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The Space of Electronic Writing

Where, or when, or what is a beginning?

Edward Said, *Beginnings: Intention and Method*

When responding to his own question about the nature of origins, Edward Said replies that a beginning 'is often that which is left behind; in speculating about beginnings we often resemble Molière's M. Jourdain, acquiring retrospective respect for what we have always done in the regular course of things'.¹ As with Molière, so too with electronic literature.

When commentators on electronic literature consider its history, one text above others tends to be located as its source and inspiration: Vannevar Bush's 1945 essay 'As We May Think'. This essay is motivated by a desire to understand the future for, and social contribution of, scientific work in the wake of the Second World War. Where scientists' efforts in the preceding years had been focused on the machinery of warfare, Bush writes, the end to hostilities provides them with an opportunity to develop instruments of peace. Of the various devices that he anticipates for this new period of enlightenment, one is typically singled out as particularly prophetic. The 'memex', the name that Bush gives to this instrument, would be 'a sort of mechanized private file and library',² a storage device that would supplement and augment memory by capturing and granting universal access to the totality of human knowledge, allowing users to navigate documents according to the textual routes that they prefer to follow. Anyone wishing to improve their understanding of something would begin by consulting an article in a pre-installed encyclopedia; after leaving this information projected on the memex's platen, the user then 'finds another pertinent item, and ties the two together. Thus, he goes, building a trail of many items. Occasionally he inserts a comment of his own, either linking to the main trail or joining it by a side trail to a particular item'.³ In this manner, Bush believes, the operations of the memex would duplicate in part how the human mind functions: it would build

knowledge and allow access to information through a process of information association.

Bush's vision for a configurable and dynamically accessible repository of information is regularly cited as the inspiration for – indeed, the beginning of – interactive and mutable writing spaces in which user or reader participation is integral to the act of textual production. In 1974, Ted Nelson draws upon Bush's vision when formulating the term *hypertext* to name the non-sequential organization of information that digital media make possible. 'Hypertexts were foreseen very clearly in 1945 by Vannevar Bush,' Nelson writes, and he describes 'As We May Think' as 'the starting point for the field of Information Retrieval'.⁴ Nelson also reprinted 'As We May Think' in his 1983 *Literary Machines*, which is often regarded as a pivotal text in the development of the notion of a non-linear system of interconnected texts. Doug Engelbart, inventor of the computer mouse and designer of human–computer interfaces and text-linking protocols, in a letter to Bush describes 'As We May Think' as one of his principal influences.⁵ Bush is 'widely credited with the invention of hypertext',⁶ N. Katherine Hayles observes, and for J. Yellowlees Douglas, the idea of hypertext 'was born' with Bush, 'who envisioned a system that could support and improve human memory more efficiently than the printed word'.⁷

An archaeology of electronic literature is, however, a risky undertaking, one that risks leaving behind its many beginnings. For Johanna Drucker, only an impoverished history of writing would position the memex as the foundational instrument that sets in motion the principle of non-sequentially ordered information. 'Ways of thinking about knowledge as an interlinked field have been a part of the mythology of networked knowledge systems since their invention,' she writes, 'and earlier, paper-based diagrammatic organizations of knowledge and argument can be traced to Ramus and his method in the late Middle Ages'.⁸ Drucker's intervention here certainly raises troubling historiographical questions about the origins of non-linear writing, and she persuasively observes that beginnings always have a precedent. But Drucker also raises a further concern that tends to be peripheralized when the memex is viewed as digital media's primogenitor. Nelson takes the memex as the inspiration for conceiving an apparatus that is rooted in the idea of user-generated textual association, but he also claims that such a device needs to operate as part of an interconnected network. Information storage and retrieval – indeed, textual production – at this point emerge as both an interactive and a distributed technology. Hypertext takes shape not only as a system that seeks to replicate the associative operations of human memory, but also as a tool that reproduces a fundamental need for

association between people; it is an instrument that reveals the ontological condition of being-with, rather than suggesting the solitary detachment of the user-as-agent.

For Nelson, the need to develop a distributed information network arises from the atomized diversity of tools and procedures that characterize computing in the 1960s and 1970s. To overcome the 'mutual incomprehensibility and disconnected special goals' that are intrinsic to this fragmented condition, tools for information storage and retrieval must, as they evolve, allow a return to the essential unity of human culture:

Now we need to get everybody back together again. We want to go back to the roots of our civilization – the ability, which we once had, for everybody who could read to be able to read everything. We must again become a community of common access to a shared heritage.⁹

With the opportunity to actualize Bush's vision of the memex there is also, therefore, the need to embrace a heritage that extends across the lands and languages of the world. The tools that Nelson proposes to facilitate this universal connection would be rooted in an ethics of mutuality, open exchange and an unrestricted cosmopolitanism; founded on these principles, hypertext would not only make the world's knowledge available in an open and interactive manner. It would, more fundamentally, effect a monumental synthesis that would put the world back in touch with itself.

