1. **Donna Haraway, “Cyborg Manifesto” and Deleuze and Guatttari (transversality) as context for Braidotti 1-6**
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**Rosi Braidotti, Transversal Post-humanities**

I propose instead a new affirmative method of co-construction and expression of vital, neo-materialist locations and perspectives. Built into this project is the question of how to renew the social responsibility of the contemporary humanities outside the jargon of corporate directives, by posing questions that have less to do with morality than with ethics. The former deals with rules and regulations, while the latter poses questions of power in the dual sense of entrapment (potestas) and empowerment (potentia). As a discourse about forces and relations, ethics is a transversal concern that exposes the contradictions of the moralization of public life, including scientific research, under neo-liberal governance.

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The Posthumanities share a number of assumptions, beyond a mere focus on non-human objects of enquiry. First, that the knower—the knowing subject—is neither Man—Homo universalis—nor Anthropos alone. The knowing subject is no longer the liberal individual, but a more complex transversal ensemble: of zoe/geo/techno-related factors, which include humans, as collaboratively linked to a material web of human and non-human agents. For instance, the subject of knowledge for the digital humanities is AI-mediated; for the environmental humanities, it is geo-, meteo-, and hydro-centred.

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Living entities are both embedded and embodied, and have relational and affective powers. As such they are capable of different things and different speeds of becoming (Braidotti 2002). Subjects defined as transversal relational entities do not coincide with a liberal individual, but are rather a “haecceity”—which means an event of complex singularities or intensities (Deleuze and Guattari 1994). Subjectivity is thus both post-personal and pre-individual and fully immersed in the conditions that it is trying to understand and modify, if not overturn. We are after all variations on a common matter; in other words, we differ from each other all the more as we co-define ourselves within the same living matter—environmentally, socially, and affectively. A second crucial feature of the Posthumanities therefore is that they assert the diversity of zoe—non-human life—in a non-hierarchical manner that acknowledges the differential intelligence of matter and the respective degrees of ability and creativity of all organisms. Zoe-geo-techno-entities are partners in knowledge production, which means that thinking and knowing are not the prerogative of humans alone, but take place in the world. The world is defined by the coexistence of multiple organic species, computational networks, and technological artefacts alongside each other (Guattari 2000; Alaimo 2010).

The term transversality was introduced to psychoanalytic theory and philosophy in the work of Guattari (1984) and of Deleuze (2000), and the two together (1994). The concept is meant to de-link the force of desire from the Lacanian dialectics of Lack and Law, and turn it instead towards a neo-Spinozist notion of desire as plenitude. Transversality positions desire as a positive force capable of subverting, but also re-structuring relations between entities in the world. In this major shift, unconscious processes get redefined not as the emanation of a centralized linguistic master code, but as the result of collectively enacted material interventions in the world. Unconscious desires are both disruptive and generative. This non-dialectical understanding of desire has important implications for marginalized, under-represented, and virtual modes of thinking and knowing. What is not yet known, in other words, does not fall into the negative regime of unknowability. It rather remains transversal, virtual, in that it expresses an uncoded, transgressive, and at times illicit mode of knowledge that has not yet received the official seal of approval. It is in the process of being actualized, through the collective praxis of forming a transversal subject assemblage that can carry out the task of actually implementing new ways of knowing. By extension, transdisciplinary, interdisciplinary, and post-disciplinary scholars have expertise and know-how without necessarily being (recognized as) disciplinary experts, or in spite of what they may know about the limitations of those disciplines. Marginal knowledge is dynamic, vital, and unruly in its very aspirations to change the rules of the game. This inner tension, and the positive force of the desire that sustains it, articulates some of the shifting ground that constitutes the Posthumanities and supports the intense trans-disciplinarity they require. The transversal approach has proved inspirational for posthuman pedagogy and education (Semetsky 2008; Semetsky and Masny 2013) by building on the idea of subject-formation as an event that takes place transversally, between nature/technology, male/female, black/white, local/global, present/past—in assemblages that flow across and displace binary oppositions (Braidotti 1994). Posthuman critical thinkers and educators situate themselves in and as part of the world, defending an idea of knowledge production as embedded, embodied, affective, and relational. The emphasis on vital neo-materialism, which provides the ontological grounding for critical posthuman scholarship as a transversal field of knowledge, is also a way to resist the business model of neo-liberal higher education. Posthuman transversality was developed (Cole and Bradley 2018) as an organizational principle that criticizes this pyramidal academic structure and the hierarchical chain of command at the core of most institutions of higher learning. It also calls into question the role of capital in higher education designed as a global market, and the unequal labour relations it engenders, with a vast “precariat” at the bottom of the academic scale. For most participants, the reality of an academic education today is a high debt and under-employment. Practices of community-driven “transversality” are the antidote to the corporatization of the university and the monetarisation of knowledge, in that they introduce a non-hierarchical model of relationality and the gratuity of affect in education. As Åsberg, Koobak, and Johnson (2010) and Lykke (2018) suggest, the Posthumanities foreground postdisciplinarity as a transformative principle to destabilize the hegemonic power of distinct disciplines and the hierarchies of knowledge that structure the academic divides between the human, social, and natural sciences. New institutional modes and methods of organizing posthuman knowledge need to unfold in transversal conversations, through collaborative, shareable academic spaces, where community work can be enacted in a non-competitive frame. This emphasis on the politics of immanence allows the inclusion in education of non-anthropomorphic elements, be it animals, natural entities, or technological apparatuses. Zoe-geo-techno transversal entities allow us to think across previously segregated species, categories, and domains. Transversality facilitates links to animality, to algorithmic systems, to planetary organism, on equal, but rhizomic terms, that involve territories, geologies, ecologies, and technologies of survival. It relocates both students and educators into the very world they are trying to learn about.

