

Editors:
Dodge
Kitchin
Perkins

The Map Reader

The Map Reader



Theories of Mapping Practice and Cartographic Representation

Editors: Martin Dodge, Rob Kitchin and Chris Perkins



 WILEY-BLACKWELL



The Map Reader

Theories of Mapping Practice and Cartographic Representation

**Edited by
Martin Dodge**

*Department of Geography, School of Environment and Development,
University of Manchester, Oxford Road, Manchester, M13 9PL, UK*

Rob Kitchin

*National Institute for Regional and Spatial Analysis, National University of Ireland,
Maynooth, Co. Kildare, Ireland*

Chris Perkins

*Department of Geography, School of Environment and Development,
University of Manchester, Oxford Road, Manchester, M13 9PL, UK*

 **WILEY-BLACKWELL**

A John Wiley & Sons, Ltd., Publication

This edition first published 2011 © 2011 by John Wiley & Sons, Ltd.

Wiley-Blackwell is an imprint of John Wiley & Sons, formed by the merger of Wiley's global Scientific, Technical and Medical business with Blackwell Publishing.

Registered office: John Wiley & Sons, Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices: 9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
111 River Street, Hoboken, NJ 07030-5774, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell.

The right of the author to be identified as the author of this work has been asserted in accordance with the UK Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book. This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold on the understanding that the publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Efforts were made to contact all copyright holders for material excerpted but this was not possible in all cases. The publisher will correct any omissions in future editions of the book.

Library of Congress Cataloging-in-Publication Data

The map reader : theories of mapping practice and cartographic representation / edited by Martin Dodge, Rob Kitchin and Chris Perkins.

p. cm.

Includes index.

ISBN 978-0-470-74283-9 (cloth)

1. Cartography. 2. Maps. I. Dodge, Martin, 1971- II. Kitchin, Rob. III. Perkins, Chris.

GA101.5.M38 2011

912-dc22

2010049397

A catalogue record for this book is available from the British Library.

This book is published in the following electronic format: ePDF 9780470979594; Wiley Online Library 9780470979587; ePub 9780470980071

Set in 9.75/11.25 pt, Minion by Thomson Digital, Noida, India.

First Impression 2011

The Editors

Martin Dodge

Department of Geography, School of Environment and Development, University of Manchester, UK

Martin is Senior Lecturer in Human Geography in Manchester where his research focuses on conceptualising the socio-spatial power of digital technologies and urban infrastructures, virtual geographies, and the theorisation of visual representations, cartographic knowledge and novel methods of geographic visualisation. He curated the well known Web-based *Atlas of Cyberspaces* and has co-authored three books covering aspects of spatiality of computer technology: *Mapping Cyberspace* (Routledge, 2000), *Atlas of Cyberspace* (Addison-Wesley, 2001) and *Code/Space* (MIT Press, 2011). He has also co-edited two books, *Geographic Visualization* (John Wiley & Sons, 2008) and *Rethinking Maps* (Routledge, 2009), focused on the social and cultural meanings of new kinds of mapping practice.

Rob Kitchin

National Institute for Regional and Spatial Analysis and Department of Geography, National University of Ireland, Maynooth, Co. Kildare, Ireland

Rob is Professor of Human Geography and Director of the National Institute of Regional and Spatial Analysis (NIRSA) at the National University of Ireland, Maynooth, and Chair of the Management Board of the Irish Social Sciences Platform (ISSP). He has published sixteen books, is editor of the international journal *Progress in Human Geography*, and co-editor-in-chief of the *International Encyclopedia of Human Geography* (Elsevier, 2009).

Chris Perkins

Department of Geography, School of Environment and Development, University of Manchester, UK

Chris is Senior Lecturer in Geography and emeritus University Map Curator. He is the author of four books, including standard texts documenting the changing contexts of map availability (*World Mapping Today* with R.B. Parry; Bowker-Saur, 2000), and has co-edited the second edition of the *Companion Encyclopaedia to Geography* (Routledge, 2006) and *Rethinking Maps* (Routledge 2009). His research interests are centred on the different ways in which mapping may be employed and he is the first Chair of the International Cartographic Association's Commission on Maps in Society.

Contents

The Editors	xvii
Preface	xix
Acknowledgements	xxv

*Colour Plate One: Cartographic Production
(On the inside front cover)*

Section One Conceptualising Mapping	1
1.1 Introductory Essay: Conceptualising Mapping, by Rob Kitchin, Martin Dodge and Chris Perkins	2
1.2 General Theory, from <i>Semiology of Graphics</i>, by Jacques Bertin	8
The first formal specification for semiotic rules controlling the representation of different kinds of information in a graphical form.	
1.3 On Maps and Mapping, from <i>The Nature of Maps: Essays Toward Understanding Maps and Mapping</i>, by Arthur H. Robinson and Barbara B. Petchenik	17
An important contribution to the status of maps and mapping reflecting on the need for cognitive and perceptual approaches to map design and cartography as visual communication.	
1.4 The Science of Cartography and its Essential Processes, by Joel L. Morrison	24
An overview of cartography as communications science and justification for a progressive and experimental approach.	
1.5 Analytical Cartography, by Waldo R. Tobler	32
An early call for a rethinking of cartography deploying a more analytical approach grounded in theory and deploying mathematical principles.	

- 1.6 Cartographic Communication, by Christopher Board** 37
One of the most complete discussions of the communications paradigm and the role of modelling the flow of cartographic information.
- 1.7 Design on Signs / Myth and Meaning in Maps, by Denis Wood and John Fels** 48
A structuralist reading of cartography as a sign system exploring how codes operate to naturalise the cultural work of the map.
- 1.8 Deconstructing the Map, by J.B. Harley** 56
An influential call for a more engaged, critical and social constructivist approach to mapping drawing upon notions of the map as a form of power knowledge.
- 1.9 Drawing Things Together, by Bruno Latour** 65
Argues that visualisations play central roles in the practices of knowledge construction and establishes how the map might function as an immutable mobile.
- 1.10 Cartography Without 'Progress': Reinterpreting the Nature and Historical Development of Mapmaking, by Matthew H. Edney** 73
Argues for an anti-progressive view of cartography as an assemblage in which different modes of knowing the world emerge from local contexts.
- 1.11 Exploratory Cartographic Visualisation: Advancing the Agenda, by Alan M. MacEachren and Menno-Jan Kraak** 83
Sets out a research agenda for a more exploratory and interactive mapping emerging from technological and epistemological change of the early 1990s.
- 1.12 The Agency of Mapping: Speculation, Critique and Invention, by James Corner** 89
A persuasive argument for the creative and emancipatory potential of mapping as a set of practices exemplified by work in architecture and planning.
- 1.13 Beyond the 'Binaries': A Methodological Intervention for Interrogating Maps as Representational Practices, by Vincent J. Del Casino Jr. and Stephen P. Hanna** 102
A call to move beyond orthodox binary thinking and to adopt a more performative approach to mapping informed by feminist critiques.

- 1.14 Rethinking Maps, by Rob Kitchin and Martin Dodge** 108
Rejects the idea of mapping as ontic knowledge, focusing instead upon its processual and emergent qualities as a context-dependant and relational problem solving technology.

Colour Plate Two: Mapping the Internet

- Section Two Technologies of Mapping** 115
- 2.1 Introductory Essay: Technologies of Mapping, by Martin Dodge, Rob Kitchin and Chris Perkins** 116
- 2.2 A Century of Cartographic Change, from *Technological Transition in Cartography*, by Mark S. Monmonier** 122
A progressive overview of technological change in the first eight decades of the twentieth century, focusing upon the nature, combinations and rates of change in mapmaking.
- 2.3 Manufacturing Metaphors: Public Cartography, the Market, and Democracy, by Patrick H. McHaffie** 129
Charts the connections between technological change and the labour process in the context of mass production of official mapping.
- 2.4 Maps and Mapping Technologies of the Persian Gulf War, by Keith C. Clarke** 134
Explores the impacts of war on mapping technologies through a case study on United States military activity in the first gulf war.
- 2.5 Automation and Cartography, by Waldo R. Tobler** 137
A pioneering consideration of the potential of using the computer in map data, storage analysis output and display.
- 2.6 Cartographic Futures on a Digital Earth, by Michael F. Goodchild** 141
A view from the late 1990s reflecting upon the power of digital technology to widen access to mapping but also diminish traditional visual cartographic skills.
- 2.7 Cartography and Geographic Information Systems, by Phillip C. Muehrcke** 147
Explores the emerging relationship between the map and GIS and considers what remains unmappable with GI technologies.