Curiously, Nelson does not claim to be the originator of this universalist vision; rather, he credits Bush with the idea of diffused information and communication system. 'This was of course what Vannevar Bush said in 1945',¹⁰ Nelson writes. However, such a claim overstates the degree to which Bush's essay proposes either a worldwide community of readers or a mechanism for accessing a universal social and cultural inheritance. 'As We May Think' comes closest to proposing this idea when it briefly remarks that science has allowed us to develop a 'record of ideas' that can be managed 'so that knowledge evolves and endures throughout the life of a race rather than that of an individual'.¹¹ This implied reference to a shared and transnational repository of human knowledge then becomes eclipsed by Bush's primary focus on the technical possibilities that the memex would offer to each user.

Nelson's concept of hypertext envisages a system of networked exchange that is, at best, implicit in Bush's essay, and 'Dream Machines' anticipates the emergence of a shared informationalism in ways that are absent from 'As We May Think'. And yet, tracing the development of a transborder and distributed

system of information exchange to Nelson would again risk the pitfalls of history as archaeology. As much as it would be an error to describe Bush as the source of non-linear writing, it would also be a mistake to describe Nelson as the principal figure in the conceptualization of a knowledge commons that would reach all of humanity. More than ten years before Nelson, in a 1963 memorandum to his colleagues, J.C.R. Licklider (often treated, alongside Engelbart and Nelson, as one of the architects of digital connectedness) proposes an ‘Intergalactic Computer Network.’¹² Even earlier, Joseph Tabbi notes, ‘The worldwide collaborative potential of collecting documents, not lost on these [Bush and Nelson] American information specialists after World War II, had already been expressed by the Belgian Paul Otlet in his *Traité de documentation* (1934).’¹³ In the *Traité*, Otlet proposes a workstation that comprises a screen and a telephone:

All knowledge, all information could be made compact enough to be contained in some works deposited on this workstation, within reach, and indexed in a manner that would make consulting them as easy as possible. In this case, the World described in the collection of books would truly be accessible to everyone. The Universal Book formed from all of these books would have become something like a supplement of the brain, itself the foundation for memory, a mechanism and an instrument that is external to the mind, but so close to it and so able to be used by it that it would truly be a sort of additional organ, an appendix beyond the skin.¹⁴

Such an appendix would offer a means to navigate the information that was close to hand, but it would also, Otlet proposes, provide remote access to the immense and dynamic physical archive of the world’s information that he named the ‘Mundaneum.’ This institution, Alex Wright explains,

was to be more than just a networked library ... Otlet envisioned it as a central component of a much vaster scheme to build a utopian World City ... Otlet believed in the inevitable progress of humanity toward a peaceful new future, in which the free flow of information over a distributed network would render traditional institutions – like state governments – anachronistic. Instead, he envisioned a dawning age of social progress, scientific achievement, and collective spiritual enlightenment. At the center of it all would stand the Mundaneum, a bulwark and beacon of truth for the whole world.¹⁵

To Licklider’s and Otlet’s predictions of distributed networks it is possible to add works which similarly offer projections that antedate the formation of a digitally connected society: Claude Shannon’s 1948 ‘A Mathematical Theory of Communication,’ Marshall McLuhan’s 1962 *The Gutenberg Galaxy* or Paul

Baran's 1964 *On Distributed Communications*. If this tradition of thinking established an association between the computer and the world, then this association continues in the instruction that has become a customary feature of coding. "Hello World", Mark C. Marino notes, 'is one of the first programs that computer scientists write in a programming language'.¹⁶ Not merely the output of test program for those new to coding, this message suggests that the world can only be greeted as a result of computing code.

However much it is possible to track the post-Second World War development of the idea of a global information network through these and other formative works, and to trace the rush during this period to embrace digital computing as the tool that would act as the conduit for a networked society, such a history provides only one account of the devices that have shaped the emergence of electronic literature. This normative sense of beginning leaves behind other technologies that have both shaped a planetary consciousness and been essential to some of the textual advances that are associated with electronic writing. The year 1945 is pivotal in this history, although not simply because Bush proposes the memex at this point. Bush's vision is of a device that would supplement memory, but in the same year Arthur C. Clarke envisaged a network of orbital relays that would allow information exchange to surpass territorial limitations and move information across the world to produce a single media and information environment.