**Deleuze and Guattari on the Transversal Rhizome**

Guattari, “Molecular Revolution” (118)

**“**Transversality in the group is a dimension opposite and complementary to the structures that generate pyramidal hierarchization and sterile ways of transmitting messages. Transversality is the unconscious source of action in the group, going beyond the objective laws on which it is based, carrying the group’s desire.

Deleuze and Guattari, ‘A Thousand Plateaus”

A rhizome has no beginning or end; it is always in the middle, between things, interbeing, intermezzo. The tree is filiation, but the rhizome is alliance, uniquely alliance. The tree imposes the verb "to be" but the fabric of the rhizome is the conjunction, "and ... and ... and..."This conjunction carries enough force to shake and uproot the verb "to be." Where are you going? Where are you coming from? What are you heading for? These are totally useless questions. Making a clean slate, starting or beginning again from ground zero, seeking a beginning or a foundation-all imply a false conception of voyage and movement (a conception that is methodical, pedagogical, initiatory, symbolic ... ). But Kleist, Lenz, and Büchner have another way of traveling and moving: proceeding from the middle, through the middle, coming and going rather than starting and finishing.25 American literature, and already English literature, manifest this rhizomatic direction to an even greater extent; they know how to move between things, establish a logic of the AND, overthrow ontology, do away with foundations, nullify endings and beginnings. They know how to practice pragmatics. The middle is by no means an average; on the contrary, it is where things pick up speed. Between things does not designate a localizable relation going from one thing to the other and back again, but a perpendicular direction, a transversal movement that sweeps one and the other away, a stream without beginning or end that undermines its banks and picks up speed in the middle.

We form a rhizome with our viruses, or rather our viruses cause us to form a rhizome with other animals. As Francois Jacob says, transfers of genetic material by viruses or through other procedures, fusions of cells originating in different species, have results analogous to 11 those of "the abominable couplings dear to antiquity and the Middle Ages."6 Transversal communications between different lines scramble the genealogical trees. Always look for the molecular, or even submolecular, particle with which we are allied. We evolve and die more from our polymorphous and rhizomatic flus than from hereditary diseases, or diseases that have their own line of descent. The rhizome is an anti-genealogy. The same applies to the book and the world: contrary to a deeply rooted belief, the book is not an image of the world. It forms a rhizome with the world, there is an aparallel evolution of the book and the world; the book assures the deterritorialization of the world, but the world effects a reterritorialization of the book, which in turn deterritorializes itself in the world (if it is capable, if it can).

**Donna Haraway, Cyborg Manifesto**

Contemporary science fiction is full of cyborgs—creatures simultaneously animal and machine, who populate worlds ambiguously natural and crafted. Modern medicine is also full of cyborgs, of couplings between organism and machine, each conceived as coded devices, in an intimacy and with a power that were not generated in the history of sexuality. Cyborg “sex” restores some of the lovely replicative baroque of ferns and invertebrates (such nice organic prophylactics against heterosexism). Cyborg replication is uncoupled from organic reproduction. Modem production seems like a dream of cyborg colonization work, a dream that makes the nightmare of Taylorism seem idyllic. And modern war is a cyborg orgy, coded by C3 I, command-control -communication-intelligence, an $84 bil - lion item in 1984’s U.S. defense budget. I am making an argument for the cyborg as a fiction mapping our social and bodily reality and as an imaginative resource suggesting some very fruitful couplings. Michel Foucault’s biopolitics is a flaccid premonition of cyborg politics, a very open field.

