Earth writing: the evolving role of storytelling in geographical and environmental education

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Abstract

This thesis investigates the diverse Earth writing practices of geographers and educators, and considers their implications in an era of planetary crisis. The investigation focuses on storytelling, a practice often positioned as an alternative to dominant modes of knowledge production, but one that has been inconsistently addressed in geographical and environmental education. The thesis aims to advance the conceptualisation of storytelling by historicising and problematising practices of Earth writing within these contexts. The research brings together literary, geographical, and educational perspectives: it draws particular insights from the geopoetics and ecopedagogy movements to articulate a radical vision of Earth writing as a critical-creative praxis with the potential to enact cultural transformation. This vision frames a historical analysis of Earth writing that unfolds through two parallel cuts: the first exploring scholarly debates around the writing of geography since the formalisation of the discipline; the second exploring educational engagements with storytelling since the emergence of the environmental education movement. The first "cut" traces the development of a minor tradition of geographical storytelling through the textual analysis of scholarly sources dating back to the late nineteenth century. The second is focused on a corpus of 227 educational journal and magazine articles published between 1972 and 2022, deploying the computer-assisted techniques of keyness analysis and concordance analysis alongside interpretative textual analysis to identify shifts in the dominant discourses over the fifty-year period. Four distinct discourses are identified, each promoting radically different conceptions of the pedagogical role of storytelling: story as resource, story as experience, story as way of knowing, and story as transformation. In both of these cuts, the debates in play disclose deeper struggles over the authority and agency of different actors in the reading and writing of the Earth. This inquiry contextualises the recent turn towards storytelling in geographical and environmental education, highlighting how underlying tensions and complexities within this turn must be addressed in order to realise its transformative potential.

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Author's declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Kirsten Somerville

Chapter 1: Introduction

Earth writing in education

At its roots, geography means "Earth writing". As a geographer with a background in languages and literature, I have long been predisposed towards this etymological interpretation of geography, from the ancient Greek *gē* and *-graphia*. Indeed, it was largely during my time teaching English, French, and academic writing that the initial seeds of this project were sown. Convinced of the pedagogical power of storytelling – a relatively established practice in language education – I became increasingly curious about how this approach could support geography education. In particular, I was interested in how stories could provide an alternative way of teaching the physical processes of landscape evolution, such as glacial and river processes. These processes seemed to have inherent narrative qualities whose potential to enhance motivation, understanding, and environmental awareness merited further exploration. This had first become apparent to me through my postgraduate studies in Human Geography, during which I completed a Directed Study in French on Elisée Reclus's popular science book *Histoire d'une montagne* ("History of a mountain") (1880). In the original conception of my PhD project, the English translation of this text was to serve as stimulus material for an empirical study evaluating the effectiveness of "creative Earth writing" in secondary geography education.[1]

Over the course of my first year, however, my neatly defined vision for the project began to unravel. As I dug deeper into the literature, I came to recognise a series of assumptions I had been making about the nature of both Earth writing and education. Firstly, I had taken it for granted that a project investigating Earth writing in education was necessarily a project investigating geography education. The declining uptake of the subject in Scottish secondary schools[2], despite its obvious – in my eyes, unrivalled – significance in an era of

[1] This original conception is immortalised in my 2022 entry to the University of Glasgow's Three Minute Thesis competition, as well as an article published in *Writing in Education*, the magazine of the National Association of Writers in Education (Somerville, 2022).

[2] I developed my research proposal in the wake of what the Royal Scottish Geographical Society describe as a "nadir" in pupil numbers taking geography in academic years 2018-19 and 2019-

planetary crisis, was a core part of my rationale for the project. Secondly, and relatedly, I had taken it for granted that the natural setting for investigating Earth writing in education was in schools. Finally, my uncritical equation of education with schooling had also shaped how I framed the aims and intended outcomes of my intervention. I was eager to align my project to the framework of the Curriculum for Excellence (Education Scotland, 2024), wherein educational "experiences and outcomes" are nationally determined, universally applicable, and knowable in advance.

My own pathway into the topic – and my aspirations for measurable research impact with national relevance – initially blinkered me to the wider possibilities of Earth writing and education. I was soon forced to confront these limitations as I grappled with the practicalities of implementing the project in a school setting. One of the challenges I faced early on was in delineating the respective contributions of disciplinary knowledge in geography and English. In attempting to map my proposed creative writing activities to the Curriculum for Excellence, I found that they aligned with a higher proportion of learning experiences and outcomes in English than in geography, causing me to question where (or whether) they would fit in the timetable. Furthermore, I struggled to determine the appropriate sequencing of knowledge from each curriculum area. I was originally inspired by Elisée Reclus's educational philosophy that "art comes before science"[3] – that aesthetic experience provides the foundation for rational understanding (Reclus, 1908, pp.479–480). Yet in discussing my project with peers, colleagues, and potential collaborators, I noticed that different assumptions were often made by those working in different subject areas about the pedagogical function of storytelling. Fellow participants on a Teaching Creative Writing course that I joined in my first year – predominantly English teachers – responded positively to an activity where I introduced the topic of glaciation through the story of an individual rock on campus, remarking that the narrative introduction was essential to their understanding of the science.

20 (Selmes, 2024). There has since been a marked rise in geography entries at National 5, Higher, and Advanced Higher level (Selmes, 2024; Selmes et al., 2022).

[3] My translation from the original French.

Physical geographers, on the other hand, tended to view storytelling as a consolidation activity, rather than an introductory one.

Over time, I realised that these challenges were more than simply logistical. The question of which forms of disciplinary knowledge are mobilised in Earth writing, in what capacity, and to what end, is fundamentally political. My Teaching Creative Writing course invited me to reflect more deeply on how pedagogical choices could afford different levels of creative agency to different actors in the construction of narratives. When it came to the narratives of landscape evolution, I had to consider not only the role of teachers and learners, but also the role of scientists and of the landscape itself. Would following Reclus's axiom of "art before science" facilitate learners' authentic exploration of the subject, or would it risk misrepresenting the nonhuman agency of geomorphological forces? Conversely, would flipping the approach support learners' understanding of these forces, or would it constrain them merely to reproduce the narratives of scientific authorities? It also struck me that there was arguably a more pressing question underlying my interest in alternative ways of writing the Earth in an educational setting: who has the right to write?

Cultural approaches to the planetary crisis

This question has become all the more urgent in a context of increasingly polarised narratives around the natural world and humanity's place within it. When I began my research in October 2021, I was buoyed by a sense of common purpose in the run up to the COP26 climate summit in Glasgow. A month into my PhD, 100,000 people marched through the city to demand climate justice – the largest protest in Glasgow since the Stop the Iraq War march in 2003 (BBC News, 2021). Four years later, similar numbers took to the streets in London for the UK's largest far-right protest in decades (Vinter et al., 2025). In the run up to COP30, as UN secretary general António Guterres acknowledged that humanity has failed to meet the 1.5°C target reaffirmed in the Glasgow Climate Pact (Watts and Xipai, 2025), public concern for the climate is decreasing in the UK and many other high-income countries (Poushter et al., 2025). The shifting political "climate" over the course of my studies made me reconsider the focus of my research. While I had initially been drawn to investigate the power of stories to foster relational understandings of landscapes informed by science, I

could not ignore their evident power to promote destructive relationships and misinformation. As narratives of greenwashing, denialism, and extremism became increasingly pervasive in the public sphere, it seemed essential to equip learners to “read” cultural and political landscapes as well as physical ones.

While the discipline of geography is undoubtedly well placed to engage learners in forms of Earth writing that span the human and the more-than-human, I became convinced that this task exceeded the scope of any one subject, and indeed of formal schooling. The planetary crisis is increasingly being recognised as a cultural crisis, wherein the destructive human behaviours that have long been the focus of mainstream environmental communication are understood not simply as the result of failings of individuals or policies, but as symptoms of deep-rooted assumptions and values that underpin the development of entire social systems (Amel et al., 2017; Clammer, 2016; Ghosh, 2016; Maggs et al., 2025; Stephenson, 2023). In this understanding, education in all its forms may play a role in either upholding or undermining these foundational assumptions, as a key arena of cultural reproduction and innovation. There is a growing movement to respond to the profound implications of such an approach, both within and beyond geographical education.

Many of the calls to develop forms of education which address the cultural roots of our present crisis have been led by those working in the field of environmental education, which mobilises learning across disciplines towards explicitly transformative aims. In a recent retrospective of the field, Macintyre et al. (2025) identify “the importance of education and learning in addressing what we can term a crisis of culture” (p.4) as a key issue that has emerged over the past 50 years of research and practice, necessitating approaches that “can speak to deeper layers of thinking and question ingrained assumptions about how we live, govern and organise ourselves” (p.6). If, to paraphrase anthropologist Clifford Geertz, culture can be understood as “the stories we tell ourselves about ourselves” (Geertz, 1973, p.448), then we cannot take culture seriously without taking stories seriously. The turn to culture in environmental education has indeed been accompanied by a proliferation of interest in creative practices, including practices of Earth writing. Recent years have seen the publication of numerous book-length explorations of the pedagogical value of the arts (Hunter

et al., 2018), language arts (McGuinn and Naylor, 2025), storytelling (Molthan-Hill et al., 2020), and poetry (Kleppe and Sorby, 2022). A similar trajectory can be discerned in geography, with earlier journal special issues exploring narratives of climate change, landscape, and environment (Daniels and Endfield, 2009; Daniels and Lorimer, 2012) and laying the groundwork for more recent pedagogical treatments of the subject (Walker et al., 2025).

Many of the recent publications on educational storytelling can be characterised as future-oriented: sharing insights from educational innovations that might inspire others to adopt new practices. Given the urgency of the planetary crisis, it is entirely understandable, perhaps even desirable, that the focus should be on developing new approaches. Few would dispute the ineffectiveness of previous approaches in bringing about the radical change that is now called for. Yet framing storytelling-based approaches as "new" is arguably at odds with the core premises of the cultural approach outlined above. If teachers and learners are always already engaged in Earth writing, always already storytelling, then engaging with the arts must be understood as an evolution, rather than a revolution, in educational practice. Furthermore, if the cultural approach calls us to examine the deep roots of our current predicament, then historical storytelling practices in education must also be subjected to critical appraisal. Assuming the transformative potential of storytelling is particularly fraught when there is so little consensus over the meaning of the term itself. Cameron (2012) notes that "understandings of exactly what 'story' *is* vary tremendously" in geographical research (p.575, emphasis in original), while Daniels and Lorimer (2012, p.7) warn of the tendency "to loosen narrative as an interpretative term, to give it too much room, too little analytical purchase, so elastic that 'narrative' has become a shorthand for almost any kind of knowledge, discourse, meaning, experience or point of view". Their calls to carefully "discriminate the varieties of geographical narrative", to explore "the limits as well as potential of narrative", to consider narrative as "a cultural predicament as well as a creative opportunity" (2012, p.7) are equally vital in an educational context, and especially in the wider context set out at the beginning of this section.

Research aims and questions

The aims of my research are threefold:

*1. To **establish** how Earth writing has been conceptualised and practised in geographical and environmental education.*

Given the proliferation of interest in educational storytelling, there is a need to recognise the diversity of approaches this entails in practice. Storytelling is a complex phenomenon which can only be understood in context, yet there is a lack of clarity over the specific pedagogical roles of storytelling within geographical and environmental education.

*2. To **historicise** Earth writing within the context of geographical and environmental education.*

In the quest for "new" forms of education capable of addressing the cultural roots of the planetary crisis, it is easy to overlook the insights that may be gleaned from "old" approaches. The widely-recognised potential of storytelling to respond to the challenges of our current moment has given rise to tacit assumptions that it represents a more or less novel, disruptive approach in geographical and environmental education. I provide a more nuanced account of earlier developments wherein Earth writing could be understood as either a challenge or a complement to established pedagogies. Bringing this underappreciated history to light provides a foundational understanding of how current approaches have evolved within the broader trajectories of the two educational fields.

*3. To **problematise** Earth writing and its implications for education in an era of planetary crisis.*

While I am primarily interested in how the meanings of storytelling have changed over time, I do not wish to present them as stable or agreed-upon at any given point in time. I therefore aim to balance the investigation of shifts in dominant understandings with a recognition of the underlying tensions and ongoing challenges to those understandings. Furthermore, I critically evaluate the potential of different approaches to promote the deep transformation that is urgently called for within geographical and environmental education.

My overarching aim is effectively to tell "the story of stories" in geographical and environmental education, by answering the following research question and sub-questions:

How has the role of storytelling in geographical and environmental education evolved over time?

- ***What** kinds of stories have been used in learning and teaching?*
- ***How** have stories been used in learning and teaching?*
- ***Why** have stories been used in learning and teaching?*

Research scope

Geographical and environmental education

As mentioned above, the focus of my research developed in part through my own realisation that geography was not the only field concerned with Earth writing – indeed, that education as a whole is only one form of cultural practice through which the Earth may be written. Although this theme will be developed more substantially in subsequent chapters, it is worth clarifying the parameters of my research here by setting out my understanding of geographical education, environmental education, and the relationship between them.

Geographical education can be considered a field of study within the academic discipline of geography (de Miguel González, 2024; Van Der Schee et al., 2024). Puttick (2022) conceptualises geographical education as comprising three fields: "geography education research", relating to the teaching and learning of geography in schools; "geography education practice and scholarship", relating to the teaching and learning of geography in universities, and "geographies of education", relating to the geographical study of education. He observes a "disconnect" of geography education research from the wider discipline of geography, with research more often published in dedicated geography education journals, edited collections, and special issues of general education journals than in mainstream geography journals (p.899), while the geographies of education is "more obviously a sub-discipline of geography", being primarily a field of research as opposed to an applied practice (p.900). In an academic context, geography educators can of course be found in both geography and

education departments, and the field draws on research and practice in both areas to varying degrees. Overall, geography education has strong ties to the discipline of geography and to the domain of formal education.

The field of environmental education lacks such clear disciplinary or institutional ties. It can be considered both a field of interest within the academic discipline of education and a branch of the wider environmental movement. While linked to earlier traditions of nature study and conservation education, it was the growing awareness of global environmental issues from the late 1960s that led to the formalisation of environmental education as a strategic response (Macintyre et al., 2025; Palmer-Cooper, 1998).[4] Environmental education is conventionally understood as an integrative, interdisciplinary field comprising education "about, in, and for" the environment (Palmer-Cooper, 1998), although Robottom and Hart (1993) argue that its practice may vary in its degree of orientation towards disciplinary knowledge, personal experience, or environmental issues. Accordingly, environmental education also includes organised learning that takes place outside of formal schooling, such as in community or museum settings (non-formal education), and unstructured learning that occurs through life experiences (informal education).

Although the two fields have different histories and scopes, they cannot always be neatly separated in practice. In recent decades, both geography and geographical education have become increasingly oriented towards environmental issues, as illustrated by the establishment of journals like *Geography and Sustainability* (Fu, 2020) and *International Research in Geographical and Environmental Education* (Lidstone and Gerber, 1992). Geography is widely positioned as a subject with a special role to play in advancing (Chang and Kidman, 2024; Fu, 2020; Fu et al., 2022; Kidman and Chang, 2024; Kidman and Chang, 2025; Lidstone and Stoltman, 2007; Meadows, 2020) – or critically intervening in (Barr, 2022) – the global sustainability agenda, including sustainability education. Chang and Kidman (2024, p.91) note that while "the substantive content of geography and environmental education are

[4] Further discussion of the emergence and distinctiveness of environmental education can be found in early editions of the publication *Environmental Education*, established in 1969 and continued as *The Journal of Environmental Education* from 1971 (e.g. Arnstein, 1971; Environmental Education, 1969; Stapp, 1969).

similar", the objectives of environmental education are "much broader", with learning outcomes mobilised towards societal transformation. The proximity of the two fields has been framed as both an opportunity and a threat for geography's disciplinary integrity: Uhlenwinkel (2017, p.42) highlights the dangers of the "over-emphasis of 'good causes'" and the importance of recognising the unique value of geographical knowledge. While these debates will be touched on at different points in the thesis, they are not the focus of my research. I am less concerned with elaborating the distinctions between geographical and environmental education than with their common engagement in "planetary pedagogies" (Kidman and Chang, 2025). Kidman and Chang (2025) argue that the Anthropocene era calls for relational pedagogies that embrace storytelling alongside scientific knowledge, and it is these storytelling practices that my research will investigate with reference to both fields.

Story and narrative

While the nature of my investigation necessitates an openness to different understandings of storytelling, it is also necessary to place some boundaries around the kinds of practices that will be included in this investigation. Writing in 2007, Marie-Laure Ryan observed that "few words have enjoyed so much use and suffered so much abuse as *narrative* and its partial synonym, *story*" (Ryan, 2007, p.22, emphases in original). In the nearly two decades that have followed, the "surging popularity" (Ryan, 2007, p.22) that she described here has only accelerated and, with it, concerns about conceptual inflation. Hyvärinen (2010) describes how scholarly engagements with narrative have evolved through four distinct "narrative turns" within literary theory, historiography, the social sciences, and broader culture, adding new layers of meaning at each turn. He identifies the first of these turns with the emergence of narratology in the 1960s, a field which treated narrative as an autonomous object of inquiry distinct from the study of literary genres (Hyvärinen, 2010; Prince, 2019; Ryan, 2010). Given its increasingly widespread usage and applications, defining narrative has remained a key challenge for narratologists up to the present day. Here, I outline three broad approaches – textual, cognitive, and cultural – to understanding narrative in order to clarify the scope of my research.

Many of the early attempts to define narrative focused on the internal characteristics that differentiate narratives from other text types. The field of narratology took its name from Tzvetan Todorov's French term *narratologie* (Todorov, 1969), denoting the science of narrative, and classical narratologists were primarily concerned with the search for "narrative universals" – the textual features that all narratives (and narrative traditions) have in common. There was, and still is, a large degree of agreement among narratologists about the minimal definitional criteria for narrative texts, typically based on their representation of an event or sequence of events (Abbott, 2020; Bal, 2017; Genette, 1980; Prince, 2003). In principle, these criteria delineate the distinction between narrative and non-narrative text types, such as descriptive or argumentative texts. As Ryan (2007) points out, however, there is considerable scholarly disagreement over what constitutes a text type: while narrative and descriptive texts are commonly defined in terms of their content, other types may be defined in terms of their function, and many typologies "arbitrarily mix semantic and pragmatic criteria" (p.27). Narrative poses a particular challenge to typologies that fail to distinguish between text types and "discourse types", the latter being understood as the pre-linguistic functions of communication constituted by the former (De Fina and Georgakopoulou, 2011). Virtanen (1992) proposed that narrative is unique among text types in that it can be used in any discourse type: a story can be told in order to persuade, explain, describe, or instruct, whereas an argument cannot be made in order to tell a story.

Given the limitations of the text-typological approach, Ryan (2007, 2010) proposes a "fuzzy-set definition" of narrative. Ryan's approach shifts the focus from the binary property of narrativehood to the scalar property of narrativity, such that the narrative status of texts becomes a matter of degree rather than kind. Ryan (2007, p.28) regards narrative as a "fuzzy set allowing variable degrees of membership, but centred on prototypical cases that everybody recognises as stories". This definition thus accounts for marginal cases that possess some narrative qualities without being universally recognised as narrative texts. Ryan (2007) outlines eight conditions of narrativity, organised

into semantic and pragmatic dimensions, summarised in the *Routledge Encyclopedia of Narrative Theory* as follows (Ryan, 2010, p.347):[5]

1. The mental representation of story involves the construction of the mental image of a world populated with individuated agents (characters) and objects. (Spatial dimension.)

2. This world must undergo not fully predictable changes of state that are caused by nonhabitual physical events: either accidents ('happenings') or deliberate actions by intelligent agents. (Temporal dimension.)

3. In addition to being linked to physical states by causal relations, the physical events must be associated with mental states and events (goals, plans, *emotions). This network of connections gives events coherence, motivation, *closure, and intelligibility and turns them into a plot. (Logical, mental and formal dimension; see CAUSALITY; STORY SCHEMATA AND CAUSAL STRUCTURE.)

Ryan (2017) notes that different schools within narratology have tended to regard different narrative genres as prototypical, elevating certain dimensions of narrativity over others. For examples, genres such as science fiction, thrillers, and tragedies can be seen as emphasising the spatial, temporal, and mental dimensions respectively (Ryan, 2007). Yet she also suggests that there is a more general property that lies at the heart of narrativity: the quality of "worldness" evoked by the mimetic properties of the text (Ryan, 2017).

To understand this property of narrativity, it is useful to invoke a central principle of classical narratology, namely the distinction between narrative texts and narrative structures. While the terms "narrative" and "story" are used interchangeably in popular discourse, they designate different levels of analysis in the technical terminology of narratology. Abbott (2020, p.19) summarises the distinction thus: "**narrative** is the representation of events, consisting of story and narrative discourse; **story** is an event or sequence of events (the action); and **narrative discourse** is those events as represented" (emphasis in original). As De Fina and Georgakopoulou (2011, p.3) note, the latter distinction between story and narrative discourse "posits the existence of a surface level (the level of the text as it is accessed by a reader) and a deep structure (the most basic

[5] Asterisks and capitalisation are used to signify cross-references to other entries in this volume; the original formatting has been retained in the quotation for accuracy.

level of actions and roles from which the story is derived)", akin to the distinction between *langue* and *parole* in Saussurean linguistics (Herman, 2005). While the distinction itself is widely accepted in narratology, there is some variation in the terminology used to describe it: some scholars adopt the Russian terms *fabula* and *syuzhet*, others the French terms *histoire* and *discours*, while others further divide the level that Abbott (2020) refers to as narrative discourse into the levels of text and narration (see Toolan, 2001). In the interests of clarity, I adopt Stibbe's (2024) terminology of "narrative structure" and "narrative text" to distinguish between the two levels of analysis, and use the term "story" in a broad sense that reflects its common usage, rather than its restrictive technical sense.

Distinguishing between narrative structures and narrative texts makes it possible to recognise that the same story can be told in any number of different texts. Furthermore, the same story can be told in different media, which, if we adopt a broad semiotic definition of "text", can include non-linguistic media. That said, as Bal (2017, p.6) highlights, the possibility of analysing narrative structures separately from narrative texts does not mean that they exist separately from each other: "The only material we have – that can be said to exist – is the text before us". Textual realisations of stories are the "materially accessible" layer of narrative that readers use "to establish the structure of the text themselves" (Bal, 2017, p.6). In other words, narrative structures are cognitive constructs that exist in the mind of the reader, rather than in the texts themselves. A cognitive understanding of narrative is central to Ryan's (2017) concept of worldness as a core condition of narrativity, such that "the more vividly a storyworld imprints itself in the reader's, hearer's or spectator's imagination, and the more all of its parts form a coherent whole, the greater the narrativity of the text that displays it" (p.756).

Proponents of a cognitive approach to narrative maintain that "stories cannot be defined or understood in abstraction from users, and without a consideration of the relative status of narrator and audience in storytelling" (De Fina and Georgakopoulou, 2011, p.7). Indeed, narrativity itself is redefined as a quality attributed to texts by readers, rather than an intrinsic property of texts. Recognising the reader's role in the construction of narrative challenges some of

the core assumptions of classical narratology, that "texts are stable entities and that readers react to them in foreseeable ways" (Fludernik, 2005, p.38). Some scholars have gone so far as to divorce the definition of narrative from texts entirely, understanding it not simply as a cognitive *construct*, but as a cognitive *mode*. Psychologist Jerome Bruner (1986) notably proposes that narrative is a fundamental way of making sense of reality alongside what he calls the "paradigmatic" mode of thought: while the latter is concerned with general truths as validated through empirical proof, the narrative mode is concerned with particular experiences as validated through verisimilitude. Bruner's work is a prominent example of the broader meaning assigned to narrative as concern for the subject spread from literary theory to the social sciences from the 1980s (Hyvärinen, 2010).

If narrative is ultimately in the eye of the beholder – or in the mind of the reader/listener – a universal definition becomes impossible. Ryan (2007, p.30) stresses that the conditions of narrativity which she outlines should be understood as a "toolkit for do-it-yourself definitions", and that opinions will inevitably vary when different readers are asked to determine the narrative status of particular texts. Yet a cognitive approach to narrative need not be a strictly individualistic one. For Ryan (2007, p.30), narrativity can be considered "a dimension relative to the context and to the interests of the participants". The context and interests of narrators and readers/listeners can be interpreted not only on a personal level, but also on a social and cultural level. Indeed, it is precisely because of the widespread social reproduction of narratives that it is necessary to distinguish narrative structures from narrative texts.

Recognising storytelling as a cultural phenomenon paved the way for still broader understandings of narrative, albeit understandings that narratologists tend to regard as metaphorical (Fludernik, 2005; Hyvärinen, 2010; Ryan, 2007, 2010). As narrative was assimilated into cultural theory, the term was increasingly used to refer to shared worldviews or belief systems, which lack the strict spatial, temporal, and mental characteristics of "narratological" narratives. A major influence on the popularisation of cultural approaches was Jean-François Lyotard's (1984) critical work on the totalising "grand narratives" of modernity. Grand narratives can be distinguished from everyday "small

stories" in their privileging of the abstract over the concrete, the collective over the individual, and the universal over the plural (Ryan, 2010). Yet, the two forms are not entirely unrelated: Ryan (2010, p.348) suggests that grand narratives may be derived from actual narratives, such that the label of narrative "remains attached to the ideological statement even after its emancipation from particular stories". The legacy of Lyotard's (1984) rejection of grand narratives can be seen in the lingering negative connotation of the term "narrative" to designate "a culturally specific and constructed representation of questionable veracity" (Ryan, 2017, p.757). Yet, as Stibbe (2024, p.14) points out, referring to dominant worldviews as narratives is also "a political act, designed to destabilize the belief system and open up possibilities for new ways of imagining the world to emerge". While particular narrative texts and structures can contribute to the entrenchment of grand narratives that "enable systemic forms of oppression" (Ryan, 2017, p.757), they can also serve to challenge or resist them. The theorisation of power in the social and cultural functioning of narrative thus introduced a new vocabulary of "metanarratives", "master narratives", and "counter narratives" into the narratological lexicon.

The distinction between textual, cognitive, and cultural understandings of story is not merely technical. It provides a framework for discerning different configurations of authority and agency in Earth writing, where meaning may be singular or plural, fixed or fluid, oppressive or liberatory. Since my aim is to understand how geographical and environmental educators make sense of storytelling, my investigation adopts a broad definition of story that reflects the three main senses of the term in common usage: to denote "a narrative structure ('know a story'), a narrative text ('read a story') or a more general worldview ('stories that society is based on')" (Stibbe, 2024, p.7). In narratological terms, my use of "story" includes both metanarratives and narratives, the latter consisting of narrative structures and narrative texts (see Figure 1). I do not impose strict criteria for determining narrativity, since I am interested in the criteria applied by educators themselves. In light of my focus on Earth writing, however, I do limit my scope to stories expressed through linguistic media. My investigation therefore excludes purely visual, musical, or other non-linguistic forms of storytelling, though it includes multimedia forms that are at least partly linguistic, such as comics, film, and theatre.

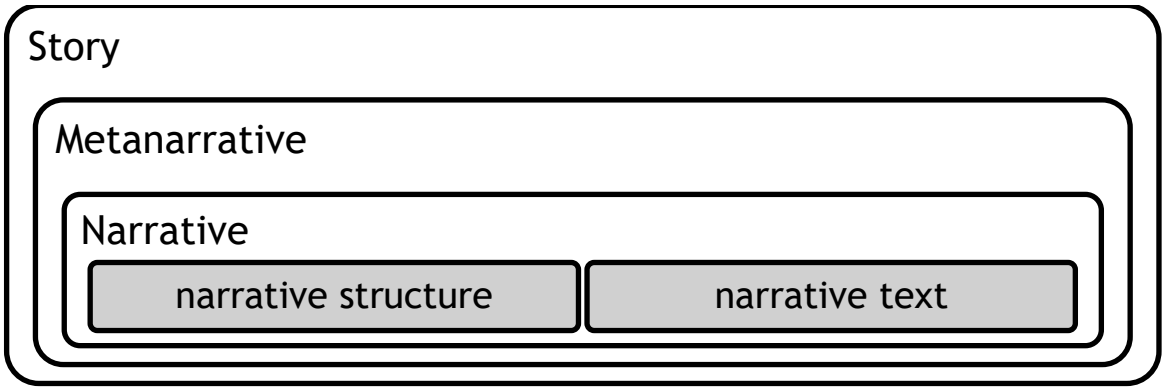

Figure 1: Narratology terms (adapted from Stibbe (2024, p.8))

Structure of the thesis

Chapter 2 sets out the coordinates of a radical conception of Earth writing, by situating the project in relation to two contemporary movements aiming at deep cultural transformation: geopoetics and ecopedagogy. I first explore each movement in turn, charting their development as theories, practices, and methodologies in the arts and educational spheres respectively. Particular attention is paid to the ways in which geopoetics and ecopedagogy diverge from mainstream traditions in these spheres, such as nature writing and Education for Sustainable Development. Next, I consider what might be gained by bringing these two movements into conversation, building on emerging scholarship around, on the one hand, geopoetic approaches to education, and on the other, aesthetic approaches to ecopedagogy. I show how both movements, despite their differing trajectories and emphases, participate in a shared project of emancipation through critical-creative praxis. The theoretical foundations of the thesis are elaborated in this chapter, specifically the grounds for problematising both writing and education as arenas of cultural reproduction, resistance, and renewal. The chapter also highlights key tensions around the notions of authority and agency in Earth writing, which frame the development of my thesis.

In **chapter 3**, I provide a critical historiography of Earth writing within its eponymous academic discipline – geography. I begin this historiography in the late nineteenth century, the period in which the discipline became formalised and institutionalised, and during which academic and professional geographers cemented their authority over Earth writing in the Western world. As well as charting how (predominantly Anglophone) writing practices have evolved over time, I critically examine how the domain of geographical writing has been a key

battleground in the broader struggles over the meaning and purpose of geography that have plagued the discipline since its inception. The analysis is structured around three key "moments" in geography's history: the reframing of traditional geographic concerns as "scientific" in the wake of the Darwinian revolution, the rise of quantitative methods in the mid-twentieth century, and the growing influence of cultural theory from the late twentieth century. The chapter includes several short case studies of published work, each addressing the topic of glaciers, to illustrate contrasting approaches to geographical writing in each period. A key contribution of this chapter is to trace the development of a broadly integrative, humanistic tradition of Earth writing as storytelling, from the early days of the "geographical experiment" to the "experimental geographies" of the contemporary moment. The chapter provides important historical context for the recent resurgence of interest in creative modes of expression in both geography and environmental education, complicating simplistic narratives around the "novelty" of such approaches. It thus extends existing scholarship around geography's "creative (re)turn", with a particular focus on geographical writing. Ultimately, I show that debates over how the Earth ought to be written are far from superficial – indeed, they illuminate deep-rooted assumptions around the legitimacy of diverse practices of knowledge-making, and more widely, of world-making.

Chapter 4 outlines the methodological approach that I adopted to investigate how the tradition of Earth writing as storytelling has developed in an educational context. Given the diversity of educational fields and settings under study, this task required a different approach to the traditional historical methods that supported my analysis of Earth writing in geography. I open the chapter with a reflection on the concept of discourse communities, which clarifies how the fields of geographical and environmental education are negotiated and maintained through communicative practices. I then explain how educational journal and magazine articles are enrolled as primary source material in my research, addressing the particular considerations associated with this type of data in relation to my research aims. The major part of the chapter is dedicated to delineating my methods of data collection and analysis, which can be summarised as a corpus-assisted discourse analysis conducted within an overarching "big qual" paradigm. This approach makes use of digital tools to

analyse texts in quantitative terms, in combination with the traditional qualitative techniques of close reading, in order to generate insights spanning the breadth and depth of the material. Specifically, I deploy the techniques of keyword analysis, which compares the relative frequencies of words in different decades of the corpus, and concordance analysis, which facilitates pattern identification by filtering and sorting short extracts of text surrounding a given keyword. Despite my incorporation of automated methods of analysis, I emphasise how my core findings remain shaped by my own decision-making throughout the research process, setting out the rationale for my decisions at each stage.

The findings of my empirical analysis of Earth writing in education are presented in **chapter 5**. This chapter is divided into four parts, detailing four distinct discourses around storytelling identified from my corpus of 227 articles published over the 50-year period from 1972 to 2022: story as resource, story as experience, story as way of knowing, and story as transformation. At the beginning of each section, I include a table of selected keywords to illustrate the chronological emergence of discursive trends in the corpus as a whole. I then develop an in-depth analysis of the "what", "how", and "why" of each approach to storytelling, based on my close reading of key texts identified through concordance analysis. The analysis focuses on how educators construct the roles and relationships between text, teacher, and learner in geographical and environmental education. This chapter acts as a parallel "cut" through the issues explored in chapter 3, adding educational perspectives to scholarly debates around the legitimacy of different modes of Earth writing. These discussions are enriched by recognising students, alongside established scholars, as readers and/or writers of the Earth. As in chapter 3, the negotiation of authority and agency among various actors in the domain of educational storytelling is understood to reveal deeper ideological struggles over who gets to participate in world-making.

Chapter 6 is the conclusion of this thesis. In this chapter, I summarise the key findings of my research, elaborate the central claims advanced in the thesis, and outline its contribution to the geographical and educational literature. As well as contributing to methodological innovation in the history of education by

integrating computational techniques with traditional textual analysis, my research contributes historical insights that extend previous research on geopoetics, ecopedagogy, and their interactions in theory and practice. I also reflect on how my evolving understanding of storytelling has influenced my own teaching practice over the course of the project. I close the chapter by reiterating the importance of cultural and critical ecoliteracies in a context of planetary crisis, and considering the structural factors that constrain or enable their development in formal education.

Chapter 2: Radical conceptions of Earth writing

Introduction

This research brings together literary, geographical, and educational perspectives on Earth writing. As I suggested in the previous chapter, I am far from the first scholar to bring these fields into conversation. My research sits within a broad movement to reconcile the arts with "planetary pedagogies": interdisciplinary, arts-enhanced, arts-integrated, and STEAM (science, technology, engineering, art, and mathematics) approaches have been proposed, many of which developed in the context of formal educational research and policy. In this chapter, I position my research within what might be understood as the "radical wing" of this broad movement, by exploring parallel movements in literature, geography, and education that reconfigure Earth writing as a potential avenue for deep cultural transformation. First, I outline the emergence of geopoetics and ecopedagogy as distinct movements and discuss their development at the margins of geographical and environmental education. I then consider the complementarity of these movements for an investigation of Earth writing as critical-creative praxis. Overall, this chapter sets out the theoretical foundations of my thesis, situating it in relation to key bodies of literature that problematise both writing and education as arenas of cultural reproduction, resistance, and renewal.

The geopoetics movement

Development of geopoetics

The concept of geopoetics first emerged outside of geography, with poet and author Kenneth White generally credited with originating the movement in the late 1970s (International Institute of Geopoetics, no date).[6] Geopoetics, as a form of creative "earth-making" (from the Greek *geo-poiesis*)[7], can be

[6] Cresswell (2022, p.377) identifies an earlier usage of "geopoetry" in the work of geologist Harry Hess (1962), albeit not as "an intentional term for a particular kind of poetic practice" (Cresswell, 2022, p.376) as in the case of White's geopoetics. Bobbette (2023) explores how Hess was himself influenced by the "geopoetry" of geologist Johannes Umbgrove (1942, 1950).

[7] This concept of geo-poetics as earth-making reflects the notion that creative practices *produce* worlds, rather than simply representing them. Haraway (2016) developed the idea of poiesis as making with her observation, following Dempster (1998), that poiesis is not a wholly autonomous act by an independent actor, but exists only as the relational act of "sympoiesis",

distinguished from the related concepts of ecopoetics as "home-making" (*oikos-poiesis*)[8] and topopoetics as "place-making" (*topos-poiesis*)[9] (Cresswell, 2022). For Magrane (2015), however, geopoetics is a broader practice that can include the study of ecopoetics and the poetics of place and space. In the same way that ecopoetics can encapsulate "any kind of poetics engaging with ecology", he argues that "geography, as an edge discipline (physical sciences as well as humanities), may have even more to offer a poetics engaged with the ongoing paradox of the twenty-first century" (in Magrane et al., 2020, p.3). He continues: "Many of the concerns being taken up as ecopoetics – such as environmental justice or political ecology, which play out within particular spatial relationships – might be more accurately understood as geopoetics" (in Magrane et al., 2020, p.3).

Drawing on Hawkins' (2011) framework of "dialogues" (geographers interpreting art) and "doings" (geographers creating art), Magrane (2015) outlines three approaches to geopoetics in geographical practice: geopoetics as creative geography, as literary geographies of poetry, and as geophilosophy. Geopoetics as creative geography aligns with the "doings" approach, and includes the work of self-identified "geographer-poets" such as Tim Cresswell (2013, 2015a, 2020) and Sarah de Leeuw (2012, 2015, 2019, 2022). Within this category one could also perhaps include the poetry produced through art-science collaborations in the geosciences (which Bissell (2021) differentiates as "geopoetry" rather than geopoetics), such as the "Geopoetry 2020" event held by the Edinburgh Geological Society (Corbett et al., 2021). Another form of engagement included in Magrane's (2015) apprehension of "geopoetics as creative geography" is the

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making-with. In this sense, geopoetics can be understood as a practice of writing *with* the world, rather than *about* the world.

[8] Ecopoetics emerged out of the ecocriticism movement of the late twentieth century, and was formalised with the establishment of a journal of the same name in 2001. It marks a departure from the Romantic tradition of "nature writing" (which implies the existence of a "natural" realm divorced from everyday human experience), by moving towards a relational, yet critical, framing of the more-than-human processes of making a home of the earth (Skinner, 2001a, b). Bryson (2002) provides a seminal introduction, while more recent overviews can be found in Knickerbocker (2012), Hume (2018), Campos (2019), and Martínez Serrano et al. (2021).

[9] Topopoetics is a term of Cresswell's (2015b, 2017) own making (although he notes an earlier use in Moslund (2011)). His usage builds on the humanistic geography tradition of exploring the poetry of place(s) (see for example Pocock (1981); Tuan (1978)), but is more concerned with exploring poetry *as* place – applying spatial thinking to poems themselves, as well as exploring spatial themes within poems. This reflects more recent developments in interdisciplinary scholarship on poetry and place which view them as mutually constitutive (see for example Alexander and Cooper (2014); Davidson and Skoulding (2013); Kreider (2014)).

use of poetry as a research method, as elaborated especially by Eshun and Madge (2012, 2021). Burlingame's (2019) work on creative writing methods in landscape geography could also be included here. The second approach to geopoetics, "literary geographies of poetry"[10], aligns with Hawkins' (2011) notion of "dialogues". This involves the analysis and interpretation of poetry from a geographical perspective. Magrane (2015) highlights ecopoetics as a particular area of interest for geographers in this regard. De Leeuw and Hawkins (2017) echo this call for critical geographical attention to ecopoetry, and Magrane's own later work provides an example of this approach (Magrane, 2018).

While the first and second approaches to geopoetics denote experiments in "doings" and "dialogues" with regard to the specific artistic form of the poem, the third approach that Magrane (2015) outlines, "geopoetics as geophilosophy"[11], moves beyond this medium to encompass a broader cultural project. This approach is strongly associated with White's original conception of geopoetics as "a major movement involving the very foundations of human life on earth" (International Institute of Geopoetics, no date). As White (2003, p.20) explains, this usage represents a more systemic understanding of "poetics":

> I tend to use the word poetics the way others use the word mathematics. That is, as a language. Not simply a particular use of language (which is how poetry is commonly understood), but as a complete language in itself.

This also helps to explain Bissell's (2021) distinction between "geopoetry" and "geopoetics", the latter referring to a movement seeking "a new or renewed sense of the Earth" (p.146). In White's (1992, p.172) words: "What we are trying to delineate is a field of presence and activity which has poïetic characteristics, but which has little in common with what is habitually known as 'poetry'". As

[10] Magrane (2015) argues that this mode of geopoetics represents a new direction in literary geography, which had previously engaged mainly with works of fiction (see also Cresswell (2015b)). For overviews of the broader field of literary geography, see Brousseau (2017); Hones (2015, 2017). A dedicated journal, *Literary Geographies*, was established in 2015.

[11] Geophilosophy is a philosophical movement which considers thought as "immanent" to (emergent from) geographical milieux. It emerged from the work of Gilles Deleuze and Félix Guattari, first in *What is Philosophy?* (1994) and then developed in *Anti-Oedipus* (2004) and *A Thousand Plateaus* (2008). Key introductory texts on geophilosophy include Bonta and Protevi (2004) and Gasché (2014). Its philosophical legacy is explored in a special issue of the journal *Subjectivity* (with particularly instructive contributions by Colebrook (2022) and Keating and Williams (2022)). For an overview of its influence in geography, see Woodward et al. (2022).

Magrane (2015, p.94) summarises, geopoetics as geophilosophy is best understood as “a practice of radical experimentation in making new worlds”. Furthermore, however geopoetics is classified, perhaps the most useful question to consider is “what this work may do in the world” (Magrane, 2021a), and it is to this world-making work that I will now turn my attention.

Geopoetics in practice

The promise of geopoetics is often presented in terms of its potential to construct a relational, more-than-human ontology. This reflects White’s (2003, p.4) proposition to reconceptualise the human as “inhabitant of the Earth” by developing “a poetics which places the planet earth at the centre of experience” (Scottish Centre for Geopoetics, no date). Within geography, de Leeuw and Hawkins (2017, pp.314–315) turn to ecopoetry as a source of inspiration for critical geographers in search of “new ways of telling new stories about the livingness of *earthlife*, stories that explore and express rich textured kinds of sensible and relational knowledge in part by writing differently about the world”. Similarly, Magrane (2018, p.167) notes the ability of ecopoetics “to foster alternative subjectivities in the face of climate change”. He develops this claim in his analysis of climate geopoetics, arguing that poetry is particularly apt to engage with shifting notions of selfhood in the Anthropocene: “Poetry as a genre has many ways of experimenting with subjectivity; in the compression of the space of a poem, a subject is often fluid and resists the solidification of a liberal humanist individuality” (Magrane, 2021a, p.18). Cresswell (2021, p.37), though, cautions that poetry (especially in the Romantic “nature writing” tradition) is as implicated in the development of liberal humanist subjectivity as any other form, and calls instead for “a promiscuous version of hybrid geopoetics that does not venerate the specific form of ‘the poem’”.

