

Note from the Editor: The following two essays are in response to Michael Goodchild's essay that appeared in the previous issue of CP.

Cartography, Digital Transitions, and Questions of History¹

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Introduction

In his "Cartographic Futures on a Digital Earth" Professor Goodchild describes how cartography and broader fields of geographical inquiry are currently coming to grips with what he calls 'the digital transition.' He stresses how this transition can also be seen as an opportunity — indeed a necessity — both for a rapprochement between GIS and cartography and for an extension of the scope and effectivity of the two together. This transition provides unprecedented opportunities for reworking cartography's traditional commitments to forms of mapping that are bound by the visual, flat, exhaustive, uniform, static, generic, precise, and slow. In practice, the transition has already occurred and GIS and cartography have already merged. In describing the nature of this transition Professor Goodchild offers a diagnosis of a pathology: the infective stages of the digital virus, barriers to its diffusion, and the possibilities attendant upon its adoption. Left to be sorted out is how the merger will be rationalized to increase efficiency of operations and what new goals can be achieved as a result of this merger. In this view, Professor Goodchild sees the real possibility of bringing into being long-held 'technological fantasies' of being able to provide upon demand all information about one place, using the Digital Earth as the equivalent of a geographical 'filing cabinet' for a global geo-library, and a corresponding transformation of the ways in which geographical and place-based information are provided and used. The future American world of digital place-based information envisaged by Vice President Al Gore thus offers an unprecedented opportunity for mobilizing efforts for the equivalent of a 'moonshot' — a vision and rallying point around which GIS and renewed cartographic imagination and practice will be able to flourish. The possibilities offered by this transition are made even more pressing and powerful by the general increase in interest by the wider society in maps and things geographic.

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The present paper responds to these ideas about the future of cartography in light of the 'digital transition,' and in doing so revisits the arguments in *Ground Truth* and elsewhere about the ways in which digital geographic information technologies are producing a wide range of new objects and new ways of seeing the earth, nature, space, place, citizen-subject, and bodies.² Indeed, in many respects and up to a point I agree entirely with Professor Goodchild's diagnosis and prescriptions of the present condition and future opportunities for cartography, GIS, and related geo-informational fields. Moreover, I find his linking of the opportunity structures that unite GIS and contemporary cartography to be extremely exciting. His remarks clearly signal the challenges posed and opportunities available to cartographic practice by the digital transition and his proposals for mobilizing effort around the Digital Earth project are — I think — exciting (especially given the emergence

of structures and institutions of the kinds he describes, such as the Alexandria Digital Library, the U.S. National Geo-spatial Data Clearinghouse, Terraserver, MapQuest, the MIT server of digital orthophoto quadrangles, and the U.S. EPA's place-based search systems). Moreover, I do think that Professor Goodchild's prognosis on the ways in which the digital transition will actually unfold is probably correct. In this sense, U.S. government officials (including former Vice-President Gore), state agencies, and public organizations have already begun to put the pieces of the 'moonshot' together. In what follows, however, I focus on several problematic issues raised by Professor Goodchild's "Cartographic Futures on a Digital Earth."

I make four central arguments:

- (1) much contemporary discussion of the digital transition presupposes only one path to the future;
- (2) like other transitions, the 'digital transition' produces geographies of its own, patterns of combined and uneven development, and – as a result – multiple and open paths to future worlds of geo-information;
- (3) all mappings (traditional and digital) have the potential to produce new social relations, but often they hide these relations. As with the information revolutions of the past, they become fetishes; and
- (4) in thinking about and working towards projects such as the Digital Earth, that combine digital spatial information with renewed cartographic practice, can we evacuate from these projects the fetishized ideologies of progress? Can we think of democratic transformations in the ways we map and use information in different ways than the History of Progress and the Sciences and Politics of Representation allow?

Geographies of Transitions

Since I am by profession and vocation a geographer and political economist of regional change and geopolitics, I will begin my remarks with some comments about transition theory. As an economic geographer and political economist, my work focuses on questions of democratic transitions variously involving transitions from industrial capitalism to monopoly and late capitalism, from Fordism to post-Fordism, from apartheid to post-apartheid, and most recently from communism to post-communism. In this post-1989 period, I find it particularly interesting that Professor Goodchild avoids the more common boosterist language of 'digital revolutions' in favor of the phrase 'digital transitions.' Knowing his efforts over the years at building constituencies, opening dialogues, and extending the range of ideas brought to GIS, the turn to 'digital transitions' at one level signals a 'Realpolitik' in regard to the current and future relations between GIS and cartography. It certainly represents a recognition of the 'sea-change' in thinking about mapping practices and the growing importance and potential of geo-information. As Stephen Hall (1993, 8) has argued in *Mapping the Next Millenium*, we are in the middle of "arguably the greatest explosion in mapping, and perhaps the greatest reconsideration of 'space' (in every sense of that word)" since the times of Babylon, a redefinition that requires a rethinking and broadening of our conceptions of maps and mapping, one that

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signals “nothing less than the reinvention of the idiom of geography” (Hall, 1993, 4-5). And so ‘digital transition’ signals a complex set of images and opportunities for building a better world.

