

Critical Views

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MAPPINGS

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REAKTION BOOKS

The Agency of Mapping: Speculation, Critique and Invention

JAMES CORNER

Mapping is a fantastic cultural project, creating and building the world as much as measuring and describing it. Long affiliated with the planning and design of cities, landscapes and buildings, mapping is particularly instrumental in the construing and constructing of lived space. In this active sense, the function of mapping is less to mirror reality than to engender the re-shaping of the worlds in which people live. While there are countless examples of authoritarian, simplistic, erroneous and coercive acts of mapping, with reductive effects upon both individuals and environments, I focus in this essay upon more optimistic revisions of mapping practices.¹ These revisions situate mapping as a collective enabling enterprise, a project that both reveals and realizes hidden potential. Hence, 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. We have been adequately cautioned about mapping as a means of projecting power-knowledge, but what about mapping as a productive and liberating instrument, a world-enriching agent, especially in the design and planning arts?

As a creative practice, mapping precipitates its most productive effects through a finding that is also a founding; its agency lies in neither reproduction nor imposition but rather in uncovering realities previously unseen or unimagined, even across seemingly exhausted grounds. Thus, mapping *unfolds* potential; it re-makes territory over and over again, each time with new and diverse consequences. Not all maps accomplish this, however; some simply reproduce what is already known. These are more ‘tracings’ than maps, delineating patterns but revealing nothing new. In describing and advocating more open-ended forms of creativity, philosophers Gilles Deleuze and Félix Guattari declare: ‘Make a map not a tracing!’ They continue:

What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. The map does not reproduce an unconscious closed in upon itself; it constructs the unconscious. It fosters connections between fields, the removal of blockages on bodies without organs, the maximum opening of bodies without organs onto a plane of consistency... The map has to do with *performance*, whereas the tracing always involves an 'alleged competence'.²

The distinction here is between mapping as equal to what is ('tracing') and mapping as equal to what is *and* to what is not yet. In other words, the unfolding agency of mapping is most effective when its capacity for description also sets the conditions for new eidetic and physical worlds to emerge. Unlike tracings, which propagate redundancies, mappings discover new worlds within past and present ones; they inaugurate new grounds upon the hidden traces of a living context. The capacity to reformulate what already exists is the important step. And what already exists is more than just the physical attributes of terrain (topography, rivers, roads, buildings) but includes also the various hidden forces that underlie the workings of a given place. These include natural processes, such as wind and sun; historical events and local stories; economic and legislative conditions; even political interests, regulatory mechanisms and programmatic structures. Through rendering visible multiple and sometimes disparate field conditions, mapping allows for an understanding of terrain as only the surface expression of a complex and dynamic imbroglio of social and natural processes. In visualizing these interrelationships and interactions, mapping itself participates in any future unfoldings. Thus, given the increased complexity and contentiousness that surrounds landscape and urbanism today, creative advances in mapping promise designers and planners greater efficacy in intervening in spatial and social processes. Avoiding the failure of universalist approaches toward master-planning and the imposition of state-controlled schemes, the unfolding agency of mapping may allow designers and planners not only to see certain possibilities in the complexity and contradiction of what already exists but also to *actualize* that potential. This instrumental function is particularly important in a world where it is becoming increasingly difficult to both *imagine* and actually to *create* anything outside of the normative.

THE AGENCY OF MAPPING

Mappings have agency because of the double-sided characteristic of all maps. First, their surfaces are directly *analogous* to actual ground condi-

tions; as horizontal planes, they record the surface of the earth as direct impressions. As in the casting of shadows, walks and sightings across land may be literally *projected* onto paper through a geometrical graticule of points and lines drawn by ruler and pen. Conversely, one can put one's finger on a map and trace out a particular route or itinerary, the map projecting a mental image into the spatial imagination. Because of this directness, maps are taken to be 'true' and 'objective' measures of the world, and are accorded a kind of benign neutrality. By contrast, the other side of this analogous characteristic is the inevitable *abstractness* of maps, the result of selection, omission, isolation, distance and codification. Map devices such as frame, scale, orientation, projection, indexing and naming reveal artificial geographies that remain unavailable to human eyes. Maps present only one version of the earth's surface, an eidetic fiction constructed from factual observation. As both analogue and abstraction, then, the surface of the map functions like an operating table, a staging ground or a theatre of operations upon which the mapper collects, combines, connects, marks, masks, relates and generally explores. These surfaces are massive collection, sorting and transfer sites, great fields upon which real material conditions are isolated, indexed and placed within an assortment of relational structures.

The analogous-abstract character of the map surface means that it is doubly projective: it both captures the projected elements off the ground and projects back a variety of effects through use. The strategic use of this double function has, of course, a long alliance with the history of mapping, and not only militarily (*reconnaissances militaires*) but also ideologically.³ Surprisingly, however, the strategic, constitutive and inventive capacities of mapping are not widely recognized in the urban design and planning arts, even though cartography and planning have enjoyed a long and mutually influential relationship since the fifteenth century.⁴ Throughout the twentieth century, mapping in design and planning has been undertaken conventionally as a quantitative and analytical survey of existing conditions made prior to the making of a new project. These survey maps are both spatial and statistical, inventorying a range of social, economic, ecological and aesthetic conditions. As expertly produced, measured representations, such maps are conventionally taken to be stable, accurate, indisputable mirrors of reality, providing the logical basis for future decision making as well as the means for later projecting a designed plan back onto the ground. It is generally assumed that if the survey is quantitative, objective and rational, it is also true and neutral, thereby helping to legitimize and enact future plans and decisions.⁵ Thus,

mapping typically precedes planning because it is assumed that the map will objectively identify and make visible the terms around which a planning project may then be rationally developed, evaluated and built.⁶

What remains overlooked in this sequence, however, is the fact that maps are highly artificial and fallible constructions, virtual abstractions that possess great force in terms of how people see and act. One of the reasons for this oversight derives from a prevalent tendency to view maps in terms of what they represent rather than what they do. As with art historical analyses of drawings and paintings, considerations of maps as a successive series of paradigmatic types and representations overlook the durational experiences and effects of mapping. That mappings are constructed from a set of internal instruments, codes, techniques and conventions, and that the worlds they describe and project derive only from those aspects of reality that are susceptible to these techniques, are dimensions of mapping still barely understood by the contemporary planner. Instead, most designers and planners consider mapping a rather unimaginative, analytical practice, at least compared to the presumed ‘inventiveness’ of the designing activities that occur *after* all the relevant maps have been made (often with the contents of the maps ignored or forgotten). An unfortunate consequence of these attitudes is that the various techniques and procedures of mapping have not been subjects of inquiry, research or criticism. Instead, they have become codified, naturalized and taken for granted as institutional conventions. Thus, critical experimentation with new and alternative forms of mapping remains largely underdeveloped if not significantly repressed.⁷ The ‘alleged competence’ of the tracing effectively dominates the exploratory inventiveness integral to acts of mapping.

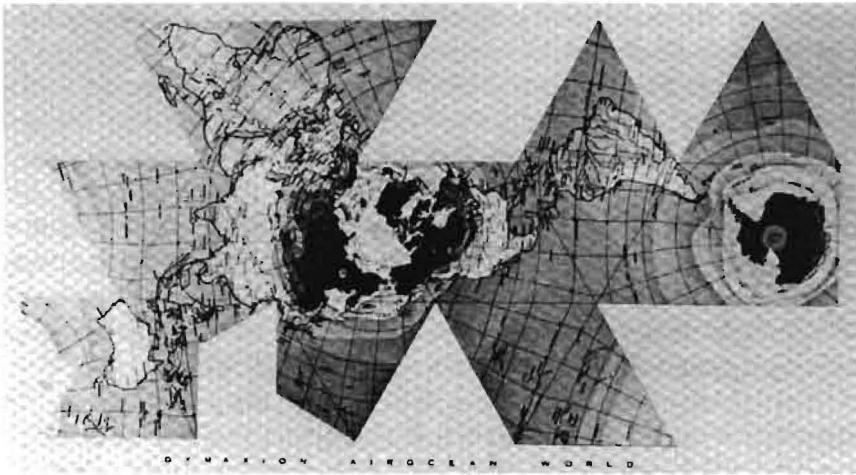
This indifference towards mapping is particularly puzzling when one considers that the very basis upon which projects are imagined and realized derives precisely from how maps are made. The conditions around which a project develops originate with what is selected and prioritized in the map, what is subsequently left aside or ignored, how the chosen material is schematized, indexed and framed, and how the synthesis of the graphic field invokes semantic, symbolic and instrumental content. Thus, the various cartographic procedures of selection, schematization and synthesis make the map *already* a project in the making.⁸ This is why mapping is never neutral, passive or without consequence; on the contrary, mapping is perhaps the most formative and creative act of any design process, first disclosing and then staging the conditions for the emergence of new realities.

In what follows, I discuss mapping as an active agent of cultural intervention. Because my interests lie in the various processes and effects of mapping, I am less concerned with what mapping *means* than with what it actually *does*. Thus, I am less interested in maps as finished artifacts than I am in mapping as a creative *activity*. It is in this participatory sense that I believe new and speculative techniques of mapping may generate new practices of creativity, practices that are expressed not in the invention of novel form but in the productive reformulation of what is already given. By showing the world in new ways, unexpected solutions and effects may emerge. However, given the importance of representational technique in the creative process, it is surprising that whilst there has been no shortage of new ideas and theories in design and planning there has been so little advancement and invention of those specific tools and techniques – including mapping – that are so crucial for the effective construal and construction of new worlds.⁹

THE EFFICACY OF TECHNIQUE

A comparison between Mercator’s projection of the earth’s surface and Buckminster Fuller’s Dymaxion projection reveals radically different spatial and socio-political structures. The same planet, the same places, and yet significantly dissimilar relationships are revealed or, more precisely, *constructed*. The Mercator map stretches the surface of the globe without excision onto a flat surface, oriented ‘upwards’ to the north. The compass directions are made parallel, leading to gross distortions of land area and shape, especially as one moves towards the poles. The northern hemisphere dominates, with Greenland more than twice the size of Australia, even though the southern island is in fact greater than three times the land area of the northern. Needless to say, this view has well suited the self-image of Europeans and North Americans in an era of Western political hegemony. By contrast, Fuller’s Dymaxion Airocean World Map of 1943 cuts the earth into triangular facets that are then unfolded as a flat polyhedron. Both the north and south poles are presented frontally and equally, with little distortion, although the typical viewer is at first likely to be disoriented by this unusual, poly-directional arrangement of countries. Only the graphic graticule of latitude and longitude allows the reader to comprehend the relative orientation of any one location.¹⁰

Interestingly, the Dymaxion structure can be unfolded and re-oriented in any number of different ways, depending on the theographics of one’s point of view. The polyhedral geometry provides a remarkably flexible and adaptive system wherein different locations and regions can be placed