De Leeuw and Hawkins (2017) identify a lack of critical reflexivity with regards to authorial positioning within creative geographical writing, something that risks reproducing the universalising tendencies of traditional modes of geographic inquiry. Their critique builds on Madge’s (2014) discussion of the limits of empathy and the risks of appropriation and “speaking for” in geographical poetry. These questions have mainly been raised in relation to the portrayal of human experiences, and there has been less discussion of the

specific challenges of “speaking for” the nonhuman in creative written forms. Related concerns can be detected, however, in scientific anxieties over correctness and “poetic licence” in geological poetry (Corbett et al., 2021). In general, recent work has drawn attention to the need to actively situate geopoetic writing, by questioning “who is writing it, who is being written out” (Magrane et al., 2020, p.7).

In response to these concerns, de Leeuw (in Magrane et al., 2020, p.7) reminds us that “[g]eopoetics is not disembodied”. Indeed, geopoetics is often deployed precisely because of its perceived ability to “face down those modes of knowledge-making that still succumb to the logics of epistemological fixing and distancing” (Marston and de Leeuw, 2013, p.iv). Madge (2014, p.181) details how poetry can allow geopolitical events to “speak through the body”, while Magrane (2015, p.91) similarly explores how “poetry is a form that works in a more associational or intuitive register, one that can serve to provoke a reader and reach for the gut, the stomach, the skin, as well as the mind”. The final phrase in this list is important here: Hawkins and Straughan (2015a, b) note a certain tendency within the field to overplay the sensuous at the expense of the cognitive, echoing Nash’s (2000, p.657) early critique that the “turn towards expressive, body-practices seems to require a new version of an old division between thought and action, between mind and body”.

Explorations of the aesthetic in physical geography are instructive in overcoming dualistic approaches to embodied and cognitive ways of knowing. Dixon et al. (2013) outline a “‘geomorphological aesthetic’, wherein knowledge of the emergence and transformation of landforms is attained via a multi-sensuous engagement with landscape, and the making sense of that experience” (p.230), drawing attention to the ways in which the sublime can function as an “invitation to thought” (p.232). This is very much in line with White’s (2003, p.8) conception of geopoetics as an approach that “tries to get beyond the division of the intellectual and the sensitive” and “sponsors an intelligent sensitivity, a sensitive intelligence”. His claim that geopoetics is “situated beyond the presently established and classified division of science, philosophy and poetry” (White, 2003, pp.8–9) finds an echo in Magrane’s (2018, p.158) discussion of the connections between ecopoetics and Indigenous and Native

Science, as “an epistemology that does not distinguish between art and science”. Geographers working in both “creatively”- and “politically”-oriented traditions have commented on the potential of geopoetics to disrupt and destabilise conventional knowledge hierarchies (Hawkins et al., 2015; Springer, 2017), particularly given the ecological implications of this separation of knowledge (Cresswell et al., 2015).

Yet others have also highlighted the challenges of putting this approach into practice, especially in academic settings. In particular, art-science work in geography risks being subsumed into “science communication” or “dissemination” projects that fail to engage with the deep epistemological challenge posed by creative methodologies. Castree (in Hawkins et al., 2015, p.221) criticises forms of engagement where humanities-oriented contributions are understood as “downstream” of global change science (GCS), and argues that they have the potential to “remake the DNA of GCS” by calling attention to the meaning-making practices of humans alongside their observable behaviours (see also Castree et al., 2014). In contrast to “downstream” models that conceptualise “existing public constituencies as end users of academic knowledge”, Hawkins (in Hawkins et al., 2015, pp.214–215) notes how publics can be “brought into being” through direct engagement in creative practices. In this context, Magrane (2021b, p.42) warns that geopoetics practitioners “should rightfully be suspicious of and resist the reduction of geopoetics to a climate communication strategy”. Yet this is indeed how such work is often framed in scientific spheres (see for example Lovell, 2021; Tooth et al., 2019; Tooth et al., 2016).

Working across multiple worldviews in multi-, inter-, and trans-disciplinary projects has been presented as both a challenge and an opportunity. Dixon et al. (2013, p.228) investigate examples of art-geomorphology collaborations “that do not ‘bridge’ divides so much as juxtapose and learn from differing approaches to landforms”. Similarly, Dear (2015, p.28) calls on practitioners to adopt “a nonexclusive ontology and epistemological openness” as a prerequisite for transdisciplinary practice. Philosophical challenges are also compounded by practical ones: Hawkins (in Hawkins et al., 2015, p.216) highlights the gap between institutional rhetoric and practice when it comes to supporting

interdisciplinarity, decrying institutions that "fail to recognize the challenges of time and the making of the space needed for such work".

Some have linked creative experimentation in geography to a perceived "aestheticism" and depoliticization of the discipline (Saldanha, 2012). Yet recent work in geopoetics has sought to explicitly interrogate the political potential of the approach. Following De Leeuw and Magrane's proposal to "*radicalise geopoetics*" (2019, pp.147–148, emphasis in original), a number of studies reimagine geopoetics as a form of decolonial/anticolonial (Ferretti, 2020, 2024, 2025b; Nassar, 2021, 2025), antifascist (Ferretti, 2025a), and antiracist (Ferretti, 2025c) praxis.[12] Geopoetic writing has been described as a "critical-creative" hybrid form, combining insights from critical geography and creative writing (Hawkins, 2013; Magrane, 2021a; Magrane et al., 2020). As such, its political potential is understood not just in terms of content (e.g. its engagement with issues of human-nonhuman relations), but also in terms of form, as an alternative mode of knowledge production (Eshun and Madge, 2016; Marston and de Leeuw, 2013). Dixon (2009) argues that artistic practices in general "are not autonomous from the political, nor are they political because of the message they send. Rather, they are both a particular form of politics *and* are capable of commenting on politics" (p.412, emphasis in original).

Nassar's (2021) framing of geopoetics as "storytelling against mastery" echoes Cameron's (2012, p.588) reflections on story as a form that works against metanarratives by evoking the particular. She asks:

> … what is at stake when geographers aim not only to explain, describe, and analyze the worlds they live in, but also to move, to affect, and to create as storytellers? Does such an approach represent a depoliticized dabbling in creative writing, or a genuinely radical transformation of geographic understandings of the political?

Similarly, Bolland (2021, p.48) describes poetry as "an ancient and resilient form, specifically designed to be memorable, portable and performable", while Magrane (2018, p.159) conceives of poems as "stored energy (Rueckert

[12] In many cases, this "reimagining" involves drawing on geopoetic traditions from the Global South as opposed to the Eurocentric tradition associated with White, whose work has been criticised for its "quasi-colonial, masculinist rhetoric" (Last, 2015, p.57).

1996/2009), as actors themselves in a more-than-human collective and family". Whether in the form of story, poetry, or other hybrid forms, the techniques of juxtaposition, association, and metaphor associated with creative writing arguably have the capacity to disrupt conventional ways of thinking about the world (Madge, 2014; Magrane, 2021a; Springer, 2017).

Yet if the power of geopoetics is located in its ability to move others, this raises a difficult question: does poetry need to be "effective" to be "affective"? And if so, how can its "effectiveness" be judged without imposing hierarchical or exclusionary aesthetic standards? For Madge (2014, p.182), the craft of poetry is key to its political potential: "Assertions about the potential 'work' that poetry can do are rendered null and void if the creative words lack poetic merit". This leads her to question if merit – however this is defined – can still be achieved without possessing the relevant skills (Madge, 2014, p.182, emphasis in original):

> So if a poem is unable to stretch meaning enough to promote emotional resonance, if the author lacks the skills and creativity to impress the reader/audience, is the creative *process* of thoughtful-making, the act of expressing new and imaginative ideas and feelings, "good enough"?

The question of whether to view creative writing as a (skilled) practice or a (democratic) process gets to the heart of the tensions inherent in discussions of the aesthetic, a "lively" concept spanning the judgemental and the experiential, the "rarified artistic sphere" and the realm of "everyday being in the world" (Hawkins and Straughan, 2015b, p.1). Madge (2014, p.182) concludes that an appreciation of skilled practice should not preclude the "opening up" of spaces in geography for experiments in the creative process. This view is concurrent with Marston and de Leeuw's (2013) comments on creative geographies more broadly, whereby a balance can be struck between judging "critical-creative" works in both critical and creative terms, drawing on the evaluative frameworks and skillsets of various disciplinary traditions.

In sum, geopoetics can be understood as "both a method and a methodology", in that it is associated with a set of creative "tools" as well as a set of philosophical "concepts" (Magrane et al., 2020, p.9). It involves both the reconceptualization of the human relationship to the planet, and the creative

expression of that relationship – a cultural project with clear political implications. Geopoetics is often promoted as a way of engaging audiences beyond the academy in these fundamental discussions (Hawkins et al., 2015; Magrane, 2015, 2021a). Yet there is an awareness that its critical edge risks being blunted by the co-opting of its creative "tools" into practices that do little to unsettle established hierarchies of knowledge. Magrane (2021b, p.42) reflects on the lack of empirical studies in this area: "The oft-repeated argument (by myself and others) that poetry and art can help imagine and set the ground-work for more positive and just socio-ecological futures is more often an assertion than an evidence-based argument". There is an evident need to understand *how* this transformative potential may be realised in practice, including through storytelling practices. Educational spaces provide a useful context for such an investigation, and one that has received surprisingly little attention in geopoetics scholarship to date.

The ecopedagogy movement

Development of ecopedagogy

Ecopedagogy is an educational movement that shares many of the aims of geopoetics, particularly in its "geopoetics as geophilosophy" (Magrane, 2015) formulation as a broad cultural project concerned with the transformation of human relationships with the Earth. Ecopedagogy emerged in the Latin American context towards the end of the twentieth century as a form of critical pedagogy in the tradition of Paulo Freire.[13] The movement has its origins in discussions around the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, held in Rio de Janeiro in 1992 (Kahn, 2010). While the initial conference failed to produce an agreed statement that "would formulate the environmental concerns of education once and for all in both ethical and ecological (as opposed to merely technocratic and instrumentalist) terms" (Kahn, 2008, p.6), these themes were notably taken

[13] Freire's approach is most notably outlined in *Pedagogy of the Oppressed* (2018 [1970]), written in Portuguese in 1968, first published in Spanish translation in the same year, then translated into English by Myra Bergman Ramos in 1970. Freire himself was understood to be working on a book on ecopedagogy (although not described as such) until his death in 1997, parts of which are included in his posthumous publication *Pedagogy of Indignation* (2004) (Gadotti and Torres, 2009). Misiaszek and Torres (2019) published an imagined "missing chapter" of *Pedagogy of the Oppressed* on the topic based on his later writings and documented conversations.

forward through the work of the Latin American Institute of Communications Pedagogy (Instituto Latinoamericano de Pedagogía de la Comunicación (ILPEC)), with Francisco Gutiérrez and Cruz Prado coining the term "ecopedagogy" in their book *Ecopedagogy and Planetary Citizenship* (*Ecopedagogía y ciudadanía planetaria* (1997)) (Gadotti, 2010).[14] Growing interest in this area led to the organisation of the First International Symposium on the Earth Charter in the Perspective of Education in 1999, held by the Paulo Freire Institute under the direction of Moacir Gadotti, in collaboration with the Earth Council and UNESCO (Kahn, 2010). This was followed by the First International Forum on Ecopedagogy in 2000, and resulted in the formation of the Earth Charter Initiative and Ecopedagogy Charter (Kahn, 2010).

While "the center of the ecopedagogy movement has remained in the global South" (Warlenius, 2022, p.143), several authors working in Anglophone contexts have sought to develop "an ecopedagogy also for the North" (Warlenius, 2022, p.143). Notable monographs in the fields of environmental and citizenship education build on ecopedagogy's Freirean heritage to incorporate insights from the critical theories of Ivan Illich and Herbert Marcuse (Kahn, 2010), as well as postcolonial and ecofeminist perspectives (Misiaszek, 2020b). This work is useful in situating ecopedagogy in relation to parallel concepts in the Anglophone environmental education literature. Misiaszek (2020b, p.17), for example, differentiates ecopedagogy from "pedagogies on the environment", a neutral term referring to any form of education on environmental topics, and "environmental pedagogies", referring to education with expressly environmental*ist* aims. In his view, ecopedagogical work questions "if pedagogies on the environment models are environmental pedagogies" (Misiaszek, 2020b, p.17). In other words, ecopedagogy serves a deconstructive purpose, critically examining the ways in which environmental knowledge is taught and evaluating their compatibility with environmental sustainability.

Both Misiaszek (2018, 2020a, b, c) and Kahn (2008, 2010) carefully distinguish ecopedagogy from "Education for Sustainable Development" (ESD). Gadotti

[14] Kahn (2010, pp.30, n. 19) suggests that Gronemeyer (1987) may have been the first to use the term outside this context, to describe "the merging of environmentalist politics and adult education".

(2010, p.205) explains how Gutiérrez and Prado's (1997) origination of the term itself arose from the recognition that "the pedagogy of sustainable development was not broad enough in scope to constitute a great innovation in education theory". Kahn (2010) links ESD to the neoliberal "Third Way" politics of former US President Clinton, which "champions *sustainable development* as a win-win-win for people, business, and nature" (p.15, emphasis in original). He charts the rise of ESD as a mainstream alternative to ecopedagogy following the failed attempt to ratify the "holistic, pointedly socialist in spirit, and non-anthropocentric Earth Charter educational framework" at the 2002 World Summit on Sustainable Development in Johannesburg, ten years after the first Earth Summit in Rio (Kahn, 2010, p.13). At the same time as expressing his concerns over the "inherent ideological contradictions" of ESD (Kahn, 2010, p.17), he highlights examples of praiseworthy work already done in the field and the potential of the UN Decade of Sustainable Development (2005-2014) as an opportunity for strategic engagement to advance a critical ecopedagogy.

Over a decade later, Warlenius (2022) concludes that there are indeed important differences between the two movements, with ESD largely ignoring power structures and limiting its critique to "singular aspects of modern society rather than modern society *as such*" (Warlenius, 2022, p.149, emphasis in original). Misiaszek (2020b, p.22) similarly calls for a critical engagement with ESD, arguing that "what ecopedagogical work focuses on is problematizing what the 'D' is, especially in relation to the 'S'". This echoes calls from the wider environmental movement to problematise the widespread association of "development" with economic growth, an association most prominently reflected in the UN Sustainable Development Goals (United Nations, no date).[15] As Misiaszek (2020b, p.31) summarises: "Ecopedagogy can be both a separate environmental pedagogy and a pedagogical tool within Education for Sustainable Development (ESD) and Environmental Education (EE), as well as a

[15] These calls have been made most strongly by the degrowth movement, which argues that it is necessary to reduce global production and consumption in order to live sustainably within planetary boundaries. This movement is fundamentally opposed to the concept of "green growth" which underpins mainstream sustainable development policy. Key texts on degrowth include Latouche (2009), Hickel (2020), Liegey et al. (2020), Kallis et al. (2021), and Schmelzer et al. (2022).

methodological research tool for critically analysing environmental pedagogies, including 'pedagogies on the environment'".

Ecopedagogy in practice

The defining feature of ecopedagogy, then, is its radical transformative aims. While ESD has been widely integrated into existing education systems (Warlenius, 2022), ecopedagogy seeks to question the very foundations of those systems.[16] It is in this sense that ecopedagogues consider other environmental pedagogies to be "not broad enough in scope" (Gadotti, 2010, p.205), stressing that "eco-pedagogy is not just another pedagogy among many other pedagogies" (Antunes and Gadotti, 2005, p.136). Gadotti (2011, p.21) considers education as "part of the solution" to twenty-first century problems, but insists that "we have to recognise that it is also part of the problem". He argues that education systems "in general, are based on predatory principles, on an instrumental rationality, reproducing unsustainable values" (Gadotti, 2011, pp.21–22).[17] Several scholars mobilise the concept of the "hidden curriculum" to explore how conventional (Western) models of education serve to reproduce unsustainable social and ecological relationships (Kahn, 2010; Misiaszek, 2010, 2018, 2020b, c; Payne, 2014). Misiaszek (2020b) is particularly critical of "distancing" epistemological frameworks that obscure the interconnectedness of the social and the ecological. This approach is typically associated with positivistic approaches to environmental education such as "KAB" (knowledge-attitude-behaviour) models, which assume that changes in attitude and behaviour will follow logically from an accumulation of scientific knowledge transmitted by experts (Payne, 2018b). Yet experiential learning approaches are also critiqued where they reduce environmental education to "outdoor educational experiences that all too often advance outdated, essentialized, and dichotomous views of nature and wilderness" (Kahn, 2010, p.7).

[16] Kahn (2010) specifically advocates transforming education along three dimensions: cosmological (transformation of the dominant worldview), technological (transformation of technology and technoliteracies), and organisational (transformation of knowledge systems).

[17] Bowers (2004) strongly criticises Gadotti's failure to acknowledge the diversity of education and knowledge systems across the world's cultures, and the related assumption that ecopedagogy necessarily entails emancipation from the intergenerational transmission of culture. Recognising that "many non-Western cultures are already ecologically centred" (p.57), he proposes an "ecojustice pedagogy" that also asks "what needs to be conserved" (p.53) in a given culture.

Ecopedagogy, as a form of critical pedagogy, is premised on the active development of an emancipatory critical consciousness ("conscientisation" or *conscientização* in the Freirean vocabulary) through the problematisation of daily life. At the same time, it departs from other social justice-oriented critical pedagogies in its rejection of anthropocentrism, including the dualistic conception of the human underpinning the concept of "humanisation" in Freire's own work (Kahn, 2010).[18] As Gadotti (2011, p.21) explains: "The word 'pedagogy' is a reference to an anthropocentric paradigm; all the classic pedagogies are anthropocentric. By contrast, ecopedagogy starts from a planetary conscience".[19] In other words, ecopedagogy is built on the premise that education must define its goals beyond merely human concerns from the outset. Kahn (2010, p.19) argues that, alongside environmental justice perspectives often absented from environmental education in the global North, ecopedagogy "incorporates more typically northern ecological ideas such as the intrinsic value of all species, the need to care for and live in harmony with the planet, as well as the emancipatory potential contained in human aesthetic experiences of nature".

In Payne's (2018b, p.82) view, ecopedagogy's ontological emphasis can go some way to overcoming the "oxymoronic" nature of environmental education, challenging the "uncritical anthropocentric inversion of Education as priority and authority while usurping Environment and subjugating (remnant) Nature". Accordingly, ecopedagogy has been associated with an ecocentric philosophy that decentres the human in its ontology and axiology (Payne, 2014, 2018a, b). Norat et al. (2016, p.181) associate it with the "ecological paradigm" in education, which involves "a transformation of the mechanistic world view that most societies share, especially Western ones". They characterise ecopedagogy as "a movement that transits between critical pedagogy and complex thinking" (p.190), with its emphasis on making the complex interrelationships of the more-than-human world visible. Similarly, Misiaszek (2020b, p.33) describes

[18] Kahn (2010, pp.100–101, n. 112) notes that this "dichotomy between human culture and animal nature must be understood as both an ideological tenant of Freire's radical humanism and as a reconstruction of the oppressive biases held by those in power that have historically labeled people of differing race, class, and/or gender as akin to 'animals' in a 'state of nature'".

[19] Again, Bowers (2004) highlights the problematic universalism of "planetary consciousness" in Gadotti's vision of ecopedagogy, arguing that it amounts to a globalising "pedagogy of Western imperialism" (p.46) that ignores cultural diversity.

ecopedagogy as a practice of "world-Earth de-distancing" (with "world" here referring to the anthropocentric sphere), noting: "Although learned epistemological frameworks can either, to varying degrees, connect or disconnect us from the rest of Earth, these complex connections exist" (Misiaszek, 2020b, p.24). In the spirit of Freire's popular literacy campaigns,[20] Kahn (2008, p.9) proposes that ecopedagogy develops "at least three varieties of ecoliteracy throughout society in the name of a more just, democratic and sustainable planetary civilization: the technical/functional, the cultural, and the critical", which "should be seen as holistically complimentary [sic] to one another, overlapping, and not in a hierarchical, logical, or linear relationship". Taken together, these "ecoliteracies" represent a holistic, learner-centred approach to environmental education, which contrasts with traditional instrumental and knowledge-centred approaches.

As an alternative to what he called the "banking" model of education, wherein knowledge is transmitted unidirectionally from "expert" educators to learners assumed to be ignorant, Freire (2018 [1970]) advances a model of "problem-posing" education, recognising learners as knowledgeable subjects in their own contexts. In this model, the educator must become familiar with the local learning context in order to facilitate critical dialogue, which starts from and builds upon learners' experiences. This emphasis on context-specific learning is also an important feature of ecopedagogy, understood as necessary for the process of conscientisation and transformative praxis. As Misiaszek (2020b, p.25) puts it, "ecopedagogies are only effective if democratic and contextual". Similarly, in a content analysis of key ecopedagogical texts, Norat et al. (2016, p.189) identify "connecting experiences with place" as one of the central practices of ecopedagogy, which in their interpretation "could help the participants feel connected to nature and to the community of life".

Given the priority placed on pluralistic, "bottom up" educational praxis, many ecopedagogical scholars have been hesitant to specify exactly how educators can

[20] Freire's *Pedagogy of the Oppressed* (2018 [1970]) was based on his experiences as an adult literacy educator in Brazil. He understood literacy as more than simply the ability to decode text, but rather as a form of creative participation in society: "Reading the world always precedes reading the word, and reading the word implies continually reading the world" (Freire, 1983, p.10; see also Freire and Macedo, 1987). This broader conceptualisation of literacy anchored his understanding of teaching as a deeply political activity (Freire, 1983).

put its principles into practice. In his overview of the movement, Kahn (2010, p.21) stresses the point that "ecopedagogy, while drawing upon a coherent body of substantive ideas, is neither a strict doctrine not a methodological technique that can be applied similarly in all places, all times, by all peoples". The theoretical focus of Kahn's work has been a source of criticism from several reviewers, including Misiaszek (2010), Reid and Payne (2011), and Francis (2011), with the latter left disappointed in his hopes for "some clues as to what this ecopedagogy would look like within the classroom, or other educational context" (Francis, 2011, p.707). Misiaszek (2010) ultimately agreed that Kahn's approach was appropriate to ecopedagogical scholarship, and would go on to describe the role of the latter as "defining the grounding tenets rather than constructing static curricula" (Misiaszek, 2020b, p.25). This leads him to raise the question: "Can ecopedagogies, as radical pedagogies, by truly part of formal schooling that questions and often counters dominant ideologies of the schools in which they are situated in?" (Misiaszek, 2020b, p.30). Indeed, the extent to which ecopedagogy can reasonably be practised within formal educational institutions, where curricula are often fixed at a national level, effectively remains an open question in the literature. While several scholars have associated ecopedagogy specifically with informal education and "deschooling" practices (Dunkley, 2018; Payne, 2017),[21] others take a more ambiguous position. Norat et al. (2016, p.180) provide the following overview:

> Ecopedagogy is focused on education throughout life and the movement occurs mostly outside the context of formal education, but there are successful practices of the integration of "a sustainable vision of education" (Gadotti, 2002, p. 160), a "sustainable education" (Sterling, 2011, p. 21) or an "ecoeducation" (Clark, 1997, p. 73) in schools.

They conclude that "the integration of ecopedagogy's principles [in]to the school context presupposes an openness and willingness of the educational community to change", responsive to the need for "structural changes which includes curriculum reconceptualization and in-service professional development" (Norat et al., 2016, p.191). Payne (2018a, p.181) observes that

[21] The term "deschooling" was coined by Ivan Illich and elaborated in his book *Deschooling Society* (1971). In it, Illich critiques compulsory formal education and calls for the traditional school system to be replaced by an informal system that facilitates voluntary, self-directed learning throughout life.

ecopedagogy "is suggestive of a range of practices of 'deschooling'", but identifies a need for greater research and theorisation of "experiential education" as an "'alternative hybrid of schooled and deschooled pedagogies", one that deploys complementary cycles of "informal/experiential" and "formal/cognitive" learning. For Gadotti (2011, p.23), however, the nature of the educational context is less important than the nature of the learning experience:

> We do not have to establish limits between what pertains to school, what does not pertain to school, or the formal, informal and non-formal educational systems and modalities. We must create learning communities where all can learn together, independently of their age, without segmentation, but in an articulate way.

Kahn (2010, pp.21–22) makes a similar point, claiming that "a Freirian [sic] ecopedagogy also analyzes schools as practical sites for ideological struggle, but with an eye to how such struggle is connected with counterhegemonic forces outside the schools in the larger society". This recalls Gadotti's (2011, p.23) echoing of Freire's view that learning is above all a collective, lifelong endeavour, "mediated by the world" and our experience of it.

The ecopedagogical imperative to valorise learners' experiences of the world also entails an epistemological openness to diverse worldviews (Misiaszek, 2020a, b). As such, ecopedagogical scholars have been particularly critical of how Western science has operated as a hegemonic knowledge practice in environmental education. Even as Kahn (2008, p.9) promotes the development of "technical/functional" ecoliteracy, which "involves goals of learning to understand basic scientific ecology, geology, biology and other scientific insights", he rejects "the attempt to translate nature into a data resource for scientific measurement and management" (Kahn, 2010, p.57). This tension highlights the importance of the complementary concepts of "cultural" and "critical" ecoliteracy, which engage critically with human-nonhuman relationships as they are understood in various cultures and resist "attempts to universalize and institutionalize ecoliteracy as functional forms of environmental knowledge that accord only with Western science and citizenship values" (Kahn, 2008, p.10). Kahn (2010, p.104) follows postcolonial and feminist critiques in depicting "Western Modern Science" (WMS) as an exclusionary knowledge

practice, a “specific sociocultural and political project” rather than “an abstract, value-free set of universally falsifiable truths”. Ecopedagogy, he argues, instead “supports transformative research into who is excluded from the canons of sustainability scholarship, the methods it undertakes, and the normative sociopolitical frameworks of WMS” (Kahn, 2010, p.107). In contrast to such exclusion, it “seeks out a type of science that allows for a reconfiguration of the geopolitical locations in which legitimate research takes place, who does it, and how” (Kahn, 2010, p.107).

Kahn also acknowledges that such a reconfiguration of “legitimate” knowledge-making practices comes with risks as well as benefits. He notes that “the dominant view of science relies upon the idea that ‘the material world ultimately judges the adequacy of our accounts of it’ (Matthews, 1994)” (Kahn, 2010, p.110). Truth claims in science depend on the principle of falsifiability – the presumption that such claims may be disproved through observation or experimentation – and, by challenging this principle, “one potentially opens up a philosophical door in which all kinds of bogies … might sneak through” (Kahn, 2010, pp.122, n. 111). Misiaszek (2020a, b) also tackles this risk in relation to the current era of “post-truth” politics, where issues like climate change denial arise from a similar process of undermining scientific claims to truth. Kahn (2010, pp.122–123, n. 111) counters:

> Still, just because a knowledge practice need not be falsifiable in order to qualify as real science does not mean that anything therefore can count as science - there are still a variety of real epistemological and sociocultural conditions that need to be evaluated of any given knowledge practice in order to determine its scientific value.

He does not elaborate, however, what these “real epistemological and sociocultural conditions” might be. Misiaszek (2020b, p.42), who himself has a background in the natural sciences, offers a pragmatic solution to reconciling our inherently limited understanding of the natural world with the need to produce legitimate knowledge about it:

> With epistemological selections, it is the outcome of such understanding that determines our actions, which are either environmentally positive or environmentally negative for Earth holistically. If our actions are the ones needed to adapt for Earth

> balance and we "understand" only through our epistemological lenses, the selections should be pragmatic towards this end.

This solution would undoubtedly be unsatisfactory to many in the field of environmental education: How could one know if actions are environmentally "positive" or environmentally "negative" on this basis alone? Can environmental actions ever be judged in binary terms? Nonetheless, such a solution is arguably in accordance with the pluralistic, non-prescriptive nature of ecopedagogy, which demands that educators embrace alternative ways of knowing as appropriate to the learning context.

More recent research in ecopedagogy has paid particular attention to the role of embodied, aesthetic experiences in producing environmental knowledge. Norat et al.'s (2016) review identifies both the "affective" as a "prioritized methodological approach" in ecopedagogy and "artistic expressions" as one of its key "practices". They associate this approach with the "holistic" dimension of ecopedagogy's educational vision, one that "prioritizes the affective, aesthetic, creative and ethical dimensions that are undervalued by traditional education" (p.191). While this approach arguably forms part of a distinct tradition within ecopedagogy, derived from the phenomenological perspective of David Jardine (1996, 2000),[22] some scholars have linked it to the Freirean tradition of critical pedagogy. Iared et al. (2016, p.196), for example, explore Freire's concern with "aesthetic curiosity" as a form of pre-reflective "opening" towards "a more 'meaningful' form of epistemological curiosity" and critical praxis. Their work advances a research agenda of investigating how bodies "are actively complicit in the generation of meaning" (Iared et al., 2016, p.196), a theme notably explored in outdoor learning contexts by Payne (2014).

Overall, ecopedagogy embodies the Freirean definition of praxis: "reflection and action upon the world in order to transform it" (Freire, 2018 [1970], p.25). In its "reflective" dimension, it engages educators and learners in critical analysis, not just of "unsustainable" human behaviours, but also of the oppressive structures that drive them (including education systems). In its "active" dimension, it

[22] Payne (2017, p.134) describes Jardine's work as "one of the early 'versions' in EE [environmental education] of ecopedagogy (not named as such)", while Hung (2025) distinguishes distinct developmental trajectories for "critical" and "poetic" ecopedagogy.

engages educators and learners in a liberatory struggle to change these structures. The movement has a somewhat uneasy relationship with environmental science, aiming to unsettle its position as an authoritative way of knowing while remaining keenly aware of the existential threats inherent in a "post-truth" society. There is a strong emphasis on developing learners' agency to recreate the world, but the role of what are commonly thought of as "creative" practices in this process is relatively under-researched.

Conclusion

Despite emerging in quite different contexts, there is a great deal of common ground between the geopoetics and ecopedagogy movements. I would argue that this stems from a shared recognition of the role that both writing and education play in cultural reproduction – and accordingly, the potential of these domains as sites of cultural resistance and renewal. Both movements are radical in their aims of "rewriting" humanity's relationships with the Earth: the geopoetics movement emphasising the writing itself, and the ecopedagogy movement emphasising the (eco)literacies that enable it. Both movements also insist on the inseparability of the "critical" and the "creative" in this rewriting, and work towards the democratisation of these capacities. Yet there is also a lot that each movement can learn from the other. There has been minimal research into pedagogical engagements with geopoetics beyond Bissell's (2005) account of "Kenneth White as educator" and Tonner's (2024) theorisation of "a geopoetic education for the twenty-first century", also based on White's work. Conversely, despite its emphasis on the world-making capacities of learners, there has been limited exploration of poetics from an ecopedagogical perspective in general, and a critical (Freirean) ecopedagogical perspective in particular - perhaps related to Freire's characterisation of "narrative education" as the epitome of the "banking" model he so fiercely opposed (2018 [1970], p.33). The following chapters explore the pedagogical potential of geopoetics, and the poetic potential of ecopedagogy, via the Earth writing of geographers and educators.

Chapter 3: Critical historiography of Earth writing

Introduction

The appropriate method and style of writing in geography have been subjects of debate throughout the history of the discipline, inextricably wrapped up in wider negotiations over of the purpose, method, and scope of geography. Springer (2017) describes writing as "a primary intellectual battleground in contemporary geographical thought" (p.1), a manifestation of a deeper epistemological divide between metaphorical ways of knowing and "the specter of naive realism that continues to haunt the discipline" (p.2). For Magrane (2015, p.87), "the ongoing play between art and science in the discipline of geography … is itself the realm of geopoetics". Both Springer (2017) and Magrane (2015) have pointed to some historical figures who contributed to what could be considered a fledgling "geopoetic" tradition in geography: a tradition that, as discussed in the previous chapter, is now flourishing, if not yet dominant, within the discipline. This chapter builds on this work by situating these developments in their historical, institutional, and popular contexts. While focusing on the writing of geographers themselves, I also consider the role of academic geography, as a source of authority on Earth writing in the Western world, in legitimating the creative writing of others. Fundamentally, I wish to underline how Earth writing has never been a "value-neutral" product, but is instead a practice conditioned by and contingent upon wider philosophical and social considerations.

My approach to this task is necessarily limited in two ways. Firstly, for reasons of space, it will not be possible to trace these debates since the inception of the term "geography". I will instead restrict my historiography to the period where geography has been recognised as a formal academic discipline, beginning across Europe in the latter half of the nineteenth century. Secondly, due to constraints of both space and language, it will not be possible to address the full range of debates occurring internationally throughout this period. Thus, I will broadly restrict the discussion to the Anglophone and Francophone spheres, drawing on sources in English and French.[23] Whilst I recognise the impossibility of separating

[23] I have referred to published English translations of French sources where these are available. Translations from original French texts are my own unless otherwise stated.

these two traditions from either each other or from developments occurring internationally, each provides important contributions of particular significance to my study. Specifically, through the textual analysis of scholarly sources across three key "moments" in geography's history, I trace the development of an integrative, humanistic tradition of Earth writing as storytelling.

Science and style in the late 19th century

Towards the end of the nineteenth century, geography began to emerge as a professional and academic discipline separate from its precursor geology. However, as Livingstone (1992, p.177) observes, the subject had to undergo something of a reinvention in order to survive in a context where "the teleological undergirding on which its theoretical superstructure had long rested was beginning to crumble under the weight of naturalistic science", and its integrative nature was being threatened by "the incipient Balkanization of knowledge that accompanied the professionalization of scientific specialties". At the same time, struggles in the emergent European geographical societies to forge a new identity for the subject beyond its reputation as "a mere adjunct to overseas rambling" (Livingstone, 1992, p.177) led to calls for a "New Geography" (Kearns, 2009; Stoddart, 1986; Unstead, 1949). Specifically, Livingstone (1992) argues that the Darwinian revolution provided a new conceptual foundation that allowed geographers to reframe geography's traditional concerns as "scientific" and embark on what he terms "the geographical experiment – an experiment in keeping nature and culture under the one conceptual umbrella".

The requirement for geography to pass as "science" so as to be legitimised as an academic discipline undoubtedly had consequences for what passed as legitimate geographical writing. There were new demands to demonstrate objectivity and methodological rigour. Yet, as Livingstone (1992) illustrates, while many geographers invoked evolutionary theories and the scientific method, little of the geographical literature produced in this context can be said to embody the disinterested pursuit of knowledge. In this section I will consider two competing visions of geography during this period, as exemplified respectively by the British geographer Halford Mackinder and the French geographer Elisée Reclus. I will reconstruct how, despite their seemingly shared

concern with fostering an integrative, scientific approach to the subject, their political and philosophical differences gave rise to quite different practices of writing geography.

Mackinder's "rational" geography

Halford Mackinder was one of the key figures in the rise of the "New Geography" in the United Kingdom. In his famous 1887 address to the Royal Geographical Society, "On the Scope and Methods of Geography", Mackinder set about answering the question "What is geography?", echoing anxieties in both the teaching world and the geographical societies in an age of declining European exploration and "discovery". In particular, the address responded to criticisms of geography's dualistic nature and its unclear distinction from related disciplines, asking: "Are physical and political geography two stages of one investigation, or are they separate subjects to be studied by different methods, the one an appendix of geology, the other of history?" (Mackinder, 1887, p.142). Mackinder's response was to firmly endorse the former: "We hold that no *rational* political geography can exist which is not built upon and subsequent to physical geography" (p.143, emphasis in original). He argued that contemporary "political" (or human) geography was "irrational" – its ignorance of causal relations reduced it to "a body of isolated data to be committed to memory" (p.143). Mackinder's critique of a superficial, descriptive, and enumerative geography extended a line of argument developed by the geographical societies from the 1870s onwards, as in the Royal Geographical Society's insistence that geography was not "a barren catalogue of names and facts, but … a science that ought to be taught in a liberal way" (Keltie, 1885, p.80), or in Francis Galton's (1873, p.199) view that geographers should henceforth "devote themselves to principles and relations" once the "primary facts" had been established through exploration.

Mackinder (1887, p.143) proposed a new definition of geography as "the science whose main function is to trace the interaction of man in society and so much of his environment as varies locally", with a particular emphasis on causal analysis. Although he emphasised the importance of physical geography, conceding that the analysis of "man in society" – and of course the reference was always to "man" – would be "shorter than that of the environment" (p.143), his

proposition was not quite as simple as applying the same scientific method to both elements. He instead proposed a special, integrative methodology that distinguished geography from the other sciences (and thereby justified its existence as a separate discipline): the New Geographer should "look equally on such parts of science and such parts of history as are pertinent to his inquiry" (pp.144–145). He then outlined "the main line of geographical argument", his conception of how geography should be written and organised, such as in "the table of contents at the beginning of a text-book" (p.155). Starting with "the idea of a landless globe" (p.155) on which mechanical forces play unimpeded, the student would next begin to "conceive the world as it is, as heated, as cooling, as shrinking, as wrinkling" (p.155), in order to understand the multiple variations affecting these forces (see Box 1 for examples from Mackinder's own writing). In the second stage, attention would shift to the mutual influence of "environment" and "community" (p.156). Key to this framework is the idea that "each successive chapter postulates what has gone before" (p.156); thus "the sequence of argument is unbroken" (p.156). This is in part a solution to the pedagogical problems of the "old" geography (p.144):

> If you learn what the old geographers term "the physical features" in their causal relations, advance becomes ever easier. New facts fit in an orderly way into the general scheme … When, however the method of description has been adopted, and still more that of enumeration, each additional fact adds an ever-increasing amount to the burden to be borne by the memory.

But more than this, this approach underlines Mackinder's conviction that "everywhere political questions will depend on the results of physical inquiry" (p.157). Mackinder saw a special purpose in a united geography, declaring: "One of the greatest of all gaps lies between the natural sciences and the study of humanity. It is the duty of the geographer to build one bridge over an abyss which in the opinion of many is upsetting the equilibrium of our culture" (p.145). He held that his New Geography could provide a "common platform" for "the man of the world and the student, the scientist and the historian", serving as a "substitute" for the uniting role that the study of the classics once played (p.160). In short, his vision of geography was intended as one "which shall satisfy at once the practical requirements of the statesman and the merchant, the

theoretical requirements of the historian and the scientist, and the intellectual requirements of the teacher" (p.159).

It is clear from the above that Mackinder's vision of geography was of a subject that was – or ought to be – of particular utility to an elite subset of society. His geography, like the classics before it, could provide common intellectual ground for this group, but did not necessarily need to be accessible to those outside it. It is significant that his assessment of the failings of the "irrational", inventory-style geography extended beyond purely academic concerns: "Such a geography can never be a discipline, can never, therefore, be honoured by the teacher, *and must always fail to attract minds of an amplitude fitting them to be the rulers of men*" (Mackinder, 1887, p.143, emphasis added). He would later develop this notion in his analysis of geographical education, claiming that the "actuality" of the subject would be essential "if the educated classes are not to lose their grip and their influence over the half-educated proletariat" (Mackinder, 1921, p.383). Geographical knowledge was therefore intimately tied up in notions of domination, and applying a scientific rigour to geography could serve not only to "rationalise" the discipline itself, but also to rationalise the exercise of power. Indeed, as Hudson (1977) observes, the rise of the so-called New Geography coincided conspicuously with the rise of the new imperialism after 1870. Mackinder's own presentation of the "environment-community" relationship as a "struggle for existence", in which naturalised nation-states must either dominate or be dominated, ultimately served to rationalise imperialist aspirations: "Nature is ruthless, and we must build a Power able to contend on equal terms with other Powers, or step into the rank of States which exist on sufferance" (Mackinder, 1905, cited in Kearns, 2009, p.68).[24]

[24] Much of the scholarship on Mackinder focuses on his role in the development of geopolitics and the political implications of his geography. Notable works include Parker (1982), Blouet (2005) and Kearns (2009).

Box 1: Mackinder writes glaciers

In the early years of the twentieth century, Mackinder published an educational series aimed at secondary school students, initially entitled "Mackinder's Geographical Studies" and later "Elementary Studies in Geography and History" (Kearns, 2009). More accurately, it was aimed at *British* secondary school students, with instalments ranging from "Our" lands (Mackinder, 1907b) to "Distant" lands (Mackinder, 1911a). This reflects Mackinder's expressly imperialist view that geography should be taught "from a British standpoint, so that finally we see the world as a theatre for British activity" (Mackinder, 1911b, p.83). An extract from the first instalment, *Our Own Islands*, provides an insight into Mackinder's approach to writing physical geography in an educational context (see Figure 2a)).

Page 131 presents a photograph of an existing glacier in Sweden to illustrate past glaciation in the UK. This is typical of Mackinder's privileging of the visual in geographical instruction, which was central to his notion of "thinking geographically" (Mackinder, 1911b, p.80), and indeed of "thinking imperially" (Mackinder, 1907a; Ó Tuathail, 1996; Ryan, 1994, 1997). The beginning of his textual evocation of glaciation on page 132 is reminiscent of a fairy tale with its "once upon a time"-style opening, but the overall tone of the section is more matter-of-fact than story-like. The authorial voice speaks directly to the reader, providing instruction on geographical observation ("If you turn up the turf in some parts of Scotland, you will find that the rock underneath is scratched all over"), as well as an analogy to illustrate the geographical process that explains the observation ("Have you ever noticed a glazier cutting glass?").

The overall tone is broadly comparable to Mackinder's earlier, general-audience equivalent text, *Britain and the British Seas* (see Figure 2b)). Here, the information is presented in a more detached manner, without any direct instruction to the reader. The copious photographs found in *Our Own Islands* are replaced with more technical maps and diagrams.

also because the Irish mountains take some of the moisture from the west Atlantic wind before it reaches Lancashire. If you look at the map, you will see that Ireland does not lie to the west of Argyll.