- 2.8 Remote Sensing of Urban/Suburban Infrastructure and Socio-Economic Attributes, by John R. Jensen and Dave C. Cowen** 153
 Considers how remotely-sensed technologies can supplement more traditional urban mapping practices.
- 2.9 Emergence of Map Projections, from *Flattening the Earth: Two Thousand Years of Map Projections*, by John P. Synder** 164
 An overview of the changing form and deployment of map projections reflecting on the flexibility of computer processing facilitating diverse choices, but also the continuing limits on appropriate use.
- 2.10 Mobile Mapping: An Emerging Technology for Spatial Data Acquisition, by Rongxing Li** 170
 A paper from the late 1990s illustrating the potential of mobile data collection methods subsequently realised in consumer services like Google Street View.
- 2.11 Extending the Map Metaphor Using Web Delivered Multimedia, by William Cartwright** 178
 An illustration of how multi-mediated interaction can deliver new kinds of information design in game like and hyper-linked interfaces.
- 2.12 Imaging the World: The State of Online Mapping, by Tom Geller** 185
 Provides a snapshot of the state of mass interactive mapping-on-demand served from online corporate portals and community projects.

Colour Plate Three: Pictorial Mapping

- Section Three Cartographic Aesthetics and Map Design** 193
- 3.1 Introductory Essay: Cartographic Aesthetics and Map Design, by Chris Perkins, Martin Dodge and Rob Kitchin** 194
- 3.2 Interplay of Elements, from *Cartographic Relief Presentation*, by Eduard Imhof** 201
 Discusses the importance of relationship between visual forms in the design of topographic mapping, with a particular focus on challenges of mountain cartography.

- 3.3 Cartography as a Visual Technique, from *The Look of Maps*, by Arthur H. Robinson** 215
Justifies the need for a visual approach to mapping, focusing in particular upon the design of thematic maps.
- 3.4 Generalisation in Statistical Mapping, by George F. Jenks** 219
A consideration of the impacts of different kinds of generalization and classification on the patterns presented in quantitative cartography.
- 3.5 Strategies for the Visualisation of Geographic Time-Series Data, by Mark Monmonier** 231
An early classification and conceptual framework for the consideration of mapping that simultaneously depicts time and space in an effective manner.
- 3.6 The Roles of Maps, from *Some Truth with Maps: A Primer on Symbolization and Design*, by Alan M. MacEachren** 244
Reflects on the roles of design in decision making in the era of data exploration, confirmation, synthesis and presentation.
- 3.7 Area Cartograms: Their Use and Creation, by Daniel Dorling** 252
Discusses the history design and use of different kinds of cartograms with a particular focus on their potential in mapping socio-economic and political data.
- 3.8 ColorBrewer.org: An Online Tool for Selecting Colour Schemes for Maps, by Mark Harrower and Cynthia A. Brewer** 261
Describes the development and potential of an online tool for guiding appropriate selection of colour schemes for the representation of quantitative data in choropleth mapping.
- 3.9 Maps, Mapping, Modernity: Art and Cartography in the Twentieth Century, by Denis Cosgrove** 269
Charts relations between art and mapping in the early twentieth century highlighting ongoing collaboration in a period when orthodox views suggested separate practices.
- 3.10 Affective Geovisualisations, by Stuart Aitken and James Craine** 278
Highlights what can be learnt from film and suggests geovisualisations should engage more with affect and emotion.
- 3.11 Egocentric Design of Map-Based Mobile Services, by Liqiu Meng** 281
Focuses on the design requirements for short-term and transient images revealed in egocentric displays that characterise map-based mobile services.

3.12	The Geographic Beauty of a Photographic Archive, by Jason Dykes and Jo Wood	288
	Explores how the beauty of data can be revealed through the creative deployment of treemaps in an analysis the <i>Geograph</i> data set.	
	<i>Colour Plate Four: Visualising Cartographic Colour Schemes and Mapping Spatial Information Space</i>	
	Section Four Cognition and Cultures of Mapping	297
4.1	Introductory Essay: Cognition and Cultures of Mapping, by Chris Perkins, Rob Kitchin and Martin Dodge	298
4.2	Map Makers are Human: Comments on the Subjective in Maps, by John K. Wright	304
	An influential and early clarion call for research into the roles people and their subjectivities play in the mapping process.	
4.3	Cognitive Maps and Spatial Behaviour: Process and Products, by Roger M. Downs and David Stea	312
	An overview of behavioural geographic understanding of cognitive mapping that argues for the need for experimental investigation and establishes basic principles.	
4.4	Natural Mapping, by James M. Blaut	318
	Provides an argument and empirical evidence for a cross cultural development of map skill acquisition, especially in children.	
4.5	The Map as Biography: Thoughts on Ordnance Survey Map, Six-Inch Sheet Devonshire CIX, SE, Newton Abbot, by J.B. Harley	327
	A personal reflection on the interplay between a single historic topographic survey sheet and the ways it narrates different biographical associations with place.	
4.6	Reading Maps, by Eileen Reeves	332
	An exploration of the cultural meanings attached to cartography through the map reading process that tracks the shift from a textual to visual view of the medium and considers the gendering of maps.	

- 4.7 Mapping Reeds and Reading Maps: The Politics of Representation in Lake Titicaca, by Benjamin S. Orlove** 339
A social anthropological consideration of tensions, actions and discourses involved in a local resource conflict and how maps and mapping are enrolled into cultural politics.
- 4.8 Refiguring Geography: Parish Maps of Common Ground, by David Crouch and David Matless** 354
A reflection on how place emerges through a community mapping project which highlights the interplay of politics, aesthetics and practice.
- 4.9 Understanding and Learning Maps, by Robert Lloyd** 362
An overview of changing trajectories of cognitive map research charting development from early psychophysical experiments to more nuanced theoretical work.
- 4.10 Citizens as Sensors: The World of Volunteered Geography, by Michael F. Goodchild** 370
Describes and explains the nature and emergence of crowd-sourced mapping and assesses its potential contribution to the social production of cartography.
- 4.11 Usability Evaluation of Web Mapping Sites, by Annu-Maaria Nivala, Stephen Brewster and L. Tiina Sarjakoski** 379
Provides an empirical comparison of web mapping portals illustrating the potential of usability engineering as a tool to evaluate and improve interface design.

Colour Plate Five: Visualising the Efforts of Volunteer Cartographers

- Section Five Power and Politics of Mapping** 387
- 5.1 Introductory Essay: Power and Politics of Mapping, by Rob Kitchin, Martin Dodge and Chris Perkins** 388
- 5.2 The Time and Space of the Enlightenment Project, from *The Condition of Postmodernity*, by David Harvey** 395
An historical analysis of perspectivism and Cartesian rationality in cartography which facilitated capital accumulation.

