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# Deconstructing the Map

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**Abstract**

The paper draws on ideas in postmodern thinking to redefine the nature of maps as representations of power. The traditional rules of cartography – long rooted in a scientific epistemology of the map as an objective form of knowledge – will firstly be reviewed as an object of deconstruction. Secondly, a deconstructionist argument will explore the textuality of maps, including their metaphorical and rhetorical nature. Thirdly, the paper will examine the dimensions both of external power and of the omnipresence of internal power in the cartographic representation of place.

*A map says to you, 'Read me carefully, follow me closely, doubt me not.' It says, 'I am the earth in the palm of your hand. Without me, you are alone and lost.'*

*And indeed you are. Were all the maps in this world destroyed and vanished under the direction of some malevolent hand, each man would be blind again, each city be made a stranger to the next, each landmark become a meaningless signpost pointing to nothing.*

*Yet, looking at it, feeling it, running a finger along its lines, it is a cold thing, a map, humourless and dull, born of calipers and a draughtsman's board. That coastline there, that ragged scrawl of scarlet ink, shows neither sand nor sea nor rock; it speaks of no mariner, blundering full sail in wakeless seas, to bequeath, on sheepskin or a slab of wood, a priceless scribble to posterity. This brown blot that marks a mountain has, for the casual eye, no other significance, though twenty men, or ten, or only one, may have squandered life to climb it. Here is a valley, there a swamp, and there a desert; and here is a river that some curious and courageous soul, like a pencil in the hand of God, first traced with bleeding feet. (Beryl Markham, 1983)*

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The pace of conceptual exploration in the history of cartography – searching for alternative ways of understanding maps – is slow. Some would say that its achievements are largely cosmetic. Applying conceptions of literary history to the history of cartography, it would appear that we are still working largely in either a 'premodern' or a 'modern' rather than in a 'postmodern' climate of thought.[2] A list of individual explorations would, it is true, contain some that sound impressive. Our students can now be directed to writings that draw on the ideas of information theory, linguistics, semiotics, structuralism, phenomenology, developmental theory, hermeneutics, iconology, Marxism and ideology. We can point to the names in our footnotes of (amongst others) Cassirer, Gombrich, Piaget, Panofsky, Kuhn, Barthes and Eco. Yet despite these symptoms of change, we are still, willingly or unwillingly, the prisoners of our own past.

My basic argument in this essay is that we should encourage an epistemological shift in the way we interpret the nature of cartography. For historians of cartography, I believe a major roadblock to understanding is that we still accept uncritically the broad consensus, with relatively few dissenting voices, of what *cartographers* tell us maps are supposed to be. In particular, we often tend to work from the premise that mappers engage in an unquestionably 'scientific' or 'objective' form of knowledge creation. Of course, cartographers believe they have to say this to remain credible but historians do not have that obligation. It is better for us to begin from the premise that cartography is seldom what cartographers say it is.

As they embrace computer-assisted methods and Geographical Information Systems, the scientistic rhetoric of map makers is becoming more strident. The 'culture of technics' is everywhere rampant. We are told that the journal now named *The American Cartographer* will become *Cartography and Geographical Information Systems.* Or, in a strangely ambivalent gesture toward the nature of maps, the British Cartographic Society proposes that there should be two definitions of cartography, 'one for professional cartographers and the other for the public at large'. A definition 'for use in communication with the general public' would be 'Cartography is the art, science and technology of making maps"; that for 'practicing cartographers' would be 'Cartography is the science and technology of analysing and interpreting geographic relationships, and communicating the results by means of maps'.[3] Many may find it surprising that 'art' no longer exists in 'professional' cartography. In the present context, however, these signs of ontological schizophrenia can also be read as reflecting an urgent need to rethink the nature of maps from different perspectives. The question arises as to whether the notion of a progressive science is a myth partly created by cartographers in the course of their own professional development. I suggest that it has been accepted too uncritically by a wider public and by other scholars who work with maps.[4] For those concerned with the history of maps it is especially timely that we challenge the cartographer's assumptions. Indeed, if

[2] For these distinctions see Eagleton (1983); for an account situated closer to the direct concerns of cartography see Ferraris (1988: 12–24).

[3] Reported in *Cartographic Perspectives: Bulletin of the North American Cartographic Information Society,* 1989, **1**(1): 4.

[4] Others have made the same point: see, especially, the trenchantly deconstructive turn of the essay by Wood and Fels (1986).

the history of cartography is to grow as an interdisciplinary subject amongst the humanities and social sciences, new ideas are essential.

The question becomes how do we as historians of cartography escape from the normative models of cartography? How do we allow new ideas to come in? How do we begin to write a cartographic history as genuinely revisionist as Louis Marin's (1988) 'The King and his Geometer' (in the context of a seventeenth century map of Paris) or William Boelhower's (1984) 'The Culture of the Map' (in the context of sixteenth century world maps showing America for the first time; pages 41–53) (see also Boelhower, 1988)? These are two studies informed by postmodernism. In this essay I also adopt a strategy aimed at the deconstruction of the map.

The notion of deconstruction[5] is also a password for the postmodern enterprise. Deconstructionist strategies can now be found not only in philosophy but also in localized disciplines, especially in literature, and in other subjects such as architecture, planning (Knox, 1988; Gregory, 1987) and, more recently, geography (Dear, 1988). I shall specifically use a deconstructionist tactic to break the assumed link between reality and representation which has dominated cartographic thinking, has led it in the pathway of 'normal science' since the Enlightenment, and has also provided a ready-made and 'taken for granted' epistemology for the history of cartography. The objective is to suggest that an alternative epistemology, rooted in social theory rather than in scientific positivism, is more appropriate to the history of cartography. It will be shown that even 'scientific' maps are a product not only of 'the rules of the order of geometry and reason' but also of the 'norms and values of the order of social . . . tradition' (Marin, 1988: 173). Our task is to search for the social forces that have structured cartography and to locate the presence of power – and its effects – in all map knowledge.

The ideas in this particular essay owe most to writings by Foucault and Derrida. My approach is deliberately eclectic because in some respects the theoretical positions of these two authors are incompatible. Foucault anchors texts in socio-political realities and constructs systems for organizing knowledge of the kind that Derrida loves to dismantle.[6] But even so, by combining different ideas on a new terrain, it may be possible to devise a scheme of social theory with which we can begin to interrogate the hidden agendas of cartography. Such a scheme offers no 'solution' to an historical interpretation of the cartographic record, nor a precise method or set of techniques, but as a broad strategy it may help to locate some of the fundamental forces that have driven map making in both European and non-European societies. From Foucault's writings, the key revelation has been the omnipresence of power in all knowledge, even though that power is invisible or implied, including the particular knowledge encoded in maps and atlases. Derrida's notion of the rhetoricity of all texts has been no less a challenge.[7] It demands a search for metaphor and rhetoric in maps where previously scholars had

[5] Deriving from the writings of Jacques Derrida: for exposition see the translator's Preface Derrida (1976: ix-lxxxvii); Norris (1982, 1987).

[6] As an introduction I have found to be particularly useful Said (1978); also the chapters 'Jacques Derrida' by Hoy (1985) and 'Michel Foucault' by Philp (1985).

[7] On the other hand, I do not adopt some of the more extreme positions attributed to Derrida. For example, it would be unacceptable for a social history of cartography to adopt the view that nothing lies outside the text.

found only measurement and topography. Its central question is reminiscent of Korzybski's (1948: 58, 247, 498, 750–751) much older dictum 'The map is not the territory' but deconstruction goes further to bring the issue of how the map represents place into much sharper focus.

