

LITERARY GEOGRAPHIES

Written on the Sky: Inscription, Scale, and Agency in Anthropocenic Semiotics

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Abstract:

This essay explores the sky as a surface of inscription in two principal forms: the speculative discourse of geoengineering as a technoscientific ‘fix’ for climate change and artist and poet David Antin’s 1987-88 diptych ‘Sky Poems,’ elemental poems printed against the sky over hours of time. I argue for a revised model of Anthropocenic semiotics that actively incorporates what I explore here as the problems of *surface*, *scale*, and *writing*. While the dominant form of Anthropocenic semiotics treats atmospheric signs as scientific data to be ‘explained’ to the public by scientists, I here draw upon both the insights of poststructural literary theory and materialist media theory to figure the sky as both receptive surface of petro-capital’s devastating inscriptions and as contested site of meaning-making. The dominant model of technoscientific semiotics relies upon *scalar collapse* to reduce the inscriptions of non-human scales to ‘human-size meaning,’ leading to an epistemic condition in which the human has become a geo-scale inscripitor without being able to read its own writing. As geoengineering discourse demonstrates, this semiotic model severely circumscribes the possible interpretations of and responses to climate change. Instead of attempting to scale-down the atmosphere’s signs, David Antin’s works point the way toward a scaling-up of human subjectivity toward collective and discontinuous forms of reading that could, I suggest, close the circuit between species-scale writing and elemental reading.

Keywords: Anthropocene; climate change; sky writing; scale; David Antin; scalar collapse.

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Anthropocenic Signification

The sky has long served as augur, seemingly offering as reward, at least to those who could interpret its cryptic inscriptions, access to dispatches from the future. It is no wonder, then, that the sky produces not only casual readers, but also many brands of connoisseurs: prophets, storytellers, literary critics. John Ruskin, by turns all three, wrote in his weather diary, on July 1, 1871: ‘the sky is covered with gray cloud;—not rain-cloud, but a dry black veil which no ray of sunshine can pierce; partly diffused in mist, feeble mist, enough to make distant objects unintelligible, yet without any substance, or wreathing, or color of its own’ (Ruskin 1908: 32-3). An assiduous reader of the sky, Ruskin kept a weather journal for most of his life, allowing him to proclaim the results of his longitudinal study in 1884: a ‘plague-wind’ had gradually come to dominate the sky over the past two decades. Where once the clouds had served a divine purpose ‘for human sight and nourishment,’ this newly malevolent weather now constitutes ‘phenomena hitherto unrecorded in the courses of nature’ (31). The natural order had been upset, or rather, the marks of nature had been replaced by altogether different signs. In this case, Ruskin proffers his own studied reading of those signs: England and its emulators have ‘blasphemed the name of God deliberately and openly; and have done iniquity by proclamation, every man doing as much injustice to his brother as it is in his power to do’ (40). Such ‘moral gloom’ is bound to bring about concomitant ‘physical gloom’ in the form of these elemental inscriptions. And while these are ill tidings indeed, they also serve as a message of hope, of renewed agency, for ‘whether you can affect the signs of the sky or not, you *can* the signs of the times’ (41).

The tenuous trans-scalar link between the signs of the sky and those of the times it reflects and frames has become all the more significant in the Anthropocene, an era marked by radical expansions of scale in the twin domains of human technics and climate semiotics. Ruskin’s concerns are ours again: how to make sense of the climatological signs that we can observe in the sky (and in scientific reports on atmospheric repositories such as ice core samples) and how to determine their causal relationship with global human activity? Now as then, the interpretation of signs—reading—is never a linear or unproblematic transfer of meaning but rather an always-contested negotiation of codes, whether we characterize this process as a hermeneutic encounter between self and being (Ricoeur 1974: 30), a language game played experimentally to produce desired outcomes (Wittgenstein 2009: 15), the privileged site of social contestations (Williams 1985), or as the potentially liberated freeplay of meaning-in-formation (Derrida 1970). Surely all of these apply to the Anthropocene, which marks an epoch so deeply animated by the gaps between knowledge and experience, the past and the future, intentionality and effect, that appropriately, even the term ‘Anthropocene’ itself is fiercely contested in both the geological sciences and the humanities.

The starting point for this essay, then, is the struggle over meaning—in this case, the divining of meaning from signs that belong neither to the world ‘outside’ of human culture (‘nature’) nor to the conventionally mediated world ‘inside’ human culture. This is because we are no longer certain which signs we read in the atmosphere, oceans, glaciers, and land are ‘ours’ in the sense of inscriptions that bear meaning that we (the human race, or participants in petro-capitalism) have determined without ever having consciously

participated in a signifying act. It is precisely this epistemological condition of having become unwitting authors who cannot recognize our own inscriptions, a condition of triangulated relation between signification, erasure, and scale, that I mean to mark by my use of the term ‘Anthropocene.’