In the course of long, long ages Argyll has sunk a little, though very, very slowly, and the sea has run up some of the glens, and in some places has entered the lower ends of the lochs, and so turned them into sea-lochs. Therefore we describe Argyll as a half-drowned country.

It is for this reason that the promontory of Kintyre, and the island pairs of Islay and Jura, and Bute and Arran, stand out towards Ireland, side

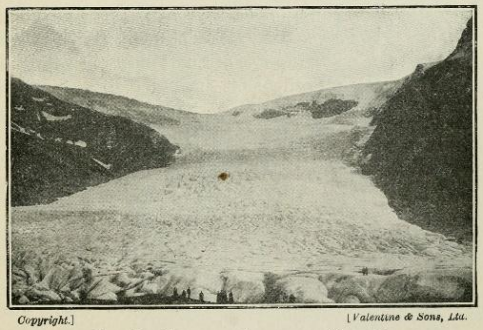

FIG. 65.—SVARTISEN GLACIER IN NORWAY.

by side, in three chains. Once they were three ridges of mountain with glens between them. Now the glens have been flooded by the sea. Find Kintyre and the four islands on the maps, and make quite sure that you understand what the last three sentences mean.

There was once a time, now long gone by—for it was before the beginning of written history—when the glens and lochs of Argyll, which had already been worn deep by the torrents, were filled with ice. The climate of Britain was then much colder, and the moisture from the Atlantic gathered on the moors, winter and summer, in deep snow, which never completely thawed. Pressing together, the snow became ice, which slipped down the glens like so many ice rivers, or, as they are called, glaciers.

These glaciers carried many stones. If you turn up the turf in some parts of Scotland, you will find that the rock underneath is scratched all over. This was done by the stones which were borne along embedded in the sides of the ancient ice rivers.

Have you ever noticed a glazier cutting glass? He scratches it with a hard diamond which he carries on the end of a holder shaped like a pencil. Then he breaks the glass along the scratch. Just in the same way the glaciers, in whose icy sides hard bits of stone often got wedged, scratched the rocky beds of the glens down which they travelled.

In the penultimate stage of the evolution of Britain a remarkable event intervened, which drew a curtain between all the great past and the present. For reasons still disputed, Britain temporarily underwent a climate similar to that of Greenland in the present day. The south-west winds brought up from the ocean vast supplies of moisture, which collected on the mountains of Scandinavia and Britain in persistent deposits of snow. Accumulating from year to year, and from century to century, this snow was compressed into an ice-sheet hundreds of feet in thickness, which overwhelmed all the land to the north of the sites of London and Berlin, and doubtless extended to the edge of the submerged platform, there breaking away in icebergs. Southern England, from Cornwall to Kent, and the site of the English Channel, were then a moss-covered sill at the foot of the ice, similar to that which now constitutes the habitable fringe of Western Greenland; this was the home of reindeer, bears, and other animals which now find refuge within the Arctic circle.

The glaciers of the English plain, as traced by the boulders transported by them, seemed to have been nourished from three quarters—from the Welsh Uplands; from a section of the southern Scottish Uplands through the Cheshire gap; and from Norway. The generally low level of both hills and valleys in the district between Flamborough Head and the Essex flats may perhaps be traced to the effect of the great Scandinavian glacier which here intruded upon Britain.

When the climate grew milder, and the ice retreated to the uplands, Britain emerged in broad connection with Europe, and the animals and plants of the mainland advanced freely northward. Even the floor of the North Sea appears to have been land, for the bones of the mammoth, the reindeer, the elk, the bear, and many other animals, have been dredged from the surface of the Dogger Bank. Ireland, separated from Great Britain by a relatively deep channel, seems to have been early detached. Comparatively few living beings had time to reach it, for alike as regards mammals, birds, reptiles, and flowering

Figure 2: a) Extract from *Our Own Islands* (Mackinder, 1907b); b) Extract from *Britain and the British Seas* (Mackinder, 1902)

Reclus's "literary" geography

Writing around the same period, the French anarchist geographer Elisée Reclus had quite a different conception of the human-environment relationship. For Reclus (1905, p.i), "Man is nature becoming self-conscious". This image in itself represents an accommodation of geography's integrative tradition to the evolutionary paradigm. Initially derived from his teacher Ritter's static, teleological analogy that "the earth is the body of mankind, and man is the soul of the earth" (Reclus, 1873, p.435), Reclus replaced the creationist logic with an evolutionary one – mankind was still engaged in an ongoing process of becoming progressively more conscious, progressively more able to act on the Earth, to improve it, as well as being acted on by it. The overriding principle of Reclus's vision, then, was not struggle but harmony, a principle that then exerted a major influence on his writing practice in geography. Firstly, Reclus's geography was not written for a political or intellectual elite, but for a united humanity striving towards progress.[25] Secondly, and crucially, the human consciousness was not separate from nature but rather its very expression. Thus, the inner world of human experience was integral to both the method and object of study, the result being a distinctive style of geographical writing that fused the cognitive, the emotional, and the sensual.

A "zoomed out" view of Reclus's geographical writing reveals an overarching logic comparable to Mackinder's "line of geographical argument", with a progressive shift in focus from the physical to the human. A trilogy of geographical texts are generally considered as his major works: *La Terre* (1868–1869)[26], a two-volume introduction to physical geography; *Nouvelle Géographie universelle* (1876–1894), a nineteen-volume encyclopaedic work subtitled "*la Terre et les Hommes*"[27]; and *L'Homme et la Terre* (1905–1908)[28], in which "man is nature becoming self-conscious" serves as the epigraph. However, as Lafaille (1989) has argued, a closer examination of Reclus's lesser-studied "literary"

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[25] Stoddart (1986) has shown how Reclus played a key role alongside his associate (and fellow anarchist geographer) Peter Kropotkin in "humanizing the new geography".

[26] Translated into English by B. B. Woodward as *The Earth* (Reclus, 1871).

[27] Translated into English by E. G. Ravenstein and A. H. Keane as *The Earth and Its Inhabitants* (1876–1894?). As Stoddart (1981, p.123, n7) notes, "the bibliography of this translation is very confused, because the publisher systematically omitted dates from his title pages".

[28] No English translation available.

texts is crucial to understand his approach to geography more fully. *Histoire d'un ruisseau* (1869)[29] – which was said to be Reclus's personal favourite work (Kropotkin, 1905) – and its sister text *Histoire d'une montagne* (1880)[30] have received relatively little attention in the geographical literature.[31] Yet their historical narrative style, tracing the more-than-human "stories" of a river from source to mouth, and of a mountain from formation to erosion, arguably represent the fullest and freest expression of an approach that Reclus applied throughout his writing (Kropotkin, 1905; Lafaille, 1989). In other words, his "literary geography" and his "geographical literature" can be regarded as two sides of the same coin.

Despite being branded as merely Romantic and fundamentally unscientific in several seminal histories of geography (Livingstone, 1992; Stoddart, 1986), deeper analyses of Reclus's work paint a more nuanced picture. In more specialised studies, his approach to geographical writing has been characterised as a "Romantic brand of science" (Robic, 2006, p.7), an unconventional mixing of genres that went against the nineteenth century movement to separate science from literature (Lafaille, 1989), and that was designed to arouse a "reasoned emotion" in its readers (Le Lay, 2008). Reclus's writing engages with the key concerns of scientific enquiry, as outlined by Mackinder and his associates: a search for natural laws, principles, and relations; an analysis of causes. These scientific preoccupations are particularly evident in *La Terre* and *Nouvelle Géographie universelle*, which are peppered with measurements, calculations and statistical analyses. But in these texts, as in the others, the ideas are presented in a manner that does not adhere strictly to the conventions

[29] No English translation available.

[30] Translated into English by B. Ness and J. Lillie as *The History of a Mountain* (Reclus, 1881).

[31] Broadly summarised, academic interest in Reclus can be grouped into three "waves" of publications. After the initial commemorations produced by his associates in the decades following his death in 1905 (Gallois, 1905; Geddes, 1905; Kropotkin, 1905; Nettlau, 1928, 1929; Schrader, 1905), Reclus was conspicuously absent from the geographical literature until the 1970s, with the exception of an introductory article by Mikesell (1959). The development of a critical current in geography in this period led scholars to recognise Reclus's role in the history of a broadly-defined, socially- and politically-engaged geography (Dunbar, 1978, 1981; Giblin, 1976, 1981; Lacoste, 1981a, b; Stoddart, 1975, 1981). After another period of relative absence following this second "wave", recent scholarship has engaged more deeply with the anarchist dimensions of Reclus's work. Springer (2012, 2013, 2016) has notably charted the history of anarchist geographies with reference to Reclus and Kropotkin, but Ferretti is currently the most prolific scholar of Reclus, having published two monographs (2014, 2018) and a co-edited collection (Ferretti et al., 2017) alongside numerous articles in French, English and other languages.

of “rational” scientific writing. Traditional scientific concerns are accompanied by traditional “literary” concerns with feeling and meaning, serving not only to paint a vivid picture of *places*, but also of physical-geographical *processes* in action (see Box 2).

Reclus’s writing style received a mixed reception among his contemporaries in the late nineteenth century. While his talent for evocative expression was widely praised, the praise itself was often somewhat ambivalent, tinged with critiques, more or less explicit, of a perceived superficiality. This is clear from Mackinder’s review of Reclus’s *Nouvelle Géographie universelle*, which represents a fascinating interfacing of two competing visions of the subject: “He is rarely profound, and never ventures beyond his depth. What he sees, however, he states forcibly, gracefully and vividly” (Mackinder, 1894, p.159). Mackinder continued (p.159):

> He spares no pains to “control” his authorities – to be true as well as graphic. It must be admitted that the French language lends itself admirably to the purposes of such a writer. When used by M. Reclus we have constantly to admire its fertility of resource for description, its insinuating delicacy when connecting cause and effect.

The implication that Reclus’s approach was in some way typically “French”, a language (and national character?) that would seem to embody style over substance, is echoed in an earlier review of the English translation of *La Terre* in *Geological Magazine*, which asserted that “French science is too poetical” and lacked a “solid background” (Jenkins, 1872, p.34). Despite these reservations, the reviewer concluded (p.34):

> The book before us well represents a French scientific compilation of the first rank, and its possession of the idealism characteristic of its nationality serves chiefly to invest its theme with a “harmony” and even with a “rhythm” which are not the less attractive because they are inconsequent.

Albeit presented in a more positive light, even Kropotkin (1905, p.341) considered Reclus’s work to have “a light veil of the poetical, imaginative mind of Southern France”. These English-language reviews make for an interesting comparison with contemporary French reviews, which readily reveal that Reclus’s style was far from typical, and was considered just as remarkable in the

Francophone context as it was in the Anglophone context. One review of the early instalments of the *Nouvelle Géographie universelle* noted that "Reclus breaks with the tradition of our geography textbooks" (Gaidoz, 1875, p.40). Another contrasted his style with "conventional", enumerative geography, affirming that "the form in M. Reclus's work is no less remarkable than the content, and his style, at times sober, at times full of imagery, and always clear, has a very personal character" (de Claparède, 1890, pp.283–284).

A recurring critique in early reviews of the *Nouvelle Géographie universelle* berated Reclus's failure to cite his sources according to scientific convention (de Saint-Martin et al., 1875; Gaidoz, 1875), but it appears that this criticism was taken into account in the later volumes, wherein, as Mackinder (1894, p.158) described, "every chapter is enriched for the student with a wealth of authorities accurately cited in notes". Similarly, Gallois (1905, p.374) highlighted Reclus's progressive mastery of the scientific method over the course of his career, remarking that "the last volumes are, from this point of view, greatly superior to the first ones". Interestingly, despite his well-known political affiliations, Reclus's commitment to scientific objectivity was rarely questioned. On the contrary, it was often praised: Gallois (1905, p.374) commented that "he never departed from a serene impartiality" in his scientific writing, Kropotkin (1905, p.343) commended his "absolute disinterestedness", and Mackinder (1894, p.159) even judged that "M. Reclus' philosophic views have an influence mainly good on his geography … they give to his judgements a detachment and freedom from current prejudices which are invaluable". Overall, Reclus's atypical integration of science and literature met with some success. While some considered his style inherently reductive or simply outdated, for others it represented a harmonious association – an "intense energy of both feeling and thought" (Kropotkin, 1905, p.341). For his admiring colleague Patrick Geddes, Reclus's work "raised anew geography into literature", a step forward that ought to be replicated elsewhere in science, "even for its own sake as well as for the world's" (Geddes, 1905, pp.494–495).

Indeed, Geddes's comment speaks to a central element in Reclus's literary geography: its capacity to engage a general audience in scientific ideas. This element was partly a matter of principle: presenting geographical knowledge in

the restrictive, formal language of science would have been antithetical to his anarchist ideals, and so he was a vulgariser by conviction. But as Lafaille (1989) and Alavoine-Muller (2013) show, it was also a matter of editorial pressure. It is important to remember that Reclus was, above all, a popular geographer, working outside of institutionalised academic geography.[32] Despite their differing motivations, Reclus and his publishers shared the same objective: to have his work read by the greatest number. He thus operated under different stylistic constraints than university-based geographers.

An analysis of Reclus's correspondence with his editor at Hachette, who published the *Nouvelle Géographie universelle*, reveals the latter's dissatisfaction with the "rigorously didactic" style of an early draft (Templier, 1872, cited in Lafaille, 1989, p.451). The editor warned that such a book would not achieve commercial success, and firmly set out his requirements: "It is not a simple schoolbook or reference book that I want from you. It is a literary work, a sort of poem in which the Earth is the heroine" (p.452). Reclus agreed to make some modifications "in order to make my work more interesting and lend it a literary character, without diminishing its scientific value" (p.452). The commercial and critical success that his work eventually enjoyed was therefore a joint endeavour, with the stylistic impetus coming at least as much from a form of editorial censorship as from Reclus's geographical genius. Earlier, when working on *Histoire d'une montagne*, Reclus had confessed in a letter to his editor Hetzel that he was struggling with the task of maintaining scientific accuracy while writing with artistic flair: "Like in German meals, I have to serve the meat and the jams at the same time" (Reclus, 1871, in Ferretti, 2012, pp.88–89). This reflection concisely encapsulates the challenges of writing an integrative geography, which would go on become a persistent theme in debates as the discipline developed.

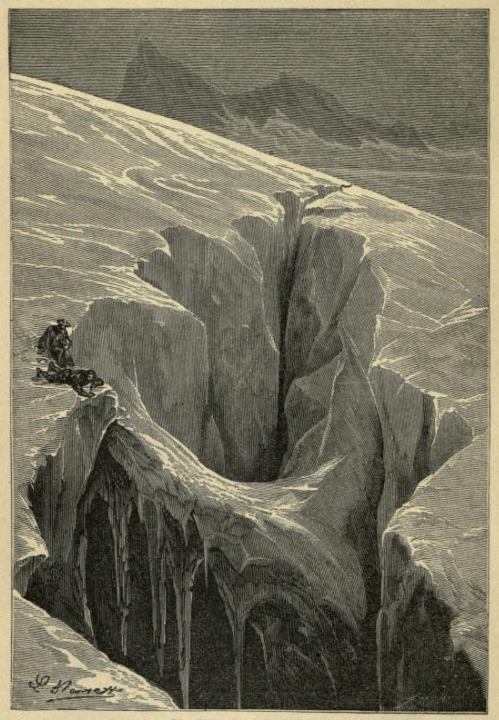
[32] See Mikesell (1959) and Dunbar (1978, 1981) for English-language biographies of Reclus.

Box 2: Reclus writes glaciers

Reclus's *History of a Mountain* was originally published in French as part of Pierre-Jules Hetzel's "Bibliothèque d'Education et de Récréation", an educational series with accessible, "storied" contributions from authors of all disciplines, for learners of all ages (Cornuault, 1995). *Histoire d'une montagne* would later be adopted as a prize book for the schools of the French Third Republic (Cornuault, 1995) – a curious fate for a book written in political exile. *The History of a Mountain*, like its (untranslated) companion text *Histoire d'un ruisseau* ("History of a Brook"), treats the physical feature under study in the abstract. In contrast to Mackinder's division of the world into politicised territories of "us" and "them", Reclus's geography is universal: the history presented could be of any mountain, any river, in any location. The extract in Figure 3a) illustrates Reclus's writing style in more detail.

Rather than using photographs of real-life mountains, Reclus provides artists' illustrations of the idealised mountain, thereby preserving its universality. The illustration facing page 97 depicts abstract human figures peering down the abyss of a glacial crevasse, inviting the reader to imagine themself in their position. The foregrounding of subjective experience continues on page 97, through a textual description which is rich in adjectives and metaphors. The glacier's movements are "barbaric"; its forms are "curious" and "fantastic", resembling "obelisks", "towers", "a labyrinth". Even the glacier is instilled with an anthropomorphic agency ("it knows how to mould itself").

While the corresponding passage in Reclus's earlier, "general audience" treatise on physical geography, *The Earth*, is accompanied by scientific diagrams rather than artistic illustrations, the language does not display the objectivity that might be expected from a text that is ostensibly more "geographical" than "literary" (see Figure 3b)). If anything, the presentation is more subjective than in *The History of a Mountain*. The invitation to imagine oneself on the edge of a glacial crevasse comes this time from the text, evoking an experience that is both emotional ("one feels a kind of dread") and multi-sensory ("unfathomable to the eye", "a vague murmur of running water", "sharp gusts of cold and biting air"). The metaphors are even more vivid, comparing the ice forms to animate beings ("knights clad in their armour", "strange animals"). Similarly to *The History of a Mountain*, *The Earth* focuses on process rather than place, although it does make passing reference to specific examples.



GLACIER AND CREVASSE.

according to the form of its bed, the ice adapts itself to the dimensions of the ravine containing it. It knows exactly how to mould itself upon the rock, as well in the vast basin whose walls widen out on either side as in the defile, where the passage almost closes up. Impelled by the masses, incessantly fed by the upper snow, the glacier continues to slide upon the bottom, the incline of which is almost insensible, or else forms a succession of precipices.

But the ice, not possessing the suppleness, the fluidity, of water, accomplishes, with a somewhat barbaric awkwardness, all the movements forced upon it by the nature of the ground. It cannot, at its cataracts, fall in one level sheet as does the water current; but, according to the inequalities of the bottom and the cohesion of the ice crystals, it fractures, splits, gets cut up into blocks inclining various ways, falling over one another, becoming cemented together again in curious obelisks, towers, fantastic groups. Even in that part where the bottom of the immense groove inclines with tolerable regularity, the surface of the glacier does not in the least resemble the even surface of the water of a river. The friction of the ice against its edges does not ripple it with tiny waves similar to those of the shore, but fractures and refractures it with crevices, intersecting one another in a labyrinth of fissures.

In winter, and even when spring has already renewed the ornamentation of the lower countries, a great number of crevasses are concealed beneath thick masses of snow, extending in continued layers along the surface of the glacier; then, if the granulous snow has not been softened by the sun's heat, it is easy to walk above the

it becomes one of those formidable chasms which gash the surface of the glacier.

When the *crevasses* have arrived at their full development, they exhibit a most striking spectacle. The two bluish walls sink down into darkness which is unfathomable by the eye; stones, falling from the surface, bound over the projections, and awaken dull echoes as they are lost in the obscurity; a vague murmur of running water ascends from the depths; and sometimes sharp gusts of cold and biting air issue out from the mouth of the abyss. While leaning over the brink of the gaping chasm one feels a kind of dread, as if the noises and darkness of the gulf beneath belonged to some new world, full of mystery and horror.

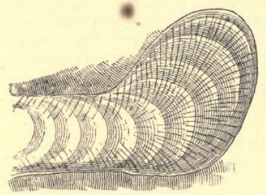


Fig. 56. Frontal or Terminal Crevasses—after Tyndall.

When the *crevasses* are numerous, and intersect one another in various directions, it often happens that masses which are thus isolated, and are also of a more compact nature, resist for a longer period the action of the sun and wind. In consequence of all these inequalities, and, doubtless, also on account of the difference in pressure operating at the base, the ice, in some spots, assumes the most picturesque and fantastic shapes. Sometimes these blocks resemble knights clad in their armor, sometimes strange animals, broken statues, pointed clock-turrets, or ruined colonnades. Tourists ask with astonishment how it is that nature, by nothing but the slow operations of the forces of gravity and pressure, the winds, and solar rays, is able to carve out the ice into groups so remarkable both for their regularity and grotesqueness. The tower-shaped forms which crown some of the abrupt falls of the glaciers have received from the Swiss mountaineers the name of *sérac*; a term which reminds one of the *sérets*—cheeses which split up into small cubical pieces.

In the lower portion of the glacier surface the walls and pillars, which are divided from one another by fissures, seldom show perpendicular sides. Their faces which are turned toward the south become wasted and worn away, and thus assume the appearance of enormous congealed waves. When the great river has this furrowed surface, it really becomes a "sea of ice." Owing to the more rapid motion of the upper layers, it generally happens that the ice-waves present their steepest face in a downward

Figure 3: a) Extract from *The History of a Mountain* (Reclus, 1881); b) Extract from *The Earth* (Reclus, 1871)

Quantification and quality in the mid-20th century

Geography became well established as an academic discipline during the early decades of the twentieth century. Yet by the middle of the century, it once again found itself facing institutional threats that forced a re-evaluation of its disciplinary identity. With environmental determinism effectively discredited as an explanatory framework for the study of human-environment relations, Anglo-American geographers in particular struggled to claim new intellectual ground for the subject (Smith, 1989). Geography's status as a university subject was questioned in the UK (David, 1958) and the US, where Harvard president James Conant's contention that "geography is not a university subject" led to the notorious closure of its geography department in 1948 (Smith, 1987). As Smith (1987) argues, the localised events at Harvard were indicative of wider weaknesses in the discipline, particularly its ongoing inability to specify a unified and unique field of study. On the one hand, there were debates over the possibility of an independent human geography, which, for Harvard geographer Isiah Bowman, could only ever "skim off the top of the other sciences", could never be anything but "descriptive, fragmentary and 'easy'" (cited in Smith, 1987, p.162). On the other hand, those who, like Bowman, insisted on the unity of physical and human geography, and rationalised the discipline in terms of synthesis, found it difficult to distinguish geography from other disciplines beyond its ability to offer a vaguely-defined "geographical perspective" (Smith, 1987).

While Richard Hartshorne had attempted to delineate a specific vision of geography as "areal differentiation" in his seminal treatise on "The nature of geography" (1939a, b), with the "regional concept" as its core, critics challenged the quality of the work produced in this vein. For David (1958, p.270), the features of areal differentiation were too diverse to be synthesised effectively: "In practice, the geographer making a regional study is forced to parade *seriatim* the facts of relief, climate, economic geography, etcetera, drawing attention where he can to related phenomena". Similarly, Livingstone (1992, p.311) observes that work in this period often "degenerated into a plodding, enumerative exercise", while Stoddart (1972, p.301) describes it as "an exercise in the classification of areas, involving as an afterthought problems of observation and function".

In the face of these challenges to the discipline, debates over the future direction of geographical study became extremely polarised. Alongside broader questions about its methods and theoretical foundations, writing practices were a key focus. Arguably, the very practice of writing was itself called into question as a means of representing geographical information during this period. While the contributions to these debates were undoubtedly complex and multifaceted, in this section I will group them broadly into schools of thought that emphasised either "scientific" or "artistic" approaches to addressing geography's perceived shortcomings. More specifically, I will examine the arguments for another "new geography" that prioritised numerical strategies during the quantitative revolution of the 1950s and 1960s, as set against the arguments for maintaining and enhancing textual description as a primary mode of representation.

Systematic geography and spatial science

Five years after the closure of the Harvard geography department, the *Annals of the Association of American Geographers* posthumously published a paper by Iowa geographer Fred Schaefer on "Exceptionalism in Geography" (1953). Schaefer's paper comprised a direct attack on Hartshorne's "The nature of geography" (1939a, b). It criticised Hartshorne's "exceptionalist" claim that geography held a unique disciplinary status, and argued instead for a re-orientation of geography's objectives and methods towards those found in the other sciences: namely, a search for laws through systematic enquiry. While he recognised the utility of regional geography, he firmly rejected Hartshorne's view that it represented the essential nature of the subject. For Schaefer (1953, p.240), Hartshorne's promotion of a historically-informed mode of explanation represented a conception of geography that was "essentially idiographic", wherein study was limited to describing the unique. Hartshorne fiercely disputed these charges in a series of responses (Hartshorne, 1954, 1955, 1958, 1959). Although the two positions were arguably not as radically opposed as they might seem, for a new generation of geographers in the 1950s, the "Hartshorne vs Schaefer debate" came to represent the battle between an outdated, idiographic, descriptive geography on the one hand, and an innovative, nomothetic, scientific geography on the other (Livingstone, 1992). Schaefer may not have been the first to call for such a change in direction, but his

contribution crystallised the key demands of a movement that became known as the “quantitative revolution” (Livingstone, 1992).

As the name implies, the quantitative revolution in geography was associated with the increased use of quantitative measures and mathematical techniques. Yet for many of its participants, this term failed to capture the full scope and ambition of the movement. For Peter Gould (1979a, p.140), it was a “disastrous misnomer”, applied by “threatened traditionalists” who “misread the signs and pinned on the wrong labels”. In his view, “it was not the numbers that were important, but a whole new way of looking at things geographic” (Gould, 1979a, p.140). Similarly, Ian Burton (1963, p.156) emphasised that the revolution was not inspired by “quantification for its own sake”, but “by a genuine need to make geography more scientific, and by a concern to develop a body of theory”. The major aim of the revolution, then, was essentially to instigate a paradigm shift in geography – although this terminology was not available to early quantifiers, the publication of Kuhn’s *The Structure of Scientific Revolutions* (1962) provided a model from the philosophy of science that could later be used, perhaps somewhat disingenuously, to “legitimise the quantitative revolution as a genuinely scientific revolution” (Barnes, 2009, p.612).

This turn towards the philosophy of science was a key characteristic of the movement, with clear implications for geographical writing. Akin to during the initial institutionalisation of the discipline in the late nineteenth century, there was a renewed focus on the scientific method, with the accompanying aspirations towards rigour and objectivity. In particular, and as Burton (1963, p.156) evoked, the “concern to develop a body of theory” was central to the project. Quantitative geographers turned to statistical methods of theory-building, believing them to be the “most rigorous” tools available (Burton, 1963, p.157), while the explanatory power of such theoretical models was contrasted with the inadequacy of the “mere description” that Schaefer (1953) criticised in regional geography. Both Schaefer (1953) and Burton (1963) recognised the importance of description as a “first step” in the scientific method, but highlighted its inherent selectivity as a weakness since it necessarily involved the subjective judgement of significance. Conversely, theory was held to provide an objective measure of what is significant: “Theory provides the measure

against which exceptional and unusual events can be recognised. In a world without theory there are no exceptions; everything is unique" (Burton, 1963, p.156). Crucially, statistical methods, particularly inferential statistics, offered a means to test the validity of theories by evaluating their predictive capacity in different contexts (Burton, 1963). The shift towards an increasingly probabilistic approach marked a partial departure from the mechanistic, deterministic approach of nineteenth-century geography.

All of this involved the incorporation of a new vocabulary in geographical writing, drawn from the language of mathematics and the philosophy of logical positivism. An important function of this linguistic shift was ostensibly to eliminate value judgements from the geographical discourse (Livingstone, 1992). The objects of study were recast as variables that could be analysed through calculations (see Box 3 for an example). Burton (1963) claimed that this was the best way of approaching complex geographical information, while for Gould (1979b) algebraic languages were at times "the *only* forms capable of describing complexity with any degree of depth" (p.133, emphasis in original). And so, as Livingstone (1992, pp.327–328) puts it, "the spatial language of surfaces, diffusion, movement, nodes, channels, and the like became geographical vernacular, while regression methods and principal components and factor analyses became, at least for some, the insignia of the scientific geographer".

The role of this linguistic "insignia" in the development of geography as a spatial science should not be underestimated. In his sociological account of the quantification debate, Peter Taylor (1976, pp.134–136) identifies the exclusionary nature of mathematical language as a factor in the "explicit creation of a generation gap", whereby young researchers could achieve "prestige by association" with a "scientific image" that older researchers could not keep up with. This led Livingstone (1992, p.326) to conclude both that "numerical language was adopted by practitioners lusting after scientific credibility" and that, ultimately, "the quantitative methods that geographers espoused turn out to have been rhetorical devices of persuasion by which the scientific authority of their assertions could be reinforced".

Box 3: Chorley writes glaciers

As Morisawa (1988, p.1020) observes, "quantification took place early in glaciology". In the early 1950s, the physicist John Nye (1951, 1952) published two papers on the mechanics of glacier flow, and an influential paper by Arthur Strahler (1952) set out a broader vision for "a system of geomorphology grounded in basic principles of mechanics and fluid dynamics" (p.923). The application of statistical techniques during the quantitative revolution led to the rise of "numerical morphometry" – the numerical description of landforms – in glacial geomorphology (Whalley, 1985, p.19). One of the earliest morphometric studies was Richard Chorley's (1959) paper on "The Shape of Drumlins".

Chorley developed his ideas with colleagues in several book-length publications including *Physical Geography: A Systems Approach* (Chorley and Kennedy, 1971), and *Geomorphology* (Chorley et al., 1984). The former text explicitly acknowledged its debt to Strahler and was one of the first to bring together systems-based research findings in a textbook-style format. The latter aimed to outline "a unified scientific philosophy of the discipline … which encompasses systems notions such as equilibrium, feedback, process-response and thresholds" (Chorley et al., 1984, p.xvi). The preface also engaged with contemporary debates over the subject matter of geomorphology: specifically, "whether it should deal with *landforms* as the central objects of study or whether emphasis should be placed on the study of observable *processes*, which seems to be so much in harmony with current preoccupations with scientific observation and measurement, environmental management, and applied geomorphology" (Chorley et al., 1984, p.xvi, emphases in original). An extract from the later text is presented in Figure 4.

In this extract, glacier flow is described in terms of the physical forces of stress and gravity. The processes are abstracted mathematically (through equations to calculate shear stress and strain rate) and visually (through a diagram of component processes). No reference is made to specific glaciers; instead the processes are presented as in an "ideal glacier", following Nye's (1951) example. Several paragraphs are dedicated to the laboratory-derived "Glen's Law" and its testing in field studies. While the author does guide the reader's interpretation of these abstractions (highlighting the "important conclusion" and the "significance of the relationship"), the extract is typical of scientific writing in its deemphasising of the authorial voice: it essentially presents a "view from nowhere", devoid of judgement or emotion.

17.3 Glacier flow

A glacier flows because it deforms in response to stress set up in the ice mass by the force of gravity. Any point within the glacier is subjected to stress as a result of the weight of the overlying ice. This stress can be envisaged as having two components – hydrostatic pressure and shear stresses. The hydrostatic pressure which is related to the weight of the overlying ice is the same in all directions. It is the shear stresses that cause particles to slip past one another and they are related to both the weight of the overlying ice and the surface slope of the glacier. The shear stress at a point can be calculated from the equation:

$$\tau = \rho g h \sin\alpha$$

where: τ is the shear stress
ρ is the density of ice
g is the acceleration of gravity
h is the thickness of the glacier
} weight
α is the slope of the upper glacier surface.

The important conclusion is that shear stresses vary according to the thickness of the glacier and the surface slope, with high values formed by thick ice or a steep surface slope. In practice, ice deforms under relatively low shear stresses and calculations for a wide variety of glaciers suggest that shear stresses generally vary from 0 beneath an ice divide with horizontal surface to 1·5 bar (150 kPa) on steep glaciers.

Glacier flow consists of three groups of processes which are conveniently described under the headings internal deformation, basal sliding and bed deformation (Figure 17.6).

17.3.1 Internal deformation

The fundamental mechanism of internal deformation is

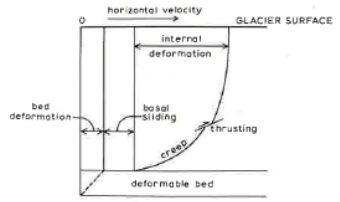


Figure 17.6 The component processes leading to glacier flow.

creep, whereby there is mutual displacement of ice crystals relative to one another. The rate of deformation or *strain rate* of ice has been studied in the laboratory and the results form the basis of what is termed Glen's Law (Glen, 1955). The behaviour of ice under stress can be approximated by the power function $\dot{\varepsilon} = A\tau^n$, where $\dot{\varepsilon}$ represents the strain rate, A is a constant approximating to the temperature of ice; τ is the effective shear stress and n is an exponent with a mean value of 3. The significance of this relationship is that it demonstrates that the rate of deformation is highly sensitive to changes in the shear stress, for example, a doubling of the shear stress will increase the rate of deformation eightfold. Also the rate of deformation is related to ice temperature, though less sensitively, and for example declines fivefold with a temperature reduction from −10°C to −25°C.

Application of Glen's Law gives important insights into glacier behaviour. It explains why most deformation takes place in the basal layers of a glacier where shear stresses are highest. It explains how there is movement within cold-based glaciers which are unable to slide. Also it explains the apparent weakness of ice in that it is unable to withstand high shear stresses without deforming. In several field tests Glen's Law seems at face-value to underestimate the softness of basal ice which appears to deform more easily than predicted. It is likely that the higher than expected plasticity reflects factors such as crystal orientation, longitudinal compression, deformation history and debris content, all of which are active areas of current research.

Larger-scale mechanisms of internal deformation are folding and thrusting. Sections through folds can often be seen in marginal ice cliffs and also picked out in patterns on glacier surfaces. They reflect differential flow down the length of a glacier induced either by variation in ice discharge or in the drag induced by the glacier bed. Under certain conditions creep cannot adjust sufficiently to the stresses within the ice and faults occur. In zones of longitudinal tension, as in ice falls, a succession of rotational slips may occur and account for a considerable proportion of glacier movement. In zones of compression overthrusting may occur. Such thrust planes can be observed in glacier cliffs or in the dislocation of such features as englacial meltwater tunnels or crevasses.

Perspective on the longitudinal distribution of such zones of longitudinal tension and compression is given by Nye (1952) (Figure 17.7). Compressive flow describes a situation where the longitudinal stress is compressive throughout the depth of the glacier and is marked by a reduction in forward glacier velocity. Extending flow describes a situation where the longitudinal stress is more

Figure 4: Extract from *Geomorphology* (Chorley et al., 1984)

Regional geography and the art of description

Faced with the same accusations of academic inadequacy in the mid-twentieth century, another group of geographers turned to entirely different sources for solutions. Rather than seeking to strengthen geography's scientific credentials, they called for greater integration with the arts and humanities. One of the earliest – and perhaps unlikeliest – proponents of this approach was none other than Halford Mackinder. His nineteenth-century criticism of a descriptive, inventory-style geography that could "never be a discipline" (Mackinder, 1887, p.143) still resonated some fifty-five years later, but his revised definition of geography as "an art of expression parallel to and complementary to the literary arts", in a 1942 address to the Geographical Association, signalled a marked departure from his earlier "scientific" vision (Mackinder, 1942, p.129). Another pioneer of the artistic approach in geography was John Kirtland Wright, whose concept of "geosophy" – "the study of geographical knowledge from any or all points of view" – inspired a whole tradition of humanistic geography concerned with exploring the "*terrae incognitae*" of the human mind (Wright, 1947, p.12).[33]

In terms of geographical writing, especially with respect to the contentious issue of geographical description, many geographers in this alternative tradition viewed creative writing as a source of inspiration. In an inaugural lecture on *Geography as a Humane Study*, E.G. Gilbert (1955, p.21) proposed that "if geography is to be regarded as one of the humanities, greater attention should be given to the quality of its writing", remarking furthermore that "some novelists have provided a more faithful description of the regions of England than the geographers". Similarly, Hugh Prince (1962, p.24) outlined the value of literary descriptions of regions for articulating "important truths" that "cannot be verified" in quantitative terms: "The blatant fictions … illuminate important themes; they particularize generalities". Later, Donald Meinig (1983, p.325) would take these arguments further, with his provocation that "geography will deserve to be called an art only when a substantial number of geographers become artists". Meinig was dissatisfied with what he perceived as geography's

[33] Humanistic geography came to prominence in the 1970s through engagements with phenomenological perspectives on place (Buttimer, 1976; Relph, 1970, 1976; Seamon, 1979; Tuan, 1971, 1974a, b), and examinations of personal values in geographical research (Buttimer, 1974). Key introductory texts include Tuan (1976) and Ley and Samuels (1978).

"subordinate and parasitic" position in relation to the arts: "Literature remains for us a resource, something we borrow from rather than contribute to, something we use rather than something we create as part of the vocation of geography" (1983, p.318). His vision of the geographer as artist represents a radical alternative to both the "scientific" and "synthetic" conceptions of the discipline circulating at the time. Yet whether these geographers viewed literature as inspiration and/or aspiration, the quantitative revolution and its aftermath created an imperative to reinterrogate and rearticulate the value of textual description to communicate geographical information (see Box 4 for an example).

One feature that distinguishes textual forms of expression from visual and, to some extent, numerical forms, is their inherently sequential nature. Interestingly, even among geographers who supported a more artistic approach to geography, this quality was viewed variously as a weakness or a strength. Despite his association of geography with the *literary* arts specifically, Mackinder stated that "it is the essential limitation of literature that it must make its statements in sequence to the mind's ear, whereas geography presents its map to the mind's eye and states many facts simultaneously" (1942, p.124). Mackinder's preoccupation with geography as a "visual way of thinking" (1942, p.124) is consistent with his earlier writings, but his later reflection recognised the limitations of this approach. The "fundamental problem of geographical imagery", he writes, is that it is "synchronous": it "should depict the pattern of phenomena as that pattern exists at a moment of time", and thus struggles to capture the "shapes of fluid circulations", such as annual fluctuations or the evolution of landscape over geological timescales (1942, p.125).

For precisely this reason - but without referring to Mackinder's earlier piece - Darby (1962, p.7) suggested that verbal description is an ideal method of presenting geographical information as a "thing in process" as opposed to a "complete thing". Since "any scene is on the way to becoming something different, and is in the process of adding its quota to the explanation of some succeeding scene" (1962, p.12), geography is required to go beyond "mere description" and ought to aim towards "explanatory interpretation … something arising from the very nature of verbal as opposed to pictorial representation"

(1962, p.7). Just as Mackinder (1942, p.125) acknowledged that geographical phenomena can "exist only in the complete continuum of space-time", Darby (1962, p.12) asserted the "necessity" of "a historical ingredient in geographical description". It is notable that both Mackinder and Darby's arguments centre around the differences between textual and visual representation, while largely ignoring numerical alternatives. This omission is particularly conspicuous in Darby's paper, published just one year before Burton (1963, p.151) declared the quantitative revolution "over", in the sense of having successfully "overthrown" the established order.

Other debates around the humanities-inspired approach targeted quantification more directly. A key focus of these debates was the accessibility and clarity of different forms of expression. As has already been noted, some critics of quantification argued that its *in*accessibility was a deliberate strategy to exclude academic opponents from the terrain of geographical discourse (Taylor, 1976). While not all commentators went so far as to suggest malicious intent, many shared Taylor's concern with a perceived decrease in the clarity of geographical writing. Gilbert (1955, p.21), for example, lamented that "modern geographical jargon becomes more and more difficult to comprehend", while Oscar Spate (1960, p.388) complained of trivial information being disguised behind a "smoke screen of formulae" by which "the uninitiate may be completely bluffed". For others, this concern extended beyond the academic realm and into educational and popular contexts. Indeed, in a later contribution – albeit one evidently fighting much the same battles as were Gilbert and Spate – John Fraser Hart (1982b, p.20) argued the case for textual regional description as an essential tool for communicating geographical information to the general public, who, he claimed, are (or ought to be) geographers' "primary audience". In Hart's view, "description in the austere and mechanical symbols of mathematics may be extraordinarily efficient … but its very precision robs it of the rich nuances and subtle shadings that are possible with words" (1982b, p.27).

Hart's proposals for a renewed regional geography, delivered during his presidential address to the Association of American Geographers in 1981, were met with fierce opposition from those who viewed it as a call to "return to the nonscientific dark ages of thirty years ago" (Golledge et al., 1982, p.558) or to

"reconstitute the discipline along solidly traditional lines" (Healey, 1983, p.439) – accusations that Hart dismissed across a series of responses as misrepresentations of his position (Hart, 1982a, 1983). Subsequently, the implication that a literary-inspired writing style is necessarily clearer or more accessible than other forms of expression was contested by Mark Billinge (1983) in a diatribe against what he termed the "Mandarin dialect" in geography. Writing chiefly in response to a mature tradition of humanistic geography, he criticised a pervasive writing style that was florid to the point of obfuscation: "It has balance and élan, passion and commitment, it has imagery, metaphor, simile and hyperbole, flamboyance and energy – in fact everything save honesty of intention and meaning" (1983, p.400). Ironically, his critiques of disguised triviality parallel those levied against quantitative geography by Spate (1960) and Taylor (1976), but Billinge contended that the "Mandarin" case is "more subtle and more unpleasant … subtle because it appears a return to straightforward normality (to the language of everyday communication: a form of English); unpleasant because it does no such thing" (1983, p.403).

As Billinge (1983, p.400) acknowledged, this style of writing emerged at least partly in response to "the flat homogeneity of an earlier period". Indeed, earlier calls for a more creative approach to writing often centred around criticism of a dominant technical style that was described as "crusty" (Wright, 1947, p.7), "dry" (Prince, 1962, p.25; Tuan, 1957, p.9) and "arid" (Lowenthal, 1961, p.258). For this group of geographers, good geographical writing should stimulate the reader's imagination and evoke a vivid picture of the area being described (Gilbert, 1955; Prince, 1962; Wright, 1947). Such imaginative evocations were also held to be more memorable than "matter-of-fact" accounts (Lowenthal, 1961, p.258). Wright (1947, p.8) shared a personal example of how a well-turned phrase evoking "the awful aridity of Sinai" has "stuck in my memory for forty years", adding that he considered the use of figurative and emotive language as "legitimate", if not necessarily "desirable", when crafting such geographical descriptions. Similarly, an early article by Yi-Fu Tuan (1957, p.10) – written during his doctoral studies in geomorphology and before his postdoctoral fellowship in statistics – advocated the use of simile and metaphor because of their ability to "give a vivid description" and "render briefly and clearly ideas that might otherwise require lengthy exposition". Tuan (1957) also highlighted

the fluidity of language, that may begin as metaphorical and then become absorbed into technical vocabulary over time.