Deconstruction urges us to read between the lines of the map – 'in the margins of the text' – and through its tropes to discover the silences and contradictions that challenge the apparent honesty of the image. We begin to learn that cartographic facts are only facts within a specific cultural perspective. We start to understand how maps, like art, far from being 'a transparent opening to the world', are but 'a particular human way . . . of looking at the world' (Blocker, 1979: 43).

In pursuing this strategy I shall develop three threads of argument. Firstly, I shall examine the discourse of cartography in the light of some of Foucault's ideas about the play of rules within discursive formations. Secondly, drawing on one of Derrida's central positions, I will examine the textuality of maps and, in particular, their rhetorical dimension. Thirdly, returning to Foucault, I will consider how maps work in society as a form of power-knowledge.

## 16.1 The Rules of Cartography

One of Foucault's primary units of analysis is the discourse. A discourse has been defined as 'a system of possibility for knowledge' (Philp, 1985: 69). Foucault's method was to ask, it has been said,

> *what rules permit certain statements to be made; what rules order these statements; what rules permit us to identify some statements as true and others as false; what rules allow the construction of a map, model or classificatory system . . . what rules are revealed when an object of discourse is modified or transformed . . . Whenever sets of rules of these kinds can be identified, we are dealing with a discursive formation or discourse. (Philp, 1985: 69)*

The key question for us then becomes, 'What type of rules have governed the development of cartography?' Cartography I define as a body of theoretical and practical knowledge that map makers employ to construct maps as a distinct mode of visual representation. The question is, of course, historically specific: the rules of cartography vary in different societies. Here I refer particularly to two distinctive sets of rules that underlie and dominate the history of Western cartography since the seventeenth century.[8] One set may be defined as governing the technical production of maps and is made explicit in the cartographic treatises and writings of the period.[9]

[8] 'Western cartography' is defined as the types of survey mapping first fully visible in the European Enlightenment and which then spread to other areas of the world as part of European overseas expansion.

[9] The history of these technical rules has been extensively written about in the history of cartography, though not in terms of their social implications nor in Foucault's sense of discourse: see, for example, the later chapters of Crone (1953, 1978).

The other set relates to the cultural production of maps. These must be understood in a broader historical context than either scientific procedure or technique. They are, moreover, rules that are usually ignored by cartographers so that they form a hidden aspect of their discourse.

The first set of cartographic rules can thus be defined in terms of a scientific epistemology. From at least the seventeenth century onward, European map makers and map users have increasingly promoted a standard scientific model of knowledge and cognition. The object of mapping is to produce a 'correct' relational model of the terrain. Its assumptions are that the objects in the world to be mapped are real and objective, and that they enjoy an existence independent of the cartographer; that their reality can be expressed in mathematical terms; that systematic observation and measurement offer the only route to cartographic truth; and that this truth can be independently verified.[10] The procedures of both surveying and map construction came to share strategies similar to those in science in general: cartography also documents a history of more precise instrumentation and measurement; increasingly complex classifications of its knowledge and a proliferation of signs for its representation; and, especially from the nineteenth century onward, the growth of institutions and a 'professional' literature designed to monitor the application and propagation of the rules (for evidence see Wolter, 1975a, 1975b). Moreover, although cartographers have continued to pay lip service to the 'art and science' of map making,[11] art, as we have seen, is being edged off the map. It has often been accorded a cosmetic rather than a central role in cartographic communication (Morris, 1982). Even philosophers of visual communication – such as Arnheim (1986: 194–202), Eco (1976: 245–257), Gombrich (1975) and Goodman (1968: 170–171; 228–230) – have tended to categorise maps as a type of congruent diagram – as analogs, models, or 'equivalents' creating a similitude of reality – and, in essence, different from art or painting. A 'scientific' cartography (so it was believed) would be untainted by social factors. Even today many cartographers are puzzled by the suggestion that political and sociological theory could throw light on their practices. They will probably shudder at the mention of deconstruction.

The acceptance of the map as 'a mirror of nature' (to employ Richard Rorty's (1979) phrase) also results in a number of other characteristics of cartographic discourse even where these are not made explicit. Most striking is the belief in progress: that, by the application of science, ever more precise representations of reality can be produced. The methods of cartography have delivered a 'true, probable, progressive, or highly confirmed knowledge' (Laudan, 1977: 2). This mimetic bondage has led to a tendency not only to look down on the maps of the past (with a dismissive scientific chauvinism) but also to regard the maps of other non-Western or early cultures (where the rules of map making were different) as inferior to European maps.[12] Similarly, the

[10] For a discussion of these characteristics in relation to science in general see Campbell (1973); also Woolgar (1988, especially Chapter 1), and Hooykaas (1987) for a more specifically historical context.

[11] See, for example, the definition of cartography in Meynen (1973: 1,3): or, more recently, Wallis and Robinson (1987: xi), where cartography 'includes the study of maps as scientific documents and works of art'.

[12] For a discussion of these tendencies in the historiography of early maps see Harley (1988a, 1988b).

primary effect of the scientific rules was to create a 'standard' – a successful version of 'normal science'[13] – that enabled cartographers to build a wall around their citadel of the 'true' map. Its central bastions were measurement and standardization and beyond there was a 'not cartography' land where lurked an army of inaccurate, heretical, subjective, valuative and ideologically distorted images. Cartographers developed a 'sense of the other' in relation to nonconforming maps. Even maps such as those produced by journalists, where different rules and modes of expressiveness might be appropriate, are evaluated by many cartographers according to standards of 'objectivity', 'accuracy' and 'truthfulness'. In this respect, the underlying attitude of many cartographers is revealed in a recent book of essays on *Cartographie dans les medias* (Gauthier, 1988). One of its reviewers has noted how many authors attempt to exorcise from

> *the realm of cartography any graphic representation that is not a simple planimetric image, and to then classify all other maps as 'decorative graphics masquerading as maps' where the 'bending of cartographic rules' has taken place . . . most journalistic maps are flawed because they are inaccurate, misleading or biased. (Andrews, 1989)*

Or, in Britain, we are told, there was set up a 'Media Map Watch' in 1984. 'Several hundred interested members [of cartographic and geographic societies] submitted several thousand maps and diagrams for analysis that revealed [according to the rules] numerous common deficiencies, errors and inaccuracies along with misleading standards' (Balchin, 1988: 33–48). In this example of cartographic vigilantism the 'ethic of accuracy' is being defended with some ideological fervour. The language of exclusion is that of a string of 'natural' opposites: 'true and false'; 'objective and subjective'; 'literal and symbolic' and so on. The best maps are those with an 'authoritative image of self-evident factuality' (Lupton, 1986: 53).

In cases where the scientific rules are invisible in the map we can still trace their play in attempting to normalize the discourse. The cartographer's 'black box' has to be defended and its social origins suppressed. The hysteria amongst leading cartographers at the popularity of the Peters' projection,[14] or the recent expressions of piety amongst Western European and North American map makers following the Russian admission that they had falsified their topographic maps to confuse the enemy, give us a glimpse of how the game is played according to these rules. What are we to make of the 1988 newspaper headlines such as 'Russians Caught Mapping' (*Ottawa Citizen*), 'Soviets Admit Map Paranoia' (*Wisconsin Journal*) or (in the *New York Times*) 'In West, Mapmakers Hail "Truth"' and 'The rascals finally realized the truth and were able to tell

[13] In the much-debated sense of Kuhn (1962). For challenges and discussions, see Lakatos and Musgrave (1970).