The urgency for human cultures to improve their reading comprehension when confronting non-intentional inscriptions in media outside of those that occupy the common scales of print, screen, and direct contact cannot be overstated. Whether we characterize this form of literacy as ‘a sense of scale’ (Boeke 1957: 4), the cultivation of ‘eco-cosmopolitanism’ (Heise 2008: 10), or simply as *rendering climate change visible*, I do not need to rehearse this urgency, or the potentially existential stakes involved, here. John Durham Peters, considering the sky as media, sums this up succinctly: ‘Our survival may depend on knowing how to read the signs in the atmosphere’ (Peters 2015: 260). What I wish to add here is an identification of three problems of Anthropocenic signification that prevent many of us—individually and institutionally—from reading the very signs of the Anthropocene that were wrought by us—that is, by techno-human assemblages. The first is *the problem of surface*, which manifests itself as an inability to read signs encoded in elemental media because we cannot recognize the medium in question as forming a substrate for inscription. The reason for this non-recognition can often be found in the *problem of scale*, or a tendency to collapse differences of scale into reductive differences of magnitude. Attending to scalar difference comprises, as I will argue, a prerequisite form of literacy for reading the signs of the Anthropocene. Finally, the *problem of writing* is something of a gestalt whereby we linearize reading as the reception of meaning from an anterior source rather than attending to the conjoined processes of reading and writing that are, in this case, the mark of the Anthropocene.

Considered as a whole, these three problematics begin to reveal a model of Anthropocenic signification that is a fusion of materialist media studies and poststructural literary studies. I invoke this somewhat unholy alliance as an alternative to the dominant model of Anthropocenic signification, which generally figures signs of human influence on the biosphere and geological record as data that speaks unambiguously (in the language of science) and persuasively about the problem space of human-environment dynamics, and thereby prescribes a set of univocal and self-evident interpretations and solutions. The failure of the general public or governmental authority to act decisively to prevent future climate catastrophe, despite the availability and widespread dissemination of such data for several decades, suggests that perhaps it is worth exploring alternative models by which we might approach reading the Anthropocene. The model I’m proposing here is not meant to be definitive, but rather to gesture toward an understanding of how we might build a more robust form of Anthropocenic literacy by better incorporating and articulating together the unique dynamics of inscription, scale, and authorial agency.

Like Ruskin, I focus on the sky as one possible site for such an intervention. The remainder of this essay will explore the problems of surface, inscription, and scale in two very different discursive formations: the speculative proposals for geoengineering as a climate change ‘fix’ that preserves the dominant models of human subjectivity and scalar semiotics, and a diptych of artworks produced by David Antin in 1987-88 entitled *Sky*

Poems that seeks to radically reconfigure the relationship between the subject, non-human scales, and the enjoined processes of reading and writing.

Surface and Environment

Earth's atmosphere, composed of gases many miles thick, lacks both the solidity and the planar character of a surface. Yet for the purposes of signification, it becomes a surface as soon as you look up. The sky is a stabilized version of the atmosphere, the atmosphere as presenting surface, encountered from below. Optically this is an effect of reflection: though the atmosphere is a volume we gaze through, it reflects light back upon its terrestrial observers, appearing as a blue surface during the day and as a soft gray membrane at night (depending on the amount of light reflecting off its particles from nearby light sources). Even viewed cross-sectionally from orbit, the atmosphere reveals itself as a thin membrane, reminding us that three-dimensionality and two-dimensionality represent a spectrum distributed according to perspective and scale. To suggest that the atmosphere is a surface, then, is not to deny that it is also a volume. Rather, these describe two *modes* of Earth's atmosphere, each activated under certain conditions, and implying different relationships of access, dependence, and signification. While rendering a volume a surface is a dimensional reduction, it is not, I am arguing here, necessarily a reduction of complexity. This is because petro-capitalism engages the atmosphere as both volume and surface in different contexts and scales. Put simply, characteristic Anthropocenic inscription takes place at one scale (the global, the species) while characteristic reading of the atmosphere takes place at another (the individual, the scientific observation, the IPCC report). When reading and writing occur at different scales and in different modes, they appear invisible to each other. This scalar magic is characteristic of the Anthropocene—is, in my view, its defining feature. Under these conditions, coming to view the sky as (also) a surface is in effect a scalar alignment that holds out the promise of making petro-capitalism's inscriptions accessible as traceable, authorial acts.

In this essay, I employ the concept of *surface* in two senses. The first is as a substrate of inscription; something one writes upon. This can be literal, as in the case of Kafka's short story, 'In the Penal Colony,' which features a remarkable torture machine that slowly kills those convicted by the justice system by inscribing the text of the law each has broken onto the surface of his body (Kafka 1976: 169). In the story, public support for the machine is on the wane, along with, we must suppose, the general authority invested in inscription. For Julia Kristeva, text itself has a surface, or many surfaces, building on Mikhail Bakhtin's concept of heteroglossia. For Kristeva, meaning only arises at sites where one structure meets another, forming 'an intersection of textual surfaces rather than a point (a fixed meaning), as a dialogue among several writings' (Kristeva 1980: 65). The emergence of meaning at the intersection of surfaces is what she famously theorizes as *intertextuality*. The surface of text is a dispersal rather than a concentration, an expansion into plurality rather than a contraction into authoritative or even singular meaning. The surface is the core component of a text that extends to and interfaces with other texts, stabilizing it to the degree necessary to bear any meaning at all. At the same time, Kristeva's use of 'surface' instead of 'volume' suggests a two-dimensionality produced by discourse

rather than an any-direction-whatsoever of wholesale radiation. That is, texts exist neither in a signficatory isolation nor in a substrateless void of pure intertextual networking. Texts arise from and are embedded in an environment with particular topographies that shape encounters along trade routes, contested shelter, and common watering holes. Surfaces are meeting places.

