 2002), 122ff; and David M. Harland and John E. Catchpole, *Creating the International Space Station* (Chichester: Springer/Praxis, 2002), 168ff.
- 2 Joseph L. Zygielbaum ed., *The First Man in Space: Soviet Radio and Newspaper Reports on the Flight of the Spaceship, Vostok*, trans. Joseph L. Zygielbaum (Pasadena: Jet Propulsion Laboratory, 1961), 5.
- 3 Denis Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore: Johns Hopkins University Press, 2001), 260.
- 4 Referring to both 'Earthrise' and the 'Blue Marble' images, Sean Gaston writes: 'Even without the recent emphasis on globalization or global climate change, which were no doubt given a tangible authority by these famous images from the 1960s and 1970s, one could treat this visualization of the earth from afar as the Copernican revolution of the twentieth century. Today, we can encircle the globe.' Sean Gaston, *The Concept of the World from Kant to Derrida* (London: Rowman and Littlefield, 2013), 1.
- 5 Henry Vaughan, 'First to Fly', in *Into That Silent Sea: Trailblazers of the Space Era, 1961–1965*, ed. Francis French and Colin Burgess (Lincoln: University of Nebraska Press, 2007), 21.
- 6 See, for example, Gordon de Q. Robin on 1957–58, the International Geophysical Year: 'The success of the IGY satellites – first with the launch of Sputnik 1 on 5 October, 1957, then of the US Explorer series starting in 1958 ... will go into

- history. This remarkable achievement enabled man to view Earth for the first time from a distance.' Gordon de Q. Robin, 'Curtain Up on Polar Research', *New Scientist* 95, no. 1323 (1982): 760.
- 7 Lisa Parks, *Cultures in Orbit: Satellites and the Televisual* (Durham, NC: Duke University Press, 2005), 3.
 - 8 Edmund Husserl, *Ideas: General Introduction to Pure Phenomenology* First Book, trans. F. Kersten (The Hague: Martinus Nijhoff, 1983), 94.
 - 9 Husserl, *Ideas*, 94.
 - 10 Husserl, *Ideas*, 94.
 - 11 Husserl, *Ideas*, 94.
 - 12 Cosgrove, *Apollo's Eye*, 259.
 - 13 Cosgrove, *Apollo's Eye*, 259. Cosgrove quotes Frank Borman, astronaut on the Apollo 8 mission that produced the 'Earthrise' photo: 'When you're finally up at the moon looking back at the earth, all those differences and nationalistic traits are pretty well going to blend and you're going to get a concept that maybe this is really one world and why the hell can't we learn to live together like decent people' (258).
 - 14 Cosgrove, *Apollo's Eye*, 260.
 - 15 Cosgrove, *Apollo's Eye*, 260.
 - 16 Cosgrove, *Apollo's Eye*, 261.
 - 17 Cosgrove, *Apollo's Eye*, 261.
 - 18 Cosgrove, *Apollo's Eye*, 261.
 - 19 'Star Flight: Yuri Gagarin. Documents of the First Manned Flight into Space'. Available online: http://www.firstorbit.org/media/pdfs/Gagarin_Vostok-1-Transcript.pdf, 12 (accessed 19 February 2018).
 - 20 Zygielbaum ed., *The First Man in Space*, 10.
 - 21 Shawn William Miller, *An Environmental History of Latin America* (Cambridge: Cambridge University Press, 2007), 193.
 - 22 See, for example, Margaret Lazarus Dean's chronicle of the direction taken by NASA following the Apollo missions, including the decline of the Shuttle programme, *Leaving Orbit: Notes from the Last Days of American Spaceflight* (Minneapolis, MN: Graywolf Press, 2015).
 - 23 Chris Hadfield, *You Are Here: Around the World in 92 Minutes* (London: Macmillan, 2014), 2.
 - 24 Hadfield, *You Are Here*, 5.
 - 25 Hadfield, *You Are Here*, 2.
 - 26 Hadfield, *You Are Here*, 3.
 - 27 Tim Peake, *Hello, Is This Planet Earth? My View from the International Space Station* (London: Century, 2016), 10.
 - 28 Peake, *Hello, Is This Planet Earth?*, 13.
 - 29 Marshal McLuhan, 'The Emperor's Old Clothes', cited in *McLuhan in Space: A Cultural Geography*, ed. Richard Cavel (Toronto: University of Toronto Press, 2002), 95.