[14] Arno Peters (1983) *The New Cartography* (New York: Friendship Press). The responses included Loxton (1985), *Cartographic Journal* (1985), Robinson (1985), Porter and Voxland (1986) and, for a more balanced view, Snyder (1988).

it, a geographer at the Defense Department said'?[15] The implication is that Western maps are value free. According to the spokesman, our maps are not ideological documents, and the condemnation of Russian falsification is as much an echo of Cold War rhetoric as it is a credible cartographic criticism.

This timely example also serves to introduce my second contention, that the scientific rules of mapping are, in any case, influenced by a quite different set of rules, those governing the cultural production of the map. To discover these rules, we have to read between the lines of technical procedures or of the map's topographic content. They are related to values, such as those of ethnicity, politics, religion or social class, and they are also embedded in the map producing society at large. Cartographic discourse operates a double silence toward this aspect of the possibilities for map knowledge. In the map itself, social structures are often disguised beneath an abstract, instrumental space, or incarcerated in the coordinates of computer mapping. And in the technical literature of cartography they are also ignored, notwithstanding the fact that they may be as important as surveying, compilation or design in producing the statements that cartography makes about the world and its landscapes. Such an interplay of social and technical rules is a universal feature of cartographic knowledge. In maps it produces the 'order' of its features and the 'hierarchies of its practices' (Foucault, 1973: xx). In Foucault's sense the rules may enable us to define an *episteme* and to trace an archaeology of that knowledge through time (Foucault, 1973: xxii).

Two examples of how such rules are manifest in maps will be given to illustrate their force in structuring cartographic representation. The first is the well-known adherence to the 'rule of ethnocentricity' in the construction of world maps. This has led many historical societies to place their own territories at the centre of their cosmographies or world maps. While it may be dangerous to assume universality, and there are exceptions, such a rule is as evident in cosmic diagrams of pre-Columbian North American Indians as it is in the maps of ancient Babylonia, Greece or China, or in the mediaeval maps of the Islamic world or Christian Europe.[16] Yet what is also significant in applying Foucault's critique of knowledge to cartography is that the history of the ethnocentric rule does not march in step with the 'scientific' history of map making. Thus, the scientific Renaissance in Europe gave modern cartography coordinate systems, Euclid, scale maps and accurate measurement, but it also helped to confirm a new myth of Europe's ideological centrality through projections such as those of Mercator (Peters, 1983). Or again, in our own century, a tradition of the exclusivity of America was enhanced before World War II by placing it in its own hemisphere ('our hemisphere') on the world map.[17] Throughout the history of cartography ideological

[15] 'Soviet aide admits maps were faked for 50 years' and 'In West, mapmakers hail truth', *The New York Times*, 3 September 1988; 'Soviets admit map paranoia', *Wisconsin State Journal* Saturday, 3 September 1988; 'Soviets caught mapping!' *The Ottawa Citizen* Saturday, 3 September 1988; 'Faked Russian maps gave the Germans fits', *The New York Times*, 11 September 1988; and 'National geo-glasnost?' *The Christian Science Monitor*, 12 September 1988.

[16] Many commentators have noted this tendency. See, for example, Tuan (1974), Chapter 4, 'Ethnocentrism, symmetry, and space', 30–44. On ancient and medieval European maps in this respect see Harley and Woodward (1987). On the maps of Islam and China see Harley and Woodward (1992).

[17] For the wider history of this 'rule' see Whitaker (1954); also Whittemore Boggs (1945), Henrikson (1975).

'Holy Lands' are frequently centred on maps. Such centricity, a kind of 'subliminal geometry' (Harley, 1988b: 289–290), adds geopolitical force and meaning to representation. It is also arguable that such world maps have, in turn, helped to codify, to legitimate and to promote the world views which are prevalent in different periods and places.[18]

A second example is how the 'rules of the social order' appear to insert themselves into the smaller codes and spaces of cartographic transcription. The history of European cartography since the seventeenth century provides many examples of this tendency. Pick a printed or manuscript map from the drawer almost at random and what stands out is the unfailing way its text is as much a commentary on the social structure of a particular nation or place as it is on its topography. The map maker is often as busy recording the contours of feudalism, the shape of a religious hierarchy or the steps in the tiers of social class,[19] as the topography of the physical and human landscape.

Why maps can be so convincing in this respect is that the rules of society and the rules of measurement are mutually reinforcing in the same image. Writing of the map of Paris, surveyed in 1652 by Jacques Gomboust, the King's engineer, Louis Marin points to 'this sly strategy of simulation-dissimulation':

> *The knowledge and science of representation, to demonstrate the truth that its subject declares plainly, flow nonetheless in a social and political hierarchy. The proofs of its 'theoretical' truth had to be given, they are the recognizable signs; but the economy of these signs in their disposition on the cartographic plane no longer obeys the rules of the order of geometry and reason but, rather, the norms and values of the order of social and religious tradition. Only the churches and important mansions benefit from natural signs and from the visible rapport they maintain with what they represent. Townhouses and private homes, precisely because they are private and not public, will have the right only to the general and common representation of an arbitrary and institutional sign, the poorest, the most elementary (but maybe, by virtue of this, principal) of geometric elements; the point identically reproduced in bulk. (Marin, 1988: 173)*

Once again, much like 'the rule of ethnocentrism', this hierarchicalization of space is not a conscious act of cartographic representation. Rather, it is taken for granted in a society that the place of the king is more important than the place of a lesser baron, that a castle is more important than a peasant's house, that the town of an archbishop is more important than that of a minor prelate, or that the estate of a landed gentleman is more worthy of emphasis than that of a plain farmer. Cartography deploys its vocabulary accordingly so that it embodies a systematic social inequality. The distinctions of class

[18] The link between actual mapping, as the principal source of our world vision, and *mentalité* still has to be thoroughly explored. For some contemporary links see Henrikson (1987). For a report on research that attempts to measure this influence in the cognitive maps of individuals in different areas of the world see Saarinen (1987).

[19] For a general discussion see Harley (1988a, 1988b: 292–294); in my essay on 'Power and legitimation in the English geographical atlases of the eighteenth century' (Harley, 1997), these 'rules of the social order' are discussed in the maps of one historical society.

and power are engineered, reified and legitimated in the map by means of cartographic signs. The rule seems to be 'the more powerful, the more prominent'. To those who have strength in the world shall be added strength in the map. Using all the tricks of the cartographic trade – size of symbol, thickness of line, height of lettering, hatching and shading, the addition of colour – we can trace this reinforcing tendency in innumerable European maps. We can begin to see how maps, like art, become a mechanism 'for defining social relationships, sustaining social rules and strengthening social values' (Geertz, 1983: 99).

In the case of both these examples of rules, the point I am making is that the rules operate both within and beyond the orderly structures of classification and measurement. They go beyond the stated purposes of cartography. Much of the power of the map, as a representation of social geography, is that it operates behind a masque of a seemingly neutral science. It hides and denies its social dimensions at the same time as it legitimates. Yet whichever way we look at it the rules of society will surface. They have ensured that maps are at least as much an image of the social order as they are a measurement of the phenomenal world of objects.

