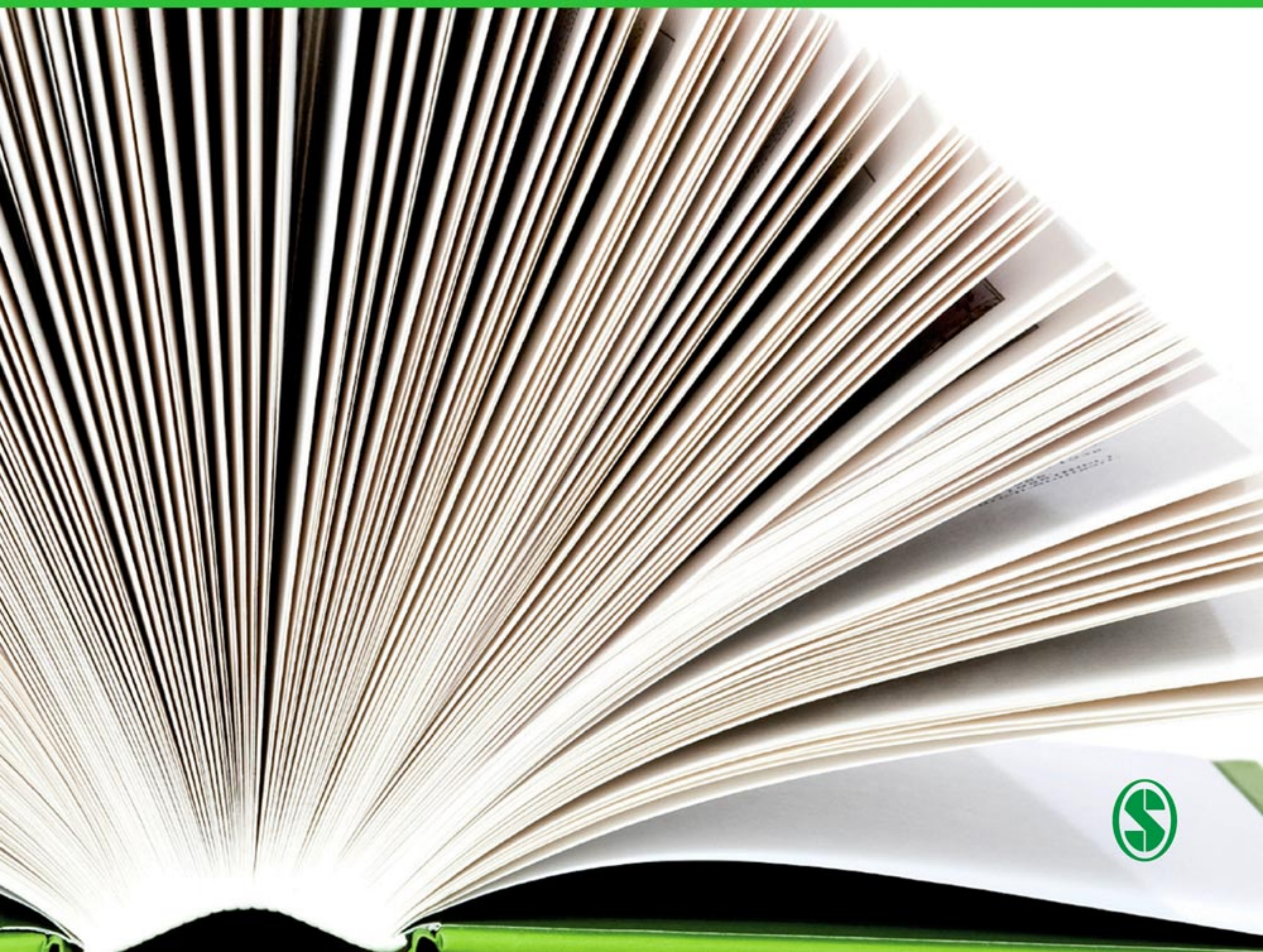


Edited by Phil Hubbard, Rob Kitichin and Gill Valentine

# Key Texts in Human Geography





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Edited by

Phil Hubbard, Rob Kitchin and Gill Valentine



Los Angeles • London • New Delhi • Singapore

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© 26.1 'Ceci n'est pas l'espace' Massey, Doreen. *For Space*. SAGE, London 2005.



