Things are how they are because of how they got that way: thoughts from the beach[1], on fifty years of *Geographical Analysis*

Although we only rarely actually see it these days, the cover of *Geographical Analysis* still features quite prominently the tagline "an international journal of theoretical geography" and it is the implications of that subtitle that I want to consider in this reflection on the journal's past and future, on the occasion of its 50th anniversary.

I am writing these words at the beach. We've recently returned permanently to Aotearoa New Zealand after four and a half years living in California and have treated ourselves to a family holiday at the place we came to annually when we lived in Auckland, not Wellington, as now. This will probably be the last time we come here for some time—it's convenient for Auckland, but a (very) full day's drive from Wellington. We've had a turbulent year selling and buying houses, wrapping up one job and starting another, re-settling the children in new schools, importing a cat (don't ask), and a million other things besides. Among those things, many professional commitments have slipped, which is how I come to be breaking the near sacred local commitment to holidays uninterrupted by even an hour or two of work. I am providing this background for a couple of reasons. The first is as a general reflection on geographical analysis and its relation to lived experience; the second is as preamble to my thoughts on theoretical geography and the thorny question of explanation in geography.

Geographical analysis has a distant relationship with lived experience. The kind of upheavals and emotional decisions we've put ourselves through in this last year don't really figure in the kind of research we call geographical analysis, with its emphasis on numbers and quantification. Research published in this journal has a tenuous relation to the world of emotions, meaning, sense of place, what our colleagues in human geography call 'affect', and what I am calling here lived experience. Geographical analysis as it has come to be understood, has tended not to emphasize these things. For a time in the 1970s and 1980s work on behavioural geography (Golledge and Stimson 1997) prompted in part by a turn to phenomenology (see Buttimer 1976) saw more attention to everyday life in quantitative geography. More recently the availability of detailed spatiotemporal data on individuals has seen a renewed interest in time geography and the analysis of everyday life of a particular kind (Kwan and Weber 2003, Miller and Goodchild 2014). Even so, while quantitative geographers might be underwhelmed by the work of human geographers doing ethnographic work on mobility, children's geographies, emotion, immigration, belonging, sense of place, and so on, the fact is that such work engages subjects and themes that really matter, more deeply than the data-driven approaches we tend to favour. So, my first reflection on the future of geographical analysis is that it is urgent that we as quantitative geographers find ways to engage fruitfully with colleagues elsewhere in geography (and beyond) who are grappling with the world, other than through numbers and statistics.

Reflecting on this further, I recall as a not-so-young assistant professor at Penn State in the early 2000s, the department hosted an eminent visitor for the weekly colloquium. I did my homework on our visitor's career, and couldn't help but notice that they had started out working on spatial weights matrices, eigenvectors, spatial interaction models and so on, but had long since moved on (via travel

1 I feel obliged to admit that I dashed off a rough draft at the beach. The references and additional detail were added later in a less congenial, better connected setting.

diaries) to focus groups, ethnography, participant observation and localized case studies. I asked why they had made such a dramatic change in course—after all, it can't be easy to walk away from all that accumulated arcane, technical, and specialized knowledge. Their answer: (I paraphrase) "that stuff just wasn't letting me answer—or even ask—the questions I wanted to, about everyday life". So again, my first reflection is to fervently wish for a future geographical analysis that engages with very different, richer kinds of data about lived experience. If *Geographical Analysis* is truly to be a journal of theoretical geography, we must engage the full range and breadth of geography and not only those aspects that can be conveniently quantified.