Both Wright and Tuan nonetheless cautioned readers against reckless use of these devices. Wright (1947) drew attention to the importance of cultural context in determining responses to landscape – in the case of the example cited above, "the Bedouins of Sinai may take its dryness as a matter of course" (p.8) – but maintained that evocative language remains legitimate "provided that the images that such words evoke in the reader's imagination correspond to the impressions that the majority of readers would receive in the presence of the phenomena described or exposed" (p.8). In his view, this issue did not represent a major obstacle in geography, since "geographical works are intended to be read by persons who share a more or less common cultural heritage and whose subjective responses to like stimuli are similar" (Wright, 1947, p.8). Tuan (1957), on the other hand, warned of the danger that a poorly-chosen textual image may unintentionally "convey a wrong idea" (p.10), and too of the risk of confusion from "worn-out" metaphors that no longer evoke a clear image (such as those that have been absorbed into technical vocabulary) (p.11). He concluded, therefore, that "literary devices must always be used sparingly and with a definite purpose" (p.10). Wright (1947, p.8) likewise urged a "discriminating and restrained" use of such devices that take care to avoid creating "false impressions".

Ultimately, while mid-century quantifiers aspired to remove value judgements from geography, the advocates of a more humanistic approach argued that it was precisely these judgements that gave the discipline its meaning and purpose. Mackinder (1942, p.128) provides an early exposition of this view, albeit one characteristically tinged with nationalistic sentiment:

> You may devote your life to the study of a purely Physical Geography, or even of some one branch of that fascinating bundle of scientific applications, and may render good service in so doing, but, as an element in the culture of a nation, only its humane crown can give broad significance to Geography. It is as mental foundations for judgement in action that geography, history and literature have their function.

Similarly, while some geographers were convinced of the necessity of statistically-derived "theory" in order to "measure" significance (see Burton, 1963), others explored the subjective interpretation of significance.

Even within this latter group, there was a diversity of opinions on the appropriate balance of subjectivity and objectivity in geographical writing. For Mackinder, it would seem that the objective was essentially subordinate to the subjective in his later vision of geography: "It integrates its conclusions from the human standpoint and so departs from the objectivity of science, for it ranges values alongside of measured facts" (1942, p.129). In contrast, Wright (1947) concluded that "the subjective should be used only to point up the objective" (p.9), even as he acknowledged that directly opposing subjectivity and objectivity is "mistaken" (p.5). David Lowenthal (1961, p.258) called for an integration of the two elements, stating that "all knowledge is necessarily subjective as well as objective", be it "scientific" or "lay". Others speculated that the subjective and the objective intervened at different stages. Tuan (1957), for example, specifically recommended using imagery to paint a vivid picture of landscapes "*prior to* analysis" (Tuan, 1957, p.11, emphasis added). Likewise, for Prince (1962), the "impelling motive" of geographical description should be "esthetic and poetic" (p.23); the "subjective view" is "the essence of the art of description" but "has no place" in geographical explanation (p.25). Overall, the incorporation of subjective experience into geographical writing was still treated with a substantial degree of hesitation, even suspicion, during this period. This is also evident in later appeals for "disciplined emotion" (Meinig, 1983, p.323) and "disciplined imagination" (Billinge, 1983, p.416), reflecting a will to limit or control subjective elements that was shared by authors with quite different views on geography's artistic status. Moreover, while it was generally considered legitimate to appeal to subjective experience in descriptions of place, few advocated applying this practice to explanations of process.

Box 4: Wooldridge writes glaciers

Sidney William Wooldridge was a late defender of a traditional approach in geomorphology. This is made explicit in the preface to the second edition of his introductory text *An Outline of Geomorphology: The Physical Basis of Geography* (Wooldridge and Morgan, 1959). Of an increasingly quantitative approach, he and co-author R. S. Morgan write (1959, p.v):

> There has been a recent attempt in certain quarters to devise a "new" quasi-mathematical geomorphology. At its worst this is hardly more than a ponderous sort of cant. The processes and results of rock sculpture are not usefully amenable to treatment by mathematics at higher certificate level. If any "best" is to result from the movement, we have yet to see it; it will be time enough to incorporate it in the subject when it has discovered or expressed something which cannot be expressed in plain English.

An extract from the text illustrates their "plain English" approach to writing (Figure 5). Instead of framing glacial processes in terms of testable theories and "laws", they are framed in terms of "arguments". Attention is drawn to historic and contemporary debates between geomorphologists, who are referred to by name and not through formal citation of specific sources. In this way, the socially contested nature of knowledge construction is foregrounded. The authorial voice is personal ("we", "our") and the tone is somewhat conversational ("of course", "obviously").

The descriptions of glacial processes engage with the reader's subjective experience through figurative language. Subglacial landforms and glacial ice are personified: the former may be "spared by" later erosion (p.334), the latter "armed with" rocks (p.334). Several metaphors are used, although their enclosure in quotation marks sets them at a distance from the main narrative (e.g. in reference to debates over the potential of glacial ice to "excavate" or "dig" (p.334)). Isolated metaphors are then developed into the fuller analogy of the "lead chisel" (p.334). The discussion of "plucking" on page 335 provides an example of a metaphor that is absorbed into technical language over time, reflected in the removal of quotation marks in the second use of the term.

The resistance to quantification is evident in this passage. As in the preface, different perspectives are evaluated using emotive language ("ridiculous" (p.335)). Quantities are expressed only in relative, approximative terms ("moderate angles" (p.335), "a duration many times that of post-glacial time" (p.335)). Overall, there is a clear focus on landforms (as illustrated in the diagram), which resists the shift towards process that was instigated in the early 1950s.

[Figure has been removed due to Copyright restrictions.]

Figure 5: Extract from *An Outline of Geomorphology* (Wooldridge and Morgan, 1959)

Culture and creativity in the late 20th century

Towards the end of the twentieth century, the turmoil over geography's disciplinary and institutional status had largely subsided, but in the process geography had become an essentially divided subject. Although human and physical geographers often continued to be housed within the same university departments, contributing to the teaching of the same degree programmes, their research practices were often radically different and even opposed. The divergence of the two branches during this period in terms of theories, methods and concepts was described by Naylor (2000, p.261) as a moment of "real rupture" – and a source of conflict - in the history of the discipline. This trend could already be observed in the immediate aftermath of the quantitative revolution, when, as Tadaki et al. (2012, p.556) put it, "hopes for methodological 'glue' in the form of parallel quantitative methods were dashed" by the emergence of Marxist and humanistic traditions in human geography. Both traditions drew on theories and methods from the social sciences and humanities broadly conceived, but Naylor (2000, p.261) especially attributes the "rupture" to the introduction of "cultural, social and feminist theory" in human geography from the late 1980s during what came to be known as the "cultural turn".

From this point onwards, the development of the human and physical "subdisciplines" appeared to be fundamentally irreconcilable (Tadaki et al., 2012, p.553):

> While human geography was being revolutionised down to its political foundations, physical geography underwent a revolution of technique developments, employing new technologies for process-based measurements and characterised by the mantra, "if it moves, measure it" (Trudgill 2003, 272).

Just as the scientific aspirations and principles of the quantitative revolution had been embraced in physical geography, human geographers were embracing new extra-disciplinary influences. These changes also manifested in highly differentiated publishing practices. Physical and human geographers alike were increasingly disseminating their work via non-traditional, non-geographical channels: in specialised science journals in the case of physical geography

(Johnston, 2003), and in books marketed under the generalised genre of "cultural studies" in the case of human geography (Barnett, 1998a).

At the same time as this divergence was playing out in academic spheres, growing awareness of anthropogenic environmental crises led many to question the extent to which the human and physical could or should be separated – not just within geography, but also in popular understandings of the world. This awareness provoked a degree of reconvergence in topics of interest to human and physical geographers. Human geographers displayed a renewed concern with the natural world, in line with Demeritt's (1994, p.170) contention that "science is too important to be left to just the scientists". Similarly, many physical geographers called for an increased engagement with human factors, in light of the recognition that "ecosystem restoration goals have as much or more to do with cultural values as with environmental factors" (Phillips, 2004, p.42). This interpenetration of issues of nature and culture produced distinctive forms of geographical writing, as well as broader reflections on the nature of geographical writing. In this section, I will explore these themes by considering work associated with two closely related movements that began around the turn of the twenty-first century, namely, the so-called "cultural" and "creative" turns.

New cultural geography and the politics of representation

As previously stated, the incorporation of cultural theory into human geography from the late 1980s marked a key turning point in the history of the discipline. This move essentially involved a reconceptualisation of "culture" and a reconsideration of its status as an object of study. Philo (2000, p.28) summarises this shift thus:

> It was to take much more seriously than hitherto all manner of things that might be construed as constituting the cultural "stuff" of human life, not just phenomena routinely designated as cultural (e.g. "highbrow" arts and "lowbrow" media), but also the complete panorama of meaning systems both collective (e.g. religions and nationalisms) and more individual (built up in personal psychic economies).

The notion of cultures as "meaning systems" was central to the development of a "new" cultural geography that drew heavily on semiotic and literary theory. In particular, there was an emphasis on deconstructive and interpretive approaches to understanding the cultural meanings of landscape. Both Daniels and Cosgrove (1988) in the UK, and Duncan and Duncan (1988) in the US, deployed the metaphor of landscape as "text" to frame their analyses of the social and discursive construction of meaning. Crucial to these analyses was the concept of intertextuality – the idea that meaning is always produced in relation to other texts, and is therefore unstable, rather than relating unproblematically to objects in the "real world". Empirical work associated with the new cultural geography was often characterised by an interest in the discursive function of landscape representations in literature and the arts (e.g. Barnes and Duncan, 1992b; Cosgrove and Daniels, 1988; Duncan and Ley, 1993). There was also a growing interest in questions of culture across a range of subdisciplines, including social, economic, and political geography, as part of a broader "cultural turn" (Philo, 2000).

But this expanded, discursive understanding of "text" also had more fundamental implications for the practice of geographical writing. If representations of the world are understood as constitutive and not merely reflective of reality, the geographer's authority to explain the "truth" of the world is radically destabilised. The "crisis of representation" stemming from this understanding challenged geographers to address the ways in which unstable and contested meanings become embedded in relations of power (Duncan and Sharp, 1993). Ultimately, the new cultural geography exposed the contingency of geographical knowledge, and the impossibility of truly "objective" geographical writing. In the words of Barnes and Duncan (1992a, p.3),

> … writing about worlds reveals as much about ourselves as it does about the worlds represented … when we write we do so from a necessarily local setting … the worlds we represent are inevitably stamped with our own particular set of local interests, views, standards, and so on.

Some geographers turned their attention to the range of linguistic and rhetorical strategies used to promote authorial meanings. Barnes and Duncan (1992a) noted, for instance, that while "under the rubric of objectivism, rhetorical

devices such as metaphors, irony, similes and the like are useless, if not nonsensical, aspects of language" (p.3), "objectivism itself is just one of many different strategies to convince" (p.4), imbued with its own "interests", "views" and "standards". Smith (1996) took this project further with his detailed investigation of geographical rhetoric. Some geographers also drew inspiration from feminist theorist Donna Haraway's (1991, p.188) critique of the "gaze from nowhere" – the detached perspective invoked in scientific claims to objectivity – and her related concept of "situated knowledges", recognising that scientific (and indeed all) knowledge is always partial. Rose (1997), for example, examined how forms of reflexivity could be incorporated into research practices in order to situate the knowledges produced therein – cautioning in particular against claims that researchers are able to know or represent their context fully themselves.

The predominance of concepts of culture, text, and discourse during the cultural turn attracted some criticism within human geography. Both Mitchell (1995) and Barnett (1998b) drew attention to the difficulty of defining "culture", expressing scepticism about the critical and political capacities of the new cultural geography. Mitchell (1995) argued that much of the work in this vein reified culture by assigning it ontological status and called for attention to be redirected towards the idea, or ideology, of culture (and to the work that this idea may do). In his reply to a series of defences from those implicated in the debate (Cosgrove, 1996; Duncan and Duncan, 1996; Jackson, 1996), Mitchell (1996) reasserted the importance of "geographical *explanation*" (p.582, emphasis in original) and the need to "approximate, to the best of our limited abilities, *truths* about the social world" (p.580, emphasis in original). This goal was contrasted with a perceived focus on the "geographical imagination",[34] a term that, tellingly, he consistently placed within quotation marks.

Mitchell's concern with the material was echoed in other areas of geographical specialism. Demeritt (1994) and Birkeland (1998) were among those to criticise how contemporary conceptualisations of culture both maintained and ignored its dualistic construction in opposition to nature. For Demeritt (1994, p.170), the "text" metaphor "suppresses any trace of other, nonhuman actors from the

[34] For an exploration of contemporary debates around this concept, see Gregory (1994).

production of landscape". In his view, Duncan and Duncan's (1988, p.123) claim "that '*any* landscape can be analysed as a text' (emphasis added) inflicts considerable violence. It treats landscape as a blank page that only human actors can read and write upon" (Demeritt, 1994, p.170). Philo (2000, p.33) expressed similar concerns about the "*dematerializing* of human geography" (emphasis in original): that "we have ended up being less attentive to the more 'thingy', bump-into-able, stubbornly there-in-the-world kinds of 'matter' (the material) with which earlier geographers tended to be more familiar". Demeritt (1994) and Birkeland (1998) each proposed alternative, non-dualistic conceptualisations from theorists including Bruno Latour, Donna Haraway, and Luce Irigaray, and Philo (2000, p.34) commended geographical work derived from these theories for "stressing the inescapable hybridity of nature and culture, practices and discourses, things and (no)things".

Despite its divergence from human geography during this period, the cultural turn did not go wholly unnoticed in physical geography. A notable contribution came in the form of an edited collection by Trudgill and Roy (2003), entitled *Contemporary Meanings in Physical Geography: From What to Why?*. Although the volume features little substantive engagement with the cultural theories permeating work in human geography, the turn to questions of meaning was highly significant. Indeed, the individual chapters here addressed many of the key concerns of the moment, from the processes of knowledge production (Trudgill, 2003b) and the situated nature of knowledge (Bayliss-Smith, 2003), to the contingency of writing practices (Viles, 2003). The work is also littered with references to literary representations of landscape, including several "geomorphological poems" (A. C. Benson's "By the Glacier" (Trudgill, 2003a, p.271) and John Ruskin's "The Glacier" (Trudgill, 2003a, p.276)) suggested to the authors by none other than Richard Chorley, the key figure in the development of quantitative glaciology whose work was reviewed in the previous section. Perhaps the most significant call to action for physical geographers was the chapter from Thornes and McGregor (2003) on "cultural climatology", which explicitly drew inspiration from the cultural turn in human geography (p.189). Thornes and McGregor's call from climatology was followed by K.J. Gregory's (2006, p.185) in geomorphology, who asked, in the light of their work, "is it now

timely for a ‘cultural turn’ that affected human sciences including human geography to be embraced by geomorphology?”.

A deeper theoretical exploration of a cultural turn in physical geography came later from Tadaki et al. (2012). The authors critiqued reductionist, dualistic conceptions of the cultural in “human dimensions” research in physical geography that attempts to model human factors as system “inputs” alongside physical factors (drawing on earlier analysis by Demeritt (2009)). Tadaki et al. (2012, p.550) summarise their position thus:

> The central thesis of this paper is that a cultural turn in physical geography should proceed by acknowledging that physical geography has always been cultural, as the practitioners and institutions of physical geography provide a signifying system through which “order is communicated, reproduced, experienced, and explored” (Williams 1981, 13).

Following Proctor’s (1998, p.234) notion of “externality”, the authors contest the dominant assumption that physical geographers’ engagements with culture are somehow “outside” of culture themselves. They conclude by urging greater attention to the “work” that the practice of physical geography does within wider systems of signification, including its ability to “reify particular ideas, rationalities, subjectivities and ‘objectivities’ … and de/legitimise other ways of knowing the world” (Tadaki et al., 2012, p.558). This charge was later taken up in several papers exploring the field of global environmental change research (Carey et al., 2016; Castree et al., 2014) (see Box 5).

Box 5: Carey et al. write glaciers

The article "Glaciers, gender, and science: A feminist glaciology framework for global environmental change research" is one of the best-known contributions to debates over cultural issues in physical geography – albeit one that is, notably, published in a human geography journal. Indeed, it is one of the "best-performing" articles in *Progress in Human Geography*, with an Altmetric "Attention Score" higher than any other tracked output from the journal at the time of writing (Altmetric, 2022). Importantly, this metric measures "attention" from both academic (i.e. citations) and non-academic sources (i.e. mentions in news and social media outlets) – with the latter being the determining factor in this particular article's score. The reason for this article's "success" is that, in March 2016, two months after its initial online release, the article "went viral" after being picked up by right-wing media channels in the US, including Fox News (Fox News, 2016), as an outrageous example of government-funded scientific research ("Feds Paid $709,000 To Academic Who Studies How Glaciers Are Sexist" (Follett, 2016)). Scandalised commentators questioned if it was a parody, comparing it to the "Sokal hoax" of 1996 (Coyne, 2016), and the *New York Post* branded it "a new low in climate 'science'" (New York Post, 2016). The public outcry over the article reflects the way in which the language and concerns of the cultural turn in the social sciences became embroiled in broader American "culture wars" in the pre-Trump era ("This University of Oregon Study on Feminizing Glaciers Might Make You Root for Trump" (Soave, 2016)).

The article itself presents a "review and synthesis of a multi-disciplinary and wide-ranging literature on human-ice relations" and proposes a four-part "feminist glaciology framework" (Carey et al., 2016, p.771). Figure 6 shows an extract from the second component of the framework, "Gendered science and knowledge". The information is presented in a conventional journal format, fully referenced and expressed in an impersonal tone. The authors foreground the social construction of knowledge in glaciology using historical and contemporary examples. The analysis addresses several key themes from feminist science studies, including both the use of technology to "place science at a god-like vantage from nowhere" (p.771) and the role played by masculinist narratives of heroism and adventure in the legitimisation of contested knowledge claims. This analysis is used to support the authors' conclusion that "ice is not just ice" (p.787) – a claim that was widely ridiculed in media attacks on the piece.

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Such feminist critiques apply today to glaciology, climate sciences, and global environmental change research more broadly. Terry (2009: 6), for example, argues that climate discourse 'is still a stereotypically "masculine" one, of new technologies, large-scale economic instruments, and complex computer modeling', which for glaciers can render them static, essentialized, and passive (also see Moosa and Tuana, 2014).

Fleming (2010) finds a similar story of domination in the climate sciences, in which 20th-century scientists and engineers used cloud seeding and other geoengineering strategies to manipulate weather, steer storms, and make rain. Technoscientific control is a dominant trope in climate change discourse and knowledge, and it is by nature highly gendered (Israel and Sachs, 2013). Much geographical fieldwork involves this masculinist reflexivity generating supposed objectivity through distance from and disinterest in the subject (Coddington, 2015; Sundberg, 2003). These conclusions transcend gendered dimensions of knowledge by acknowledging broader trends in Western sciences that have sought to place science at a god-like vantage from nowhere, ignoring both situated knowledges and the geography of science (Haraway, 1988; Shapin, 1998; Livingstone, 2003).

Gendered aspects of cryospheric knowledge have existed for centuries. In the 1730s, for instance, the French crown sent geodetic expeditions to Peru and the Arctic (Lapland). The naturalist-adventurers chronicled in their reports how they overcame savage environments and bitter cold conditions, frequently celebrating their selfless, heroic risk taking. As the Arctic explorer Pierre-Louis Moreau de Maupertuis explained (characteristically for this genre of scientific writing), 'you may imagine what it is to walk in two feet of snow, carrying heavy measuring sticks, which must be continually set down in the snow and retrieved. All this in a cold so great that when we tried to drink eau-de-vie, the only drink that could be kept liquid, the tongue and lips froze instantly against the cup and could only be torn away bleeding' (quoted in Terrall, 1998: 230). Terrall (1998: 230) concludes that 'the physical strength and perseverance necessary to conquer such obstacles made of the returning men of science not just selfless seekers of truth, but tough adventurers'. But the Lapland and Peru expeditions were also about promoting France's prestige in the wake of new scientific discoveries: male triumph over hostile nature and isolated spaces in the name of science fed nationalism and colonialism, and these forces co-constituted a masculinist glaciology.

When debates about glacier motion emerged in the second half of the 19th century, two central protagonists – the early leading glaciologists James Forbes and John Tyndall – competed for credibility by pinning their scientific contributions to their abilities as 'manly' mountaineers and heroic conquerors of the European Alps. Forbes theorized that glaciers behaved more like a semi-fluid body, flowing downhill as a viscous fluid rather than as a solid object. He highlighted his fieldwork in the mountains and among the glaciers to legitimate his theory. Tyndall, on the other hand, argued that glaciers moved more like a solid substance flowing over bedrock. He eventually triumphed in this debate, contends Hevly (1996), because Tyndall mobilized his greater fame as a mountaineer – having achieved many pioneering first ascents – and deployed a rhetoric of manly risk and exertion. There was what Hevly calls a 'culture of field science' in the 19th century that favored 'authentic, rigorous, manly experience', and scientists – let alone women – who did not explicitly demonstrate that their glaciological conclusions stemmed from heroic, manly adventures struggled to make their scientific claims credible. Glaciology was for muscular gentlemen scientists. Women could read about glaciers in the Alps, but they were not fit for glaciological research, field science,

Figure 6: Extract from "Glaciers, gender, and science: A feminist glaciology framework for global environmental change research" (Carey et al., 2016)

Experimental geographies and the geohumanities

In a contribution to the 1991 conference "New Words, New Worlds", organised by the Social and Cultural Geography Study Group of the Institute of British Geographers and a key moment in the development of the cultural turn in geography, Nigel Thrift expressed his "thoughts and worries" about the "over-wordy worlds" he perceived to be dominating human geography at the time (Thrift, 1991). In his view, the excessive attention paid to text and writing was "profoundly exclusionary", a symptom of the "middle-classing" of social thought that resulted in the less-textual worlds of working-class people being "not so much ignored as colonised" (Thrift, 1991, pp.145–146). To minimise this danger, Thrift (1991, pp.146–147) made the following suggestion:

> We need to think more seriously about the medium in which we are trying to communicate. The most radical thing we might do is to try to move out of the academic book and paper economy. After all, as Friedman (1991, p. 18) puts it somewhat cynically, "[t]he career considerations and status of the academic disallow any but textual experimentation" – or do they?

In the years that followed, Thrift developed this critique, and this question, into a body of work that engaged with what he termed "non-representational theories" (Thrift, 1996, 2000, 2008). Thrift and others mobilised these theories not in opposition to representation per se, but in opposition to "representationalism" in human geography – that is, the notion that meaning is formed in the mind and precedes action (Dewsbury et al., 2002, p.438). For Thrift and his colleagues, the emphasis on the interpretation of cultural representations, epitomised in the "landscape-as-text" approach to cultural geography, served to produce "dead geographies" that nullified lived experience (Thrift, 2000, p.235; Thrift and Dewsbury, 2000). In a provocatively-titled elaboration of his vision for non-representational approaches in geography, "Afterwords", Thrift (2000, p.244) argued that "meaning shows itself only in the living" and called for a reorientation of attention from the textual to the performative. For Dewsbury et al. (2002, p.438), "representations are apprehended as performative in themselves; as doings".

This shift involved a reconceptualisation of knowledge as "practical knowing" (Thrift, 2000, p.222). Geographers displayed a conceptual concern with

"excess", especially what exceeds (or precedes) the linguistic and the textual (Dewsbury et al., 2002; Lorimer, 2005). Work in non-representational geography emphasised embodiment and affect, often highlighting the ways in which both are distributed across actors both human and nonhuman. In a sense, moreover, practice became both the object and method of study. Empirically, cultural geography was marked by a proliferation of studies on "embodied acts of landscaping" (Lorimer, 2005, p.85), in a departure from the earlier focus on landscape representations. Engaging with these practices in research necessitated a search for new methods beyond the traditional, text-centric repertoire of the social sciences. Indeed, the limited range of methods used in human geography was a key complaint among geographers working in this non-representational domain (Crang, 2003; Thrift, 2000; Thrift and Dewsbury, 2000). In his early programmatic statement, Thrift (2000, p.244) affirmed that non-representational work "is concerned with multiplying performative methodologies which allow their participants equal rights to disclosure, through dialogical actions rather than texts, through relation rather than representation", inspired by the "intensification of presence provided by the performing arts". Similarly, Dewsbury et al. (2002, pp.439–440) spoke of "mobilising other sources of expression (literature, art, performance)" and "a commitment to a resolute experimentalism". Lorimer (2005, p.86) reflected that "there is no 'one-size-fits-all' policy for accessing embodied knowledge and emotional response", but that a general "rediscovery of the senses" beyond geography's traditional focus on the visual was evidently taking place (see also Paterson, 2009). As Last (2012, p.711) observed in an overview of "experimental geographies", there was "a common tendency to privilege artistic registers" in discussions of perceived methodological lack in human geography.

Nonetheless, Thrift's (1991) initial question over the possibilities of more-than-textual experimentation within academic geography remained pertinent. Crang (2003) remarked that, in spite of contemporary engagements with "performative, embodied and haptic knowledge" (p.494), "qualitative geography seems locked in a conventional expository mode" (p.501) wherein "a lot of field-based work is still set up around a conventional data and report structure" (p.501). Lorimer (2005, p.89) wondered if "[p]erhaps the concern is that experimentalism during data collection will be emasculated by established codes

for the 'proper' representation of research in publication". Even before publication can be considered, the challenges of academic experimentation are compounded by the "upstream" imperatives of research funding and ethics, which sit uneasily with the risks and indeterminacies inherent in experimental approaches (Last, 2012).

The launch of the journal *Cultural Geographies*' "in practice" section in 2000 created some space for unconventional and creative approaches within academic geography. The subsequent development of the geohumanities as a subfield opened up further avenues for publication, including a dedicated journal, *GeoHumanities*, in 2015, which accommodates creative pieces in its "Practices and Curations" section alongside scholarly articles at the intersection of geography and the humanities. These developments were associated with the flourishing of a "creative turn" – or as Hawkins (2013, p.56) puts it, a "re-turn" – in the discipline. This movement saw geographers engage with a range of expressive modes across the visual and performing arts, either themselves or in collaboration with professional artists. Hawkins (2019, p.964) noted the rise of "hybrid forms – such as photo or video essays or critical-creative writing pieces that explore the essay rather than paper format" within academic journals and monographs. Yet, as Last (2012, p.711) outlined, "[f]or many geographers, textual experiments remain a first point of call".

Several human geographers have speculated on the value of creative writing for navigating the embodied and affective in the presentation of research. Even as he laid out his early vision for geography "afterwords"/after words, Thrift (2000, p.235) discussed efforts in performance studies to develop forms of "performative writing" with the capacity to "constitute a performance in their own right". In his overview of "haptic geographies", Paterson (2009, p.785) concluded that "evoking and describing sensuous dispositions and haptic knowledges benefits from the styles and methods involved in experimental or creative writing", noting particularly the "sensory conjunctions achieved through simile and metaphor". Referring specifically to poetry, Madge (2014, p.181) identified it as "a creative format that traverses between the representational and the more-than-representational", capable of evoking embodied experiences through texts. Springer (2017, p.2) strongly contested

accusations (such as those levelled by Billinge, 1983) that metaphorical language is esoteric, claiming that all knowledge is acquired through "an inherently metaphorical process" of connecting abstract ideas with embodied experience.

Over the same period, parallel experimentation with creative approaches was happening in physical geography – even if the nature of these engagements was often different to those occurring in human geography. In particular, they most often took place in the context of formal collaborations between artists and geographers, rather than via the kinds of solo experimentations practised by some human geographers. Examples include artist residencies in various scientific research institutes, "SciArt" initiatives like the Joint Research Centre of the European Commission's *Resonances* festival, and the establishment in 2015 of an "Earth sciences and art" session at the General Assembly of the European Geosciences Union (Lanza, 2020). Furthermore, while human geographers have tended to privilege textual modes, the visual arts have been more prominent in physical geography collaborations (Dixon et al., 2013; Tooth et al., 2019; Tooth et al., 2016). For an example of a text-based art-geoscience collaboration, see Box 6.

More broadly, while creative experimentation arguably developed in human geography when striving to articulate some of its central concerns (such as embodiment and affect), art-science collaborations are more likely to be framed as exercises in science communication, dissemination, or outreach, set to one side of the core practice of physical geography per se. Still, the 2018 launch of a dedicated journal, *Geoscience Communication*, suggests this work is "increasingly seen as an important component of the professional life of geoscientists" (Tooth et al., 2019, p.2). As in human geography, there is an awareness of the political potential of artistic forms, stemming from their capacity to "appeal to affective reasoning" (Tooth et al., 2019, p.2). In physical geography, this is most apparent in the context of climate action (Lanza, 2020, p.128):

> … the humanities can find a powerful ally in geoscience for re-awakening in everybody the sense of beauty, values, and respect for the planet … we hope that the development of a unified culture will help to involve everybody in a deeper knowledge of the Earth and its

> delicate and complex mechanisms, and that by doing so we are able to preserve our planet for future generations.

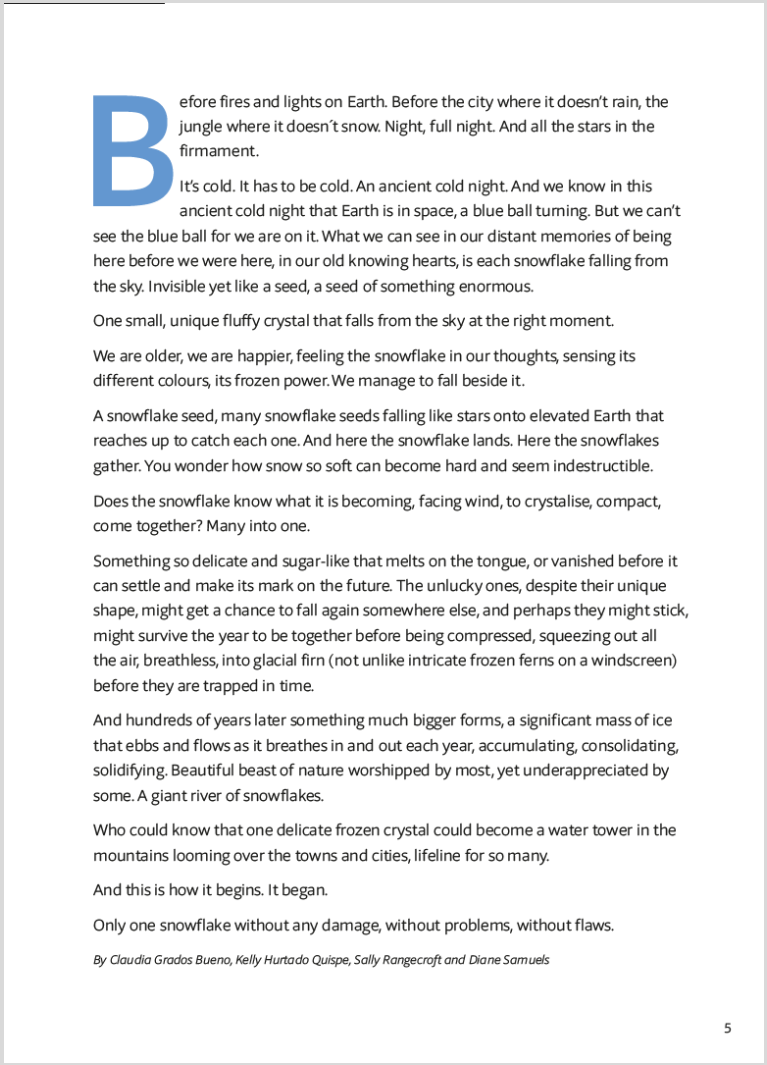
Indeed, there is evidence to suggest that the use of creative forms can aid heightened engagement with climate science even within the academy, with one study finding that papers whose abstracts are written in a more “narrative style” are cited more often (Hillier et al., 2016).

Box 6: Bueno et al. write glaciers

The e-book *Glacier Gifts* (Rangecroft et al., 2022) was released as part of the Societal Impact of Glacier Melt in the Andes: Peru (SIGMA: Peru) project, an interdisciplinary collaboration between the University of Plymouth and the Instituto Geofísico del Perú. A team of UK and Peruvian scientists collaborated with the British author Diane Samuels to write poetry and prose exploring glacial science. The texts collected in the book combine scientific insights, the field experiences of the scientists, and elements of local culture and folklore. In the words of the authors (SIGMA: Peru, no date):

> Our aim has been to make emotional connections and imaginative journeys from the factual data and lived experience to celebrate the irreplaceable value of glaciers, not only to the communities who live nearby and directly depend upon them, but to everyone throughout the world.

One contribution, entitled “It starts with a snowflake”, is presented in Figure 7. This is a collaborative piece written by three scientists together with Diane Samuels. The piece describes the processes of glacier formation by following the journey of a single snowflake through time. The writing is personal (“we”, “our”, “you”) and sensual (“cold”, “fluffy”, “sugar-like”, “melts on the tongue”). Emotive language evokes a sense of empathy (“delicate”, “unlucky”) and wonder (“beautiful”, “worshipped”). The processes are vividly described through metaphor: “snowflake seed” evokes (potential) growth, “river of snowflakes” evokes fluid movement. Similarly, the snowflake, mountain and glacier are animated by extensive use of personification (“Does the snowflake know…?”, “Earth that reaches up”, “breathless”, “breathes in and out”).



Before fires and lights on Earth. Before the city where it doesn't rain, the jungle where it doesn´t snow. Night, full night. And all the stars in the firmament.

It's cold. It has to be cold. An ancient cold night. And we know in this ancient cold night that Earth is in space, a blue ball turning. But we can't see the blue ball for we are on it. What we can see in our distant memories of being here before we were here, in our old knowing hearts, is each snowflake falling from the sky. Invisible yet like a seed, a seed of something enormous.

One small, unique fluffy crystal that falls from the sky at the right moment.

We are older, we are happier, feeling the snowflake in our thoughts, sensing its different colours, its frozen power. We manage to fall beside it.

A snowflake seed, many snowflake seeds falling like stars onto elevated Earth that reaches up to catch each one. And here the snowflake lands. Here the snowflakes gather. You wonder how snow so soft can become hard and seem indestructible.

Does the snowflake know what it is becoming, facing wind, to crystalise, compact, come together? Many into one.

Something so delicate and sugar-like that melts on the tongue, or vanished before it can settle and make its mark on the future. The unlucky ones, despite their unique shape, might get a chance to fall again somewhere else, and perhaps they might stick, might survive the year to be together before being compressed, squeezing out all the air, breathless, into glacial firn (not unlike intricate frozen ferns on a windscreen) before they are trapped in time.

And hundreds of years later something much bigger forms, a significant mass of ice that ebbs and flows as it breathes in and out each year, accumulating, consolidating, solidifying. Beautiful beast of nature worshipped by most, yet underappreciated by some. A giant river of snowflakes.

Who could know that one delicate frozen crystal could become a water tower in the mountains looming over the towns and cities, lifeline for so many.

And this is how it begins. It began.

Only one snowflake without any damage, without problems, without flaws.

By Claudia Grados Bueno, Kelly Hurtado Quispe, Sally Rangecroft and Diane Samuels

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Figure 7: Extract from *Glacier Gifts* (Rangecroft et al., 2022)

Conclusion

This discussion of the changing nature of writing in geography over the past century shows that writing style cannot be taken for granted. Examining the use of language and form can suggest a great deal about the author's assumptions, aims, and intended audience. Questioning how geography is written also leads into questions of what – or who – may be "written out" of geography in the process. Historically, approaches that aspire towards scientific ideals have tended to self-consciously exclude forms of expression that relate aspects of subjective experience: sensations, emotions, and values. There have, however, been exceptions throughout geography's history, from Reclus's geomorphological stories to contemporary scientific poetry, that use a range of linguistic devices to evoke the immersive narrative quality of "worldness" (Ryan, 2017). These forms of writing have been understood as a powerful tool for change within, and especially beyond, the academy. The "reasoned emotion" that Le Lay (2008, p.222) considered a hallmark of Reclus's anarchist geography finds its modern counterpart in the "affective reasoning" that Tooth et al. (2019, p.2) view as key to constructive public engagements with the geosciences in the Anthropocene. This chapter suggests that recent experiments in creative writing can indeed be characterised as a creative *re*-turn in geography (Hawkins, 2013).

These experiments have ranged from the use and interpretation to the production and dissemination of creative writing. Arguably, all of these practices contribute in some way to the legitimation of diverse ways of knowing the Earth beyond detached rationality, and hence, to the potential displacement of the "metanarratives" historically perpetuated through the discipline of geography. To understand the wider implications of this "geopoetic tradition" more clearly, it is necessary to look beyond the writing practices of established academic geographers. In Chapter 5, I explore how educators and learners are positioned as readers and/or writers of the Earth through different forms of engagement with creative writing. To do this, I adopt a different methodological approach to the essayistic historiography of this chapter. The technical nature of my approach requires that, in an admittedly atypical move at the mid-point of a thesis, the next chapter is dedicated to a detailed discussion of this method, without which it would be difficult to interpret the findings that follow.

Chapter 4: Corpus methods of discourse analysis

Methodological orientation

Discourse communities

As I argued in Chapter 1, the fields of geographical and environmental education share a common engagement in what Kidman and Chang (2025) call "planetary pedagogies". Geography has not only been described as an "interdisciplinary discipline" (Baerwald, 2010), but as "the preeminent interdisciplinary environmental discipline" (Skole, 2004), one that, in an era of planetary crisis, is increasingly defining its role in alignment with the environmental education ethos of "interdisciplinarity in action" (McMillan and Vasseur, 2010). Despite differences in the histories, traditions, and institutions associated with each field, the considerable overlap in the interests and practices of geographical and environmental educators make it difficult to draw clear boundaries between them. The porosity of these interdisciplinary fields also makes it difficult to draw boundaries around them, which poses some practical challenges from a research perspective. This chapter explains how I applied the concept of discourse communities, anchoring my research in the communicative practices of geographical and environmental educators, to analyse how the pedagogical role of stories has been constructed over time.

According to Borg (2003), the concept of "discourse community" developed from two earlier conceptualisations: the socio-linguistic concept of the "speech community" (Gumperz, 1968; Hymes, 1974) and the literary-critical concept of the "interpretive community" (Fish, 1980). The former relates to shared linguistic norms which influence how speakers use language, while the latter relates to shared cultural assumptions which influence how readers make sense of texts. The "discourse community" effectively sits between these two concepts, emphasising the *inter*communication between group members and blurring the distinction between textual "production" and "consumption" (see also Bizzell, 1992). While the term is thought to have been first used by Martin Nystrand (Nystrand, 1982), the most influential theorisation of discourse communities comes from linguist John Swales (Swales, 1990). Borg (2003, p.398) summarises Swales' definition as "groups that have goals or purposes, and use

communication to achieve these goals". The emphasis on shared "goals" distinguishes Swales' (1990) definition of discourse communities from those based on looser conceptions of "communities" as groups with interests (Johns, 1997) or texts (Barton, 1994) in common (see Hyland, 2009). For Swales (1990), although common interests and common goals often go hand in hand, common interests alone are not sufficient to constitute a discourse community. In his words: "The fact that the shared object of study is, say, the Vatican, does not imply that students of the Vatican in history departments, the Kremlin, dioceses, birth control agencies and liberation theology seminaries form a discourse community" (Swales, 1990, p.25). Of course, the goals of any discourse community are constantly being negotiated: Porter (1992, p.107) characterises them as "unstable, dynamic, but with regularity". As previously suggested, the extent to which geographical and environmental education are (or should be) aligned in their interests and/or goals is an ongoing matter of debate.

One of the biggest challenges in applying the concept of discourse communities is the question of scale. Something of a blind spot in Swales' (1990) original conceptualisation, the term has been used variously to describe anything from individual academic classes (McKenna, 1987) to a generalised "academic discourse community" (Bizzell, 1992). Swales himself revised his definition to account for variation in the localisation of discourse communities, first with his concept of "place discourse communities" (Swales, 1998) and later with his distinction between "local", "focal" and "folocal" discourse communities (Swales, 2016). In this taxonomy, professional associations – such as the Geographical Association (GA) or the National Association for Environmental Education (NAEE) – are examples of "focal" discourse communities, while a university department is an example of a "folocal" discourse community. That accepted, Swales' (2016) revised concept still struggles to account for higher-level community membership beyond the national level: following his logic, the UK-based associations mentioned above would be considered as separate discourse communities to their US-based counterparts the National Council for Geographic Education (NCGE) and the North American Association for Environmental Education (NAAEE). One solution can be found in shifting the focus away from institutions and towards channels of communication, as Porter (1992) does by introducing the concept of "forums". He defines a forum as "a

concrete, local manifestation of the operation of the discourse community … such as a journal, a conference, a corporation, or a department within a corporation" (Porter, 1992, p.107). In this view, the GA, NCGE, NAEE and NAAEE, as well as their associated conferences, journals, and newsletters could all be seen as forums facilitating the discursive activities of the wider discourse communities of geographical and environmental education. In other words, rather than constituting a discourse community, each forum is a "trace" of a discourse community (Porter, 1992, p.108).

Tracing discourses

In order to understand the various discourses circulating within and between discourse communities, we must therefore seek out their traces. Although discourses circulate through a variety of modes, including spoken communication and non-verbal practices, written communication is arguably the most "traceable" mode. While spoken communication and non-verbal practices leave "ephemeral traces" (Dabbs, 1982) that usually need to be "captured" directly by the researcher at the time and place of their occurrence (Lee, 2000), written communication leaves "lasting traces" (Dabbs, 1982) which are intended to be preserved and can therefore be "retrieved" at a later date and from various locations (Lee, 2000). The "running records" (Webb, 2000) of discourse found in educational journals and magazines thus provide rich sources of data that are relatively easy to obtain through "unobtrusive" methods – that is to say, without eliciting information directly from research participants (Kellehear, 1993; Lee, 2000; Webb, 2000).