By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism—in short, cyborgs. The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centers struc- turing any possibility of historical transformation. In the tradi- tions of “Western” science and politics—the tradition of racist, male-dominant capitalism; the tradition of progress; the tradi- tion of the appropriation of nature as resource for the produc- tions of culture; the tradition of reproduction of the self from the reflections of the other—the relation between organism and machine has been a border war. The stakes in the border war have been the territories of production, reproduction, and imagination. This essay is an argument for *pleasure* in the con- fusion of boundaries and for *responsibility* in their construc- tion. It is also an effort to contribute to socialist-feminist cul- ture and theory in a postmodernist, non-naturalist mode and in the utopian tradition of imagining a world without gender, which is perhaps a world without genesis, but maybe also a world without end. The cyborg incarnation is outside salvation history. Nor does it mark time on an oedipal calendar, attempt- ing to heal the terrible cleavages of gender in an oral symbiotic utopia or post-oedipal apocalypse. As Zoë Sofoulis argues in her unpublished manuscript on Jacques Lacan, Melanie Klein, and nuclear culture, “Lacklein,” the most terrible and perhaps the most promising monsters in cyborg worlds are embodied in non-oedipal narratives with a diferent logic of repression, which we need to understand for our survival.1 The cyborg is a creature in a postgender world; it has no truck with bisexuality, pre-oedipal symbiosis, unalienated labor, or other seductions to organic wholeness through a fnal appropriation of all the powers of the parts into a higher unity. In a sense, the cyborg has no origin story in the Western sense—a “fnal” irony since the cyborg is also the awful apocalyptic telos of the “West’s” escalating dominations of abstract individuation, an ultimate self untied at last from all dependency, a man in space. An origin story in the “Western,” humanist sense depends on the myth of original unity, fullness, bliss and terror, represented by the phallic mother from whom all humans must separate, the task of individual development and of history, the twin potent myths inscribed most powerfully for us in psychoanalysis and Marxism. Hilary Klein has argued that both Marxism and psychoanalysis, in their concepts of labor and of individuation and gender formation, depend on the plot of original unity out of which diference must be produced and enlisted in a drama of escalating domination of woman/nature.2The cyborg skips the step of original unity, of identifcation with nature in the Western sense. This is its illegitimate promise that might lead to subversion of its teleology as Star Wars.

The cyborg is resolutely committed to partiality, irony, intimacy, and perversity. It is oppositional, utopian, and completely without innocence. No longer structured by the polarity of public and private, the cyborg defnes a technological polis based partly on a revolution of social relations in the oikos, the household. Nature and culture are reworked; the one can no longer be the resource for appropriation or incorporation by the other. The relationships for forming wholes from parts, including those of polarity and hierarchical domination, are at issue in the cyborg world. Unlike the hopes of Frankenstein’s monster, the cyborg does not expect its father to save it through a restoration of the garden—that is, through the fabrication of a heterosexual mate, through its completion in a fnished whole, a city and cosmos. The cyborg does not dream of community on the model of the organic family, this time without the oedipal project. The cyborg would not recognize the Garden of Eden; it is not made of mud and cannot dream of returning to dust. Perhaps that is why I want to see if cyborgs can subvert the apocalypse of returning to nuclear dust in the manic compulsion to name the Enemy. Cyborgs are not reverent; they do not re-member the cosmos. They are wary of hol - ism, but needy for connection—they seem to have a natural feel for united-front politics, but without the vanguard party. The main trouble with cyborgs, of course, is that they are the ille - gitimate ofspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate ofspring are ofen exceedingly unfaithful to their origins. Their fathers, afer all, are inessential. I will return to the science fction of cyborgs at the end of this essay, but now I want to signal three crucial boundary breakdowns that make the following political-fctional (political- scientifc) analysis possible. By the late twentieth century in U.S. scientifc culture, the boundary between human and animal is thoroughly breached. The last beachheads of uniqueness have been polluted if not turned into amusement parks: language, tool use, social behavior, mental events—nothing really convincingly settles the separation of human and animal. And many people no longer feel the need for such a separation; indeed, many branches of feminist culture afrm the pleasure of connection of human and other living creatures. Movements for animal rights are not irrational denials of human uniqueness; they are a clear-sighted recognition of connection across the discredited breach of nature and culture. Biology and evolutionary theory over the past two centuries have simultaneously produced modern organisms as objects of knowledge and reduced the line between humans and animals to a faint trace re-etched in ideological struggle or professional disputes between life and social science. Within this framework, teaching modern Christian creationism should be fought as a form of child abuse

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I want to conclude with a myth about identity and boundaries that might inform late-twentieth-century political imaginations. I am indebted in this story to writers like Joanna Russ, Samuel R. Delany, John Varley, James Tiptree Jr., Octavia Butler, Monique Wittig, and Vonda Mclntyre. 28 These are our storytellers exploring what it means to be embodied in high-tech worlds. They are theorists for cyborgs. Exploring conceptions of bodily boundaries and social order, the anthropologist Mary Douglas (1966, 1970) should be credited with helping us to con sciousness about how fundamental body imagery is to worldview, and so to political language.

But there are also great riches for feminists in explicitly embracing the possibilities inherent in the breakdown of clean distinctions between organism and machine and similar distinctions structuring the Western self. It is the simultaneity of breakdowns that cracks the matrices of domination and opens geometric possibilities.

