Geography needs science, science needs Geography

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Abstract
Physical geography continues to have complex relationships both with Geography as a whole and the natural sciences. At a time when the nature and future of physical geography and its sub-disciplines has been questioned, I explore these changing relationships and their impacts on the discipline itself and on our collective ability to understand and address environmental crises. The exploration is through the themes of disciplinary shape and institutional change, physical geography’s content and interactions, and how its practitioners badge themselves in an increasingly inter- even trans-disciplinary world. I conclude that there is now a fluidity between disciplines in which Geography holds an important place in research addressing key environmental challenges. This is evidenced by records of publication, conferences and employment mobility between the silos of academic departments. More than ever, the challenges facing environment and society today require collective, inclusive, efforts to achieve solutions that are beyond the capacity of a single discipline. Geography’s complexity and frequent rewiring position it well to be part of the research into global grand challenges that require disciplinary agility. Fears over Geography’s shape and practice can be more than offset by the need to contribute to holistic endeavours, so long as vital sub-disciplinary building blocks are not lost in desiloing endeavours.

Keywords
Physical geography, natural sciences, geomorphology, interdisciplinary, post-disciplinary

Fourteen years ago, the Guardian columnist Jenkins (2007) wrote a memorable piece about the threat to Geography in UK school curricula. The article was notable not for its attack on political interference with education, but for how it described Geography as a discipline, as holding ‘the key that unlocks the coherence of the physical world . . . Without geography’s mapping of planet Earth, the work of chemists, biologists and physicists is disjointed, mere technique’. Jenkins (2007) also suggested that ‘it is Geography that applies common sense to the statistical hysteria of climatologists’ 2 years before the ‘climate-gate’ scandal (see Wynne, 2010 for its significance) saw a very public questioning of the use of data by climate experts that has had lingering effects on the relationship of science and the public (Raman and Pearce, 2021). I have often pondered the relationship between Geography and the natural sciences, on the one hand as a geographer proud of the complexity and content of the discipline, but on the other as someone with enough years under my belt as an academic (38 to date since starting my first lectureship)
to have experienced plenty of moments in the proximity of natural scientists for the occasional emergence of a (personal) disciplinary inferiority complex. As a physical geographer, my research has brought, and continues to bring me, into regular engagement and partnerships with physicists, biologists and the like, initially as much as, and increasingly much more than, with the social scientists in my own discipline. And sometimes I have even felt confused, because of these complex relationships, about why I am in a Geography department, where my research, and the lexicons of some (many?) human geography colleagues, can make me confusingly feel a stranger within the discipline.

My confusion arises, I suspect, because the discipline itself can seem systemically and regularly confused about what it does, why it does it, and what the relationships to both other disciplines and the world beyond the academy are (see also Liu et al., 2022). There is also confusion and debate surrounding who and what is within the discipline. Self-questioning within a discipline is not necessarily a bad thing: better than complacency of shape and purpose that might lead to inertia and an inability to respond to evolving externalities. The ever-changing, sometimes turbulent, shape of the discipline could be seen as evidence of a chaotic, direction-seeking discipline, or of a vibrant, direction-creating discipline that is continuously experiencing subtle resets in the face of evolving externalities, as described for example in the report on the subject made by the panel evaluating the state of research for the United Kingdom’s 2014 Research Excellence Framework assessment (REF, 2014).

In this vein, the purpose of this article is to reflect on aspects of the (changing) relationships of Geography, particularly physical geography, with the natural sciences, and the impacts this has on the discipline itself. I will do this through the themes of disciplinary shape, sub-disciplinary (physical geography) content and interactions, and people. What I write is based on my observations, especially through the last decade or so, but it is also based on conversations with geographers around the world, especially in the United Kingdom, United States, Australia and southern Africa. It is therefore undoubtedly a set of observations with biases towards particular parts of the Anglosphere, and to parts of physical geography, that I know best: the observations I make may not be replicated in all contexts and places, or even be as widely present as I believe they are within the contexts that I have drawn upon.

Changing directions?