## 16.2 Deconstruction and the Cartographic Text

To move inward from the question of cartographic rules – the social context within which map knowledge is fashioned – we have to turn to the cartographic text itself. The word 'text' is deliberately chosen. It is now generally accepted that the model of text can have a much wider application than to literary texts alone. To non-book texts such as musical compositions and architectural structures we can confidently add the graphic texts we call maps.[20] It has been said that 'what constitutes a text is not the presence of linguistic elements but the act of construction' so that maps, as 'constructions employing a conventional sign system' (McKenzie, 1986: 35), become texts. With Barthes we could say they 'presuppose a signifying consciousness' that it is our business to uncover (Barthes, 1973: 110). 'Text' is certainly a better metaphor for maps than the mirror of nature. Maps are a cultural text. By accepting their textuality we are able to embrace a number of different interpretative possibilities. Instead of just the transparency of clarity we can discover the pregnancy of the opaque. To fact we can add myth, and instead of innocence we may expect duplicity. Rather than working with a formal science of communication, or even a sequence of loosely related technical processes, our concern is redirected to a history and anthropology of the image, and we learn to recognize the narrative qualities of cartographic representation[21] as well as its claim to provide a synchronous picture of the world. All this, moreover, is likely to lead to a

[20] This is cogently argued by McKenzie (1986: especially 34–39), where he discusses the textuality of maps. Robinson and Petchenik (1976: 43), reject the metaphor of map as language: they state that 'the two systems, map and language are essentially incompatible', basing their belief on the familiar grounds of literality that language is verbal, that images do not have a vocabulary, that there is no grammar, and the temporal sequence of a syntax is lacking. Rather than isolating the differences, however, it now seems more constructive to stress the *similarities* between map and text.

[21] The narrative qualities of cartography are introduced by Wood (1987).

rejection of the neutrality of maps, as we come to define their intentions rather than the literal face of representation, and as we begin to accept the social consequences of cartographic practices. I am not suggesting that the direction of textual enquiry offers a simple set of techniques for reading either contemporary or historical maps. In some cases we will have to conclude that there are many aspects of their meaning that are undecidable.[22]

Deconstruction, as discourse analysis in general, demands a closer and deeper reading of the cartographic text than has been the general practice in either cartography or the history of cartography. It may be regarded as a search for alternative meanings. 'To deconstruct', it is argued,

> *is to reinscribe and resituate meanings, events and objects within broader movements and structures; it is, so to speak, to reverse the imposing tapestry in order to expose in all its unglamorously dishevelled tangle the threads constituting the well-heeled image it presents to the world. (Eagleton, 1986: 80, quoted in Soja, 1989: 12)*

The published map also has a 'well-heeled image' and our reading has to go beyond the assessment of geometric accuracy, beyond the fixing of location and beyond the recognition of topographical patterns and geographies. Such interpretation begins from the premise that the map text may contain 'unperceived contradictions or duplicitous tensions' (Hoy, 1985: 540) that undermine the surface layer of standard objectivity. Maps are slippery customers. In the words of W.J.T. Mitchell, writing of languages and images in general, we may need to regard them more as 'enigmas, problems to be explained, prison houses which lock the understanding away from the world'. We should regard them 'as the sort of sign that presents a deceptive appearance of naturalness and transparency concealing an opaque, distorting, arbitrary mechanism of representation' (Mitchell, 1986: 8). Throughout the history of modern cartography in the West, for example, there have been numerous instances of where maps have been falsified, of where they have been censored or kept secret, or of where they have surreptitiously contradicted the rules of their proclaimed scientific status (Harley, 1988c).

As in the case of these practices, map deconstruction would focus on aspects of maps that many interpreters have glossed over. Writing of 'Derrida's most typical deconstructive moves', Christopher Norris (1987: 19) notes that

> *deconstruction is the vigilant seeking-out of those 'aporias', blindspots or moments of self-contradiction where a text involuntarily betrays the tension between rhetoric and logic, between what it manifestly* means to say *and what it is nonetheless* constrained to mean. *To 'deconstruct' a piece of writing is therefore to operate a kind of strategic reversal, seizing on precisely those unregarded details (casual metaphors, footnotes, incidental turns of argument) which are always, and necessarily, passed over by interpreters of a more orthodox persuasion. For it is here, in the margins of the*

[22] The undecidability of textual meaning is a central position in Derrida's criticism of philosophy: see the discussion by Hoy (1985: 54–58).

*text – the 'margins', that is, as defined by a powerful normative consensus – that deconstruction discovers those same unsettling forces at work.*

A good example of how we could deconstruct an early map – by beginning with what have hitherto been regarded as its 'casual metaphors' and 'footnotes' – is provided by recent studies reinterpreting the status of decorative art on the European maps of the seventeenth and eighteenth centuries. Rather than being inconsequential marginalia, the emblems in cartouches and decorative title pages can be regarded as *bask to the way* they *convey their* cultural meaning,[23] and they help to demolish the claim of cartography to produce an impartial graphic science. But the possibility of such a revision is not limited to historic 'decorative' maps. A recent essay by Wood and Fels (1986) on the Official State Highway Map of North Carolina indicates a much wider applicability for a deconstructive strategy by beginning in the 'margins' of the contemporary map. They also treat the map as a text and, drawing on the ideas of Roland Barthes (1973: 103–159) of myth as a semiological system, develop a forceful social critique of cartography which though structuralist in its approach is deconstructionist in its outcome. They begin, deliberately, with the margins of the map, or rather with the subject matter that is printed on its verso:

*One side is taken up by an inventory of North Carolina points of interest – illustrated with photos of, among other things, a scimitar horned oryx (resident in the state zoo), a Cherokee woman making beaded jewelry, a ski lift, a sand dune (but no cities) – a ferry schedule, a message of welcome from the then governor, and a motorist's prayer ('Our heavenly Father, we ask this day a particular blessing as we take the wheel of our car. . .'). On the other side, North Carolina, hemmed in by the margins of pale yellow South Carolinas and Virginias, Georgias and Tennessees, and washed by a pale blue Atlantic, is represented as a meshwork of red, black, blue, green and yellow lines on a white background, thickened at the intersections by roundels of black or blotches of pink. . . .To the left of. . . [the] title is a sketch of the fluttering state flag. To the right is a sketch of a cardinal (state bird) on a branch of flowering dogwood (state flower) surmounting a buzzing honey bee arrested in midflight (state insect). (Wood and Fels, 1986: 54)*

What is the meaning of these emblems? Are they merely a pleasant ornament for the traveller or can they inform us about the social production of such state highway maps? A deconstructionist might claim that such meanings are undecidable, but it is also clear that the State Highway Map of North Carolina is making other dialogical assertions behind its masque of innocence and transparency. I am not suggesting that these elements hinder the traveller getting from point A to B, but that there is a second text within the map. No map is devoid of an intertextual dimension and, in this case too, the discovery of intertextuality enables us to scan the image as more than a neutral picture of a road network.[24] Its 'users' are not only the ordinary motorists but also the State of

[23] Most recently, Clarke (1988); also Harley (1984; 1988b: especially 296–299; 1984; 1985).

[24] On the intertextuality of all discourses – with pointers for the analysis of cartography – see Todorov (1984: 60–74); also Bakhtin (1981). I owe these references to Dr. Cordell Yee, History of Cartography Project, University of Wisconsin at Madison.

North Carolina that has appropriated its publication (distributed in millions of copies) as a promotional device. The map has become an instrument of State policy and an instrument of sovereignty (Wood and Fels, 1986: 63). At the same time, it is more than an affirmation of North Carolina's dominion over its territory. It also constructs a mythic geography, a landscape full of 'points of interest', with incantations of loyalty to state emblems and to the values of a Christian piety. The hierarchy of towns and the visually dominating highways that connect them have become the legitimate natural order of the world. The map finally insists 'that roads really *are* what North Carolina's all about' (Wood and Fels, 1986: 60). The map idolises our love affair with the automobile. The myth is believable.

