

Afterword

On Mapping and Maps

Peter Hall

Peter Hall is Convenor, Design and Digital Media at Griffith University QCA. Before moving to Griffith he was senior lecturer in design at the University of Texas at Austin where he taught design theory, history, and mapping as a research method. He also taught at Yale University School of Art worked at the University of Minnesota Design Institute, where he wrote and co-edited with Janet Abrams the book *Else/Where: Mapping – New Cartographies of Networks and Territories*. He has been a contributing writer for *Metropolis* magazine since 2000 and has written widely about design in its various forms for publications including *Print*, *I.D. Magazine*, *The New York Times* and *The Guardian*.

Maps can lie, wield power and even start wars.¹ But mapping, which describes the *process* of selecting and plotting information spatially, suggests a way of looking beyond the finished artefact, thereby eluding the charges leveled against the map. In recent discourse, mapping emerges from the ashes of the imperial map in a blaze of hopeful rhetoric: it is participatory, generative, revealing, enabling, performative.² This paper will examine the historical and political baggage of the map and the potentials of mapping as an emerging concept. Building on the expansive discourse on maps and mapping in cartography, geography and history, I will focus this discussion on mapping as it has been interpreted in contemporary design, art, planning and education, drawing from some of my own experiences using mapping as a pedagogical tool in design education.

In his recent overview of mapping and geographic information systems (GIS), geographer Jeremy Crampton argues that mapping is a field of “knowledge and power relations” being pulled in several different directions.³ Deploying a compass-like diagram to vivify the argument, Crampton describes a pull on one side toward “securitization” countered by “resistances” on the other. Securitization emerges from post-war efforts to rid

cartography of any association with art and propaganda and render it “post-political” – a position that the resistance side generally finds untenable. It is characterized by an instrumentalist drive toward scientific precision, to discipline geographical knowledges and define ontologies (notably among GIS scientists), as well as control (by certification) entry into the field.

GIS in this context cannot escape the ideological genealogy of the imperial map, in that once territory is framed, surveyed, coded, represented, authorized and fixed in a medium – be it in print or more seemingly fluid interactive forms such as GIS – it becomes what Bruno Latour has called an “immutable mobile”, an instrument for preserving the meaning and truth of a scientific observation as it circulates.⁴ In the history of cartography, it is difficult to find maps that *do not* act in this way, since this is, after all, a victor’s history, of exquisitely crafted artefacts produced almost entirely by the dominant forces in every territorial conflict. Those who argue (much like the formalists of design discourse) that cartography is the pursuit of neutrality and precision, and the judge of a good or bad map has nothing to do with its political context, are logically obliged to ignore the means by which political interests are translated into – and wielded by – the supposedly neutral form of a map.

One particularly vivid illustration of how maps conceal agendas as neutral “truth” comes from an episode in the “carve up of Africa” by imperial European powers in the late 19th Century. A key actor at the Berlin conference in 1884 – in which European diplomats negotiated among themselves for portions of the African continent – was a map of Africa by cartographer Heinrich Kiepert. The map, which hung on the walls of the conference meeting room, is striking today for the uncharted void in the center; not a reflection of ground truth (there is never *nothing* there) but a projection of colonial designs and anxieties: this “huge white space” in the middle of the continent, as historian Neil Asherson put it, was thrilling and frightening because of its potential for, respectively, wealth and power – and the threat that some other power might get there first.⁵ As the subsequent scramble for Africa demonstrated, the map’s role as an instrument of power is not insignificant; it lent credibility, authority and defined a field of operations for the notorious land grab.

The resistance side of Crampton’s diagram is characterized by critical cartography (as practiced by scholars from JB Harley to Denis Wood), map art and the open source movement; millions of amateurs and novices using hitherto inaccessible mapping technologies to construct a vast “geoweb”. A 2007 article in the New York Times on such practices optimistically described the amateurization of mapping as the “collective creation of a new kind of atlas” that would be “richer and messier than any other”.⁶ One particularly resonant example is Ushahidi, an open source platform which was started in Kenya as a way of tracking post-election violence in 2007.⁷

Essentially a way to geo-locate reports sent to a website through SMS, the platform, together with its visualisation tool Crowdmap, translates, classifies and geo-references (using Google maps) reports sent, email and even voice messages (for the illiterate). In the wake of the Haitian earthquake of 2010, Ushahidi set up a Haitian crisis mapping operation through which people and organisations posted their needs, and volunteers translated and picked up geo-located requests, and reportedly helped save many lives.⁸