As an undergraduate in the late 1970s, there were, broadly speaking, three distinct parts to the Geography I was taught, and to the geography researched in the department I was taught in: physical, human and regional. Today, geographers will all recognise the continued presence of the first two. The third has been described as a ‘variegated and historically contingent subarea of academic geography, both as a concrete research field and as an object of theorization’ (Paasi, 2009: 226). It perhaps offered a space in which aspects of the physical environment, societies and interactions between the two, could be investigated together, but the overt presence of regional geography, as a theme to study and investigate, is greatly diminished, though not totally absent, today. Place and space of course remain as central dynamics of geographical study, but the purposeful study of the integral characteristics and relationships within a specific region or regions has, as is widely documented, declined substantially since its heyday in the mid-20th century (e.g. Price, 2010 as an example with metrics demonstrating the changes that have occurred). The decline has not solely been in the Anglophone world, either (see, for example, Wood, 1999, on Germany). The same demise also applies to some degree to regional science, which wove together geography and economics (Barnes, 2004).

There have, from time to time, been calls for regional geography’s revitalisation, (see Dicken, 2004, for a well-known injunction), not least as a means to increase Geography’s influence within the debates about a globalised society, but the strong sense is that the discipline had moved on, despite a diminished number of geographers lamenting its decline and the consequences thereof (e.g. Wei, 2006). I will return to regional geography later in this piece.
Today three parts, each with many subareas, remain in the discipline, but the geographical triumvirate of today comprises physical, human and environmental, albeit with sometimes healthily porous boundaries. What though does environmental geography entail? Is it the space that Lave et al. (2014) called for where active engagement can occur between human and physical geographers?

Here are a few descriptions, taken, unscientifically, from different university websites in December 2021: ‘Environmental geography focusses on the physical environment and its effect on humans’ (University of York, UK); ‘Environmental geographers use their scientific understanding of the natural and physical environment to find solutions to crucial environmental issues’ (Cardiff University, UK); ‘Environmental Geography examines both the physical processes on Earth as well as human-environment interactions. Drawing from the natural and social sciences, Physical and Environmental Geographers seek to understand the applied and conceptual challenges facing our planet’ (University of New South Wales, Canberra, Australia); and ‘Environmental geographers describe, analyse and explain the arrangement of Earth’s physical features, including atmospheric, terrestrial and marine components, and how they work together. Emphasis is placed on how these forces influence humans and how humans may be altering the natural environment’ (Michigan State University).

Notwithstanding that some of these descriptions include physical geography within, all imply analysis or investigation of some form of environmental agency, albeit rather deterministically in the first case, while by the time we get to the fourth, human agency is espoused too. Spatiality is implied throughout. Common to many attempts to define environmental geography, including some of those above, is a quest to find solutions to challenges by drawing upon the natural – and social – science aspects of the discipline: an integrated face to the discipline that has a purpose beyond the interests of the discipline itself. Can Geography, therefore, provide the architecture for contributing knowledge for a better, less hot, less environmentally damaged, less spatially segregated, less hazardous Earth? Can it fulfil a role that more directly links the natural sciences to people? Given that the sciences have not always been terribly proficient at being people-facing when attempting to engage society, or entice it to behave differently, when scientific objectivity is been increasingly contested, especially by neoliberal politicians, and when there have been clear barriers to effective science communication and engagement of the public (e.g. Corner and Groves, 2014; Howarth et al., 2020), there is certainly a space to fill.

If there is a role to play, and dare I say it, if science needs Geography, the discipline requires a presence and a population that can fulfil an integrating, engaging, role. Is this the space for environmental geography, where it can also bring linkages to Geography’s involvement with the natural world, and thus physical geography, to the fore? Twenty years ago, Thrift (2002) argued in rather dramatic terms that physical geography was coming out of the doldrums and security of its own introspection by repositioning itself within mainstream science, with institutions rebuilding units based on the natural science model of critical mass, research groups and research income: perfect in many regards for the administrator’s view of the ideal neoliberal university (see Lane, 2016) as well as being a bolster to the discipline as a whole. But how ‘present’ in wider academia, wider research, including in what are in effect environmental units that Thrift (2002) described, and societal arenas, has Geography actually become? These are difficult questions to answer and to find metrics for, but the following sections represent an attempt to do so, largely based on, but not exclusively confined to, the UK context.