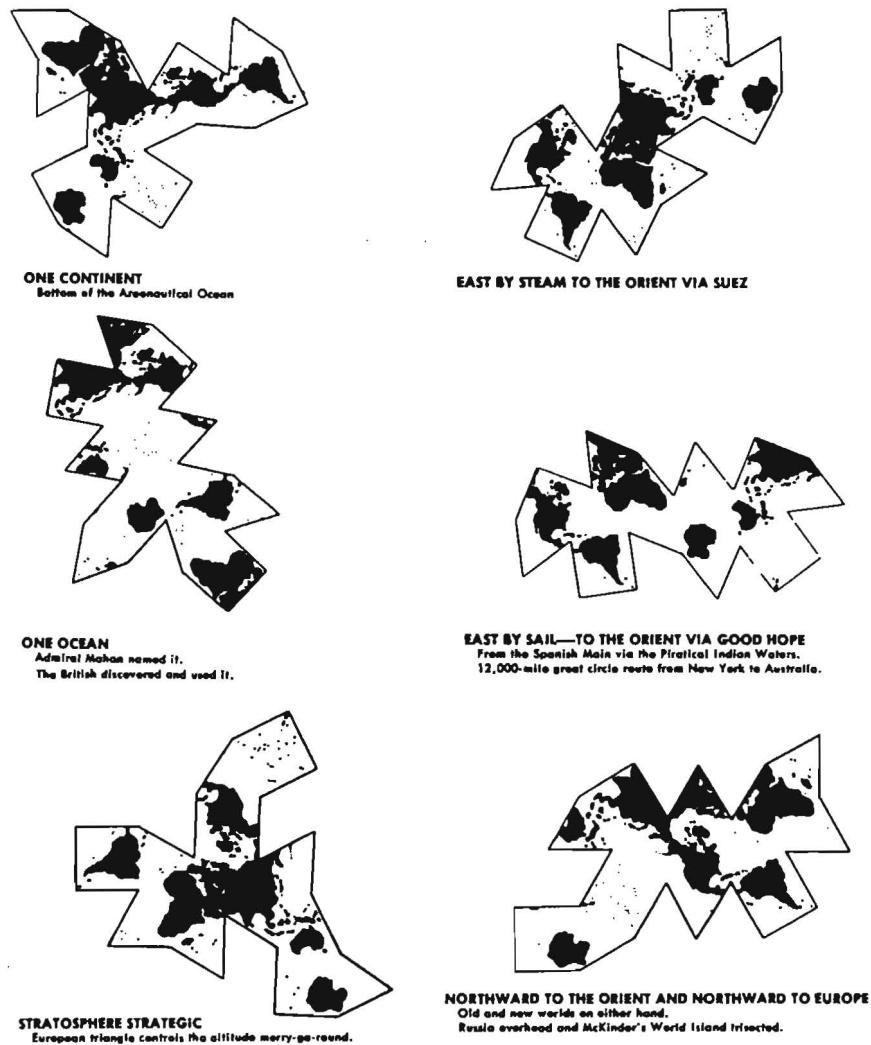


R. Buckminster Fuller and Shoji Sadao, *Dymaxion Airocean World Map*, 1954.

into significantly different sets of relationship. Precisely where the map is cut and folded determines how the parts are seen in relationship to each other, each time in radically altered, yet equally true, configurations. Potentially at least, each arrangement possesses great efficacy with regard to certain socio-political, strategic and imaginative possibilities.

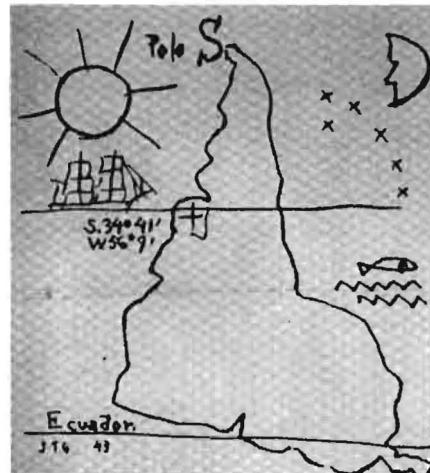
Unlike the scientific objectivism that guides most modern cartographers, artists have been more conscious of the essentially fictional status of maps and the power they possess for construing and constructing worlds.¹¹ In the same year as Fuller's projection, the Uruguayan artist Joaquín Torres-García drew the *Inverted Map of South America* with a very distinct 'S' at the top of the drawing. This remarkable image reminds us of the ways in which habitual conventions (in this case the unquestioned domination of north on top) condition spatial hierarchies and power relations. The convention of orienting the map to the north first arose early in the global and economic expansion of Northern Europe and in response to practices of navigation. But there are many instances of other societies at different times orienting their maps towards one of the other cardinal points, or making them circular without top and bottom (the Dymaxion map is perhaps one of the few modern instances where singular orientation is not a prerequisite). Maps of this sort are still legible and 'correct' in their depiction of spatial relationship, but the reader must first learn the relevant mapping codes and conventions.

Another instance of critique and invention of the modern map is Waltercio Caldas's *Japão*, of 1972.¹² Here, the artist is mapping a territory



R. Buckminster Fuller, *Alternative Sectional Arrangements of the Airocean World Map*, 1943.

that is foreign, or 'unimaginable' for many in the West. Rather than colonizing this territory through survey and inventory, typically Western techniques of power-knowledge, Caldas simply marks an otherwise empty map surface with very small inscriptions and numbers. These are contained by a very prominent, classical cartographic frame. There are no other outlines, shapes or forms, just small type and a few scribbles. There is no scale, no identifiable marks, no graticule of orientation, just a square



Joaquín Torres-García, *Inverted Map of South America*, 1943.

ink frame. In this stark, minimal cartographic field, Caldas presents an elusive geography, an open and indeterminate field of figures that returns *terra incognita* to an otherwise excessively mapped planet. The image is also a commentary on the cage-like power of the imperializing frame: the graphic square surrounds, captures and holds its quarry, but at the same time its contents remain foreign, evasive and autonomous. This blank, non-figured space raises both anxiety and a certain promise – promise because its potential efficacy lies in the emancipation of its contents. The autonomous, abstract structure suggests how mystery and desire might be returned to a world of places and things that have been otherwise excessively classified and structured. In Caldas's image, such places are liberated through precisely the same measures that first captured them.

Whereas certain artists have engaged creatively with cartographic techniques, planners and designers have been less ambitious.¹³ Techniques of aerial-oblique and zenithal views – planimetry, ichnography, and triangulation – were most developed during the early sixteenth century, and have since become the primary tools with which cities and landscapes are analysed, planned and constructed. Quantitative and thematic mapping techniques originated with the Enlightenment enthusiasm for rational progress and social reform, and these were later complemented by various statistical, comparative and 'zoning' techniques during the late nineteenth and early twentieth centuries.¹⁴ Some advances in these techniques have occurred over the past 30 years with the rise of satellite and

remote-sensing capabilities, together with new computer technologies such as Geographic Information Systems, but in principle they remain unchanged. These techniques remain largely unquestioned, conventional devices of inventory, quantitative analysis and legitimization of future plans. Issues of selectivity, schematization and synthesis remain generally oriented around the same conventions used a hundred years ago. With only a handful of exceptions, the relationship of maps to world-making is surprisingly under-thought. The limitations of this condition are extremely unfortunate; as the late geographer J. B. Harley argues:

One effect of accelerated technological change – as manifest in digital cartography and geographical information systems – has been to strengthen its positivist assumptions and [to breed] a new arrogance in geography about its supposed value as a mode of access to reality. If it is true that new fictions of factual representation are daily being foisted upon us, then the case for introducing a social dimension into modern cartography is especially strong. Maps are too important to be left to cartographers alone.¹⁵

In what follows, I suggest ways in which the social, imaginative and critical dimensions of mapping may be re-established in modern cartography, especially in mapping for urban and landscape planning and design. First, I discuss three points of clarification: the map's relationship to reality; the changing nature of time–space relations; and an insistence on equality of importance amongst mapping actions (techniques), mapping effects (consequences) and maps themselves. These will underpin my outline of a number of alternative mapping practices that play actively constitutive roles in forging culture, space and place.

MAPS AND REALITY

Jorge Luis Borges's tale of a fully detailed and life-sized map that eventually tore and weathered to shreds across the actual territory it covered is frequently quoted in essays on mapping.¹⁶ Not only does the tale beautifully capture the cartographic imagination, it goes to the heart of a tension between reality and representation, between the territory and the map. Equally referenced is Lewis Carroll's tale in *Sylvie and Bruno*, also of a life-sized map, in this case folded, thus preventing it being unfolded for practical application. The map was useless, allowing Carroll's character Mein Herr to conclude, 'so now we use the country itself, as its own map, and I assure you it does nearly as well'. In these two fables, not only is the map an inferior, secondary representation of territory, but the more detailed and life-like the map strives to be, the more redundant or unnecessary it becomes. Unlike paintings or photographs, which have the

capacity to bear a direct resemblance to the things they depict, maps must by necessity be abstract if they are to sustain meaning and utility. And such abstraction, the bane of untrained map-readers, is not at all a failing of maps but rather their virtue.

Jean Baudrillard reverses Borges's tale to make another point:

Simulation is no longer that of a territory, a referential being or substance. It is the generation by models of a real without origin or reality: a hyper-real. The territory no longer precedes the map, nor survives it. Henceforth, it is the map that precedes the territory.¹⁷

Arguably, of course, the map *always* precedes the territory, in that space only becomes territory through acts of bounding and making visible, which are primary functions of mapping. But Baudrillard is going one step further here, claiming that late twentieth-century communication and information technologies have produced such a blurring of what is real and what is a representation that the two can no longer be distinguished. He inverts Borges's fable to proclaim that 'it is the real and not the map whose vestiges subsist here and there'.¹⁸ Here, Baudrillard is careful to explain that this reversal does not mean that the world is scarcely more than a vast simulacrum, but rather that the act of differentiating between the real and the representation is no longer meaningful.

The dissolution of difference between reality and representation can also be approached through studies of spatial perception and cognition, especially those of child psychologists such as Jean Piaget, Edith Cobb and Donald Winnicott. Winnicott, for example, discusses the necessity of play for the maturing of psychological selfhood, describing how children relate to the external world of things and spaces in extremely fluid and labile ways. In discussing the importance of engagement and discovery through playing, he describes 'transitional objects' as those that are so possessed by the imagination that they are neither fully part of the self nor explicitly external. Emphasizing the creativity afforded by play, Winnicott argues that the space of play must remain beyond the reach of the empiricist question, 'Did you find that (in the world) or did you make it up?'¹⁹ To distinguish so completely an external, *a priori*, 'real world' from a constructed and participatory one would not only deny imagination but also be incongruent with humankind's innate capacity to structure reciprocal relationships with its surroundings.