This approach has several advantages when viewed in the light of my research questions. From a practical point of view, working with existing records of educational practice allows me to explore the discursive construction of storytelling over a much longer time period and across a greater geographical range than would be possible through direct observation or elicitation. Evidently, observational methods are incompatible with the historical analysis of educational practices, while the possibility of longitudinal observation is severely restricted by the time-limited nature of most – but particularly doctoral – research projects. Although it is theoretically possible to conduct historical research through elicitation, such as occurs in oral history, the range of accounts

that can be collected is inherently limited. The relative ease with which published texts can be retrieved makes unobtrusive methods a much more feasible option for exploring trends over time and space.

An additional advantage is the "non-reactive" nature of this type of data. Unobtrusive methods first emerged in response to the limitations of the traditional elicitation methods that have long dominated social scientific research, specifically that the elicited information "is often shaped by the dynamics surrounding the interaction between researcher and researched" (Lee, 2000, p.1). Originally fuelled by positivistic concerns over objectivity and representativeness, unobtrusive methods have also been widely adopted in poststructuralist research because of their sensitivity to social context (Kellehear, 1993). Rather than generating data within the context of a researcher-researched dynamic - where the ethical imperative of informed consent means that participants are aware of the research aims and their role in achieving them – unobtrusive methods allow researchers to access discourses in their "natural habitat". In this context, the discourses are shaped by the dynamics of the discourse communities themselves, rather than the dynamics of the research process. Similarly, the availability of the data reflects the circulation of the discourses themselves, rather than the availability of participants. Indeed, the more likely texts are to be preserved and disseminated, the more likely they are to be influential within the discourse communities under study.

As multiply mediated documentary sources, published articles cannot be interpreted as providing direct windows into educational practice, or as straightforward representations of the authors' views and experiences. The texts themselves may be the most visible traces of discourses, but, following Swales (1990), their meaning must be understood in relation to the evolving "goals" of the discourse communities. This context can provide insights into how different forms of Earth writing have been legitimised and accommodated to the central concerns of each field.

Analysing discourses

Discourse analysis, as a hallmark method of deconstructive, poststructuralist research, has traditionally been associated with qualitative methods. The intensive nature of close reading and hermeneutic interpretation means that this approach is often only feasible with relatively small datasets: constrained by author, publication, or location, for example. More recently, however, the rise of digital methods, combined with the increasing availability of digitised texts, has created new opportunities for conducting various forms of qualitative analysis on a much larger scale. Building on the trend towards "big data" in quantitative research, Brower et al. (2019) coined the term "big qual" to characterise research involving large qualitative data sets. A team of researchers at the Universities of Southampton and Edinburgh subsequently developed what they call the "breadth-and-depth" method for analysing big qual datasets (Davidson et al., 2019; Edwards et al., 2021; Weller et al., 2023), with new computational processing tools facilitating the iterative movement between surface-level "mapping" and in-depth interpretation of texts.

Many of the tools used in the "breadth-and-depth" method were originally developed within the field of corpus linguistics. While the development of this method represents one of the first attempts to apply these tools in social science research, corpus linguists have been using them to explore the relationships between language and society for much longer. Corpus linguistics is a field of study that uses large collections of naturally-occurring language – known as "corpora" – to identify patterns in language use. Traditionally considered a quantitative approach, the emergence of Corpus Assisted Discourse Studies (CADS) in the 1990s brought with it a new mixed-methods approach, uniting the traditional methods of corpus linguistics with those of discourse analysis (Ancarno, 2020; Gillings et al., 2023; Partington, 2013). As Gillings et al. (2023, p.6) point out, despite their methodological differences, both approaches share a central concern with linguistic patterning: "Corpus linguistics identifies regularities in the evaluative load of word partnerships; DS [discourse studies] explains how these are related systematically to the sociopolitical context". While linguists typically take the linguistic patterns themselves as the object of study, discourse analysts, and social scientists in general, can consider them as evidence of broader social processes.

A corpus-assisted approach to discourse analysis not only enables me to broaden the scope of my research, but also to enrich the analysis in ways that would be difficult to achieve through traditional methods. Quantifying the frequencies and distributions of words within my dataset can provide an approximation of the extent to which discourses are dominant or minoritarian within each discourse community, and how this has changed over time. While Baker (2012) cautions that such a grounding in quantification does not necessarily equate to greater objectivity, it can at least provide greater transparency regarding the empirical basis on which interpretations are formed. The combination of quantitative and qualitative analysis can also provide a form of "triangulation", whereby the interpretations are supported by multiple forms of data (Baker, 2023).

To make this form of analysis possible in my research, I had to construct a specialised corpus exploring the discursive construction of storytelling in geographical and environmental education. The steps taken to achieve this outcome are detailed in the following sections.

Data collection

Search strategy

I considered several approaches to identifying relevant sources for analysis. Before making a decision on the parameters of my search, I carried out preliminary scoping searches using a variety of search strategies and terms. Having already identified key periodicals in geographical and environmental education in the early stages of my research, my initial approach involved conducting keyword searches within selected individual publications. I conducted searches using a range of keywords relating to creative writing, like "literature", "fiction", and "narrative". Quite predictably, these terms returned large quantities of results, only some of which were relevant to my specific interests. The polysemous nature of these terms – words with more than one meaning - reduced their effectiveness for my purpose. "Literature" in particular returned overwhelming numbers of articles using this term in the sense of "the academic literature", with no way of distinguishing this usage from articles referring to what might be called "literary works". Genre-specific terms like "poem OR poet*" tended to return higher proportions of relevant results, but

this approach was complicated by the likes of “novel”, another polysemous term that introduced numerous irrelevant results. Even when limiting my search to specific keywords within specific publications, my initial approach consistently returned results that would require unmanageable levels of manual reviewing to identify relevant texts.

As well as being inefficient, the approach of conducting keyword searches within selected publications also suffers from a limited conception of discourse communities within geographical and environmental education. Focusing solely on articles published in field-specific journals in geographical and environmental education means missing out on relevant articles published in other outlets, such as general education journals, general geography journals, or even literary education journals. While publication in a specialised journal can be seen as a form of “legitimation” within discourse communities, it is also interesting to consider the fluidity of these groupings – how discourses flow between different disciplinary spaces and how they become established within them. I therefore sought another approach to data collection that would allow me to “capture” this porosity and dynamism.

In conducting initial scoping searches within particular publications, I faced two main limitations: the inefficiency of keyword searches using polysemous terms, and the inability to identify relevant texts published outwith the mainstream publications in geographical and environmental education. To address both of these issues, I turned to bibliographic research databases. As curated collections, articles found through academic databases benefit from detailed metadata, which is generated consistently across different publications within the collection. Crucially for my purposes, this metadata includes keywords assigned from controlled vocabularies – standardised subject descriptors that designate specific concepts. The specificity and consistency of these terms can be exploited in searches to achieve more efficient retrieval of relevant results. Firstly, searches can be conducted using these subject descriptors, either alone or in combination with keyword searches of the titles, abstracts and/or full text of articles. This allows the researcher to specify if they only want to retrieve articles that deal with, for example, the *subject* of literature, and exclude those that use the *word* “literature” in passing in the body of the text. Secondly, the

scope of each subject descriptor is set out clearly in a Thesaurus compiled and applied consistently by specialist indexers. This practice minimises the problem of polysemy: database thesauri indicate which meaning of a polysemous term is used in the controlled vocabulary. For instance, if the subject descriptor "literature" is only applied in the sense of "literary works", the researcher may be directed to use another term to search for articles on "the academic literature". Controlled vocabularies also minimise the problem of synonymity – multiple terms sharing the same or similar meanings. In this case, database thesauri indicate which of the terms is used in the controlled vocabulary. For instance, if searching for articles on the subject of "geography teaching", the researcher may be directed to use the descriptor "geography education" instead. When each term designates only one concept, and each concept is designated by only one term, search efficiency improves significantly.

Conducting searches via academic databases also allowed me to broaden the scope of my search beyond the key periodicals that I had already identified in geographical and environmental education. As previously discussed, controlled vocabularies allow for search terms to be applied consistently across all publications indexed in the database, although it is important to recognise that this approach still involves an element of selection at several stages. The first stage of selection is beyond the control of the researcher: each database operates a selection policy around which publications to index. It is possible to gather information about these decisions – both in the broadest sense, from the stated scope of the collection, and in a narrower sense, from published lists of indexed publications. The level of detail provided in these lists also varies, with some databases providing indexing start and end dates for each publication, and others providing only publication titles. Not all indexed publications will have full coverage – many databases operate selection policies whereby certain sources will be indexed in their entirety while others will only have a proportion of their articles indexed according to established criteria, which may or may not be available for consultation by researchers. The researcher can then use the available information to guide their own selection of databases to consult. This two-stage selection process means that database searches, while potentially more extensive than searches of individual publications, are still restrictive: they cannot claim to be comprehensive of all the published literature on a topic.

One limitation of particular significance to a historical study relates to the history of academic databases themselves. Many of the major collections were only established in the latter half of the twentieth century (Sheffield and Saunders, 2002; Weiner, 2009). As indicated in Chapter 3, the discipline of geography was formalised much earlier than this, towards the end of the nineteenth century. Initial scoping searches revealed that many of the older editions of the earliest publications in geographical education, dating back to the early twentieth century, were only made available retrospectively on JSTOR. This database hence lacks the detailed metadata, controlled vocabulary, and advanced search options of other collections curated at the time of publication. Keyword searches here, even when limited to article titles or abstracts (often absent from early publications in any case), were subject to the same problems of inefficiency described above. Furthermore, the vast volume of historical material available on JSTOR meant it was not feasible to search the whole collection in this way. Searches within individual publications, such as early geographical education journals, were somewhat more fruitful, but again excluded the possibility of identifying relevant articles published outwith the disciplinary mainstream. The development of curated academic databases is, however, more or less contemporaneous with the emergence of environmental education (and the rise of the wider environmental movement) in the late 1960s. Narrowing my search to this time period felt appropriate to the wider aims of my research in terms of exploring cultural approaches to education in times of environmental crisis, and the evolving role of geographical education in this context.

I therefore set about identifying relevant databases for my research area. The most obvious starting point was the Education Resources Information Center (ERIC). Established in 1966, the US government-sponsored database provides one of the most comprehensive collections of educational research. Two smaller collections, the British Education Index (BEI), established in 1954, and the Australian Education Index (AEI), established in 1957, were also selected for their coverage of national publications. These databases are hosted across two platforms: the BEI is hosted on EBSCOhost, while the AEI is hosted on ProQuest, which also provides access to ERIC and its own Education Database via the Education Collection. In order to expand my search beyond educational

publications, to include results published in geography or literature journals, for example, I also opted to search ProQuest's Arts & Humanities Database and Social Science Database. ERIC was the first education database to develop a controlled vocabulary, and the BEI and AEI thesauri are derived from ERIC's model (Sheffield and Saunders, 2002). The ProQuest databases share a controlled vocabulary described in the ProQuest Thesaurus.

My next step was to identify relevant subject descriptors for each database. This involved consulting each thesaurus in turn, looking for terms corresponding to the three overarching concepts of my search: 1) Earth writing, 2) geographical education, and 3) environmental education. My goal was to find descriptors that were broadly consistent across all databases, excepting for minor variations in national spellings or terminologies. I then trialled the search by "layering" concepts – conducting separate searches for each concept before combining them with AND/OR operators – to allow for accurate evaluation of the usefulness of each term. While the "geographical education" and "environmental education" concepts corresponded closely to existing descriptors in each thesaurus, the "Earth writing" concept was a little harder to pin down. I used my broad conception of "stories" to guide my selection: I wanted to ensure that a) my search was inclusive of textual, cognitive, and cultural understandings of story, and b) my search was not limited to creative engagements with the *written* word (while at the same time avoiding over-extending it to encompass the visual or performing arts). Another challenge was the variety of specific genre descriptors available in different thesauri. For example, the ProQuest thesaurus includes descriptors for eight varieties of poetry along with the general term "poetry", whereas the ERIC thesaurus only uses the latter. I found that including the narrower terms made minimal difference to the results, and therefore settled on the more general terms that could be applied more or less consistently across all databases. My final search strategy, after trialling and refining my terms, is summarised in Table 1.

Table 1: Search strategy

Platform	Databases	Search terms
ProQuest	Arts & Humanities Database Australian Education Index Education Database ERIC Social Science Database	(MAINSUBJECT.EXACT("Creative writing") OR MAINSUBJECT.EXACT("Literature") OR MAINSUBJECT.EXACT("Storytelling") OR MAINSUBJECT.EXACT("Story telling") OR MAINSUBJECT.EXACT("Story reading") OR MAINSUBJECT.EXACT("Fiction") OR MAINSUBJECT.EXACT("Nonfiction") OR MAINSUBJECT.EXACT("Prose") OR MAINSUBJECT.EXACT("Poetry")) AND (MAINSUBJECT.EXACT("Geography teaching") OR MAINSUBJECT.EXACT("Geography Instruction") OR MAINSUBJECT.EXACT("Environmental education"))
EBSCOhost	British Education Index	(DE "CREATIVE writing" OR DE "LITERATURE" OR DE "STORYTELLING" OR DE "FICTION" OR DE "NONFICTION" OR DE "POETRY") AND (DE "GEOGRAPHY education" OR DE "ENVIRONMENTAL education")

Selection process

The search was limited to published articles, returning a total of 359 results (ProQuest: 342, EBSCOhost: 17) when conducted on 10th November 2023. After de-duplication, the results comprised 339 articles, 335 of which were in the English language. The four non-English language articles were excluded from the sample to facilitate linguistic analysis. I was able to obtain full text versions of 331 articles.[35] I then undertook a process of manual review to exclude any articles that lacked relevance to my research focus: discourses around the pedagogical role of storytelling in geographical and environmental education. This entailed the exclusion of articles meeting the criteria outlined in Table 2.

[35] Of the four cases where this was not possible, two were related to the cyber-attack on the British Library that took place in October 2023 (British Library, 2024).

Table 2: Exclusion criteria

Criteria	Examples
1. Does not include **discussion**	Stand-alone lesson plans Educational resources
2. Does not discuss **pedagogical** role of storytelling	Discussions of storytelling as research method Reviews of academic literature Analyses of literary texts
3. Does not discuss pedagogical role of storytelling **in geographical or environmental education**	Discussions of storytelling in a range of different fields

99 articles were excluded using these criteria. This left a total of 231 articles published between 1972 and 2023. Since the search was conducted before the end of the year in 2023, and considering the potential delay between publication and indexing in databases, I judged that the results from 2023 were incomplete and excluded the five articles published that year. Finally, 227 articles were selected for analysis, spanning the period 1972 to 2022. Full bibliographic details can be found in the "Primary sources" section of the thesis bibliography. The selection process is summarised in Table 3.

Table 3: Selection process

Stage	Number of articles
Database search	359
De-duplication	339 (-20)
Application of language criteria	335 (-4)
Procurement of full text	331 (-4)
Manual review: application of exclusion criteria	232 (-99)
Limitation of time period	227 (-5)

While the table above presents a neat summary of a seemingly seamless selection process based on objective criteria, the reality was rather more complicated. Despite my efforts to document the stages and criteria used as transparently as possible, my approach to data collection did not aim to replicate the strict protocol of a systematic review. In practice, the inclusion and exclusion criteria evolved in an iterative process, guided by my research questions, as I familiarised myself with the articles identified through the database searches. It quickly became apparent that the process of manually reviewing articles would not be as quick or easy as I had initially imagined. To begin with, the diverse publication types and long time span were reflected in a wide array of text formats and structures, meaning that many of the articles did not have abstracts. To determine their relevance to my research, it was often necessary to scan the full text, particularly for older articles and those published in educational magazines. Indeed, I had to do the same even for many of the articles that did have abstracts, as I realised the complexity of the exclusion criteria that I was seeking to apply. Criterion 2 – "does not discuss **pedagogical** role of storytelling" (see Table 2) - proved particularly challenging. As previously discussed, the concept of "Earth writing" had to be approximated in my search terms through reference to various forms of creative expression, so its "pedagogical" function would always have to be determined through manual review. However, distinguishing between creative *pedagogies* and creative *research methods* proved to be less than straightforward in many cases.

On one level, it is obvious that conducting educational research often necessitates some kind of educational – pedagogical - intervention. The question of where the "intervention" ends and the "research" begins is not always clear-cut, especially when the researcher(s) and the educator(s) are the same person, as in the case of practitioner research. On another level, though, the distinction between pedagogy and methodology reveals a deeper tension between different conceptions of research. Traditional social science paradigms derived from the scientific method would require "research" to be based on neutral observation and objective evaluation of an "intervention". However, since at least the beginning of my study period in the 1970s, researchers have increasingly questioned the imperative, or even the possibility, of neutrality in social research. Transformative research paradigms recognise that research can be an

intervention in itself: hence, in an educational context, the research methods and the teaching methods may be one and the same. Given the rise of creative and arts-based methods in education (Cahnmann-Taylor and Siegesmund, 2018) and the broader social sciences (Barone and Eisner, 2012; Kara, 2015, 2024; Leavy, 2015, 2018) in the twenty-first century, many of the articles from this period did not make an explicit distinction between research and intervention.[36] Therefore, in deciding which ones to include in my analysis, I had to pay close attention to the aims of the research/intervention: were creative methods used to develop (students') learning or (researchers') understanding? I included all articles where the stated aims were at least partly pedagogical.

It was clear, then, that the selection process would involve more than a quick "eligibility check". The decisions that I was making at this stage already required a deeper reflection on the conceptual boundaries of my research, as well as a deeper interrogation of my source material. In a sense, data analysis was starting to bleed into data collection. I therefore used this opportunity to create a detailed overview of the included and excluded articles in an Excel spreadsheet. This overview served to document key information that I gleaned from each source during this early stage of familiarisation, as well as providing a starting point for the quantitative and qualitative analysis to follow. As well as bibliographic information, I added basic information related to my research questions, briefly outlining where, when, why, and how storytelling was used (and written about). I also adopted Hawkins' (2011) framework of "dialogues" and "doings" to record whether learners were working with the Earth writing of others and/or creating their own. The column headings and brief explanatory notes are presented in Table 4.[37]

[36] The issues here, and the extent to which storytelling might become enlisted for "transformative" intervention purposes, return in how I assess key dimensions of what has been happening in this period in my findings towards the end of Chapter 5.

[37] For reasons of space and legibility, the full document is too large to be appended to the thesis. Charts derived from the document, visualising the number, field, and location of articles published in each year of the corpus, are presented in the Appendix.

Table 4: Article overview column headings

File name	File name of article in the corpus
Accession number	Accession number of article in the database
Year	Year of publication
Author	Author of article
Title	Title of article
Publication	Title of periodical
Publication Field	Field of periodical (e.g. general education)
Publication Location	Location of publisher (e.g. UK, international)
Education Field	Field of education (e.g. geographical education)
Education Location	Location of authors (e.g. USA)
Education Context	Educational setting and level (e.g. formal, primary)
Education Content	Educational topic (e.g. glaciers)
Genre	Genre of writing (e.g. fiction, poetry)
Source Material	Sources of writing (e.g. folk tales, named authors)
Methods	Summary of learning activities
Aims	Summary of learning aims
Outcomes	Summary of learning outcomes
Challenges	Summary of pedagogical challenges
Dialogues?	y/n – learners interpret writing
Doings?	y/n – learners produce writing
Excluded?	Reason for exclusion (if applicable)

The decisions made at each stage of the data collection process inevitably had implications for the composition of my corpus. Collating information on the spatio-temporal characteristics of my sources in the database shed some light on the limitations of my approach. Perhaps most obviously, limiting the scope to English-language articles means that the selection cannot provide a global picture of practice in geographical and environmental education. While in this case only four articles were excluded from the database results, the databases themselves hold limited collections which are heavily biased towards English language publications, reflecting a wider issue of linguistic privilege in the making and sharing of disciplinary knowledge (see Albert et al., 2017; Müller, 2021). The national remits of the major Education databases further restrict the geographical range of indexed publications, even within the English-speaking world. The globalisation of academic and educational publishing has meant that many publications associated with national organisations now have international editorial boards and publish material (in English) from a wider range of locations, but a few countries still predominate. I tried to “capture” this phenomenon by recording both the location of the publication (which in some

cases was international from its inception) and the location of the educational practice being discussed. The trend towards internationalisation is visible within the data (see Appendix) and must be recognised as indicative of a broader movement that complicates the analysis, rather than necessarily telling us something about the spatio-temporal development of Earth writing practices themselves.

It is also important to remember that, regardless of geographical context, not all educational practice gets published. There are other important factors which influence the likelihood of publication, which again became apparent in the process of adding information to the database. Despite my efforts to mitigate this risk by including practitioner magazines along with scholarly journals, there was an uneven representation of different educational contexts (formal, non-formal, informal) and levels (early years, primary, secondary, tertiary, adult). Again, the balance appeared to shift over time, and again this is indicative of broader trends that must be accounted for in the analysis. Clearly, there are differing expectations around publishing in different sectors of education, with universities being most likely to consider it a requirement of the job. This consideration is also reflected in the expansion of the academic publishing landscape itself, with publishers increasing the number of journal issues released each year to accommodate the growing pressure to publish, a trend which is less pronounced in practitioner magazines. An increase in the number of articles published on the topic of storytelling (see Appendix) cannot be solely attributed to an increased interest in the topic – the changes in the broader publishing landscape must also be acknowledged.

The pressure to publish and other employment pressures can produce perverse effects on the types of educational practice that get written up and accepted for publication. Dawson and Dawson (2018) highlight how the fuzzy boundaries between research and teaching, the influence of funding bodies, methodological issues, and insecure employment together incentivise a culture of “sharing successes and hiding failures” in learning and teaching research. Although less widely documented outside of higher education, this kind of institutionalised reporting bias, or “positivity bias” (Tight, 2023), almost certainly exists in other educational contexts too – how likely is it that a school teacher would write a

report on an intervention that they developed but which made no discernible difference to students' learning, or even negatively affected it? How likely is it that their school would support the dissemination of this report? How likely is it that an editor would select such a piece for publication over one relating a "success story" that readers might wish to emulate? The dearth of negative or critical accounts of storytelling was among the starkest of my observations during the data collection/familiarisation process. The "Outcomes" column of the database had to be widened to accommodate lists of improvements in student motivation, engagement, and understanding, whereas the "Challenges" column was overwhelmingly populated with "not specified". Where challenges were specified, they were almost exclusively framed as minor hurdles on the way to an otherwise happy ending. This finding, of course, tells us at least as much about the storytelling imperatives of published articles as it does about storytelling in geographical and environmental education.

Close attention to context is a central aspect of discourse analysis, and it is evident that the context of the data I collected – or, rather, my capacity to appreciate the intricacies of such context - is limited in various ways. To an extent, though the limitations arguably reflect the existing limitations of the discourse communities in which I am interested. In being clear that the data is not a comprehensive survey of educational practices of Earth writing, but rather an analysis of how *discursive* practice operates in the fields of geographical and environmental education, the omissions themselves open up avenues for investigation. The fact that certain countries, sectors, and findings appear to be over-represented in the data already suggests something about the nature of these discourse communities. The broad historical and geographical scope of my research necessitates working with "what's there" – generating new data through observation or interview is hardly feasible at this scale – but it also necessitates careful attention to what's *not* there – what has not been recorded for posterity, and why – at all stages in the research process, from data collection onwards.

Data processing

Conversion and cleaning

In order to prepare the selected articles for computer-assisted analysis, I had to process them into a computer-readable format. This involved converting the formatted files that I had downloaded to plain text. The process for doing this was slightly different depending on the type of file with which I was working. For fully digitised texts, I used the freeware tool *AntFileConverter*, specifically developed to convert .pdf and .docx into .txt files for use with corpus software (Anthony, 2022), but this conversion was obviously impossible for files where the text was not computer-readable (as with scanned images of print articles). A significant minority of the selected texts fell into this category, particularly among the older articles. These articles required the use of Optical Character Recognition (OCR) technology before they could be converted into text files. OCR, which detects and converts text in images, is increasingly being built into widely used applications from the likes of Google, Microsoft, and Adobe. After trialling various conversion methods on a small "pilot corpus" comprising one article from each decade of my study period, I found that the native OCR in Microsoft OneNote tended to produce the best results in terms of accuracy and formatting. I therefore converted all files in the corpus requiring OCR processing by inserting them into OneNote and copying the text into a .txt file. The converted plain text files were named using abbreviated metadata from the Excel overview document in the following format: [file number]_[year]_[country]_[field], e.g. 001_1972_US_EE.txt.

Regardless of the conversion method used, all files in the corpus required some level of manual editing, partly due to the limitations of the currently available conversion methods. The format of the original print (e.g. text size, font) and the quality of the scanned image (e.g. page skew, colour contrast) can affect the accuracy of OCR text conversion. Page layout was problematic in the conversion of both digitised and OCR-processed texts. Although both methods handled column navigation reasonably well, some layout elements – such as enlarged "pull quotes" that break up the main flow of text (a common feature in practitioner magazines) – caused words and paragraphs to appear in the wrong order. All texts were also "cleaned" to remove paratextual elements that would

skew the results of the corpus analysis. The “clean” version of texts included the article titles, abstracts (where present) and main article content. I removed any “boilerplate” text (e.g. page headers and footers with bibliographic information), author names and biographies, figures, tables and captions, footnotes and endnotes, reference lists, acknowledgements, and appendices (e.g. creative materials used in interventions). Non-English text (e.g. multilingual translations of abstracts) was also removed. The aim was to ensure that the analysis focused on the natural flow of the author’s voice to the greatest extent possible. My approach to data cleaning largely followed the precedent of comparable corpora of academic texts such as the Pearson International Corpus of Academic English (Ackermann et al., 2011) and the Academic Journal Register Corpus (Gray, 2015). All manual editing was conducted using the free text editor *Notepad++* (Ho, 2024). This software supports advanced “find and replace” searches across multiple files, facilitating the removal of repeated text like bibliographical headers and footers.

The distinction between textual and paratextual material was not always clear-cut, and the treatment of footnotes and endnotes in particular required pause for thought. The range of referencing conventions used in different disciplines and publications meant that such notes served a range of different functions across the corpus. In some cases, it could be argued that they were an extension of the main discursive text, adding additional points that conceivably formed part of the argument advanced by the author. In other cases, they simply formed part of the referencing system, providing partial or full bibliographic details of cited sources. To remove notes could be seen as introducing a form of inequality into the corpus, whereby articles that happen to use in-text referencing systems have their cited sources represented in the corpus to a greater extent than those that happen to use note-based systems. On the other hand, including note-based references could lead to an over-representation of cited sources from these articles, as they generally provide more detailed bibliographic information than do in-text systems. Gray (2015) resolves this dilemma in a multidisciplinary academic corpus by manually reviewing all notes to determine their function, removing the reference notes and retaining those with a discursive function. As well as being time-consuming, however, this approach raises other questions about where the notes “belong” in a clean text file. Footnotes and endnotes are

effectively “extratextual” in the sense that they take the reader out of the flow of the main text, while retaining reference points to particular parts of it. Gray’s (2015) solution, to retain footnotes but move them to the end of the file so as not to interrupt the main prose of the text, seemed unsatisfactory for the types of corpus analysis I wanted to conduct. Concordance analyses, for example, are based largely on the proximity between different words in a text (see “Qualitative analysis” section below), so artificially distancing the notes from their reference points could give an artificial impression of the relationships between concepts. Arguably, the question of whether these notes are necessary to understand the texts is already answered by the author in relegating them from the main prose. For this reason, I chose to remove all footnotes and endnotes from the corpus files, regardless of function, since my mixed methods research design still allowed me to consult them in the full text as required. On balance, I judged that the degree of “noise” introduced by retaining in-text citations elsewhere was more acceptable (and easier to deal with) than distorting the relationship between concepts in concordance analyses.

Annotation and structure

After conversion and cleaning, the files were ready to be uploaded into the corpus analysis software. Before uploading the full corpus, I trialled different software using the pilot corpus created during the conversion and cleaning stage to compare functionality and format. I was particularly interested in the handling of metadata (e.g. the year, location, and educational field of each article) and its application in the creation of subcorpora (subsections of the corpus) to facilitate comparison. The commercial, web-based corpus software *Sketch Engine* (Lexical Computing, no date-c) offered the greatest flexibility in this regard. Rather than “hard coding” metadata into the plain text files, *Sketch Engine* allows for metadata to be added and edited after the files have been uploaded. Subcorpora can then be created flexibly using this metadata – for example, I could choose to focus my analysis on a single year, or group them together to compare different decades.

Grammatical and comparative analyses are made possible through different levels of corpus annotation. At the word level, *Sketch Engine* automatically

applies part-of-speech tagging and lemmatisation to user-uploaded corpora. Part-of-speech tagging (or POS tagging) means that each word is annotated with a tag containing information about its grammatical category (e.g. noun, verb, or adjective) and form (e.g. plural or singular nouns, present or past tense verbs). Lemmatisation recognises the derived forms of words and assigns them to their base (dictionary) form (e.g. the derived forms “am”, “are”, and “was” would be assigned to the base form “be”). More precisely, POS tagging and lemmatisation are applied to *tokens* – the smallest grammatical units found between spaces in a text, which may be words, punctuation, numbers, or abbreviations. Words may contain more than one token – for example, the word “don’t” consists of two tokens, the verb “do”, and the negator “n’t”. Tokenisation, lemmatisation and POS tagging allow for more effective concept searches to be carried out (e.g. searching for the lemma “write” will include the derived forms “writing”, “written”, “wrote” in the results). My corpus was annotated using the default *English TreeTagger PoS tagset with Sketch Engine modifications* (Lexical Computing, no date-a). It should be noted that automatic taggers are rarely one hundred percent accurate. To cite two common issues, end-of-line hyphenation can prevent words from being recognised as one unit, while international spelling variations can cause the same word to be recognised as two different units. These issues potentially introduce further sources of “noise” in the data, which may affect the results of particular types of analysis, but it has also been recognised that automatic annotation is more reliable the more texts conform to formal grammatical conventions (Baker, 2023). We would therefore expect published journal and magazine articles to be tagged with a relatively high degree of accuracy compared to other text types.

In addition to automatic word-level annotation, I also carried out manual annotation at the document level to facilitate comparative analyses of articles from different time periods. *Sketch Engine* features a built-in annotation tool for adding metadata related to whole files. I used this tool to assign the year of publication as an “attribute” of each file, manually inputting the values according to the file names. I then grouped the articles using this metadata to create subcorpora for each decade. The corpus is described in Table 5 in terms of number of articles, number of words, and percentage of total corpus size (rounded to the nearest whole percentage) per subcorpus.

Table 5: Corpus description

Attribute	Subcorpus	Number of articles (%)	Number of words (%)
Decade	1970s	14 (6%)	34,870 (3%)
	1980s	13 (6%)	25,271 (3%)
	1990s	48 (21%)	121,427 (13%)
	2000s	35 (15%)	118,888 (12%)
	2010s	72 (32%)	382,463 (40%)
	2020s	47 (21%)	272,804 (29%)
TOTAL		**227**	**955,725**

Data analysis

Table 6: Overview of breadth-and-depth analysis process

Step (from Weller et al. (2023))	Aim	Method	Unit of analysis
1. "Aerial survey"	Identify sources	Corpus building	Full texts
2. "Geophysical survey"	Map themes	Keyness analysis	Words and terms
3. "Test pit sampling"	Identify areas for further analysis	Concordance	Text extracts
4. "Deep excavation"	Interpret themes	Close reading	Full texts

Keyness analysis

My approach to discourse analysis broadly followed the iterative steps of the breadth-and-depth method (see Table 6). Having gained a broad overview (or "aerial survey") of the texts through the corpus compilation process, I next sought to explore linguistic patterns within them through surface-level thematic mapping (or "geophysical surveying"). As Weller et al. (2023, p.27) explain, the aim of this step is "to identify potential areas of conceptual and substantive interest in order to assess what merits closer investigation". In my case, I was interested in linguistic patterns that might indicate shifts in the dominant discourses around the conceptualisation and use of stories over time. These patterns were principally identified through keyness analysis – a measure of the extent to which words are characteristic ("key") of a corpus or subcorpus.

According to Baker (2004), early scholarship on keywords focused on terms deemed to be socially or culturally significant (e.g. Firth, 1957; Williams, 1976) before shifting towards statistical measures of significance, as pioneered by corpus linguist Mike Scott through his software *WordSmith Tools* (Scott, 1996, 1997). Bondi (2010, p.1) notes that the notion of keywords has "no well-defined meaning in language studies", while Stubbs (2010, p.21) observes that the term "is used in several different senses which are only loosely related". The *Cambridge Dictionary of Linguistics* defines a keyword as "a word occurring in a text or corpus more frequently than might be expected if it occurred by chance" (Brown and Miller, 2013, no pagination), while its Oxford equivalent defines it as "a word or concept characteristic of the thought of a particular community in a particular period" (Matthews, 2014, no pagination). Despite the differing emphases of contemporary definitions, a common thread can be discerned in applied work. As its metaphorical foundation implies, a keyword acts as a "key": a "tool" (Bondi, 2010, p.4) or "enabling device" (Scott, 2010, p.44) that unlocks a "way in" (Gabrielatos, 2018, p.227) to texts. Indeed, Scott (1997) himself drew a direct comparison between his quantitative approach to keywords and the cultural approach of his predecessors, claiming that, while they differed in procedure, his aim to "characterise texts, and from there … to develop means for drawing inferences regarding the culture these texts spring from" (p.235) was "akin to that of Raymond Williams (1976)" (p.233). Thus, words act as keys to texts, which in turn act as keys to culture – or in my case, to the major

preoccupations of the discourse communities of geographical and environmental educators.

Quantitative methods of keyword generation are based on the relative frequencies with which words occur in the (sub)corpus of interest (the focus corpus) as compared with another (sub)corpus (the reference corpus).[38] Words that occur statistically more frequently in the focus corpus are considered key. Since this method is comparative in nature, the choice of reference corpus will influence the results, although Scott (2010) found that a common core of keywords tends to be identified even across different reference corpora. In corpus linguistics, the term "reference corpus" usually refers to large corpora designed to provide a representative sample of a particular language variety, such as the British National Corpus, which contains 100 million words of contemporary spoken (Love et al., 2017) and written (Brezina et al., 2021) British English. Generating keywords through comparison with a general reference corpus can help to identify salient concepts in the focus corpus as a whole: for example, Wearne and Riedy (2024) identified ecocentric and anthropocentric discourses in internet discussions of place-based sustainability by comparing their sample texts to a general reference corpus of internet English. Since I was primarily interested in the evolution of discourses within my corpus over time (diachronic change), however, the use of a general reference corpus was less relevant to my aims. Instead, I adopted what Baker (2023, p.180) calls the "remainder method" of generating keywords by comparing each section of the corpus to a reference corpus comprised of all the other sections combined (see Baker et al., 2019; Baker et al., 2013; Brookes and Baker, 2021). Having structured my corpus by decade as described above, I used these subcorpora to generate initial keyword lists for each decade (in comparison to all the other decades), following a conventional structure in corpus-assisted discourse studies exploring diachronic change over comparable time periods (e.g. Hocking, 2022).

Various statistical methods have been proposed for measuring keyness. While methodological debates have existed since quantitative approaches first

[38] The focus corpus is sometimes referred to as the "target" or "study" corpus, while the reference corpus may be referred to as the "comparator" or "comparative" corpus. I use the terms "focus" and "reference" corpus throughout to reflect the terminology of the software used in my analysis, *Sketch Engine* (Lexical Computing, no date-b).

emerged in this context the 1990s (Gabrielatos, 2018), Sönning (2024) argues that the choice of metric is ultimately a secondary concern to the more fundamental question of the researcher's objectives in using keyness analysis: we must decide "*what* to measure" before deciding "*how* to measure it" (p.277, emphasis in original). Building on work by Baker (2004), Egbert and Biber (2019), and Gries (2021), Sönning (2024) identifies four dimensions of keyness ("discernibility", "distinctiveness", "generality", and "comparative generality"), each emphasising different aspects of "typicalness" in a corpus. The "discernability" and "distinctiveness" of keywords indicate the extent to which they are associated with the focus corpus, either in isolation or in comparison to a reference corpus, respectively. Sönning (2024) calls these "frequency-oriented" approaches to keyness, since they prioritise occurrence rates in the focus corpus as a whole. The "generality" and "comparative generality" of keywords indicate how widely they are used throughout the focus corpus (again considered either in isolation or in comparative terms). Sönning (2024) calls these "dispersion-oriented" approaches, since they prioritise the distribution of occurrences across the individual texts in the corpus. Each dimension of keyness can be measured by a range of different metrics, in either descriptive or inferential terms.

I generated my initial keyword lists using *Sketch Engine*'s keywords tool, which ranks keywords based on a simple ratio of normalised frequencies: a score of 1 indicates that the word occurs with equal frequency in the focus and reference corpus, while a score of 2 indicates that the word occurs twice as frequently in the focus corpus as in the reference corpus (in relative terms of frequency per million words, to account for differences in corpus size) (Kilgarriff, 2009; Lexical Computing, 2015). Sönning (2024) characterises this metric as a descriptive measure of distinctiveness using a "bag-of-words" approach, where the corpus is considered as a collection of individual words (rather than a collection of texts). While inferential measures of distinctiveness are more widely used in keyness analysis (Pojanapunya and Watson Todd, 2018; Sönning, 2024), Gabrielatos (2018) insists that they are fundamentally inappropriate for measuring keyness, a position maintained by *Sketch Engine*'s developer Adam Kilgarriff (2005) on the basis that language is "never, ever, ever random". In other words, the null hypothesis on which such measures are based – that differences in the relative

frequencies of words between two corpora “occurred by chance”, as posited in the Cambridge definition of a keyword – can never be true. Sönning (2024) shares this evaluation of inferential measures as applied to “bag-of-words” analyses, although he clarifies that they may be appropriate in newly developed text-level methods of analysis.

Ultimately, however, descriptive measures are more appropriate to the aims of my research. Inferential measures of keyness treat the focus corpus as a sample of a given language variety, expressing the level of confidence that the differences observed can be attributed to something other than sampling variability. As Baker (2023) puts it, an inferential metric of keyness “does not necessarily tell us anything about the extent or strength of a difference between a word’s frequency in two corpora, but is more concerned with whether there actually *is* a difference” (p.167, emphasis in original). While this may be an important consideration for conducting genre analysis (i.e. analysis of style), where the corpus indeed functions as a representative sample of a wider body of texts, this is not the case in my specialised corpus. At this stage in my analysis, my aims are explicitly to describe the internal characteristics of the corpus - not to hypothesise about it – as a precursor to deeper interpretive analysis. In this regard, an additional strength of the ratio of normalised frequencies metric is its ease of interpretation, for which Sönning (2024) rates it the best among the distinctiveness measures available in the major corpus analysis tools. Gabrielatos (2018) notes that ease of interpretation is an important consideration, since several of the descriptive metrics use different numerical scores to express the same overall ranking of keywords (see also Sönning, 2024).

Since the normalised ratio of frequencies is a comparative measure of distinctiveness, the highest ranked keywords are those with the largest difference in relative frequency in comparison to the reference corpus. It has been noted that simple ratios may over-emphasise lower-frequency keywords, since each occurrence holds greater proportional weight at this frequency range: Kilgarriff (2009) gives the example of a word occurring ten times in the focus corpus and only once in the reference corpus achieving the same ratio score as a word occurring ten thousand times in the focus corpus and one thousand times in the reference corpus, despite the latter seemingly being a much more striking

difference. A word occurring only ten times in a large corpus is a dubious indicator of typicalness: while it may meet the comparative criterion of distinctiveness, its low frequency means that it lacks discernability within the focus corpus and is less likely to meet the criteria of generality or comparative generality. In addition, simple ratios exclude keywords that are wholly absent in the reference corpus, due to the impossibility of dividing by zero, even though such words are by definition highly distinctive of the focus corpus. To address these issues, the calculation for the *Sketch Engine* keyness score adds a smoothing parameter *N* to the normalised frequencies, allowing users to adjust the frequency range of the outputs (Kilgarriff, 2009; Lexical Computing, 2015). After exploring lemmatised keyword lists in the low- (*N* =1), middle- (*N* = 100), and high-frequency (*N* = 1000) ranges, I found that the latter setting achieved the best balance of distinctiveness and discernability for my purposes.

Scott (1999) advises that three kinds of words are often found in keyword lists: proper nouns, words that indicate what the corpus is about, and words that indicate the style of the corpus. For my analysis, I was principally interested in the "aboutness indicators" (Scott and Tribble, 2006, p.55) – typically lexical (content) words like nouns, adjectives, and verbs. The raw output of my initial keyword lists already contained a relatively high proportion of such words: stylistic indicators – typically grammatical (function) words with little referential meaning – were deprioritised thanks to my use of stylistically similar texts as a reference corpus and my choice of a keyness metric that prioritises distinctiveness over generality. However, not all words in the lists were intuitively recognisable as aboutness indicators. As Gabrielatos (2018, p.238) notes, "[t]he inclusion of an item in the list returned by an automated frequency comparison does not necessarily entail that the item is key". He suggests instead that initial outputs should therefore be regarded as "candidate key items" (p.238) whose keyness must be established through triangulation (Gabrielatos and Baker, 2008). Similarly, Johnson and Ensslin (2006) distinguish between the "'rough' keyword list" produced by the software and a "'true' keyword list", the latter requiring manual (qualitative) analysis and interpretation. Researchers typically focus their analysis on a subset of the original list, using various means to select "true" keywords relevant to their research aims (Egbert and Biber, 2019; Gabrielatos, 2018; Pojanapunya and Watson Todd, 2018). Rather than

selecting keywords by specifying a quantitative cut-off point (e.g. of statistical significance, frequency in the corpus, or dispersion across the corpus), I found Baker's (2004) approach of qualitatively examining their use in context to be more appropriate to the discursive orientation of my research.