What’s in a name? Diluting or strengthening?

There are 78 higher education institutions in the United Kingdom that have departments with the discipline of Geography in their title. The number has gone up and down over the years, though institutional manifestations of the discipline also vary, making clean and simple counts challenging, noted by Hall et al. (2015). In their analysis of the state of geography departments, these authors noted a loss
of administrative autonomy of geography in many parts of the Anglophone world. One trend, observ-
able in the United Kingdom and elsewhere (Rhoads, 2022, discusses this in the United States), has been the agglomeration of Geography into larger units or schools that comprise a range of other disciplines, both in the social and the natural sciences.

In the United Kingdom, 25 or so years ago, there were many ‘Departments/Schools of Geography’; in fact, 47 with no additional disciplinary claims in the title, and a further 10 with Geography named with one other discipline. By 2015, there were less than 30 solo Geography departments, with many former such units now linked to another discipline, at least by name (Hall et al., 2015). By 2021, a further six had lost the word Geography from their title, though there was also one name change into Geography, and the creation of a totally new Geography department at one institution. Interestingly, only two of the 24 ‘Russell Group’ (research intensive) universities do not have Geography departments, or Geography named as part of a wider school. Across the whole human-environment interaction domain, the most common linkage of Geography to another field or discipline in a unit name is to Environment; with 26 cases in all, Environment also features in the title of 9 of the 22 UK Russell Group universities with Geography. Financial and administrative reasons may lie behind at least some of the changed places for Geography within institutional structures, reasons that according to Holmes (2002) also lay behind the fall in discrete Geography departments in Australia (e.g. Lahiri-Dutt, 2019) in the late 20th/early 21st century. Agglomeration has affected three Russell Group Geography departments; within each case, their assimilation being into units (schools) with natural science disciplines. Others, including my own department in 2000, added environment to their title to reflect an evolution of mission and research direction. It is vital, however, for the practice of the discipline and for the generation of the tools to conduct research and address environmental problems, that the building blocks of the discipline, the techniques and methods of geomorphology, biogeography and climatology, are not lost, diluted or un-taught in the mergers of units and courses that can result.

There is also evidence that some geographical research, particularly physical, is conducted within the facilities of other disciplines. The Royal Geographical Society’s (RGS) 2017 review of the state of physical geography in the United Kingdom, which I chaired, noted that ‘increasingly, physical geography is not just carried out in traditional geography departments, but in a diverse range of academic units (many with “Environment” in their title)’ (Thomas et al., 2017). Whether this geographical research without reflects the employment of trained physical geographers in these departments or the evolution of research interests of non-geographers (e.g. geomorphology is taught in a number of Earth Science courses and may therefore also be researched in these departments) is hard to ascertain with confidence.

Even if the trends in the decline, or dilution, of the once-ubiquitous single subject Geography department signifies something that sets some alarm bells ringing (see Hall et al., 2015), an alternative scenario is that the dispersal of physical geography teaching and research around the campuses of universities could include aspects that represent a strengthening, an infiltration even, into other disciplines, predominantly within the natural sciences. And it is, of course, the natural science disciplines, according to Thrift (2002), that physical geography has sought to mimic the practices of.

Given the interminably complex internal wiring of Geography, and its tendency to remake circuits on a fairly regular basis (see also Rhoads, 2022, for an account of this process in the United States), it can be argued that the discipline has always been well-primed for restructuring or repositioning, whether at the whim of academic administrators or for more philosophical and internally mandated reasons. While some have seen some of the structural changes that have occurred in HEIs as threats to the discipline’s autonomy and even existence, they may also represent, or in some cases have pre-empted a wider reality: the ‘desiloing’ of research enquiry reflecting wider interdisciplinary or even post-disciplinary trends (Emmel, 2021). These trends may be highly desirable for effectively researching, and contributing solutions to, major global issues, as well as contributing towards the decolonising of disciplines, including Geography, that have pasts with murky aspects (see Haber, 2012 for an
early and interesting discussion of ‘undisciplining’ archaeology, which has many aspects relevant to Geography).