If for Borges and Carroll the territory itself wins out over the map, and for Baudrillard the map has come to both precede and construct the territory, Winnicott points to the futility of trying to make any distinction

between the two, or indeed to accord primacy to either. And, whereas Baudrillard writes about the dissolution of difference with regard to the world of contemporary culture and its various systems of production, and Winnicott is more concerned with psychological development in relation to the phenomenal world, both authors recognize the conflation of cultural invention with found nature.

Reality, then, as in concepts such as 'landscape' or 'space', is not something external and 'given' for our apprehension; rather it is constituted, or 'formed', through our participation with things: material objects, images, values, cultural codes, places, cognitive schemata, events and maps. As the philosopher of science Jacob Bronowski pointedly observes, 'there are no appearances to be photographed, no experiences to be copied, in which we do not take part. Science, like art, is not a copy of nature but a re-creation of her.'²⁰ This mediated mode of being is more fully described by the philosopher Ernst Cassirer:

In truth . . . what we call the world of our perception is not simple, not given and self-evident from the outset, but 'is' only insofar as it has gone through certain basic theoretical acts by which it is apprehended and specified. This universal relationship is perhaps most evident in the intuitive form of our perceptual world, in its spatial form. The relations of 'together,' 'separate,' 'side-by-side,' are not just 'given' along with our 'simple' sensations, the sensuous matter that is order in space; they are a highly complex, thoroughly *mediated* product of empirical thought. When we attribute a certain size, position, and distance to things in space, we are not thereby expressing a simple datum of sensation but are situating the sensory data in a relationship and system, which proves ultimately to be nothing other than a relationship of pure judgement.²¹

The application of judgement, subjectively constituted, is precisely what makes a map more a project than a 'mere' empirical description. The still widely held assumption that maps are mute, utilitarian tools, of secondary significance to the *milieu* they represent, and lacking in power, agency or effects beyond simple, objective description, is to grossly misconstrue their capacity for shaping reality. Both maps and territories are 'thoroughly mediated products' and the nature of their exchange is far from neutral or uncomplicated.

I offer this sketch of maps and reality because it charts out what I think remains markedly under-thought (or, more precisely, *under-practised*) in current cultural projects. The implications of a world derived more from cultural invention than from a pre-formed 'nature' have barely begun to be explored, let alone accepted, at the level of cartographic practice. While contemporary scholars have begun to demonstrate how even the

most objective descriptions of reality are culturally 'situated', and that 'nature' is perhaps the most situated yet shifting construction of all, few have dared to develop and practise techniques for realizing the potential offered by such an emancipated (even playful and promiscuous) world of constructions.

Whereas the architectural and planning arts ought to be leading such an exploration, they are still largely entrenched with the tools of thought passed down from Enlightenment and modernist paradigms: orthography, axonometry, perspective, maps as quantitative surveys and inventories, and plans as rational, self-contained ideals. Although these conventions are closely aligned with procedures of translation and construction, they are also technical instruments that enable the utopian renovation of huge tracts of urban fabric (stylistic issues notwithstanding). Sites are treated either as blank areas (*tabulae rasae*) or as simple geometrical figures to be manipulated from high above. The synoptic 'master-plan' governs, while mapping, and all its potential for engaging and evolving local intricacy, is relegated to the relatively trivial role of marking location, inventorying resources and justifying future policies.

In recent years, however, much greater attention has been paid in the landscape and architectural arts to the specificity of site and context. Also, there has been a corresponding interest in developing more discreet and local modes of intervention as distinct from universal planning. Hence the resurgence of interest in mapping by a generation of young landscape architects, architects and urban planners. For them, mapping refers to more than inventory and geometrical measure, and no presumption is made of innocence, neutrality or inertia in its construction. Instead, the map is first employed as a *means* of 'finding' and then 'founding' new projects, effectively re-working what already exists. Thus, the *processes* of mapping, together with their varied informational and semantic scope, are valued for both their revelatory and productive potential. Consequently, concepts of 'site' are shifting from that of simply a geometrically defined parcel of land to that of a much larger and more active *milieu*.

Milieu is a French term that means 'surroundings', 'medium' and 'middle'. *Milieu* has neither beginning nor end, but is surrounded by other middles, in a field of connections, relationships, extensions and potentials. In this sense, then, a grounded site, locally situated, invokes a host of 'other' places, including all the maps, drawings, ideas, references, other worlds and places that are invoked during the making of a project. 'Site' today is a multiplicitous and complex affair, comprising a potentially

boundless field of phenomena, some palpable and some imaginary. In making visible what is otherwise hidden and inaccessible, maps provide a working table for identifying and reworking polyvalent conditions; their analogous-abstract surfaces enable the accumulation, organization and restructuring of the various strata that comprise an ever-emerging *milieu*.

These ideas return us to the opening concern of this essay for the role of maps within the landscape and architectural imagination. For the landscape architect and urban planner, maps are sites for the imaging and projecting of alternative worlds. Thus maps are in-between the virtual and the real. Here, Winnicott's question, 'Did you find that in the world or did you make it up?' denotes an irrelevant distinction. More important is how the map permits a kind of excavation (downward) and extension (outward) to expose, reveal and construct latent possibilities within a greater *milieu*. The map 'gathers' and 'shows' things presently (and always) invisible, things which may appear incongruous or untimely but which may also harbour enormous potential for the unfolding of alternative events. In this regard, maps have very little to do with representation as depiction. After all, maps look nothing like their subject, not only because of their vantage point but also because they present all parts at once, with an immediacy unavailable to the grounded individual. But more than this, the function of maps is not to depict but to enable, to precipitate a set of effects in time. Thus, mappings do not *represent geographies* or ideas; rather they *effect* their actualization.

Mapping is neither secondary nor representational but doubly operative: digging, finding and exposing on the one hand, and relating, connecting and structuring on the other. Through visual disclosure, mapping both sets up and puts into effect complex sets of relationship that remain to be more fully actualized. Thus mapping is not subsequent to but prior to landscape and urban formations. In this sense, mapping is returned to its origins as a process of exploration, discovery and enablement. This is less a case of mapping to assert authority, stability and control, and more one of searching, disclosing and engendering new sets of possibility. Like a nomadic grazer, the exploratory mapper detours around the obvious so as to engage what remains hidden.

SPACE AND TIME TODAY

A creative view of mapping in the context of architectural, landscape and urban production is rendered all the more relevant by the changing nature of spatial and temporal structures in today's world. Events occur with such speed and complexity that nothing remains certain. Large numbers

live in a world where local economies and cultures are tightly bound into global ones, through which effects ripple with enormous velocity and consequence. Surrounded by media images and an excess of communication that makes the far seem near and the shocking merely normal, local cultures have become fully networked around the world. Air travel and other modes of rapid transportation have become so accessible that localities can be more closely connected to sites thousands of miles away than to their immediate surroundings. Today, structures of community life are shifting from spatial stability towards shifting, temporal coordination. Public life is now scheduled and allocated more by time than centred according to place, while the circulation of capital demands an ever-more mobile and migratory workforce. Ten-mile linear cities are built in South-East Asia in a matter of months, seemingly constructed out of nothing according to modes of agreement that are neither democratic nor authoritarian, merely expedient. And finally, perhaps, the near-conquest of both the Genome and the Universe proclaim the end of earthly limits and coherence. Such fantastic play across the world's various surfaces is characterized not only by a fertile heterogeneity but also by conceptual elements coming loose from their traditional moorings. The boundaries between different foundational realities have become so blurred, in fact, that it is practically impossible in a cyber-world to distinguish between what is information and what is concrete, what is fact and what is fiction, what is space and what is time.

Mapping and contemporary spatial design techniques more generally have yet to find adequate ways to engage creatively with the dynamic and promiscuous character of time and space today. Most design and planning operations appear somewhat outmoded, overwhelmed or incongruent in comparison to the rapidly metabolizing processes of urbanization and communication. In celebrating the urban freedoms and pleasures of Los Angeles, for example, the urbanist Reyner Banham goes to great lengths to explain the complex array of forces that led to the city's development, with planners and designers playing a distinctly minor role.²² He questions whether or not Los Angeles would be as rich and modern a city if planners had exercised more of their authority – a point often made about London in comparison to Paris. While not everyone may share Banham's enthusiasm for the contemporary metropolis, his point is that new and productive forms of socialization and spatial arrangement are evolving without the aid, direction or involvement of planners and designers. Moreover, Banham suggests that to assume this is a bad and negligent thing is to adopt a somewhat naïve and insular, even elitist, posi-

tion. This point is also argued by Rem Koolhaas in his discussion of 'the generic city', or those identity-less areas that today comprise the bulk of the sprawling urban fabric where most people live. In criticizing a continued fascination of architects and planners with the 'old identities' of traditional city centres such as Paris or Berlin, Koolhaas argues that there is a much more current and urgent urban condition that is being neglected. He argues that there might be certain virtues in these generic regions, such as their complete lack of memory or tradition that then liberates the urban planner from a whole series of conventional obligations, models and assumptions. 'The stronger identity, the more it imprisons, the more it resists expansion, interpretation, renewal, contradiction,' he writes. 'The generic city presents the final death of planning. Why? Not because it is unplanned . . . [but because] planning makes no difference whatsoever.'²³

Through such urbanists as Reyner Banham, Edward Soja, David Harvey, Rem Koolhaas and Bernard Tschumi, anthropologists such as Marc Auge, or philosophers such as Henri Lefebvre or Gilles Deleuze, it is becoming clearer to architects and planners that 'space' is more complex and dynamic than previous formal models allowed. Ideas about spatiality are moving away from physical objects and forms towards the variety of territorial, political and psychological social processes that flow through space. The *interrelationships* amongst things in space, as well as the *effects* that are produced through such dynamic interactions, are becoming of greater significance for intervening in urban landscapes than the solely compositional arrangement of objects and surfaces.

The experiences of space cannot be separated from the events that happen in it; space is situated, contingent and differentiated. It is remade continuously every time it is encountered by different people, every time it is represented through another medium, every time its surroundings change, every time new affiliations are forged. Thus, as David Harvey has argued, planners and architects have been barking up the wrong tree in believing that new spatial structures alone would yield new patterns of socialization. The struggle for designers and planners, Harvey insists, lies not with spatial form and aesthetic appearances alone (the city as a thing) but with the advancement of more liberating processes and interactions in time (urbanization). Multiple processes of urbanization in time are what produce 'a distinctive mix of spatialized permanences in relation to one another';²⁴ hence the urban project ought to be less about spatial determinism and more about reshaping those urbanization processes that are 'fundamental to the construction of the things that contain them'.²⁵

Thus, in criticizing the formalism of both the modernist utopia and the sentimental, communitarian 'new urbanism', Harvey argues that the dynamic multiplicity of urban processes cannot be contained within a singular, fixed spatial frame, especially when that frame neither derives from, nor itself redirects, those processes moving through it. He writes:

The issue is not one of gazing into some crystal ball or imposing some classic form of utopian scheme in which a dead spatiality is made to rule over history and process. The problem is to enlist in the struggle to advance a more socially just and emancipatory mix of spatio-temporal production processes rather than to acquiesce to those imposed by finance capital, the World Bank and the generally class-bound inequalities internalized within any system of uncontrolled capital accumulation.²⁶

Harvey's point is that projecting new urban and regional futures must derive less from a utopia of form and more from a *utopia of process* – how things work, interact and inter-relate in space and time. Thus, the emphasis shifts from static object–space to the space–time of relational systems. And, it is here, in this complex and shifty *milieu*, that *maps*, not *plans*, achieve a new instrumental significance.