A cartographer's stock response to this deconstructionist argument might well be to cry 'foul'. The argument would run like this: 'Well after all it's a state highway map. It's designed to be at once popular and useful. We expect it to exaggerate the road network and to show points of interest to motorists. It is a derived rather than a basic map'.[25] It is not a scientific map. The appeal to the ultimate scientific map is always the cartographers' last line of defence when seeking to deny the social relations that permeate their technology.

It is at this point that Derrida's strategy can help us to extend such an interpretation to all maps, scientific or non-scientific, basic or derived. Just as in the deconstruction of philosophy Derrida was able to show 'how the supposedly literal level is intensively metaphorical' (Hoy, 1985: 44), so too we can show how cartographic 'fact' is also symbol. In 'plain' scientific maps, science itself becomes the metaphor. Such maps contain a dimension of 'symbolic realism' which is no less a statement of political authority and control than a coat-of-arms or a portrait of a queen placed at the head of an earlier decorative map. The metaphor has changed. The map has attempted to purge itself of ambiguity and alternative possibility.[26] Accuracy and austerity of design are now the new talismans of authority culminating in our own age with computer mapping. We can trace this process very clearly in the history of Enlightenment mapping in Europe. The topography as shown in maps, increasingly detailed and planimetrically accurate, has become a metaphor for a utilitarian philosophy and its will to power. Cartography inscribes this cultural model upon the paper and we can examine it in many scales and types of maps. Precision of instrument and technique merely serves to reinforce the image, with its encrustation of myth, as a selective perspective on the world. Thus maps of local estates in the European *ancien regime*, though derived from instrumental survey, were a metaphor for a social structure based on landed property. County and regional maps, though founded on scientific triangulation, were an articulation of local values and rights. Maps of the European states, though constructed along arcs of the meridian, served still as a symbolic shorthand for a complex of nationalist ideas. And world maps, though increasingly drawn on mathematically

[25] The 'basic' and 'derived' division, like that of 'general purpose' and 'thematic', is one of the axiomatic distinctions often drawn by cartographers. Deconstruction, however, by making explicit the play of forces such as intention, myth, silence and power in maps, will tend to dissolve such an opposition for interpretive purposes except in the very practical sense that one map is often copied or derived from another.

[26] I derive this thought from Eagleton (1983: 135), writing of the ideas of Roland Barthes.

defined projections, nevertheless gave a spiralling twist to the manifest destiny of European overseas conquest and colonisation. (These examples are from Harley, 1988b: 300.) In each of these examples we can trace the contours of metaphor in a scientific map. This in turn enhances our understanding of how the text works as an instrument operating on social reality. In deconstructionist theory the play of rhetoric is closely linked to that of metaphor. In concluding this section of the essay I will argue that notwithstanding 'scientific' cartography's efforts to convert culture into nature, and to 'naturalize' social reality (Eagleton, 1983: 135–136), it has remained an inherently rhetorical discourse. Another of the lessons of Derrida's criticism of philosophy is 'that modes of rhetorical analysis, hitherto applied mainly to literary texts, are in fact indispensable for reading *any* kind of discourse' (Norris, 1982: 19). There is nothing revolutionary in the idea that cartography is an art of persuasive communication. It is now commonplace to write about the rhetoric of the human sciences in the classical sense of the word rhetoric (McCloskey, 1985; Nelson *et al.*, 1987). Even cartographers – as well as their critics – are beginning to allude to the notion of a rhetorical cartography but what is still lacking is a rhetorical close-reading of maps.[27]

The issue in contention is not whether some maps are rhetorical, or whether other maps are partly rhetorical, but the extent to which rhetoric is a universal aspect of all cartographic texts. Thus, for some cartographers the notion of 'rhetoric' would remain a pejorative term. It would be an 'empty rhetoric' which was unsubstantiated in the scientific content of a map. 'Rhetoric' would be used to refer to the 'excesses' of propaganda mapping or advertising cartography or an attempt would be made to confine it to an 'artistic' or aesthetic element in maps as opposed to their scientific core. My position is to accept that rhetoric is part of the way all texts work and that all maps are rhetorical texts. Again we ought to dismantle the arbitrary dualism between 'propaganda' and 'true', and between modes of 'artistic' and 'scientific' representation as they are found in maps. All maps strive to frame their message in the context of an audience. All maps state an argument about the world and they are propositional in nature. All maps employ the common devices of rhetoric such as invocations of authority (*especially* in 'scientific' maps[28]) and appeals to a potential readership through the use of colours, decoration, typography, dedications or written justifications of their method.[29] Rhetoric may be concealed but it is always present, for there is no description without performance.

The steps in making a map – selection, omission, simplification, classification, the creation of hierarchies and 'symbolization' – are all inherently rhetorical. In their intentions as much as in their applications they signify subjective human purposes

[27] For a notable exception see Wood and Fels (1986). An interesting example of cartographic rhetoric in historical atlases is described in Goffart (1988).

[28] In Wood and Fels (1986: 99), the examples are given for topographical maps of reliability diagrams, multiple referencing grids, and magnetic error diagrams; on thematic maps 'the trappings of F-scaled symbols and psychometrically divided greys' are a similar form of rhetorical assertion.

[29] The 'letter' incorporated into Gomboust's map of Paris, as discussed by Marin (1988: 169–174), provides an apposite example.

rather than reciprocating the workings of some 'fundamental law of cartographic generalization'.[30] Indeed, the freedom of rhetorical manoeuvre in cartography is considerable: the map maker merely omits those features of the world that lie outside the purpose of the immediate discourse. There have been no limits to the varieties of maps that have been developed historically in response to different purposes of argument, aiming at different rhetorical goals, and embodying different assumptions about what is sound cartographic practice. The style of maps is neither fixed in the past nor is it today. It has been said that 'The rhetorical code appropriates to its map the style most advantageous to the myth it intends to propagate' (Wood and Fels, 1986: 71). Instead of thinking in terms of rhetorical versus non-rhetorical maps, it may be more helpful to think in terms of a theory of cartographic rhetoric which accommodated this fundamental aspect of representation in all types of cartographic text. Thus, I am not concerned to privilege rhetoric over science, but to dissolve the illusory distinction between the two in reading the social purposes as well as the content of maps.

## 16.3 Maps and the Exercise of Power

For the final stage in the argument I return to Foucault. In doing so I am mindful of Foucault's criticism of Derrida that he attempted 'to restrict interpretation to a purely syntactic and textual level' (Hoy, 1985: 60; for further discussion see Norris, 1987: 213–220), a world where political realities no longer exist. Foucault, on the other hand, sought to uncover 'the social practices that the text itself both reflects and employs' and to 'reconstruct the technical and material framework in which it arose' (Hoy, 1985: 60). Though deconstruction is useful in helping to change the epistemological climate, and in encouraging a rhetorical reading of cartography, my final concern is with its social and political dimensions, and with understanding how the map works in society as a form of power-knowledge. This closes the circle to a context-dependent form of cartographic history.