Changing shape, changing labels

I now want to shift my gaze specifically back to physical geography, to consider the components of the Earth system are investigated today by its practitioners. My commentary here starts broadly, is biased towards the United Kingdom, and focusses down on geomorphology for particular exemplification.

Forty years ago, physical geography research, and the relevant academic appointments held in universities, largely fell in the areas of geomorphology, climatology and biogeography, with a smaller number in subfields such as soils and hydrology, as well as others in areas, such as Quaternary science that cross-cut parts of physical geography. The ‘quantitative revolution’ had also occurred with significant impacts on the conduct of research enquiry, though aspects of description, still founded in fieldwork, could be found to dominate in some subfields, notably aspects of geomorphology and Quaternary research.

This simple framework, which I do not think is a construct of faded or clouded memory, is not really replicated today. There has been significant evolution, even several revolutions, in how and what physical geography does, and the structures in which it pursues its goals (Thrift, 2002). This is evidenced in both the RGS review (Thomas et al., 2017) and the REF2014 report, both of which were produced after an observed growth in the presence of physical geography in UK departments over successive research assessment cycles (RAE2008, relative to RAE2001, and in REF2014). In essence, biogeography, in its simplest form, has evolved into the wider conduct of ‘whole ecosystem’ research, and climatology into wider climate science, often involving collaboration with atmospheric physics. Modelling has come to play as big, if not bigger a role, than field research across physical geography,3 while Earth observation has since the 1970s become one of the key research tools, with high spatial and temporal resolutions that are unobtainable through field work.

In geomorphology, where much of my personal interest lies, marked changes have occurred. The REF2014 report observed a decline in the representation of reductionist approaches in fluvial research, and a rise in more holistic or upscaled research, to the point that water science was suggested as a more appropriate moniker, even a sub-discipline, to capture the field in the United Kingdom. Research in this field often has linkages to other elements of physical geography and environmental research more widely. Similar trends of linkage and scale-changes in investigation have been reported for aeolian and glacial research, for example, on the role of aeolian dust in wider global systems including the atmosphere, and the impacts of ice dynamics on ocean systems. Externalities, including changes in the research-funding landscape linked to an increase in problem-solving research, driven by both national funding agendas and global environmental concerns, and an associated rise in ‘big science’ requiring large data sets and data from multiple fields, have seen sub-disciplinary introspection (Clifford, 2002) in all fields of physical geography, replaced by an outward gaze.

For some within physical geography, there are problematic facets associated with these changes, manifested in the loss of various sub-disciplinary identities. This has been no more hotly debated than in geomorphology, where I sense both elements of an identity crisis and a fear of loss and diminishment. Tooth (2009) wrote of invisible geomorphology, and concerns about the discipline being little known and little understood, expressing fears that its practitioners were ‘commonly absent’ from major science debates, not dissimilar to some of the concerns that were raised with the decline of regional geography (e.g. Dicken, 2004). The analysis of the submissions to REF2014, discussed above, suggests, however, a different trajectory for geomorphology, and one that is not negative, simply different from what has gone before. This is a view that I believe the report from the soon to be announced REF2021 outcomes is likely to solidify.
The research is there, even if its shape has to some degree evolved, but it may not be labelled as geomorphology per se: Woodward (2015) has also noted a systematic decline in the use of the term itself in book titles from a heyday in the late 20th century, although this may largely reflect a change in publishing habits (fewer books form geomorphologists, more papers, which could be linked to the stronger ‘scientification’ (cf. Thrift, 2002), rather than in terminological use. Very recently, the question of geomorphology’s visibility has again been raised, in an internationally authored commentary that suggests the term is potentially an impediment to its practitioners’ contributions to tackling major environmental problems at the international scale (Slaymaker et al., 2021, but also see Lane, 2012, for an earlier expression of the concerns).