**Yu, Multipolar Climate Studies**

Throughout this book, geo, as its Greek root—gaîa—suggests, signifies both the physical Earth and the mother of all life conceived of as an Earth goddess, and is the integral union of the physical and the spiritual worlds. The indigenous Greek concept of geo resonates with its indigenous counterparts in the Himalaya, Andes, and Arctic.

2

Demonstrated in many of our individual case studies, this book reconnects the disconnected knowing and feeling of climate by starting a critical rethink of humanity as an ecological species (Rose et al. 2012). Being ecological in our chapters means relational entanglements with many other species, rootedness in places, capability of migrating with the terrestrially shifting life-giving forces of the Earth when the fecundity of ancestral lands declines due to extreme weather conditions, and our ability to innovate new modes of human-earth interactions for survival because of environmental crises created by ourselves. When climate changes, it concurrently works through air, water, and land in both creative and destructive manners. Like many of our peer scholars and scientists, we also see climate change both as a proxy of the dual power of the Earth as the life-giver and the life-receiver, and as a consequence of human-induced environmental changes. With the geological agency of humankind in the Anthropocene considered (Chakrabarty 2021, 14, 15; Clark and Yusoff 2017, 5), the Earth appears to be more destructive than life-sustaining with instances of global warming, extreme weather events, environmental degradation, and the frequently involuntary migrations of humans and nonhumans. While climate models inform us of the current and projected average temperature change of the planet, climate change itself or, more accurately, clime change occurs not uniformly but variously in geographically-specific places in meteorological, ecological, and political terms. Rethinking ourselves as ecological beings affords us multiple terrestrial perspectives to recognize the omnipresent kinesis of climate embodied in the physical Earth and in the health, social behaviors, and psyches of humans, animals, and spiritual entities.

The efficacy of seeing place as clime is shown in the environmentally and socially observable presence of climate forces in our individual chapters. When climate is understood as clime, or concrete places viewed as diverse lifeworlds, climate change is then no longer encoded in the abstractly constructed numerical models but marks itself deeply in the physical environment, moves in the environmental flows, and enters the social behaviors of humans and nonhumans.

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By “multispecies indigeneity” I mean that being indigenous connotes more-than-human experiences in geographically and ecologically specific places, in which human and nonhumans spin together their shared but negotiated and contended lifeworlds. In addition to animals and plants, nonhumans in the Himalaya and the Andes also include locally-cherished sentient gods, goddesses, spirits, and supernatural beings, many of whom are incarnated in mountain- and water bodies. Grounded in the maternal principle of the Earth (Berry 2009, 75), human-nonhuman relations weave together their co-habited worlds—or a pluriverse understood as a world of many worlds (Escobar 2018; de la Cadena and Mario Blaser 2018; Andersen, and Iqbal, this book). From this multispecies perspective, the Himalaya and the Tibetan Plateau can be seen, for example, as the nation of snow leopards (Gamble, this book); the Peruvian Andes as a nation of llamas, the Arctic as intertwined nations of polar bears, penguins, and harp seals. We can continue with Yunnan as a surviving Asian-elephant nation (Smyer Yu 2021a, 15), and many interconnected parts of India, Bangladesh, Nepal, and Bhutan as a nation of Bengal tigers (Aiyadurai 2021). Examples are ample. The point here is that the geographies of multispecies climes disrupt human cartographies. When indigeneity is seen from this multispecies perspective, it offers an ecologically and biologically more enlightened picture of the Earth. Adding the Deep Time perspective, many nonhuman species existed long before the arrival of humans on Earth. With the unique inclusion of Earth-based deities as sentient and ecological beings in many of our chapters, the lifeworlds of multispecies indigeneity also encompass a multitude of spiritual worlds in the Himalaya, the Andes, and the Arctic. Climate change is inevitable; however, our ethics for sustainable human-nonhuman relations always have the option of being renewed as multispecies collaboration for collective survival and flourishing. Returning to our multipolar clime studies, when we connect the indigeneity of the Earth, and humans and nonhumans in geological, ecological, and climatic terms, we find the historical and contemporary Himalaya, Andes, and Arctic are undoubtedly multispecies indigenous climes, in which being indigenous entails horizontally shared, trans-species experiences of common climate histories and changes since pre-human times. Specific environmental wisdoms accumulated over time are embodied and instrumentalized in living beings’ unique bodily forms that are adapted to particular ecological niches and climatic patterns. Each species has its unique relation with the Earth and with other species. In this sense, indigenous climes are symbiotic climes, meaning that everything and everyone is entwined in physical contact (Margulis 1998, 5). However, symbiosis does not mean only harmonious and peaceful interactions, entanglements, and intertwinements. Animal-human relations are both violent and affectionate. So are plant-human and human-to-human relations.17