Clarke's vision takes shape over two short pieces. In the first, a paper circulated in 1945 to his colleagues at the British Interplanetary Society, Clarke speculates on how a future space station could have uses beyond acting as a staging post for vessels journeying from the earth to the further regions of space. Such a station could, he hypothesizes, enable 'the provision of world-wide ultra-high-frequency radio services'.¹⁷ In addition to television, these services could, Clarke writes, include remote transmission of documents, monitoring meteorological conditions and providing navigational information. A chain of these stations – fixed in geosynchronous orbit – would offer total coverage of the earth, allowing 'simultaneous television broadcasts to the entire globe' and the ability to relay 'programmes between distant parts of the planet'.¹⁸ Clarke's second (published) paper in 1945 emphasizes the prospects for social unity that such a network of geosynchronous stations would offer: 'A true broadcast service, giving constant field strength at all times over the whole globe would be invaluable, not to say indispensable, in a world society'.¹⁹ In contrast with land-based communications transmitters, which are able to cover only limited areas, orbiting satellites would not, Clarke advises, be limited by atmospheric conditions, and would therefore convey information across the planet in a more efficient manner.

Clarke is not the first, nor even the first writer of fiction, to conceive an artificial device in orbit. According to Joseph N. Pelton:

The Russian theorist Konstantin Tsiolkovsky was the first to note that a satellite orbiting 22,300 miles above the Earth's surface would travel at a speed that would make it appear to be stationary from Earth because its orbital velocity would be the same as the speed at which the Earth was rotating. In 1928, Herman Potôcnik, an Austrian Imperial Army officer, writing under the pseudonym Noordung, proposed a crewed space station in such a 'geosynchronous' orbit, to be used for meteorology, reconnaissance, and Earth mapping.²⁰

Clarke does not conceive orbiting devices for the first time, but he is the first to propose the use of geosynchronous satellites to transport information around the world. What is also notable about these texts is the momentous topographical displacement that they promote: only with the establishing of an orbital network, Clarke writes, will worldwide communication be possible. The informational demands associated with the second half of the twentieth century require a departure from earlier methods of global circumnavigation, and the exchanges that Clark describes could not result from a terrestrial network of storage and retrieval devices, or from transmission across the earth's surface. 'A relay chain several thousand miles long would cost millions,' he writes, 'and transoceanic services would still be impossible.'²¹ Neither impractical nor prohibitively costly, a network of orbiting stations would be 'the only way in which true world coverage can be achieved for all possible services.'²² Extraterrestrial relays are, therefore, understood by Clarke as exceptionally suited to establishing a global society that is complete and fully in touch with itself. Only the satellite, unencumbered by any attachment to the ground, is able to make the world observable and knowable. A network of these relays promises a world that is cohesive and unitary, rather than assembled from discrete informational spaces.

If the beginnings of electronic literature are to be traced not only to the development of techniques for non-linear textual production and navigation but also to a writing that ranges beyond literature's national contexts, then its emergence needs to be associated with the orbital relay as much as the memory expander, with the satellite as much as the computer. And if 1945 should not, strictly speaking, be identified as the moment in which computing – or, indeed, a distributed information network – was first conceived, then it can nevertheless be viewed as the year in which two formative visions collide to catalyse proclamations of a connected world. The prospect of a planetary writing therefore acquires momentum because of the convergence at this point of two

technologies that appeared unrelated: a tool for documentary storage and an extraterrestrial mechanism for information transmission.

Those associated with the arrival of the digital computer appear not to share Clarke's sense of the satellite's exceptional capacity to create a globalized world. In 1962, another formative year for digital computing and satellite technologies, Licklider and Welden E. Clark describe time-sharing and remote access to large-scale networked computers as pre-requisites for a functional 'man-computer symbiosis'²³ that would benefit humanity in its entirety. However, although this was also the year in which the first *Telstar* communications satellite was launched into orbit, Licklider and Clark make no reference either to this event or to the appetite at this time for globalized communication technologies beyond the digital computer. Nelson refers to Philip Klass's 1971 *Secret Sentries of Space*, an early and influential analysis of the United States's use of satellites for intelligence gathering, although only as part of a broader consideration of how computers make image manipulation possible. 'You can get pictures of any area you want from ERTS (Earth Resources Observation Systems) satellites,'²⁴ Nelson notes, although he does not elaborate on how pictures from orbit might contribute to the perception of the world or the emergence of a planetary consciousness.