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## Editors' Introduction

Phil Hubbard, Rob Kitchin and Gill Valentine

### Why key texts?

Geography, like all academic disciplines, is never static, with geographers always seeking to either extend and consolidate particular ways of thinking and doing or to develop new understandings of the unfolding relationship between people, place and environment. Far from being a discipline preoccupied with the mere accumulation of facts about the world, geography is a discipline where our understanding of the world is constantly being evaluated in the light of new ideas and thinking, with empirical projects always informed by notions that some forms of knowledge and ways of knowing may be more productive or valid than others. Empirical studies of what appears to be happening in particular contexts thus build up into wider theoretical accounts that, in turn, drive new explorations of how people, place and environment are entwined in complex and relational geographies. Without this diversity of thought and sense of progression – i.e. the idea that we are moving towards a more productive understanding of the way the world works – geography would long ago have become an intellectual backwater, rather than the vibrant, vital and varied discipline that many currently believe it to be.

This book is based on the premise that texts play a crucial role in this story of disciplinary development. More specifically, it works with the assumption that particular texts can be read and interpreted as symptomatic (and perhaps totemic) of key transitions in the ways that we

think, practise and write geography. The widest possible definition of a geography text might include conference papers, journal articles, book chapters, literature reviews, working papers, online articles, monographs, student textbooks, dictionaries, encyclopedias, readers, gazeteers, maps, and atlases. All of these may, in different ways, presage important shifts in the way geography is conducted. Yet in this volume we want to focus on one particular kind of text: the book. More specifically we want to hone in one type of book – the authored monograph.

Despite some concern in the discipline that publishers are less and less willing to publish monographs, preferring instead to publish student-oriented texts like this one, we focus here on authored monographs for two principal reasons. First, while most monographs are empirical – in the sense they seek to describe or map a particular aspect of the world – many also make important theoretical statements about the way that geographical knowledges should be constructed and disseminated. For many, this is the acid test of a geographic research monograph: for a book to make a contribution that furthers the discipline, it needs to spell out possible routes towards a more relevant, ethical or viable geography by advocating a particular approach to its subject matter. As such, monographs seek to transform geographical thinking and praxis through a sustained engagement with, and exploration of, a set of theoretical ideas as well as the detailing of particular empirical 'facts'. They are often

books with Big Ideas and Big Ambitions, and if their thesis gains currency they become key reference works which are mined, re-worked and critiqued by subsequent generations. Authored texts thus become foils that stimulate new ideas and thinking. This is not to say that research articles, chapters, edited books, etc. do not make similarly important contributions to debates concerning disciplinary progress. Indeed, papers in journals may often stimulate important changes in the disciplinary landscape by providing rapid dissemination of research findings. Yet we would argue that authored books often become *the* key milestones in disciplinary histories in ways that articles rarely do because they allow authors to connect disparate empirical and theoretical elements to develop a wider, more systematic and rigorous argument about the way the world works.

Second, we focus on authored monographs because students are often referred to these 'key texts', encouraged to engage with them in order to understand particular modes of thought and the history of the discipline and to reflect on the ideas contained within them with respect to shaping their own geographical thinking and praxis. Many courses on the histories and philosophies of geography are in fact stories in which key authored texts are given due prominence, with these key works deemed to have punctuated geography's histories. From the perspective of the present, a retrospective reading of these works is often encouraged as a way of understanding how we got to where we are today. Making oneself familiar with key texts is part of any geographical education – for many educators, 'thinking geographically' is something that only emerges from critical reading and re-reading of geography's 'ur-texts'. Contemporary libraries, we note, are often all-too-ready to dispose of older books to make way for new tomes, but most retain those volumes which educators suggest are 'classics' which students will always need to return to.

This brief discussion indicates that this volume is necessarily restrictive in its definition of what a 'key text' is. Not only do we ignore papers, chapters, edited collections, readers and conference presentations, we also disregard a number of important student-oriented textbooks. Ron Johnston (2006) argues that textbooks are particularly important in institutionalizing particular approaches to geography, given that they often proclaim to be 'objective' or authoritative introductions to the discipline. Although we would not necessarily disagree, given that such volumes are written to be accessible to as wide an audience as possible, we feel there is little need to provide a guide to such texts. Nor do we consider some of the important histories of the discipline (Johnston's, 2005, *Geography and Geographers* – now in its fifth edition – being a prime example, alongside Peet's, 1998, *Modern Geographical Thought*, or Cloke, Philo and Sadler's, 1991, *Approaching Human Geography*) for the same reason. Other books that have gone through multiple iterations, and have hence been integral in policing the boundaries of the discipline, are also precluded from consideration here (e.g. the *Dictionary of Human Geography*, now in its fifth edition, the *Companion Encyclopedia of Human Geography*, now in its second, the *International Encyclopedia of Human Geography*, and so on).