**Singh- Not Just the Science**

The question arises: what use are stories? Why would anyone, much less a physicist, introduce them as part of a pedagogy of climate change? How might they inform a useful and inspired understanding—affective and cognitive—of climate science? And might the reverse be also possible—that one could discover stories in the detached, formal narratives of climate science? As a physicist, it is more than obvious to me that matter is active in the universe and has stories to tell, stories generally ignored in modernity’s obsession with the exclusively human. As an educator, I also know that stories of the nonhuman seen through the lens of science can be made accessible, meaningful, and relevant to the nonscientist. But how—and why—should we bridge the divide between disciplines, between stories like those quoted above and the narratives of science, between human and nonhuman, local and planetary? What I learned and continue to learn from my teachers, human and nonhuman, has led me to a fundamental reconceptualization of climate pedagogy, which foregrounds its transdisciplinary nature and makes issues of justice and ethics central. It proposes four dimensions of an effective pedagogy:

the scientific-technological, the transdisciplinary, the epistemological, and the psychosocial-action dimensions. Rather than reductively exploring each aspect, these dimensions are manifested relationally through stories and via three interdisciplinary meta-concepts (Singh 2021a). My primary impetus for developing such a pedagogy is this: when we are confronted with a phenomenon such as the climate crisis, which defies our current paradigms, we must go to it with a radical openness and humility, divesting ourselves (to the extent possible) of preconceived frameworks. In other words, we must acknowledge the phenomenon itself as teacher. In this chapter I begin with an invocation to sea ice in Alaska, focusing on its physical nature, seasonal cycles, and decline. I acknowledge the teachings of the sea ice and those of the climate problem as a whole. I then briefly summarize my pedagogical framework, including three key transdisciplinary meta-concepts. Thereafter I return to the Alaskan Arctic to illustrate these ideas, bringing out the connections between clime and climate, local and planetary, social and scientific, and human and nonhuman. I elaborate on the notion of cryospheric clime, and show how stories can help animate the concept.

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What might we learn from the sea ice that is pedagogically useful for understanding clime and climate? Sea ice is a necessary aspect of coastal cryospheric climes of the Arctic and Antarctic, but its importance crosses boundaries of geography and time. To summarize, it tells us that the local and global are intimately connected; it spans large scales of space and time. In addition, it warrants a transdisciplinary understanding, since the meaning of sea ice, the implications of its decline, and how we might mitigate and adapt to its loss involve multiple disciplines, including the natural and social sciences, Indigenous culture, history and epistemology, and considerations of economics and justice. From my scientific invocation arise three additional “meta-concepts” that form the basis of my pedagogical framework. One is the idea of balance or steady state, and its opposite, the state of change or imbalance. As the dynamics of the sea ice change due to global heating, the speed of melt is gaining over the speed of formation. Scientists predict that Arctic summer sea ice will be completely gone by midcentury, and possibly even by 2035 (Guarino et al. 2020). This is unprecedented in human history, and represents a limit, boundary, or threshold with serious implications. Is it a threshold of no return? Such critical limits, boundaries, and thresholds crop up in multiple climatic phenomena. Sea ice also demonstrates a richness of relationships—between and within human and biophysical systems that extend from the local to the planetary. The nature of these relationships is complex, in a specific way that I will demonstrate with another story from the Arctic.