Curiously, Clarke is present as an incidental figure in 'Dream Machines'. Nelson discusses him in the context of the description in 'Dream Machines' of hypertext as a multidimensional simultaneity that erases the distinction between text (Clarke and Stanley Kubrick's screenplay for *2001: A Space Odyssey*) and paratext (Clarke's account of the ideas that were left out of *2001*):

Arthur C. Clarke wrote a book entitled *The Lost Worlds of 2001* ... about the variants and alternatives of that story that did not find their way to the screen. In a hypertext version, we could look at them all in context, in collateral views, and see the related variants – with annotations.²⁵

What is particularly notable here is not the suggestion that the relationship between *2001* and *The Lost Worlds of 2001* is somehow exemplary – that it illustrates a layered and differentiated literary condition that can only become apparent in the emerging medium of hypertext – but that it makes no reference to the narrative that is the subject of Clarke's book. The concept of an orbiting transit station that Clarke introduces in 'Extra-Terrestrial Relays', as well as the idea of a device that monitors the earth from space (the focus of his 1948 short story 'The Sentinel'), is developed in *2001*. These texts share a fascination with instruments in orbit, yet Nelson does not acknowledge these instruments in his proposal for a mechanism that would both permit navigation of complex documentary resources and provide a shared system of exchange.

Bush, too, seems to attach little value to satellites in comparison with other technological opportunities that were on the horizon following the end of the Second World War. In his testimony to a US Special Senate Committee on Atomic Energy in 1945, Bush voices doubts about the technical feasibility of a delivery vehicle that would put a satellite into orbit. 'There has been a great deal said about a 3,000-mile high-angle rocket', he states, 'In my opinion, such a thing is impossible and will remain impossible for many years.'²⁶ Bush continues to express reservations about these instruments in the following decades. 'In his statement to the House Committee on Science and Astronautics recently', Dallas Smythe writes in 1961, Bush objects to how 'the United States is unreasonably enthusiastic about using its resources for development of space technology and is neglecting its other objectives, such as health and culture, to do so.'²⁷ And, although he came to adopt a different position on the need to compete with the USSR in orbit ('he had initially seen *Sputnik* as a 'wake-up call' for Americans who had grown too smug'²⁸), in this period he nevertheless remains resistant to proposals that space should become a primary area of scientific research in the United States. 'Bush favored a more balanced approach to space R&D', Kay writes, 'throughout the 1960s, he wrote numerous articles decrying Project Apollo.'²⁹ It is perhaps with a roguish sense of irony, then, that Clarke looks to Bush when naming the principal character (Vannevar Morgan) of his 1979 novel *The Fountains of Paradise*, a novel that is most renowned for imagining a space elevator which tethers the ground to a satellite in geosynchronous orbit. Morgan, perhaps like his namesake, is 'one of those rare people who are completely unaffected by heights.'³⁰

II

How are we, inhabitants of a modernity in which computer and satellite networks are closely associated, to understand this early adversarialism? For Clarke, Bush's misgivings about the ability to develop long-range rockets illustrate the risks attached to predicting future technologies,³¹ but there is more to be made of this difficult relationship than a simple warning about unreliable speculation on machines and instruments to come. Rather than arriving as apparatuses of military surveillance and governmental subjugation, satellites were – in the United States, at least – themselves, in a manner that today might seem perverse or counter-intuitive, subordinated in narratives of technological relevance that were developing in what was increasingly becoming defined as the age of

globalization. The denial of the satellite's capacity to compress and consolidate the world can be explained in relation to the scarcity of resources in the years after the Second World War. An alternative explanation is that this moment illustrates how conflict is often simulated in a political and economic system that values the idea of perfectibility while also preventing its attainment. Capitalism, for Slavoj Žižek,

is branded by a crippling contradiction, discord, by an immanent want of balance: this is exactly why it changes, develops incessantly – incessant development is the only way for it to resolve again and again, come to terms with, its own fundamental, constitutive, imbalance, 'contradiction'.³²

Discord between instruments that compete over the promise of world unification would, then, set the stage for a future resolution of this conflict. This discord prepared the ground for the ensuing narrative of the world's reconnection with itself, but it also permitted the resulting discourse that positioned technological instruments as the means to accessing and knowing the world as a space of human community.