We have already seen how it is possible to view cartography as a discourse – a system which provides a set of rules for the representation of knowledge embodied in the images we define as maps and atlases. It is not difficult to find for maps – especially those produced and manipulated by the state – a niche in the 'power/knowledge matrix of the modern order' (Philp, 1985: 76). Especially where maps are ordered by government (or are derived from such maps), it can be seen how they extend and reinforce the legal statutes, territorial imperatives and values stemming from the exercise of political power. Yet to understand how power works through cartographic discourse and the effects of that power in society further dissection is needed. A simple model of domination and subversion is inadequate and I propose to draw a distinction between *external* and *internal* power in cartography. This ultimately derives from Foucault's ideas about power-knowledge, but this particular formulation is owed to Joseph Rouse's (1987) recent book on *Knowledge and Power,* where a theory of the internal power of science is, in turn, based on his reading of Foucault.

[30] This is still given credence in some textbooks: see, for example, Robinson *et al.* (1984: 127).

The most familiar sense of power in cartography is that of power *external* to maps and mapping. This serves to link maps to the centres of political power. Power is exerted *on* cartography. Behind most cartographers there is a patron; in innumerable instances the makers of cartographic texts were responding to external needs. Power is also exercised *with* cartography. Monarchs, ministers, state institutions, the Church, have all initiated programmes of mapping for their own ends. In modern Western society maps quickly became crucial to the maintenance of state power – to its boundaries, to its commerce, to its internal administration, to control of populations and to its military strength. Mapping soon became the business of the state: cartography is early nationalized. The state guards its knowledge carefully: maps have been universally censored, kept secret and falsified. In all these cases maps are linked to what Foucault called the exercise of 'juridical power' (Foucault, 1980: 88; see also Rouse, 1987: 209–210). The map becomes a 'juridical territory': it facilitates surveillance and control. Maps are still used to control our lives in innumerable ways. A map-less society, though we may take the map for granted, would now be politically unimaginable. All this is power *with* the help of maps. It is an external power, often centralized and exercised bureaucratically, imposed from above and manifest in particular acts or phases of deliberate policy.

I come now to the important distinction. What is also central to the effects of maps in society is what may be defined as the power *internal* to cartography. The focus of enquiry therefore shifts from the place of cartography in a juridical system of power to the political effects of what cartographers do when they make maps. Cartographers manufacture power: they create a spatial panopticon. It is a power embedded in the map text. We can talk about the power of the map just as we already talk about the power of the word or about the book as a force for change. In this sense maps have politics. (I adapt this idea from Winner, 1980: 121–136.) It is a power that intersects and is embedded in knowledge. It is universal. Foucault writes of

> *The omnipresence of power: not because it has the privilege of consolidating everything under its invincible unity, but because it is produced from one moment to the next, at every point, or rather in every relation from one point to another. Power is everywhere; not because it embraces everything, but because it comes from everywhere. (Foucault, 1978: 93)*

Power comes from the map and it traverses the way maps are made. The key to this internal power is thus cartographic process. By this I mean the way maps are compiled and the categories of information selected; the way they are generalized, a set of rules for the abstraction of the landscape; the way the elements in the landscape are formed into hierarchies; and the way various rhetorical styles that also reproduce power are employed to represent the landscape. To catalogue the world is to appropriate it,[31] so that all these technical processes represent acts of control over its image which extend beyond the professed uses of cartography. The world is disciplined. The world is normalized. We

[31] Adapting Barthes (1980: 27), who writes much like Foucault, 'To catalogue is not merely to ascertain, as it appears at first glance, but also to appropriate'. Quoted in Wood and Fels (1986: 72).

are prisoners in its spatial matrix. For cartography as much as other forms of knowledge, 'All social action flows through boundaries determined by classification schemes' (Darnton, 1984: 192–193). An analogy is to what happens to data in the cartographer's workshop and what happens to people in the disciplinary institutions – prisons, schools, armies, factories – described by Foucault (Rouse, 1987: 213–226): in both cases a process of normalization occurs. Or, similarly, just as in factories we standardize our manufactured goods, so in our cartographic workshops we standardize our images of the world. Just as in the laboratory we create formulaic understandings of the processes of the physical world, so, too, in the map, nature is reduced to a graphic formula.[32] The power of the map maker was not generally exercised over individuals but over the knowledge of the world made available to people in general. Yet this is not consciously done and it transcends the simple categories of 'intended' and 'unintended' altogether. I am not suggesting that power is deliberately or centrally exercised. It is a local knowledge which at the same time is universal. It usually passes unnoticed. The map is a silent arbiter of power.

What have been the effects of this 'logic of the map' upon human consciousness, if I may adapt Marshall McLuhan's (1962) phrase ('logic of print')? Like him I believe we have to consider for maps the effects of abstraction, uniformity, repeatability and visuality in shaping mental structures, and in imparting a sense of the places of the world. It is the disjunction between those senses of place, and many alternative visions of what the world is, or what it might be, that has raised questions about the effect of cartography in society. Thus, Theodore Roszak (1972: 410) writes:

> *The cartographers are talking about their maps and not landscapes. That is why what they say frequently becomes so paradoxical when translated into ordinary language. When they forget the difference between map and landscape – and when they permit or persuade us to forget that difference – all sorts of liabilities ensue.*[33]

One of these 'liabilities' is that maps, by articulating the world in mass-produced and stereotyped images, express an embedded social vision. Consider, for example, the fact that the ordinary road atlas is amongst the best selling paperback books in the United States (McNally, 1987: 389–392) and then try to gauge how this may have affected ordinary Americans' perception of their country. What sort of an image of America do these atlases promote? On the one hand, there is a patina of gross simplicity. Once off the interstate highways the landscape dissolves into a generic world of bare essentials that invites no exploration. Context is stripped away and place is no longer important. On the other hand, the maps reveal the ambivalence of all stereotypes. Their silences are also inscribed on the page: where, on the page, is the variety of nature, where is the

[32] Indeed, cartographers like to promote this metaphor of what they do: read, for example, Monmonier and Schnell (1988: 15), 'Geography thrives on cartographic generalization. The map is to the geographer what the microscope is to the microbiologist, for the ability to shrink the earth and generalize about it . . . The microbiologist must choose a suitable objective lens, and the geographer must select a map scale appropriate to both the phenomenon in question and the 'regional laboratory' in which the geographer is studying it'.

[33] Roszak is using the map as a metaphor for scientific method in this argument, which again points to the widespread perception of how maps represent the world.

history of the landscape, and where is the space-time of human experience in such anonymised maps?[34]

The question has now become: do such empty images have their consequences in the way we think about the world? Because all the world is designed to look the same, is it easier to act upon it without realizing the social effects? It is in the posing of such questions that the strategies of Derrida and Foucault appear to clash. For Derrida, if meaning is undecidable so must be *pari passu*, the measurement of the force of the map as a discourse of symbolic action. In ending, I prefer to align myself with Foucault in seeing all knowledge (Rabinow, 1984: 6–7) – and hence cartography – as thoroughly enmeshed with the larger battles which constitute our world. Maps are not external to these struggles to alter power relations. The history of map use suggests that this may be so and that maps embody specific forms of power and authority. Since the Renaissance they have changed the way in which power was exercised. In colonial North America, for example, it was easy for Europeans to draw lines across the territories of Indian nations without sensing the reality of their political identity (Harley, 1988d). The map allowed them to say, 'This is mine; these are the boundaries'.[35] Similarly, in innumerable wars since the sixteenth century it has been equally easy for the generals to fight battles with coloured pins and dividers rather than sensing the slaughter of the battlefield.[36] Or again, in our own society, it is still easy for bureaucrats, developers and 'planners' to operate on the bodies of unique places without measuring the social dislocations of 'progress'. While the map is never the reality, in such ways it helps to create a different reality. Once embedded in the published text the lines on the map acquire an authority that may be hard to dislodge. Maps are authoritarian images. Without our being aware of it maps can reinforce and legitimate the status quo. Sometimes agents of change, they can equally become conservative documents. But in either case the map is never neutral. Where it seems to be neutral it is the sly 'rhetoric of neutrality'[37] that is trying to persuade us.