MAPPING

'To plan a city is both to think the very plurality of the real and to make that way of thinking effective,' writes the philosopher of the everyday Michel de Certeau: 'it is to know how to articulate it and be able to do it.'²⁷ Mapping is key here for it entails processes of gathering, working, reworking, assembling, relating, revealing, sifting and speculating. In turn, these activities enable the inclusion of massive amounts of information that, when articulated, allow certain sets of possibility to become actual. In containing multiple modes of spatio-temporal description, mapping precipitates fresh insights and enables effective actions to be taken. Thus mapping differs from 'planning' in that it entails searching, finding and unfolding complex and latent forces in the existing *milieu* rather than imposing a more-or-less idealized project from on high. Moreover, the synoptic imposition of the 'plan' implies a consumption (or extinguishing) of contextual potential, wherein all that is available is subsumed into the making of the project. Mapping, by contrast, discloses, stages and even adds potential for later acts and events to unfold. Whereas the plan leads to an end, the map provides a generative means, a suggestive vehicle that 'points' but does not overly determine.

A particularly important aspect of mapping in this regard is the acknowledgement of the maker's own participation and engagement

with the cartographic process. In studying the development of spatial perception in children, Jean Piaget has written:

Geometrical intuition is essentially active in character. It consists primarily of virtual actions, abridgements or schemata of past, or anticipatory schemata of future actions, and if the action itself is inadequate, intuition breaks down.²⁸

In describing the mental imaging of various relational processes, such as cutting, folding, rotating and enlarging, Piaget writes:

Spatial concepts can only effectively predict these results by becoming active themselves, by operating on physical objects, and not simply evoking memory images of them. To arrange objects mentally is not merely to imagine a series of things already set in order, nor even to imagine the action of arranging them. It means arranging the series just as positively and actively as if the action were physical.²⁹

Actions precede conceptions; order is the outcome of the act of ordering. Thus mapping precedes the map, to the degree that it cannot properly anticipate its final form. Robinson and Petchenik claim that 'in mapping, one objective is to discover (by seeing) meaningful physical and intellectual shape organizations in the *milieu*, structures that are likely to remain hidden until they have been mapped . . . plotting out or mapping is a method for searching for such meaningful designs'.³⁰ In other words, there are some phenomena that can only achieve visibility through representation rather than through direct experience. Furthermore, mapping engenders new and meaningful relationships amongst otherwise disparate parts. The resultant relational structure is not something already 'out-there', but rather something constructed, bodied forth through the act of mapping. As the philosopher Brand Blanshard observes, 'space is simply a relation of systematized outsideness, by itself neither sensible nor imaginable';³¹ it is *created* in the process of mapping.

MAPPING OPERATIONS

The operational structure of mapping might be schematized as consisting of 'fields', 'extracts' and 'plottings'. The field is the continuous surface, the flat-bed, the paper or the table itself, schematically the analogical equivalent to the actual ground, albeit flat and scaled. The field is also the graphic *system* within which the extracts will later be organized. The system includes the frame, orientation, coordinates, scale, units of measure and the graphic projection (oblique, zenithal, isometric, anamorphic, folded, etc.). The design and set-up of the field is perhaps one of the most creative acts in mapping, for as a prior system of organization it will

inevitably condition how and what observations are made and presented. Enlarging the frame, reducing the scale, shifting the projection or combining one system with another are all actions that significantly affect what is seen and how these findings are organized. Obviously, a field that has multiple frameworks and entryways is likely to be more inclusive than a singular, closed system. Also, a field that breaks with convention is more likely to precipitate new findings than one that is more habitual and routine. And third, a field that is designed to be as non-hierarchical and inclusive as possible – more ‘neutral’ – is likely to bring a greater range of conditions into play than a field of restrictive scope.

Extracts are the things that are then observed within a given *milieu* and drawn onto the graphic field. We call them extracts because they are always selected, isolated and pulled-out from their original seamlessness with other things; they are effectively ‘de-territorialized’. They include objects but also other informational data: quantities, velocities, forces, trajectories. Once detached they may be studied, manipulated and networked with other figures in the field. As described above, different field systems will lead to different arrangements of the extracts, revealing alternative patterns and possibilities.

Plotting entails the ‘drawing out’ of new and latent relationships that can be seen amongst the various extracts within the field. There are, of course, an infinite number of relationships that can be drawn depending upon one’s criteria or agenda. Richard Long, for example, who has made an art-form of walking, may plot a line upon a map to connect the highest to the lowest summit in sequential order, for example, revealing a latent structural line across a given terrain. Upon the same map, however, it is possible to plot a line that connects all south-facing aspects in sequential order from large to small areas, or to find a range of wet conditions that can then be set into relationship by plotting a comparative index of water characteristics. In addition to geometrical and spatial plotting, taxonomic and genealogical procedures of relating, indexing and naming can often be extremely productive in revealing latent structures. Such techniques may produce insights that have both utility and metaphoricity. In either case, plotting entails an active and creative interpretation of the map to reveal, construct and engender latent sets of possibility. Plotting is *not* simply the indiscriminate listing and inventorying of conditions, as in a tracing, a table or a chart, but rather a strategic and imaginative drawing-out of relational structures. To plot is to track, to trace, to set-in-relation, to find and to found. In this sense, plotting produces a ‘re-territorialization’ of sites.

Thus we can identify three essential operations in mapping: first, the creation of a field, the setting of rules and the establishment of a system; second, the extraction, isolation or ‘de-territorialization’ of parts and data; and third, the plotting, the drawing-out, the setting-up of relationships, or the ‘re-territorialization’ of the parts. At each stage, choices and judgements are made, with the construing and constructing of the map alternating between processes of accumulation, disassembly and reassembly. By virtue of the map-maker’s awareness of the innately rhetorical nature of the map’s construction as well as of personal authorship and intent, these operations differ from the mute, empirical documentation of terrain so often assumed by cartographers.

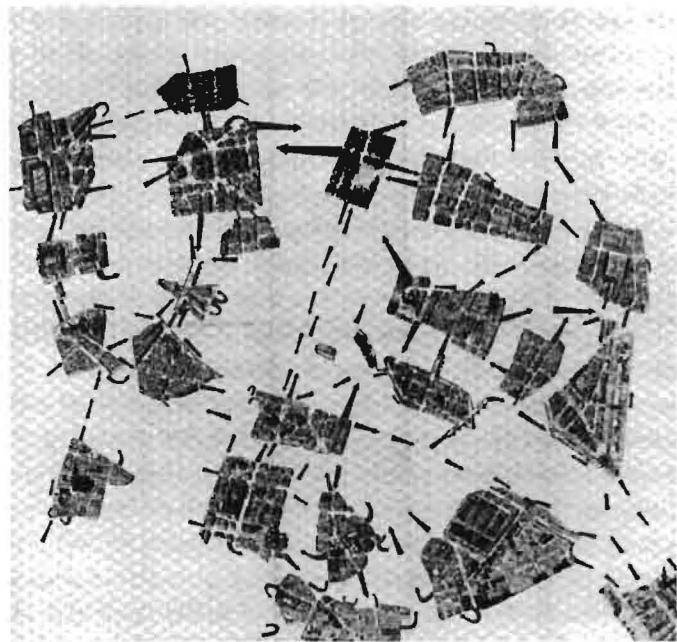
We may now identify four thematic ways in which new practices of mapping are emerging in contemporary design and planning, each producing certain effects upon perceptions and practices of space. I label these techniques ‘drift’, ‘layering’, ‘game-board’ and ‘rhizome’.

Drift

The Situationists were a European group of artists and activists in the 1950s and 1960s. They aimed somehow to disrupt any form of what they took to be the dominant regime or capitalist power. Drawing from various Dadaist practices, and later influencing other conceptual art movements such as Fluxus and Performance Art, the Situationists advocated a series of works that increased public consciousness and promoted direct action and systematic participation in everyday life. They were less interested in art objects and stylistic concerns than with the engaging life situations and social formations.³²

Guy Debord, a key Situationist theorist, made a series of maps, or ‘psycho-geographic guides’, of Paris. These were made after Debord had walked aimlessly around the streets and alleys of the city, turning here and there wherever the fancy took him. Recording these wanderings, Debord would cut up and reconfigure a standard Paris map as a series of turns and detours. The resultant map reflected subjective, street-level desires and perceptions rather than a synoptic totality of the city’s fabric. More a form of cognitive mapping than mimetic description of the cityscape, Debord’s maps located his own play and representation within the recessive nooks and crannies of everyday life. Such activity became known as the *dérive*, or the dream-like drift through the city, mapping alternative itineraries and subverting dominant readings and authoritarian regimes.