Compared with the traditional, fixed map, two key distinctive characteristics of a mapping like the Ushahidi project are that it is participatory and continually in flux: to print or screen-grab the map at any particular point would be to render it quickly impotent. This state of a map's *becoming* provides the underlying premise in James Corner's seminal essay on mapping in the planning arts, "The Agency of Mapping". Opening with Deleuze and Guattari's exhortation to "make a map not a tracing!" Corner positions mapping as a "collective, enabling enterprise":

In describing the "agency" of mapping, I do not mean to invoke agendas of imperialist technocracy and control but rather to suggest ways in which mapping acts may emancipate potentials, enrich experiences and diversify worlds.⁹

Corner builds a case with four themes in mapping practices that he argues are emerging in contemporary design and planning: the psychogeographic "drift" (initiated by the Situationists in the 1950s); the "layering" practiced by architects such as Peter Eisenmann in the 1980s; the "game-board," in which game rules are purposely established to enable stakeholders to negotiate complex planning decisions; and the "rhizome," which draws on Deleuze and Guattari's concept of an open ended and indeterminate growth (they use the metaphor of a burrow), to provide a context for some of Corner's own projects. The four themes have proven durable in that they have been widely explored by various practitioners over the last decade: Drifting has been adopted in any number of neo-psychogeographic projects, particularly those conducted by artists enabled by global positioning systems technology (GPS) which was made commercially available by an act of the Clinton administration in 2000. Layering describes almost literally the mode of GIS interfaces, in which territorial space can be viewed as a series of geo-coded layers revealing everything from subterranean infrastructures to voting patterns and tree coverage. Game-board can be extended as a concept to incorporate "big urban games" and similar festivals aimed at engaging a public in the use, description and activation of urban space – enabled by the internet and smart phones. Rhizome remains perhaps the most theoretical and least applied of the four themes, suggesting that as a viewpoint that "privileges actions and effects over

representation and meaning,” it is more aspirational than directional, more rhetorical than descriptive.¹⁰

Best known of all Corner’s collaborations is the High Line of New York City, a project with the architects Diller, Scofidio and Renfro to turn a 2.4 km long corridor of elevated disused rail into an urban park. The project can be said to have begun as a mapping, in the form of the evocative photographic series taken by Joel Sternfeld in the late 1990s, who trespassed onto the disused line and photographically mapped its changes over the seasons. These images galvanized interest among the art communities of the area, leading to a campaign to save the High Line and an extensive negotiation between community representatives, artists, property owners, developers and local government. This negotiatory process itself influenced the terms and field of play for the emergence of a final design. Much of Corner’s language in discussing the project also draws on the idea that the rail line might retain some of the wild, windswept, weedy character of its prior life as a disused piece of urban infrastructure. This adaptation of a “hostile environment” might be framed as a rhizomic mapping inasmuch as the forces converging on the project – self-seeding plantings, weather, ageing industrial structures, public and private interests – were in a sense given a voice or representation in the final outcome.¹¹

We should be cautious, however, of idealizing the project with the glow of Corner’s rhetoric. Mapping may be a “collective enabling activity,” but the High Line project is not quite the kind of participatory design that the essay promotes. In process, it resembles the more conventional methods of a signature architecture team working on a boutique, high profile project in Manhattan. The design implementation was quite artificially doctored, with the plants and railway sleepers ripped out in order to shore up the infrastructure, and then replanted. The poetic hint that the High Line granted agency to non-human elements (“self-seeding plantings”) to participate in the mapping-generating process does not quite hold up to scrutiny.¹²

If Corner stops short of embracing the true participatory and collective implications of mapping, Nabeel Hamdi, an Afghanistan-born architect known for his work in participatory action planning in city slums, presents a more planning-centred approach drawing from the phenomenon of emergent systems. Citing Steven Johnson’s book on emergence and his account of a Japanese scientist who trained slime mould to find its way through a maze, Hamdi makes a case for galvanizing networks of practice:

Organic systems, in nature and society, exhibit patterns – recognized in the informal cities of everywhere – where problems are solved by drawing on a variety of information from the multitude of small, relatively simple and local elements, rather than from some power elite or single brain.¹³

Mapping, as a means of identifying and visualizing such networks of activity, presents the potential to also organize them and allow them to grow, to go to scale. This is happening in the examples in Kenya and Haiti for crisis situations; it has also been explored by a consortium including the London based architecture practice Chora through “bundling” initiatives – appropriating funds conventionally reserved for large-scale renewable energy projects to help aggregate small scale urban initiatives. As Hamdi puts it, small change is achieved through the use of impulses rather than instructions.