- 5.3 Texts, Hermeneutics and Propaganda Maps, by John Pickles** 400
A textual approach to cartographic power focusing on an interpretive case study of the cultural work of propaganda maps.
- 5.4 Mapping: A New Technology of Space; Geo-Body, from *Siam Mapped: A History of the Geo-Body of a Nation*, by Thongchai Winichakul** 407
An insightful case study exploring the constitutive role of maps in the making of imaginative geographies of nationhood.
- 5.5 First Principles of a Literary Cartography, from *Territorial Disputes: Maps and Mapping Strategies in Contemporary Canadian and Australian Fiction*, by Graham Huggan** 412
Examines the potential of cartography to control, but reminds us of the destabilising potential of maps in feminist and ethnic literature, serving as both texts and textual events.
- 5.6 Whose Woods are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia, by Nancy Lee Peluso** 422
Discusses how state interests deploy mapping as a powerful discourse, but also reveals the potential of counter-mapping by NGOs and local people.
- 5.7 A Map that Roared and an Original Atlas: Canada, Cartography, and the Narration of Nation, by Matthew Sparke** 430
A postcolonial approach to maps as contra-punctual moments in the struggle for identity and space, developed through an analysis of Canadian mapping encounters.
- 5.8 Cartographic Rationality and the Politics of Geosurveillance and Security, by Jeremy W. Crampton** 440
An historical analysis of the role of mapping as a surveillant technology deployed as part of governmental regimes to rationalise and discipline citizens.
- 5.9 Affecting Geospatial Technologies: Toward a Feminist Politics of Emotion, by Mei-Po Kwan** 448
Argues for a vision of geo-spatial technologies informed by feminist ideas and notions of affect, that incorporates an emotional and embodied approach to mapping practices.
- 5.10 Queering the Map: The Productive Tensions of Colliding Epistemologies, by Michael Brown and Larry Knopp** 456
Explores the tensions between queer geographies and Cartesian rationality, revealed in ontological and epistemological differences in a community mapping project.

5.11 Mapping the Digital Empire: Google Earth and the Process of Postmodern Cartography, by Jason Farman 464

An exploration of the emancipatory potential of Web 2.0 interfaces, reflecting on the remaking of corporate power embodied in newly crowd-sourced alternative mappings.

*Colour Plate Six: Cartographies of Protest
(On the inside back cover)*

Index 471

Preface

Introducing *The Map Reader*

Martin Dodge, Rob Kitchin and Chris Perkins

Delineating maps and mapping

A map is, in its primary conception, a conventionalised picture of the Earth's pattern as seen from above.

Erwin Raisz, *General Cartography*, 1938.

Mapping provides a uniquely powerful visual means to classify, represent and communicate information about places that are too large and too complex to be seen directly, and cartography is the practice of map making. Importantly, the places that maps are able to represent need not be limited to physical, geographical spaces like continents, rivers, mountain ranges and such like: maps can be used to represent human activities, cultural patterns and economic exchanges, and indeed to construct worlds of the imagination. In this Preface we delineate the nature of maps and mapping, and outline the aims of *The Map Reader* and the practicalities of its making.

The ability to create and use maps is one of the most basic means of human communication, at least as old as the invention of language and, arguably, as significant as the development of mathematics. The recorded history of cartography clearly demonstrates the practical utility of maps in all aspects of Western society, being most important for organising spatial knowledges, facilitating navigation and controlling territory. They are instrumental in the work of the state, in aiding governance and administration, and in assisting trade and the accumulation of capital. Some have gone further to argue that mapping processes are culturally universal, an innate human activity, evident across all societies (Blaut *et al.* 2003), although the visual forms of the resulting cartographic representations are very diverse. At the same time, maps are rhetorically powerful graphic images that frame our understanding of the human and physical world, shaping our mental image of places and constructing our

sense of spatial relations. So, in a very real sense, maps make our world.

Conventionally, maps are material artefacts that visually represent a geographical landscape using the cartographic norms of a planar view – looking straight down from above – and a consistently applied reduction in scale. However, it makes little sense to neatly define maps according to the type of phenomena mapped or the particular mode of presentation, or their medium of dissemination. Maps have traditionally been used as static paper repositories for spatial data, but now they are much more likely to be interactive tools displayed on a computer screen. Indeed, many national mapping agencies are discontinuing their printed topographic map products as customers increasingly use digital geospatial data. Today, we live in a map-saturated world (Wood 1992), continually exposed to conventional maps, along with many other map-like spatial images and media (e.g. animated satellite views on television news, three-dimensional city models in video games, medical scans in hospitals and clinics), along with myriad artistically deployed maps, and pictorial and cartoon cartographies meant to amuse and persuade.

Maps have long been used in scholarly research into social and physical phenomena. They are a primary technique of analysis in geography but they are also used widely in other disciplines, such as anthropology, archaeology, history and epidemiology, to store spatial data, to analyse information and generate ideas, to test hypotheses and to present results in compelling, visual forms. Mapping as a method of enquiry and knowledge creation also plays a growing role in the natural sciences, in disciplines such as astronomy and particle physics, and in the life sciences, as exemplified by the metaphorical and literal mapping of DNA by the Human Genome Project. This mapping work is not limited to cartography; many other spatial

visualisation techniques, often using multidimensional displays, have been developed for handling very large, complex spatial datasets without gross simplification or opaque statistical output (e.g. volumetric visualisation in atmospheric modelling, three-dimensional body imaging in medical sciences or huge fractal graphs – see Colour Plate Two). At the start of the 1990s, Hall (1992: 22) claimed that ‘more mapping of more domains by more nations will probably occur in the next decade than has occurred at any time since Alexander von Humboldt “rediscovered” the earth in the eighteenth century, and more *terra incognita* will be charted than ever before in history’; two decades on not only has this happened, but the trend shows no signs of slowing.

Mapping processes

The production of cartography and other spatial visualisations involves a whole series of mapping processes, from the initial selection of what is to be measured to the choice of the most appropriate scale of representation and projection, and the best visual symbology to use. The concept of ‘map as process’ is useful methodologically because it encourages particular ways of organised thinking about how to generalise reality, how to distil inherent, meaningful spatial structure from the data, and how to show significant relationships between entities in a legible fashion. Mapping provides a means of organising large amounts of, often multidimensional, information about a place in such a fashion as to facilitate human exploration and understanding. Yet, mapping practices are not just a set of techniques for information ‘management’, they also encompass important social processes of knowledge construction. As scholars have come to realise, maps and culture are intimately entwined and inseparable.

Mapping not only represents reality, it has an active role in the social construction of that reality. Mapmakers do not so much represent space, as create it. As Winichakul (1994; excerpted here as Chapter 5.4) and Pickles (2004) persuasively argue, maps precede and make the territory they seek to portray. So, for example, the first maps of Siam delineated the nation providing the model for an imagined community, rather than depicting it. Maps then are a key resource of states in the formation of national identity (Anderson 1991). It is rarely the case, however, that people are conscious of this constructive role when they make or use maps. Sparke (1998: 466, excerpted here as Chapter 5.7) calls this the ‘recursive proleptic effect’ of mapping, ‘the way maps contribute to the construction of spaces that later they seem only to represent’. The power of maps comes from the fact that they are both a practical form of information processing and also a compelling form of rhetorical communication.

Maps work, essentially, by helping people to visualise the unseeable. This is achieved through the act of visualisation, premised on the common notion that humans can reason and learn more effectively in a visual environment than when using textual or numerical descriptions. Maps provide graphical displays which renders a place, a phenomenon or a process visible, enabling one of our most powerful information processing abilities – that of spatial cognition associated with the human eye–brain vision system – to be brought to bear. Visualisation is thus a cognitive process of learning through interactions with the multiple visual signs that make up the map. Effective cartographic visualisation can reveal novel insights about spatial relations, patterns and trends that are not apparent with other methods. In an instrumental sense, then, map use is a powerful prosthetic enhancement for the human body: ‘[l]ike the telescope or microscope, it allows us to see at scales impossible for the naked eye and without moving the physical body over space’ (Cosgrove 2003: 137). The ideal of obtaining a reliable capacity to see the unseen is particularly applicable to much of thematic cartography, because it renders statistical information about people, places and geographical processes tangible by revealing their spatial pattern.