Although I did not specify a minimum level of frequency or dispersion – an approach that Egbert and Biber (2019, p.100) found to produce "a poorer keyword list" – I did take these factors into account in selecting keywords for further analysis. While the *Sketch Engine* output ranks keywords by their keyness score (derived from the ratio of normalised frequencies), it also includes additional columns with a range of other measures, including measures of dispersion. An initial review of outputs suggested that the top 50 keywords provided sufficient insights into "aboutness", with sufficient levels of relative frequency and dispersion to be considered broadly typical of each decade. It is important to note, though, that my consideration of frequency and dispersion was not limited to the level of the individual word (the lexical level). Keyness analysis at the lexical level has been described as a "fairly blunt instrument" for analysing discourse (Gabrielatos and Baker, 2008, p.28) due to its inability to account for other aspects of linguistic meaning including "homography, polysemy, part of speech, multi-word units and syntactic relations" (Gabrielatos, 2018, p.226). As Baker (2004, p.353) notes, low-frequency words may still be insightful when considered alongside other low-frequency synonyms as part of "key categories" of meaning or function.

I used a two-stage process to establish these common discursive themes beyond the lexical level. Firstly, I supplemented the top 50 keyword lists with the top 50 "key terms" – multi-word expressions identified using the same process as keywords[39] – to gain a sense of the specific meanings with which words were being used. Secondly, I examined how the keywords and key terms were used by examining concordances, a tool that presents all occurrences of a given keyword in their immediate contexts (usually a few words before and after the word in question). Reviewing how keywords functioned within larger units of meaning

[39] Multi-word expressions may also be referred to as "n-grams", "clusters" or "lexical bundles". Sketch Engine computes key terms according to a language-specific "term grammar" that defines the lexical structure of multi-word expressions, typically noun phrases (Lexical Computing, 2015; no date).

provided greater confidence in my identification of discursive themes and reduced the risk of "erroneously combining words that may appear similar at face value" (Baker, 2004, p.353).

The keywords and key terms reported in the following chapter illustrate the major themes identified from the top 50 keyword and key term outputs in *Sketch Engine*. In order to focus on the "aboutness indicators", grammatical words and proper nouns have been excluded. The words and terms are grouped according to my research questions: checking their use in context allowed me to determine whether they illustrated key kinds of stories, teaching approaches, or learning aims. After compiling summary tables for each decade, it became apparent that there was substantial thematic overlap between the keywords and terms of certain decades. Since the ultimate aim of my research was to chart discursive change over time, rather than strictly between decades, I decided to use these themes to structure my analysis, combining the results from decades with thematically similar keywords and terms. Of course, discourses themselves are fluid and unconstrained by such neat parameters. Therefore, while the decade framework provided insights into the periods during which different discourses rose to prominence, it was necessary to look beyond those periods to capture their "full story".

Qualitative analysis

The initial stages of data analysis provided the "breadth" to my "breadth-and-depth" approach. Following Weller et al. (2023), the keyword analysis acted like a "geophysical survey", mapping the key thematic features of the corpus. At this stage, my understanding of these themes was limited to the surface level: I had some sense of the salient issues permeating each decade, but little insight into why they were salient, or how they were being discussed. Obviously, keywords do not constitute discourses in themselves, but rather offer access points into them. Understanding the nuances, debates, and anomalies beneath the surface of these overarching themes required me to expand the unit of analysis beyond the lexical or semantic level, and to shift from an exploratory into a targeted approach to analysis (Gabrielatos, 2018).

Like other corpus analysis software, *Sketch Engine* offers a concordancing tool that facilitates the preliminary analysis of short extracts from the corpus texts, a "critical juncture" in the shift from breadth to depth that Weller et al. (2023, p.129), in their archaeological analogy, liken to "digging shallow 'test pits'". As previously mentioned, I made limited use of this tool during my keyword analysis to "sense check" the results, particularly those with ambiguous or multiple meanings, and determine their relevance to my research questions. Having refined my keyword results, I then returned to the concordancing tool with the aim of identifying discursive patterns that merited deeper exploration. Pattern identification was facilitated by the filtering and sorting functionalities of the concordancing tool. For example, filtering concordance lines by decade allowed me to explore how the usage of words identified as key in certain decades had changed over time, while sorting concordance lines alphabetically by the first word following the keyword allowed me to identify patterns of co-occurrence (see Figure 8). Recurring words of interest identified in the concordance lines could then be used as search terms themselves, in a process Duguid and Partington (2018, p.46) refer to as "chain-concordancing". Lemmatisation ensured that occurrences of derived forms of keywords, such as plural nouns and conjugated verbs, were included in the results. By examining short extracts of text containing key words and terms, I began to build up a more complex picture of the discourses in which they were embedded. This process also allowed me to identify illustrative texts within the corpus for more in-depth textual analysis. Importantly, this included articles published before or after the decade in which the words and terms were identified as key, lending insights into the precedents and legacies of discursive trends. In other words, the shallow "test pits" of the concordance lines served to identify sites within the corpus that were most suitable for "deep excavation" (Weller et al., 2023).

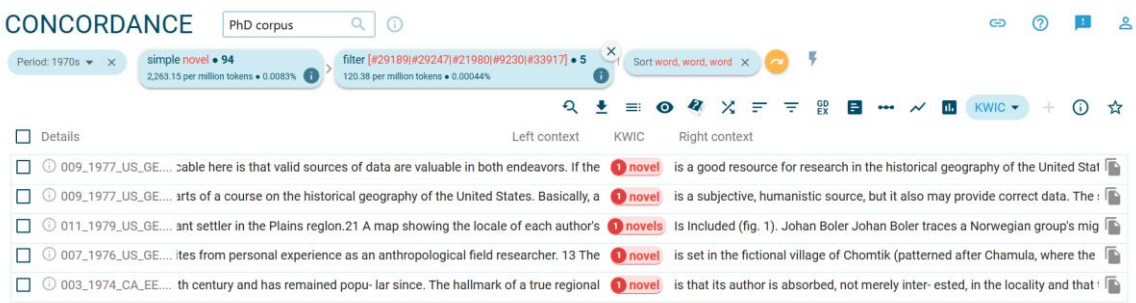

Figure 8: Sample concordance lines for the keyword in context (KWIC) "novel"
Results are filtered by decade and sorted alphabetically by first, second, and third word to the right.

The final stage of analysis involved the close reading of articles in their entirety. While comparing short extracts helped to understand how individual texts contributed to dominant discourses circulating in the discourse community, their full meaning could not be understood in isolation. It was equally important to understand how the extracts functioned as constituent parts within the structured, self-contained argumentation of articles published by different authors in different outlets. Although the initial keyword analysis relied on an unstructured "bag-of-words" model of the corpus, in which each term is understood independently from the others, the analysis was not complete until it reflected the actual composition of the corpus as a collection of texts (see Sönning, 2024). In the breadth-and-depth method, the text is retained as the ultimate unit of analysis: lexical- and semantic-level analyses are incorporated as a means to that end, using computer-assisted methods to identify patterns that would be difficult to detect through manual analysis of large volumes of material (Weller et al., 2023).[40] The reduction in textual complexity that facilitated this large-scale analysis was then restored for a more manageable selection of texts that, as could now be demonstrated in quantitative terms, reflected the central concerns of the corpus as a whole.

In this regard, there are important distinctions between my approach to corpus-assisted discourse analysis and strictly computational approaches such as topic modelling. While both approaches make use of "low-dimensional" (Grimmer et al., 2022) representations of texts, such representations provided an entry point to my analysis rather than an end point. The role of the "low-dimensional" representation was to provide a different perspective on the corpus – a zoomed-out view which helped to orient my navigation through it. My concern was to apply the principles of qualitative research at scale: to engage with the richness of "big qual" data (Weller et al., 2023), rooted in the understanding that texts are more than the sum of their parts. This perspective is fundamentally at odds with the reductionist approach advocated by Grimmer et al. (2022), which conceives of texts as analogous to numerical data: as sets composed of variables

[40] Baker (2023, p.24) argues that, in addition to the advantages of scale, computer-assisted methods are particularly adept at identifying "hidden patterns of language", which may not be consciously remarked upon by human readers but could be considered "all the more powerful because we are not aware of them".

(lexical items) whose meanings can be interpreted through the objective analysis of their internal characteristics (co-occurrence patterns).[41]

Like Baker (2012, 2023), I am wary of claims that the quantitative elements of corpus-assisted discourse analysis make it inherently "more objective" or "less biased" than traditional qualitative approaches. It should be clear from the previous section that conducting a keyword analysis involves human decision-making at each stage in the process. I considered it important to set out these decisions at length in this chapter, to ensure that the significant role of the researcher remains visible even – perhaps especially - in the parts of my analysis that involved elements of automation. At no point did I approach the corpus from a naïve position. From design to interpretation, each stage in the research process was informed by my understanding of the broader context: of the discourse communities of geographical and environmental education research, in which I also participate. This contextualised understanding was essential to an investigation of linguistic patterns as "traces" of discourses which themselves exceed the linguistic domain. Investigating these patterns both quantitatively and qualitatively helps to understand the dynamics of "regularity" and "instability" in the meaning-making practices of discourse communities (Porter, 1992). The next chapter presents the findings of my investigation: the second "cut" through the issues of Earth writing and storytelling discussed in Chapter 3.

[41] For critiques of topic modelling in discourse studies, see Bednarek (2025); Brookes and McEnery (2019); Gillings and Hardie (2023); Gillings and Jaworska (2025); Shadrova (2021).

Chapter 5: Educational discourses of Earth writing

Introduction

Having explored scholarly debates around the legitimacy of different modes of Earth writing in geography, this chapter expands the discussion by exploring the dynamics of Earth writing in educational spaces. Examining how geographical and environmental educators construct the relationship between text, teacher, and learner provides insights into different configurations of authority and agency in Earth writing – in other words, into who has the right to write. Four such configurations were identified through the discourse analysis of my corpus of educational journal and magazine articles. As outlined in the previous chapter, these discourses were identified through a combination of quantitative and qualitative textual analysis: key terms suggested the dominant concerns in each decade of the corpus, which were then explored in depth through the close reading of extracts across the whole corpus.

This chapter presents the findings from both stages of the analysis, to illustrate the educational discourses of Earth writing in their breadth and depth. The four discourses are presented in the broad chronological order in which they rose to prominence within the corpus (which is not, of course, to suggest that they are in any way restricted to particular time periods). Overarching descriptors reflect the conceptualisation of the pedagogical role of stories that is core to each discourse: story as resource, story as experience, story as way of knowing, and story as transformation. Each conceptualisation is then illustrated through, firstly, a table summarising key terms evoking the typical "what", "how", and "why" of storytelling in each decade,[42] and secondly, an in-depth qualitative analysis of the associated pedagogical approaches illustrated with extracts from the corpus as a whole. This chapter does not have a concluding section: instead, key findings and implications are discussed in the thesis conclusion in Chapter 6, pulling together threads from this chapter with ones from Chapters 2 and 3.

[42] In line with stylistic conventions in corpus linguistics, key terms are listed alphabetically in the summary tables and presented in italics to facilitate their distinction from the main text (see for example Baker et al., 2019; Baker et al., 2013; Brookes and Baker, 2021). Single-word terms are referred to as "keywords", while multi-word terms are referred to as "key clusters".

Story as resource

Key terms

Table 7: Selected key terms from articles published in the 1970s

	1970s
Story sources	*book, imaginative literature, literary, literary work, literature, novel, novelist, regional novel, work of literature, writer*
Teaching approaches	*description, descriptive passage, geography class, geography classroom, geography teacher, reading material, use of literary works*
Learning aims	*cultural conflict, ethnic, ethnic community, ethnic group, ethnic immigrant, geology, historical, historical geographer, historical geography, immigrant, immigrant group, land, land use, landscape, local, natural history, regional, regional geography, rural, town, village*

The top 50 keywords and key clusters from articles published in the 1970s (Table 7) point to a predominant interest in written story formats and published works of literature. In particular, this period is characterised by frequent discussions of novels: *novel* is the strongest keyword overall in the subcorpus (94 occurrences), while the cluster *regional novel* (5) occurs uniquely within this period. A corresponding interest in the authors of such works can also be identified from the keywords *writer* (25) and *novelist* (21). While pronouns have been excluded from the summary table above, it is notable that *his* (119) and *he* (113) fall within the top five keywords, suggesting that male figures – as authors, characters, educators, or students – are disproportionately referenced in this decade compared to those that follow. Formal educational settings appear to be a key context for engaging with literature, with the discipline of geography strongly represented in the subcorpus. Receptive modes of engagement appear to be more typical, as suggested by the clusters *reading material* (4) and *use of literary works* (3). The terms *description* (27) and *descriptive passage* (4) suggest that the descriptive elements of literature attract particular attention in educational spheres at this time. A concern with content relating to the subdisciplines of *historical geography* (8), *natural history* (8) and *regional*

geography (8) is also apparent, with a number of keywords and key clusters designating classifications of human and physical characteristics that form objects of study in these fields.

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Conceptualisation of story as resource

A qualitative exploration of the corpus reveals that many of the earliest accounts of using stories in geographical and environmental education treat them as a resource. Of course, the term "resource" can be used in a broad sense to refer to any material used to support learning: in this regard, stories can be considered as a resource whenever they are used for educational purposes, regardless of how they are used. In this section, however, I use the term "resource" in the more specific sense of a source of material for exploitation, which relates to a distinctive way of using stories, rooted in a conception of story as a particular type of source from which information can be extracted. This conception is apparent among educators aligned with several different traditions in geography and environmental education. Indeed, discourses of story as a resource can be found in the academic geography literature some years prior to discussions of its pedagogical potential. Some of the earliest articles in the corpus make direct reference to this earlier literature when setting out their rationale for educational engagement with stories:

> With the growing interest of some scholars in the behavioural aspects of geography, traditional resources are being supplemented with more humanistic, subjective information sources. In historical geography, for example, literature is a particularly suitable resource for studies of man's role in past geographies and of human perception of past environments. Specialists in regional geography and area studies also have shown a growing appreciation of such sources. (Lamme, 1977, p.66)

> In recent years, geographers have shown a new interest in works of fiction as sources of geographical knowledge. Humanistic geographers have noted how novelists can capture the concrete experience of life in a particular place. Cultural and historical geographers have demonstrated the utility of novels in interpreting the real and perceived landscapes of the past. Others have pointed out how the geography of particular regions can be enriched by the novelist's powers of description. (Wyckoff, 1979, p.226)

Both authors here present the educational use of stories as a practice which emerges as a "natural" consequence of disciplinary developments in specific domains of research. Lamme (1977, p.66) describes it as a "parallel and related development" in geographic education: "If the novel is a good resource for research in the historical geography of the United States, for example, it is also appropriate for teaching a course on that subject" (Lamme, 1977, p.67). These excerpts illustrate a historiography of the practice that is developed across a series of publications by US-based academic geographers in the *Journal of Geography* over the 1970s and 1980s (Davenport, 1981; Hoy and Elbow, 1976; Lamme, 1977; Miller, 1989; Wyckoff, 1979). These articles recount how the approaches of cultural, historical, humanistic, and – especially – regional geographers can be applied in formal educational settings.

The discursive construction of story as resource effectively reduces stories to their textual content. Such accounts tend to focus on *stories* - the product - rather than *storytelling* – the process. Within the finished product of a story, some types of content are considered more valuable than others. Many educators identify the descriptive elements of stories as the most useful in pedagogical terms. In this regard, certain story formats are considered richer resources than others. The longform prose of the novel attracts particular attention from educators seeking to exploit literary descriptions for geographic content:

> Regional description and life-style characterization are major elements in a number of novels and personal narratives. One of the best known is William H. Hudson's *Green Mansions*, which provides enrapturing word pictures of the Guiana Highlands landscapes. Hudson comes to us from the school of naturalists, and his writings betray his background. Hudson's narrative style and his gift of phrasing yield useful descriptions and insights of both the countryside and the Indian inhabitants. (Hoy and Elbow, 1976, p.564)

> Michener's descriptions of Afghanistan's physical and human landscapes and of the harshness of life in that country created vivid place images that will undoubtedly have a more lasting effect on the class than even the best-written textbook. (Davenport, 1981, p.263)

These portrayals of the geographic value of novels echo Wyckoff's (1979, p.226) reference to the "novelist's powers of description" as a means of enriching regional geography. All these authors highlight the regional novel as a type of

narrative text that contains substantial descriptive elements – a rhetorical mode typically associated with scholarly writing in geography. Students can therefore obtain propositional knowledge about regions – their "physical and human landscapes" (Davenport, 1981, p.263) – from these sources like they can from traditional scholarly sources. Indeed, Davenport's (1981) comparison of novels and textbooks implies that the pedagogical aims remain the same whichever source is used. The difference is that novels hold an advantage in helping students to *retain* that propositional knowledge, thanks to the "enrapturing word pictures" (Hoy and Elbow, 1976, p.564) and "vivid place images" (Davenport, 1981, p.263) crafted by the novelist. In other words, the distinction between the two source types essentially boils down to a question of writing quality: with his (and only rarely "her") "gift of phrasing" (Hoy and Elbow, 1976, p.564), the novelist will always produce better writing than the "best-written textbook" (Davenport, 1981, p.263). Novels, therefore, can serve as a kind of "textbook plus" in the geography classroom.

Pedagogies of story as resource

Classification

Using novels in this manner, however, poses some challenges for the educator. Unlike textbooks, not all of the textual contents of novels contain useful geographic information, while the parts that do so are of course not signposted as such. To assist fellow educators in this task, the contributors to the *Journal of Geography* dedicate large portions of their articles to identifying and evaluating the geographical content of their recommended novels. Lamme (1977, p.67) notably proposes a taxonomy of geographic information that can be extracted from literary descriptions: 1. *Landscape* ("patterns of physical and human landscapes"), 2. *Human ecology* ("man-land relationships" and "differences between actual and perceived environments"), 3. *Strategy* ("ways of making a living"), and 4. *Regionalism* ("regional identification with place"). The second part of his article applies this taxonomy to James A. Michener's novel *Centennial*, noting examples of content pertaining to each heading. Davenport (1981) takes Lamme's (1977) framework a step further, using it to structure his teaching of another Michener novel, *Caravans*. As he observes, the "four themes, clear as they may be to the professional geographer, are vague to students in

their first geography class" (Davenport, 1981, p.260). He therefore instructed his students to compile a "topical index" to the novel, identifying the "substantive topics within each theme", each of which would then be discussed in turn over successive classes:

> Landscape, for example is composed of physical and human elements. Climate, vegetation, mountains, rivers, and deserts comprise the former, and historic sites, cities, villages, farms and infrastructure make up the latter. The human landscape can be further divided into two broad categories: its form or morphology and its principal activities, usually economic. (Davenport, 1981, pp.260–261)

This exercise in classification serves to fundamentally disrupt a narrative reading of the text. By isolating descriptive passages from their context in the plot and regrouping them by geographic feature, the reader is lifted out of the storyline and forced to take a bird's-eye view of the setting. A thematic structure is superposed over the narrative structure. Thus, the novel is rendered pedagogically useful through the excision of its narrative elements, and the reorganisation of its descriptive content into a format more closely resembling a scholarly source. A number of school-level educators working in later decades share Lamme (1977) and Davenport's (1981) concern with the classification of geographical information in literary texts (Bolding et al., 1994; Dowd, 1990; Flaim and Chiodo, 1994; Hann and Hagelman, 2021), particularly following the publication of the influential "five themes" framework for geography education in the US.[43]

Despite Davenport's (1981) efforts to guide his students towards a "geographical" reading of their assigned novel, regrettably not all of them succeeded in this task:

> As the class progressed, it became clear that some students had read the work as if it were an assignment for an English course; they knew the storyline, the chronology, and the names of all major characters. Fortunately, this group was a minority. (Davenport, 1981, p.261)

[43] The five themes of geography were first elaborated in the Association of American Geographers and National Council for Geographic Education's *Guidelines for Geographic Education* (1984) as "location", "place", "relationships within places", "movement", and "regions". This framework was widely adopted as a basis for teacher training, textbooks, and curriculum development at the elementary and secondary level (Boehm and Petersen, 1994; Natoli, 1994; Petersen, 1994).

It is evident from the above that the novel's storyline, chronology, and characters – the core narrative elements of the text – were assumed to be irrelevant to the aims of the class. In urging students to disregard these elements, to the extent that any familiarity with them is deemed a failure, Davenport draws clear boundaries around the domain of geographical knowledge. To read a text "geographically" is precisely *not* to read it "narratively". In labouring this point, he illustrates a problem identified in an earlier issue of the *Journal of Geography*:

> The most serious problem regarding the use of literature in regional geography courses is that even the most explicitly "geographical" works are not geographies; they were written for some purpose other than describing and explaining the processes leading to development of the physical, cultural, and economic patterns that characterize a region. (Hoy and Elbow, 1976, p.557)

Here, the authors make explicit the boundaries of geographical knowledge more implicit in Davenport's (1981) observations. They define the very purpose of geography in terms of the rhetorical modes of description and exposition. Ironically perhaps, the "most serious problem" with using narrative texts to teach geography is their narrative nature itself, a mode of writing that would appear antithetical to the aims of the discipline. Hoy and Elbow (1976, p.559) advise educators that this problem can be mitigated by selecting texts on the basis of their "geographic value", suggesting that this value may even be inversely proportional to their literary value. Lamme (1977, p.67) makes a similar comment in relation to his recommended novel, Michener's *Centennial*, which, he writes, was not regarded by critics as a "great literary accomplishment" but rather "reasonably characterized as encyclopedic". Strangely enough, the novel's stylistic proximity to a reference work makes it an ideal candidate for use in the geography classroom.

Verification

As well as offering guidance on selecting texts with a maximum of "geographic content", educators here advocate various approaches to filtering out any remaining "non-geographic" content from selected texts. The task of filtration may be accomplished by the teacher and/or the students. As we have seen, the criteria for what counts as "geographic" content are delimited by some

educators through a negative definition of "narrative" content. Davenport (1981, p.263) highlights "the problem of educating students to read for geographic content and not for character development and plot", recognising that reading a story as a resource is a skill that requires a degree of "unlearning" as well as explicit (re)training. He recommends that "the teacher carefully instructs the class on reasons for the selection of a particular work and the themes to be developed", in preparation for the topical indexing exercise and subsequent thematic discussion (Davenport, 1981, p.263). In this way, students are schooled in the distinction between geographical and non-geographical forms of knowledge, as well as trained in the skills of extraction and categorisation that apparently characterise the former.

Another core skill in the filtration process is that of verification. Although it is not explicitly stated in these terms, Davenport's (1981) differentiation of "geographic content" from the narrative elements of plot and character is arguably a distinction between textual content that is "real" – objectively verifiable – and that which is "imagined" – fabricated by the author. The special attention given to the regional novel over other forms of fiction can perhaps be explained by its anchoring in a "real" place as opposed to an "imagined" world built by the author. Both teachers and students are therefore encouraged to evaluate the veracity of any content that appears to fall under the "geographic" category. This evaluation may form part of the initial selection process: Hoy and Elbow (1976, p.557) reassure readers that "a great deal can be done to control the vagaries of literary license by using care in the selection of reading materials for course use". The tension between literary license and verifiable information forms the entire basis of Miller's (1989) article "Mark Twain in the Geography Classroom: Should We Invite Him In?":

> Mark Twain wrote three river books; they were all literary enterprises. One of them, *Life on the Mississippi*, is the experience of an apprentice pilot on the unregulated river in the 1850s. Some critics have suggested that the book is only partly autobiographical. Much of it is from Twain's imagination. Does such criticism mean that the book has no value to geography teachers and their students? To answer that question we should: 1) examine the genesis of the book; 2) investigate the authenticity of Twain's four years on steamboats, [sic] and 3) analyze the content of the material. (Miller, 1989, p.46)

The implication of Miller's question is that if the content of the book is indeed found to be primarily "imagined", the author should not be "invited in" to the geography classroom: the "authenticity" of their writing is a condition of entry. Miller maintains that the important task for the educator is to "sort out" the "first-hand knowledge" contained in the text from the "literary sketches" and "tall tales" that accompany it, through an investigative process of objective verification (Miller, 1989, p.46). Following her investigation, she concludes that there is sufficient evidence to support the authenticity of certain chapters, recommending that only those chapters are used in teaching. The other chapters are judged to contain "a mongrel content of uneven quality" (Miller, 1989, p.46): the diversity of influences on their composition was a liability which impeded the task of verification.

If students are to be trusted to read literary works in their entirety, Hoy and Elbow (1976, p.558) propose that teachers train them to be vigilant in the face of literary license:

> … students should be cautioned to accept descriptions, accounts of historic events, expressed attitudes, and politically loaded writing as tools used by an author to achieve a desired effect and not necessarily as "fact" or representative of the attitudes of large numbers of his countrymen or Latin Americans in general.

While Hoy and Elbow do not discount literary content on this basis, their warning reminds readers that the distinction between fact and fiction is an important one for students of geography to master. Several other educators issue similar warnings:

> Basically, a novel is a subjective, humanistic source, but it also may provide correct data. The strength of literature rests with its penetration of universals of the human condition. Therefore, a novel can be assigned to give students a "feel" or "spirit" of a place and time. Of course, if such emotions overwhelm the student, it would be detrimental. A balance between fact and literary experience is a worthwhile goal. (Lamme, 1977, p.67)

> Where there is little background to draw on, the reader may create what geographer Reginald Golledge calls "dragons" – distorted images of geography constructed more from affect than actuality. (Levstik, 1985, p.39)

Both Lamme and Levstik emphasise the distinction between “fact”/“actuality” and “literary experience”/“affect”. The language used portrays the latter as a source of danger that must be kept in check: too much “literary experience” threatens to “overwhelm” the student; too much “affect” gives rise to “dragons”. Lamme does acknowledge, however, that the “subjective, humanistic” dimensions of novels may hold some geographical value in their own right – even if his use of scare quotes suggests a degree of suspicion towards the nature of that value. In contrast to Davenport’s (1981) insistence on channelling students’ understanding of a novel into a set of pre-determined geographical themes, Lamme (1977, p.68) notes that the “experiential involvement of the teacher and students with the literary work is likely to differ from person to person”. He advises that teaching with novels is “unlike assigning traditional textbook material”, in that the teacher can only “point out some general themes” while accepting that “each individual will undoubtedly be influenced in a different way” (Lamme, 1977, p.68).

Other educators share this more balanced view on the geographical value of literary content that escapes objective verification. Even as Hoy and Elbow (1976, p.556) warn students that literary descriptions should not be accepted as fact, they praise their unique qualities, writing that “[l]iterary license in the hands of a skilled writer provides a valuable means of communication and emphasis not normally found in academic writings”. Literary descriptions may be difficult to verify objectively precisely because they offer insights that cannot be found in other sources – “information that otherwise could be obtained only by travel in the region or, in the case of past conditions, by no other means” (Hoy and Elbow, 1976, p.556). They suggest that the significance of material concerning “individual and group behaviour and thought patterns”, “attitudes”, and “accounts of daily life” may be more meaningfully conveyed in a “personal and explicit manner” than by using “impartial and analytical approaches” (Hoy and Elbow, 1976, p.556). Similarly, Wyckoff (1979, p.227) suggests that literary works can either “enlarge upon” the themes found in scholarly sources or “show their limitations”, with literary works offering “new possibilities” for understanding regions and their inhabitants in a more humanistic manner.

Supplementation

The range of approaches to handling the subjective dimensions of stories in the classroom reflects wider debates about the nature of geographical knowledge that accompanied the rise in humanistic approaches to research from the 1970s (as discussed in Chapter 3). Whether they argued that these dimensions were irrelevant, dangerous, or valuable, however, there was a widespread agreement among educators using stories as a resource that literary sources are *partial* in both senses of the term:

> Even the best literary works for use in geography classes tend to be narrow in scope, highly selective in presentation of details of life and landscape, and generally reflect the attitudes and biases of the author to a greater extent than academic works. (Hoy and Elbow, 1976, p.557)

The pedagogical implication, that "incorporation of literary works into regional geography classes probably is most effectively accomplished by using them to supplement regular readings in textbooks" (Hoy and Elbow, 1976, p.557), was widely accepted regardless of the authors' stance on geographical knowledge. Educators more sympathetic to the humanistic approach tend to emphasise the "incomplete" sense of partiality in their rationale for supplementing literary sources with other material. For Hoy and Elbow (1976, p.557), the omission of "background material that is not essential to the development of the story line" may "prevent the student from understanding the geographic significance of events or conditions described". They suggest that the instructor "provide such background through lecture or additional readings" (Hoy and Elbow, 1976, p.557). Those more sceptical of the humanistic approach tend to frame their rationale in terms of the "biased" sense of partiality. Davenport (1981, p.262) asserts that "popular literature and scholarly material must be integrated", with analytical work like climate data used to "provide structure and order to the novel". In his view, combining sources is essential to ensure that "the literary work becomes a tool in the education process and not a vacation from learning for the students" (Davenport, 1981, p.262). Similarly, Levstik (1985, p.39) suggests that the provision of "visual images to supplement verbal descriptions" serves to "exorcise some of the geographical dragons" created when students' understanding is insufficiently anchored in reality.

Knowledge acquisition

If a "vacation from learning" is evidently not the desired outcome of using stories in the classroom, many educators recognise that making learning *feel* more like a vacation may be beneficial for the learning process. Indeed, student enjoyment is a recurring theme in educators' rationale for using stories. As Davenport's remark suggests, however, student enjoyment is rarely presented as an end in itself when stories are used as resources. Rather, it is presented as a means to enhancing the attainment of learning outcomes, implicitly or explicitly framed around the acquisition and retention of propositional knowledge:

> Whereas a textbook, even a well-written one, may fail to hold a student's attention or stimulate him to attempt further reading, an exciting and informative novel may produce the desired response. (Hoy and Elbow, 1976, p.556)

> Novels can be effective learning tools in the geography classroom. One of their useful characteristics is that most are fun to read, unlike some required readings. (Lamme, 1977, p.68)

> The fact that literature often involves the emotions as well as the intellects of readers also enhances the chance of it creating a long-lasting learning experience. (Atkinson, 1989, p.44)

The above quotations illustrate a recurring subordination of the affective domain of learning to the cognitive. Literary works are described in instrumental terms as "tools" whose affective dimensions are "useful characteristics" that ultimately serve the ends of cognitive learning. They are useful insofar as they are both "exciting" *and* "informative"; they engage both "the emotions" *and* "the intellects" of readers. Again, they are portrayed as a kind of "textbook plus", doing the job of a textbook but better (even than a "well-written one"). Students' enjoyment of reading imaginative literature can be exploited pedagogically to produce the "desired response" – further knowledge acquisition, and the "long-lasting" retention of that knowledge. Other educators argue that stories generate student interest by providing a "meaningful context" (Levstik, 1985, p.39) or "relevant context" (Drake et al., 1996, p.38) for core content – context that, as we have seen, can be filtered out again through structured learning activities once it has served its affective purpose. Lamme (1977, p.68) perhaps puts it best when he writes that his chosen novel "deserves

to be considered because of its vast scope, its relevance to geographic themes, and its palatable nature": the story is the spoonful of sugar that helps the medicine go down.

In sum, the educational discourse of story as resource instrumentalises creative writing by conceptualising it as a repository of useful information. The pedagogy of this approach is akin to the practices of extractive industries, beginning with the identification of valuable material – in this case, descriptive content – and the surveying of sites rich in this material – typically, novels, especially regional novels. Teachers and students engage in processes of extracting and classifying the valuable material, with less valuable material discarded through filtration and evaluation. The terms of this evaluation are subject to some debate, but the debate is framed in utilitarian terms: how useful is material that cannot be verified objectively? Finally, the valuable material is processed into a usable format, generally by combining it with other types of material. The usable format in this case is propositional knowledge – about places, people, landscapes and environments. Processing stories into this format amounts to a blunt de-narrativisation of the original material. The core narrative elements of stories – plot and character – are portrayed as flaws on the purity of geographical description, or at least as unruly properties to be handled with caution. The recognised value of "non-geographical" material is relatively superficial: literary works are like textbooks, but better written, more memorable, more enjoyable to read. Using stories as a resource does not pose any real challenge to the conventional pedagogies of the time; rather they are presented as a complementary "add-on" to those pedagogies.

Story as experience

Key terms

Table 8: Selected key terms from articles published in the 1980s and 1990s

	1980s	1990s
Story sources	*book, haiku, haiku magazine, haiku poet, literary work, literature, poem of others, poetry*	*book, haiku*
Teaching approaches	*center, educator, education facility, facility, nature center, outdoor, outdoor center, outdoor education, outdoor education facility, outdoor education program, outdoor educator, outdoor poetry, outdoor recreation, poetry experience, residential outdoor center*	*direct experience, environmental education, environmental educator, global education, nature study, outdoor education, read, tell*
Learning aims	[no relevant key terms identified]	*behavior, behavioral change, changing world, earth, global perspective, world*

The top 50 keywords and key clusters from articles published in the 1980s (Table 8) represent a marked shift from the dominant discourses of the 1970s. While *book* (58 occurrences) and *literature* (48) are identified as key story formats in both periods, there are clear discrepancies in the types of literary works which are typically discussed. In particular, there is a clear constellation of interest around *haiku* (66) and other forms of *poetry* (38) in this period, with *haiku* continuing to be key into the 1990s (Table 8, 80 occurrences). Receptive (*read* (166)) and productive (*tell* (149)) modes of engagement are both represented in the 1990s keywords, while the 1980s key clusters *outdoor poetry* (5) and *poetry experience* (4) imply more embodied modes of engagement. *Outdoor* is in fact the number one keyword for the 1980s (102), while *outdoor education* (44) and *outdoor educator* (26) are the top two key clusters, demonstrating that

discussion of outdoor contexts is strongly characteristic of this period. This finding is further illustrated by keywords and key clusters designating a range of outdoor learning settings. While the 1970s were dominated by discussions of storytelling in the context of formal geography education, discussions in the 1980s appear to focus on informal and non-formal contexts. In the 1990s, there are more frequent references to the fields of *environmental education* (109) and *global education* (16), the work of the *environmental educator* (15) and the tradition of *nature study* (8). The keyword *behavior* (85) and the key cluster *behavioral change* (8) correspond to the typical aims of these fields, as does the holistic outlook suggested by *world* (372), *earth* (169), *changing world* (15) and *global perspective* (13).

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Conceptualisation of story as experience

In contrast to approaches which treat stories as products, the story as experience discourse emphasises the process of storytelling. In these accounts, it is not the informative but the affective dimensions of story that define its pedagogical value. Accordingly, in their rationale for educational engagement with stories, educators focus less on their content than on their creation, including potentially by students themselves. Environmental educators in particular tend to value stories for their capacity to evoke subjective experiences in the natural world: a capacity which aligns strongly with established traditions of experiential education. The subtle distinction between description and evocation is important: while descriptive writing conveys a detached representation an experience, evocative writing invites an involved *recreation* of it through suggestion or association. The quality of evocation, where words communicate meaning beyond their literal denotation, is a quintessential characteristic of what is commonly understood as poetic language. As such, the period under review witnesses early signs of geopoetic practice in educational settings.

One format that is particularly prized for its economy of expression is the shortform poetry of haiku. It is perhaps unsurprising that haiku should appeal to environmental educators, given its traditional thematic orientation. Yarrow (in

Gustafson et al., 1991, p.7), for example, indicates that as a naturalist, it was the "inclusion of some aspect of nature" that first drew her to the form. She also points to the short, 5-7-5 syllable format as "one reason why students like to write haiku and outdoor educators like to teach it" (Yarrow, 1982, p.41). However, in her articles "Haiku: it's not just 5-7-5" (Yarrow, 1982) and "Haiku: more than meets the eye" (Gustafson et al., 1991), published in the *Outdoor Communicator* and *Nature Study* journals respectively, she argues that the relevance of the form to environmental education lies much deeper than these superficial characteristics of content and form. Instead, she locates the "source of Haiku's power" in the lived experience that produces them: more specifically, "the observation of nature combined with the awareness of feelings" (Yarrow, 1982, p.40). Furthermore, Yarrow stresses that in principle, haiku are not produced from general observations and feelings towards nature, but rather from the observations and feelings of a single moment. She cites the Haiku Society of America's definition of haiku as "unrhymed poetry 'recording the essence of a moment keenly perceived in which nature is linked to human nature'" (1982, p.40).

Thus, the brevity of the haiku form takes on a new significance for environmental educators: beyond the practicality of providing a "quick and easy" activity for students, the form encourages them to pay attention to particular moments in which they experience a sense of connection to nature. Several educators argue that the form offers an unrivalled proximity to the lived experience of these moments. For Yarrow (in Gustafson et al., 1991, p.6), "Haiku captures such moments of awareness so well because it is brief like the moment itself", noting elsewhere that shorter haiku "fit easily in one breath, another measure of the appropriate length to describe a moment keenly perceived" (Yarrow, 1982, p.40). The act of writing a haiku is presented as "a means of preserving one's experience of nature, much as the more scientific tools of photography, leaf-pressing, rock-tumbling, and the preparation of microscope slides are used" (Gustafson et al., 1991, p.5). Compared to other textual modes of preserving experience, educators recognise the value of such a constrained form to focus attention on the most significant details – not only to "capture" the experience (Alston, 1993; Gustafson et al., 1991), but more

precisely to “distil” it in as few words as possible (Gastreich and Milakovic, 2021; Gustafson et al., 1991).

On the surface, the haiku form indeed concentrates attention on the immediate and the particular. Yarrow (1982, p.40) claims that haiku “does not generalize because that diffuses the power. Rather it is the particular event that pulls out this power – and the present tense that makes it flow.” Writing in the present tense is also described as a way of “making the experience immediate” (Yarrow, 1982, p.5). The haiku, which “simply presents the experience” (Gustafson et al., 1991, p.6) directly, without imagery or “additional description” (Gustafson et al., 1991, p.7), is contrasted with “much of our western poetry, in which the poet’s thoughts and feelings about an experience are spelled out at length” (Gustafson et al., 1991, p.6). Yet despite an apparent focus on direct descriptions of immediate experience, educators appreciate the power of haiku to express powerful emotions and broader reflections about the human-nature relationship through evocative language. As Culver writes, “the poems suggest more than they say. A single word or phrase may act as a clue to the season of the year or a whole class of creatures or phenomena” (in Gustafson et al., 1991, p.5). In this way, a haiku “lends some echoes of the universe to an apparently mundane event”, is able to “depict natural events while really expressing human feelings”, or “focus on humans while expressing the feeling of our connectedness with the natural world” (Gustafson et al., 1991, p.7). Alston (1993, p.44) similarly describes haiku as “a dramatic moment found in common everyday occurrences”. The effect of directly describing the event, but only hinting at the author’s response to it, “leaves us free to experience the moment and react with our own thoughts and feelings” (Gustafson et al., 1991, p.6). In an environmental education context, the student is not explicitly *instructed* about the human-nature relationship by reading haiku, but is able to *experience* it by imaginatively recreating the situation that sparked a moment of awareness in the author.

Haiku is not the only form that can achieve this effect. Harms and Lettow (1995, p.167) outline how various forms of poetry can serve to “heighten awareness of the environment”. They point to poetic devices like imagery as a means of evoking “sensory aspects (sight, sound, touch, smell, and taste) of an

experience" (Harms and Lettow, 1995, p.167), and sound techniques like alliteration as another form of sensory meaning-making:

> In the poem "Thistles", the "th" sound, as it is formed by the lower teeth moving across the bottom of the tongue, creates a sharp sound and bodily sensation that can be related to a tactile experience with a thistle. (Harms and Lettow, 1995, pp.167–168)

When meaning is evoked through sensory imagery or alliteration, embodied experience plays a more central role than when it is communicated through semantic denotation alone. Bai et al. (2010, p.360) argue that poetic language "is aware that it is pointing and invoking", in contrast to explicative language, which "tends to fool us into thinking that it describes the world 'out there'". In their view, both poetic and narrative forms of storytelling have the power to provoke "presencing" in lived experience: education through storytelling "is not information transmission but consciousness transformation" (Bai et al., 2010, p.361). They critique the "relative paucity of the evocative, that is, the poetic" in formal schooling, arguing that the preponderance of explicative approaches "is problematic in terms of the openness and connection we seek with/in nature" (Bai et al., 2010, p.360). Payne (2010, pp.305–306) similarly describes storytelling as an opportunity to depart from "the teaching and telling of a particular state-sanctioned curriculum story", offering a "means of promoting the sensual, perceptual and conceptual dimensions of an aesthetic education, in this instance an ecoaesthetic opening in 'experiencing', 'living', *being* the story".

Pedagogies of story as experience

Enhancement of direct experience

Despite widespread recognition of the close alignment of poetic language and embodied experience, most educators agree that storytelling does not constitute experiential learning in itself. Many of those who use stories in this way maintain the pedagogical primacy of "direct experience" with nature – that is to say, hands-on encounters with the more-than-human world. The role of stories, then, is to support or enhance these experiences in some way. Several educators duly stipulate that storytelling activities be carried out in outdoor environments,

using material that relates directly to perceivable elements in the immediate surroundings:

> It is imperative that the poetry be related to the students' current outdoor environment. For example, it would not be appropriate to read about autumn leaves in the spring, or a day at the beach on a school playground. (Rowell and Goodkind, 1989, p.8)

Similarly, in his account of running a "poetry nature trail", Gustafson (in Gustafson et al., 1991, p.5) advises educators that the trail "should be scouted out beforehand, looking for situations which will fit the poetry". While on the trail, he reminds the educator to "position yourself in such a way that the subject of the poem will not be trampled or out of view" (Gustafson et al., 1991, p.5). Poetry adds value to these outdoor experiences by directing students' attention towards details that might otherwise go unnoticed:

> While working with poetry in the outdoors, students can enhance their perceptions of things in their natural environment. For example, they can compare they poems of others about some natural phenomena, such as a tree or the clouds with what they are presently experiencing. They can keenly observe with a variety of senses – sight, hearing, touch, smell – to compose their own outdoor poems. Because they are encouraged to, or "required to", or "forced" to take the time to examine something closely, they can focus in on things they might not have been aware of in the outdoors. (Rowell and Goodkind, 1989, p.7)

In these accounts, story plays an intermediary role, assisting the student to attune more deeply to their own sensory experience of the outdoor environment. There is a clear prioritisation of *immediate* experience: Rowell and Goodkind (1989, p.10) recommend instructing students that "they can write only about things that they can see, hear, touch or smell <u>now</u>" (emphasis in original), not from memory of past experience. Payne (2010) draws a clear distinction between story that is "performed orally (not textually) in nature's places" (p.308), which "encourage a 'direct' embodying, sensing and perceiving of wilder, in-between possibilities of that 'place'" (p.308), and story that is "read or told only within the confines of the indoor classroom" (p.306), "a vicarious experience that is easily and immediately accessed – but, at the end of the day, is abstract and primarily of the mind or intellect only" (p.308).