But, in the term ‘digital transitions’ we can — I think — also see a signaling of something else. The deployment of the discourse of ‘transitions’ also brings to our conversations about the future of GIS and cartography a metaphorical political economy of ‘democratization’ and a particular notion of History. Michael Burawoy (1992) has recently warned that the language of transitions (what he calls ‘transitology’) has — especially since the events of 1989 — been triumphalist in nature, signaling a break with a constrained and drab past. (What better way to describe communism than using Professor Goodchild’s own descriptions of the traditional commitments of cartography — flat, exhaustive, uniform, static, generic, precise, and slow.) In transition studies this ‘break’ has usually been seen as inevitable, motivated by the more flexible, dynamic, responsive, differentiated, and strategic structures and practices of democracy and capitalism. Transitions are, then, about a certain type of reading of the dynamics of political economy and presuppose a particular conception of History that is progressive and usually singular and linear.

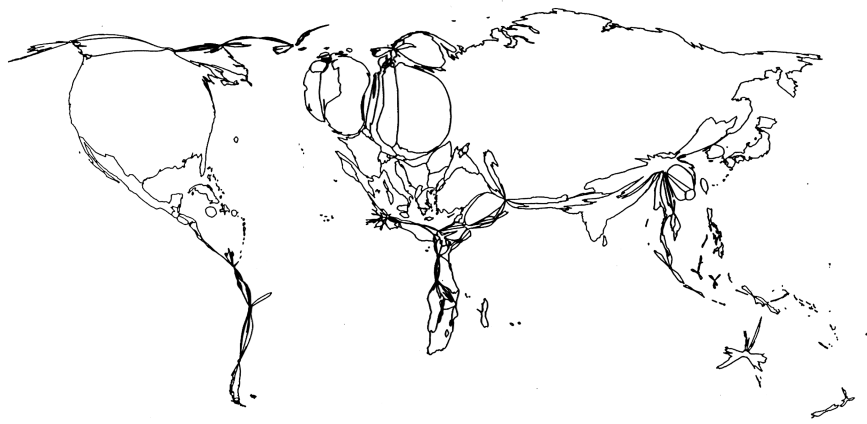
Thus, when Professor Goodchild asks us to think about the opportunities of the ‘digital transition,’ as a student of ‘transitology,’ I am immediately on my guard. ‘Transition-talk’ evokes for me a liberal progressivist ideology of ‘breaks,’ overcomings, and new universal futures (market capitalism and representative democracy); what Jacques Derrida in *The Specters of Marx* spoke of as the new specter haunting Europe, the specter of a new hegemony of neo-liberalism. To ‘transition-talk’ then, I would want to add questions about the geography of socio-technological change and the political economy of mapping: what are the geographies and the interests of the ‘digital transition’ and what seems to be presupposed in this particular triumphalist rendering of History? This is no revelation: Professor Goodchild and I have been collaborating indirectly through the National Center for Geographic Information Analysis for eight years now to foster precisely this kind of GIS-Society studies.

The cartographer Brian Harley (1989, 1990) has already opened up the spaces within which I want to think of this political economy of transitions and representation. In his various essays on ‘deconstructing the map’ and the ‘power of the map,’ Harley reminded us that the act of representing the world is an interested act that brings certain issues to light and submerges other possibilities. Behind the pretensions of objectivist and universalist cartography and GIS lay a variety of culturally determined and socially conditioned interests. Of necessity, the map is a tool whose form and context are selected, partial, and vested with a variety of such interests. This is, in many ways, an unavoidable situation, but it does require that the pretensions of universalism and disinterestedness be unmasked, the map be deconstructed, and its representations denaturalized. In a parallel vein, Denis Wood (1993) has shown how the *Power of Maps* resides in political and social power as well as in the technical capacities of the cartographic project, Svetlana Alpers (1983) has shown how Italian perspectival painting and the cartographic impulse that emerged in contradistinction in the low countries of the Netherlands and Belgium have to be thought of as distinct (though related) systems of representation, and more recently Martin Jay (1993) has shown how the universal goals of a single ‘God’s Eye View’ must be ‘disseminated’ and understood in terms of multiple, different, and competing ‘scopic regimes.’

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The geography of the 'digital transition' is, of course, difficult to describe, in part because it is changing so quickly. Last year's cautions about the 'over-reaching' claims of boosters are over-matched by far by the growth, diffusion, and accessibility of this year's products. So, writing any geography of the transition is fraught with danger and likely to be overly conservative in its judgments. But there are some things we can say. The last great universalist state-led project of mapping — the topographic surveys of the nation states — itself produced a highly uneven geography (Figure 1). The current 'digital transition' has its own



Cartogram of the worldwide coverage of topographic mapping (approximately mid 1990s). Each country has been distorted in proportion to the area of the map sheets of the most detailed coverage for the whole country. The base value of 1:1,000,000 is assumed everywhere. Most detailed complete coverage assembled from UN and International Cartographic Association reports.