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What about stories coming from the opposite direction, that is, from matter, the subject of scientific exploration, to the social worlds of humans? It has been suggested that climate scientists need to become better storytellers, because the language of science does not translate well to the public sphere. Instead, an approach that builds trust, contextualizes the content to the local community, uses the complexity and thick description inherent in a good story, and includes good listening as much as good storytelling has been recommended (Harris 2019). In the classroom as well, attention to student reception of a story is crucially important. A fine example of a story crossing the boundary from the science side is the notion of storylining (Shepherd and Lloyd 2021), where the power of narrative is invoked to connect local-scale environmental change (for example, a single ecological event) to the bigger picture (statistics-based climate science), thus making causal sense of the local-global connection. A storyline is also a boundary object, because it can inhabit the local and global simultaneously, allowing the navigation of multiple social worlds, with implications for climate action, and law and policy. It can enable a transdisciplinary understanding of climate change (Shepherd and Truong, this book). As a means of storifying science in the classroom, it can also be pedagogically useful. If we allow nonhumans to be agents, then scientific phenomena can be rendered as stories. I have used approaches similar to storylining—storified renderings of causal relations in scientific phenomena, for instance, stories in which the sea ice speaks—in the classroom. I have also used embodied learning, such as the dramatized enactment of physical processes like the greenhouse effect, to help students transcend the subject-object separation in science toward a more “participant-observer” approach to learning. This allows me to extend the concept of clime, thus: clime is an enactment or a performance in which the actors are human, nonhuman living beings, as well as elements of the local landscape, wind, and weather patterns. Through their multiple mutual relationships, cultural, ecological and geophysical distinctiveness is co-produced, such that a “sense of place” comes into being, what one might call an “ethos of place,” to extend the notion of ethos as “what makes a group or kind distinct” (Van Dooren and Rose 2016, 80). Ecological classifications like bioregions (biomes) and ecoregions, generally don’t take into account human settlements, cultures, or histories, whereas a clime—which may span ecoregions and fall within bioregions—entangles all of these. Cryospheric climes all share the physical characteristic of high albedo or shininess due to ice and snow, but are made distinct from each other by particularities of place, weather and climatic patterns, and ecosystems and species, including humans. The cryospheric clime of the north shore of Alaska, where the Iñupiat live, is defined by sea ice and tundra, the seasonal migration of the bowhead whale, and the history, customs, politics, and epistemology of the Iñupiat, which make it distinct from, for example, the cryospheric clime of Ladakh in the Himalayas. Because the three meta-concepts manifest in specific ways in particular climes, they help to particularize climes in the context of the climate crisis. Thus sea-ice-mass imbalance in the Alaskan Arctic impacts subsistence hunting and polar bear health (Whiteman, John P. 2018), while glacial melt in the Himalayas results in spring floods and summer drought that affect agricultural productivity. These meta-concepts are therefore useful in describing the current and future projected changes to “ethos of place.” In this chapter, I have described how the acknowledgment of climate as teacher allows for the emergence of a radically transdisciplinary pedagogy that – through varieties of selected stories, help make evident three meta-concepts that serve as boundary objects, traveling between climate and clime as well as between disciplines. Crucially, these stories center considerations of justice, including epistemic justice. The acknowledgment of nonhuman actors, including the elements of weather and climate, leads to an expansion of the concept of clime as an enactment with multiple human and nonhuman actors. Thus the cryospheric clime of the Alaskan North Slope is co-produced through the performances of sea ice, wind and ocean currents, polar bears and bowhead whales, and the history and culture of the Iñupiat, always entangled, always in mutuality

**Ghosh, Stories**

“Can the timing of this renewed recognition be mere coincidence, or is the synchronicity an indication that there are entities in the world, like forests, that are fully capable of inserting themselves into our processes of thought? And if that were so, could it not *also* be said that the earth has itself intervened to revise those habits of thought that are based on the Cartesian dualism that arrogates all intelligence and agency to the human while denying them to every other kind of being?

This possibility is not, by any means, the most important of the many ways in which climate change challenges and refutes Enlightenment ideas. It is, however, certainly the most uncanny. For what it suggests – indeed proves – is that non-human forces have the ability to intervene directly in human thought. And to be alerted to such interventions is also to become uncannily aware that conversations among ourselves have always had other participants: it is like finding out that one’s telephone has been tapped for years, or that the neighbors have long been eavesdropping on family discussions.”

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“The Anthropocene has reversed the temporal order of modernity: those at the margins are now the first to experience the future that waits all of us; it is they who confront most directly what Thoreau called ‘vast, Titanic, inhuman nature.’ Nor is it any longer possible to exclude this dynamic even from places that were once renowned for their distinctiveness. Nor is it any longer possible to exclude this dynamic even from places that were once renowned for their distinctiveness…Here then, is another form of resistance, a scalar one, that the Anthropocene presents to the techniques that are most closely identified with the novel: its essence consists of phenomena that were long ago expelled from the territory of the novel - forces of unthinkable magnitude that create unbearably intimate connections over vast gaps in time and space.”

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**Booker Prize 2024**

**Orbital** by Samantha Harvey has been named the winner of the Booker Prize 2024. The …Harvey’s novel takes place over a single day in the life of six astronauts and cosmonauts aboard the International Space Station. Compact yet beautifully expansive, Orbital invites us to observe Earth’s splendour, whilst reflecting on the individual and collective value of every human life.

**Creation Lake** by Rachel Kushner. A woman is caught in the crossfire between the past and the future in this part-spy novel, part-profound treatise on human history. Sadie Smith – a 34-year-old American undercover agent of ruthless tactics, bold opinions and clean beauty – is sent by her mysterious but powerful employers to a remote corner of France. Her mission: to infiltrate a commune of radical eco-activists led by the charismatic svengali Bruno Lacombe. Sadie casts her cynical eye over this region of ancient farms and sleepy villages, and at first finds Bruno’s idealism laughable – he lives in a Neanderthal cave and believes the path to enlightenment is a return to primitivism. But just as Sadie is certain she’s the seductress and puppet master of those she surveils, Bruno Lacombe is seducing her with his ingenious counter-histories, his artful laments, his own tragic story.

A work of high art, high comedy, and irresistible pleasure, from the author of the Booker Prize-nominated The Mars Room.