What is interesting about the *dérive* is the way in which the contingent, the ephemeral, the vague, fugitive eventfulness of spatial experience



Guy Debord, *Discours sur les Passions de l'amour*, 1957.

becomes foregrounded in place of the dominant, ocular gaze. As de Certeau writes:

The ordinary practitioners of the city live 'down below', below the threshold at which visibility begins. They walk – an elementary form of this experience of the city: they are walkers, *Wandersmänner*, whose bodies follow the thicks and thins of an urban 'text' they are able to write without being able to read it.³³

The political and moral underpinnings of this view gesture towards the valorization of individual participation within a seemingly repressive apparatus of state or bureaucratic power. In describing the importance of such cognitive mapping in relation to urban space, Frederic Jameson writes:

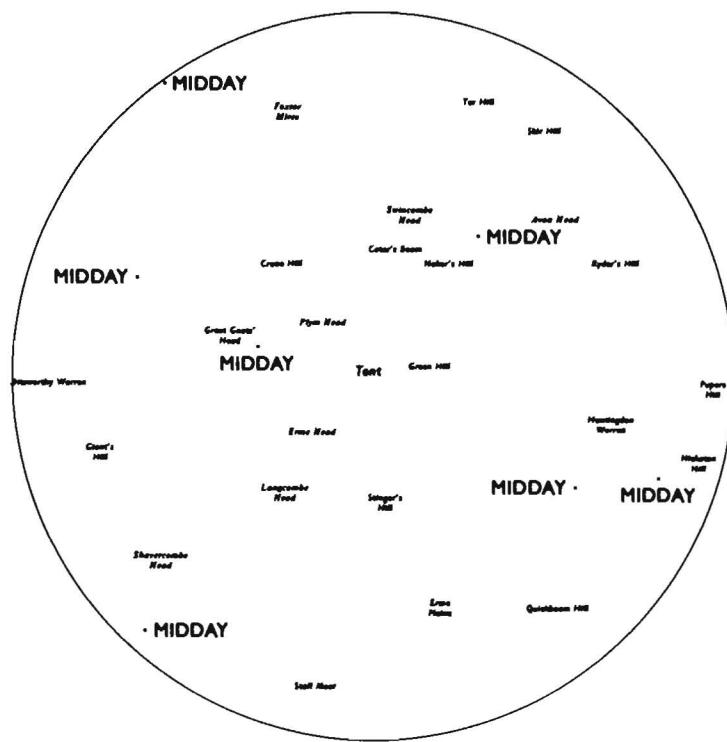
Disalienation in the traditional city . . . involves the practical reconquest of a sense of place and the construction or reconstruction of an articulated ensemble which can be retained in memory and which the individual subject can map and remap along the moments of mobile, alternative trajectories.³⁴

If mapping had been traditionally assigned to the colonizing agency of survey and control, the Situationists were attempting to return the map to everyday life and to the unexplored, repressed topographies of the city. In

this regard, Fluxus founder George Maciunas organized a series of 'Free Flux Tours' around Manhattan in 1976, which included an 'Aleatoric Tour', a 'Subterranean Tour', an 'Exotic Sites' itinerary and an 'All the Way Around and Back Again' trip. The art 'object' here was the city itself, the map's role to facilitate alternative impressions of and interventions in the urban *milieu*. There are similar instances of such work – Daniel Buren's *Seven Ballets in Manhattan*, or Yoko Ono's urban 'scores', for example – but the essential characteristic shared by all these projects is an ambition to contest and destabilize any fixed, dominant image of the city by incorporating the nomadic, transitive and shifting character of urban experience into spatial representation.³⁵

Although earth-artist Richard Long shares little of the political and strategic agenda of the Situationists, his systematic play with maps and landscapes is very much in the same vein as *dérive*. Long works closely with maps in planning and then recording his walks.³⁶ Sometimes he will simply draw an arrow-straight line across a terrain and embark on the mission of walking it in actuality. The line may have a particular unit of measure (a mile, sixty minutes or seven days) to which he will adhere, or it may assume a geometrical configuration such as a circle, a square or a spiral, superimposed upon a variegated terrain. At other times, the line might follow a particular topographic condition, tracing the highest to the lowest point, following a lake edge or bisecting human boundaries. He links together river beds, mountain tops, wind directions, left turns, dead ends or any number of other topographic itineraries in an effort both to experience the land through what is an 'unusual' walk or journey and to trace upon it (albeit lightly, or even only in memory) an alternative gesture.

It is important to understand that the primacy of both Long's and the Situationist's use of maps belongs to the their *performative* aspects, that is to the way in which mapping directs and enacts a particular set of events, events that derive from a given milieu. But, of course, there are the recordings that come after the proceedings, and these are neither passive nor neutral in their effects either. In Long's *A Seven Day Circle of Ground – Seven Days Walking Within an Imaginary Circle 5½ Miles Wide* (1984), for example, the extremely selective choice of place names (spaced locationally) are brought into a unique associational relationship *simply* by the straightforward and laconic recording of the performance, recorded by the word 'tent' and the array of seven 'midday' points contained within a circular frame. The circle itself, like other lines and figures in Long's work, is not visible on the ground; it exercises its effect through its



SEVEN DAYS WALKING WITHIN AN IMAGINARY CIRCLE 5½ MILES WIDE
DARTMOOR ENGLAND 1984

Richard Long, printed text from *A Seven Day Circle of Ground* . . .

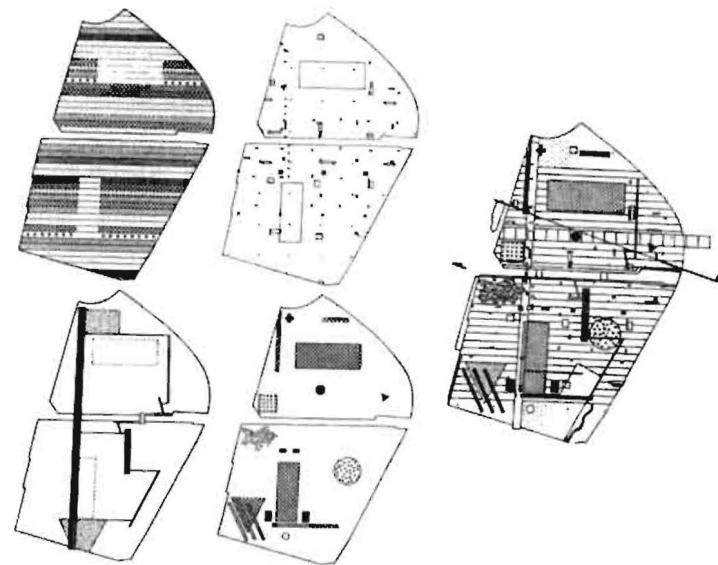
(arbitrary) delineation on the map. Like a frame or graticule, the circle is an imaginary figure that holds otherwise inchoate things in a field of relationship. This, in turn, points towards various alternative readings and actions that might then be exercised upon a particular landscape.

These various practices of 'drift' use maps as instruments for establishing and aligning otherwise disparate, repressed or unavailable topographies; they are 'set-ups' that both derive from and precipitate a series of interpretative and participatory acts. Their highly personal and constructive agency make them quite unlike the detached work of conventional map-makers. They are openly cognitive, mental maps, rendering new images of space and relationship. Moreover, the drift permits a critique of

contemporary circumstances, not from outside and above (as a master-plan) but from participation *within* the very contours and fabric of political and institutional reality. The field, the extracts and the plottings are played out not only upon the surface of the map but also upon the physical terrain itself, leaving an entire corpus of interventions and effects behind. Thus, drift discloses hidden topographies within ruling, dominant structures in an attempt to re-territorialize seemingly repressed or spent ground.³⁷

Layering

A relatively new development in the design of large-scale urban and landscape fabrics has been 'layering'. This involves the superimposition of various independent layers one upon the other to produce a heterogeneous and 'thickened' surface. Architects Bernard Tschumi and Rem Koolhaas were amongst the first to develop layering strategies in design and planning in their respective proposals for the Parc de la Villette in Paris, 1983.³⁸ Generally, these projects dismantle the programmatic and logistical aspects of the park into a series of layers, each of which is then considered independently from the other layers. There is an internal logic, content and system of organization to each layer, depending on its function or intended purpose. The layers are not mappings of an existing site or context, but of the complexity of the intended programme for the site. In both analysing and synthesizing the enormously complex array of data and technical requirements surrounding the programme for the new park, these mappings also array an enabling geometry. When these separate layers are overlaid together, a stratified amalgam of relationships amongst parts appears. The resulting structure is a complex fabric, without centre, hierarchy or single organizing principle. The composite field is instead one of multiple parts and elements, cohesive at one layer but disjunct in relation to others. Such richness and complexity cannot be gained by the limited scope of the single master-plan or the zoning plan, both of which group, hierarchicalize and isolate their component parts. Unlike the clear order of the compositional plan, the layering of independently structured conditions leads to a mosaic-like field of multiple orders, not unlike the combination of different coloured paint delineations for the playing of games superimposed on a gymnasium floor. One layer becomes legible only through the lens of the game or rules of use that apply to it. But, of course, the possibility of 'hybrid' games becomes possible here too – not only may things occur simultaneously side-by-side, but they may also merge as a new event structure (as in many children's games



Rem Koolhaas/Office for Metropolitan Architecture, *Layer Diagrams for the Parc de la Villette*, 1983.

where throwing, hitting, passing and running are combined into a new system of play).

The same effects of multiplicity, montage and hybridization are found in similar layering techniques used in some contemporary rock music genres. Several autonomous mixes may be simultaneously run together to develop a polyrhythmic and cross-cultural condition. The music escapes any single interpretation, as a range of cultural and genre sources come into radically new fields of combination. Caribbean rhythms are overlaid with country-and-western and techno-dance music, often producing a frenzied cacophony of associations and new possibilities. Significantly, though, this effect is performative not representational; it engenders new possibilities out of old, and does not simply array its extracts as a muted archaeology.

Another way one can characterize the multiplying functions of layering is in terms of indeterminacy. Unlike a traditional plan, the layered field remains open to any number of interpretations, uses and transformations in time. Just as upon the gymnasium floor, almost anything can happen; the layered structure provides little restraint or imposition. Unlike traditional plans, maps share this open-ended characteristic. Maps are not prescriptive but infinitely promising. Thus, as constructed projects, mapping



Rem Koolhaas/Office for Metropolitan Architecture, *Program Map*, Yokohama, 1992.

strategies propose organizational field-systems that both instigate and sustain a range of activities and interpretations in time.

Another architect who has worked with strata in the formation of projects is Peter Eisenman. In his proposal for a new Art Museum at the California State University at Long Beach, California, developed in collaboration with landscape architect Laurie Olin, a whole series of local maps are drawn upon and transformed into a new composite assembly.³⁹ In the resulting design, landscape and building are merged into one large fractured ground-plane, evoking both the excavations typical of archaeological sites as well as the strata of historical and projective time that are often visible in maps but not on the ground.

In documenting the site, the designers found a number of significant historic moments: the Gold Rush settlement of California in 1849, the creation of the campus in 1949 and the anticipated 'rediscovery' of the



Peter Eisenman with Laurie Olin, *Sketch Site Plan, phase 4, University Art Museum of the State University at Long Beach California, 1986.*

museum in 2049, two hundred years after its initial marking. Seven key 'figures' emerge from this: 'ranch', 'campus', 'fault-lines', 'land-division grids', 'river', 'channel' and 'coastline'. An archival search through historical maps enables these primary figures to be identified and drawn out as discrete shapes. Each figure is considered a separate layer, and can be either shrunk, enlarged or rotated according to the designer's syntactical code. 'Scaling', for instance, is a significant step in Eisenman's work.⁴⁰ This involves the displacement, reduction/enlargement and multiplication of prominent textual figures (shape-forms derived from topographical maps) so as to remove any fixed or stable reading. The trace of the faultlines, for instance, is not intended to represent or even invoke a geological condition, but rather to produce a new, de-territorialized figure through extraction and scaling. In both defamiliarizing and systematizing the landscape through such a series of mapping operations, Eisenman eliminates the traditionally assumed causal relationship between form and intention while also avoiding the limitations of purely autonomous,

self-referential procedures of composition. He argues that in manipulating mappings of the site and its larger milieu, the project can 'evolve' a future form out of specific and unique local histories.