It is important to emphasize here that I am *not* thinking about clicks and likes and retweets and other kinds of so-called volunteered, so-called big data. If anything, these are our worst impulses at play: an industrial scale effort to reduce lived experience to numbers, with very particular underlying for-profit motives, not the scientific geographer's interest in understanding the world. What I mean instead are the messy kinds of information gleaned from interrogating the world in ways not designed from the outset to be quantified. Because this kind of analysis is so far removed from our collective analytical (if not lived!) experience it will demand development of new approaches and methods, and also new conversations with a wider range of colleagues than we may be accustomed to. It is commonplace to suggest that we should 'let the data speak' in quantitative work (Gould 1981). I would instead argue that we should figure out how to engage much more diverse methods computationally, and find ways to translate between those methods and the quantitative ones we are so familiar with, so that such data can not only speak, but participate in conversations, and tell richer and more complex stories. Some pointers to such engagement are provided by work in the digital humanities (Drucker 2009) and in imaginative new cartographic work (Iosifescu Enscu et al. 2015, Knowles 2014). We should also revisit the rich methodological resources in quantitative geography's past engagement with cognitive and other non-metric geographical spaces (see O'Sullivan et al. 2018), which now seem likely to yield new insights given contemporary visualization and network analytic methods. It would also be good to remind ourselves that geographical analysis and spatial analysis are *not* one and the same, and that geographical spaces are much richer and more complicated than mere (x, y) coordinates can convey (Bergmann and O'Sullivan 2018). Methods leveraging network science's recent rapid advances can enable us to investigate these spaces in ways that I believe can resonate with colleagues across the discipline.

This call to engage a wider range of theoretical geography, oddly enough, returns my attention to the beach. It is interesting coming back to a place after six years away, to notice so much persistence, amidst continual change. My eye is drawn at this beach in particular (see Figure 1) to the semi-regularly spaced dark patches of pebbles thrown up each day by the incoming tide. I suspect without having paid close attention—and my son, who has been sketching the beach over a number of days, confirms—that the pebble patches while similarly spaced each day, are not in the same spots, nor are they the same sizes. This kind of persistent yet varying pattern, and the challenge of accounting for it reminds me of a wider agenda implied in the earliest calls for 'theoretical geography', which I would like to see pursued more often in the pages of *Geographical Analysis*.

Accounting for those patches of pebbles is at once illuminating about the nature of geographical theory and explanation and also about its limits. We more or less know what is going on here: we

have a theory. Roughly speaking each incoming tide erases the previous tide's distribution of pebbles. Minor irregularities in the beach topography lead some areas to be favoured for pebble deposition. Once started a more pebbly area of sand tends to slow incoming waves, making it more likely that more pebbles will be deposited nearby, and not in the intervening spaces. And so a new collection of somewhat evenly spaced pebbly patches is established only to be erased and re-made by the next tide. This fairly peaceful process persists under relatively stable tide, wave, and wind conditions.

Figure 1 – The beach discussed in the text

Importantly, even under the blissfully stable conditions we are lucky enough to be getting right now, precisely where and how large the patches of pebbles will be, how far apart they will be spaced, and how many there will be, is unpredictable from one tide to the next, even though we have a pretty good understanding of what is going on. And of course, outside the benign conditions of these first few days of our summer holiday, all bets are off. A storm will throw everything into disarray for a day or two, until relative order is restored. A particularly high tide, or the disorganizing effects of high or blustery winds on the incoming sequences of waves will produce different results. Other beaches in other places, with the right combinations of prevailing winds, tidal range, beach slope and so on may yield persistent and marked formation of regularly spaced cusps. Still other beaches may sort pebbles and sand in the onshore direction, but yield no longshore patterning. (If you are interested in more than my armchair coastal geomorphology, Coco and Murray 2007 is a good place to start.)

I hope that what all of this has to do with explanation in geography and the possibilities and limitations of a theoretical geography is not too obscure. We observe some phenomenon in the world, a pattern of some kind—often, but not necessarily a spatial one—for which we seek an explanation. How does this configuration of things arise? What mechanisms, what processes can account for it? Under what conditions do those mechanisms yield these kinds of patterns? Can we formulate a theoretical model of the processes and mechanisms that produces the patterns observed? If so, then we have an explanation of the geography.