**Playground** by Richard Powers explores that last wild place we have yet to colonise and interweaves profound themes of technology and the environment, and a deep exploration of our shared humanity

Rafi and Todd are two polar opposites at an elite high school where they bond over a 3,000-year-old board game. Elsewhere, Evie Beaulieu sinks to the bottom of a swimming pool in Montreal strapped to one of the world’s first aqualungs; Ina Aroita grows up in naval bases across the Pacific with art as her only home. All of these people meet on the history-scarred island of Makatea in French Polynesia, marked for humanity’s next great adventure: a plan to send floating, autonomous cities out into the open sea. As the seasteaders close in, how will Evie play the ever-unfolding oceanic game? Will Ina engage in acts of destruction? Todd and Rafi, now estranged, still find themselves in competition: Todd unravels while working on an idea to redraw the boundaries of human immortality, while Rafi and the residents must decide if they will greenlight the new project on their shores and change their home forever.

**Ancient Greek Geographers on India**

**Strabo on india (7BC – 17aAD)**

The boundaries of India, on the north, from Ariana to the Eastern Sea,[20](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note20) are the extremities of Taurus, to the several parts of which the natives give, besides others, the names of Paropamisus, Emodus, and Imaus,[21](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note21) but the Macedonians call them Caucasus; on the west, the river Indus; the southern and eastern sides, which are much larger than the others, project towards the Atlantic Sea, and the figure of the country becomes rhomboïdal,[22](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note22) each of the greater sides exceeding the opposite by 3000 stadia; and this is the extent of the extremity, common to the eastern and southern coast, and which projects beyond the rest of that coast equally on the east and south.

The western side, from the Caucasian mountains to the Southern Sea, is estimated at 13,000 stadia, along the river Indus to its mouth; wherefore the eastern side opposite, with the addition of the 3000 stadia of the promontory, will be 16,000 stadia in extent. This is both the smallest and greatest breadth of India.[23](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note23) The length is reckoned from west to east. The part of this extending (from the Indus) as far as Palibothra[24](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note24) we may describe more confidently; for it has been measured by Schœni,[25](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note25) and is a royal road of 10,000 stadia. The extent of the parts beyond depends upon conjecture derived from the ascent of vessels from the sea by the Ganges to Palibothra. This may be estimated at 6000 stadia.

The whole, on the shortest computation, will amount to 16,000 stadia, according to Eratosthenes, who says that he took it from the register of the Stathmi (or the several stages from place to place),[26](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note26) which was received as authentic, and Megasthenes agrees with him. But Patrocles says, that the sum of the whole is less by 1000 stadia. If again we add to this distance the extent of the extremity which advances far towards the east, the greatest length of India will be 3000 stadia; this length is reckoned from the mouths of the river Indus along the coast, in a line with the mouths to the abovementioned extremity and its eastern limits. Here the people called Coniaci[27](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note27) live. [12]

From what has been said, we may perceive how the opinions of the other writers differ from one another. Ctesias says that India is not less than the rest of Asia; Onesicritus regards it as the third part of the habitable world; Nearchus says that it is a march of four months through the plain only. The computations of Megasthenes and Deïmachus are more moderate, for they estimate the distance from the Southern Sea to Caucasus[28](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note28) at above 20,000 stadia. Deïmachus says that in some places it exceeds 30,000 stadia.

We have replied to these writers in the early part of this work.[29](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note29) At present it is sufficient to say that these opinions are in favour of the writers who, in describing India, solicit indulgence if they do not advance anything with confidence. [13]

The whole of India is watered by rivers, some of which empty themselves into the two largest, the Indus and the Ganges; others discharge themselves into the sea by their own mouths. But all of them have their sources in the Caucasus. At their commencement their course is towards the south; some of them continue to flow in the same direction, particularly those which unite with the Indus; others turn to the east, as the Ganges. This, the largest of the Indian rivers, descends from the mountainous country, and when it reaches the plains, turns to the east, then flowing past Palibothra, a very large city, proceeds onwards to the sea in that quarter, and discharges its waters by a single mouth. The Indus falls into the Southern Sea, and empties itself by two mouths, encompassing the country called Patalene, which resembles the Delta of Egypt.

Aristobulus, however, says, that rain and snow fall only on the mountains and the country immediately below them, and that the plains experience neither one nor the other, but are overflowed only by the rise of the waters of the rivers; that the mountains are covered with snow in the winter; that the rains set in at the commencement of spring, and continue to increase; that at the time of the blowing of the Etesian winds they pour down impetuously, without intermission, night and day till the rising of Arcturus,[38](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note38) and that the rivers, filled by the melting of the snow and by the rains, irrigate the flat grounds.