Figure 1. 'Cartogram of the worldwide coverage of topographic mapping.' Source: Nicholas Chrisman. *Exploring Geographic Information Systems*, John Wiley, 1996 with permission.

uneven development. Harry Cleaver, for example, has calculated that the bulk of the growth of the U.S. economy in the 1990s can be attributed to the restructuring that resulted from the computerization of every aspect of economic, political, and social life.

These illustrations should give us pause for thought about the nature of the 'digital transition' so richly described by Professor Goodchild. First, what will be the geography of the Digital Earth project and its spin-offs, and second, what is and what will be the political economy of investment and use in GIS and cartography in the years ahead? I have been dealing with these issues elsewhere (see, for example, Pickles 1995) and so, for the present, I shall simply say that in contemporary GIS there exists a paradox where by on the one hand there seems to be an overriding concern when discussing the 'digital transition' to emphasize the democratizing of information and access to it that new digital information and geo-referenced technologies offer, and on the other hand the overwhelming evidence pointing to the fact that its diffusion, use, and further development seems increasingly to be in the hands of state bureaucracies, businesses and research centers of military strategic planning. I shall have more to say later about its use as a 'public' good and how we might re-conceptualize the new cartographies in terms of direct action and participatory democracy. For the present, I want to focus on one aspect of this paradox, the assumption of the democratizing capacities of the digital transition.

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Digital Earth and Mirror Worlds

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If I am correct that Professor Goodchild’s embrace of the ‘digital transition,’ place-based cartography, and the Digital Earth may also entail an embrace of the attendant political economy of Vice President Gore’s “technological fantasy” of a world in which a new Americanism (thoroughly post-Fordist in nature) is in the making, can we think of the ‘digital transition’ differently? This is certainly a difficult undertaking. Vice President Gore’s own understanding of the ‘digital transition’ is presented by Professor Goodchild (Gore www2.nas.edu/besr/238a.html):

Imagine, for example, a young child going to a Digital Earth exhibit at a local museum. After donning a head-mounted display, she sees the Earth as it appears from space. Using a data glove, she zooms in, using higher and higher levels of resolution, to see continents, then regions, countries, cities, and finally individual houses, trees, and other natural and man-made objects. Having found an area of the planet she is interested in exploring, she takes the equivalent of a ‘magic carpet ride’ through a 3-D visualization of the terrain. Of course, terrain is only one of the numerous kinds of data with which she can interact. Using the system’s voice recognition capabilities, she is able to request information on land cover, distribution of plant and animal species, real-time weather, roads, political boundaries, and population. She can also visualize the environmental information that she and other students all over the world have collected as part of the GLOBE project. This information can be seamlessly fused with the digital map or terrain data. She can get more information on many of the objects she sees by using her data glove to click on a hyperlink. To prepare her family’s vacation to Yellowstone National Park, for example, she plans the perfect hike to the geysers, bison, and bighorn sheep that she has just read about. In fact, she can follow the trail visually from start to finish before she ever leaves the museum in her hometown.

She is not limited to moving through space, but can also travel through time. After taking a virtual field-trip to Paris to visit the Louvre, she moves back in time to learn about French history, perusing digitized maps overlaid on the surface of the Digital Earth, newsreel footage, oral history, newspapers and other primary sources. She sends some of this information to her personal e-mail address to study later. The time-line, which stretches off in the distance, can be set for days, years, centuries, or even geological epochs, for those occasions when she wants to learn more about dinosaurs.

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This is eerily reminiscent of David Gelernter’s *Mirror Worlds*. In *Mirror Worlds*, Gelernter “describes an event that will happen someday soon. You will look into a computer screen and see reality. Some part of your world—the town you live in, the company you work for, your school system, the city hospital—will hang there in sharp color image, abstract but recognizable, moving subtly in a thousand places” (Gelernter, 1992, 1). The mirror world of virtual reality and spatial images is a “true-to-life mirror image trapped inside a computer—where you can see and grasp it whole” (p.3). These images “engulf some chunk of reality” (p.6) and the mirror world “reflects the real one” (p.6). “Fundamentally these programs are intended to help you *comprehend* the powerful, super-techno-glossy, dangerously complicated and basically indifferent man-made environments that enmesh you, and that control you to the extent that you don’t control them” (p.6).

How is this to happen? How will the “place” of mirror world permit one to enter, stroll around, and retrieve archival and live-medium information?

The picture you see on your display represents a real physical layout. In a City Mirror World, you see a city map of some kind. Lots of information is superimposed on the map, using words, numbers, colors, dials -- the resulting display is dense with data; you are tracking thousands of different values simultaneously. You can see traffic density on the streets, delays at the airport, the physical condition of the bridges, the status of markets, the condition of the city's finances, the current agenda at city hall and the board of education, crime conditions in the park, air quality, average bulk cauliflower prices and a huge list of others.