By focusing on specific authored texts we are accordingly not trying to suggest other types of text are insignificant in shaping geographical thought. Yet we feel that, by their very nature, the type of books we focus on here were often written for an academic peer audience rather than a student one. For the uninitiated, many appear remarkably dense, use difficult language and work through complex theory and unfamiliar examples, and are not accessible in the same way that a textbook might be. Many talk to debates and social-economic contexts that have long since disappeared or are only just coming

into being, or refer to events or processes that would only be known to those who have grown up in particular contexts. In a sense, this is precisely why lecturers are often keen to refer their students to these texts – they want to challenge them, encourage them to develop their skills of critical reading and appreciate the impact of particular thinkers and ways of thinking on the practices of geography.

This given, *Key Texts* provides an introduction to 26 books that we argue have made a significant impact on the theoretical underpinnings and praxis of human geography in the last 50 or so years. The book's ambition is two-fold. First, it aims to serve as a primer for students, introducing them to specific monographs, exploring the nuance of the authors' arguments and explaining why they should take the time and trouble to engage with the text itself rather than summaries provided in textbooks. To that end, each of the entries in this volume is an interpretive essay that highlights: the positionality and biography of the author(s); the significance of the text in relation to the geographical debates and issues current at the time of writing; the book's main arguments and sources of evidence; its initial impacts and reception; how the book was subsequently critiqued, evaluated and incorporated into the geographical imagination; and how the book changed – and continues to influence – the practices of geography.

Secondly, the book seeks to contribute to ongoing debates over the production of geographic knowledge by posing some important questions of what constitutes a 'key text'. It is of course crucial to ask why some books become privileged, and to consider how disciplinary histories become written around key texts as well as key thinkers (see Hubbard *et al.*, 2004). In recent years scholars interested in the history of geographical knowledge production have come to argue that geographical endeavour occurs in a highly diversified landscape, shaped by issues such as educational training,

personality and location, friendships and collegiality, disciplinary gatekeeping and access to disciplinary networks, prevalent trends and vested interests, and wider debates on the relevance and value of the academy and the funding of higher education. In other words, it has become recognized that geographic scholarship is shaped by multiple factors, some personal, cultural and social, and some that are more political and economic in nature (Barnes, 2002). While the academy is a place of collegiality and collaboration, it can also be a competitive environment with most academics working both for themselves and their institutions as they seek to acquire kudos, funding and intellectual respect. In the UK, for example, departments are in competition with one another under the influence of a Research Assessment Exercise which is focused on research outputs. The influence of RAE culture on the shape and form of institutional geography is still to become clear, yet the potential to be identified by one's institution as a 'research inactive' academic creates immense pressures to work in particular ways, and to work to identified assessment criteria.

These diverse factors shape what kinds of ideas and praxis become mainstream, and, in turn, influence who become recognized as the key thinkers in a discipline (though, as the exchange in *Environment and Planning A* 37: 161–187, illustrates, there are certain dangers in trying to name those who are most influential in the discipline). However, as debates about English language and Anglo-American dominance in the production of geographic knowledge have highlighted, knowledge production has both a history and a geography, with some scholars located in key centres, others on the periphery (see Berg and Kearns, 1998; Garcia-Ramon, 2003; Kitchin, 2005; Paasi, 2005). As such, it is important to acknowledge that the production of geographical knowledge is messy, contingent, relational and political, meaning



that any history of the discipline needs to be written in ways that are cognizant of such politics. *Key Texts* is no exception.

The authors of the entries in this volume were not asked to explicitly address such issues, but often raise questions of authority, privilege and hierarchy in their contributions. As many acknowledge, it is seldom the case that a book becomes significant because of sheer good fortune. Rather, a book catches and helps further promote the zeitgeist of a particular moment, crystallizing the authors' thoughts at the time, and often many other peoples', working within and outside the discipline. Indeed, it is likely that many conference papers and journal articles preceded the publication of a 'key text', especially given how long books take to write. And it is often the case that other related or similar books appeared at roughly the same time. What distinguishes a 'key text' – a book that was taken up or 'enrolled' within dominant disciplinary networks – is that it said something significant that had widespread appeal and which challenged its readers to think differently about the world. It simply did not repeat arguments emerging within the journal literature, it extended these, amplified them and illustrated them with rich empirical material. Of course, other books might have been saying similar things, but were perhaps saying them less well, with less conviction or were promoting slightly different viewpoints. And while the book's content is the crucial factor determining its reception and uptake, there is no denying that issues of authorship and authority are also significant. In short, it matters who wrote the book. Some books are highly anticipated given their author's existing reputation; others emanate from unheralded sources but become best-selling works. Most, however, are published to indifference, and never achieve anything more than modest sales: the ability of an author to promote their books through their other activities and

networking can be vital in ensuring a book has a shelf-life.