## 16.4 Conclusion

The interpretive act of deconstructing the map can serve three functions in a broad enquiry into the history of cartography. Firstly, it allows us to challenge the episte-

[34] This criticism is reminiscent of Barthes' (1973: 74–77) essay on 'The *Blue Guide*', where he writes of the *Guide* as 'reducing geography to the description of an uninhabited world of monuments' (we substitute 'roads'). More generally, this tendency is also the concern of Szegö (1987). See also Roszak (1972: 408), where he writes that 'We forfeit the whole value of a map if we forget that it is *not* the landscape itself or anything remotely like an exhaustive depiction of it. If we do forget, we grow rigid as a robot obeying a computer program; we lose the intelligent plasticity and intuitive judgement that every wayfarer must preserve. We may then know the map in fine detail, but our knowledge will be purely academic, inexperienced, shallow'.

[35] Boelhower (1984: 47), quoting François Wahl, 1980, 'Le désir d'espace', in *Cartes et Figures de la Terre* (Centre Georges Pompidou, Paris), 41.

[36] For a modern example relating to Vietnam see Muehrcke (1986: 394), where, however, such military examples are classified as 'abuse' rather than a normal aspect of actions with maps. The author retains 'maps mirror the world' as his central metaphor.

[37] There is a suggestive analogy to maps in the example of the railway timetable given by Kinross (1985).

mological myth (created by cartographers) of the cumulative progress of an objective science always producing better delineations of reality. Secondly, deconstructionist argument allows us to redefine the historical importance of maps. Rather than invalidating their study, it is enhanced by adding different nuances to our understanding of the power of cartographic representation as a way of building order into our world. If we can accept intertextuality then we can start to read our maps for alternative and sometimes competing discourses. Thirdly, a deconstructive turn of mind may allow map history to take a fuller place in the interdisciplinary study of text and knowledge. Intellectual strategies such as those of discourse in the Foucauldian sense, the Derridian notion of metaphor and rhetoric as inherent to scientific discourse, and the pervading concept of power-knowledge are shared by many subjects. As ways of looking at maps they are equally enriching. They are neither inimical to hermeneutic enquiry nor anti-historical in their thrust. By dismantling we build. The possibilities of discovering meaning in maps and of tracing the social mechanisms of cartographic change are enlarged. Postmodernism offers a challenge to read maps in ways that could reciprocally enrich the reading of other texts.

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## References

Andrews, S.K. (1989) Review of Cartography in the Media. *The American Cartographer*, **16**, 219–220.

Arnheim, R. (1986) The perception of maps, in *New Essays on the Psychology of Art* (ed. R. Arnheim), University of California Press, Berkeley, CA, pp. 194–202.

Bakhtin, M.M. (1981) *The Dialogic Imagination: Four Essays* (ed. M. Holquist), trans. C. Emerson and M. Holquist, University of Texas Press, Austin, TX.

Balchin, W.G.V. (1988) The media map watch in the United Kingdom, in *Cartographie dans les Médias* (ed. M. Gauthier), Presses de l'Université du Québec, Sillery, Québec, pp. 33–48.

Barthes, R. (1973) *Mythologies* (Selected and Translated from the French by Annette Lavers), Paladin, London.

Barthes, R. (1980) The Plates of the Encyclopedia, in *New Critical Essays*, Hill and Wang, New York.

Blocker, H.G. (1979) *Philosophy and Art*, Charles Scribner's Sons, New York.

Boelhower, W. (1984) *Through a Glass Darkly: Ethnic Semiosis in American Literature*, Edizioni Helvetia, Venezia.

Boelhower, W. (1988) Inventing America: A model of cartographic semiosis. *Word and Image*, **4**(2), 475–497.
Campbell, P.N. (1973) Scientific discourse. *Philosophy and Rhetoric*, **6**(1), 1–29.
Cartographic Journal (1985) The so-called Peters projection. *The Cartographic Journal*, **22**(2), 108–110.
Clarke, C.N.G. (1988) Taking possession: The cartouche as cultural text in eighteenth-century American maps. *Word and Image*, **4**(2), 455–474.
Crone, G.R. (1953) *Maps and Their Makers: An Introduction to the History of Cartography*, 1st edn, Dawson, Folkestone, Kent.
Crone, G.R. (1978) *Maps and Their Makers: An Introduction to the History of Cartography*, 5th edn, Archon Books, Hamden, CT.
Darnton, R. (1984) *The Great Cat Massacre and Other Episodes in French Cultural History*, Basic Books, New York.
Dear, M. (1988) The postmodern challenge: Reconstructing human geography. *Transactions of the Institute of British Geographers NS*, **13**, 262–274.
Derrida, J. (1976) *Of Grammatology* (trans. G.C. Spivak), The John Hopkins University Press, Baltimore, MD.
Eagleton, T. (1983) *Literary Theory: An Introduction*, University of Minnesota Press, Minneapolis, MN.
Eagleton, T. (1986) *Against the Grain*, Verso, London.
Eco, U. (1976) *A Theory of Semiotics*, Indiana University Press, Bloomington, IN.
Ferraris, M. (1988) Postmodernism and the deconstruction of modernism. *Design Issues*, **4** (1/2), 12–24.
Foucault, M. (1973) *The Order of Things: An Archaeology of the Human Sciences*, Vintage Books, New York.
Foucault, M. (1978) *The History of Sexuality: Volume I An Introduction* (trans. R. Hurley), Random House, New York.
Foucault, M. (1980) *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977* (ed. C. Gordon) (trans. C. Gordon, L. Marshall, J. Mepham and K. Sopher), Pantheon Books, New York.
Gauthier, M. (1988) *Cartographie dans les Medias*, Presses de l'Université du Québec, Québec.
Geertz, G. (1983) Art as a cultural system, in *Local Knowledge: Further Essays in Interpretive Anthropology*, Basic Books, New York.
Goffart, W. (1988) The map of the barbarian invasions: A preliminary report. *Nottingham Medieval Studies*, **32**, 49–64.
Gombrich, E. (1975) Mirror and map: Theories of pictorial representation. *Philosophical Transactions of the Royal Society of London Series B Biological Sciences*, **270**, 119–149.
Goodman, N. (1968) *Languages of Art: An Approach to a Theory of Symbols*, Bobbs-Merrill, New York.
Gregory, D. (1987) Postmodernism and the politics of social theory. *Environment and Planning D: Society and Space*, **5**, 245–248.
Harley, J.B. (1984) Meaning and ambiguity in Tudor cartography, in *English Map-Making, 1500–1650: Historical Essays* (ed. S. Tyacke), The British Library Reference Division Publications, London, pp. 22–45.
Harley, J.B. (1988a) L'histoire de la cartographie comme discourse. *Préfaces* 5 December, 70–75.
Harley, J.B. (1988b) Maps, knowledge, and power, in *The Iconography of Landscape* (eds. D. Cosgrove and S. Daniels), Cambridge University Press, Cambridge.