Electronic literature allows an alternative reading of the arrival and subsequent fortunes of technologies that compete for the right to unite the world. The early schism between computing and orbital devices has not only fashioned a sense of how particular technical instruments might forge global relations. It has also shaped perceptions of how technologies transform the literary landscape, and, as this chapter has noted, typologies of electronic – especially digital – writing have often regarded it as the literary legatee of the computing architecture envisaged by Bush, Engelbart, Licklider and Nelson. When J. David Bolter describes the contemporary moment as 'the late age of print'³³ – an age in which, for him, the codex and other printed forms are being displaced by digital communication – he places hypertext at the centre of this irrepressible departure from the mechanical media of the industrial age. It is hypertext, rather than any other instrument, that for Bolter is effecting this monumental transformation of writing, and it is hypertext that has facilitated a global connectedness: 'The World-Wide Web was an explicit hypertext system from the start', he notes, and its 'great innovation ... was to define a protocol to make hypertext global'.³⁴ Within this story of how the world has become networked, the satellite continues to be given an incidental role, acting merely as one of several intermediaries that tie a network together: 'Each host or computer is a router or node', Bolter writes, 'and the hypertextual relationships among these nodes are defined by the cables and microwave or satellite links'.³⁵ If, in this manner, writing in general is understood as becoming

globalized because of largely ground-based digital networks then literature's passage across the world too has been associated with its shift into electronic media.

There have, in recent years, been some early signs that this situation might be changing, in the first instance as a result of the growing influence of location-aware technologies that utilize GPS (Global Positioning System) data. Evidence that these technologies now constitute an intimate part of our interactions can be found, Adriana de Souza e Silva and Jordan Frith note, in how they have 'entered the discourse of mass media outlets and have become common topics of popular conversations'.³⁶ Although little has been made of how these technologies are restructuring the public sphere, they propose that there is an emerging awareness of how locative media are shaping 'artistic and research projects'.³⁷ The aesthetic dimensions of this transformation are evident in the treatment of locative literature, although it is these texts' capacity to produce an enhanced sense of the situatedness that is seen to be a primary characteristic of this writing. Jason Farman, for example, in *The Mobile Story* maintains that site-specific narratives developed for mobile devices can provoke in readers a profound sense of attachment to particular places:

Storytelling with mobile media takes the stories of a place and attaches them to that place, offering an almost infinite number of stories that can be layered onto a single site. Readers of these stories can stand at a location, access the stories about that site, and gain a deep connection to that space (and the various histories of that space).³⁸

Rita Raley similarly writes that locative narratives 'gesture toward a cartography of the intimate and the quotidian, with users navigating the landscape via a subjective atlas or "deep map" that renders the ephemeral monumental'.³⁹

Literature that explores the locative opportunities of mobile phones and computers needs, then, to be approached in terms of how they open writing to new narrative, poetic and other representational possibilities. But they also need to be approached in terms of what is specific to this new aesthetic: not just a renewal of literature by digital media, and not even simply a renewal of electronic literature as a result of the media-specific affordances of mobile computing and telephony. Rather, what is seen to be specific to locative textuality is a different relationship to space: a different experience of local environments, a different mode of exploring unknown places,⁴⁰ but also, and more importantly, a different encounter with the world itself. Embedding the new cartography of orbital mapping – the images that cascade from satellites – into locative texts is requiring us to look again at how the earth has provided a ground for understanding.

The idea that locative writing can provide both a more sensitive, and a more reliable, understanding of particular environments is explored in Jeremy Hight, Jeff Knowlton and Naomi Spellman's *34 North 118 West*. This is an early, and now canonical, example of locative writing in which the idea of a site-specific narrative interaction is built on the notion that images from orbit can provoke a better understanding of how we interact with the world. Originally developed in 2002, and republished in 2016 in the third volume of the *Electronic Literature Collection*, *34 North 118 West* is frequently mentioned in studies of digital media as an example of the inventive use of mixed media – text, images, audio narrative – which engage readers/users in the production of narrative (here relating to an early twentieth-century railroad depot in downtown Los Angeles that has since been replaced by other structures). The place of this story becomes the page on which it is written: as those who use this tool move through the landscape in the vicinity of the depot, they activate audio narratives and sound effects which have been excavated from this area's forgotten antecedents. Indeed, Hight, Knowlton and Spellman describe *34 North 118 West* as an exercise in 'narrative archaeology' which conjures up spectres of the past and brings them evanescently into the present. The project's website in this manner invites us to 'imagine wandering through a space inhabited with the sonic ghosts of another era ... Like ether, the air around you pulses with spirits, voices, and sounds.'⁴¹ The effect of such a haunting encounter with this site would be a passage through the immediate experience of degeneration – this place has become almost derelict – to a greater understanding of how the urban landscape is mutable, constantly referencing the past but also holding open the possibility for a similar transformation in the future. What motivates this site-specific text, then, is the notion that the narrative reinvention of place permits a more tangled spatialized experience, one that unearths the stories that are buried in the ground.