Their ability to communicate effectively means that maps are widely deployed as devices to present ideas, themes and concepts that are difficult to express verbally and to persuade people to their message. Most of the maps encountered on a daily basis (often with little conscious thought given to them) are used in the service of persuasion, ranging from marketing maps and city-centre tourist maps to the more subtle displays such as states’ claims to sovereign power over territory, implicitly displayed in daily weather maps. Maps work because they are able to *sell* a particular vision of the world *and* because people are willing to *buy* into this vision: people believe in the authority of the image as a trustworthy representation of reality.

Objectives of *The Map Reader*

The map is one of the key components of visual culture and has proved to be a vital representational technology in many fields for hundreds of years. Maps enjoy widespread functional use for a range of tasks. In recent years, maps have started to gain more significance in the wider academy given the visual and spatial turns across the social sciences. As a consequence, there is an increasing interest in spatial representations and mapping practices in disciplines such as anthropology, literary studies, sociology, history and communications (Elkins 2007; Warf and Arias 2008). Similarly, mapping approaches are proving useful in the information sciences, bio-informatics and

human–computer studies as the basis for novel knowledge discovery strategies (Börner 2010). In addition, there is also a lively engagement with cartography beyond academia with growing artistic interest (see Wood 2010 for a recent overview), numerous exciting participatory mapping projects and mass consumer enrolment of interactive spatial media on the Web, on mobile phones and with in-car satnavs to solve myriad daily tasks.

However, despite this attention and their widespread production and use, at a theoretical and analytical level, maps are still somewhat taken for granted: they are spatial representations that portray the spatial relations of the world. As such, analysis of the rhetorical power and technical complexity of how maps work has largely been confined to the small field of cartography, with some contributions from across the social sciences and humanities. Compared with other visual cultures, such as art and film, this literature is relatively small and, we feel, often overlooked. In compiling *The Map Reader* we wanted to draw together into a single source some of the most influential articles from the last half century to provide an intellectually-driven and interpretative anthology of cartographic research which could act as a primer for students, academics and lay readers interested in understanding the appeal and power of maps.

In that sense, the book cuts through the ‘information overload’ generated by bibliographic databases and ready online access to e-journals and digital books by providing direct access to a careful selection of the most influential texts. The materials selected for inclusion in *The Map Reader* are diverse in their agendas and approaches, drawn from leading scholars and researchers from a range of cognate fields, including cartography, geography, architecture, anthropology, literature, political science, graphic design and geomatic engineering. Each reading provides a thought provoking analysis, and collectively they demonstrate the diverse philosophy, history, praxis and technologies of mapping. They thus provide an insight into how influential cartographic ideas arise and how they circulate as catalysts that can codify and instigate important areas of research within cartography. While the focus on past ‘classics’ might seem rather backward looking in an era of such rapid change in mapping techniques and technologies, there is nonetheless real intellectual value understanding the roots and routes of cartographic thinking because it places current developments in context and provides a basis on which to build and extent contemporary analysis.

To aid the reader, we have structured the readings around five broad themes: (1) concepts, (2) technologies, (3) aesthetics and design, (4) cognition and culture, (5) politics and power. Each theme is set into context by an original interpretative essay from the editors. A series of full-page colour plates between sections present distinctive

map exemplars that we hope will serve as provocative visual ‘think-pieces’ that counterpoise the surrounding texts.

Making our selection

The task of drawing up a limited, yet definitive, list of significant work for inclusion in a ‘reader’ text that would achieve widespread agreement is, for any academic discipline, an almost impossible one. We therefore acknowledge our final selection for *The Map Reader* is subjective, reflecting our personal biases, partial knowledge and political agendas. To guide our selection we used a number of parameters. Firstly, we decided to focus on the post Second World War period. This period has seen a diverse range of new theoretical ideas and technological developments, when cartography emerged as a distinct scholarly discipline with its own peer-review journals. Secondly, our remit centred upon pieces that were concerned in the main with contemporary mapping. There is only a limited consideration here of the history of cartography. Thirdly, we limited our selection to the English language given our own language limitations and the prospective readership of the book. As a consequence, the book is unavoidably reflective of Anglo-American scholarship. Fourthly, we sought to select material that speaks in a scholarly fashion to trends and concepts, rather than include more applied, technical and practical papers. Fifthly, nearly all of the readings were published in peer-review journals and scholarly monographs.

We did not, however, use quantitative metrics to guide the assessment of what counts as ‘significant’. There is a panoply of projects that seeks to ‘scientifically’ assess the most significant scholarly work using citations counts, impact factors, h-scores and an assortment of other quantitatively derived metrics. While such calculative approaches seem to offer objectivity, this is very much a veneer that masks a whole host of messy realities, fallacies and contingencies with citation data, particularly relating to relative comparability through time and across subject areas. The material we have selected for *The Map Reader* has a range of citation counts from over one thousand to more recent articles which have so far attracted little attention. For example, according to Google Scholar (July 2010), the foundational semiological work of Jacques Bertin has been cited 566 times in the original French language version, and 1341 times in the 1983 translation (excerpted here as Chapter 1.2). Another well-cited ‘classic’ article in this collection is *Deconstructing the Map* by Brian Harley (excerpted here as Chapter 1.8), with well over 500 citations since its publication in 1989. A few of the pieces we have included have, as yet, negligible numbers of citations (e.g. Aitken and Craine’s 2006 article in *Directions Magazine* cited only seven times so far; excerpted here as

Table P.1 Count of excerpts in *The Map Reader* by decade in which they were first published

Decade	Count
1940–1949	1
1950–1959	2
1960–1969	3
1970–1979	4
1980–1989	6
1990–1999	23
2000–2010	15
<i>Total</i>	<i>54</i>

Chapter 3.10). We have included such pieces because we think they have something important to contribute and are worthy of a wider audience.

While the material in *The Map Reader* covers a wide time span – nearly 60 years – running from 1942 up to 2010, there is an uneven spread of material selected and we are perhaps guilty of overlooking earlier significant work. Styles and conventions of academic discourse evolve and the pace of change in mapping tends to focus attention on the more recent past. Looking at the dates of the pieces included grouped by decade (Table P.1) it is somewhat evident that there is a bulge of material post 1990. This is reflective of the notable upsurge in philosophical engagement given the influx of social theory into cartographic debates and the explosion of new mapping technologies underpinning the growth of digital cartography. Given that we wanted to cover a wide range of topics it has meant that none could be covered in depth; not all the issues are as well represented as perhaps needed and, consequently, many important topics are represented by a single piece of work (in some cases this is unavoidably a placeholder for larger subfield). Clearly in these cases, these articles cannot encompass the full complexity and nuances of on-going debates. We hope that our introductory essays will help provide some additional context.

Editorial practicalities

In terms of the editorial process we have employed in *The Map Reader*, working within practical constraints of an affordable and commercially viable book, has meant that the pieces included are mostly reprinted as excerpts rather than verbatim. For monographs, we have generally excerpted from a single, most pertinent chapter. Where material has been deleted from the original this is indicated in the text by [...]. In some cases sizable edits have

been made, but we have endeavoured to preserve the core intellectual argument as well as the narrative flow of the original, whilst removing extraneous examples or more elliptical context.

Each entry has been reformatted for consistency and to remove variability in the layout and referencing style evident in the original versions. The degree of standardisation, particularly the switch from footnote citations to Harvard style referencing in some excerpts, has necessitated some very minor changes to the texts themselves involving the insertion of references. Bibliographies have been edited from the originals to include only the references used in the excerpted text. Spelling has generally been standardised to British English. Some tables and figures have been omitted (to save space and for copyright reasons), so the numbering of these sometimes differs from the original. Many of the original illustrations included have been faithfully redrawn for this book by Graham Bowden (Cartographic Unit, University of Manchester) to ensure higher quality reproduction than scans of the originals.