The second notion of ‘surface’ that I wish to invoke here is that of James Gibson, whose theory of ‘ecological optics’ emphasizes that all environments must be rendered as surfaces before they can become navigable to an observer:

To perceive is to be aware of the surfaces of the environment and of oneself in it. The interchange between hidden and unhidden surfaces is essential to this awareness... The full awareness of surfaces includes their layout, their substances, their events, and their affordances. Note how this definition includes within perception a part of memory, expectation, knowledge, and meaning. (Gibson 2014: 244)

Though all perceiving beings find themselves confronted with mediums—air, water, land—they only bear meaning once we can perceive them as surfaces, for surfaces are the basic prerequisites of interaction, and interaction (actual or virtual) only becomes possible when the affordances of surfaces become manifest. In other words, we can only interact with a medium in the mode of surface. An aircraft hanger may possess a volume, but its walls and roof determine its function. A swamp has depth, but to a biped it is a surface to be crossed or avoided, and to an amphibian evading that biped, it is the water’s surface from which to flee, and the sheltering surface of the bed below, that present themselves as meaningful features. Surfaces mark difference: resistance and boundary, launchpad and anchor. Professional sprinters need the surface of a starting block to begin a race; writers need a surface to resist their ink before they can make their marks.

What these notions of surface have in common, despite their different disciplinary provenances, is not only an emphasis on the potentials of interaction, but an implied shift from environment as external context to incorporation and integration as active event. This is a shift from outside to inside, from an objective ‘view from above, from nowhere’ (Haraway 1988: 589) to an immanent dynamic of meaning arising from within the system in question, as Haraway evokes in her recent call for materialist meaning-making in the ‘Chthulucene’: ‘Alignment in tentacular worlding must be a seriously tangled affair!’ (Haraway 2016: 42). Language and text become surfaces as they are written, read, or modulate one another. Mediums become surfaces as they present possibilities for interaction, and therefore meaning-making. To perceive surfaces, then, is to perceive signification in the act. That is, surfaces are always inscribed with possibilities, and those inscriptions alter the surfaces in question. By contrast, we often cognize the world as radically separated between ‘environment’ and ‘subject.’ That is, even if we cannot do otherwise than to make use of surfaces, we are quite capable of hiding those acts of inscription, removing from view the surface itself. It is here that the ‘environment’ becomes data, and the idea that human activity could be having an impact on it a scandal.

The problem of climate change inaction is often framed as one of a lack of understanding of the significance of scientific data, or alternately on a general human inability to care about the temporally distant or spatially vast. The problematics of surface suggest, on the other hand, that such disconnect may be caused not by distance but by proximity: far from remaining passive, we are all furiously navigating meaning on surfaces daily, and to many humans climate change appears as a site of immanent contestation and active production. The problem is not that people don't understand atmospheric science or aren't convinced by it, but rather that they are so intimately acquainted with it that its very inscription as 'fact' provides new surfaces of inscription, new affordances for capital, power, and technoscience. Perhaps the most telling anti-climate-change discourse is one invested not in denial but in active engagement. How do we respond to potentially devastating anthropogenic climate change? For many voices, the answer is that we (either do already or must) actively manage the process, producing a climate we desire.

Paul Crutzen and Eugene Stoermer, in the essay in which they introduce the concept of the Anthropocene, after arguing for 'the central role of mankind in geology and ecology' at 'all, including global, scales' by citing numerous examples of environmental degradation caused by human activities, conclude that '[a]n exciting, but also difficult and daunting task lies ahead of the global research and engineering community to guide mankind towards global, sustainable, environmental management' (Crutzen and Stoermer 2000: 17). The politics of visibility and agency on display in this short piece are remarkable. The authors argue that 'during the past two centuries, the global effects of human activities have become clearly noticeable,' but only in the context of glacial ice cores, which 'show the beginning of a growth in the atmospheric concentrations' of greenhouse gases (17). The ice cores are texts that reveal, to the scientists who know how to read them, that humans have, at the planetary and species scale, collectively changed the composition of the atmosphere. The human species inscribes the atmosphere, but only scientists can read it, and even more problematically, only 'the global research and engineering community' can take on the paternal role of 'guiding mankind' toward management practices that would act as a substitute form of inscription.