What is clear is that some books emerge to become 'classics' within the discipline. The authors of such books may (reluctantly or otherwise) become gatekeepers within the discipline – recognized as 'key thinkers' – in the sense both they and their books are held up as promoting a particular way of doing geography. As such, many of the entries in this volume highlight interesting debates about the politics of geographical knowledge production. So too does our choice of key texts. In making the difficult choices we have made about which books are worthy of consideration, we realize that we are not simply reflecting established knowledges, we are actively perpetuating particular value claims about whose views matter, and which books should be read. That given, we are certain that the books we exclude will be as significant for some readers as the books we include – and we hope that these exclusions are interrogated as meaningfully and productively as was the case for the companion work for this text – *Key Thinkers on Space and Place* (see especially the review forum in *Environment and Planning A* 37: 161–187). Given the controversy that our selection will undoubtedly excite in some quarters, it is hence necessary to spend some little time outlining the criteria for selection that we have employed in this volume.

### Which key texts?

When drawing up a list of some of the most important texts in human geography, we are forced to make some difficult decisions as to what we understand the boundaries of human geography to be. Indeed, even if we are happy to exclude key texts in physical geography (the subject of a volume yet to come?), there are certainly books on the relation of the

physical and human world that have been significant in changing the purview of geographers and their understanding of what the subject matter of the discipline might be. There is also the vexed question of what distinguishes a geographical text from other kinds of text, given many key interventions in debates over space and place have been made by those who do not identify as geographers or claim to be writing for a geographical audience. The boundaries between human geography and planning, urban studies, history, anthropology, sociology, philosophy and area studies have often been highly porous and geographical thinking has certainly borrowed and benefited significantly from texts written by those located in other disciplines.

Given these fluid and indistinct boundaries, our first criterion for selection was to consider only books written by people who self-identified as geographers, and were writing, first and foremost, for a geographical audience. This is to take a narrow view of the discipline, perhaps, but is in keeping with one of the most widely accepted (if hoary) definitions of geography: that is, geography is what geographers do. Secondly, we limited our choices to books published in English in the last 50 years. While this is a somewhat arbitrary cut-off date, there are good reasons for supposing that students will be most frequently steered towards these texts: many recent, student-friendly histories of the discipline tend to start with the post-war shift from regional description to a theoretically inclined spatial science tradition (i.e. what is commonly referred to as the 'quantitative revolution'); students are most likely to be steered to books whose ideas still have currency in contemporary debates (and these tend to be the most recently published); many university libraries simply do not have an extensive catalogue of books dating back to the pre-World War Two years, and students undertaking courses in Anglophone countries

often lack an advanced proficiency in languages other than English that would prevent them from engaging with non-English texts.

Within these broad parameters, we still faced difficult decisions about what constituted a 'key text' and which 'key texts' to include. One strategy to aid our selection might have been to consult the citation rates for different books (i.e. the number of times a book has been referred to in other books and articles). There is some tradition of using citation analysis to identify the 'weavers and makers' of human geography (e.g. Bodman, 1991), and online databases and search engines (Google Scholar<sup>TM</sup> or the ISI Indexes) certainly facilitate such analyses. Yet not all such analyses are robust and reliable, and we should remain mindful that not all citations are favourable. Equally, some books appear to be more cited than read (a charge made in at least one of the chapters in this volume), and self-citation can often inflate the apparent importance of a given text. Suffice to say, most of the books in this volume are well-cited (some more so than others), but not all of the most cited books in geography are included here.

Another way of honing in on the key texts within the discipline might have been to select the best-selling texts. However, for a variety of reasons, sales might not be a good indicator of significance. As we noted above, textbooks, especially those designed for 'introduction to human geography' courses, tend to have significantly more sales than research monographs. This is because monographs are generally targeted at the author's peer group rather than student masses, and so might have limited sales. They might, however, have hundreds more citations than a textbook which sold in far higher numbers (suggesting that they sway more influence). Further, geography books seldom (if ever) break into the best-seller charts, with few geographers ever having adopted the position of a genuine 'public intellectual' (see Ward, 2006; Castree, 2006 on public

geographies). Some texts may well achieve sales beyond geography, reaching student and academic audiences in cognate disciplines, but very few break through to 'discerning' public audiences in the same way that, for example, historical or archaeological books currently do in the UK. This does not mean that the key texts we profile have not sold well, with some featured here having gone to multiple editions and repeat print runs. Irrespective of this, we would claim that the acid test of a key text is not its popularity or citationality, but its longevity; that is to say that their impact is best measured in terms of their influence on subsequent texts.