- 30 Writing in *The Guardian* in anticipation of Peake's mission, Edward Bloomer similarly rejects the idea of an encompassing celestial regard: 'The space station itself is a significant source of light pollution for the crew, making it extremely difficult to take good pictures of the dim astronomical objects surrounding them (although the human eye, a more advanced device, will still afford amazing views every day). In a suitable location, Earth-bound observers will actually have quite an advantage over astronauts observing stars and deep-space objects: the vantage point may not be quite as exotic, but a dedicated astrophotographer can still capture something unique'. Edward Bloomer, 'The Third Brightest Object in the Sky', *The Guardian*, 15 November 2015. Available online: <https://www.theguardian.com/science/2015/nov/15/international-space-station-astronaut-starwatching> (accessed 19 February 2018).
- 31 Alice Oswald, 'Tithonus: 46 Minutes in the Life of the Dawn', in *Falling Awake* (London: Jonathan Cape, 2016), 48.
- 32 Jacques Derrida, 'Ellipsis', in *Writing and Difference*, trans. Alan Bass (London: Routledge and Kegan Paul, 1978), 299.
- 33 Peter Sloterdijk, *In the World Interior of Capital: For a Philosophical Theory of Globalization*, trans. Wieland Hoban (Cambridge: Polity, 2014), 4.
- 34 Francis MacDonald Cornford, *Plato's Cosmology: The Timaeus of Plato* (London: Routledge and Kegan Paul, 1937), 118.
- 35 Cornford, *Plato's Cosmology*, 115.
- 36 Plato, *Phaedo*, 109a, trans. David Gallop (Oxford: Oxford University Press, 1993), 68.
- 37 Plato, *Phaedo*, 108e, 68. In his notes on this section, Gallop points to the controversy among scholars about how Plato's term *περιφερής* should be translated. 'At 108e5 the translation "round", rather than "spherical", avoids prejudging the question of whether the earth is, in fact, thought of as spherical'. Plato, *Phaedo*, p. 223 n.108c5–109a8. Intervening in this debate, William M. Calder III submits that 'spherical' best conveys Plato's usage of *περιφερής* elsewhere. '*περιφερής* applied to solids means *spherical, globular*'. William M. Calder III, 'The Spherical Earth in Plato's *Phaedo*', *Phronesis* 3, no. 2 (1958): 122.
- 38 Plato, *Phaedo*, 109c–d, 69.
- 39 Plato, *Phaedo*, 109d–110a, 69.
- 40 Plato, *Phaedo*, 110b–d, 70.
- 41 Jay Apt, Michael Helfert, and Justin Wilkson, *Orbit: Nasa Astronauts Photograph the Earth* (Washington, DC: National Geographical Society, 1996), 11.
- 42 Cosgrove, *Apollo's Eye*, xi.
- 43 Cosgrove, *Apollo's Eye*, 257.
- 44 Cosgrove, *Apollo's Eye*, 258.
- 45 Hadfield, *You Are Here*, 1.
- 46 Hadfield, *You Are Here*, 1.
- 47 Hadfield, *You Are Here*, 1.

- 48 On the morning of 15 December 2015, Tim Peake's journey to the ISS was triumphantly announced by news and social media in the UK as a unique and historic moment, since (it was claimed) this was the first time that a British astronaut had travelled to space. As ever, however, the narrative of novelty attached to being in orbit is curious and unreliable. Peake was not the first British person to have undertaken spaceflight. Among the other British astronauts are Helen Sharman, who in 1991 visited the Mir space station, Piers Sellers (a UK meteorologist who gained US citizenship in order to train as an astronaut), who served on three NASA missions to the ISS between 2002 and 2010, and Michael Foale (born with dual UK-US citizenship), who flew on Space Shuttle missions from 1992 to 2003 and was Commander of the ISS from 2003 to 2004.
- 49 Joyce E. Chaplin, *Round About the Earth: Circumnavigation from Magellan to Orbit* (New York: Simon and Schuster, 2012), 134.
- 50 Chaplin, *Round About the Earth*, 67.
- 51 Chaplin, *Round About the Earth*, 102.
- 52 Chaplin, *Round About the Earth*, 189. Also notable here is Verne's less-acclaimed 1879 novel *The Begum's Fortune*, which imagines a device that can circumnavigate the world: 'A projectile, animated with an initial speed twenty times superior to the actual speed, being ten thousand yards to the second, can never fall! This movement, combined with terrestrial attraction, destines it to revolve perpetually round our globe.' Jules Verne, *The Begum's Fortune*, cited in Doug Millard, *Satellite: Innovation in Orbit* (London: Reaktion, 2017), 22.
- 53 Chaplin, *Round About the Earth*, 255–90, *passim*.
- 54 Cosgrove, *Apollo's Eye*, 26–8.
- 55 John Donne, 'Good Friday 1613. Riding Westward', cited in Cosgrove, *Apollo's Eye*, 28. Cosgrove mistranscribes the second line that he quotes. This should read 'And tune all spheres at once, pierced with those holes?'. John Donne, 'Good Friday 1613. Riding Westward', in *John Donne: Selected Poetry*, ed. John Carey (Oxford: Oxford University Press, 1996), 208.
- 56 Emily Dickinson, 'No Matter Where the Saints Abide', in *The Poems of Emily Dickinson*, ed. R.W. Franklin (Cambridge, MA: Belknap Press of Harvard University Press, 1999), 581.
- 57 Hart Crane, 'Cape Hatteras', in *Hart Crane's The Bridge: An Annotated Edition*, ed. Lawrence Kramer (New York: Fordham University Press, 1999), 75.
- 58 Crane, 'Cape Hatteras', 72.
- 59 Martin Heidegger, "'Only a God Can Save Us': The *Der Spiegel* Interview', trans. William J. Richardson, in *Heidegger: The Man and the Thinker*, ed. Thomas Sheehan (Chicago: Precedent, 1981), 56.
- 60 Heidegger, "'Only a God Can Save Us'", 56.
- 61 Heidegger, "'Only a God Can Save Us'", 56.
- 62 The terms 'earth' and 'world', Kelly Oliver comments, function differently in Heidegger's work. 'Earth comes to play a central role in Heidegger's thought