Conclusion

Over the past fifty years there has been a sustained scholarly engagement in thinking about the ontological bases of cartographic representation and an exploration of new epistemologies of mapping. Moreover, there is burgeoning interest from many scientists, social scientists and humanities disciplines in theorising the nature of cartography and productively applying mapping and geographic visualisation to solve research problems. This coupled with tremendous socio-technical developments in the production of cartographic representations has led to a widening and more vibrant array of different kinds of mapping being employed by scholars. We hope *The Map Reader* will further advance understandings of cartography by illustrating the ways in which maps have been thought about and researched and that it will encourage a wider appreciation of where mapping has come from, and perhaps where it might go.

References

- Aitken, S. and Craine, J. (2006) Guest editorial: Affective geovisualizations. *Directions Magazine*, 7 February. www.directionsmag.com. (Excerpted as Chapter 3.10.)
- Anderson, B. (1991) *Imagined Communities: Reflections on the Origins and Spread of Nationalism*, 2nd edn, Verso, New York.
- Bertin, J. (1983) *Semiology of Graphics* (trans. W.J. Berg), University of Wisconsin Press, Madison, WI. (Excerpted as Chapter 1.2.)

- Blaut, J.M., Stea, D., Spencer, C. and Blades, M. (2003) Mapping as a cultural and cognitive universal. *Annals of the Association of American Geographers*, **93**(1), 165–185.
- Börner, K. (2010) *Atlas of Science*, MIT Press, Cambridge, MA.
- Cosgrove, D. (2003) Historical perspectives on representing and transferring spatial knowledge, in *Mapping in the Age of Digital Media*, (eds. M. Silver and D. Balmori), John Wiley & Sons Ltd, Chichester, UK, pp. 128–137.
- Elkins, J. (2007) *Visual Practices Across the University*, Wilhelm Fink, Munich.
- Hall, S.S. (1992) *Mapping the Next Millennium*, Vintage Books, New York.
- Harley, J.B. (1989) Deconstructing the map. *Cartographica*, **26**(2), 1–20. (Excerpted as Chapter 1.8.)
- Pickles, J. (2004) *A History of Spaces: Cartographic Reason, Mapping and the Geo-Coded World*, Routledge, London.
- Raisz, E. (1938) *General Cartography*, McGraw-Hill, New York.
- Sparke, M. (1998) A map that roared and an original atlas: Canada, cartography, and narration of nation. *Annals of the Association of American Cartographer*, **88**(3), 463–495. (Excerpted as Chapter 5.7.)
- Warf, B. and Arias, S. (2008) *The Spatial Turn: Interdisciplinary Perspectives*, Routledge, London.
- Winichakul, T. (1994) *Siam Mapped: A History of the Geobody of a Nation*, University of Hawai Press, Honolulu, HI. (Excerpted as Chapter 5.4.)
- Wood, D. (1992) *The Power of Maps*, Guilford, New York.
- Wood, D. (2010) *Rethinking the Power of Maps*, Guilford, New York.

SECTION ONE

Conceptualising Mapping

COPYRIGHTED MATERIAL

Chapter 1.1

Introductory Essay: Conceptualising Mapping

Rob Kitchin, Martin Dodge and Chris Perkins

It is all too easy to think of maps and cartography in a naïve, commonsense way – a map is a two-dimensional, spatial representation of the Earth, and cartography is the creation of such maps. If only it were so simple! The history of cartography reveals a rich engagement with different philosophies of science. As a result, the scholarly understanding of what maps are and the processes, procedures and protocols through which they are created and deployed has changed enormously over time. This has never been more so than over the past fifty years as academics from a broad range of disciplines have focused on conceptualising mapping.

In this section, a broad range of readings are excerpted; they span more than 60 years and have sought to advance how maps and cartography are conceptualised. What unites the thirteen chapters is the common pursuit of rethinking the ontological and epistemological bases of cartography. That is, they each put forward a novel way to conceptualise maps as artefacts and mapping practices, each moving beyond commonsense and naïve understandings to set out a viewpoint that they believe provides a more robust and useful theoretical underpinning. At the time of writing, none of the approaches detailed in the readings is considered hegemonic amongst academics. For some, this conceptual plurality is considered a hindrance because it means that there is no generally accepted way to understand maps, thus introducing uncertainty and undermining the credibility of cartography as a 'science', with well-grounded theory and

prevailing methods and an established canon. For others, it is a sign of intellectual fervent that has reinvigorated what was arguably becoming an increasingly technical discipline that was progressing largely through technological advances and methodological refinement rather than more philosophical ideas (Crampton 2003).

According to Harvey (1989, excerpted as Chapter 5.2) the first major change in how maps were conceptualised, in a Western context, occurred in the Renaissance through the application of Enlightenment thought and technologies to cartography. Prior to this, knowledge of the geographical world was parochial and documented from multiple perspectives to no formal, universal standards. Areas that were unknown were literally off the map, filled with religious cosmology and figures of myth and imagination. Maps were understood more as reminders – as spatial stories – than as scientific representations of the world based on surveyed data (Ingold 2000). Replacing the piecemeal frameworks of medieval cartography was the adoption of a single, universal system of measuring and representing the world that used perspectivism and Cartesian rationality, underpinned by notions of objectivity, functionality and ordering. This perspective understood space and time in quite different ways to the medieval period, and the resulting transformation in cartographic thinking made the world knowable, navigable and claimable, for a privileged and powerful few, through a shared framework of scientific endeavour that was translatable across peoples and places (see Latour 1992,

excerpted as Chapter 1.9). In the centuries that followed, the science of cartography – wherein maps provided objective, truthful representations of the spatial relations of the world – was refined through improvements in surveying and mapping techniques and the development of a set of established principles of design and aesthetics.

Attempts to historicise the nature of (Western) cartography through categorisations of map forms and taxonomies based on purpose, often implicitly use the notion of evolutionary advancement driven by technological development. The end result narrates cartography as a beneficent pursuit, characterised by improving accuracy and comprehensiveness with each new generation of map. Examples of this conceptualisation are quite common in the literature, such that '[t]he normative history of cartography is a ceaseless massaging of this theme of noble progress' (Harley 1989: 4). For example, Crone (1953: xi) notes, '[t]he history of cartography is largely that of the increase of accuracy with which . . . elements of distance and direction are determined and the comprehensiveness of the maps' content.' Histories of cartography in this tradition were histories of techniques, with an underlying assumption that rational decision making leads to the adoption of improved technologies and institutional practices when they become available. The result is that cartographic development can be conceptualised as a 'tree' with evolving complexity of mapping (Figure 1.1.1).

The apparent 'naturalness' of this account belies the politics behind the progressive conceptualisation of the development of cartography from a primitive past to

the sophisticated present (Edney 1993, excerpted as Chapter 1.10). The underlying goal of this kind of construction of cartographic history – achievable only through a carefully selective reading of extant map artefacts – is to 'prove' that the objectivity of *current* scientific methods is predestined. It grants an important legitimisation to the positivist notion of contemporary professional cartography as the 'best' and provides a discursive mechanism to dismiss maps that do not fit 'acceptable' scientific standards. Scientific worldviews see technological progress almost like a force of nature that somehow operates outside society and beyond the political concerns of money, power and ego. The way one approaches cartographic history is therefore worthy of consideration, as it is at the heart of the recent political theorisation of cartography and directly informs our understanding of the nature of the map and contemporary positivistic epistemological foundations of cartography (including much of the work on online mapping and GIScience).