While mindful of citations, sales, and longevity, we chose to narrow our selection further by consulting with colleagues from across human geography as to what books they felt merited inclusion based on their experience as researchers and teachers. From that extended list we whittled the books down to the publisher's limit of approximately 25 (given page length constraints). Here, we tried to provide a regular temporal spacing of books, including texts published within each decade; to include texts that were important within specific sub-disciplines as well as human geography as a whole; and to include texts that engaged with and promoted the many '-ologies' and '-isms' that have permeated recent geographical thought. We also took the decision to try to include some quite recent books that we feel have the potential to become 'key texts' given their initial reception and how quickly their ideas have permeated the discipline.

This then is not a random selection of books. It is a set of books that we believe are worth reading, either individually or collectively. Each book has made an important intervention not just within a given sub-discipline (e.g. urban, rural, social, economic, political, historical or cultural geography) but shaped the wider practices and imaginations

of human geography. Indeed, if one were to critically read all the books included in this volume, one would have a very good grasp of geographical theory and practice over the past 50 years. It is nonetheless a subjectively derived list and we would in no way claim it is *the* list of the most influential books in human geography. Other geographers would have of course drawn up their own lists and may be distraught to find some of their favourite texts excluded here (possibly including their own books!) They will no doubt suggest that our list bears the imprint of our own particular exposure to geography through Anglo-American traditions, our own research interests and expertise, our own peer networks – all of which might have impinged on our judgement as to which books have exercised most influence on geographical thought. This is unavoidable, not least because any book published prior to 1990 pre-dates our professional experience in the discipline (indeed the earliest books were written before all three of us were born!). But, for all its flaws, we feel that the 26 entries in this book do some kind of justice to the diversity of human geography practised in the last 50 years, with each having 'pushed the envelope' intellectually, methodologically and philosophically, shaping the landscape of human geography as we see it today.

## How to use this book

The most important thing to stress about this book is that it is *not* intended to substitute for an engagement with the text itself. While each entry provides a synopsis of the book in hand, it is necessarily brief, and often glosses over the nuance of the book's argument in the interests of identifying its essential arguments. The book is designed to be a primer, to be read *alongside* the text, and seeks to encourage a critically informed engagement and exploration

of the intricacies of each book. Each of our entries thus provides useful background context that might help the reader understand the situation within which a particular text was written (i.e. the wider social and political conditions that prevailed at the time, as well as the disciplinary preoccupations which prompted the authorship of that volume). It also considers how the book was received by the wider academic community, noting the way that the book was reviewed and how people reacted to the ideas being forwarded. In many cases, the entry also documents how people engaged with the ideas and took them forward in different ways. Accordingly, each entry considers the way in which the book affected and shaped the geographies that succeeded it, through a critical appraisal of the book's key thematic concerns, its particular approach and espousal of specific philosophies of geographic knowledge production.

Those asked to write chapters for this volume were asked to do so because we felt they would be able to offer a critical, reflective and balanced assessment of the text in question. Inevitably, many of our authors have written about a book that has profoundly shaped their own life as a geographer, perhaps influencing their own approach to the discipline. Some are explicit about this, and provide a highly personalized account of how the book influenced them; others are less forthcoming, and instead try to produce an account in which their own opinions are harder to discern. But in either case it is highly unlikely that the authors have produced an unbiased interpretation, with most likely to be predisposed towards (or, occasionally, against) the book they are considering. This is unavoidable: as we have stressed, there is no such thing as an objective assessment, and there is no one who is in a position to ultimately determine the value of a text. What therefore needs to be remembered is that each of our entries comes with a point of view that you,

and your tutors or colleagues, might not share.

Our hope is thus that this book will prove a useful companion for students seeking to engage with geography's rich histories (and not a crib that will dispense with the need to actually read each book in question) and might provide a useful template for how students might critically engage with texts in general (indeed a useful exercise is for students to undertake critical reviews of texts not included in this volume). The bibliography that closes each entry consequently offers numerous departure points for further explorations of the text and its author, and throughout we include frequent cross-references to other entries in this volume (as well as the companion text, *Key Thinkers on Space and Place*). As we suggested above, when we commissioned people to write the entries in this book, we chose people who we felt might have a close knowledge or perhaps even affinity for the book in question. Each is also knowledgeable about the place of the book in the wider disciplinary landscape and in the 'geographical tradition'. Yet we implore students not to take their views for granted, as their summation is not necessarily the one that other geographers might make. Perhaps their reading contradicts your own, or comes to different conclusions. Any one of the books featured here is open to multiple readings, and sometimes even readings that the author never intended. Such is the polysemous nature of text. In the final analysis, we hope that this book provokes people to read and re-read these texts, subject them to discussion and interrogation, and form their own situated interpretations. Perhaps, in time, these engagements might even stimulate the production of new key texts! Whatever, we hope *Key Texts* is a useful and stimulating text that is much, much more than a lesson in geographical navel-gazing and nostalgia.