Christoph Benda's 2012 novel *Senghor on the Rocks* similarly appeals to the idea that location-aware technologies allow a writing that is more rooted in the landscape than other texts that do not make use of these instruments. Benda's novel uses satellite imagery taken from Google Maps to illustrate a story that is set against Senegal's qualification for the 2012 World Cup at the same time that the death of its first president, Leopold Senghor, is announced. Proclaimed as the first geo-referenced novel, this text places its narrative alongside satellite imagery that allows readers to track characters' movement across Dakar. This story is significant partly because it navigates a complex moment in which Senegal is seeking energetically to detach itself from the idea that it remains a postcolonial nation by embracing an ethic of globalized nationhood. Central to this text is the documenting of a difficult national sensibility in which recognition of the past –

in the form of mourning and commemorating Senghor – sits uneasily alongside the promise of a new transnationalism that would finally allow Senegal to escape the burdens not only of colonialism but also of postcoloniality by competing in a global arena. If this locative fiction promotes the notion of site-specific narrative, then this specificity should not be understood in local, national or regional terms. Rather, Benda's geo-referenced novel embraces the idea that we now regard geographical and political spaces in terms of their place in both a global society and a consistent planetary space. It is the world, in other words, that is apparently conveyed in this story about place. And, as with *34 North 118 West*, what is seen to permit such worldly connection is not the interactivity of electronic writing; these are not stories that simply celebrate the capacity of computational devices to animate the reader in the renewal of literature. Rather, these stories take as their premise the assumption that location awareness – that a global perspective – needs more than networked computing. They are, in other words, part of a literature which looks to Bush in its realization of a user-generated passage through documents. But is upon the instrument envisaged by Clarke that it relies when producing a narrative of worldly connection and comprehension.

Because images from orbit are so essential to them, locative narratives appeal to the notion that they – more other writing – are the beneficiaries of a truly global perspective. And yet, any such appeal is troubled by how, in both *34 North 118 West* and *Senghor on the Rocks*, the world does not submit to panoptic observation. As much as they suggest a rewriting of the planet from a newfound height and with the benefit of an unprecedentedly commanding perspective, in these texts the satellite's lens is not consistently seen to capture the ground below. Indeed, in them, the world retreats from view in the moment that it is surveyed from above. Despite the significance that they attach to the satellite's gaze, both *34 North 118 West* and *Senghor on the Rocks* also suggest that orbital monitoring and cartography must produce an uncertain relationship with space. The project *34 North 118 West* predates the development of cartographic tools such as Google Maps, which allow viewers to move smoothly from the visualization of the planet to a highly localized image of a particular place. As a result, this narrative is unable to situate the place marked by these co-ordinates within the generalized field of planetary space; pointing to the geographical limitations of site-specific narrative, *34 North 118 West* is able to provide only an incomplete and fragmentary perspective. Raley too questions the suggestion that the locative qualities of this text translate to a writing that conveys the actuality of space. 'The audioscape' of *34 North 118 West*, she writes,

with its jammed phrases and overlapping voices, produces a sense of dynamism and flux. Aural and visual perspectives alike are neither singular nor stable. And without a stable perspective, narrative representation cannot construct a distance between participant and territory, cannot allow for an objective, and objectivizing, zenith perspective, a privileged vantage point from which to perceive the whole of the city.⁴²

Senghor on the Rocks too is unable to construct a privileged and objectivizing vantage point. Benda's novel is principally focused on the meeting of two social and historical moments – Senghor's death and Senegal hosting the World Cup – but it interrupts the historiographical trajectory that this convergence might imply. In addition to indicating a historical tension in this moment – commemorating Senegal's colonial past at a time when this country is seeking to move through postcolonial nationhood to a global future – this novel also proceeds through the minutiae of streets and buildings, rather than across the world as a territory. *Senghor on the Rocks* does not deliver a complete and authoritative perception of the earth from height, and technology does not operate according to a historical progression that has culminated with the world becoming contained within the field of vision and cognition. Instead, satellite imagery works to invoke a sense of geographical and spatial particularity. What we see is not globality but location, not space transcended or overcome but reaffirmed as the site of cartographic inscription, not the harmoniously complete realm of *cosmos* but atomized instances of *topos* and *locus*. In this novel, then, technologies are seen not to reveal the smooth consistency of global space, but become the source of a locative dislocation, interrupting the idea that the global can be imaged or imagined technologically in the moment that they look closely at the surface of the world.