This high-level view would represent - if you could achieve it at all -- the ultimate and only goal of the *hardware* city model. In the software version, it's merely a starting point. You can dive deeper and explore. Pilot your mouse over to some interesting point and turn the *altitude* knob. Now you are inside a school, courthouse, hospital or City Hall. You see a picture like the one at the top level, but here it's all focussed on this *one* sub-world, so you can find out what's really going on down here. Meet and chat (electronically) with the local inhabitants, or other Mirror World browsers. You'd like to be informed whenever the zoning board turns its attention to Piffel Street? Whenever the school board finalizes a budget? Leave a software agent behind.

Gelernter, 1992, 16-17

Gelernter's world (and perhaps the world of the Digital Earth) is one where all information about place is available and mapped almost immediately, limited only by the speed of moving the mouse and dropping the agents. The new digital world is a mirror world — a world of hyper-textual information, geo-coded to a virtual globe, and devised to provide, as Professor Goodchild says, “all information about one place.” But what does it mean to accept the grand narratives of the mirror world and the ‘Digital Earth,’ and what kinds of epistemological alternatives are available to us?

Maps Precede Territory and Produce Identities

If the geography and political economy of the ‘digital transition’ pose questions for the project of building the Digital Earth and related mapping practices, the epistemological assumptions at work pose even more challenging questions. It is to these epistemological issues that I now turn.

I think it is now fairly well established in critical studies (if not in practice) that the ‘Cartographic Anxiety’ of modernist, universalist cartography has been pretty much laid to rest. In its place we have a much more nuanced and multiform understanding of cartographic practice and use, and one in which the production of geographical images is understood to be a thoroughly social project. In this view, maps do not simply represent territory, but they also produce it. As Baudrillard (1981, 2-3) asserts, in important ways ‘maps precede territory’ (see also King 1996). That is, maps construct objects that in turn become our realities. Far from being a mere representation of private property, cadastral mapping gave legal and material form to the new territories and landscapes of private property. Booth's maps of London did not merely mirror the socio-spatial patterns of working class neighborhoods, but produced them as spatialized social

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categories in which new ways of thinking and representing the population as poor and unhealthy came into being; categories that have been the foundation for much urban social research since. What worlds are being produced in the digital transition and what conceptions of History are at work?

There is much that could be said here. For the sake of brevity, the kinds of issues that ‘the digital transition’ seem to evoke will be illustrated through a brief reading of Allucquere Rosanne Stone’s *Desire and Technology at the Close of the Mechanical Age* and Walter Benjamin’s *Passagen-Werk*, specifically his notion of History and Progress, and his discussion of four representational technologies – part of a previous representational transition — taken from nineteenth century Paris.

Benjamin’s *Passagen-Werk* project was carried out in Paris up to and during the early years of the Second World War. The explicit goal of the project was an investigation of the cultural and economic transformations at work in nineteenth century Paris at a time of major capitalist restructuring, a time very much akin to our own end of century period of restructuring and change. In this project Benjamin was concerned with debunking mythic theories of history and overcoming “the ideology of progress . . . in all its aspects” (Benjamin quoted in Buck-Morss, 1989, 79):

It can be considered one of the methodological objectives of this work to demonstrate a historical materialism within which the idea of progress has been annihilated. Precisely on this point historical materialism has every reason to distinguish itself sharply from bourgeois mental habits. Its basic principle is not progress, but actualization.

In turning to Paris, it is significant for our purposes to note that what was new at the time was not the urban brilliance and luxury of the city, but secular public access to them (Susan Buck-Morss, 1989, 81). Paris was, in this sense, a “looking-glass city” and a Mirror City that dazzled the crowds, reflecting images of new consumer goods and consumers,

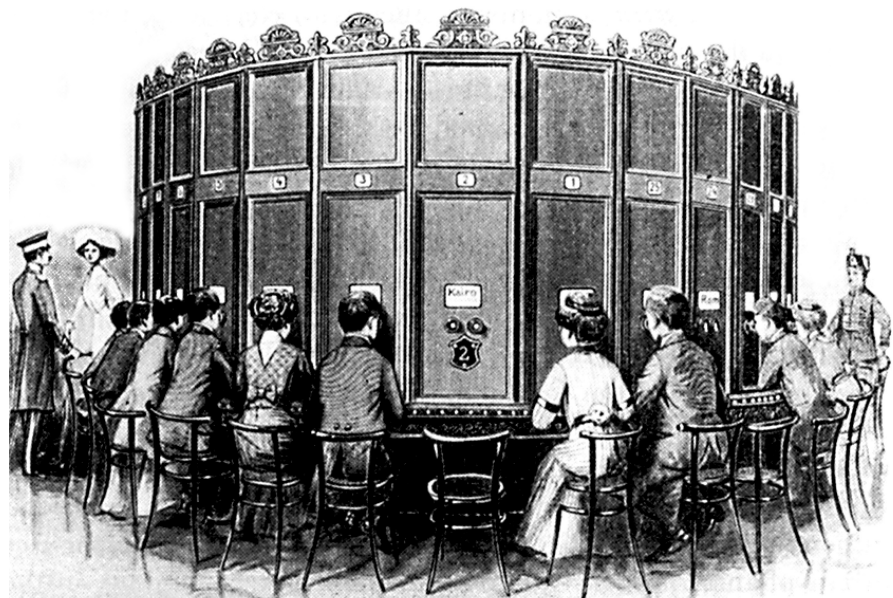


Figure 2. ‘MirrorWorld of end-of-century Paris’. Source: V. Zglinicki, *Der Weg des Films*. Berlin: Rembrandt Verlag, 1956. Public domain. Reproduced from Susan Buck-Morss *Dialectics of Seeing: Walter Benjamin and the Arcades Project*, MIT Press, 1991 with permission.