At the same time, if we are to return to Crampton’s diagram, the language of participatory mapping is put to securitizing ends too, as a rhetorical means of concealing more conventional power structures in current professional practice and its associated technologies. Crampton notes that with participatory mapping, specifically that involving Geographic Information Systems (GIS), “academics still work with communities as the enabler” unlike the above projects where communities work for themselves. Part of the problem is that an instrumentalist agenda becomes all-encompassing in GIS discourse, to the extent that it is assumed that simply improving and enriching data will improve community participation. “Better information will help develop appropriate responses,” as one GIS scholar put it.¹⁴ In planning, GIS software platforms like CommunityViz, “designed to help people visualize, analyze, and communicate about the future of their communities” offer a dubious substitute for community engagement in the planning process. Defaults built into the software embody assumptions that reflect ideologies; methods intended to allow users to “question assumptions” turn out to provide choice on relatively trivial matters like how many people typically live in each household in the model, not whether the problem is being framed fairly or with a long-term view of the given area’s future. As one observer noted of collaborative GIS systems, “...the interface encapsulates a language, worldview, and concepts that support the system’s architecture, rather than the user’s worldview.”¹⁵

It becomes clear that a critical apparatus is necessary to dismantle and reveal the agendas implicit in both the technology and the rhetoric of participatory mapping. This is where mappings on the resistance side of Crampton’s compass – “map art” – have a crucial role to play. Any discussion of map art necessarily returns to Situationist *dérive*, which shifts attention away from the *map* as synoptic representation to *mapping* as the production of space. Participants in a *dérive* are literally drifting through an area, following the subconscious pushes and pulls of the various buildings and features of the city. Their approach is, as Guy Debord described it at the time, a “technique of rapid passage through varied ambiances...involving playful-constructive behavior and awareness of psychogeographical effects”.¹⁶ The well-known psychogeographic “maps” that Debord produced with artist

Asper Jorn by cutting up Paris street maps and drawing arrows between sections tend nowadays to draw attention away from the event that preceded them. The *dérive* was foremost a reaction to contemporary designs on the city prevailing in post-war Paris: The Corbusian “cure” for the ailing city in the 1950s, to raze the slums and separate the metropolis into regions of work, recreation and residence, connected by transportation corridors. Debord and colleagues likened such ideas to the organization of life along the lines of a concentration camp.

The rich legacy of the Situationist project can be seen in the many protest and participatory mappings that have flourished particularly with the availability of accessible geo-locating technologies and the Web. Esther Polak’s *Amsterdam Real Time* is an early example at rendering “live” maps of the city by equipping its residents with GPS units whose movements were projected on a large screen at the Waag Society for Old and New Media in Amsterdam.¹⁷ The New York-based Institute of Applied Autonomy’s more recent iSee online platform uses data collected by civil liberties and the Surveillance Camera Players to enable participants to plot pathways of least surveillance through Manhattan.

Crampton positions such protest and participatory work as that which is “trying to redress the silences and erasures of mapping representations.”¹⁸ The possibility emerges that it is at this end of the mapping spectrum that city planning is being rewritten. Christian Nold, a London-based artist and designer, for example, works with schools or community groups to make large scale collaborative mappings over periods of days or weeks with schools or communities. Deploying various technologies to assist in the mappings, including galvanic sensors to register stress levels and GPS devices to track the movements of participants, Nold also deploys analogue tools: the routes traveled by participants are reviewed and annotated with their comments or responses to questions – aimed at revealing the many layers of a city as experienced by the people who live there. The goal, drawing from the Situationist project, is to engage people in the production of space. Nold’s website states a commitment to developing “new participatory models for communal representation”. Over the course of his various projects, Nold has observed a shift in his role from artistic distance to direct involvement, leading to denser, more layered maps: “With each new map I try to take into account the character, social and political and cultural dynamics of the place as well as possible local interventions”.¹⁹ In Nold’s 10 meter Brentford Biopsy, developed over a 12 week residency with the designer Daniela Boraschi, and 200 participants, the point is not to provide actionable items but give voice to the neglected aspects of conventional urban planning:

In particular, we insist on the role of people’s sensory and emotional experiences as an essential part of all political

discussions. How each one of us ‘feels’ about each other and our environment is the foundation stone upon which any democratic decision-making has to be based.²⁰

I will now turn briefly to two projects in which I was personally involved, both efforts to redress silences and put back “on the map” those interests commonly excluded from architecture, planning and mapping procedures. The first was one of several initiatives to map Waller Creek, a largely abandoned waterway in Austin Texas. The City of Austin had begun work in 2010 on a flood water tunnel under the creek which would, it hoped, attract property development by removing prime real estate from the flood plain. Typical of this kind of massive concrete engineering imposition, little consideration had been given to the role of a vegetated riparian zone in mitigating flood risk. One research project, led by Bjorn Sletto, an activist and planning professor at the University of Texas at Austin (UT), deployed GIS and ethnographic methods to map the use of the creek by homeless communities. Subsequent endeavors, including one led by myself and community and regional planning doctoral student Lynn Osgood, with UT design students, aimed at revealing the network of actors with prior connections to the creek, such as the music venues which had sprung up due to the low rents on a flood plain, the homeless populations and the wildlife that had managed to survive despite overbuilding around the creek. Presentations were made to city officials of student research findings and proposed ways of re-invigorating the site by focusing on the design detail stage of the development. As such, the final focus was pragmatic, seeking ways to carve out public space and increase community engagement in the site, before the flurry of property developers moved in. As a teaching method, the mapping theme enabled students to think across disciplines, unconstrained by conventional boundaries: ethnographic research examining the creek’s legibility (drawing from Kevin Lynch’s *Image of the City*) led to a wayfinding proposal and experimental approach to lighting aimed at attracting people to the creek in daylight hours.

A second mapping endeavor piggybacked on an existing initiative by doctoral students in three schools at the University of Texas at Austin: Social Work, Community and Regional Planning, and Writing and Rhetoric. Named the Mart Community Project, the initiative has set out to help galvanize a fractured community in a deteriorating town in north Texas. In this case, mapping played a critical role in bringing to light the town’s street-level problems and qualities as part of a suite of activities, including a “Your Town” workshop funded by the National Endowment for the Arts. It also brought into sharp focus some of the issues addressed in this essay.

The town of Mart typifies a rural settlement beleaguered by the deprioritization of rail networks in the USA. Once a bustling cotton industry centre, Mart declined once the railroad was re-routed away

from the town and today faces litany of challenges summarized in a project report: “a deteriorating main street and downtown core; a lack of community gathering spaces to facilitate participation and social capital; a history of racial segregation and the division of the town along a color line; and a psychological and physical disconnect of community-identified sites of memory.”²¹ Along with other activities coordinated by the larger project, including theatre, art and design-related activities with Mart High School, mapping exercises aimed to engage High School students in creating cognitive maps of their own town by taking *dérives* with UT design students and then collaborating on the development of maps to display the Your Town workshop. The structure of the mapping was purposely established to highlight the distinctions between perspectives and levels of detail. An initial, fast-paced “tourist” map required the design students to visit Mart and make maps on one of five topics: empty buildings, things to do, sacred spaces, an African American cemetery, and vernacular signs. The second stage was a “bird’s eye” information visualization exercise using publicly available census data on the town. The third stage was a psychogeographic collaboration with Mart High School students, which was undoubtedly the most effective stage for bringing to light street-level perspectives, local issues and histories. The mappings became more revelatory at the Your Town workshop itself, where we conducted a cognitive mapping exercise with older residents of the town, beginning with landmarks, paths, boundaries and nodes (Lynch’s taxonomy) and adding layers of anecdotal detail (buildings lost, recollections of particular sites and features) and then proposed future additions.