These things, he says, were observed by himself and by others on their journey into India from the Paropamisadæ. This was after the setting of the Pleiades,[39](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note39) and during their stay in the mountainous country in the territory of the Hypasii, and in that of Assacanus during the winter. At the beginning of spring they descended into the plains to a large city called Taxila,[40](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note40) thence they proceeded to the Hydaspes and the country of Porus. During the winter they saw no rain, but only snow. The first rain which fell was at Taxila. After their descent to the Hydaspes and the conquest of Porus, their progress was eastwards to the Hypanis, and thence again to the Hydaspes. At this time it rained continually, and particularly during the blowing of the Etesian winds, but at the rising of Arcturus the rains ceased. They remained at the Hydaspes while the ships were constructing, and began their voyage not many days before the setting of the Pleiades, and were occupied during the whole autumn, winter, and the ensuing spring and summer, in sailing down the river, and arrived at Patalene[41](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note41) about the rising of the Dog-Star;[42](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note42) during the passage down the river, which lasted ten months, they did not experience rain at any place, not even when the Etesian winds were at their height, when the rivers were full and the plains overflowed; the sea could not be navigated on account of the blowing of contrary winds, but no land breezes succeeded. [18]

Nearchus gives the same account, but does not agree with Aristobulus respecting the rains in summer, but says that the plains are watered by rain in the summer, and that they are without rain in winter. Both writers, however, speak of the rise of the rivers. Nearchus says, that the men encamped upon the Acesines[43](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0239%3Abook%3D15#note43) were obliged to change their situation for another more elevated, and that this was at the time of the rise of the river, and of the summer solstice.

Aristobulus gives even the measure of the height to which the river rises, namely, forty cubits, of which twenty would fill the channel beyond its previous depth up to the margin, and the other twenty are the measure of the water when it overflows the plains.

Pliny the Elder on the Nations of India AD 77

But we come now to nations as to which there is a more general agreement among writers. Where the chain of Emodus[1](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note1) rises, the nations of India begin, which borders not only on the Eastern sea, but on the Southern as well, which we have already mentioned[2](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note2) as being called the Indian Ocean. That part which faces the east runs in a straight line a distance of eighteen hundred and seventy-five miles until it comes to a bend, at which the Indian Ocean begins. Here it takes a turn to the south, and continues to run in that direction a distance of two thousand four hundred and seventy-five miles, according to Eratosthenes, as far as the river Indus, the boundary of India on the west.[3](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note3) Many authors have represented the entire length of the Indian coast as being forty days' and nights' sail, and as being, from north to south, two thousand eight hundred and fifty miles. Agrippa states its length to be three thousand three hundred miles, and its breadth, two thousand three hundred. Posidonius has given its measurement as lying from north-east to south-east, placing it opposite to Gaul, of which country he has given the measurement as lying from north-west to south-west; making the whole of India to lie due west of Gaul. Hence, as he has shewn by undoubted proofs, India lying opposite to Gaul must be refreshed by the blowing of that wind,[4](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note4) and derive its salubrity there- from.

In this region, the appearance of the heavens is totally changed, and quite different is the rising of the stars; there are two summers in the year, and two harvests, while the winter intervenes between them during the time that the Etesian[5](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note5) winds are blowing: during our winter too, they enjoy light breezes, and their seas are navigable. In this country there are nations and cities which would be found to be quite innumerable, if a person should attempt to enumerate them. For it has been explored not only by the arms of Alexander the Great and of the kings who succeeded him, by Seleucus and Antiochus, who sailed round even to the Caspian and Hyrcanian Sea, and by Patrocles,[6](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note6) the admiral of their fleet, but has been treated of by several other Greek writers who resided at the courts of Indian kings, such, for instance, as Megasthenes, and by Dionysius, who was sent thither by Philadelphus, expressly for the purpose: all of whom have enlarged upon the power and vast resources of these nations. Still, however, there is no possibility of being rigorously exact, so different are the accounts given, and often of a nature so incredible. The followers of Alexander the Great have stated in their writings, that there were no less than five thousand cities in that portion of India which they vanquished by force of arms, not one of which was smaller than that of Cos;[7](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note7) that its nations were eight in number, that India forms one-third of the whole earth, and that its populations are innumerable—a thing which is certainly far from improbable, seeing that the Indians are nearly the only race of people who have never migrated from their own territories. From the time of Father Liber[8](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note8) to that of Alexander the Great, one hundred and fifty-three kings of India are reckoned, extending over a period of six thousand four hundred and fifty-one years and three months. The vast extent of their rivers is quite marvellous; it is stated that on no one day did Alexander the Great sail less than six hundred stadia[9](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note9) on the Indus, and still was unable to reach its mouth in less than five months and some few days: and yet it is a well-known fact that this river is not so large as the Ganges.[10](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note10) Seneca, one of our fellow-countrymen, who has written a treatise[11](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21#note11) upon the subject of India, has given its rivers as sixty-five in number, and its nations as one hundred and eighteen. The difficulty too would be quite as great, if we were to attempt to enumerate its mountains. The chains of Emaüs, of Emodus, of Paropanisus, and of Caucasus, are all connected, the one with the other; and from their foot, the country of India runs down in the form of a vast plain, bearing a very considerable resemblance to that of Egypt.

[**https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21**](https://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.02.0137%3Abook%3D6%3Achapter%3D21)