but “keeping the class relations of production virtually invisible on the looking glass’s other side.” Benjamin called the spectacle of Paris the “phantasmagoria’ — a magic lantern show of optical illusions, rapidly changing size and blending into one another” (Buck-Morss, 1989, 81). In this system, everything desirable came to be transformed into fetishized images of commodities-on-display, and when newness itself became a fetish “history itself became a manifestation of the commodity form.”

Benjamin sought to unmask this fetishized Mirror World of end-of-century Paris by describing what he called the ‘ur-forms of the phantasmagoria of progress.’ Four such ur-forms are of direct interest to our present discussion: the panorama, the arcade, the world exhibition, and the plate-glass shop window. Each represents elements of the informational transition that was occurring in the late nineteenth century as Western capitalist economies internationalized, and new global imperial geographies were built. The panorama was a new technology of visual representation that was organized and moved around different cities to present spectacles of one form or another to eager middle-class consumers (Figure 2). The panoramas provided sweeping views that rolled by the viewer at varying speeds, giving the impression of movement through the world at accelerated speed (Buck-Morss, 1989, 82). Panoramas were a common feature of the new commercial arcades that were springing up throughout the city (‘the original temple of commodity capitalism’), and it was in the arcades that the flow of images and the flow of commodities came together. The arcades are the precursors of the department store and, in more contemporary form, the panorama and the arcade have conjoined as precursors for the Digital World of the internet and on-line shopping. But it is not just shopping that is commodified. Information itself has been rendered into a fetishized commodity.

With the culmination of the panorama and arcade experience emerged the great world exhibitions, the first being in London in 1851 — a Mirror World of a different kind; a Chrystal Palace (Figure 3). It was in these great international exhibitions and fairs that the ‘pleasure industry’ has its origin and it is they that:

... refined and multiplied the varieties of reactive behaviour of the masses. It thereby prepares the masses for adapting to advertisements. The connection between the advertising industry and world exhibitions is thus well-founded.

The exhibitions and arcades incorporated another technology that became fundamental to a modernist sensibility: the large plate-glass window. This lent to sellers the ability to display goods for view, but prevented consumers from touching. Pleasure was now to be derived from the visual spectacle alone. The representation of far away places and possible ways of life came, in itself, to be a source of pleasure, as was the broadening experience and promise of movement, global reach, and speed. Exhibitions and

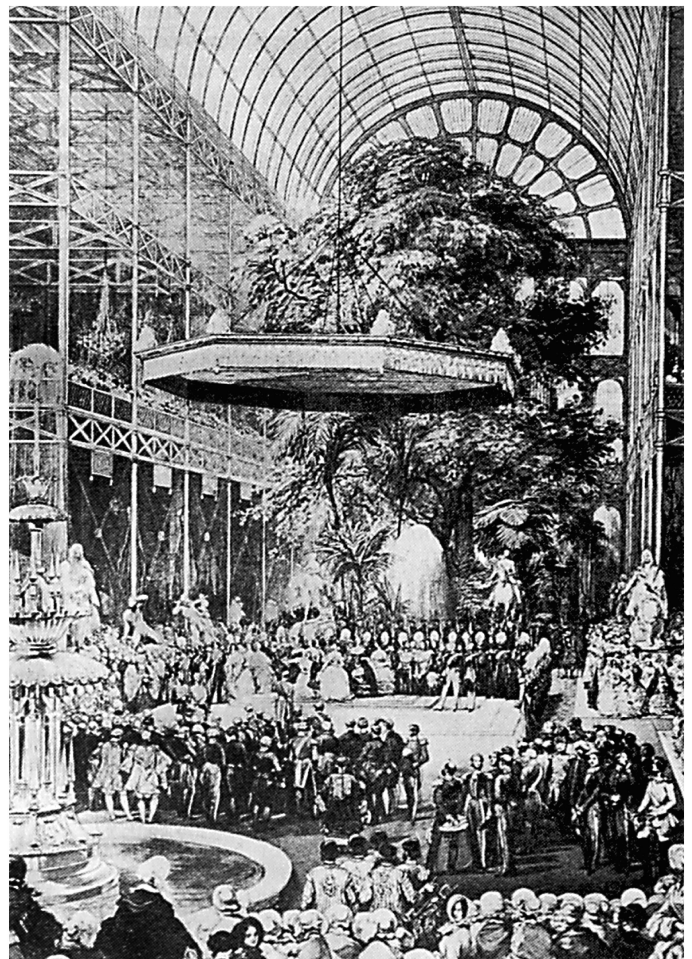


Figure 3. 'A glass arcade'. Source: *Catalogue of the Chrystal Palace Exhibition, London*. Public domain. Reproduced from Susan Buck-Morss *Dialectics of Seeing: Walter Benjamin and the Arcades Project*, MIT Press, 1991 with permission.