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# 1

## INNOVATION DIFFUSION AS SPATIAL PROCESS (1953): TÖRSTEN HÄGERSTRAND

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The diffusion of innovations – the origin and dissemination of cultural novelties – is an area of study which concerns all sciences dealing with human activity, including, not least of all, cultural and economic geography. (Hägerstrand, 1953: 1)

### Introduction

It is difficult to grasp the importance of Törsten Hägerstrand's key work on innovation diffusion – his doctoral thesis from 1953 – without an appreciation of the historical context in which the work was conceived and prepared and the fact that it was first translated into English by Allan Pred some 14 years after submission. Most notable for setting out theories of spatial diffusion and adoption, Hägerstrand's early research also contains the key to the later development of his ideas. One example is *time geography*, which became formalized in the 1960s, but whose conceptual roots were to be found in Hägerstrand's writing in the 1940s and 1950s.

Hägerstrand arrived at Lund University in the late 1930s. His interest was directed, more or less by chance, toward migration and he started to work on a project intended to chart the entire demographic development of a considerable geographical area of Sweden from 1840 to 1940. Building an impressive collection of data, this enormous undertaking left Hägerstrand with a profound empirical understanding of demographic development.

At the same time he also developed a deeper theoretical proficiency, setting in motion his particular geographical worldview. More particularly, the systematic collection and analysis of data on the life courses of a population over a century contributed to the germination and growth of a foundational idea; namely the importance of analysing spatial processes.

Over time Hägerstrand absorbed important theoretic ideas and trends from beyond Swedish geography. These did not emanate from the regional perspective then dominant in university teaching, with Hägerstrand stating 'lectures in regional geography were abominably boring ... Geography appeared not as a realm of ideas or a perspective on the world but as an endless array of encyclopaedic data' (Hägerstrand, 1983: 244). Rather they came to his attention through a chance acquaintance. His future wife, Britt, was then working for the ethnologist Sigrid Svensson who was conducting research and publishing books on diffusion processes, and one of his school colleagues had a burning interest in numerical analyses and in developing computers and was an early visitor to the US.

Having gained a sound knowledge of demography and ideas on diffusion courses and simulation models, the foundations of his doctoral thesis had fallen into place. In many respects this work was to mark a decisive break with the then dominant tradition of regional studies. Hägerstrand's principal aim

in his doctoral thesis was not to present a broad regional description of an area, but instead to investigate and illuminate a problem. That the material concerned a specific area, argued Hägerstrand, was a regrettable necessity and not a methodological finesse which in itself marked a stand against regional geography.

### **Innovation diffusion: the Swedish version**

For obvious reasons a doctoral thesis written in Swedish does not reach a large international readership. Nevertheless, it is informative to comment on its immediate reception, 14 years before it was first published in English. The first academic review of Hägerstrand's doctoral thesis was published in 1953 – in the same year he was awarded his doctorate. The reviewer was Edgar Kant, previously professor in Tartu in Estonia, but who had by then spent many years in Lund at the Department of Geography. Kant was widely read in international scholarly literature and he was also the first opponent at Hägerstrand's disputation.

Kant opens his review with a discussion of the respective pros and cons of research specialization. Kant was of the opinion that the disadvantages associated with specialization 'begin to become apparent when large lacunae arise leaving poorly-lit areas in border zones, as monadnocks of the total ignorance' (Kant, 1953: 221). It is useful to recite Kant's concluding comments in order to relate exactly why he saw Hägerstrand's thesis as pioneering.

*The author has, to a noteworthy extent, utilized new methods and established new links to neighbouring disciplines. This must present itself as innovative to those who perceive geography as indissolubly bound to traditional methods of investigation and research subjects, such*

*as landscape analysis, which have as their only or primary task ascertaining interactions between man and nature. ... It may transpire that the author's longest expeditions into the unknown border- and twilight-zone have been but excursions leaving many areas as yet largely unexplored. Those who follow in his path can, however, draw benefit from his pioneering work and fashion new riches. (Kant, 1953: 225)*

In his doctoral thesis Hägerstrand investigated the changing extent of propagation of cultural artefacts. He did this by selecting six specific indicators; three for agriculture (state subsidies for improving pastures, control of bovine tuberculosis, soil mapping) and three more general indicators (postal money transfer, automobiles, telephones). The choice of indicators was guided by the need that these should be localizable to coordinates and that their development over time could be followed with a very high degree of precision. Furthermore, it was necessary that the indicators had been adopted by a sizeable proportion of the population.