In tracing out several iterations of the scaled overlays, Eisenman searches for new analogic relationships; for example, amongst the 'ranch', the 'campus' and the 'faultline'. He finally settles on what he believes to be the most poignant composition of combination and relationship. As he says, 'the overlapping registration of several maps . . . are combined in such a way that none of the notations takes precedence over any other, and so as to textualize coincidental overlaps by subjective interpretation'.⁴¹ The composite quarry reveals certain relationships that were never visible, as if the ground itself were now a constructed map, or text, albeit infinitely interpretable. Constructed fragments of information become 'marks of intelligence, glimpses of the way the culture organized itself,' writes Eisenman, continuing: 'One recognizes in this project that architecture is about telling stories, and this stone text that is being written, this fiction, might tell a very different story about Long Beach than has ever been recorded before'.⁴² In other words, the way in which the narrative is assembled, the relating or registering of one thing to another, constructs a radically new fiction out of old facts.

Whereas Koolhaas and Tschumi's strategic layers are drawn from and anticipate future programmes, Eisenman's layers are site and textual in origin. They are less intended to accommodate a variety of changing activities than they are to produce new formal arrangements. In both cases, however, the practice of superimposing otherwise independent layers of information is aimed towards the production of a constructed *milieu* that is heterogeneous and multiple in its effects. In other words, traditional notions of centring, bounding, imparting meaning and asserting finish or completion are here banished in favour of more plural, open-ended 'performances' of the project-in-time. In this context, mapping is no longer restricted to preliminary site surveys or data collection but rather extends *generatively* into the formation of the design itself, analytically transforming the originating referents into new figures and coordinates.

Game-board

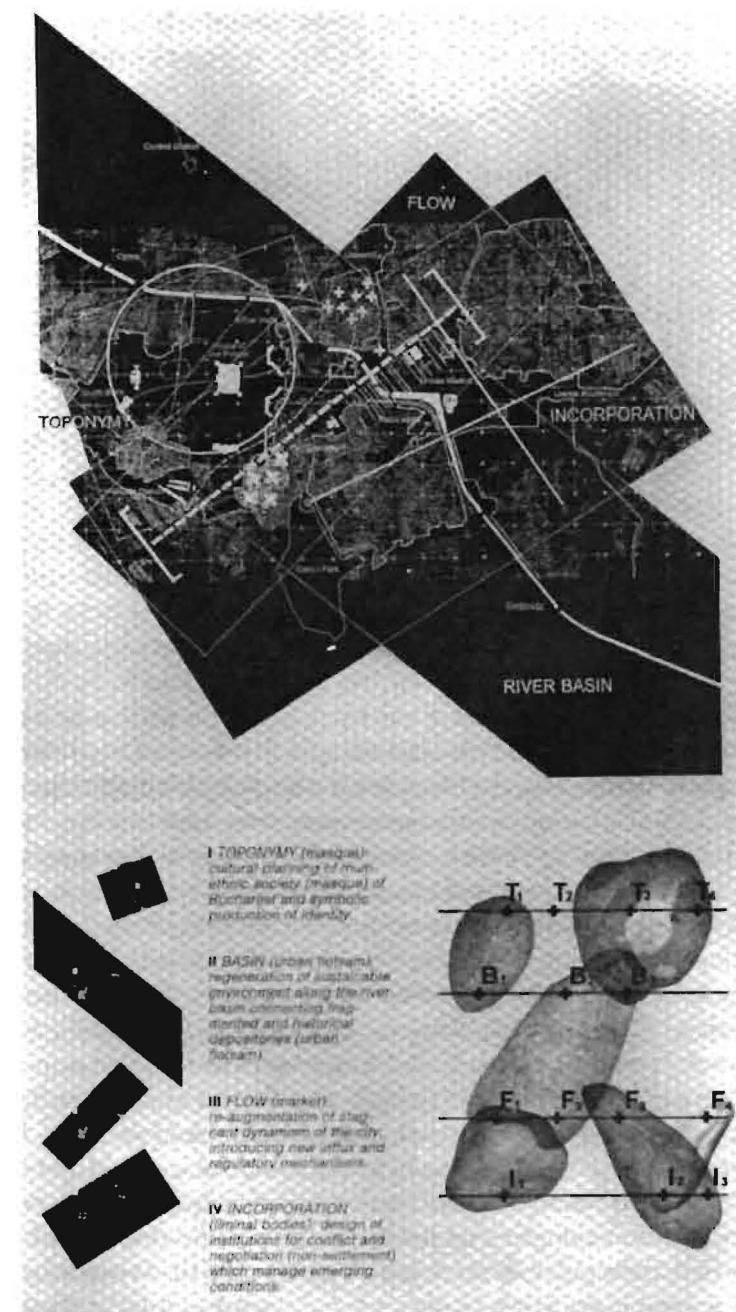
A third thematic development of mapping in contemporary design practice, and one related to the notions of performance mentioned above, has been the projection of 'game-board' map structures. These are conceived as shared working surfaces upon which various competing constituencies

are invited to meet to work out their differences. As a representation of contested territory, the map assumes an enabling or facilitating status for otherwise adversarial groups to try and find common ground while 'playing out' various scenarios. Ideas of drift and layering are developed here, as the former allows for personal engagement between mapper and constituents, while the latter permits the analytical separation of multiple issues and agendas.

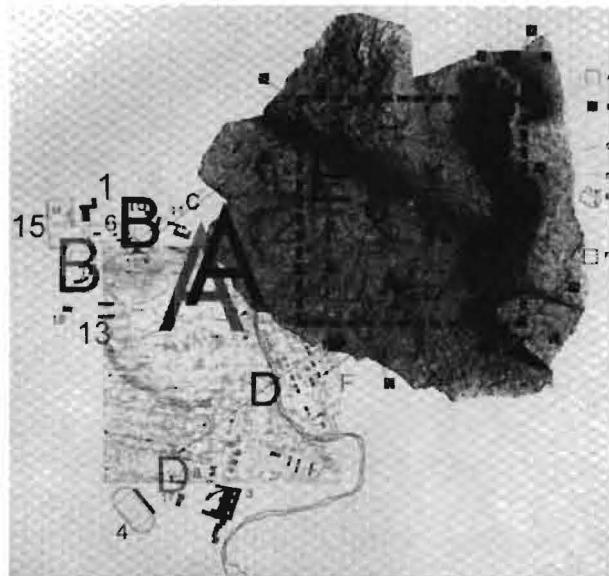
Raoul Bunschoten is a London-based architect who has engaged with a number of complex and contentious urban regions in Europe, and has developed a number of innovative mapping techniques for working with such sites.⁴³ For Bunschoten, cities are dynamic and multiple; they comprise a vast range of 'players' and 'agents' whose 'effects' flow through the system, continually reworking the variety of urban spaces in any given field. His approach is aimed first towards identifying and then redirecting the temporal play of these various forces. Consequently, urban design is practised less as spatial composition and more as orchestrating the conditions around which processes in the city may be brought into relationship and 'put into effect'. Bunschoten calls this 'stirring'.

A key principle in Bunschoten's work is the idea of 'proto-urban conditions'. These are the range of potentially productive situations in a given *milieu*. But whereas the conventional planner's list of possibilities derive more from some overall governing authority, proto-urban conditions are 'drawn out' from existing structures and potentials, and, thus, are already invested with local, emotive force. 'Proto-urban conditions are like emotions in human beings,' writes Bunschoten, 'subliminal conditions that strongly affect physical states and behavior. These conditions form a metaphoric space in the city, a space that is in need of appropriate forms of expression.'⁴⁴ In order to employ and operationalize these various conditions, they must first be made visible. Bunschoten accomplishes this by setting up a number of map-frames, within which certain processes or conditions are graphically identified. He is careful to link the various cultural aspirations of each group to a physical space or territory, distinguishing amongst 'local authorities' who anchor conditions into specific institutions or places, 'actors' who participate with stated desires and 'agents' who have the power and capacity to make things happen. Each frame permits the play of certain thematic conditions (preservation, ecology, economic development or cultural memory, for instance), whilst the composite overlay of all of the frames more accurately conveys the plural and interacting nature of the urban theatre.

In Bunschoten's proposal for Bucharest, Romania, the city is clearly



Raoul Bunschoten/CHORA, *Four Planning Fields for Bucharest, Romania, 1996*.



Raoul Bunschoten/CHORA, *Toponymy*,
Alexandrov, Russia, 1995.

mapped into the larger context of the Black Sea basin with respect to the various social, political and physical changes that have affected the city's development. 'In this way, the Black Sea is a large-scale object that relates to cultural identification,' writes Bunschoten, 'but, importantly, it is also virtually a "dead sea", a cause for international concern that engenders a kind of operational power and creates the possibility of linking global economy to urban planning propositions within the context of cultural and ecological planning.'⁴⁵ In other words, through situating the city in its larger geographical and political-economic region – linking Bucharest with Russia, Central Asia, Western Europe and the Middle East – Bunschoten develops a cartographic 'stage' upon which various interests and agents can be identified and brought together for mutual benefit.

To clarify the process further, Bunschoten itemizes four fields: 'toponymy' refers to the deployment of the colourful, cultural and ethnic diversity that characterizes Bucharest; 'basin' refers to the desire to regenerate the various ecologies and historical sites of the river basin; 'flow' refers to both the regulatory mechanisms and the physical venues for market and economic exchange in the city; and 'incorporation' refers to the specific design of new institutions and small-scale self-organizational forms that permit public negotiation. When the layers are superimposed,

there are revealed a number of vertical correspondences, or 'stepping stones', that are conceived by Bunschoten to permit decisions and actions on one plane to have effects upon the others. He writes:

The overall aim of the project is to provide a cultural planning concept that acts as a model for interested parties in Bucharest. It is a rule-based plan for developing and advancing possible scenarios of urbanization, a type of game structure. The game suggests a mode of planning based on temporal structures that evolve independently and yet may intertwine with fruitful effects. This requires players, acting both in the city and at a distance. Both model and game are based on an understanding of as many different proto-urban conditions as possible.⁴⁶

The graphic map provides the game-board for playing out a range of urban futures. Identified players and actors are brought together to try to work out complex urban issues within an open-ended generative structure. Diverse forms of negotiation are promoted as the survival strategies of each player unfold and become interwoven with others in reaction to changing interests and situations. Thus the maps themselves are evolving structures, drawn and redrawn by the urban planner so as to permit the game to continue while also generating the necessary conditions for the emergence of an enterprising urbanity.