“Speed, information, and access came to symbolize progress.”



Figure 4. 'Angelus Novus' by Paul Klee. Copyright the Israel Museum, Jerusalem. Israel Museum in Jerusalem. Reproduced from Susan Buck-Morss *Dialectics of Seeing: Walter Benjamin and the Arcades Project*, MIT Press, 1991 with permission.

arcades were then, for Benjamin, the source of a broader phantasmagorical politics: “a promise of social progress for the masses without revolution” (Buck-Morss, 1989, 86). “Each successive exhibition was called upon to give visible ‘proof’ of historical progress toward the realization of these utopian goals, by being more monumental, more spectacular than the last” (Buck-Morss, 1989, 87), and each show-cased the technologies that enabled the movement of goods around the globe. Speed, information, and access came to symbolize progress.

As an American professor at the end of the twentieth century looking forward to the restructurings of the next millenium, the Digital Earth project holds exciting possibilities. But it also sounds disturbingly like the display technologies of panorama, arcade, world exhibition, and shop-window of end-of-century Imperial Paris. For Benjamin, the mythic history of progress embedded in these exhibitions was so generalized that the possibilities for dislodging its hold on the masses was extremely limited. He resolved his dilemma by searching for ‘counter-images,’ and through these small, discarded objects (the trash of history) he sought to illustrate a different conception of history from which all traces of progress and development were eradicated. Paul Klee’s painting, ‘Angelus Novus,’ provided a map for this vision of history which stood in marked contrast to the futurist myth of historical progress which could only be sustained by forgetting its past (Buck-Morss, 1989, 95) (Figure 4):

There is a picture by Klee called ‘Angelus Novus.’ An angel is presented in it who looks as if he were about to move away from something at which he is staring. His eyes are wide open, mouth agape, wings spread. The angel of history must look like that. His face is turned toward the past. Where a chain of events appear to us, he sees one single catastrophe which relentlessly piles up wreckage upon wreckage, and hurls them before his feet.... The storm [from Paradise] drives him irresistibly into the future to which his back is turned, while the pile of debris before him grows toward the sky. That which we call progress is this storm.

At the heart of mythic notions of history are a series of metaphors and images that Benjamin called ‘wish-images’, and they remain at the core of modernist and liberal conceptions of history as progress.

These images are wish images, and in them the collective attempts to transcend as well as to illumine the incompleteness of the social order of production. There also merges in these wish images a positive striving to set themselves off from the outdated—that means, however, the most recent past. These tendencies turn the image fantasy, that maintains its impulse from the new, back to the ur-past. In the dream in which every epoch sees in images the epoch that follows, the latter appears wedded to elements of ur-history, that is, a classless society . . . Out of it comes the images of utopia that have left their traces behind them in a thousand configurations of life from buildings to fashions.

Benjamin (V, p.1224-5 m version of the 1935 expose) quoted in Buck-Morss (1989, 114, 118).

In this new world of images, commodity fetishes and dream fetishes become indistinguishable. Food and other commodities drop magically onto the shelves of stores, and advertising and commerce come to be seen as the means of social progress (Figure 5). The democratization of

culture is now seen to be derived from the mass media, and they too become fetishes (Buck-Morss, 1989, 120).

The 'digital transition' is, of course, thoroughly embedded in these concepts of mythic History and the dissemination of wish images and fetishes. It remains an open and interesting question to what extent the universalizing mantra of digital information and mapping constitutes a new set of global exhibitions for the dissemination of information and goods; shop-windows for accessing information about all places or all information about one place. We must yet consider whether these are necessarily wish images and fetishes that reproduce a mythic promise of social progress.

Conclusion: Digital Transformations, Guerrilla Epistemologies, and Fragmentary Cartographies

Like Walter Benjamin, Allucquere Rosanne Stone (1995) also seems to have grown tired of trying to think of these issues in terms of utopian or dystopian perspectives, and — like Benjamin — she asks in *The War of Desire and Technology at the Close of the Mechanical Age*, what is happening in the deployment of emergent digital technologies? What kinds of 'counter-images' are available to us and what new forms of identity are being produced?

The War of Desire and Technology is about science fiction, in the sense that it is about the emergent technologies, shifting boundaries between the living and the nonliving, optional embodiments . . . in other words, about the everyday world as cyborg habitat. But it is only partly about cyberspace. It is also about social systems that arise in the phantasmatic spaces enabled and constituted through communication technologies . . . I am interested in prosthetic communication for what it shows of the 'real' world that might otherwise go unnoticed. And I am interested because of the potential of cyberspace for emergent behavior, for new social forms that arise in a circumstance in which *body, meet, place*, and even *space* mean something quite different from our accustomed understanding. I want to see how tenacious these new social forms are in the face of adversity, and what we can learn from them about social problems outside the worlds of the nets.