The next stage in the investigation was to establish reduction bases for the indicators. This was necessary because it would have been meaningless to work with absolute numbers of acceptors. Hägerstrand carefully analysed the population (or demographic) development in the region and the location and size of each of the respective homesteads and residential apartments in order to construct the 'reduction bases' against which the number of acceptors should be matched.

An important section of the thesis, encompassing nearly 100 pages, then deals with the actual diffusion process. Hägerstrand's primary objective here is not to identify specific details in this diffusion process, but rather to generalize about the characteristics that could serve as the basis for subsequent operationalization in models. However, it was

important to observe certain characteristics as these generated variations in the diffusion process. A significant degree of the discrepancy between the indicators is based on the level of state intervention, for example in promoting the introduction of controls on bovine tuberculosis. Car purchase was principally a matter of private decision making, even if state legislation played a certain role. The introduction and diffusion of the telephone in the region of investigation was affected by the manner and the speed with which the electricity network was developed. Consequently, the diffusion of the six indicators reveals different courses and show how they are influenced to lesser or greater extents by planning and policy at national and regional levels. The larger part of this discussion is of more general interest, and is not confined to its historical or regional context.

With the help of this detailed empirical knowledge, Hägerstrand then formulated a series of experimental, stochastic models to show how innovations spread within a population. The first model was very simple and is steered entirely by chance and provides a picture that most closely approximates the manner in which a rumour spreads through a population. Hägerstrand therefore focuses on how differences in acceptance and how unevenly spread information could be modelled. Concerning the indicators for agriculture, he examines how, for example, farm size can influence the propensity to accept an innovation. In his studies, Hägerstrand identifies the importance of the proximity and thus comes to deal with private information diffusion and the question of how this should be modelled. He examines the chorological characteristics of information and how migration and telephone data can be utilized to describe the extent of the range of private information. In this particular case study he finds that migration data provides the best approximation as the telephone network was incomplete at the time of the study.

Furthermore, there were zonal boundaries that acted to deform the contact field.

The resulting models operated with a real, coordinate based population. The diffusion of an innovation in a population is determined by constructing a so-called mean information field (a concept still outlined in many standard textbooks on human geography), which illustrates how the probability of making contact with another individual decreases with increased distance. The empirical basis for the MIFs comprising  $5 \times 5$  cells (each cell being 1 square kilometre) is grounded on migration data. The matrix illustrates the probability of a contact being made from the central cell to one or more of the surrounding cells. The probabilities are cumulated (from 1 to 10,000) and each cell is attributed an interval proportional to the probability. The matrix is centred on an individual having knowledge of the innovation in question. By drawing a random number one decides which cell (interval) is met. The matrix is used in the manner of a floating grid – i.e. it moves over the fixed population and is centred over those individuals who have knowledge of the innovation in each generation and who are prepared to spread this knowledge. In this manner the innovation is continually diffused over time to new generations and gives rise to spatial patterns of acceptors, which are randomly determined but always within the given probability intervals. Even when the rules of the game and the probabilities remain unchanged, the results of different simulations are often very divergent as a result of the stochastic factor.

In these models Hägerstrand experimented with different forms of physical and social barriers. The propensity to accept an innovation was modelled (for example, a person must be 'hit' two or three times before accepting) and the degree of correspondence with the empirically ascertained patterns became increasingly close. As a result of the degree of correspondence between the actual and the modelled courses, Hägerstrand was able to conclude that the key elements deciding the

course of innovation diffusion had been captured. It is worth noting that all of these comprehensive modelling experiments were carried out by hand as computers had not as yet been developed. Each of the thousand upon thousand of random numbers was collated from tables in a strict order.

The first international commentary on Hägerstrand's doctoral thesis was written by John Leighly and published in the *Geographical Review* in 1954. Leighly, then Professor at Berkeley, was well acquainted with Swedish geography, which he had considered for several years (Leighly, 1952). Leighly emphasized his admiration of the scope and precision of the empirical work, not least concerning the map representation: 'His "relative" mapping uses refinements (isarithms at numerical intervals given by geometric progressions, interpolation of isarithms by logarithmic intervals) that make it exemplary' (Leighly, 1954: 440). However, and in a similar manner to many other commentators, Leighly viewed Hägerstrand's interpretation of innovation diffusion and the following operational modelling as the 'culmination' of his work. Leighly (1954: 441) concludes by commenting that anyone doing research in this area 'cannot afford to ignore Hägerstrand's methods and conclusions'.