This Cartesian rationality still predominates the general understanding of maps. However, over the last half century or so there has been a fresh engagement between cartography and philosophy that has either sought to refine and advance scientific cartography, or has sought to challenge and reconfigure its ontological and epistemological underpinnings. The first of these engagements by Ernest Raisz (1938) and Arthur Robinson and colleagues (Robinson 1952; Robinson and Petchenik 1976; excerpted as Chapters 1.3 and 3.3) sought to provide formalised rules and principles of map design, drawing on a range of disciplines such as mathematics and

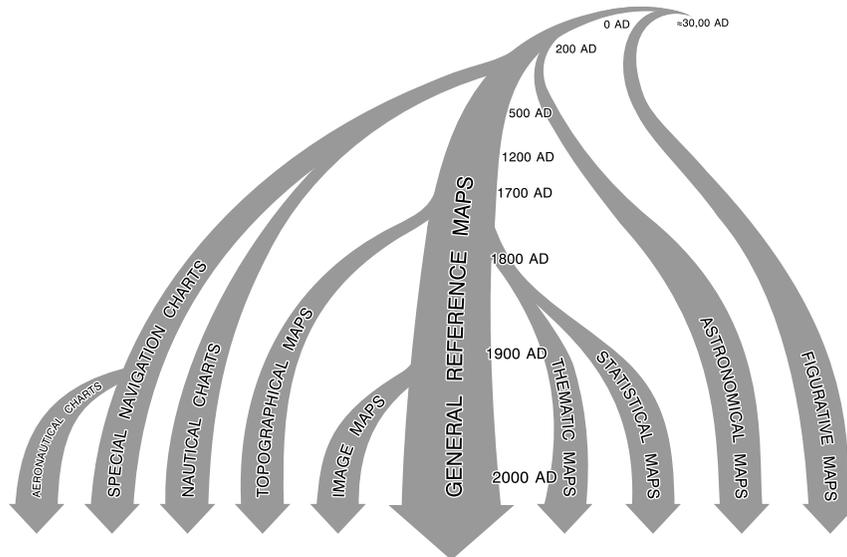


Figure 1.1.1 Cartography explained as a 'story of progress'. Mapping is shown to evolve over time with the development of increasingly complex forms. (Source: Redrawn from Robinson *et al.* 1995: 22.)

psychology. These approaches tended to see cartography as a blend of art and science, but where the aesthetic elements could be formalised through colour and visual theory and thus made more effective. Robinson, in particular, sought to advance a communications model approach that drew inspiration from psychology and information theory, and which sought to foreground the fact that maps serve as communication devices. As such, cartographic research needed to be framed around the goal of effective communication, wherein maps capture and portray information in a way that an idealised map reader could easily and intuitively analyse and interpret. Here, the aims of the cartographer were framed normatively to reduce error in the representation and to increase map effectiveness through appropriate design. Research thus sought to improve map designs by carefully controlled scientific experimentation that focused on issues such as: how to represent location, direction and distance; how to select information; how best to symbolise these data; how to combine these symbols together; and what kind of map to publish.

Robinson's ideas were extended and developed by others such as Joel Morrison (1976, excerpted as Chapter 1.4) and Christopher Board (1981, excerpted as Chapter 1.6). These scholars sought to forward the communication model as the new dominant paradigm for academic cartographic research, producing increasingly sophisticated conceptual models of how maps worked. Links were forged with cognitive scientists and behavioural geographers interested in cognitive mapping and how maps were learnt and people used and interpreted maps (Downs and Stea 1973; Lloyd 2000; excerpted are Chapters 4.3 and 4.9). Morrison, for example, envisaged cartography developing as 'communications science' with researchers working to understand the structural transmission of mapped information from data collection through to map use – including the science of data classification, generalisation, symbolisation and so on – in order to develop more effective cartographic syntax and grammar suitable for a given situation. By the early 1980s, Board was able to provide an overview of different information flow models, which by that stage had started to engage with the ideas of semiology.

Whilst Anglo-American cartographic researchers were examining the communicative properties of maps from a functional and pragmatic perspective, French academics were examining the utility of semiology – the study of signs and symbols – for map design. This work was based principally on the influential work of Jacques Bertin (1967) on graphic design (the 1983 English translation is excerpted as Chapter 1.2). Bertin set out what he saw as key properties of graphic systems and a set of rules for their presentation founded on a semiological analysis of the presentation of information in graphic form. These rules

were influential in informing map design, and the science of semiology became an important touchstone for Anglo-American researchers in the late 1980s and early 1990s seeking to move beyond the limitations of the communications model. A semiological approach elided the divide between mapmaker and reader that underpinned communications theory. Technological advances were already exposing this divide as a fiction by the late 1980s and communication theory also failed to recognise the social and cultural aspects of mapping. A representational theory of cartography offered a more useful and practical grounding for scientific research. For example, MacEachren (1995) sought to blend cognitive and semiotic approaches, along with visualisation theory, to provide a coherent picture of how maps worked. Such work became influential amongst those working in GIScience and geovisualisation seeking ways to scientifically conceptualise and improve mapping within increasingly exploratory and interactive media. This new representational orthodoxy is borne out in research agendas of the geovisualisation community (MacEachren and Kraak 1997, excerpted as Chapter 1.11) and in emerging work in multimedia cartography (Cartwright 1999, excerpted as Chapter 2.11).

A different challenge to cartographic theory emerged at the end of the 1980s, however. The communications model and its subsequent offshoots are still framed within a scientific rationality that sought to produce objective, 'value free', accurate representations. In a landmark paper, Brian Harley (1989, excerpted as Chapter 1.8) argued that, far from presenting the truth of the world, maps were social constructions presenting subjective versions of reality. Harley was by then a well-established scholar in the history of cartography, able to draw on a wealth of empirical material. He built on an emerging critical tradition, dating back to research from John Kirkland Wright in the 1940s (Wright 1942, excerpted as Chapter 4.2). Although there is a long history of analysis examining the role of maps in society, and the part they have played as cultural artefacts in political and economic development of nations and empires, including the 'persuasive cartography' of propaganda maps (Tyner 1974), Harley changed the tenor of such analysis by focusing on the power of maps and the power invested in maps. Drawing on the ideas of Foucault and Derrida, Harley argued that maps are a product of the society that creates them, and regardless of how much they seek to represent 'the truth', they inherently capture the interests of those that produced them and work to further those interests. Such a position recognises that in the production of maps many subjective decisions are made about what to include, how the map will look, and what the map is seeking to communicate. As such, maps are the product of power and they exert power, and therefore in any theory or history of cartography it is necessary to be mindful of the historical

and social context in which mapping has been employed and to deconstruct the power relations inherent within its production. His goal was to 'subvert the apparent naturalness and innocence of the world shown in maps both past and present' (Harley 1992: 232).

Harley's ideas opened the floodgates for a re-imagining of cartography and maps, and a re-examination of works that had been suggesting such a reorientation but had, at that time, received little attention. Shortly after its publication other significant pieces by Pickles (1991, excerpted as Chapter 5.3) and Wood (1992) were published. Wood's book, *The Power of Maps*, drew together and extended a number of his works published over the previous decade (see the 1986 Wood and Fels' article 'Designs on Signs', excerpted as Chapter 1.7). Wood, drawing on linguistic structural thought and Barthean semiotics sought to detail how maps worked as a complex sign system, through their design and structuring, to produce certain versions of truth in order further the interests of those that created them. 'No sooner are maps acknowledged as social constructions than their contingent, their conditional, their . . . arbitrary character is unveiled. Suddenly the things represented by these lines are open to discussion and debate, the interest in them of owner, state, insurance company is made apparent' (Wood 1992: 19). Maps from this perspective are always political, working to (re)produce certain ways of thinking about the world. Rather than drawing on semiology, Pickles (1991, excerpted as Chapter 5.3) argued for a hermeneutic reading of maps that understood them as texts. As with Harley and Wood, Pickles argued that maps are inherently political and to fully understand them requires a method of deconstruction that seeks to provide a multifaceted, contextual and interpretive reading of their meaning and purpose. This includes examining the context in which a map is made, how the map is framed by other texts, the situation into which it is projected, and the world of the reader.