Maps precede and produce territories and social identities. But what kind of objects and identities are being produced in the digital transition? What forms of territorialization are at work in the Digital Earth project? I have already suggested that Vice President Gore's vision is both about a digital informational world *and* it is about retraining and recomposition of the U.S. labor-force and the restructuring of the U.S. economic and geopolitical position in the world. It is, in a Gramscian sense, a new Americanism — a thorough-going post-Fordism, with important implications for the ways in which notions of social progress

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Figure 5. 'Human Happiness -- food for the asking in the Fourierist utopia'. Grandville, 1844. Public domain. Reproduced from Susan Buck-Morss *Dialectics of Seeing: Walter Benjamin and the Arcades Project*, MIT Press, 1991 with permission.

“ . . . we cannot be silent about the real class and national politics at work in constituting and disseminating a vision of a classless future of digital information.”

are being written, global relations understood, and an American (and global) future is being mapped.

There are many opportunities in this new digital world of geographical information and representation, but we cannot be silent about the real class and national politics at work in constituting and disseminating a vision of a classless future of digital information. But perhaps we can say that another kind of transition is at work in the digital transition, one that Professor Goodchild both describes well, but does not directly acknowledge. The turn to “things geographic” and the desire for place-specific information is — in this view — a different ‘transition’ that provides a serious challenge to the epistemological and political underpinnings of modern cartography and GIS, and the fetishized nature of the Digital Earth project.

Bruno Latour has recently asked, ‘Have we ever been modern?’ By this he means to ask whether the project of modernity was, or could ever be, fulfilled. Through a discussion of the debate between Boyle and Hobbes in the mid-seventeenth century, Latour shows how a modern notion of representation comes into being at this time and with it a binary distinction between science and politics that frames the geometry of the modern world. The Boyle-Hobbes debate stands, in this discussion, for an originary moment from which spring two related but separate notions of representation, underpinned by a single modern anxiety about the necessity of moulding and controlling the masses. One notion of representation is that which involves the political representation of the views of citizen in an emerging democracy—representative democracy. In this notion of representation, a modern notion of ‘Society’ is born as that structure of social relations that must be represented and regulated politically. The Leviathan will require maps of its territory and information about its citizens and places. A second notion of representation is that which involves the representation of natural objects and in this move ‘Nature,’ as we now know it, is produced. The ‘constitution’ of modernity is the structure of science and politics that keeps Society and Nature distinct and subject to regimes of representation by experts: political leaders on the one hand and scientific scholars on the other.

“ . . . the constitution that keeps Society and Nature, Politics and Science, Representer and Represented separate, has given birth to, at times, uncontrollable and unrepresented/unrepresentable monsters and hybrids.”

Latour’s point is that even our most basic categories of ‘Society’ and ‘Nature’ have been produced historically as what he calls a governing ‘constitution’ of the modern world. However, as the title of the book *We Have Never Been Modern* indicates, Latour believes that the constitution and binary geometry of modernity have never been, and can never be, the structure of practice of everyday life of actual citizens. Instead, the constitution that keeps Society and Nature, Politics and Science, Representer and Represented separate, has given birth to, at times, uncontrollable and unrepresented/unrepresentable monsters and hybrids.

What kind of transition is at work then in this spatial turn? It is certainly one that — as Derek Gregory (1994) has argued — puts into question the Cartographic Anxiety of modernist thought and practice. In this sense, it challenges many of the assumptions that cartography and GIS have about its origins in representational thought, or as Richard Rorty (1979) has suggested, a modernist epistemology of science (and mapping) as the Mirror of Nature can no longer be sustained. In its place we need ways of thinking about geography and mapping that do not presuppose the master narratives of modern cartography, and that do not seek to hide the politics in science (or the interests behind the map, as Brian Harley taught us). The task is one of constructing a post-representational cartography and GIS.

But in this task, Professor Goodchild has highlighted precisely the possibilities of bringing together cartographic imagination and skill along with the information handling abilities of digital GIS. I would argue that this is as much a possibility to rethink the constitution of representational science and politics, as it is the possibility of creating a larger Leviathan—the Digital Earth. It is a possibility for an iconographic, not representational cartography. It is the possibility for an epistemology that Stengler (1997, 118) has called ‘guerrilla’ epistemology:

... the problem of the contemporary sciences is not, for me, one of scientific rationality but of a very particular form of mobilization: it is a matter of succeeding in aligning interests, in disciplining them without destroying them. The goal is not an army of soldiers all marching in step in the same direction; there has to be an initiative, a sense of opportunity that belongs rather to the guerrilla. But the guerrilla has to imagine himself [sic] as belonging to a disciplined army, and relate the sense and possibility of his local initiatives to the commands of staff headquarters.

It is the possibility for a renewal of direct democratic practices that destabilize, and always have the tools to challenge any and all hegemonies—be they created by Representational Science in the name of Nature or by Representational Politics in the name of Society. “[I]t leaves us free to work at modifying these institutions without burdening ourselves with atemporal problems like those of Reason, Understanding, or the West” (Stengler, 1997, 118). It opens the possibility for a different epistemology and politics of ‘digital transformations.’