Slaymaker et al.’s (2021) suggestion is to recast geomorphology as a landscape science, as well as retaining its place as a geoscience. Reading the commentary, I tend not to agree with its central tenets – for example, ‘as traditional geoscientists, we are not used to thinking of coastal flooding, permafrost degradation and snow depletion as centrally important to our science’, to which my immediate response is: Really? Where have you been? I am not alone. Wasson et al.’s (2021) riposte from Australia illustrates very fully the valuable contributions to the identification and resolution of environmental problems that the field makes in that country, noting that contributions do not have to be (internationally) headline-making to be valuable, but also that geomorphologists are members of panels and international bodies that address international-scale issues.

Lane’s (2016) essay on critical physical geography illustrates well the recognition of physical geography’s (indeed geomorphology’s) contribution to problem solving. This includes via equitable engagement with the social sciences, including human geography, at critical local scales, which also offers the opportunity for a more ethical physical geography (Sharp et al., 2022). Critical local scales are the places where problems hit hard, but are also where achievable solutions can be had (research ‘impact’ in the parlance of REF and national funders), especially, or only, if the general theories that science (including geomorphologists!) has often sought are questioned in the context of where, and why, they do not fit. I even recently saw a documentary on the BBC, on the English Lake District, that had the presenter of the programme talking to a member of Natural England about reducing flood risks. And lo and behold, what were they scientific experts who next appeared in this piece about river ‘rewiggling’ called? Geomorphologists! (with the terms referred to at least three times in the 10-minute piece). To reiterate a point implicit in Wasson et al.’s (2021) note, it is not necessary to just be visible in the international arena; critical, effective contributions are made at smaller scales too. And studies at smaller scales, including often-sneered at reductionist approaches to elements of geomorphology, generate data, the building blocks of science, that no amount of theorising, big data studies or global analyses can occur without (nor would you be able to manage rivers without understanding the processes of sediment movement on the channel bed, the nature of fluid flow or the specificities of the place where you are attempting to effect a change). I also suspect that a lot of the fundamental data gathering that big data research relies upon occurs under the radar, within the depths of sub-disciplines, however they are labelled.

Studies at smaller scales are also matched, I believe, by a strong regional turn within significant elements of physical geography and allied scientific research. Place is important, as it is in places that the elements of the physical (and social) systems interact, in a manner allied to Earth System Science (ESS), the ‘super discipline’ that integrates across boundaries within the natural and social sciences (Pitman, 2005). The focus on critical environments and regions that has accompanied ESS has also seen the growth of disciplinary expertise integration for these regions. Whole research groups, commonly international and cross-disciplinary, investigate the complex integrated science systems of the Antarctic, of the Amazon basin, of the drivers of climate systems in parts of Africa, of the complexities of past Quaternary climate and environmental changes in particular regions and so on. To all intents and purpose, these are new regional (physical) geographies, where detailed expertise about an area is essential to provide the depth of understanding needed to establish system behaviours, drivers
of change and links to externalities. Regional geography has reappeared in an unexpected part of the discipline; groups build their capacity, and apply their different expertise, over years or research, just as the regional geographers of old did.

**Communication change**

There is a final element of changing disciplinary shape that I want to comment briefly on: journals, conferences and learned societies. Gone are the days when geographers of every flavour went to the same conferences and published in the same journals. How often is physical geography research published today in what are still regarded by some as the discipline’s flagship journals – the *Annals of the American Association of Geographers* and the *Transactions of the Institute of British Geographers*? Physical geography papers appeared in these outlets quite regularly back in the 1980s when I first published (my first paper was a Quaternary/geomorphology paper in *Transactions*, in 1984), but this is much less the case today, and that would likely be a very odd place to submit such a paper in 2022. Specialist journals have grown in abundance (who, for example, would have dreamed in 1984 that there would be a niche journal called *Aeolian Research*?), not only taking papers away from more generalist geography journals but also satisfying the insatiable demand to (excessively?) publish (see Lane, 2016, which contains a good commentary on geomorphological aspects of the academic publishing revolution).