These new ways of thinking opened up fresh opportunities for historians of cartography. For example, Edney (1993, excerpted as Chapter 1.10) argued that historical accounts of cartography and the role of maps in society up to that point were largely empiricist and teleological, charting out in linear ways the progression of cartographic knowledge and method. He points out that the development of cartography has not followed such a well-defined path, but rather has been contingent on the social, cultural and technical relations at particular times and places. In so doing, Edney argues for a non-progressivist and non-presentist history; that is, a history that is sensitive to the science, politics and technologies of map production at the time of their creation and which does not judge maps *vis-à-vis* the standards and norms of the present day. In other words, maps from the past are seen as no better or worse than now, but rather are simply different and can be

thought of a rhizomatic tangle of mapping modes rather than a family tree of cartographic progress.

While this body of critical writing on cartography has been forceful (and sometimes polemical), it is not without its problems, inconsistencies and critics (Andrews 2001; Belyea 1992; Godlewska 1989). Keates (1996: 194), for example, undermines the methodological agenda of Harley and 'critical cartography' paradigm more broadly, commenting: 'The question of how the production and publication of maps is controlled in any society is an interesting and important issue, but it is not illuminated by uttering clichés about hidden agendas.'

Ideologically-driven cartographic deconstruction can also be seen as unproductive in that it offers little in the way of an agenda for changing or improving mapmaking practice other than exalting cartographers to be aware of the power of the maps they create (Crampton 2001; Kitchin and Dodge 2007, excerpted as Chapter 1.14). Indeed, the influence of new critical theoretical approaches within academic discourse is in marked contrast to the work of the large majority of cartographers in practitioner communities, in university drawing offices, in government departments and in commercial design firms. The profession has largely ignored this new epistemological line as it offers little of value for those tasked with real world demands of making effective maps and they have little reason to contribute to wider theoretical debates; as Petchenik (1985, quoted in Keates 1996: 190) wryly notes: 'Practising cartographers tend to be so busy earning their living by making and selling maps that there isn't 'free' time or energy left to be expended on research and writing projects: as a consequence, their point of view is not accurately reflected in the literature.' Equally disappointing in terms of effecting progressive change in the nature of cartography is the failure of human geographers and other social scientists to make critical use of maps in their research. Accordingly, Perkins (2004: 385) laments: '[d]espite arguments for a social cartography employing visualisations to destabilise accepted categories most geographers prefer to write theory rather than employ critical visualisation'.

Other accusations levelled at critical cartography include: a misreading and superficial misuse of social theories; of simply jumping on the cultural 'bandwagon' of deconstruction; and the foisting of a false 'conspiracy' view of cartography through biased sampling of empirical evidence (Black 1997). 'In contrast to Harley's experience of cartographers', Godlewska (1989: 97) notes, 'I have found that most have a subtle and critical sense of the nature of their work and do not perceive cartography as an objective form of knowledge'. Of course, the critical scholars themselves had an agenda in their attacks on mainstream cartography, being 'propelled by an odd mixture of cynicism and idealism' (Lemann 2001).

As Crampton (2003) has noted, these new theorisations – maps as communicative models, sign systems, social constructions – whilst significantly advancing the conceptual ideas for understanding and interrogating maps, are still rooted in representational ways of thinking. As the new millennium turned, a small number of cartographic theorists started to rethink maps from a post-representational perspective. In particular, they drew on post-structural theory that was becoming popular across the social sciences and humanities at the time. From a post-representational perspective, the questions applied to cartography change from what maps represent and mean, to focus more on how maps work and their effects on the world (Corner 1999, excerpted in Chapter 1.12). Further, the separation of map and territory – a fundamental tenet of representational cartography – becomes problematised.

For example, the landscape architect, James Corner, following Baudrillard, argued that a territory does not precede a map, but that space becomes territory through bounding practices that include mapping (see also Winichakul's 1994 work on Siam, excerpted as Chapter 5.4). And since places are planned and built on the basis of maps, so space is itself a representation of the map; maps and territories are co-constructed. In other words, he demonstrates that space is constituted through mapping practices, amongst many others, so that maps are not a reflection of the world, but a re-creation of it; mapping activates territory. Corner thus develops an understanding of maps as unfolding potential; as conduits of possibilities. He thus argues for a processual understanding of maps, wherein mapping is seen to consist of multiple processes of action that have effects in the world. In so doing, maps endlessly remake territory through their employment. The power of maps then is not simply in their capturing and presentation of the world, but in their use and suggestion of new possibilities. For him, cartographic research thus needs to focus on mapping actions and mapping effects and not solely on map design, map meaning and the reading of maps.

Del Casino and Hanna (2005, excerpted as Chapter 1.13) similarly draw on poststructural theory, and in particular the idea of performativity, to argue that maps, far from being fixed, immutable objects, are in a constant state of becoming; that they are 'mobile subjects' whose meaning emerges through socio-spatial practices of use that mutate with context and is contested and intertextual. They argue that the map is not fixed at the moment of initial construction but is in constant flux, where each encounter with the map produces new meanings and engagements with the world, the product of the map as representation and material object, the knowledges the subject brings to bear on it and the space it represents, and the context of its use. Maps are produced and used through practices, and maps and space co-produce each other through their creation

and use. They thus argue that maps can only be fully understood by examining the complex, recursive interplay between map and the world.

Likewise, Kitchin and Dodge (2007, excerpted as Chapter 1.14) have argued for a shift in cartographic theory from seeking to understand the nature of maps (an ontological project) to examining the practices of mapping (an ontogenetic project). This move denies maps any ontological security as representations of reality and instead posits that they are always in the state of becoming, bought into being through embodied, social and technical practices to solve relational problems such as plotting, planning, navigating and so on. Maps then emerge through a mix of creative, reflexive, playful, tactile and habitual practices; affected by the knowledge, experience and skill of the individual to perform mappings and apply them in the world, and shaped by the context of its reproduction. The map does not re-present the world or make the world, it is a co-constitutive production between inscription, individual and world; a production that is constantly in motion, always seeking to appear ontologically secure. Of course, this process very often succeeds – hence the real utility of cartography in all kinds of contexts for all manner of pragmatic tasks. Conceiving of maps in this way reveals that they are never fully formed but emerge in process and are mutable. Such a re-imagining of maps changes in quite fundamental ways the focus of cartography, moving it away from notions of accuracy, design, aesthetics and power, to emphasising the complex, contingent interactions between cartographers, users, maps and the world.

As is clear from this discussion, how maps are presently conceptualised varies substantially between scholars. Understanding maps and conceiving of how to undertake cartographic research is anything but straightforward. Mapping is a lot more complex than it at first seems; the theory, history and principles of map creation and use are contested. And so it should be. The engagement between cartography and philosophy is enormously important because it sets the parameters through which maps are thought about, produced and used; it shapes our assumptions about how we can know and measure the world, how maps work, their techniques, technologies, aesthetics, ethics, ideology, what they tell us about the world, the work they do in the world, and our capacity as humans to engage in mapping (Kitchin, Perkins and Dodge 2009). There are many fundamental ontological, epistemological, ideological and methodological questions that need further examination and debate, and yet more questions that have not yet received sufficient attention. This is the challenge for cartographers going forward, to continue to debate, refine and extend our theories during the search for a conceptual framework that adequately accounts for the nature of maps and the work that they do in the world.