A similar fascination with, and ambivalent response to, observation and images from above can be found in print-based writing. In Salvador Plascencia's 2005 novel *The People of Paper*, one character imagines that he is being monitored from space. Preventing these acts of surveillance, another character – a baby with uncanny powers of perception – is able to shield thoughts both from those who are watching from above and also from readers. This novel therefore allies the act of reading with the invasive spectatorialism that we associate with the satellite, but it also suggests that the satellite is not always able to see. In Michael Joyce's 2007 *Was: Annales Nomadique: A Novel of Internet*, the satellite features briefly as a metonym for the world's networking by data. However, for Joyce this process does not forge an unprecedented global unity. When it describes an 'invisible lattice of mist across the valley manna of information descending from satellites

like tiny angels on parachutes,’⁴³ this novel suggests a landscape that has long been filtered by literary and theological images of a natural and cosmological sublime that resists comprehension even as it is rendered recognizable.

This troubled relationship between orbital hardware and seeing the world is also evident in *Where You Are*, a collection of stories and other documents published in 2013, some of which build literary geographies around satellite imagery. Geoff Dyer’s ‘The Boy out of Cheltenham’, an autobiographical narrative about growing up in the town of this story’s title, includes a large, high-resolution grid-referenced map – an image produced by a satellite – with an accompanying directory that indexes the roads, buildings and amenities that are documented in the text. However, Dyer’s narrative is very much in the tradition of the literary autobiography, and events in his childhood are presented as subject to the perspectivalism of reminiscence, and to recoding by writing. This text does not merely describe places and events; it organizes them according to a taxonomy (which includes Homes, Schools, Relatives, Beer, Drugs and Trouble) that attaches a non-spatial significance to them. This text therefore proceeds according to the principle of location awareness, but it does not promise an intimate – archaeological – connection with place or offer a sense of how this place might be situated in the world. Other pieces in this collection are also built around satellite imagery. John Simpson’s ‘Nature’s Valley’ combines images from orbit with graphical maps in a travel narrative about journeying across urban and rural spaces on the Western Cape of South Africa. Chloe Aridjis’s story ‘Map of a Lost Soul’ is organized around indexed satellite images of, and photographs of locations in, Mexico City. Valeria Luiselli’s ‘Swings of Harlem’ is enclosed within a fold-out, sepia-coloured geolocation image that is overlaid with photos of the places that feature in the story.

Introducing *Where You Are*, James Bridle situates this collection against the historical, technical and operational attributes of the GPS. The GPS system, Bridle writes, has become ‘a monumental network that provides a permanent “You Are Here” sign hanging in the sky, its signal a constant, synchronised timecode. It suggests the possibility that one may never be lost again.’⁴⁴ As Bridle continues, however, he claims that not being lost is not a mere suggestion or possibility. This cartographic system is part of an apparatus that allows us to observe orbital perception: these devices allow us to see how we see the world. ‘Mapping’, he states,

is a process of understanding: in order to be able to act fully and decisively in the world, we must render it legible, because only by reading the world are we capable of writing into it. Maps are powerful; they gift to those who commission

them a greater agency than those who operate in ignorance of the true shape of the terrain. As that terrain extends into the virtual, the electromagnetic, the invisible, so cartography must work to illuminate these dimensions as well.⁴⁵

With orbital visualization of the planet, then, we are provoked into understanding that the act of mapping is a process of perceptual, cognitive and taxonomic imposition; this process makes the world not only readable and navigable but also narratable, with our inscriptions extending from it and casting light upon it. Knowledge and writing, he suggests, take root in the landscape of the world because our new condition of being encircled by instruments allows the world to be contained for us. GPS is, he writes, ‘a grand asymmetric architecture composed of space-hardened signallers and radio waves, and us, no longer lost, suspended in its ever-shifting embrace’.⁴⁶

Such claims are curious, not least because the subtitle of this collection – ‘A book of maps that will leave you completely lost’ – indicates less confidence in cartographic and literary representations of space. Indeed, the stories and other texts in *Where You Are* continually trouble the notion that the satellite’s celestial gaze recentres us, creates a better connection with the world itself or produces a perceptual system that reliably captures the world’s immanent character. In them, the world remains in abeyance, not suddenly and finally revealed as an intelligible ground, but a site that continues to be rendered intelligible and is perpetually written and rewritten.