On the other hand, can we explain, after any given tide, the exact arrangement of organization of pebbly patches on the beach? Well, honestly, no we can't. Perhaps a particularly assiduous researcher could tag and track a sufficiently large number of pebbles to produce on a particular day at a particular beach a more complete account of the formation of the particular set of patches that emerge in the next tide. It is highly unlikely, even in such an unlikely scenario (let's face it, in such an impossible scenario) that instrumenting the entire beach will allow prediction with much certainty of where the pebbly patches will be, following the next tide, or the high tide the week after next. Optimists might point to recent progress in machine learning methods applied to chaotic systems (Pathak et al. 2018), which extend the time horizon for prediction of chaotic systems (interestingly these are inherently spatial methods). But these methods don't eliminate the essential unknowability of such systems. In the end, by instrumenting the beach we might produce a detailed geographical history, a narrative describing how a particular configuration arose; it is a lot less clear that we would advance theoretical understanding or explanation much further. We would know how things got how they are but we would probably not know much more that was generalizable to other beaches in other places at other times.

Yet, it seems as if, for many, it is this kind of doomed enterprise—or one very like it—that is the cutting edge of contemporary geographical analysis. More instruments, more sensors, more data, more computation, more detail. I am *not* arguing here that more data and more computation are unwelcome. Perhaps we will observe in them new patterns demanding new explanations, or pointing us toward new understanding. That is almost certainly true in the physical world about which we know so little. In the social world, I am more skeptical. We already have a good handle in broad outline of the political and economic forces that structure our social world. More detailed data about who is going where and when, assembled from cellphone and internet data feeds, like tagging and tracking pebbles on a beach won't contribute much new to our understanding of how inequality arises, when our societies are organized precisely to produce unequal outcomes, winners and losers. Nor will it tell us anything we didn't already know about inequities in the distribution of education, healthcare, criminal justice outcomes, and so on. Given the inequality-producing way in which our social world is currently organized, there is more than a little danger in heavily data-driven approaches to unraveling what is going on, that we "tend to perpetuate existing social structures and dynamics [...] to optimize the status quo rather than challenge it" (Carr 2014). Again, if geographical analysts engaged more fully with theory in human geography, beyond spatial science, this danger might be reduced.

I can feel myself ranting just a little here (probably, I should go for a swim, and cool off). Some of these comments are uncomfortably close to bad-tempered exchanges between David Harvey, Brian Berry and others, in the early 1970s (Berry 1972, Harvey 1972) when accusations of 'status quo', 'counter-revolutionary' and 'revolutionary' theory were thrown around, and not in a good way (Harvey 1972, page 41). Indeed, those very arguments have a great deal to do with how we got to where we are today in our distinct geographical silos. Those divides became chasms for a time in the 1990s, when GIS came under heavy fire from critical geographers (Smith 1992) and exchanges were characterised by mutual incomprehension (Flowerdew 1998, Pickles 1995). Since then we can point to the emergence of 'critical GIS' (Schurrman 2000, Pavlovskaya 2006) and of a less confrontational relationship between quantitative and qualitative work in geography (Schwanen and Kwan 2009). Even so, as someone involved in those enterprises, levels of mutual incomprehension remain high (see Tsou 2019, Wilson 2017).

So, making unconstructive and value-laden judgments of the often great work reported in geographical analysis is emphatically not my intention. However, I do believe that it would benefit the field greatly for us to take more seriously the journal's subtitle and commit ourselves to developing quantitative methods addressing broader and deeper geographical questions than "What, for example, is the appropriate geometry for discussing a particular process operating on a particular surface?" or "How can we apply techniques of statistical inference in geography, and, further, what is the population from which we are presumed to be sampling?" (ironically, this is Harvey again, just a few years earlier, 1969, page 485). These questions and ones like them are the jumping off point for much of what has been published in the journal since 1969. It would be good *also* to see discussion in these pages of questions of geographical theory, understood not only as concerning the technical and statistical questions we encounter when applying mathematical and computational methods to geographical data. To the extent that *Geographical Analysis* is a journal of theoretical geography at all, it has, in effect, adopted a severely circumscribed notion of theory, that prioritizes technical, mathematical and statistical questions over questions about (for example) the nature of data, the relationship between data representations and reality, the nature of space, place and scale, and how their complexities can be represented, or how we can relate models to the empirical world, and so on. These are technical questions too, meaning that they would be very much at home in the pages of this journal, but they don't take as given that geometry and mathematics are the only useful frameworks that can be used to advance geographical theory and analysis. What is striking about such questions in the pages of *Geographical Analysis* over 50 years is their absence! There was a section entitled `Discussions of Theory in the Social Sciences' in volume 15 in 1983, which ranges widely over many of these themes. The editor of the day rather diffidently introduces the section,