More recently, there has been a rise in another type of journal, which cuts across disciplinary boundaries, particularly in the natural sciences but also playing to wider integrated environmental/societal concerns and to ESS. Once there were just *Nature* and *Science*, both (in my experience) rather difficult to publish in as a geographer: now there is a whole suite of *Nature* family journals, plus *Scientific Reports* (PNAS (Proceedings of the National Academy of Science USA), PLOS One (Public Library of Science)) and so on. Much of what is published in these peer-reviewed journals is the outcome of integrated, trans- or even post-disciplinary research, big science by big teams, including, as well as pure research, analytical commentaries targeted at influencing policy or the shape of research. Authorships of 10, even 20, or more seem the norm; hundreds are not unknown, with international and multidisciplinary memberships, often featuring geographers/individuals employed in geography departments.

These are increasingly the places where the research on topics widely regarded of international relevance (and urgency) is published: food crises (e.g. Godfrey et al., 2018: 10 authors, 3 from a geography department including its environmental unit), climate crises (e.g. Bednar et al., 2021: 8 authors, 4 from a geography department), ocean crises (e.g. Perry et al., 2018: 26 authors, 3 from geography departments), arctic warming (e.g. Myers-Smith et al., 2020: 41 authors, 5 from geography departments), ecosystem risks (e.g. Arrigo et al., 2020: 16 authors, 3 from a geography department), flood disasters (e.g. Aerts et al., 2018: 10 authors, 3 from geography departments); carbon storage (e.g. Sullivan et al., 2017: 12 authors, 9 from geography departments); plastics problems (e.g. Lau et al., 2020: 12 authors, 1 from a geography department) – the list is endless because we have so many environmental and societal crises availing themselves upon us. Among the geography authors are physical (and even human) geographers, environmental geographers, geomorphologists, climatologists and biogeographers, all demonstrating their place at the high tables of collaborative, internationally relevant, research.

A similar trend has occurred in the ecology of conferences. No more are the regular physical geography sessions at the RGS (formerly IBG) annual conferences in the United Kingdom, where once biogeography, climatology and geomorphology sessions held sway. Although representation is a little stronger at the annual conference of the Association of American Geographers, the decline in allegiances to physical speciality groups is marked (Rhoads, 2022). Instead, the annual, giant, American Geophysical Union (AGU) and European Geoscience Union (EGU) meetings are the places to be,
magnets for physical geographers not only in integrative sessions but at sessions that have themes that look suspiciously like geomorphology, climatology and biogeography. Geographers talk outwardly to and with other disciplines, rather than inwardly to other geographers. At the same time, speciality groups have proliferated or become stronger as the niche places where researchers in specific domains (such as aeolian research, and glaciology, as well as larger groupings such as the International Association of Geomorphology) meet to trade knowledge within on a less frequent basis. This changing ecosystem, which in reality is represented by a complex and dynamic mosaic of communication platforms, is surely a further reflection of the desiloing of research. It is an arena though where physical (and even environmental) geographers hold a very visible presence, as perusal of the annual programmes of the EGU and AGU meetings can demonstrate.

**Who wants to be a (physical) geographer? The reluctant geographer and the enthusiastic migrant**

In answer to the first part of the section title, I do, but that is not the case, I suspect, for everyone who is trained as a geographer and still works in a Geography department. My evidence for this is in part conversational, but is also based on looking at the titles of posts that individuals hold and the way that they badge their affiliations in publications. I have always badged myself as a geographer, physical geographer or geomorphologist. I like these terms; they describe me, my research and the contexts I have worked in. But I believe that at the scientific-end of Geography, use of the first two of these badges is relatively rare, and perhaps even largely confined to people of my generation.