Others take a more nuanced view of the relationship between “direct” and “vicarious” story experiences. Several educators propose that, while “direct” experiences ought to be prioritised, they can also be supported through “vicarious” experiences in the classroom:

> Nothing can, nor should, take the place of children’s direct hands-on experiences with the natural environment. Efforts to increase the frequency of children’s encounters with nature are paramount (Dighe, 1993). Direct experiences with nature may be supplemented and enhanced through vicarious experiences in the literary, musical, and visual arts. (Kemple and Johnson, 2002, p.217)

Kemple and Johnson (2002, p.214) suggest a number of classroom activities that can be carried out either before or after an outdoor walk, with poetry and song “encouraging children to notice and appreciate their own local environments” and supporting them in “creating their own poetry about what they appreciate in their own world”. Alston (1993, p.49) follows a similar approach, reading haiku aloud in class before taking children outside on a “silent walk” to “discover something in nature”, then returning to the classroom to write a haiku about their experience. She also explains how the haiku unit is delivered towards the end of the school year, following months of outdoor walks and “nature” activities that introduce children to the “spirit of haiku” before introducing the form itself: “By the time spring comes, they will be trained in focusing on their haiku moments” (Alston, 1993, p.47). In these accounts, the role of story is not just to provide models for the students’ own writing, but also to model ways of being, noticing, and relating that students are encouraged to adopt in their own outdoor experiences. Wason-Ellam (2010) describes literature as a “springboard to place-based embodied learning”, creating “pedagogical pivot points” (p.282) between textual and embodied experience, even when encountered in classroom settings. Although they argue that storytelling and outdoor experiences need not occur simultaneously to be effective, both Alston (1993) and Wason-Ellam (2010) emphasise the importance of a close relationship between the two, whether by reading “place-based literature” (Wason-Ellam, 2010, p.290) relevant to the local area or encouraging students to write about their “authentic ‘haiku moment’” (Alston, 1993, p.50) rather than imagined scenarios.

Replacement for direct experience

When "vicarious" experiences cannot be combined with "direct" experiences, some educators concede that storytelling may have some experiential merit as a standalone activity. These accounts characterise story as a poor relation of field experience, an approach to be considered only when the preferred option is logistically challenging:

> If you're like me, you have more opportunities to talk to groups like garden clubs and church fellowships than you do to take them on field trips. There's no substitute for a trip in the field, but other occasions should not be neglected. (Gustafson, 1972, p.21, emphasis in original)

Gustafson (1972, p.21) suggests that a possible response to such situations is to create what he calls "vicarious 'happenings'" through poetry. He describes his own attempts to recreate the field experience by combining poems with visual depictions of their content:

> Properly done these pictorial "field trips" succeed in creating some degree of rapport with Nature; they fan, perhaps only feebly, the spark of kinship with Mother Earth which exists in every human breast. (Gustafson, 1972, p.21)

Hadzigeorgiou et al. (2011, p.521) concur that environmental educators may "resort to stories as substitutes for direct experience", recognising that the latter "is not always possible and may not always be positive". They cite an earlier article by De Young and Monroe (1996) which lists problems with direct experience including coordination, expense, and the limitations of single interventions.

De Young and Monroe's (1996) article goes further, however, than presenting story as a weak measure of last resort. In fact, they make a strong positive case for story as a "singularly effective replacement for direct experience" (De Young and Monroe, 1996, abstract). As well as outlining the logistical challenges that can make educating through direct experience more difficult, they also highlight a range of issues in environmental education that simply cannot be experienced "directly". This includes issues that occur over scales or timescales beyond immediate human perception, such as "acid deposition, ozone depletion and climatic change" (De Young and Monroe, 1996, p.173). The authors draw on

evidence from cognitive psychology to argue that the experience of storytelling promotes a depth of engagement in learning comparable to that achieved through direct experience. A key aspect of this engagement relates to the sequential presentation of information in context, which allows readers to build a generic structure of knowledge out of specific instances: "The reader becomes engaged in the text, experiencing the information and events as if they were just happening, all the while cognitive structure is being built" (De Young and Monroe, 1996, p.181). An example of this approach can be found in Hipkins' (2004, p.54) account of developing a narrative-based board game to teach children about the rock cycle:

> As children move around the board, with their counter representing one rock particle, they "experience" the actual transformations that are open to rocks located at any particular point of the cycle, and the action that unfolds can be retraced for subsequent discussion.

In this case, narrative pedagogy allows students to experience the "dynamism" of geologic processes, which "isn't immediately apparent because rock-cycle changes take so long" and is obscured in the "static diagrams by which these relationships are more often represented" (Hipkins, 2004, p.56). For Kuchta (2022), the experiential potential of story finds its strongest expression in fiction:

> Reading fiction triggers the imagination, allowing us to conceptualize simulations of the real world and thus neurobiologically *experience* alternate realities. Reading fiction *is* a form of experiential and holistic learning. It stimulates new ideas, emotions, and bodily sensations, such as hormonal, blood pressure, and heart rate changes. (pp.196–197, emphasis in original)

These accounts offer a more critical perspective on "direct experience", not only by pointing out its limitations, but also by complicating the binary distinction between "direct" and "vicarious" experience, one that ultimately reproduces the mind-body dualism in the learning process.

Nature connection

Whether story is used to enhance or replace "direct" encounters with "nature", a common goal of these approaches is to cultivate a personal sense of connection with it. Specifically, those using story as experience aim to develop a

felt connection, going beyond a general understanding of human-nature interconnectedness developed through propositional knowledge. Yarrow (1982, p.40) observes that "haiku demands more than an understanding of how life is linked through the flow of energy and cycling of materials through ecosystems", requiring readers and writers to make "emotional, intuitive links". Several others contrast the learning and teaching of ecology with the development of a "love of nature" (Alston, 1993) or "biophilia" (Bai et al., 2010). Bai et al. (2010, p.360) argue that the development of biophilia is "the real lesson in ecology and environmental education":

> To the extent that we remain in the egoic consciousness that externalizes nature/life and world, and draws a boundary around the self and sees the world as otherness, to that extent ecology is a failed lesson, even if we are tracking in wilderness and know a million bits of important ecological facts. *Biophilia* only emerges when we can indwell our beingness or be present to the here and now, wherever we are. Not surprisingly, this is the same lesson in poetry-making and moving into a poetic consciousness. (emphasis in original)

Gustafson (1984, p.37) draws a similar comparison between the aims of poetry-making and environmental education, presenting both as dynamic practices with the potential to move from immediate experience to broader understanding:

> It has been said that poetry (at least of the lasting kind) leads us from consideration of the "particular" to thinking about the "general", and ultimately focuses attention on the "universal". Environmental education attempts to do just that! Unless we move students from the *details* of nature to the *grand themes* of the universe (or even of our globe!), the behavioral changes we desire will not occur. (emphasis in original)

These passages reveal a philosophy of learning in which understanding is expanded not through the accumulation of factual information, but rather through the expansion of one's experiential awareness – towards something akin to the ecopedagogical "planetary consciousness" discussed in Chapter 2. The capacity to be "present to the here and now", to appreciate the "details" of a particular moment, is therefore a key starting point in the process of environmental education.

Story is presented as an opportunity to hone this capacity. Educators describe poetry as offering "strong invitations to children to become involved with ideas

and emotions associated with their environment" (Harms and Lettow, 1995, p.170); haiku as "a wake-up call from the earth to its children to come, commune with it, and experience its beauty" (Alston, 1993, p.45). The evocative language of story "can return us to our bodies and senses" (Bai et al., 2010, p.362), creating a "reanimated version of 'ecoliteracy'" (Payne, 2010, p.297). This embodied ecoliteracy entails a heightened observational and emotional sensitivity towards their environment. Rowell and Goodkind (1989, p.8) recount how students engaged in outdoor poetry experiences "will comment that they never 'noticed this' before about something in the outdoor environment and will want to learn more about it". These authors hence encourage educators to "vary the outdoor focus to enhance student environmental awareness", "focusing on other phenomena students might not have yet noticed" (Rowell and Goodkind, 1989, p.9). Culver claims that "the developing poet-naturalist of any age comes to deeper perceptions and appreciation of our natural environment" through haiku (Gustafson et al., 1991, p.6), a sentiment echoed by Yarrow in the same piece: "You may find, even as a skilled naturalist, that reading and writing haiku helps you perceive more than first met your eyes" (Gustafson et al., 1991, p.7).

The enhancement of environmental awareness and sensitivity is sometimes presented as an end in itself for environmental education, but it is more commonly presented as a necessary step in promoting caring behaviours towards the environment. Alston (1993, p.45) explains how her motivation for teaching haiku is ultimately "political":

> We teach children to recycle and many other ways to save the earth, and this is good. But teachers neglect an important precursor: to teach children to continue to love nature. As we implore children to save the earth, we must affirm their innate appreciation for its inexhaustible beauty and splendor.

Alston's approach is suggestive of an emergent alliance of geopoetic practices with politically-engaged ecopedagogy, albeit one more romantically than critically inflected as regards the "inexhaustible" quality of nature's beauty. Harms and Lettow (1995) and Kemple and Johnson (2002) similarly position the role of story in the early stages of a pedagogical process that culminates in environmental stewardship. Harms and Lettow (1995, p.167) argue that poetry experiences "can extend the goals of environmental education, assisting children

to know and feel and then to act", while Kemple and Johnson (2002, p.211) claim that incorporating literature in environmental education "heightens the power of aesthetic response", which acts as a "*catalyst* to the development of investment in, and the motivation to take care of, the environment" (emphasis in original). While cognitive learning has a role to play in this process, it is the affective dimensions of learning that reckoned to be transformative.

Overall, it is notable that the discourse of story as experience predominantly targets transformation at the individual level. In this regard, it can be considered typical of stewardship models of environmental education, where students are encouraged to connect with nature in order to develop a sense of personal responsibility towards it. Gustafson's (1972, p.20) earliest article exploring outdoor poetry walks certainly frames his approach in these terms:

> I am convinced that the ultimate answer to our environmental crisis is "meaningful relationship", a one-to-one relationship between each person and the natural world. Only when this is achieved will we have the sense of belonging which will make us behave as responsible citizens of the community of life on earth.

He further explains how he ensured that the poetry walk was "a deeply personal experience between each individual and the natural world" (1972, p.20):

> My instructions at the start of the trip were very specific: there was to be absolutely no talking until the trip was over – either to one another or to me. At each place I would stop until everyone caught up, read something, then go on – quietly, reverently. I urged each person to relate to the world of nature – not to me or one another. (emphasis in original)

It is apparent from this description that connecting to nature is viewed as an essentially solitary task, one that is threatened by social interaction but enhanced by poetic contemplation. While few educators espouse such an explicitly individualistic approach, overtones of the Romantic "escape to nature" can be discerned in accounts of story as experience spanning all five decades under study. The Romantic opposition of nature and society is perhaps most clearly expressed in discussions of environmental education in childhood. While Gustafson's adult learners effectively had to retreat from society to connect to nature (1972, 1984; Gustafson et al., 1991), there is a tendency to portray

children's connections to nature as innate and uncorrupted. Alston (1993, p.45), discussing the importance of teaching children to "continue to love" nature, shares her beliefs that "children are born with this special awareness of nature" and that the task of the educator is to "affirm" it. Bai et al. (2010, p.361) praise the poetic intuition of "uninhibited children" and lament its loss in adulthood, while Payne (2010, p.297) posits (outdoor) storytelling as an opportunity for children to reclaim their "untamed and yet to be domesticated wild natures". In many ways, the experiential approach to story – in its equation of experience with spatial and temporal immediacy, in its preoccupation with embodied affect – can be understood as an attempt to access the "innocent", "unmediated" experience of pristine nature assumed, if problematically, to be innate in children.

Story as way of knowing

Key terms

Table 9: Selected key terms from articles published in the 2000s

	2000s
Story sources	*aboriginal, aboriginal community, aboriginal people, community, cultural, discourse, first nations, nations, native, west, western*
Teaching approaches	*aboriginal education, decolonizing methodology, historical account*
Learning aims	*aboriginal study, ecological literacy, environmental history, history, indigenous knowledge, indigenous theory, landscape, place, point of view, represent*

The top 50 keywords and key clusters from articles published in the 2000s (Table 9) suggest a shift in the focus of educational discourses around story towards the contexts of their production and circulation. While the keywords of previous decades tended to emphasise individual authors such as novelists and poets, such terms are absent from these lists. Instead, the keywords *community* (275 occurrences), *cultural* (138) and *discourse* (58) point to a broader perspective on story that emphasises its collective dimensions. A particular interest in the stories of Indigenous cultures is apparent from the keywords *aboriginal* (173) and

native (86), as too from the key clusters *aboriginal people* (25), *aboriginal community* (13), and *first nations* (10). Similarly, the terms *western* (89) and *west* (48) are identified as key only in this decade, illustrating that a concern with spatial situatedness is characteristic of the period. Several key clusters also highlight a concern with temporal situatedness, with *decolonizing methodology* (11) alluding to colonial histories and *historical account* (10) suggesting a departure from the prioritisation of immediate experience seen in previous decades. Notions of indigeneity are apparent in a number of key clusters relating to pedagogical approaches and aims, including *indigenous knowledge* (16), *aboriginal study* (11 – all occurrences appear as the plural "Aboriginal studies"), *aboriginal education* (10), and *indigenous theory* (10). Equally, the concern with spatio-temporal specificity is illustrated by the keywords *place* (373), *history* (127), and *landscape* (111), alongside the key cluster *environmental history* (20). Overall, the keywords from this period signal a rise to prominence of pluralistic approaches to meaning-making, with attention given to what stories *represent* (81) and their *point of view* (17). This emphasis on the making and interpretation of meaning is encapsulated in the key cluster *ecological literacy* (25), a term popularised by David Orr (1989, 1990, 1992) which makes its first appearance in the corpus in 2007.

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Conceptualisation of story as way of knowing

The previously presented educational discourses conceptualise stories and storytelling as ways of supporting geographical and environmental education, whether theoretical or experiential. The discourse of story as a way of knowing differs from such approaches in that it is premised on the notion that education is always already storytelling. This approach entails more than a shift in emphasis from product to process: rather, it necessitates a much broader understanding of story that goes beyond what is conventionally designated as "creative writing". In this understanding, "story" is a term that can also be applied to the narratives and discourses that circulate in wider society, through a range of cultural arenas including, but not limited to, literature *and* education. Of particular interest to geographical and environmental educators are the stories told about human-environment relationships – whether they are

told in a recognisable “story” format or, perhaps more importantly, are so deeply ingrained in everyday discourse that they are no longer recognisable as such.

One of the first to conceptualise environmental education as a storytelling practice was Gough. In a series of papers published in the early 1990s, he draws on narrative theory to elaborate “the ways in which the discourses of environmental education … are configured as stories” (Gough, 1993, p.607):

> That is, teachers, policy makers, curriculum developers, textbook writers and the like tell stories to learners; scientists, journalists and the authors of literary fiction also tell stories to their respective audiences. Each story-telling practice incorporates a particular selection of narrative strategies and conventions, the implicit or explicit knowledge of which influences the story-maker's craft, the audience's expectations and the meanings that are mutually constructed. (Gough, 1993, pp.607–608)

In addition to highlighting the narrative form of environmental education discourses, Gough seeks to evaluate the “adequacy” of their narrative strategies (Gough, 1993, p.607). In an article on “Environmental Education as Cultural Criticism” (Gough, 1990), he argues that the conventional pedagogies of the time belie a fundamental contradiction:

> Environmental education and experiential education (the latter is better known in Australia as outdoor education) are stories constructed in response to some of the perceived inadequacies of Western culture, but they also embody these inadequacies. Most significantly, perhaps, the stories of environmental and outdoor education embody what we might call the myth of objectivity. (Gough, 1990, p.12)

Gough is particularly critical of pedagogies dependent upon modern scientific principles in which “fact and fiction are mutually exclusive categories”, with the former presumed to correspond to an external reality “independent of human agency” (Gough, 1993, p.609). He likens the narrative strategies of these pedagogies to the “longing for ‘one true story’”, citing the feminist philosopher Sandra Harding (Gough, 1993, p.609). Ultimately, Gough (1993, p.610) judges such strategies to be inadequate to the task of environmental education:

> There can be little doubt that the narrative strategies of modern science have helped to raise our awareness of the nature and extent of numerous environmental problems. But these problems may themselves have resulted from modern science's construction of stories in which the story-maker or -teller is "detached" from the earth, in which subject and object, "culture" and "nature", are categorically distinct.

Gough's diagnosis of the root causes of environmental issues as arising, at least in part, from the storytelling practices of modern science represents a significant shift from pedagogical approaches that target individual knowledge, attitudes, and behaviour. He concludes that a new approach is needed in environmental education: "we must abandon the conceit of trying to tell 'one true story' and, instead, deliberately treat our stories as metafictions – self-conscious artefacts which invite deconstruction and scepticism" (Gough, 1993, p.622).

In this approach, the pedagogical value of stories – broadly conceived – lies neither in their provision of "objective" (universal) facts about nature, nor in their distillation of "subjective" (individual) experiences in nature. Rather, stories are understood as a primary vehicle for the transmission of the interpretive frameworks that shape *collective* (cultural) perceptions of nature. In Gough's (1993, p.607) words, the stories we live by are both collective and "selective" – that is to say, culturally contingent. Understanding story as a way of knowing invites close attention to the situatedness of knowledge in time and space – an aspect that the outdoor educator Simpson (1988) claims is often overlooked in experiential education. Citing Dewey's (1938) belief that "[t]he nature of issues cannot be understood save as we know how they came about", he recommends situating outdoor learning experiences within their cultural context through pedagogical engagements with situated creative literatures. Writing from an American perspective, he notes that "The nature-human interaction is one of the major themes of American literature" (Simpson, 1988, p.26), and that its use in outdoor education "both illustrates perceptions the reader already realizes and presents new perceptions that the reader has, to that point, never considered" (Simpson, 1988, p.30). Hindle (1974, p.60), a lecturer in English Literature, similarly highlights the intersubjective and (hi)storied nature of environmental perception:

> What we read is not merely marginal to what we see and hear, it in effect shapes the outside world for us. It tells us what to see and hear … The information that we receive through our senses from the material world has to be interpreted by the mind before what we call reality forms. Until we have interpreted we can't really see. Humboldt put forward the momentous thesis "No words, no world" and any study of poetry becomes a study of ways of seeing the world.

For Hindle (1974, p.60), literary study is a "vital component of courses in Environmental Education" because the assumptions (about the meaning and value of the environment) upon which such courses are built "have been created by literary culture". Underlying the arguments of Hindle, Simpson, and Gough is the notion that there can be no experience of nature that is "innocent" of culture. They assert that our experiences are inevitably influenced (although not determined) by forces beyond our immediate personal experience: namely, "the narratives, myths and rituals that are passed from one generation to the next" in particular settings (Gough, 2014, p.19).

Pedagogies of story as way of knowing

Cultural analysis

Recognising and interrogating this cultural inheritance necessitates a situated pedagogical approach, identifying the dominant discourses of the setting and their sites of (re)production. In the bibliocentric cultures of many Western settings, this often involves turning to the published texts of canonical nature writers, such as the English Romantics (Hindle, 1974) or American Transcendentalists (Simpson, 1988). These texts are understood as playing an important role in intergenerational cultural transmission, themselves acting as "elders" in Western culture (Cheney, 2002; Howard, 2010). This status of cultural authority is central to their pedagogical value: as Simpson (1988, p.26) puts it, "sitting in the woods writing haiku is not bringing literature to outdoor education". Crucially, the texts are considered worthy of study precisely because their influence extends beyond literary spheres:

> A study of the poetry of Wordsworth in an Environmental Education class is thus seen in this context not just as an exercise in literary appreciation, nor even as a course in the history of ideas, but as an exploration of the shaping forces behind our whole attitude to scenery and to conservation. (Hindle, 1974, p.62)

Several educators suggest that this influence can best be understood by combining literary and historical approaches to the texts. Morse (2003), for example, suggests supplementing the American literary canon with secondary material examining the contexts of its production and circulation, connecting "the history of ideas about nature with the history of Americans' actual physical efforts to transform the earth, and to draw material, social, and intellectual sustenance from the world around them" (p.68). The goal here is thus to illustrate how literary texts contributed to "the romantic, moral, and ethical foundations of modern environmentalism" (p.67). Both Hindle (1974) and Gough (1990) relativise conceptions of sublime nature by contrasting them with other meanings associated with mountainous areas before the Romantic movement, with Gough (1990) highlighting its influence on the development of recreational mountaineering.

The ongoing legacy of (for example) Romantic and Transcendentalist narratives can then be traced in a range of everyday settings, with the "space of contact, of experience, between child, teacher, and text" acting as a "place of exchange, a flow-through of the voices of the young and the old" (Howard, 2010, p.195). Rather than taking students on one-off "wilderness" excursions removed from their everyday experiences, educators seek to make connections to these wider narratives from within students' everyday lifeworlds – including within the classrooms of formal educational settings. Simpson (1988, p.27) argues that the "field trip/one shot method of exposure" is a weakness of many outdoor education programmes and that the "presentation of outdoor education themes in the classroom would extend their relevance beyond the outdoor education facility". His method of conducting "outdoor education in the classroom" (Simpson, 1988, p.26) complicates the indoor/outdoor, culture/nature binaries that remain pervasive in many spheres of environmental education. Hindle (1974, p.70) follows a similar approach, outlining a programme that begins and ends in the library but includes visits to the settings of the texts under study, to observe the "present scene" as well as aspects that have been "preserved" according to their literary and historical significance.

Others espouse a more critical engagement with the literary inheritance of Western culture. As previously mentioned, Gough (1990, 1993, 2014) argues that

understanding the cultural roots of Western environmentalism is only the first step: educators must also confront its role in perpetuating "unsustainable fictions" concerning human-environment relationships (Gough, 2014). Pedagogically, this involves engaging students in a critical textual analysis of dominant narratives present in a variety of popular media, from advertising campaigns (Kulnieks et al., 2013) to the "founding texts of environmental education" themselves (Gough, 2014, p.26). Kulnieks (2013) and Gough (2014) encourage a close reading of the metaphorical language of such texts, analysing their alignment with "root metaphors" of Western culture such as mechanism, progress, and patriarchy. For Gough (2014, p.27), the final step in the pedagogical process involves the search for alternative narratives, or "sustainable fictions": "to participate in the creative reconstruction of a language which foregrounds our kinship with nature". In his view, this reconstruction need not entail a wholesale abandonment of Western culture, but can seek inspiration from subversive traditions that resist its dominant narratives:

> Conceptions of human kinship with nature may have survived in Western culture in various forms of subversive storytelling. The dominant worldview of Western society is largely an invention of "Civilised Man" – of the chiefly Christian patriarchy which so willingly embraced modern science and industrialism. Stories which subvert this worldview are told mostly by people outside this cultural mainstream, including women and children. (Gough, 1990, p.16)

He cites as an example Ursula Le Guin's "talking-animal stories", a narrative strategy most often deployed in children's literature but also common to science fiction and other subversive traditions (Gough, 1993). These forms of literary fiction, he claims, offer "more complex and complicating discourses" that challenge narratives of detachment and objectification (Gough, 1993, p.619).

Restorying

In some settings, particularly those with histories of colonial settlement, Western ways of knowing only came to be dominant through the active suppression of other stories. In this case, educational storytelling can serve to make visible both those suppressed stories themselves and the means of their suppression. Unlike the bibliocentric approaches typical of Western contexts,

many educators working in settler colonial contexts demonstrate a holistic understanding of story that encompasses more than written texts, and indeed more than humans. In this understanding, stories can be said to embody "the wisdom of the *locale*" (Jay, 1986, cited in Gough, 1993, p.612, emphasis in original), rather than the wisdom of particular (human) authors. Accordingly, it is the locale, rather than the library, that provides the starting point for such pedagogies. Several educators draw on notions of "storied land" (Paperson, 2014) wherein "humans, more-than-human things, plants, as well as practices and multiple knowledges, are all participants in the storying of places" (Nxumalo and Villanueva, 2019, p.50). Places are also "storied within unevenly distributed power relations" (Nxumalo and Villanueva, 2019, p.50), however, resulting in the colonial "vanishing" (Paperson, 2014) or "erasure" (Nxumalo and Villanueva, 2019) of Indigenous ways of knowing. For Stewart (2008), incorporating insights from cultural and environmental history into outdoor education experiences can counteract the "practical forgetfulness" that characterises Australian attitudes to Aboriginal dispossession. He describes his facilitation of outdoor storytelling experiences along the Murray River, a place where "it is still possible to 'read' signs in the landscape that tell stories of past indigenous lives and activities" (Stewart, 2008, p.89). In his view, "Weaving stories through an experience of the river can transform it from people-less landscape into place with a rich history and an uncertain future" (Stewart, 2008, p.93). Similarly, Nxumalo and Villanueva (2019) present their account of "(re)storying place through Indigenous song and storytelling" (p.42) at a creek in Austin, Texas as a method of "refiguring Indigenous presences" (p.46) in a settler colonial context.

Others argue that it is the form of stories, as much as their content, that affirms Indigenous ways of knowing. Several educators describe storytelling as a defining method of Indigenous education: McKeon (2012, p.137), for example, calls it the "what and how of Indigenous education". Cheney (2002, p.97) differentiates Indigenous approaches to story from instrumental – we might say story-as-resource - approaches within Western knowledge systems:

> Stories within the dominant Western paradigm of environmental education are merely tools for educating students up to (what is thought to be) the real thing: a proper scientific understanding of the land-community and the ethic that follows from this understanding.

> Stories within First Nations cultures, on the other hand, are the real thing.

The differing pedagogical roles of story reflect a fundamental difference in the knowledge-making practices of Western and Indigenous cultures: as McGregor (2005, p.72) puts it, "Aboriginal knowledges and worldviews are most often conceptualised by Aboriginal people as a way of living (i.e., more of [a] verb than a noun)". Gough (1993, p.611) sees the failure to understand storytelling as a knowledge-making practice in itself as a key driver of the misappropriation of Indigenous cultures in Western environmentalism. He cautions that the living ecological wisdom of Indigenous cultures should not be understood as propositional knowledge and cannot be separated from its contexts of production. He suggests that the narrative strategies of Indigenous cultures can, nevertheless, still be instructive in Western contexts "in so far as they draw our attention to a signal failure of the narratives of modern science" (Gough, 1993, p.612). In other words, Indigenous stories should not be treated as a bank of knowledge, but rather as a practice-based system of knowledge that operates in a fundamentally different way to Western knowledge systems.

Cultural literacies

The aim of teaching with story as a way of knowing, therefore, is not necessarily to encourage students to adopt the worldviews of more "sustainable", ecocentric cultures. Indeed, as Gough (2014, p.27) warns, "we cannot, and should not, attempt to appropriate the metanarratives of another culture to replace our own". Instead, story in this respect can be used to support the development of students' cultural and critical literacies: their critical awareness of their *own* cultural inheritance, its influence on everyday perceptions, and how it was produced in particular times and spaces. Hindle (1974, p.72) describes the approach as an attempt to "relate reading to living", to help students "realize that such matters as love of Nature or love of the past are not self-evident, but have been formed by artists". He views literature as the "birthright" of those who share the social context of these artists, and considers that its democratic function ought to be restored in an increasingly elitist literary culture:

> What has given me most personal satisfaction in this kind of course has been the way in which general readers have received back something which was rightfully theirs, something that belonged to their lives but which was taken away from them by the gnostic cults that tend to use literature as arcana. (Hindle, 1974, pp.71–72)

An awareness that seemingly "self-evident" collective values have been constructed makes possible the awareness that they can be reconstructed. In other words, cultural literacy – the "familiarity with one's cultural assumptions" (Kulnieks et al., 2013, p.144) – is a necessary condition for cultural criticism and cultural renewal.

Given the important role of education in cultural reproduction, many educators emphasise the critical and transformative capacities of educational storytelling. Critically analysing stories can allow students to diagnose "the cultural dysfunction that contributes to the local and global environmental crisis" (Kulnieks et al., 2013, p.149). Educators using stories in this way portray the environmental crisis as fundamentally a cultural crisis, and warn that a failure to recognise this risks worsening the crisis through "dysfunctional" pedagogies:

> I have argued that to move beyond the realm of rhetoric and wishful thinking, it is necessary to examine the global and postcolonial context of pedagogies concerned with education for sustainability and environmental education. Failure to address cultural and historical aspects of pedagogy can lead to the assumption that educational solutions to contemporary environmental problems are to be found in the addition of more science-based environmental education, education for sustainability, or climate change management courses and programs. (Matthews, 2011, p.274)

Instead of framing the environmental crisis in terms of technical "problems" and "solutions", Gough (2014, p.25) advocates directing students' attention to "questions of how meaning has been created" and how "such questions are related to our daily lives" – in effect initiating a process of conscientisation that is strongly aligned with critical ecopedagogy. In so doing, he aims to promote not just cultural literacies, but ultimately a sense of cultural responsibility:

> The majority of people in modern Western societies have abrogated their responsibility for "singing the world into existence". Instead they accept uncritically the world that Bacon, Descartes, Newton and others "sang" into existence – the world that presents itself as a machine of structures and systems, with sharp lines drawn around

> detachable parts called "forest" and "grasslands" – the world that is constructed as a story that obeys the rules of the positivist metanarrative of knowledge. (Gough, 2014, p.25)[44]

In essence, Gough (2014) locates the roots of the environmental crisis not just in the dominant stories of Western culture, but also in a collective failure to challenge the authority of these stories – a kind of cultural stagnation. To remedy this, both educators and students need to become active participants in a democratic renewal of their own culture – to "'sing' the earth into existence *in the conditions of urban and late industrial lifestyles*" (Gough, 2014, p.27, emphasis in original) – by becoming storytellers as well as critics. Cultivating pluralistic approaches to storytelling that are inclusive of Indigenous voices can also further the causes of environmental justice and decolonisation through education (Kulnieks et al., 2013; Nxumalo and Villanueva, 2019; Stewart, 2008).

In summary, approaching story as a way of knowing reflects a shift in focus from the individual learner to the role of education in wider culture. It starts from a recognition that education is deeply implicated in the broader storytelling practices of particular cultures and can be a key site in the reproduction of – or resistance to – dominant ways of seeing the world. By analysing the narrative *strategies* of different storytelling practices alongside the stories themselves, students not only expand their knowledge about the world, but their understanding of different *systems* of knowledge production. Similarly, students are encouraged to reflect not only on their personal relationship with nature, but also on the ways in which this relationship has been structured by shared cultural assumptions and meanings. The cultivation of "environmental consciousness" is subordinated to the critique of "culturally embedded pattern[s] of consciousness" (Bowers, 1990, cited in Gough, 1990, p.15). The act of *creating* stories also takes on a new significance when story is understood as a way of knowing. Armed with the critical literacy to situate stories within relations of power, students gain a recognition of the subversive power of storytelling that goes against the narrative conventions of the dominant culture. Approaching story as a way of knowing therefore empowers students to

[44] Gough's (2014) reference to "singing the world into existence" is a paraphrase from Watson and Chambers' (1989) book *Singing the Land, Signing the Land*, exploring Aboriginal Australian conceptions of "songlines" (see also Chatwin, 1987).

recognise their own cultural agency: their capacity to influence and effect change beyond their own personal behaviours.

Story as transformation

Key terms

Table 10: Selected key terms from articles published in the 2010s and 2020s

	2010s	2020s
Story sources	*digital storytelling, film, interactive video, speculative fiction, technology, video*	*digital, digital story, digital storytelling, game, map, multimodal storytelling, simulation game, story, story map, storyline, storytelling, sustainability story*
Teaching approaches	*citizenship education, education for sustainability, esd, global citizenship education, project-based learning*	*sustainability education*
Learning aims	*behavior, change, citizenship, climate change, community, empathy, environmental awareness, global, global citizenship, own life, political, relation, self, social justice, social responsibility, social sustainability, sustainable, sustainable development, sustainability*	*agency, climate, climate change, communication, critical thinking, environmental problem, relational, science communication, simulation, sustainability issue*

There is substantial thematic overlap between the top 50 keywords and key clusters from articles published in the 2010s and 2020s (Table 10). The rise in discussions of digitally-mediated story formats is evident: *digital storytelling* falls within the top five key clusters in the 2010s (163 occurrences) and remains there into the 2020s (141 occurrences), where *digital story* (213) is also identified as the strongest key cluster for the decade. These terms make their

first appearance in the corpus in 2012, and their emergence as key tracks a broader interest in the approach following the publication of Joe Lambert's (2002) book *Digital Storytelling: Capturing Lives, Creating Community* and its subsequent editions in 2006, 2009, 2013, 2018, and 2020. The keywords *video* (283) and *film* (188), and the key cluster *interactive video* (40) suggest the predominance of audiovisual formats in the 2010s, while in the 2020s the terms *map* (625), *game* (226), *story map* (263) and *simulation game* (61) designate alternative formats incorporating narrative elements. There is still some representation of literary formats, however, with *speculative fiction* (36) being identified as key in the 2010s. The future orientation of this genre contrasts with the emphasis on historical storytelling in the previous decade. This shift is also illustrated by key terms designating future-oriented teaching approaches, such as *esd* (128 – all occurrences use the capitalised form "ESD", i.e. Education for Sustainable Development) and *education for sustainability* (42) in the 2010s, and *sustainability education* (48) in the 2020s. The key clusters *citizenship education* (32) and *global citizenship education* (30) designate approaches oriented towards democratic participation, and the practice of *project-based learning* (52) is typical of such approaches. A number of keywords and key clusters in both decades relate to core concepts and competencies associated with sustainability and citizenship education.

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Conceptualisation of story as transformation

Many of the more recent accounts in the corpus focus on the transformative capacities of story. These accounts build on conceptualisations of story as a way of knowing, sharing a common concern with the relationship between ways of knowing and ways of being. Yet, while the approaches explored in the previous section typically involve looking back – uncovering the historical roots of present-day ways of being – the approaches charted in this section are more forward-looking. Just as stories can shine a light on how things came to be, so too can they be used to envision how they might become. More specifically, geographical and environmental educators value the affordances of story for helping students – and others – to envision how they might *act* going forward into the future. While the goal of educating for transformative action was arguably a

founding principle of the field of environmental education (Stapp, 1969), the influence of critical and transformative pedagogies became more prominent after the turn of the century amid growing recognition of the urgency of environmental crisis.

In elaborating the value of story for transformative pedagogies, many educators turn their attention to reading as a transformative experience. Bigger and Webb (2010, p.404) draw on Ricoeur's hermeneutic phenomenology to explore the "storied" nature of human experience: "Whatever we experience slots into our life story and our community story, past (retrospective) and future (prospective), and is informed by stories that we have found meaningful". At the same time, they argue that "fiction might equally 'story' experience", acting as an "interpretive tool" that enables readers both to "assess past experience" and to "structure new experiences" (Bigger and Webb, 2010, p.404). Story's mediating function between self and community, past and future, is particularly powerful in the context of transformative education: "Unlike in fiction, the story of one's life is not fixed. Young people can *restory* their past and their potential futures through the understandings generated by reading" (Bigger and Webb, 2010, p.410, emphasis in original). The task of "restorying" life experiences, they argue, is aided by the narrative conventions and structures of fiction.

In particular, Bigger and Webb (2010) highlight characterisation as a key element of fiction that assists the reader in applying "the understandings generated by reading" to their own lives. They describe the "polyvocal and polyphonic" nature of fiction, which "juxtaposes different opinions" as characters grapple with internal or external conflict (Bigger and Webb, 2010, p.402). In their view, reading fictional stories can "stimulate inner debate" that can then be developed through discussion with classmates and teachers in relation to their own lives: "In considering what kinds of people the characters are and how appropriately they behave, readers can reconsider their own lives and the lives of others" (Bigger and Webb, 2010, p.409). Amidst this plurality of voices, however, they note that most stories – at least in the Anglophone children's literature that they surveyed – are crafted in such a way that leads the reader to identify with one central character above all others. In the context of environmental education, they identify the hero figure as a key vehicle for

supporting students' developing sense of environmental responsibility. More precisely, they pinpoint the figure of the heroic *resister*: those who "stand up firmly against social pressures, facing personal risk for reasons of principle" (Bigger and Webb, 2010, p.410). They claim that young people's fiction is "full of heroic resisters as role models for readers", as well as "anti-heroes, from whom different lessons can come about selfishness, greed and power" (Bigger and Webb, 2010, p.410). Thus, "[u]nderstanding the range of characters in stories may help readers better to understand themselves, others and human nature in general" (Bigger and Webb, 2010, p.409). Dean (1994) and Holm (2012) make a similar case for reading and discussing narrativised "true stories" of real-life environmental heroes and heroines to inspire students to take action in their own lives. It is notable that the aspects of story identified as valuable in these accounts – plot and character - are precisely those dismissed as irrelevant or dangerous in some of the earliest discussions of storytelling by (predominantly) geographical educators.

Others have sought to problematise pedagogies based on identification with literary heroes. Jespersen (2014) highlights the limitations of this approach from an environmental justice perspective, including its implication in mainstream Western traditions of "hero environmentalism" that have historically excluded marginalised groups from environmental decision-making. When students identify with characters embodying "the tropes of the outlaw adventure story and renewal through wilderness", she argues, they may "incorporate into themselves ideologies espoused by them – not as something outside but as something within structuring their identities" (Jespersen, 2014, p.224). In this way, close identification with heroic characters can impede the critical distance required to scrutinise these ideologies, with students feeling "personally attacked" by such critique (Jespersen, 2014, p.224). Jespersen (2014) encourages educators to "teach students to critically examine their identifications with characters" (p.225), while noting that this process "is often a painful and rocky one" (p.223). Indeed, even as Bigger and Webb (2010, p.411) praise heroic narratives of "the victory of good over evil", they emphasise the importance of supporting students towards critical reading. Citing the tropes of some traditional environmental writing – "The big wide world is threatening, progress is to be feared, the hero conserves the rural idyll" – they caution that

young readers "may need some help to disagree with a story's omniscient and persuasive narrational voice" (Bigger and Webb, 2010, pp.410–411). Jespersen, though, ultimately concludes that identification with literary characters "might be *necessary* for a literary project in social justice" (2014, p.226, emphasis in original). She recommends incorporating diverse perspectives into reading materials to "facilitate students' identification outside of their own subject positions" (Jespersen, 2014, p.223):

> When my students begin to identify with the protagonists of environmental justice novels, they also begin to view their long-held beliefs as ideological. In other words, the process of critically thinking about the masculinist rhetoric of reinvention of self through wilderness comes in part through the "uncritical practice" of identifying with characters that question, reject, or see that belief system as ideological and exclusionary. (Jespersen, 2014, p.226)

In other words, reading a range of stories where students may experience conflicting identifications with both protagonists and antagonists serves to complicate taken-for-granted assumptions about "good" and "evil" in environmental activism. For Jespersen, this critical process must take account of students' own identities to be effective:

> Because altering ideology is fundamentally altering the self, I'm not sure that my students would have engaged at all without the possibility of identification, and maybe not without the possibility of heroic identification as refuge from some of the stances that many began to reject. (Jespersen, 2014, p.227)

In this way, the "uncritical practice" of literary identification can still play an important role within a broader process of ideological transformation.

Pedagogies of story as transformation

Participation

As well as reading stories, some educators introduce opportunities for their students to participate in collective storytelling. In some cases these activities progress sequentially, with students creating their own stories in response to stories introduced by the teacher. Dean (1994), for example, invited students not only to reflect on the heroic qualities of the characters encountered, but also to share how they might embody these qualities in their own lives:

> As each of us recounted a heroic deed we could perform for our place, I connected the speakers back and forth across the circle with a string until we had created a web. All the while, I stressed that this web of heroism for our home place would be able to sustain the earth. (Dean, 1994, p.32)

The “story circle” approach moves away from the narrative trope of the lone hero by weaving together the personal stories of each participant into a “web of heroism”. This emphasis on collective action recalls the dialogic orientation of critical ecopedagogy, and contrasts strongly with the introspective individualism that typified the discourse of story as experience.

Others adopt a participatory approach from the outset. While Uhrqvist et al. (2021, p.150) recognise “the importance of role models to inspire action”, they encourage students to draw on their own experience rather than the examples of literary heroes. This team of researchers and educators developed a didactical tool to support the co-production of “sustainability stories”, allowing students to map the connections between different dimensions of a given sustainability issue. The dimensions incorporate the three standard pillars of sustainable development (environmental, social, and economic), but add the dimensions of “pluralism”, “agents”, and “organizations”, thereby introducing narrative elements of character and conflict into students’ engagements with the issues in play. These elements are central to the transformative aims of the approach, moving students away from “static descriptions of issues” and enabling them to “visualise examples of possible change” (Uhrqvist et al., 2021, p.150). Specifically, students are encouraged to write themselves into their sustainability stories in order to “visualize a realistic mode of becoming an agent”, operating within structural constraints and alongside others who may have different perspectives on the issue (Uhrqvist et al., 2021, p.154). In this regard, the story mapping tool “remains open in the struggle between structural and agent-based perspectives when understanding social change” (Uhrqvist et al., 2021, p.151). Unlike the fixed narratives of fiction, students develop “open-ended stories” that enable them to collectively navigate possible pathways “between the current and a preferred future state” (Uhrqvist et al., 2021, p.157). Other educators engage students in similarly open-ended participatory storytelling activities through simulation games (Vasconcelos and Seingyai, 2022), or design entire learning units according to narrative co-production

frameworks such as the Storyline (Häggström, 2022) or Storypath (McGuire and Stevahn, 2022) methods.