> "Explicit methodological discussions have not played an important role in the pages of *Geographical Analysis*. Even a skeptic on the value of such debates, such as the editor, must view the journal as poorer for this deficiency. With a mandate to promote theoretical geography, we cannot ignore the issues which guide the search for and evaluations of theoretical constructs. From time to time, we should step back and assess, from a broader perspective, theoretical contributions and perhaps even the feasibility of writing theory for human geography." (MacKinnon 1983, page 28).

The editor's ambivalence is certainly *not* reflected in the tone of many of the articles collected in this section, which enthusiastically engage with questions of language (Couclelis 1983), incommensurable theoretical perspectives (Hanson 1983), the role of politics in geographical analysis (Buttimer 1983), and the importance of values and meaning in science (Ley and Pratt 1983).[2] Only two of the most prolific *Geographical Analysis* authors of the period (as tabulated in Griffith et al. 2013, page 5) are among the contributors to this section, which perhaps accounts for this divergence from the mainstream of thinking in the journal. The overall tenor of the articles is that there are certainly important theoretical issues to be considered in relation to favoured approaches to geographical analysis, which makes it all the more frustrating that there is not more work on these lines to be found in later years. Whatever the reason, other than that one (very

2 I am doing violence to the arguments presented in the discussion section with these meagre three and four word summaries. I would encourage the interested reader to read them all. I only mention these four from the dozen contributions to give a sense of the range.

interesting!) section, I found little sustained consideration of wider theoretical issues in geography in all fifty volumes of the journal to date. The rare articles in this vein that do show up come as welcome surprises out of left field (see for example Staehli and Lawson 1995).

Perhaps *Geographical Analysis* is not the place for such thinking.[3] The technical issues are after all important ones to address if we are to address substantive geographical questions. But I agree with MacKinnon that the journal is poorer for this deficiency. Let me be absolutely clear. I don't think 'theory' in the broader sense I am considering here is in any way more important than the narrower kinds of 'theory' that have featured heavily in the journal. We need both broad theoretical frameworks *and* more specific technical and methodological advances to pursue geographical research of all kinds. It was the kind of abstract spatial mathematics so characteristic of *Geographical Analysis*, with its elegance and (yes) beauty, that drew me into geography in the first place! (Take a look at my first paper in the journal if you don't believe me!) But like our visitor at Penn State, I think it takes more than beautiful equations to do geographical analysis.

Harvey's questions remain thought provoking and fruitful lines of inquiry for any would-be geographer contemplating applying quantitative methods to geographical questions. A great deal of progress has been made in addressing them as a scan of the journal contents over the last 50 years clearly shows. Yet, while the journal has remained faithful to that ideal of theoretical geography (see also Bunge 1966) we have lost much of our connection to the wider development of ideas in geography that was behind those questions when they were posed in the late 1960s. Reconnecting with those ideas will require a broadening of our methodological horizons, of accepted forms of data, and of understandings of what we mean by 'analysis'. That thought really returns me to a reiteration of my first point. It would be exciting and wonderful to see quantitative geographers thinking theoretically outside the the small box we've made for ourselves over the last several decades. Let's take seriously the journal's subtitle, and return to theoretical geography beyond the narrow terrain of spatial weights matrices, spatial autocorrelation, and the technical challenges they bring.

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3 Although, if that is what we really believe, then we should change the journal's subtitle!

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