There are three possible explanations for this. Some physical geographers do not want to be labelled with the term Geography: it associates them with social scientists, the human geographers, with their cultural turns, qualitative approaches and the like. They have said this to me, with colleagues in other departments, including in the United States and Australia, reporting the same. Is it scientific snobbery: they want titles to signpost them away rather than into the discipline? Second, in the increasingly inter-, trans- and post-disciplinary worlds of big science, the AGU, EGU and the like, perhaps the terms are too broad when encountering researchers from more clearly identified disciplines, people want labels that spell out precisely what they do: research may be desiloed, but paradoxically many individuals are more siloed and specialised than ever before. So I have colleagues badged (with their titles chosen on appointment or on promotion) as Professors of Climate Science (rather than climatology), Hydrology, Geosystem Science, Ecosystem Science (rather than biogeography) and Environmental Systems. I do also have colleagues badged as Professors of Biogeography, Biogeomorphology and Aeolian Geomorphology, and several Associate Professors (AP) of Physical Geography – but I wonder how these APs will label themselves on promotion to full chairs? Will they embrace or shun the discipline? Third, and very positively, there are an increasing number of non-Geography trained researchers employed in Geography departments. They want to come in! They want to work in the diverse, rich and rewarding world of Geography departments. They are enthusiastic migrants. I, for example, have colleagues from Engineering, Atmospheric Physics, Zoology and Biology and probably other scientific backgrounds.

**Concluding remarks**

In his article on the nature, pace and place of his discipline, Lane (2016) argued that ‘physical geography has evolved to become a highly provocative mainstream natural science’. Evidence from Thomas et al. (2017) and REF2014 supports this, but my argument is that the detail on the ground paints a rather complex picture of physical geography today and of its interfaces, with other parts of the discipline and the sciences beyond. I first reflected on Geography’s changing identity and
construct, the demise of regional geography and rise of environmental geographies, as well as its changed presentation within higher education institutions. These changes are sometimes regarded as threats to the discipline, or reflections of the discipline’s uncertainty about itself. Contrary to this, I opine that in today’s rapidly changing and complex world, these changes reflect an agile discipline, with versatile sub-disciplines, able to respond to changing externalities and research agendas.

Second, as Thrift (2002) noted two decades ago, there has been an undoubted scientific turn within physical geography. This has been more, much more, than through the mechanisms of organisation and methods of research conduct. There is now a fluidity between disciplines, and Geography, the work in Geography departments, sits large in these enterprises. This is evidenced by records of publication, conferences and employment mobility between the silos of academic departments that results ultimately in a desiloing, a post-disciplining, of research effort. More than ever, the grand challenges that environment and society face today require collective, inclusive, efforts to achieve grand solutions. Nothing is within the capacity of a single discipline, a single science, to resolve. If boundaries become blurred, identities lost, diluted or challenged, are these nothing more than what the questions being asked require for their solution? Geography’s flexibility, its history of ‘confusion’, places it well to be a major player in today’s research environment. Geography certainly needs science, but science certainly needs Geography too. Perhaps Jenkins (2007) was correct: without geography’s instruction, we are in every sense lost – random robots who can only read and count.

This piece is dedicated to the memory of Professors Stan Gregory and Ron Johnson, who gave me my first lectureship position and who came from very different ends of the Geography spectrum, though sharing the desire for quantification. They led the very happy and united department at Sheffield in the 1980s that provided me with the confidence and space to explore what I wanted to do and be within the discipline. They taught me more than they realised.

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Notes

1. Liu et al. (2022) also note how this ‘herding’ model links in some countries to the neoliberal university model of assessment by metrics rather than content.
2. With thanks to Catherine Souch at the Royal Geographical Society (RGS) for the provision of updated information.
3. While the power of modelling is wonderful and has been revolutionary in its enhancement of understanding and prediction, my fear is that many new-generation modellers are so addicted to the next iteration that they forget the necessity of observation and empiricism and run the risk of modelling a world that is not one we inhabit.
4. ‘The Lakes, with Simon Reeve’, Episode 2.
5. Two of them, based in a department that once had Geography in its title but which is now the School of Science, Engineering and the Environment.
6. I understand from some American colleagues that this acronym is sometimes interpreted to mean ‘Paper Not Accepted in Science’.
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