References

- Andrews, J.H. (2001) Meaning, knowledge and power in the map philosophy of J.B. Harley, in *The New Nature of Maps: Essays in the History of Cartography* (ed. P. Laxton), The Johns Hopkins University Press, Baltimore, MD, pp. 1–32.
- Belyea, B. (1992) Images of power: Derrida/Foucault/Harley. *Cartographica*, **29** (2), 1–9.
- Bertin, J. (1967) *Sémiologie Graphique*, Gauthier-Villars, Paris.
- Black, J. (1997) *Maps and Politics*, Reaktion Books, London.
- Board, C. (1981) Cartographic communication. *Cartographica*, **18** (2), 42–78. (Excerpted as Chapter 1.6.)
- Cartwright, W. (1999) Extending the map metaphor using web-delivered multimedia. *International Journal of Geographical Information Science*, **13** (4), 335–353. (Excerpted as Chapter 2.11.)
- Corner, J. (1999) The agency of mapping: speculation, critique and invention, in *Mappings* (ed. D. Cosgrove), Reaktion Books, London, pp. 213–252. (Excerpted as Chapter 112.)
- Crampton, J.W. (2001) Maps as social constructions: power, communication and visualization. *Progress in Human Geography*, **25** (2), 235–252.
- Crampton, J. (2003) *The Political Mapping of Cyberspace*, Edinburgh University Press, Edinburgh.
- Crone, G.R. (1953) *Maps and Their Makers: An Introduction to the History of Cartography*, Hutchinson's University Library, London.
- Del Casino, V.J. and Hanna, S.P. (2005) Beyond the 'binaries': a methodological intervention for interrogating maps as representational practices. *ACME: An International E-Journal for Critical Geographies*, **4** (1), 34–56. (Excerpted as Chapter 1.13.)
- Downs, R.M. and Stea, D. (1973) Cognitive maps and spatial behavior: process and products, in *Image and Environment: Cognitive Mapping and Spatial Behavior* (eds R.M. Downs and D. Stea), Aldine Press, Chicago, pp. 8–26. (Excerpted as Chapter 4.3.)
- Edney, M.H. (1993) Cartography without 'progress': reinterpreting the nature and historical development of map-making. *Cartographica*, **30** (2/3), 54–68. (Excerpted as Chapter 1.10.)
- Godlewska, A. (1989) To surf or to swim? Responses to J.B. Harley's article 'Deconstructing the map'. *Cartographica*, **26** (3/4), 96–98.
- Harley, J.B. (1989) Deconstructing the map. *Cartographica*, **26** (2), 1–20. (Excerpted as Chapter 1.8.)
- Harley, J.B. (1992) Deconstructing the map, in *Writing Worlds: Discourse, Text and Metaphor in the Representation of Landscape* (eds T.J. Barnes and S. Duncan), Routledge, London, pp. 231–247.
- Harvey, D. (1989) *The Condition of Postmodernity*, Blackwell, London. (Excerpted as Chapter 5.2.)
- Ingold, T. (2000) *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*, Routledge, London.
- Keates, J.S. (1996) *Understand Maps*, 2nd edn, Addison Wesley, Harlow, England.
- Kitchin, R. and Dodge, M. (2007) Rethinking maps. *Progress in Human Geography*, **31** (3), 331–344. (Excerpted as Chapter 1.14.)
- Kitchin, R., Perkins, C. and Dodge, M. (2009) Thinking about maps, in *Rethinking Maps: New Frontiers in Cartographic Theory* (eds M. Dodge, R. Kitchin and C. Perkins), Routledge, London, pp. 1–25.
- Latour, B. (1992) Drawing things together, in *Representation in Scientific Practice* (eds M. Lynch and S. Woolgar), MIT Press, Cambridge, MA, pp. 19–68. (Excerpted as Chapter 1.9.)
- Lemann, N. (2001) Atlas shrugs: the new geography argues that maps have shaped the world, *The New Yorker*, 9 April.
- Lloyd, R. (2000) Cognitive maps: encoding and decoding information, in *Cognitive Mapping: Past, Present and Future* (eds R. Kitchin and S. Freundschuh), Routledge, London, pp. 84–107. (Excerpted as Chapter 4.9.)
- MacEachren, A.M. (1995) *How Maps Work: Representation, Visualization and Design*, Guilford, New York.
- MacEachren, A.M. and Kraak, M.J. (1997) Exploratory cartographic visualization: advancing the agenda. *Computers & Geosciences*, **23** (4), 335–343. (Excerpted as Chapter 1.11.)
- Morrison, J.L. (1976) The science of cartography and its essential processes. *International Yearbook of Cartography*, **16**, 84–97. (Excerpted as Chapter 1.4.)
- Perkins, C. (2004) Cartography: cultures of mapping, power in practice. *Progress in Human Geography*, **28**, 381–339.
- Pickles, J. (1991) Texts, hermeneutics and propaganda maps, in *Writing Worlds: Discourse, Text and Metaphor in the Representation of Landscape* (eds T.J. Barnes and J.T. Duncan), Routledge, London, pp. 193–230. (Excerpted as Chapter 5.3.)
- Raisz, E. (1938) *General Cartography*, McGraw-Hill, New York.
- Robinson, A.H. (1952) *The Look of Maps*, University of Wisconsin Press, Madison, WI. (Excerpted as Chapter 3.3.)
- Robinson, A.H. and Petchenik, B.B. (1976) *The Nature of Maps*, University of Chicago Press, Chicago. (Excerpted as Chapter 1.3.)
- Robinson, A.H., Morrison, J.L., Muehrcke, P.C. *et al.* (1995) *Elements of Cartography*, 6th edn, John Wiley & Sons, Inc., New York.
- Tyner, J. (1974) *Persuasive Cartography*, University of California Press, Los Angeles.
- Winichakul, T. (1994) *Siam Mapped: A History of the Geobody of a Nation*, University of Hawai Press, Honolulu, HI. (Excerpted as Chapter 5.4.)
- Wood, D. (1992) *The Power of Maps*, Guilford, New York.
- Wood, D. and Fels, J. (1986) Designs on signs/myth and meaning in maps. *Cartographica*, **23** (3), 54–103. (Excerpted as Chapter 1.7.)
- Wright, J.K. (1942) Map makers are human: comments on the subjective in maps. *Geographical Review*, **32** (4), 527–544. (Excerpted as Chapter 4.2.)

The Map Reader

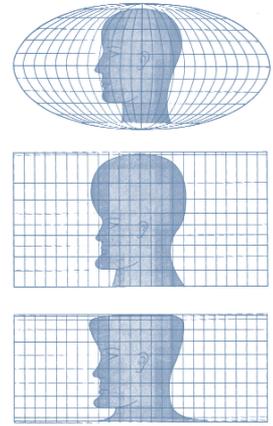
Theories of Mapping Practice and Cartographic Representation

Editors:

Martin Dodge, *University of Manchester*

Rob Kitchin, *National University of Ireland, Maynooth*

Chris Perkins, *University of Manchester*



The Map Reader brings together, for the first time, classic and hard-to-find articles on mapping. Providing a wide-ranging and coherent edited compendium of key scholarly writing about the changing nature of cartography over the last half century. The editorial selection of fifty-five theoretical and thought provoking texts demonstrates how cartography works as a powerful representational form and explores how different mapping practices have been conceptualised in particular scholarly contexts.

Themes covered include paradigms, politics, people, aesthetics and technology. Original interpretative essays set the literature into intellectual context within these themes. Excerpts are drawn from leading scholars and researchers in a range of cognate fields including: Cartography, Geography, Anthropology, Architecture, Engineering, Computer Science and Graphic Design.

***The Map Reader* provides a new unique single source reference to the essential literature in the cartographic field:**

- ◆ more than fifty specially edited excerpts from key, classic articles and monographs
- ◆ critical introductions by experienced experts in the field
- ◆ focused coverage of key mapping practices, techniques and ideas
- ◆ a valuable resource suited to a broad spectrum of researchers and students working in cartography and GIScience, geography, the social sciences, media studies, and visual arts
- ◆ full page colour illustrations of significant maps as provocative visual 'think-pieces'
- ◆ fully indexed, clearly structured and accessible ways into a fast changing field of cartographic research

Co-edited by Martin Dodge and Chris Perkins, Senior Lecturers in Human Geography in the School of Environment and Development, the University of Manchester; and Rob Kitchin, Professor of Geography, National University of Ireland, Maynooth.

The photograph shows view of Barden Moor, Yorkshire Dales. Courtesy of www.nationalparks.gov.uk

Cover design by Dan Jubb

 **WILEY-BLACKWELL**
www.wiley.com/wiley-blackwell

ISBN 978-0-470-74283-9



9 780470 742839