insofar as it conceals itself from us, resists, and refuses our attempt to conquer it. In this way earth resists technological framing in the sense of mastering or managing ... Earth is associated with the past as given, our *native ground* and rootedness in history ... World, on the other hand, is associated with the future as an engagement with this past and history through which, in decisive moments, we can transform our experience or be transformed by it'. Kelly Oliver, *Earth and World: Philosophy after the Apollo Missions* (New York: Columbia University Press, 2015), 112.

- 63 Martin Heidegger, *Contributions to Philosophy (From Enowning)*, trans. Parvis Emad and Kenneth Maly (Bloomington: University of Indiana Press, 1999), 89.
- 64 Martin Heidegger, *Mindfulness*, trans. Parvis Emad and Thomas Kalary (London: Continuum, 2006), 12.
- 65 Heidegger, *Mindfulness*, 12.
- 66 Heidegger, "Only a God Can Save Us", 56.
- 67 Heidegger, "Only a God Can Save Us", 57.
- 68 Martin Heidegger, 'Traditional Language and Technological Language', trans. Wanda Torres Gregory, *Journal of Philosophical Research* 23 (1998): 138.
- 69 Heidegger, 'Traditional Language and Technological Language', 140.
- 70 Heidegger, 'Traditional Language and Technological Language', 140.
- 71 Relevant here is the place of the satellite in Jacques Lacan's distinction between linguistic and technical communication: 'Many people talk nowadays about messages everywhere, inside the organism a hormone is a message, a beam of light to obtain teleguidance to a plane or from a satellite is a message and so on; but the message in language is absolutely different. The message, our message, in all cases comes from the Other, by which I understand "from the place of the Other"'. Jacques Lacan, 'Of Structure as an Inmixing of Otherness Prerequisite to Any Subject Whatever', cited in Elizabeth Grosz, *Jacques Lacan: A Feminist Introduction* (London: Routledge, 1990), 204.
- 72 Heidegger, 'Traditional Language and Technological Language', 142.
- 73 Heidegger, 'Traditional Language and Technological Language', 142.
- 74 Heidegger, 'Traditional Language and Technological Language', 134.
- 75 Heidegger, 'Traditional Language and Technological Language', 134.
- 76 Heidegger, 'Traditional Language and Technological Language', 134.
- 77 Heidegger, 'Traditional Language and Technological Language', 140.
- 78 Heidegger, 'Traditional Language and Technological Language', 141.
- 79 Heidegger, 'Traditional Language and Technological Language', 141.
- 80 For a detailed account of the emergence and development of this legacy, see Don Ihde, *Heidegger's Technologies: Postphenomenological Perspectives* (New York: Fordham University Press, 2010), 1–27.
- 81 Paul Virilio, *Strategy of Deception*, trans. Chris Turner (London: Verso, 2000), *passim*.