Thus Crutzen and Stoermer invoke two types of writing and one type of reading, each differentiated by a scalar and disciplinary cut: (temporally and spatially) large-scale humanity writes unwittingly on the sky, specialized scientists read that text at extremely circumscribed, local scales (the ice core sample, the specialist), and then, as a global body, write a new management plan for the entire species (and in fact, for all species). The first form/scale of writing takes the form of uninhibited, but non-intentional release of greenhouse gasses into the atmosphere-as-volume. Ordinary humans can't read this because it does not appear as an inscription at all: a volume, without affordances, without surfaces, offers no resistance to such effluents—it seems to simply absorb them. The scientist with her ice core sample, however, converts a volume to a surface, deciphering meaning in its signifiers. The intervention proposed by Crutzen and Stoermer then amounts to a changed writing practice, or rather one form of writing, emerging from a particular disciplinary formation of specialist readers, is meant to replace the mass scrawlings of the anonymous and homogeneous species author. The problem then becomes, for the techno-scientific writers and their supporters, one of translation: how to

translate their blueprints and their justifications to the wider public? It is not difficult to see how this approach has failed, however valid its scientific reading practices. Beyond its paternal approach to persuasive scaling, where a masculinized minority colonizes the majority ‘for their own good,’ this approach elides the imbrication of the science and technology community in *both* forms of writing: the anonymous climate-wrecking release of pollutants as much as the authored policy white paper. While one way out of this thorny mess leads to Haraway’s embrace of a ‘tentacular,’ multi-species form of the Anthropocene—re-cast as the Chthulucene—another, and I believe, complementary path might be to stay with the trouble of writing a bit longer, and ask how we might better entwine the processes of elemental reading and inscription.

Troubled Writing: David Antin’s *Sky Poem 1*

The sky has served as a literal surface of inscription ever since the surplus of agile aircraft and pilots produced by the First World War made such a feat technically possible and economically viable. By 1922, skywriting was born as a commercial activity. This expensive practice of burning specialized oil in aircraft exhaust to produce sinewy white lines against a vast blue canvas has mostly treated the sky as a giant billboard (the first undisputed use of skywriting was an advertisement for *The Daily Mail* in London). At typical skywriting altitudes, each inscription lasts between one and five minutes before being dispersed by wind currents, rendering all such writing radically ephemeral. Given the high cost and brief duration of these advertising techniques, their efficacy (or perceived efficacy) surely lies in their novelty. The scale of the endeavor demands the reader’s attention, and the foreshortened duration of the mark ensures in most cases that any reader who happens to see it at all is virtually guaranteed to experience it only incompletely. In other words, it is the *act* of writing on the sky, as much as the scale of the marks themselves, that commands the reader’s attention and justifies advertising dollars in the face of much less expensive and temporally durable forms of aerial advertising such as banners and blimps. Skywriting only signifies as a *process*, a unique conjunction of the spatially expansive and temporally circumscribed.

This unique scalar structure can be exploited for other than advertising purposes. Poet and conceptual artist David Antin captured the temporal and spatial dimensions of figuring the sky as a surface of inscription in 1987 and 1988 with his duo of artworks, ‘*Sky Poems*.’ First over Santa Monica, California, and then over La Jolla, California, he commissioned a team of aircraft to ‘print,’ in oil-based puffs, text against the sky.¹ As each line dissipated into the atmosphere, Antin directed the pilots to print the next line in its place—an aerial palimpsest. Each of these enormous but ephemeral acts of printing spelled out, over a two hour period, a poem. The first read:

IF WE GET IT TOGETHER
CAN THEY TAKE IT APART
OR ONLY IF WE LET THEM

Addressed to a distracted public going about its daily tasks, this poem was likely experienced by most individual readers *in media res*, and without the satisfying completeness that it obtains when printed on the page or screen before you now. Antin's work is a happening, the emergence of signification upon the surface of the sky itself. It highlights the relationship between scale and inscription: The sky has no scale until it becomes a surface.² For a reader of Sky Poems on the ground, the 2,100 foot tall characters have a similar resolution and relative size as the characters that you are reading in this essay. Here the text itself acts as a trans-scalar intermediary: it is small for the human reader even though each letter is the size of a skyscraper (Figure 1). That is, it inherits the familiar scale of printed media and thereby forms a signifying relationship with the human reader on the ground at the same time that it inherits the vast scale of the sky, a scale that encompasses both the local and the planetary. The skytype, occupying this unstable scalar nodal point between the human and the atmosphere, comes to life as an inscription of human behavior, human movements, human meaning, upon the atmosphere itself. This is writing for the Anthropocene.



Figure 1. David Antin, *Sky Poem No. 2*.

While spectators stopped and read this *relatively* small text, focusing on the sky as surface, the scalar oscillation that made this possible could only be registered as distance: spatial distance between the spectator and the read text, and temporal distance between each line of the poem and the next. The sky transposed into surface, scale transposed into distance—Antin asks us to reconfigure our relationship, at least for the duration of the poem or the duration of our attention span (whichever is shorter), to humanity's trans-scalar inscriptions, the production of textual perturbations at radically non-human scales, out of sight because so far away (we may consider, for example, the Global North's

inscriptions on the Global South in the form of pollution, waste, and poverty) or so distant in time. This latter temporal disjunction, the experience of missing part of the message, points toward what Rob Nixon has theorized as ‘slow violence,’ or ‘a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all’ (Nixon 2011: 2).