Particularly striking was the impact of the refined, finished, *fixed* maps that emerged from the looser, sometimes arbitrary research efforts of the design students. Given that the students were at this point well versed in typography and layout skills, the maps almost before their eyes gained an aura of authority, which both impressed and confused non-designers in the collaborative teams. Locals wanted to know why certain buildings or details had been omitted (student research was not comprehensive) or whether data displayed was really correct. One particular third stage effort to re-engage local residents and present a project as an *unfinished* map made a bold attempt to unsettle the finality of the map in this regard: A map of “black hubs” from the town’s history – gathering spots for the African American community – focused on Bacy’s, a former barbershop now marked by a derelict wall. Perturbed by the seemingly unilateral and fixed representation mode of the map, the students added blank sheets inviting residents at the Your Town workshop to annotate or add their memories of the place. One local resident’s recollection brought the history into rich detail: “Mr Bacy was a good man. He would let you have credit long as you pay him. I remember going in there getting soda, candy, mostly anything.

Hair cuts, eyebrow arch and shoe shines, just a good place to have in Mart. I still miss him.”

Rather than file this comment as simply anecdotal, it presents a larger opportunity to see where a mapping of the past contains the seeds for future development. Mart’s communities have been fractured by the effects of *laissez faire* planning and the isolating effects of media and suburbanization, bringing the loss of the public sphere. The Mart Community Project exists to stimulate the re-establishment of the public sphere, by identifying needs, sites for intervention and local teams to lead the change, which in turn can be networked with concurrent initiatives. As Hamdi’s work in slums in Sri Lanka and Thailand demonstrates, communities are knitted together in small steps, through sustainable social enterprise, in which resources are shared. Coincidentally, Hamdi identifies the barber’s shop as a seedling of growth in one of the cities in which he worked. Two brothers launched their businesses in a shared space with the sign: “Barber’s Shop. We also Sell Bicycle Parts.” The challenge of participatory mapping and social enterprise is thus the same. Citing a study by geographers Lin and Ghose on collaborative GIS, Crampton writes: “The big question is sustainability – after the academics have completed their project and gone home, how will it maintain itself?”^{22,23}

Shortly before he died, the geographer Denis Cosgrove closed a lecture with the advice, “Always make maps, always question maps.”²⁴ In a sense, the first part of the statement refers to mapping as it has been reconceived – “performative, participatory, and political”²⁵ – and the second to the importance of critical discourse. If a *mapping* suggests mapmaking in time, with all its useful implications of being collective, in process, subject to continuous revision, it also is never a neutral project. Something is always omitted right at the beginning when the mapmakers choose what to map. To celebrate the mapping and vilify the map is to miss the point: that both are tools that can be put to work for resisting or securitizing. To develop Cosgrove’s advice, it is better to interrogate the maps/mappings with the basic questions of any critical inquiry: who is mapping/making the map, and for what purpose?

Dodge and Kitchen have argued that maps are always fleeting, without any “ontological security,” and argue that as practices maps are always *mappings*.²⁶ In conclusion, I would counter that the distinction between the map and the mapping is critical, however, to understanding the extraordinary agency of the former, as “immutable mobile.”

The Situationist concept of *detournement* might best describe my concluding example, from David Turnbull’s account of the topographic map of Dreaming tracks drawn in Australia. This hybrid of European cartographic technique and indigenous knowledge was initiated by researcher Kingsley Palmer, amid the complex and vexed history of Aboriginal land rights.²⁷ Palmer went about

interviewing the Southern Pitjantjatjara living in the Great Victoria Desert about the cognitive maps they sustained through storytelling and myths. Upon receiving his finished map, however, Palmer's Aboriginal helpers were anxious that it contained information that would normally only be discussed by mature and fully initiated men, and should be kept safely hidden in a bank. It was accordingly locked up. Subsequently, however, Palmer attended a land rights meeting between the Aboriginals and Parliamentarians from Adelaide, to find that the map had become a key negotiating tool, and in 1984, the majority of the disputed lands were handed back to the Southern Pitjantjatjara.²⁸ The language and tools of the occupying entities had been, in effect, subverted. Thus the map, for all its historical baggage as an instrument of colonisation, as a crisis of representation and as a reduction of knowledges, wields a power almost despite our well-earned distrust.