This tactical kind of mapping is not to be confused with the simple inventory and empirical presentation of resources. First, its data is not indiscriminately derived from the usual statistical and quantifiable sources and represented in the form of tracings; rather, data is knowingly selected and arrayed according to local knowledge of and direct participation within the field itself. These maps are informed by a kind of street-level ethnography that is often highly personalized and peculiar to places and individuals. In this way, the field-worker/mapper gains a remarkably detailed and socially colourful sense of local dynamics and desires.⁴⁷ Moreover, game-board mapping is more purposefully active and rhetorical than the passivity and neutrality assumed by a GIS engineer. The game-board mapper exercises shrewd judgement in designing the map structure, incorporating and engaging the various imaginations of all the relevant parties. In devising the map (constructing field frames, naming, indexing, graphic iconography and so on), the designer 'sets up' the game-board in a very specific way, not in order to predetermine or prefigure the outcome but rather to instigate, support and enable social forms of interaction, affiliation and negotiation. And in this sense, one can see the similarity of Bunschoten's approach to the revitalization of urban fields to that of the Situationists. In neither case is it believed that a single authority, or a single directive, can ever really produce a rich form of

urbanism. It is recognized instead that multiple *processes* of urbanization must be engaged and artfully, yet indeterminately, choreographed in relation to evolving and open-ended spatial formations.

Rhizome

Open-ended and indeterminate characteristics can be likened to the process-form of the rhizome. ‘Unlike trees or their roots,’ write Deleuze and Guattari, ‘the rhizome connects any point to any other point . . . It has neither beginning nor end, but always a middle (*milieu*) from which it grows and overspills, [constituting] linear multiplicities.’⁴⁸ In contrast to centric or tree-like, hierarchical systems, the rhizome is acentred, non-hierarchical and continually expanding across multiplicitous terrains. ‘Rats are rhizomes. Burrows too, in all of their functions of shelter, supply, movement, evasion, and breakout.’⁴⁹

As mentioned earlier in this essay, Deleuze and Guattari draw an important distinction between ‘maps’ and ‘tracings’, describing the former as open, connectable, ‘experimentations with the real’, and the latter as repetitive redundancies that ‘always come back to “the same”’. Hence, tracings belong to hierarchical systems of order that ultimately limit any hope of innovation – ‘all of tree logic is a logic of tracing and reproduction’.⁵⁰ By contrast, the infinitely open, rhizomatic nature of mapping affords many diverse entryways, exits and ‘lines of flight’, each of which allows for a plurality of readings, uses and effects.

The significance of the rhizome for mapping is encapsulated in Deleuze and Guattari’s belief that ‘the book’ (and we might equally say the map, the city or the landscape) ‘has no object. As an assemblage [it] has only itself, in connection with other assemblages and in relation to other bodies without organs.’ Thus, they conclude:

We will never ask what a book means, as signifier or signified; we will not look for anything to understand in it. We will ask what it functions with, in connection with what other things it does or does not transmit intensities, in which other multiplicities its own are inserted and metamorphosed, and with what other bodies it makes its own converge.⁵¹

This viewpoint privileges actions and effects over representation and meaning; the concern is for how things work and what they do. Moreover, there is an explicit interest here for new kinds of affiliative relationship and interconnection. The argument emphasizes probing practices of interpretation that extend previous products of culture (maps and landscapes, for instance) towards more diverse and interconnected fields of

possibility, their ‘becoming’ bodied-forth through various acts of mapping and relating.

One especially important principle with regard to mapping as a rhizomatic (burrowing and extending) activity is what Deleuze and Guattari refer to as the ‘plane of consistency’. While this assumes a rich and complex array of meanings for the authors, I shall summarize plane of consistency here as a surface that is both inclusive (even of things that may not normally fit or ‘belong’ to any given scheme, including arbitrary ‘debris’) and *structuring* of new and open-ended series of relationships. Obviously, if such a surface is both inclusive and structuring, the techniques and modes of representation must be both multiple and flexible. Several different graphic and notational systems have to come into play so that diverse and even ‘unmappable’ aspects of a *milieu* are revealed. All of this must be brought to bear on one plane, one fully inclusive, non-differentiated surface (as many architects are fond of saying, if one cannot see it all right in front of one’s eyes, as a visual synthesis, then one cannot properly formulate a proposition). The devised systems of collection and array cannot be closed; they must remain open, fostering endless chains of possibility and insight. Rather than limiting reality, the rhizomatic map opens reality up to a host of new and alternative possibilities. The process is not unlike working with bits of arbitrarily found matter upon a dissecting table – a mode of work integral to collage, and with all the similar experiences of discovery, revelation and pleasure. Unlike collage, however, which functions mostly connotatively (by suggestion), mapping typically *systematizes* its material into more analytical and denotative schemas. Where mappings may become more inclusive and suggestive, then, is less through collage, which works with fragments, and more through a form of systematic montage, where multiple and independent layers are incorporated as a synthetic composite.

A useful example of multiple and inclusive synthesis of complex information is the French engineer Charles Joseph Minard’s narrative map of the fate of Napoleon’s army in Russia during the winter of 1812–13.⁵² Moving from the left on the Polish–Russian border, the thick band shows the size of the army (422,000 men) in June 1812. Its width diminishes as the size of the army is reduced through casualties. When the army reaches Moscow (to the east/right) in September there are only 100,000 men who must begin their retreat west through the winter months. The retreat line is in solid tone and can be read in conjunction with location and temperature readings. The army returned to Poland with a mere 10,000 survivors. Minard’s graphic describes a complex and tragic human

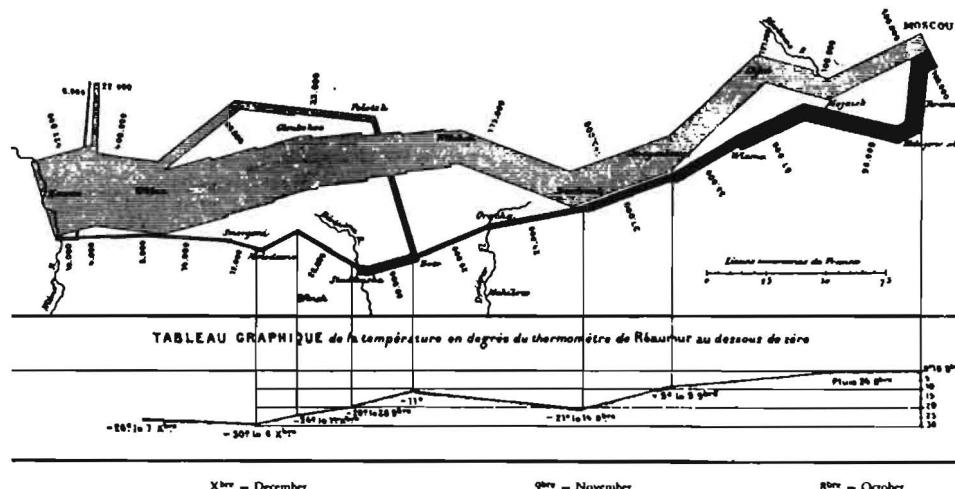
story in an enlightening and eloquent way. But more than telling a story, the map conditions how places on the land have come to exist in new relationships precisely through the vector of an event.

Minard's map very elegantly synthesizes a complex amalgam of facts and interrelationships (the size of the army, the locations and times of battle, vectors of movement, topography, place names, weather and temperature, and the passage of time). These events in time assume particular geometrical shape-forms, vectors, densities and patterns of effect. It is no small feat to encode graphically complex and multivariate temporal events in direct relationship to geography, but even more impressive is how the mapping visually layers and embeds the network relationships amongst all of the variables. If the chart were to be animated in a computer program, its shape-forms would change significantly if any one of the many variables were altered. Thus the map depicts a *systemic* field of interrelationships; it is dynamic performance of interacting parts, mapping 'shaping forces' as much as spatial terrain.⁵³ This is akin to what the Dutch urbanist Winy Maas calls a 'datascape', that is a spatial visualization of otherwise invisible flows and forces that exercise enormous effects across terrain.⁵⁴

At the same time, however, Minard's datascape is far from the rhizomatic plane of consistency outlined above because it is a closed system. It only depicts the facts that are relevant to its narrative theme, and it must therefore be read in a linear way. There is a clear intention of thematic communication in this map, together with a sequential, narrational reading, common to itinerary maps. The map offers clues for rhizomatic mappings because of its overlay and structural incorporation of different space-time systems of analysis, but at the same time it is not at all rhizomatic because of its focused content and single, linear reading. A more rhizomatic map would be much more multi-variate and open. Indeed, such a map might not 'represent' any one thing at all; rather, it might simply array a complex combination of things that provides a framework for many different uses, readings, projections and effects, rather like a thesaurus, without beginning, end, limit or single meaning.

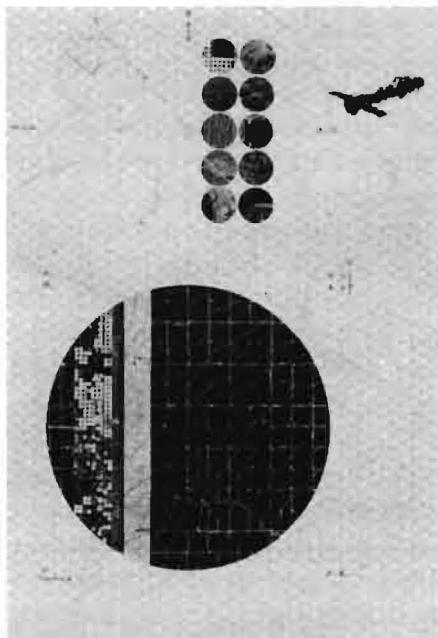
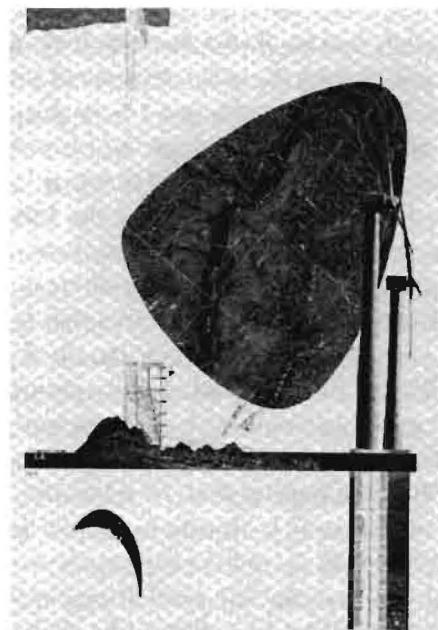
Of course, regular Ordnance Survey and United States Geological Survey maps are 'open' in the sense described above. They contain many different layers of information, with multiple entryways, diverse uses and applications, infinite routes and networks, and potentially endless surfaces of engagement. Richard Long's drifts might be considered rhizomatic exploitations of these 'neutral' planes. What these maps do not show, however, are time structures—local stories, histories, events and

CARTE FIGURATIVE des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.
Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.