Antin’s work does not make this violence visible as content, but instead figures a trans-scalar textuality, a process of writing on physical space and dispersing that writing into the larger environment, that problematizes the act of reading it. The Sky Poems call attention to the impossibility of a truly unified spatial and temporal scale, figuring the act of atmospheric inscription as a scalar paradox: an oversized yet ephemeral gesture that nonetheless reads as intimately small while unfolding with a duration that is likely to out-span any reader’s attention or ability to hold constant her own relationship with her environment—required in order to maintain the requisite fixed viewpoint.

Antin’s text highlights these scalar paradoxes and seems to mock any reader steadfast enough to make it through the poem’s duration. How can ‘we’ ‘get it together’ when such sustained acts of reading are necessary in order to do so? The individual reader must be able to make out the words, hang around long enough for the whole poem to appear, and develop a method for unifying what occurred in the past with the present, while filtering out all of the other events that occurred at more immediate scales in the interim. Reading this longitudinal artwork is like reading climate change. It always exceeds our field of view, our familiar durational scales, and our interpretive habits. Antin’s artwork seems to require technological mediation in the same way that the signs of climate change do in order to ‘get it together,’ or unify dispersed signifiers into a legible text (in Antin’s case, the two-hour event was primarily documented on video tape).

Antin’s explicit challenge expands from one of time and space to one of community. What is needed, suggests his poem, is a communal act of reading, a communal memory. And even if such a unification is possible, it is vulnerable to the ‘they’ that could dismantle it again, could disperse the crowd, the concentration of readers, back into the larger environment, reversing the process of focusing a volume into a surface. This points to a durational paradox: the sky, always the recipient of human inscription, nonetheless becomes surface only ephemerally; focused, flattened, and stabilized only for the duration of the artwork, which performs its own noncapturability, its own dispersal, its own volumanization.

The Return of the Author: Geoengineering and Scalar Collapse

In Paul Crutzen’s second published work on the Anthropocene concept, which reached a significantly larger readership when it was published in *Nature* in 2002, his proposed solution to the problematics of humanity’s geological inscriptions has coalesced from the vague program of guiding mankind to ‘internationally accepted, large-scale geo-engineering projects, for instance to ‘optimize’ climate’ (Crutzen 2002: 23). Once again Crutzen frames the Anthropocene as an engineering problem, and thus the engineer as a curative writer. A collective subject, whether Antin’s ‘we’ or ‘they,’ has been re-writing the sky, the oceans,

the polar ice caps, and so on. As that writing becomes visible—a problematic of scale and media—a new subject rises up to wrest away the pen, a new inscription at hand, ready to deploy. This is the geoengineering narrative. Here there is an author ready to take over from the radically collective subject occupying the title page of climate change. In the geoengineering tradition, engineers view themselves as the proper writers of climate: more rational, and more efficient.

Geoengineering, defined by the Royal Society as ‘deliberate large-scale intervention in the Earth’s climate system,’ is the technical ‘Plan B’ to mitigate the effects of climate change should the social Plan A—reorganizing human activity to reduce greenhouse gas emissions—fail (Royal Society 2009: 11). Of course, for global capital, the technical ‘solution’ is always Plan A, or more properly, Plan A is to have a Plan B compelling enough to prevent the official Plan A from ever gaining traction. Geoengineering discourse thus seeks to *speculatively* counter the effects of climate change in order to diffuse the weight of its signs. This game of erasure, conducted in the language of technics, is really about a monumental (and elemental) play of signifiers.

The world’s most prolific geoengineering advocate is not Paul Crutzen, but David Keith, who published a comprehensive study of geoengineering techniques in 1992, four years after NASA scientist James Hansen’s famous testimony to the US Senate asserting a strong correlation between the burning of fossil fuels and global warming (Shabecoff 1988), and only two years after the release of the first Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). In Keith’s ‘A Serious Look at Geoengineering,’ he argues that

The existence of a fallback is critically important, as it allows more confidence in choosing a moderate response strategy. Moderate responses are difficult to implement when catastrophic consequences are possible from weak anthropogenic climate forcing. Fallback strategies permit moderate responses to be adopted with the knowledge that should these prove inadequate, an alternative mitigation option is available. (Keith 1992: 289)

Keith’s argument is that signs of catastrophe admit of no proper response. Geoengineering, not as a practice, but as a potential (a ‘fallback strategy’) can resignify climate change not as impending doom analogous to Ruskin’s plague-wind, but rather as basic context, a new normal to be incorporated into our social and technical systems as an anticipated baseline.³ Keith discusses five geoengineering techniques: direct ocean dispersal (injecting carbon into the ocean), ocean fertilization (dumping phosphate or iron onto the surface of the ocean in order to stimulate plankton blooms), afforestation (planting trees, or greening the terrestrial surface), space based shields (giant mirrors deployed between the sun and the earth) and sulfate aerosols (the large-scale spraying of reflective particles into the atmosphere to increase its reflectivity) (Keith 1992: 291-2). Keith strongly favors the sulfate aerosols, which ‘may influence radiative fluxes either by optical scattering and reradiation, or indirectly by increasing the albedo [reflectivity] and lifetime of clouds’ (292). Remaking the atmosphere, or as weather modification historian James Fleming puts it in his book of the same title, ‘Fixing the Sky’ (Fleming 2010) is thus

both a technical and aesthetic program. Keith has devoted his career, from 1992 to the present, to developing, refining, and advocating for significant funding of stratospheric aerosol injection research. In a 2010 advocacy piece in *Nature*, for example, Keith, Parson and Morgan refer to this method of geoengineering as ‘global sun block’ (Keith et al 2010: 426).