Notes

1. 'Google Nearly Starts a War. Seriously' ABC News online. 11 November 2010. Web. <http://abcnews.go.com/blogs/politics/2010/11/google-nearly-starts-a-war-seriously/>
2. See, for example, Kimberly Powell, 'Making Sense of Place: Mapping as a Multisensory Research Method' *Qualitative Inquiry* 16(7) 539–555; Jeremy Crampton, 'Cartography: Performative, Participatory, Political' *Progress in Human Geography* 33(6) 2009, pp. 840–848; Janet Abrams and Peter Hall, eds. *Else/Where: Mapping – New Cartographies of Networks and Territories*. Minneapolis, MN: University of Minnesota Design Institute, 2006.
3. Jeremy Crampton, *Mapping: A Critical Introduction to Cartography and GIS*, John Wiley & Son, 2010, pp. 4–6.
4. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, Cambridge (Mass.): Harvard University Press, 1999. Quoted in Denis Cosgrove, 'Maps, Mapping, Modernity: Art and Cartography in the Twentieth Century' *Imago Mundi* Vol 57, Part 1, pp. 35–54.
5. Frances Stonor Saunders, BBC Radio 3 Sunday Feature: Meetings of Minds, part 1. Sunday 14 November 2004 21:30–22:15 (Radio 3). Web. <http://www.bbc.co.uk/radio3/sundayfeature/pip/fbkmi/>
6. Miguel Helft, 'With Tools on Web, Amateurs Reshape Mapping' *The New York Times* July 27, 2007.
7. C.C.Freifeld, R. Chunara, S.R.Mekaru, E.H. Chan, T. Kass-Hout et al. 'Participatory Epidemiology: Use of Mobile Phones for Community-Based Health Reporting' *PLoS Med* 7(12): e1000376, 2010. doi:10.1371/journal.pmed.1000376
8. Rebecca Goolsby, 'Social Media as Crisis Platform: The Future of Community Maps/Crisis Map' *ACM Transactions on Intelligent Systems and Technology*, Vol. 1, No. 1, Article 7, October 2010.

9. James Corner, 'The Agency of Mapping: Critique, Speculation and Inquiry' in *Mappings*, edited by Denis Cosgrove, London: Reaktion Books, 1999, p. 213.
10. Corner, *Mappings*, p. 244.
11. James Corner, Interview with Jill Fehrenbacher on the High Line, *Inhabitat*, September 25, 2011. Web. <http://inhabitat.com/interview-architect-james-corner-on-the-design-of-high-line/>
12. Corner, Interview with Jill Fehrenbacher.
13. Nabeel Hamdi, *Small Change: About the Art of Practice and the Limits of Planning in Cities*, London, Sterling VA: Earthscan. 2004, p. xvii.
14. Daniel Weiner et al, *Community Participation and GIS*, 2002.
15. Haklay Mordechai, 'Usability Dimensions in Collaborative GIS' in S. Balram and S. Dragecevic, eds, *Collaborative Geographic Information Systems*, Idea Group, 2006.
16. Guy Debord, 'Theory of the Derive' (1958). Translation by Ken Knabb, *Situationist International Anthology* (Revised and Expanded Edition, 2006).
17. Rebecca Ross, 'The Perils of Precision' in Hall and Abrams, *Else/Where: Mapping*.
18. Jeremy Crampton, 'Cartography: Performative, Participatory, Political' *Progress in Human Geography* 33(6) 2009, p. 841.
19. Email from author, October 20, 2009.
20. Christian Nold, Brentford Biopsy project description, 2008. Web. <http://www.publicbiopsy.net/info.htm>
21. Mart Community Project application to the National Endowment for the Arts Your Town application, 2011. cited in 'Design Students Participate in Mapping Project to Revitalize Historical Texas Town' Nov. 8, 2011, Department of Art and Art History, University of Texas at Austin. Web. Retrieved June 24, 2012. http://www.finearts.utexas.edu/news/news_items/mcp.cfm?calset=aah
22. Crampton, 'Cartography: Performative, Participatory, Political' p. 843.
23. W. Lin and R. Ghose, Complexities in sustainable provision of GIS for urban grassroots organizations, *Cartographica* 43, pp. 31–44, 2008.
24. Ross, 'The Perils of Precision'.
25. Crampton, 'Cartography: Performative, Participatory, Political'.
26. M. Dodge and R. Kitchin, 'Outlines of a world coming into existence: pervasive computing and the ethics of forgetting' *Environment and Planning B: Planning and Design* 34, pp. 431–45, 2007.
27. See, for example, Stuart MacIntyre, *A Concise History of Australia*. Cambridge University Press 2004, p. 293.
28. David Turnbull, *Maps are Territories: Science is an Atlas*, University of Chicago Press, 1994, p. 60.