Gillian Rose (1993) has suggested that the conception of the mirror and the Imperial Eye, so prevalent in the history of modern cartography, is also thoroughly masculinist in nature. In its place she suggests we need to think in terms of a different epistemology of mapping, one in which the mirror has been broken into a thousand pieces with each shard still reflecting, but without coherence, without the possibility of the universal view, and without the possibility of control. Is this a future that is possible or even desirable in the ‘digital transition/transformation’? Is this a future way of thinking about mapping practice? Is this a new cartography?

George Landow (1992) has—in a different context—come to a similar conclusion. For Landow, digital information systems and specifically hypertext promise new ways of theorizing information and representation. The apparently infinite malleability and reproducibility of spatial information in digital systems allows, even forces us to rethink the relations among objects and practices that have been set in concrete for hundreds of years under the regime of print capitalism (Anderson 1991). Textuality, narrative, margins, inter-textuality, and the roles and functions of readers and writers are all reconfigured in the digital text. The digital transformations of geo-mapping in Roland Barthes’ terms point to the possibility of the production of writerly (rather than readerly) texts, which do not dominate the reader and insist on particular readings, but engage the reader as an ‘author’ and insist upon the openness and inter-textuality of the text—that is, its openness to other texts and readings. That is, digitality opens up again the question of the participation of the masses and provides new opportunities for interactivity lost to an earlier nineteenth century information revolution. It became a transition and it commodified media, information, and images, and in the process it built the large state

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and corporate empires—the monopolies—that eventually led to Walter Benjamin's death.

How are we to think of the current opening offered by a digital revolution now that is still only about 20 years old? Certainly the opportunities offered by digital information and mapping systems are lost on few practitioners of geography and cartography today. New work habits, new research opportunities, new languages, new ways of governing ourselves, even new forms of the university are now all in process, if not in place. GIS has generalized and GIS and cartography are increasingly united on a common front (see Pickles 1999). But the question posed to us in 1974 by David Harvey remains, I think, especially pertinent today: what kind of digital transition (he said public policy), by whom, and for whom? What kind of GIS and cartography do we want to see in the new millenium, by whom will it be constructed, for what purposes, and whose interests will it serve: whose voices will it represent? At one level, this is precisely the question that enervates Initiative 19 (GIS and Society) of the NCGIA, and it is the democratic potential of the digital transition that is, in part, explicitly the goal of the Public Participation GIS Project (NCGIA/I-19/Varenus). In one of the meetings of these groups, Stan Openshaw suggested that what we were seeking was a GIS-2 (a thoroughly decentered, user-accessible, and delinkable public GIS infrastructure). Efforts at building a GIS-2 might emerge on principles different from those that fetishize media, information, and the public. Indeed in town after town, village after village, and NGO after NGO experiments are going on that adapt new digital mapping devices to local needs. But they can, I think, do this only insofar as their efforts are not monopolized and fetishized. These grassroots cartographers and analysts certainly need access to information, and this seems to me to be precisely the pregnant possibility that Professor Goodchild's account of Digital Earth 'represents' for them.

At the end of his report on the condition of knowledge (*The Postmodern Condition*), Jean Francois Lyotard (1984, 67) left us with a warning that seems particularly pertinent today as we consider the forms of mobilization appropriate to building new geo-information and mapping systems for a truly democratic world:

"What kind of GIS and cartography do we want to see in the new millenium, by whom will it be constructed, for what purposes, and whose interests will it serve: whose voices will it represent?"

"These grassroots cartographers and analysts certainly need access to information, and this seems to me to be precisely the pregnant possibility that Professor Goodchild's account of Digital Earth 'represents' for them."

We are finally in a position to understand how the computerization of society affects this problematic. It could become the 'dream' instrument for controlling and regulating the market system, extended to include knowledge itself and governed exclusively by the performativity principle. In that case, it would inevitably involve the use of terror. But it could also aid groups discussing metaprescriptives by supplying them with the information they usually lack for making knowledgeable decisions. The line to follow for computerization to take the second of these two paths is, in principle, quite simple: give the public free access to the memory and data banks. Language games would then be games of perfect information at any given moment. But they would also be non-zero-sum games, and by virtue of that fact discussion would never risk fixating in a position of minimax equilibrium because it had exhausted its stakes. For the stakes would be knowledge (or information, if you will), and the reserve of knowledge—language's reserve of possible utterances—is inexhaustible. This sketches the outline of a politics that would respect both the desire for justice and the desire for the unknown.

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NOTES

1. This paper was written as an invited response to Michael Goodchild's Keynote Presentation "Cartographic Futures on a Digital Earth." International Cartographic Association Annual Conference on "Touching the Past, Visualizing the Future," Ottawa, Canada, August 1999.

2. These ideas have been presented in various forms at invited keynote addresses to the annual NACIS Conference, Lexington, KY, 1997, and to the International Conference on "Writing, Speaking, Drawing Space," Tours, France, December 4-7, 1998.