To geoengineers, the atmosphere is a surface of engagement whose affordances are activated by the discourse of climate change. First the sun is re-signified as threatening, the greenhouse-gas-laden atmosphere stifling: textual surface. Then we (they) respond by applying ‘global sun block’ to the dangerously exposed ‘skin’ of the planet: technoscientific surface. Such a discursive move also scrambles the scales of the individual human observer, the planet, and technological agency attributed to the species as a whole. If this language conjures up an image of smearing suntan lotion on a chapped globe, it may as well serve as an adequate icon of the techno-optimist wing of Anthropocenic thinking advocated by the likes of Stewart Brand⁴ and the authors of ‘An Ecomodernist Manifesto’ (which include both Brand and Keith) (Asafu-Adjaye et al. 2015).

The sky is a surface, but it is not the same sort of surface as a television or a postcard. It is a *trans-scalar* surface: encountering it always involves stabilizing or destabilizing a relationship across scales. The sky is local and global at the same time, intimately close and the very figure of unfathomable distance. This scalar tension renders the sky taut, a multiplicitous surface that extends along a scalar axis, authorizing seemingly endless scalar slippages. And yet, for all of this scalar instability, it remains remarkably stable as a surface, an elemental medium. As John Durham Peters notes, sky media fundamentally mediates time as a basic model for knowledge. ‘Disasters—a term that means ‘bad star’—happen in the sky first’ (Peters 2015: 244). As the surface of a scalar condensation, the sky makes visible, to its most assiduous readers, momentary flashes of processes as they shift scales in acts of becoming, passing from the invisible, diffused scale of the planetary to the pointal, temperamental scale of the local: particulate suspension become smog, climate become weather. But if this scalar phase shift becomes visible as sky media, it also presents itself as an environmental affordance, an Archimedian lever capable of shifting global dynamics. Peters notes that the sky mediates time in two different modes, as *chronos*, or duration, and as *kairos*, or opportunity (213). Climate and the technology of the calendar belong to the mode former mode, while weather and the technology of the clock belong to the latter. Geoengineering makes use of this bidirectional scaling as a form of media to materially and discursively generate a loop: aerosol sulfates deposited in/on the sky to reverse the climate change that we read there, writing feeding back into reading, *kairos* transmogrified into *chronos*. As surface, the sky renders this materially and discursively possible.

Harnessing the sky’s affordances for technocratic climate intervention relies upon a medial and discursive conflation of scale, as exemplified by the figures of global sun block and a ‘global thermostat,’ a phrase picked up by climate journalist Eli Kintisch as a warning against ‘the inevitable international squabbles over the thermostat’ (Kintisch 2010: 206). This is an example of what I refer to as *scalar collapse* (Horton 2013). Scalar collapse speculatively negates the differences that attend changes of scale, dismantling the relationships (both ecological and medial) that constitute scale itself. This is the dark side

of scalar media: the sky acts as a surface upon which the signs from different scales assemble, effectuating legitimate shifts of scale (dispersion and concentration) that nevertheless, as signs, can be read to dismantle the scalar distinctions upon which such processes rely.

David Keith himself acknowledges that scalar collapse attends the geoengineering narrative: ‘The deliberate management of the environment on a global scale would, at least in part, force us to view the biosphere as an artifact’ (Keith 2000: 33). This underscores the scalar scrambling inherent to such speculation, an example of what Timothy Clark has referred to as ‘the derangement of scale’ that characterizes the human individual’s experience of the Anthropocene (Clark 2012: 148). Scalar collapse involves more, however, than merely figuring an object as occupying the wrong point on the scalar spectrum (e.g. figuring the planet as smaller than the human, or the thermostat as larger than the sky). What is ultimately at stake in scalar collapse is the elision of difference that attends the dynamics of disparate scales. The cybernetic systems that maintain the temperature of your house do not scale; speculatively imagining that the global climate (a classic chaotic system from a mathematical standpoint) can be homeostatically forced is to catastrophically fail to attend to scalar difference.

There is no greater barrier to a trans-scalar semiotics of climate change than narratives that collapse scale. The process of scalar collapse is a collapse of signification. Like Newton’s apocryphal epiphanic moment under an apple tree, one scale comes to stand in for another. An apple for a planet. An article of faith: surely they must operate according to the very same principles! This narrative trope is akin to that of many climate change writers, who attempt to ‘tame’ the radical scales of climate change by re-signifying them as ‘human-scale’ and familiar. The polar bear on a fragile ice sheet. The face of the climate refugee. But as one scale collapses into another, we lose the critical ability to attend to scalar difference, an essential ability if we are truly to read the climate across geological time and planetary space. It is precisely because agency, intentionality, equilibrium, and ecology function so differently at these scales than they do in our back yards that we have run into so much trouble in the first place.