While the attention surrounding Hägerstrand's doctoral thesis waned in the period following this appraisal, the same cannot be said regarding interest in his theoretical ideas and methodological approach. Aspects of his principal research were gradually disseminated via lectures, conferences and minor publications. Shortly prior to the completion of his doctoral thesis, Hägerstrand laid out his research field in an article entitled 'The propagation of innovation waves' (Hägerstrand, 1952). By 1967 he had published three articles on migration, two on diffusion, and one on simulation. A very widely read and often cited article is 'A Monte Carlo approach to diffusion' (1965), which

directly deals with models and is published in four journals and has even been translated into Japanese.

### **Innovation diffusion: the English version**

Although Hägerstrand's research had become relatively well known on the international scene, the broader understanding of his research remained fragmentary. Accordingly, both Gilbert White in Chicago and Allan Pred at Berkeley argued that his doctoral thesis should be translated into English. Pred took on this task as he was both fluent in Swedish and well versed in the specific area of research; two attributes which Hägerstrand argued were prerequisites for the successful translation of his work. Pred also wrote a Postscript in which he introduced Torsten Hägerstrand providing a detailed background to the research, and how the field of research had developed.

The book was well received. However, the fact that 14 years had passed since the publication of the original Swedish edition is at least partly evidenced by the content of a number of more critical commentaries. Quantitative geography had further developed and was quickly establishing an important set of new methodologies and theories (see Chapters 2, 3 and 4). One particular line of development concerned the statistical and objective comparison of patterns in time and space, which made it possible to elucidate more precisely differences and similarities in these patterns. In his review, Gunnar Olsson pointed out that 'the evaluation of the model was based on more intuition and visual inspection than objective statistical testing' (Olsson, 1969: 310). None of the reviews published during the 1950s had raised this issue.

Simulation had become a popular *modus operandi* within the discipline, and against this

background Olsson had somewhat critically stated: 'In conclusion, most of those who now experiment with Monte Carlo models seem to have missed the point. Thus it is rare that the relation between theory and model is as explicit as in Hägerstrand's own work' (Olsson, 1969: 311). This observation further supports the proficiency with which Hägerstrand had succeeded in fusing thorough empirical material with a well-developed command of theory. This is what gives his work its credibility and strength.

Richard L. Morrill, himself a former visiting fellow at Lund who also had experience of simulations, argued that although Hägerstrand's earlier work had been disseminated relatively widely, the opportunity now existed for a wider audience to discover that this was by no means a curious approach, but instead constituted a theoretical framework founded on an unusually rigorous empirical grounding. Morrill (1969) went to particular lengths to emphasize the linkages between spatial patterns and individual behaviour, and argued this represented a revolutionizing insight and a powerful break with tradition within the discipline. In a more anecdotal vein, we might also note that he concluded his review in *Economic Geography* by protesting against the 'outrageous price' of the book (then \$16).

L.J. Evenden (1969) forwarded a comprehensive and positive review in the journal *Social Forces*. He argued that: '... Hägerstrand allows a glimpse of a fertile imagination and, simultaneously, teaches the useful lessons that patience is a research virtue, that theory is fundamentally about *something*, and that reliable theory in social science stays close to this *something*' (Evenden, 1969: 9). Evenden further argued that evidence that Hägerstrand's research had left a lasting legacy was to be found in the wide range of fields in which Monte Carlo simulation had subsequently been applied. Simulation was well known and widely used at the time of the

publication of the English edition, so there was no question of its subject matter being received as breaking news. Evenden emphasized that the work represented a combination of a careful factual analysis and the best of traditional and contemporary geographical scholarship, and contended that Hägerstrand's doctoral thesis would long be considered a classic work in the development of geographical theory.

The economist Harvey Leibenstein, then based at Harvard University, reviewed the book in the *Journal of Economic Literature*. He maintained that it was of interest for economists who were interested in diffusion processes and location theory, as well as modulated processing of innovation diffusion. Leibenstein further contended that it was difficult to assess the value of the models' predictions, in spite of all the empirical information. He also found the approach altogether mechanical – a critique which one can at least partly agree upon – if one did not take into consideration the fact that the translated thesis was 14 years old. A further point made by Leibenstein was that it had been a mistake to translate the thesis in its entirety. The meticulous account of empirical material was, he deemed, utterly boring and would probably act to '... repel most readers' (Leibenstein, 1969: 11). It is as well to add that no such critique has been forthcoming from any of the geographers who have reviewed the book; instead they have viewed this detail as an extra bonus – stimulating for many, previously unknown for most readers.

### As time goes by

While Hägerstrand's research on diffusion was largely well known prior to the publication of the English version, it did open the possibility for a deeper understanding of his research. At first it was widely read and acted