While these approaches can certainly be classed as participatory, in each case the teacher retains a significant role in setting the parameters of the story. Even as students develop the characters' motivations and actions, they must do so in a way that meets the overall objectives determined by the teacher – typically, to "solve" the problem under study. Uhrqvist et al. (2021, p.154) stipulate that "a sustainability story must cover content from all the six dimensions" in their mapping tool, and that "the story's primary agents, who are identified with, must be a part of the solution". The objective of Vasconcelos and Seingyai's (2022) simulation game, meanwhile, is to achieve a combination of UN Sustainable Development Goals (SDGs) chosen at random from a card deck, with the context, implementation tools, and unfolding events determined by other cards. In the Storyline method, the sequence of events (or "episodes") is "planned by the teacher", with students "using various sources to help them solve the problems within the specific context that has been constructed" (Häggström, 2022, p.158). All three approaches effectively constitute problem-based learning – albeit with a narrative twist – where the teacher's role is to set the problem and the student's role is to find a solution. While a mandated "happy ending" may be appropriate to the aims of transformative environmental education, these approaches are not, perhaps, as "open-ended" as they first appear.

Speculation

In contrast to these scaffolded approaches, Rousell et al. (2017) offer students a radical degree of creative freedom in their approach to storytelling. In a project that enrolled children and young people as co-researchers and co-producers of a transdisciplinary climate change curriculum, they describe how speculative fiction emerged as "a creative research method that opened up spaces for children and young people to think and act differently in relation to climate change" (Rousell et al., 2017, p.660). The narrative conventions of speculative fiction enabled their students to imagine characters and worlds beyond the limitations of the "real world", producing "new aesthetic milieus that are also intimately connected with the concrete challenges of our current existence"

(Rousell et al., 2017, p.655). One particular affordance of speculative fiction is its accommodation of nonhuman protagonists, which can facilitate creative explorations of climate change "outside of anthropocentric imaginaries" (Rousell et al., 2017, p.655):

> This means that speculative fictions have the capacity to inhabit new bodies, landscapes, and planets; propose radical changes in social and political organizations; and explore the very limits of human experience through graphic description and visualization. (Rousell et al., 2017, p.657)

Rousell et al. (2017, p.658) position speculative fiction as an "ontological tool" that allows students to experiment with possible futures through "a form of immersive simulation, rather than depiction". Drawing on Deleuze and Guattari's notion of "minor literature", they understand the genre as "a literature that operates in the cracks, interstices or 'minor keys' between the majoritarian, State-controlled regimes of art, literature, science, technology, philosophy, and education" (Rousell et al., 2017, p.658). This approach to storytelling is determinedly open-ended in the sense that it is oriented towards experimentation, rather than resolution: neither character development, world building, nor dramatic structure is subject to external constraints. In this way, students may envisage transformative change far beyond what is possible under current political and economic systems.

Contagion

The dissemination of students' speculative fictions was similarly open-ended. Young co-researchers were encouraged to share findings and creative outputs via a secure online platform, adopting "fictional avatars and alternative identities" (Rousell et al., 2017, p.660). The collaborative fictions that emerged led the team to propose a "viral approach to climate change education", whereby the affective qualities of student narratives "infect" other students' learning experiences via a "contagious proliferation of affective resonances" (Rousell et al., 2017, p.667). They situate these possibilities in opposition to more directive approaches that are "predicated on the cognitive development of the individual student" (Rousell et al., 2017, p.666). Their exploration of the "contagious" properties of narrative expression is echoed by a number of other educators, including science educators. For example, one physical geography outreach

project identified the narrative elements of “scientist ‘characters’, adventure and adversity” as key to engaging pupils in climate science and climate action (Adamson et al., 2021, p.921). The researchers attribute the success of these strategies to their deployment of the “personal lens”, which provides “a rich variety of creative engagement opportunities to relate the expertise of the scientist with the experiences of the audience” (Adamson et al., 2021, p.913).

If the internal characteristics of stories inherently lend themselves to sharing, the medium by which they are shared can also facilitate wider engagement in transformative learning. Some educators highlight the value of live performances for creating communal experiences that make it easier for audiences to relate stories to their own lives. Law et al. (2021, p.551) argue that the medium of theatre is “especially well-suited to this, as the shared experience of attending a live performance promotes conversations amongst audience-members about the show and its subject matter”. Many others point to the affordances of digital media for creating and sharing engaging stories. Adamson et al. (2021) combined live and digital modes of storytelling in their climate outreach project, developing podcasts and videos based on their in-school workshops to maximise popularity and accessibility. The interactive social media platform created by Rousell et al. (2017) facilitated their “viral” approach to climate change education, allowing participants to produce affective resonances by combining textual and visual modes of storytelling. Similarly, Truong-White and McLean (2015) describe a transformative global citizenship education project that allowed school pupils to connect globally through multimedia digital storytelling. Schrum et al. (2021, p.12) find that digital storytelling also allows university students to “forge connections with communities beyond the classroom” by offering “scope to incorporate a greater variety of types of media into the stories told”, permitting them to “experiment creatively with different ways of representing knowledge to an audience”. One case study used digital story maps as a mode of assessment in an authentic learning project for geography undergraduates, with the output designed to be “launched into wider circulation” through partnerships with local civic organisations (Schrum et al., 2021, p.9). The assignment required students to organise a range of geographic referenced data into coherent narratives, which provided civic partners with “an

immersive, interactive, structured, evidence base to share with stakeholders and inform policy decisions" (Schrum et al., 2021, p.8).

Communication

For many educators, the ability to engage different audiences through stories is a key skill that they aim to develop in their students. Some frame this aim in terms of employability and professional development. Casper and Balgopal (2020, p.1580) note that natural resource management professionals often explicitly reference storytelling during undergraduate guest lectures on environmental socio-scientific issues, "helping future science professionals identify this as an important communication strategy" for working with the public. Similarly, Schrum et al. (2021, p.9) describe how the open-ended process of digital storytelling offers students a "real experience of the working world" that expanded their communication skills and digital literacies beyond what could be achieved through traditional academic assignments. Law et al. (2021, p.153) draw on the storytelling expertise of acting students in a project to co-create a play with geography students, allowing the geographers to "see the importance of affective engagement in enhancing understanding of the impacts of climate change" in ways that could be applied to "their other assignments and beyond into their professional lives". These framings effectively position storytelling as a "green skill" that will be important for the "green jobs" of the future – a position that evokes a rather limited conception of "transformation" from a critical ecopedagogical perspective.

Others look beyond the professional sphere, recognising storytelling as a vital skill for political participation in times of social and ecological uncertainty. Several educators contend that when students produce their own narrative content, they develop a critical awareness of the narrative strategies used by others in a saturated media landscape:

> By asking students to engage in the production of knowledge that is so ubiquitously consumed by them, the hope is that students (the public) will become savvier knowledge producers, which can only aid our overall use of information in this increasingly digitalizing and globalizing world. (Graybill, 2016, p.57)

As Uhrqvist et al. (2021, p.148) note, "[t]he most powerful stories are those that succeed in separating themselves from the category of stories … Given the power of stories, the ability to engage with important stories in our lives becomes a matter of empowerment". In their view, the empowerment that comes from storytelling is "not just about writing it down; it is also the ability to tell a story that is perceived to be relevant by others" (Uhrqvist et al., 2021, p.153). These comments, together with those of Graybill, reflect the key tenets of media literacy education in its receptive and productive dimensions.

Empowerment through narrative agency is highlighted as particularly important for groups whose voices are often marginalised in the political sphere, including women and children. Piersol and Timmerman (2017, p.11) describe their pedagogical engagements with storytelling as a form of "lived ecofeminist politics" which allows them to "redistribute voice, promote diversity, resist power imbalances, and restore caring and relational ways of being within academia". Walsh and Cordero (2019, p.659) consider digital storytelling as "a potential tool of agency for youth from communities currently underrepresented in societal decision making around climate change". Noting that students "may have a better chance of being heard, understood and believed by the general public" when they develop expertise in telling stories, they conclude that storytelling "may be a tool youth and their communities can leverage to amplify their voices" (Walsh and Cordero, 2019, p.659). Rousell et al. (2017, p.665) similarly note the parallels between the "minoritarian status" of the mutant protagonists of their young co-researchers' speculative fictions and the "broader marginalization of children and young people in today's political economies as minors, in which they are accorded very little agency on political issues that have a direct bearing on their lives". They propose that "such speculative and aesthetic milieus have the capacity to support children as practitioners" who can "actively reshape the very nature of climate change education" (Rousell et al., 2017, p.668).

Even if students' narrative agency is constrained by frameworks set by the teacher, or indeed if they are not creating stories themselves, many argue that engaging with stories develops important skills for democratic participation and citizenship. Bigger and Webb (2010) claim that the "dialogue-rich text" (p.411)

of fictional stories brings young people “face-to-face with dilemmas and contested values” (p.409), the discussion of which serves as an exercise in democratic deliberation that lays the foundations for “active citizenship” (Bigger and Webb, 2010, p.411). Franck and Osbeck (2018) similarly propose that reading stories can develop ethical literacy by cultivating empathy and extending the “sympathetic imagination”. They emphasise the necessity of ethical literacy for navigating transformative change in a complex world where there is “no such thing as unequivocal and unquestionable ‘sustainability morals’” (p.134). They view storytelling as supportive of pedagogies “where different visions for the future are allowed to be cultivated side by side” (p.141). The skills of democratic deliberation can be further enhanced when students participate in the co-creation of stories, such as in the aforementioned Storyline/Storypath methods. Both Häggström (2022) and McGuire and Stevahn (2022) describe the aims of these approaches in terms of empowerment, agency, and democracy. For Häggström (2022, p.164), allowing pupils to be “agents of change within the arc of the narrative” has “potential impacts on their imagined selves as future agents of change”. These scaffolded approaches could be summarised as seeking to develop the action competence of students through nurturing a sense of relational agency.

Among the wide range of approaches deployed, a common thread can be distinguished in the educational discourse of story as transformation: that story is well suited to transformative education because it a mode of communication that is highly relatable and, therefore, highly shareable. These qualities stem from the core characteristics that distinguish narrative from other rhetorical modes, namely, character, conflict, and the dramatic structures that arise from them. The narrative arc of stories, where events unfold sequentially through a beginning, middle, and end, is arguably an inherently transformative structure – things are different at the end of the story to how they were at the beginning. Thus, even reading or listening to stories allows students to identify with characters enacting transformative change in the face of obstacles. Engaging with stories in an educational setting creates opportunities for collective transformation through discussion, co-creation, and sharing. This emphasis on the sharing of stories, whether within or beyond the educational setting, reveals a concern with the social function of education, and a broadening of educational

aims beyond the individual student. In an era of planetary crisis where radical transformation is a necessity, the transformative capacities of story truly cannot be ignored.

Chapter 6: Conclusion

Telling “the story of stories”

In the introduction to this thesis, I stated that my overarching aim was to tell “the story of stories” in geographical and environmental education. With hindsight, it now seems obvious that this was always going to be an impossible task: my research has shown that there is no definitive story to tell about stories. Rather, I have traced the development of four distinct storylines, and there are undoubtedly others still to be followed. In this final chapter, I will revisit the initial aims and questions that guided my research, reflecting on a) how I navigated the complexities of addressing them in practice, b) what can be learned from the answers I advanced, and c) what questions my research raises in turn for further investigation. I will conclude by discussing how I have applied insights from my research in my own teaching practice through an introductory module titled *What is Nature?*, as well as the institutional enablers that facilitated a cultural approach to environmental issues in a university setting.

To return to my original research aim, it is perhaps more accurate to describe my research as an attempt to tell *some* of the stories of stories. It is neither possible nor desirable to achieve universality in this endeavour, and not only because of the time- and resource-limited nature of doctoral research. My object of study has been the discourse communities of geographical and environmental education, and my own junior membership of these communities – for which my research has served as an apprenticeship – has allowed me to build the interpretive frameworks needed to make sense of the findings. More specifically, I have focused my attention on the discourse communities of Anglophone educators. It is therefore important to reiterate that what I have presented here is far from the full story, even if it is possible to observe a wider range of voices participating in these communities from outwith predominantly English-speaking countries over the fifty-year period of study (see Appendix). At the same time, it is important to recognise that English-speaking voices have been historically amplified within geographical and environmental education (Albert et al., 2017; Müller, 2021). My intention has not been to conflate Anglophone discourse communities with educational communities as a whole,

but rather, to subject these voices to particular critical attention precisely because of their powerful influence on the field.

My research highlights the radically different meanings and purposes assigned to stories over time within these discourse communities. While the keyword analysis points to identifiable trends over time, the qualitative analysis reveals that the matter was contested throughout each period of the corpus, suggesting too that it remains so today. In this regard, it recalls Swales' (2016) warning against viewing discourse communities as static or homogenous in their beliefs and values, and illustrates both the regularity and the instability that Porter (1992) considers to be definitional features of discourse communities. In this thesis, I have primarily analysed the temporal dimensions of this regularity and instability: my decision to divide the corpus into decades for the initial keyword analysis inevitably entailed a de-prioritisation of other axes of variation, including that between discourse communities or across differing geographical and educational contexts. While I had originally built these factors into my corpus structure, ultimately it was beyond the scope of this project to conduct a full "breadth-and-depth" analysis along these lines. Although my analysis is effectively structured along temporal rather than spatial lines, my goal was never to offer a detached "view from nowhere". I was able to account for geographical and educational context to some extent in the qualitative analysis, but these could also provide complementary perspectives for future research. With story as my main protagonist, I emphasised the pedagogical continuities in its travels across contexts, but in-depth retrospectives focusing on the particularities of storytelling in certain locations, with certain groups of learners, or at certain levels of education would be equally valuable contributions.

One advantage of the more zoomed-out perspective I have adopted is the ability to map out the "roots and fruits" – the origins and legacies - of various discourses around story. I found that some approaches were relatively concentrated in particular settings, while others were more migratory across geographical or disciplinary boundaries. For example, the roots of the discourse of story as resource could be quite clearly traced to a cluster of articles published in the *Journal of Geography* during the 1970s and 1980s, as

contributions to geographical education that explicitly referenced contemporary developments in geographical research. As the official journal of the (US) National Council for Geographic Education, it is perhaps unsurprising that the "fruits" of this approach are largely seen in formal educational settings, with many of the later accounts being published in the same journal or those of related subject organisations in the US, such as the National Council for the Social Studies. In contrast, the discourse of story as way of knowing can be identified in an article published in the journal *English in Education* several decades before this approach became established in dedicated geographical or environmental education journals, and its legacy can be observed in settings ranging from secondary science education to early years outdoor education. Of course, the deeper roots and wider fruits of these approaches remain largely unexplored within the restricted parameters of my corpus, leaving open other promising avenues for future research.

The controlled vocabularies of academic and educational databases enabled me to trace the flow of ideas across contexts by facilitating the discovery of relevant source material published outside of geographical and environmental education journals, such as the English education journal just mentioned. However, relying on databases also ruled out the discovery of both source material published before indexing began and material published in sources not approved for indexing. A stark reminder of the power dynamics underlying database selection policies came in March 2025, when it was announced that the number of actively catalogued sources in the educational research database ERIC would be significantly reduced following major budget cuts by the US Department of Government Efficiency, an initiative of the second Trump administration spearheaded by Elon Musk (Laurier Library, 2025). While this particular development occurred after I had completed my data collection, it forced me to confront anew the partial and constructed nature of the tools that supported it. I now recognise that my corpus reflects the evolution of the academic publishing and indexing landscape in the Anglosphere as much as the evolution of pedagogical discourse itself – but also, crucially, that the latter cannot easily be separated from the former due to the visibility and accessibility afforded to indexed sources.

With this in mind, I now return to my central research question – *How has the role of storytelling in geographical and environmental education evolved over time?* – to summarise three key findings that can be drawn from my situated "story of stories":

- There has been an evolution in the dominant understanding of what constitutes a story: the narrow textual approach of early engagements has expanded to incorporate cognitive and cultural understandings of story.

One of the most striking results of the keyness analysis was the high ranking of words and terms denoting different story formats, suggesting their strong association with particular time periods. This pattern could be observed from a quick glance over just the top five keywords in each decade: from *novel* (1970s) to *haiku* (1980s/1990s) to *video* (2010s) to *digital* (2020s). On further investigation, it became clear that this was not merely a superficial trend in the use of learning materials, but pointed to a deeper shift in the dominant understanding of story, with significant implications for the politics of knowledge production. Engagement with literary works – fiction and poetry - is common to the discourses of both "story as resource" and "story as experience", but there is an important difference in the framing of story in each case. In the first, the texts in question are overwhelmingly discussed in terms of their internal properties, whereas in the second the emphasis is on their capacity to evoke images and emotions in others. From a narratological perspective, locating story in the function of narrative *structures*, rather than in the content of narrative *texts*, marks a fundamental shift from a textual to a cognitive understanding of story. This shift is important because it destabilises the authority of the storyteller and reconfigures storytelling as a relational process in which both reader and writer (or teller and listener) play active roles. The discourse of "story as way of knowing" rose to prominence during the 2000s, the only decade not to feature a specific story format among its top five keywords. This move arguably represents one step further in the decoupling of story from narrative texts, typifying an increasingly pervasive cultural approach that understands stories as metanarratives permeating all spheres of society. Finally, the discourse of "story as transformation" is primarily concerned with the stories told by learners and the formats , notably digital ones, that facilitate the sharing

of these stories – thus moving from destabilising to actively countering authoritative narratives.

- The evolution in the dominant understanding of story has been accompanied by an evolution in the respective roles of text, teacher, and learner: in broad terms, learners have been granted more active roles in Earth writing over time.

Looking at how stories have actually been used in learning and teaching provides a clearer illustration of the political implications of shifting from textual to cognitive and cultural understandings of story. Crucially, a concurrent shift was apparent in the dominant construction of the role of the learner, from being a *reader* of the Earth to becoming a *writer* of the Earth. Again, this shift can be seen by comparing the discourses of "story as resource" and "story as experience": students engage with literary reading material in both cases, but in quite different ways. Learners are typically expected to acquire knowledge directly from stories when they are conceptualised as a resource, but when conceptualised as an experience stories are more likely to be used as a stimulus for learners to produce their own knowledge through exploration and/or writing. The power dynamics of reading and writing the Earth are explicitly addressed in the discourses of "story as way of knowing" and "story as transformation": learners are portrayed as reflexive and agentic subjects who participate in the construction and deconstruction of influential narratives.

- Learners' increasingly active role in Earth writing has been justified by the need to move from learning *about* the environment to learning *for* the environment: in a context of escalating planetary crises, educational priorities have broadly evolved from the acquisition of knowledge to the development of critical literacies and action competencies.

The evolving role of the learner in relation to text and teacher also reflects deeper shifts in the dominant educational philosophies and paradigms of both geographical and environmental education. The conventional characterisation of environmental education as comprising education *about*, *in* (or *from*), and *for* the environment was first formalised in the UK Schools Council's (1974) *Project Environment*, and remains influential in Anglophone environmental education to

this day. The extent to which these three “threads” can be considered as complementary elements of an integrated model, or as distinct paradigms with conflicting epistemological foundations, has long been debated within environmental education research (Palmer-Cooper, 1998). Although the framework itself has been subject to critique (see for example Gough, 1987; Jickling and Spork, 1998), an increasing emphasis on the action-oriented forms of learning associated with education *for* the environment has been observed over the last fifty years of research and practice (Macintyre et al., 2025). The shifting dynamics of authority and agency in Earth writing cannot be understood in isolation from this broader renegotiation of the “why” and “how” of environmental education. The discourse of “story as resource” reflects a vision of education that aims to deposit authoritative knowledge in the minds of learners: stories are primarily valued as repositories of this knowledge. In contrast, the discourse of “story as experience” assumes that knowledge must be actively constructed by the learner, with stories (read and/or written by the learner) providing valuable aids in this process. In the discourses of “story as way of knowing” and “story as transformation”, both the aims of education and the value of stories are understood at the societal rather than the individual level. Taken together, my small “story about stories” thus tells a bigger story about the shifting and interwoven trajectories of the fields of geographical and environmental education.

Situating storytelling

In telling these stories, I sought to develop a more nuanced conceptualisation of storytelling by historicising and problematising practices of Earth writing in educational contexts. In light of the findings presented above, the central claims of this thesis can be summarised as follows: firstly, storytelling is not just one thing; secondly, storytelling is not new; and thirdly, storytelling is not *necessarily* transformative. I will now elaborate each of these claims in turn, before outlining the overall contribution of the thesis to the geographical and educational literatures.

1. Storytelling is not just one thing

My research identifies four distinct discourses around storytelling as it has been understood and practised by geographical and environmental educators. While these discourses were initially identified through a diachronic keyword analysis spanning the last five decades, the qualitative analysis shows that all four discourses continue to circulate in some form up to the present day. There is significant potential for misunderstanding and miscommunication if these diverse approaches are conflated under the banner of storytelling. The conceptual distinction between strictly textual and more-than-textual understandings of story has both philosophical and practical implications in an educational context. If story is understood as a particular type of text, then educators may choose to engage in storytelling as a particular way of presenting knowledge, and this way of presenting knowledge may be easily differentiated from other approaches to teaching. If, however, story is understood as a way of knowing, something not confined to any particular type of text nor indeed to texts as a whole, then educators are always already engaged in storytelling – the choice is not whether to tell stories, but which kinds of stories to tell, and how. It is particularly important to distinguish these approaches to story in interdisciplinary fields like geographical and environmental education, where teaching practices are already underpinned by a range of (sometimes conflicting) epistemological assumptions that are not always made explicit (Stables, 2001).

2. Storytelling is not new

Few would dispute that storytelling is an ancient practice – indeed, variants of Jensen's (2007, p.18) claim that storytelling is "the most ancient learning tool" are repeated throughout the corpus. Yet it is also widely recognised in the corpus that modern Western models of education have tended to perpetuate "a cultural bias against the use of stories" (De Young and Monroe, 1996, p.173) and "in favor of expository, factual and information-intensive text" (De Young and Monroe, 1996, p.175). In this thesis, I do not seek to dispute the latter claim, nor simply to restate the former, but rather to establish that storytelling has a history *within* Anglophone geographical and environmental education. The practice has persisted since at least the early days of the modern environmental

education movement in the 1970s, initially as a minor tradition that has now gained significant momentum within the field. In the case of geographical education specifically, the approach can also be understood as a continuation of minor traditions of creative Earth writing dating back to the formalisation of the discipline of geography. The recent rise to prominence of storytelling has been facilitated by the diversification of the field: approaches that appear "new" within geographical and environmental education, both of which emerged out of predominantly scientific traditions, may be considered "old" in the fields increasingly influencing them now, such as arts education and Indigenous education. Taken together, it can be argued that storytelling broadly challenges the rationalist, scientistic approaches that have long dominated the field in Western contexts. Yet in bringing its history to light, I also argue that there are clear tensions within this counter-tradition that must not be overlooked if its transformative potential is to be realised.

3. *Storytelling is not necessarily transformative*

In the current moment, when discourses of "story as transformation" predominate, it could easily be forgotten that storytelling can also have conservative effects in educational contexts. My research has shown that storytelling can serve to reproduce authoritative writings of the Earth as well as facilitate critical readings of it, to constrain agency as well as nurture it, to reinforce hierarchical relationships as well as reconstruct them. It is important to remember that storytelling is not a challenge to conventional transmissive pedagogies in and of itself: it has historically been accommodated to them and obviously remains vulnerable to co-option in a contemporary context. Truly transformative education – at least as it is understood in critical-progressive traditions - occurs when learners confront powerful narratives and construct alternative ones; superficial, decontextualised, or individualised engagements with stories do little to challenge the status quo. This is not to say that educators face an either/or choice between the various approaches that I have articulated and evaluated in the preceding chapter. In practice, each approach has the potential to contribute to a rich counter movement that legitimises more diverse forms of Earth writing, even if they differ in their degree of radicality.

This thesis has brought together literary-linguistic and pedagogical perspectives to make sense of the complexity of storytelling as it pertains to Earth writing in scholarly (Chapter 3) and educational (Chapter 5) contexts. By situating storytelling in relation to internal traditions in geography and environmental education, moreover, my research contributes new historical insights that extend previous research in both fields. It also contributes to methodological developments in the humanities and social sciences, demonstrating how digital tools and techniques developed for linguistic research can facilitate qualitative historical analysis. My use of diachronic keyness analysis to chart discursive shifts in the history of education represents a novel application of the "breadth-and-depth" method, originally developed for the secondary analysis of archived data from qualitative studies (Davidson et al., 2019; Weller et al., 2023). The guiding principle of this approach, in contrast to purely computational analysis, is to combine the affordances of digital methods with the "integrity of attention to nuanced context and detail" that characterises qualitative research (Davidson et al., 2019, p.365). At each stage, my analysis was informed by an understanding of the wider fields in which it is embedded. I will now outline how my research contributes to these fields.

The starting point for this thesis was a meditation on "Earth writing" as the root meaning of geography. While the process of conducting this research ultimately led me to question geography's "ownership" of Earth writing, geographical research was foundational to my approach, and it is only fitting that I should return to it here. As I set out in Chapter 2, my work speaks directly to geographical engagements with geopoetics, particularly those concerned with its political implications, as part of the broader "creative (re)turn" in the discipline. This thesis contributes the first sustained historical analysis of geopoetic practices in educational contexts. Previous theorisations of geopoetic education have focused on the work of Kenneth White (Tonner, 2024): my research expands the concept by situating geopoetic education within longer traditions of creative Earth writing in geography, and substantiates it by examining the practices of numerous geographers and educators. Shifting the focus from professional to pedagogical practices of Earth writing offers a different perspective on the relationship between geography and geopoetics that has been underexplored in the existing literature. Springer (2017) posits

geopoetics as a means of "undisciplining" the discipline of geography, of moving past the singularity of authority into the possibilities of creativity, and my research makes these dynamics manifest by exploring the shifting relationships between text, teacher, and learner. In contrast to the apparent neutrality of a term like "geo-graphy", "geo-*poetics*" makes clear that writing the Earth is an act of creation, not merely of description. I argue that a geopoetic education is one that engages with the inherent non-neutrality of Earth writing – which recognises that "how we write about the world constitutes a deeply political choice" (Springer, 2017, p.3) – and not simply one that engages with "creative" texts.

My research demonstrates that literary forms of Earth writing can be enrolled in authoritarian pedagogical practices as well as liberatory ones. It is difficult to conceive of the discourse of "story as resource" as geopoetic pedagogy, when creative texts are treated in much the same way as any other authoritative source that learners are disciplined into reproducing. Common to the discourses of "story as experience", "story as way of knowing", and "story as transformation", however, is the assumption that knowledge of the world cannot be unproblematically transferred from text to learner: it must be constructed, deconstructed, enacted. These approaches engage the learners' creative, critical, and agentic capacities in the reading and writing of the Earth, closely corresponding to Magrane's (2015) understanding of geopoetics as "creative geography", "literary geographies", and "geophilosophy". There are also interesting parallels between the learning activities associated with these three discourses and White's account of his own practice of writing poetry, prose, and essays. White explains the relationship between the three forms as representing, respectively, the cosmology, itinerary, and cartography of his poetics (McManus, 2007; White, 2004), likening them as well to the parts of an arrow:

> The essays, maintaining direction, are the feathers; the prose, ongoing autobiography, or what I like to call "way-books" (alias transcendental travelogues) is the arrow's shaft; and the poem is the arrow-head. (White, 1989, pp.7–8)

My research illustrates how storytelling can support learners both in critically orienting themselves within their cultural context and in finding new ways of being in the world. Although I have separated these pedagogical approaches in

my analysis, they could be considered to play complementary roles in a geopoetic education aiming at radical cultural renewal. Following Springer (2017), this vision of geopoetic education is not guided by prescriptive notions of how the Earth should be (re)written. On the contrary, it is guided by an ethos of emancipation from authoritative writings through critical-creative praxis.

In this regard, my research also illustrates resonances between the geopoetics and ecopedagogy movements. This thesis advances the latter field by articulating the specific affordances of storytelling for enacting ecopedagogies, in both theoretical and empirical terms. More precisely, it clarifies how storytelling can play a role in *critical* ecopedagogies in the Freirean tradition. As discussed in Chapter 2, educational researchers have tended to situate artistic engagements within a phenomenological tradition of ecopedagogy that has previously remained quite distinct from its Freirean lineage. My work sheds light on Freire's suspicion of the "fundamentally *narrative* character" of the "banking" model of education (2018 [1970], p.33, emphasis in original). Freire's diagnosis of "narration sickness", whereby educational content becomes "lifeless and petrified" in the process of being narrated (2018 [1970], p.33), is grounded in a particular understanding that assumes narration to be a one-way process of transmission – the understanding of "story as resource". My analysis calls into question the binary opposition of narrative and dialogic modes of education, showing how different understandings of narrative – as experience, way of knowing, and transformation - can enable the critical-creative praxis of ecopedagogy in a range of contexts. Indeed, I argue that these modes of storytelling are not just a "nice to have", but a "need to have" for enacting the cosmological, technological, and organisational transformation of education for which Kahn (2010) calls.

Storytelling in practice

In August 2024, as I was analysing the initial findings of my research, I had the great pleasure of attending a conference on "Storytelling for Environmental Futures" hosted by the Greenhouse Centre for Environmental Humanities at the University of Stavanger, Norway.[45] There were fascinating sessions exploring

[45] https://nordic-envhum.org/anest/storytelling-for-environmental-futures/

contemporary storytelling practices in literature, film, music, education, media and more. But it was only at the conference dinner on the final night, over a glass of wine, that a fellow delegate finally asked the question that had been bothering him the whole time: "What *is* 'storytelling'?". Even after three days of collective inquiry into this topic, everyone at the table had a different answer. No one disputed the relevance of the varied contributions to the conference theme, but neither could we agree on exactly what it was that they had in common, or what it was that set this theme apart from other areas of inquiry in the environmental humanities. This experience helped to clarify my own purpose as I delved deeper into my analysis. If, as the conference call for papers insists, the fight against environmental challenges "needs to take advantage" of storytelling,[46] and if environmental humanities scholars have a role to play in making this case, part of this role must be to provide some clarity about what storytelling means in practice. I hope that my thesis makes a small contribution to this cause in an educational context, mindful of the opportunities that remain to expand the conceptualisation of storytelling beyond the written (/spoken) word.

Storytelling is essential to addressing the cultural roots of the planetary crisis. As ecolinguist Arran Stibbe puts it, there is a need to, on the one hand, interrogate "the stories we live by" (Stibbe, 2021), and on the other, search for "new stories to live by" (Stibbe, 2024). Differentiating the meanings of storytelling enables educators to more easily distinguish approaches that promote deep cultural transformation from those that engage with culture only on a superficial level. My research suggests – contrary to my own assumptions on starting the project – that integrating "creative writing" into geographical and environmental education is not necessarily enough to challenge the status quo. It serves as a reminder that the transformative potential of storytelling lies less in the style of writing than in its wider implications. Truly transformative education requires a critical awareness of the cultural context: What are the "grand narratives" of Earth writing? Who tells these stories, and how? How are they reproduced in educational spaces, and how might they be resisted? Recognising that education

[46] https://nordic-envhum.org/anest/cfp-storytelling-for-environmental-futures/

cannot be “bracketed out” from the wider ecosystem of cultural (re)production is an important first step.

Reflecting on how my own understanding of storytelling has evolved over the course of this project, I believe that many of the problems I encountered in the early stages can be explained by my initial failure to recognise the inseparability of education and culture. I had been inspired by the poetic (proto-)ecopedagogy of Elisée Reclus, but I had underestimated the challenges of enacting it in twenty-first century schooling. When I was trying to build my project around a “landscape storytelling” intervention for secondary pupils, aligning the activities I had developed with the Curriculum for Excellence framework felt like trying to fit a square peg into a round hole. Frustrating as this was at the time, it taught me an important lesson: that the very structures of formal education reflect the dominant worldview of its setting. If Reclus can be considered an early ecopedagogue (Toro, 2016), it is important to remember that this ecopedagogy was enacted through his published writing, a form of public pedagogy (Sandlin et al., 2010) that operated beyond the constraints of educational institutions (albeit not entirely unconstrained, as discussed in Chapter 3). The structural constraints into which I ran early in my project – the pre-determination of learning outcomes, the division of learning into distinct disciplines – were symptoms of more foundational assumptions that constrain our experience of the world, and experimenting with different styles of writing within this system would arguably do little to change it.

In August 2025, I had the opportunity to apply what I had learnt from my recently-completed corpus analysis in my own teaching practice. Although this teaching took place in a university setting, the particularities of the programme meant that it was not subject to many of the usual constraints associated with higher education. I am fortunate in that my teaching work at the University of Glasgow has not required me to resolve my struggles over disciplinary identity. While I have occasionally been involved with teaching in the School of Geographical and Earth Sciences (and previously in the School of Modern Languages and Cultures), my main student-facing role during my PhD has been in Student Learning Development, the university service that supports students across the university to develop their academic research, writing, and study

skills. As part of the "Transition to Glasgow" programme for incoming undergraduates, I developed an elective module called *What is Nature?*, with enrolments open to students in both the "Sciences" and "Arts and Social Sciences" streams.[47] The module aimed to develop a critical consciousness of Western imaginaries of nature by uncovering the "origin stories" of mechanistic, extractivist, romantic, and systems perspectives. Reading material was drawn from philosophy, politics, arts, and sciences, and class activities fostered collective reflection on the meanings of nature in students' own lives, including their previous educational experiences. In the final class, students explored initiatives to reimagine nature in Western societies.

The ecopedagogy that I sought to enact through the module was enabled by its anomalous status within the university system, as part of a non-credit-bearing transition programme with no specific entry requirements. Designed to cater to the needs of students in the liminal space between (typically) school and university, the "Transition to Glasgow" programme also opens up a liminal space beyond disciplinary boundaries, where students soon to embark on radically different degree programmes can come together to form a learning community. *What is Nature?* brought together future engineers, musicians, veterinary medics, and, yes, geographers, who are unlikely to share a classroom again for the rest of their studies. This felt like a site of radical possibility, of epistemological openness, in the midst of an academy that has largely institutionalised the dichotomisation of nature and culture as discrete objects of study.

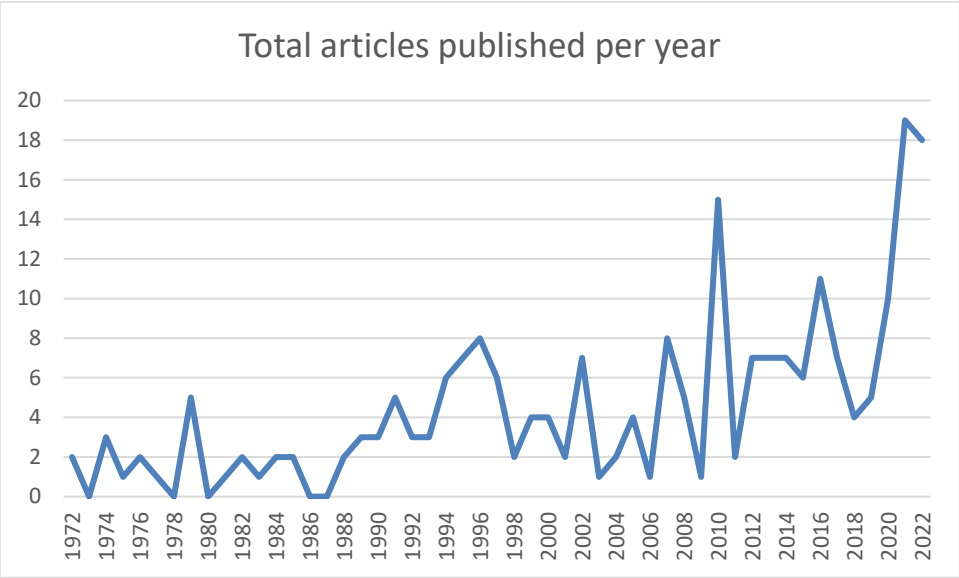
When I first decided to commence my doctoral studies, I was a literacies educator who wanted to become an environmental educator. In the process of completing the research, I have learned that the two are not mutually exclusive. In fact, I have become convinced that literacies education must be at the heart of environmental education in the twenty-first century. The compartmentalisation of technical/functional, cultural, and critical (eco)literacies in disciplinary education – and the historic prioritisation of the

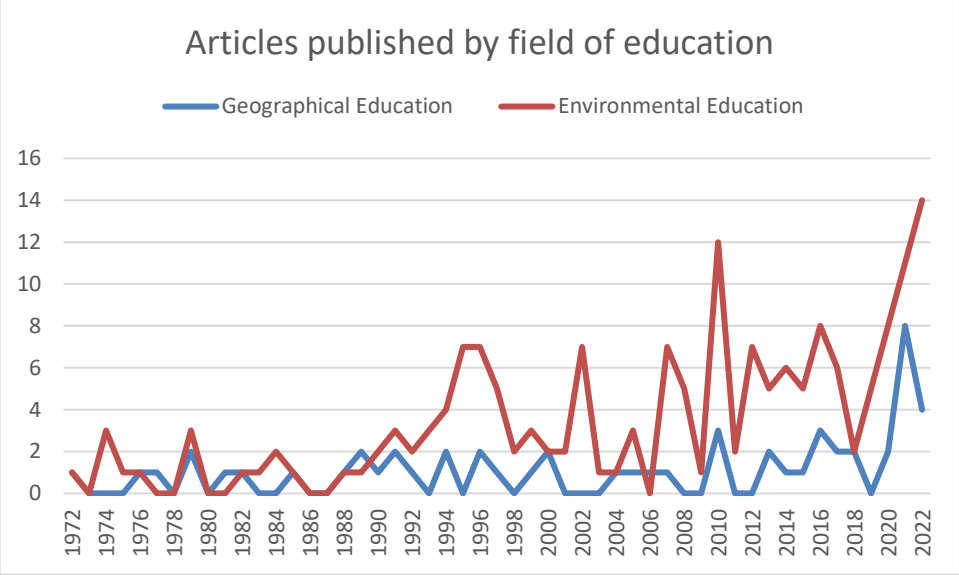
[47] The module consisted of six hour-long seminars delivered over two weeks and a formative written assignment of 800-1000 words. In 2025, two groups of 15-20 students completed the module, one online and one on campus. A module outline can be viewed on the Transition to Glasgow (T2G) Sciences and Arts and Social Sciences webpages.

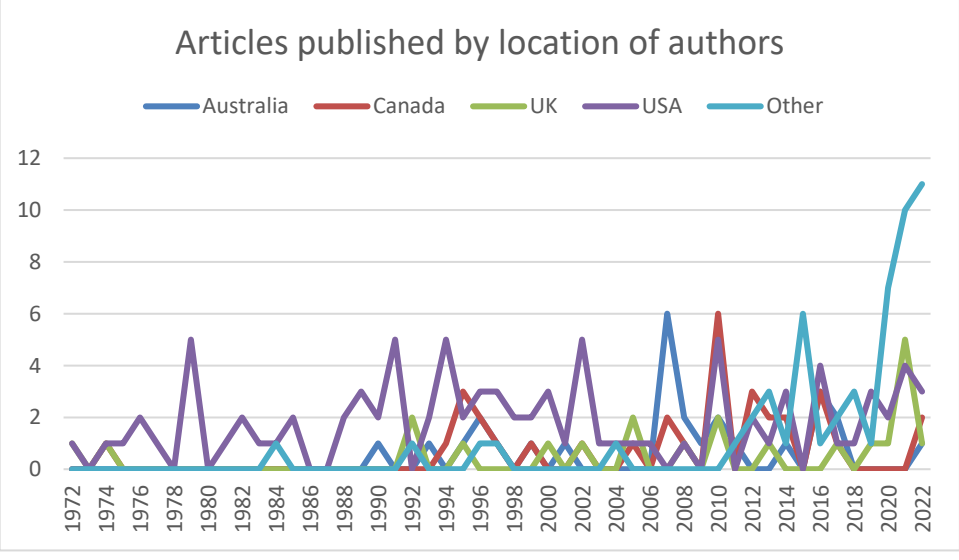
functional over the critical and cultural (Stables, 1998) – is a barrier to the holistic ecopedagogy that enables societal transformation. I now regard geography, with its longstanding integrative tradition, less as a privileged site for the development of ecoliteracies in formal education than as a model of what is possible. I am grateful to have received a foundational education that enabled me to understand physical Earth processes, interpret the contested meanings of nature, and interrogate their implication in relations of power. Even if I went on to specialise in the humanities, I was conscious that many of my peers in other humanities subjects had few opportunities to learn about the more-than-human world. Conversely, students who had specialised in other science subjects had few opportunities to learn about social and cultural issues. I am heartened to see that the current generation of undergraduates are not only demanding these opportunities, but creating them themselves: in my own institution, two student activists developed an accredited evening course, *Interdisciplinary Introduction to Climate Change and Sustainability*, which has been running since 2021 in collaboration with the Centre for Sustainable Solutions (Centre for Sustainable Solutions, 2020; University of Glasgow, 2021).

While this student-led initiative is a source of hope for the future of environmental education, I cannot conclude my thesis without acknowledging what has become, for me, a major source of despair since I started this project in 2021: the emergence of Generative Artificial Intelligence (GenAI). This technology accelerates the algorithmic amplification of dominant narratives at the very moment that they need to be challenged most, all while the powerful few who profit from GenAI seek to frame it as an incontrovertible asset to both education and environmentalism. In an age of automation, alienation, and homogenisation, an education that recognises the non-neutrality of Earth writing, that empowers students as critical readers and creative writers of the Earth, is a vital antidote.

Appendix: Overview of articles in the corpus







NB: articles associated with more than one field or location are visualised in all applicable trendlines, so the total count of articles differs slightly in each chart.

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