Sarah Kember and Joanna Zylińska figure the scalar problematics of the Anthropocene as a Goldilocks narrative. Anthropocene thinking seems to vacillate between the too big (grand unifying theories that elide difference) and the too small (microhistories that miss the overall picture). ‘Between the master narrative and the partial, plural, incommensurate stories of human-technological relations there surely lies a ‘Goldilocks’ approach that is not just right, but ‘just right,’ in the sense of being neither too big nor too small’ (Kember and Zylińska 2015: 234). I take this Goldilocks principle to indicate not that there is a ‘correct’ scale at which to view the Anthropocene, but rather that any one, monolithic scale (however large or small its purview) will automatically blind its reader to scalar difference. What I term scalar collapse then, could be thought of as slavish adherence to mediation at one and only one scale. This is the ever-present danger of engaging mediation at privileged surfaces that stabilize at scalar boundaries: they become powerful discursive tools, as well as material substrates for trans-scalar interventions, but simultaneously collapse the differences that they straddle. Thus an adequate Anthropocenic literacy must involve a certain scale fluidity, or a foregrounding of the

semiotics and ontology of scale itself. Only then will we be able to re-synthesize intentional and unintentional modes of inscription that geoengineering discourse artificially divides, and re-conceive medial surfaces such as the sky as ineluctably *trans*-scalar.

Trans-Scalar Readers: David Antin's *Sky Poem 2*

David Antin's second Sky Poem, printed upon the sky over the La Jolla Museum of Contemporary Art on September 3, 1988, read:

IF WE MAKE IT TOGETHER OR
FIND IT WILL THEY BREAK IN
OR OUT OF IT OR LEAVE IT AS
THEY FIND IT STRICTLY ALONE

This poem, in its unfolding, figures a communal process of signification, offering two possibilities for meaning making against the canvas of the sky: 'we' may work together on a composition that likely outscapes us individually, or 'we' may make a communal discovery, find something that signifies to us as a community (Figure 2). And yet, whether we make it or find it, it is still vulnerable to other communities, other possible social formations that bear a topologically indeterminate relationship with our composition/discovery: perhaps they emerge from within, or perhaps they will not be kept out. In an interview conducted on the day of his first Sky Poem performance, Antin explains that the project is 'in response to the fragility of language, of talk, of ideas' (Skypoems 1987). In the midst of Reaganite neoliberalism, which used/uses market economics as a trans-scalar intermediary to penetrate and dismantle both public institutions and collective voices, the specter of infiltration invoked in both poems is scale-reflexive: any collective project that forms, on whatever temporal and spatial scale, is subject to dismantling, both from within and without. This scalar fragility of composed assemblages, of collective subjectivity, challenges the reinscription of agency in the figure of the engineer as evoked in geoengineering discourse, and points the way toward an understanding of elemental signification as a trans-scalar loop that composes and recomposes subjects as much as signs.

Antin explains in a later essay that he had initially imagined the dynamics of writing and reading rehearsed by these poems on an even larger scale: 'So then I had this dream of an epic poem stretching across the United States over twenty or thirty years, three or four lines a year—at two thousand bucks a shot—gradually being written for people who would never see all of it' (Antin 2011: 153). A text extended to such spatial, temporal, and economic scales could never be inscribed or read by a single human being. Yet meaning would be generated, produced at scales only engaged by collective formations-in-the-making. These imagined poems, notes Antin, will 'be related, not so much thematically as linguistically, grammatically, and semantically' (Skypoems 1987). While such meaning eludes the individual subject of the liberal humanist tradition, the text still signifies to a different assemblage, one that is dispersed in time and space, and thus not classically figured as an entity that reads.



Figure 2: *Sky Poem No. 2.*

Antin's Sky Poem project, never fully realized, never fully realizable, gestures toward not only a form of signification at hitherto unimagined scales, but also the formation of a trans-scalar subject to match. These performances force the individual subject to acknowledge the incompleteness of their own ability to interpret its signs, but at the same time, this lacuna of the reader is transmuted into a catalyst for the production of a new writer. The spectator may be frustrated by the temporal duration of the performance and feel dwarfed by its elemental spatial and temporal scale, but the hint of a new subject arises, piecing together the signs as a collective endeavor, signifying at scales that may not feed back to the scale of individual agency. The production of meaning here is mutually constitutive of the production of subjectivity. If assemblages must scale up to meet the reading challenge posed by Sky Poems, this scaling-up process, a signifying event, becomes a productive foray into making meaning. Antin, as poet and artist, becomes something of a catalyst, or an asymptote that marks the recession of the signifying event from the unified consciousness of the classical human subject. The writers, however, as the poems indicate, are these new assemblages themselves.