III

In addition to describing orbital networks as enhancing agency and grounding perception, the introduction to *Where You Are* departs from the idea of a functional technological architecture that nurtures us in its embrace. In Gilles Deleuze and Félix Guattari’s thinking, Bridle writes, there are the resources for conceptualizing the devices that surround the earth. ‘The GPS system is part of what Deleuze and Guattari termed the “abstract machine”’, he writes,

the sum of all machines which in their terminology includes the body, society, language, interpretation and technology. So the network too is one of these abstract machines: a mainframe, a terminal, a handheld device, a wireless LAN, a diadem of satellites, and us.⁴⁷

The concept of the abstract machine does indeed provide a frame in which GPS, and the satellite in general, can be understood as part of the technical machinery

that situates cognition. Insofar as these devices contribute to the formalization and stratification of sense they render the world legible; in this manner, they work with other instruments (including tools and other artefacts, modes of signification, and social, institutional and subjective practices) which collide, collaborate and connect to each other to structure and stabilize relationships between things in and beyond the world. But, for Deleuze and Guattari, as much as stability is forged in the production of these assemblages, intrinsic to structure is the primordial, inexorable and regenerative act of production. The source, rather than the expression, of this formative process, the abstract machine

cuts across all stratifications, develops alone and in its own right on the plane of consistency whose diagram it constitutes, the same machine at work in astrophysics and microphysics, in the natural and in the artificial, piloting flows of absolute deterritorialization.⁴⁸

Operating on what Deleuze and Guattari describe as ‘the plane of consistency’, abstract machines are not reducible to devices in the world but ‘surpass any kind of mechanics.’⁴⁹ Although they are essential to the forming of assemblages (such as the GPS system and orbital networks, as well as the perceptual schema that these instruments generate and maintain), these machines ‘cut across stratifications’, which is to say that they interrupt attempts to subject the world to cartographic categories. These machines are not, in other words, like the instruments that we use when interacting with the world.

Two principal consequences follow from this association of the satellite, the assemblage and the abstract machine. First, to return to Said’s observation that beginnings are what get left behind, the story of the devices that shape electronic literature needs to be revisited, and the role of instruments in orbit needs to be written into this story. Beginnings are never determinable as the initial or unprecedented inauguration of the new, Said advises, but should be treated as moments of coalescence which at once produce the future and reach into the pasts that they seek to discard. The instruments envisaged in 1945 – Bush’s memex and Clarke’s orbital relays – contribute to one such coalescence, since both have been essential to the narrative of a modernity in which the world is connected by – is assembled through – communication and the transfer of information. This narrative has been sustained by the repression of a longer and more expansive history of thinking about the techniques of universal connection, but it has also been defined by a contest over which instruments will truly connect us to each other and put us in touch with the world. In the regular course of thinking about literature, and in the assertion of electronic literature’s

capacity truly to be in touch with the world, the curious co-incidence that occurs in 1945 has been left behind.

Second, the association of the satellite, the assemblage and the abstract machine prevents the separation of print and paper from born-digital literature. 'Print and electronic textuality deeply interpenetrate one another', Hayles notes:

Although print texts and electronic literature – that is, literature that is 'digital born', created and meant to be performed in digital media – differ significantly in their functionalities, they are best considered as two components of a complex and dynamic media ecology.⁵⁰

Although differing in their technical properties, *The People of Paper, Was, 34 North 118 West, Senghor on the Rocks* and *Where You Are* prevent a rudimentary and evaluative separation of digital and print-based fiction because of what they share. Components of an ecology that incorporates images and navigational data that are transmitted from orbit, these texts share a fascination with the opportunity to create locative and cartographic narratives that are sensitive to places (and their own place) in the world. They are among the constituent parts of a media ecology that is creating different experiences of the literary, but these texts are also components in the larger assemblage that produces knowledge of the world from orbit. As this chapter has noted, however, these texts also exhibit a shared departure from familiar claims about what satellites allow us to see and know. Important though it is to consider the singular ways in which the codex and born-digital writing effect an experience of the literary, it is just as important to attend to how their fascination with the satellite results in a confused ontology of the world. What brings these texts together is not a confidence in the technical apparatus of orbital observation and mapping but a recognition that the satellite is always frustrated in its efforts to formalize, stratify and contain the territory below. What they reveal is not how the assemblage operates as system of tools, but how the abstract machine interrupts our sense of where we are.

Notes

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- 19 Arthur C. Clarke, 'Extra-Terrestrial Relays: Can Rocket Stations Give World-Wide Radio Coverage', in *Exploring the Unknown*, ed. Logsdon et al., 16.
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- 25 Nelson, 'Dream Machines', 45.
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