Harley, J.B. (1988c) Silences and secrecy: The hidden agenda of cartography in early modern Europe. *Imago Mundi*, **40**, 57–76.
Harley, J.B. (1988d) Victims of a map: New England cartography and the native Americans. Paper read at the Land of Norumbega Conference, Portland, Maine.
Harley, J.B. (1997) Power and legitimation in the English geographical atlases of the eighteenth century, in *Images of the World: The Atlas Through History* (ed. J.A. Wolter), Library of Congress, Washington, DC.
Harley, J.B. and Woodward, D. (1987) *The History of Cartography, Volume 1: Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, University of Chicago Press, Chicago.
Harley, J.B. and Woodward, D. (1992) *The History of Cartography, Volume 2: Cartography in the Traditional Islamic and Asian Societies*, University of Chicago Press, Chicago.
Henrikson, A.K. (1975) The map as an 'idea': The role of cartographic imagery during the Second World War. *The American Cartographer*, **2**(1), 19–53.
Henrikson, A.K. (1987) Frameworks for the world, in *Scholars' Guide to Washington D.C. for Cartography and Remote Sensing Imagery* (ed. R.E. Ehrenberg), Smithsonian Institution Press, Washington, DC, pp. viii–xiii.
Hoy, D. (1985) Jacques Derrida, in *The Return of Grand Theory in the Human Sciences* (ed. Q. Skinner), Cambridge University Press, Cambridge, pp. 65–82.
Hooykaas, R. (1987) The rise of modern science: when and why? *The British Journal for the History of Science*, **20**(4), 453–473.
Kinross, R. (1985) The rhetoric of neutrality. *Design lssues*, **2**(2), 18–30.
Knox, P.L. (1988) *The Design Professions and the Built Environment*, Croom Helm, London.
Korzybski, A. (1948) *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics*, 3rd edn, The International Non-Aristotelian Library, Lakeville, CT.
Kuhn, T.S. (1962) *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago.
Lakatos, I. and Musgrave, A. (1970) *Criticism and the Growth of Knowledge*, Cambridge University Press, Cambridge.
Laudan, L. (1977) *Progress and Its Problems: Toward a Theory of Scientific Growth*, University of California Press, Berkeley, CA.
Loxton, J. (1985) The Peters phenomenon. *The Cartographic Journal*, **22**(2), 106–108.
Lupton, E. (1986) Reading isotype. *Design Issues*, **3**(2), 47–58.
Marin, L. (1988) Portrait of the King, in *Theory and History of Literature 57* (trans. Marth M. Houle), University of Minnesota Press, Minneapolis, pp. 169–179.
Markham, B. (1983) *West With The Night*, North Point Press, New York.
McCloskey, D.N. (1985) *The Rhetoric of Economics*, University of Wisconsin Press, Madison, WI.
McKenzie, D.F. (1986) *Bibliography and the Sociology of Texts*, The British Library, London.
McLuhan, M. (1962) *The Gutenberg Galaxy: The Making of Typographic Man*, University of Toronto Press, Toronto.
McNally, A. (1987) You can't get there from here, with today's approach to geography. *The Professional Geographer*, **39**, 389–392.
Meynen, E. (1973) *Multilingual Dictionary of Technical Terms in Cartography, International Cartographic Association*, Franz Steiner Verlag, Wiesbaden.
Mitchell, W.J.T. (1986) *Iconology: Image, Text, Ideology*, University of Chicago Press, Chicago.
Monmonier, M. and Schnell, G.A. (1988) *Map Appreciation*, Prentice Hall, Englewood Cliffs, NJ.
Morris, J. (1982) *The Magic of Maps: The Art of Cartography*. Unpublished MA Dissertation, University of Hawaii.

Muehrcke, P.C. (1986) *Map Use: Reading, Analysis, and Interpretation*, 2nd edn, J.P. Publications, Madison, WI.
Nelson, J.S., Megill, A. and McCloskey, D.N. (1987) *The Rhetoric of the Human Sciences: Language and Argument in Scholarship and Public Affairs*, University of Wisconsin Press, Madison, WI.
Norris, C. (1982) *Deconstruction: Theory and Practice*, Methuen, London.
Norris, C. (1987) *Derrida*, Harvard University Press, Cambridge, MA.
Peters, A. (1983) *The New Cartography*, Friendship Press, New York.
Philp, M. (1985) Michel Foucault, in *The Return of Grand Theory in the Human Sciences* (ed. Q. Skinner), Cambridge University Press, Cambridge, pp. 41–64.
Porter, P. and Voxland, P. (1986) Distortion in maps: The Peters' projection and other devilments. *Focus*, **36**, 22–30.
Rabinow, P. (1984) *The Foucault Reader*, Pantheon Books, New York.
Robinson, A.H. (1985) Arno Peters and his new cartography. *American Cartographer*, **12**, 103–111.
Robinson, A.H. and Petchenik, B.B. (1984) *The Nature of Maps*, University of Chicago Press, Chicago.
Robinson, A.H., Sale, R.D., Morrison, J.L. and Muehrcke, P.C. (1984) *Elements of Cartography*, 5th edn, John Wiley & Sons, Inc., New York.
Rorty, R. (1979) *Philosophy and the Mirror of Nature*, Princeton University Press, Princeton, NJ.
Roszak, T. (1972) *Where the Wasteland Ends: Politics and Transcendence in Postindustrial Society*, Doubleday, New York.
Rouse, J. (1987) *Knowledge and Power: Toward a Political Philosophy of Science*, Cornell University Press, Ithaca, NY.
Said, E.W. (1978) The problem of textuality: Two exemplary positions. *Critical Inquiry*, **4** (4), 673–714.
Saarinen, T.F. (1987) *Centering of Mental Maps of the World*, Department of Geography and Regional Development, Tucson, AZ.
Soja, E.W. (1989) *Postmodern Geographies*, Verso, London.
Snyder, J.P. (1988) Social consciousness and world maps. *The Christian Century* 24 February, 190–192.
Szegö, J. (1987) *Human Cartography: Mapping the World of Man* (trans. T. Miller), Swedish Council for Building Research, Stockholm.
Todorov, T. (1984) *Mikhail Bakhtin: The Dialogical Principle* (trans. W. Godzich), University of Minnesota Press, Minneapolis, MN.
Tuan, Y.-F. (1974) *Topophilia: A Study of Environmental Perception, Attitudes, and Values*, Prentice-Hall, Englewood Cliffs, NJ.
Wallis, H.M. and Robinson, A.H. (1987) *Cartographical Innovations: An International Handbook of Mapping Terms to 1900*, Map Collector Publications and International Cartographic Association, Tring, Hertfordshire, UK.
Whitaker, A.P. (1954) *The Western Hemisphere Idea: Its Rise and Decline*, Cornell University Press, Ithaca, NY.
Whittemore Boggs, S. (1945) This hemisphere. *Department of State Bulletin*, **12**(306), 845–850.
Winner, L. (1980) Do artifacts have politics? *Daedalus*, **109**(1), 121–136.
Wolter, J.A. (1975a) *The Emerging Discipline of Cartography*. Unpublished PhD Dissertation, University of Minnesota.
Wolter, J.A. (1975b) Cartography – an emerging discipline. *The Canadian Cartographer*, **12** (2), 210–216.

Wood, D. (1987) Pleasure in the idea: The atlas as narrative form, in *Atlases for Schools: Design Principles and Curriculum Perspectives* (eds G.J.A. Carswell, N.M. de Leeuw and R.J.B. Waters), Cartographica, Monograph 36, pp. 24–45.

Wood, D. and Fels, J. (1986) Designs on signs/ myth and meaning in maps. *Cartographica*, **23** (3), 54–103.

Woolgar, S. (1988) *Science: The Very Idea*, Ellis Horwood, Chichester, Sussex.