The shift in signifying responsibility from an author to the reader is famously figured by Roland Barthes as a shift from 'readerly' engagement with signs to a 'writerly' semiotics. For Barthes, this shift implies both a movement from singularity to plurality and a valorization of production over consumption: 'Why is the writerly our value? Because the goal of literary work (of literature as work) is to make the reader no longer a consumer, but a producer of the text' (Barthes 1974: 4). Antin's Sky Poems enact this project with a twist: the shift to the writerly is also a scalar one. A new semiotics is required for new scales, and vice versa. The sky can be read, but only by a new collective subject that writes its own meaning on its simultaneously monumental and ephemeral surface.

Conclusion: The Writing is on the Sky

I have argued in this essay that an adequate semiotics of the Anthropocene must be both robustly trans-scalar and self-reflexive—that is, that it must be capable not only of reading the monumental signs of petro-capital modernity, but also of tracking the scalar and elemental transformations that comprise the inscriptions of the human. These are the very inscriptions that are rendered invisible by the narrow bands of our medial attention. The sky is only one surface of this vast, unintentional inscription project, but it opens toward and draws in many scales. Humans produce climate change, but not as individual subjects. To read the climate's signs, then, requires an ironically writerly semiotics aimed not at reducing the elemental scale of the sky to human-sized meaning, but rather a scalar *expansion* and dispersal of the human subject to a scale adequate to read its own writing.

The climate is no longer an indifferent backdrop to human production, an environment or context, but rather the product of collective human endeavor—the context become text. If geological strata have been revealed to be the collective human subject's history of record, it nonetheless remains a univocal history, 'possessing a true, canonical meaning' (Barthes 1974: 8). The Anthropocene marks the full realization of geological media as perverse strata of signifieds, what Jussi Parikka refers to as the 'Anthroscene' (Parikka 2014: 6; 2015). It also marks atmospheric media, in its vast scale and mercurial play of meaning, as 'a galaxy of signifiers,' a writerly surface *par excellence* (Barthes 1974: 5). The problem is not to *become* trans-scalar writers, the problem is to see that we already are, and thus to learn to track the trans-scalar processes of inscription and mediation that comprise but conceal this form of elemental writing.

We must become what we already are: writers on/of/with the sky. In the current, dominant mode of Anthropocene semiotics, we read at the scale of the human subject, while we write at the scale of the sky. The problem of the author returns here with a scalar twist. If, for Barthes, 'the modern scriptor is born simultaneously with the text' (Barthes 1978: 145), and the Anthropocene signals the birth of the trans-scalar human subject, extended in deep time and planetary space, then the death of the author heralds, at these scales, a truly grotesque reader, flush with trans-scalar powers of inscription that it can barely recognize, let alone understand or check.

To approach the problem of anthropogenic climate change in this mode, the mode of geoengineering, is inevitably to collapse scalar difference, exploiting the affordances of the sky as surface to maintain these scalar boundaries, preserving the scale of the individual human subject as reader and outsourcing collective production to the detritus of petro-capitalism, furthering a monumental act of inscription that cannot be properly read by its authors. Geoengineering as a perverse, if seemingly inevitable, response to climate change is an expression of this 'old' mode of reading the sky. Its narratives deploy a form of trans-scalar writing that nonetheless depend entirely upon a classic subject who performs the role of the author: the geoengineer, the technocrat who imagines his hand upon the planetary thermostat. This discourse is reactionary, a direct response to the semiotic terror that attends the apprehension of anthropogenic climate change. David Antin's *Sky Poems* project, on the other hand, points the way toward a new semiotics of composition that

maintains scalar difference, meeting collective human inscription with a concomitant, Goldilocks-scaled collective self-reflexivity. Only then may we hope to MAKE IT—that is, ourselves—into a more generative sort of writer on the sky.

Notes

¹ This process, developed in the 1940s and known as ‘skytyping,’ uses a dot matrix like process involving four or five planes flying in a tight formation, each emitting brief puffs of smoke in a coordinated pattern to form the larger characters.

² Martin Scorsese’s biopic about Howard Hughes, *The Aviator*, dramatizes this point in a scene about Hughes’ production woes on his infamous film, *Hell’s Angels*. Hughes demands to know why the planes look like ‘models’ and seem not to signify speed. He then proclaims the answer: there are no clouds visible in the sky, and without a reference point, we cannot tell how large or how fast the planes are. Scorsese claims that based on screenwriter John Logan’s research, this really did occur (Scorsese 2007).

³ Twenty years later, Bill McKibben would suggest a new signifier for this altered planet: Eearth, which marks ‘the start of a change far larger and more thoroughgoing than anything we can read in the records of man, on a par with the biggest dangers we can read in the records of rock and ice’ (McKibben 2010: 2-3). While McKibben is sounding an alarm and Keith is pointing to techno-social potentials, both foreground the interrelationship between reading and writing: literacy must be tuned to new scales and media if it is to detect unseen inscriptions, prompting a new act of writing that metonymically stands in for them: the geoengineering plan, ‘Eearth.’

⁴ Stewart Brand, founder of the *Whole Earth Catalog* in 1968, unconditionally advocated for geoengineering in his 2009 book, *Whole Earth Discipline: An Ecopragmatist Manifesto*.

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