- 82 Jean Baudrillard, 'The Ecstasy of Communication,' trans. John Johnston, in Hal Foster, ed., *The Anti-Aesthetic: Essays on Postmodern Culture* (New York: New Press, 2002), 147.
- 83 Baudrillard, 'The Ecstasy of Communication,' 147.
- 84 Baudrillard, 'The Ecstasy of Communication,' 147.
- 85 Jean-Luc Nancy, *The Creation of the World or Globalization*, trans. François Raffoul and David Pettigrew (New York: SUNY Press, 2007), 33–4.
- 86 Luce Irigaray, *Way of Love*, trans. Heidi Bostic and Stephen Pluháček (London: Continuum, 2002), 20.
- 87 Irigaray, *Way of Love*, 20.
- 88 Anthony Giddens, *Beyond Left and Right*, cited in Parks, *Cultures in Orbit*, 5. Also see Peter Dickens and James S. Omrod, 'Globalization of Space: From the Global to the Galactic,' in *The Routledge International Handbook of Globalization Studies*, ed. Bryan S. Turner (London: Routledge, 2010), 531–53.
- 89 Gayatri Chakravorty Spivak, *Death of a Discipline* (New York: Columbia University Press, 2005), 16.
- 90 Spivak, *Death of a Discipline*, 16.
- 91 Peter Dicken and James S. Ormrod, *Cosmic Society: Towards a Sociology of the Universe* (London: Routledge, 2007), 107.
- 92 Spivak, *Death of a Discipline*, 16.
- 93 Ngūgĩ Wa Thiong'o, 'On the Abolition of the English Department,' in *The Postcolonial Studies Reader*, ed. Bill Ashcroft, Gareth Griffiths, and Helen Tiffin (London: Routledge, 1995), 441.
- 94 Oliver, *Earth and World*, 23.
- 95 Walter Benjamin, 'The Moon,' in *Berlin Childhood around 1900*, trans. Howard Eiland (Cambridge, MA: Belknap Press of Harvard University Press, 2006), 161.
- 96 Benjamin, 'The Moon,' 163.
- 97 Emmanuel Levinas, 'Heidegger, Gagarin, and Us,' in *Difficult Freedom: Essays on Judaism*, trans. Seán Hand (London: Athlone, 1990), 231.
- 98 Levinas, 'Heidegger, Gagarin, and Us,' 232–3.
- 99 Levinas, 'Heidegger, Gagarin, and Us,' 233.
- 100 Parks, *Cultures in Orbit*, 47.
- 101 David Howard, 'Cartographies and Visualization,' in *A Concise Companion to Postcolonial Literature*, ed. Shirley Chew and David Richards (Oxford: Blackwell, 2010), 157.
- 102 Thembisa Waetjen, 'Sputnik from Below: Space Age Science and Public Culture in Cold War South Africa,' *Interventions: International Journal of Postcolonial Studies* 18, no. 5 (2016): 705–6.
- 103 Wole Soyinka, 'This Past Must Address Its Present,' Nobel Lecture, 8 December 1986. Available online: http://www.nobelprize.org/nobel_prizes/literature/laureates/1986/soyinka-lecture.html (accessed 25 August 2017).

- 104 Soyinka, 'This Past Must Address Its Present'.
- 105 Derek Walcott, 'North and South', in *The Poetry of Derek Walcott 1948–2013*, ed. Glyn Maxwell (New York: Farrar, Straus and Giroux, 2014), 287.
- 106 Discussions of some literary references to the astronomical figure of orbit are provided in, for example, Frédérique Aït-Touati, *Fictions of the Cosmos: Science and Literature in the Seventeenth Century*, trans. Susan Emmanuel (Chicago: University of Chicago Press, 2011); David H. Levy, *The Sky in Early Modern English Literature: A Study of Allusions to Celestial Events in Elizabethan and Jacobean Writing 1572–1620* (New York: Springer, 2011); and Anna Henchman, *The Starry Sky Within: Astronomy and the Reach of the Mind in Victorian Literature* (Oxford: Oxford University Press, 2014).
- 107 Donne, 'Good Friday 1613. Riding Westward', 208.
- 108 Emily Dickinson, 'Tell the Truth but Tell It Slant', in *The Poems of Emily Dickinson*, 494.
- 109 Walt Whitman, *Song of Myself: With a Complete Commentary*, ed. Folsum and Christopher Merrill (Iowa City: University of Iowa Press, 2016), 67.
- 110 Crane, 'Cape Hatteras', 73.
- 111 George Eliot, *Daniel Deronda* (London: Penguin, 1995), 164.
- 112 James Joyce, *Ulysses* (Oxford: Oxford University Press, 1993), 680.
- 113 Joyce, *Ulysses*, 680.
- 114 Joyce, *Ulysses*, 680.
- 115 Paul Valéry, 'Agathe', in *Collected Works of Paul Valéry, Volume 2: Poems in the Rough*, trans. Hilary Corke (Princeton, NJ: Princeton University Press, 1969), 210.
- 116 Valéry, 'Agathe', 210.
- 117 Valéry, 'Agathe', 210.
- 118 Valéry, 'Agathe', 210.
- 119 Millard, *Satellite*, 26.
- 120 David Meerman Scott and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (Cambridge, MA: MIT Press, 2014), 2.
- 121 Dean, *Leaving Orbit*, 15.