Charles Joseph Minard, *Carte figurative des pertes successives en hommes de l'armée Française dans la campagne de Russie 1812-13*, from E. J. Marey, *La Méthode graphique* (Paris, 1885).

issues on the one hand, and local processes such as capital flows or seasonal hydrological patterns on the other. In some of my own mappings of the larger, working American landscape, I have purposefully used and subverted the conventions of USGS maps, and incorporated into them other systems of notation that are intended to 'open' and further 'extend' the field.⁵⁵ In *Pivot Irrigators I*, for instance, the USGS map is cut as a circle without scale, place names or geographical coordinates visible; the cropping and reframing effectively de-territorializes the map and its referent (illus. 12). Incorporated into this frame are other fragments of images such as underground aquifer maps—which are allied with the irrigation landscapes of the West—and infra-red satellite photographs which capture the circular forms of different fields as temperature traces (the more recently irrigated fields coolest and therefore lightest). Satellites too use these temperature 'fixes' to register their own location in space, and thus another circular construction is drawn to invoke both the planetary geometry of fixing location as well as the engineered geometry of the pivot-irrigator field. Similarly, in *Windmill Topography*, the de-territorialized map is framed as an egg-like ellipse (the shape of both a turbine gear and a wind-shadow) and combined with a topographical section

James Corner, *Pivot Irrigators I*, 1994.James Corner, *Windmill Topography (Los Angeles, CA)*, 1994.

that depicts the mountain range, air temperature, air-pressure and wind velocity charts. Together, the composite parts of the map construct an ideographic, synaesthetic image of the vast windmill territories east of Los Angeles while also arraying the various shaping forces and conditions that undergird the genesis of this still evolving landscape. There are similar mappings in this project: the poly-oriented and calendrical maps of the Hopi, the multi-scaled maps of the Very Large Array radio telescope installation in New Mexico, or the various 'field plots' of contour farming in the mid-west or dry-strip farming across the northern plains. In each, the codes and conventions of the USGS maps (frame, scale, orientation, colour-separation, numerical coordinates, grid measures and indexes) are co-opted, enhanced and subverted. There is an attempt to represent and describe certain geographical conditions and processes of landscape formation whilst also to suggest new foundations for future work. In a sense, these mappings construct 'planes of consistency' that present analytical information while also allowing for suggestive readings/projections. They 'draw out' of common maps and landscapes certain figural and processual relationships that might occasion new landscapes. Admittedly, these mappings are not as open or rhizomatic as they might be, owing to their thematic focus, but their inclusion and incorporation (synthesis) of diverse kinds of information and possibility, as well as their utilization and subversion of dominant conventions, illustrates two important ways in which mapping might move towards more polymorphous and creative ends. They are also suggestive of how temporal, systemic, performance networks can be rendered distinct from traditional cartographic concerns with static space.

Performance networks are multiple systems of interconnection which liberate elements while also fostering non-hierarchical communication and relationship amongst otherwise disparate parts. 'To network' means to work one's way into a field of opportunity, mapping the various players and sites whilst remaining an active player in the field. Cities and landscapes are becoming increasingly dependent upon network spaces and processes; as Paul Virilio puts it:

The essence of what we insist on calling urbanism is composed/decomposed by these transfer, transit, and transmission systems, these transport and transmigration networks whose immaterial configuration reiterates the cadastral organization and the building of monuments.⁵⁶

In other words, the experience of spatial life today is as much immaterial as it is physical, as much bound into time and relational connections as it is to traditional notions of enclosure and 'place.' By extension, the

principle of rhizomatic planes of consistency – together with the above-mentioned and closely allied themes of drift, *dérive*, layering, scaling, *milieu* and game-board structures – provides a useful model for mapping as a creative form of spatio-temporal practice in urban planning and design. In this way, we move away from urbanistic projects as authoritative master-plans, concerned solely with the composition and order of static parts, toward practices of self-reflexive organization. Mapping as an extensive and rhizomatic set of field operations precipitates, unfolds and supports hidden conditions, desires and possibilities nested within a *milieu*. Here, the concern becomes less about the design of form and space *per se*, and more about engaging, accelerating and networking interactions amongst forces in time. Instead of designing relatively closed systems of order, rhizomatic mappings provide an infinite series of connections, switches, relays and circuits for activating matter and information. Hence *mapping*, as an open and inclusive process of disclosure and enablement, comes to replace the reduction of *planning*.

CONCLUSION

'All perceiving is also thinking, all reasoning is also intuition, all observation is also invention,' wrote Rudolf Arnheim.⁵⁷ Moreover, these activities are not without effect; they have great force in shaping the world. It is in this inter-subjective and active sense that mappings are not transparent, neutral or passive devices of spatial measurement and description. They are instead extremely opaque, imaginative, operational instruments. Although drawn from measured observations in the world, mappings are neither depictions nor representations but mental constructs, *ideas* that enable and effect change. In describing and visualizing otherwise hidden facts, maps set the stage for future work. Mapping is always already a project in the making.

If maps are essentially subjective, interpretative and fictional constructs of facts, constructs that influence decisions, actions and cultural values generally, then why not embrace the profound efficacy of mapping in exploring and shaping new realities? Why not embrace the fact that the potentially infinite capacity of mapping to find and found new conditions might enable more socially engaging modes of exchange within larger *milieux*? The notion that mapping should be restricted to empirical data-sorting and array diminishes the profound social and orienting sway of the cartographic enterprise. And yet the power of 'objective analysis' in building consensus and representing collective responsibility is not something to be abandoned for a free-form 'subjectivity'; this would be both

naïve and ineffective. The power of maps resides in their facticity. The analytical measure of factual objectivity (and the credibility that it brings to collective discourse) is a characteristic of mapping that ought to be embraced, co-opted and *used* as the means by which critical projects can be realized.⁵⁸ After all, it is the apparent rigour of objective analysis and logical argument that possesses the greatest efficacy in a pluralistic, democratic society. Analytical research through mapping enables the designer to *construct* an argument, to embed it within the dominant practices of a rational culture, and ultimately to turn those practices towards more productive and collective ends. In this sense, mapping is not the indiscriminate, blinkered accumulation and endless array of data, but rather an extremely shrewd and tactical enterprise, a practice of relational reasoning that intelligently unfolds new realities out of existing constraints, quantities, facts and conditions.⁵⁹ The artistry lies in the use of the technique, in the way in which things are framed and set up. Through reformulating things differently, novel and inventive possibilities emerge. Thus mapping innovates; it derives neither from logical possibility (projection) nor necessity (utility) but from logical *force*. The agency of mapping lies in its cunning exposure and engendering of new sets of possibility.⁶⁰

This discussion of mapping also implies a parallel with contemporary practices in urban design and planning. The bureaucratic regime of city and landscape planning, with its traditional focus on objects and functions, has failed to embrace the full complexity and fluidity of urbanism, and of culture generally. This failing results in large measure from the inadequacy of techniques and instruments to imaginatively incorporate the rich interplay of processes that shape the world. In asserting authority and closure, current techniques have also failed to embrace the contingency, improvisation, error and uncertainty that inevitably circulate in urbanism. Given the complex nature of late capitalist culture, together with the increased array of competing interest groups and forces, it is becoming ever more difficult for urban designers and planners to play a role in the development of cities and regions beyond scenographic or environmental amelioration. There is a kind of inertia and levelling of possibilities as it becomes politically impossible in a mass democracy to do anything out of the ordinary. While there is no shortage of theories and ideas for addressing this condition more critically, there has been very little development of new operational techniques for actualizing them. In other words, the difficulty today is less a crisis of *what* to do than of *how* to do anything at all. It is precisely at the strategic and rhetorical level of operation, then, that mappings hold great value.

Instances of drift, strata, game-board and rhizome represent only a handful of techniques that mapping practices might assume if they are to play more creative roles in design and planning, and in culture more generally. These techniques presuppose any number of variations and enhancements as issues of framing, scaling, orientation, projection, indexing and coding become more flexible and open-ended, especially in the context of powerful new digital and animation media. As we are freed from the old limits of frame and boundary – preconditions for the survey and ‘colonization’ of wilderness areas – the role of mapping will become less one of tracing and re-tracing already known worlds, and more one of inaugurating new worlds out of old. Instead of mapping as a means of appropriation, we might begin to see it as a means of emancipation and enablement, liberating phenomena and potential from the encasements of convention and habit. What remains unseen and unrealized across seemingly exhausted grounds becomes actualized anew with the liberating efficacy of creatively aligned cartographic procedures. Mapping may thus retain its original entrepreneurial and exploratory character, actualizing within its virtual spaces new territories and prospects out of pervasive yet dormant conditions.

- 90 For a later development of such arguments see E. A. Gutkind, 'Our World from the Air: Conflict and Adaptation', the opening essay in the influential geographical collection edited by W. L. Thomas, *Man's Role in Changing the Face of the Earth* (Chicago, 1956), pp. 1–44.
- 91 D. Haraway, 'Situated Knowledges', in *Simians, Cyborgs and Women* (London, 1991), pp. 183–201 (191, 188).
- 10 James Corner: *The Agency of Mapping: Speculation, Critique and Invention*
- 1 On the coercive aspects of mapping see Denis Wood, *The Power of Maps* (New York, 1992); Mark Monmonier, *How to Lie with Maps* (Chicago, 1991); and John Pickles, 'Texts, Hermeneutics and Propaganda Maps', in Trevor J. Barnes and James S. Duncan, eds, *Writing Worlds* (London, 1992), pp. 193–230. On the technocratic and reductive force of mapping see James C. Scott, *Seeing Like a State: Why Certain Schemes to Improve the Human Condition Have Failed* (New Haven, 1998), pp. 1–83. On the more revelatory attributes of maps see Stephen Hall, *Mapping the Next Millennium* (New York, 1992); and *Cartes et figures de la terre*, exhibition catalogue, Centre Georges Pompidou, Paris (Paris, 1980), cat. no. 206.
 - 2 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. and foreword by Brian Massumi (Minneapolis, 1987), p. 12.
 - 3 See J. B. Harley, 'Maps, Knowledge, and Power', in Denis Cosgrove and Stephen Daniels, eds, *The Iconography of Landscape* (Cambridge, 1988), pp. 277–312; J. B. Harley, 'Deconstructing the Map', in Barnes and Duncan, eds, *Writing Worlds*, pp. 231–47; and Scott, *Seeing Like a State*, pp. 38–76.
 - 4 See David Buisseret, *Envisioning the City: Six Studies in Urban Cartography* (Chicago, 1998); and Ola Söderström, 'Paper Cities: Visual Thinking in Urban Planning', *Ecumene* 11/3 (1996), pp. 249–81.
 - 5 See Anthony Giddens, 'Living in a Post-Traditional Society', in Ulrich Beck, Anthony Giddens and Scott Lasch, *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order* (Cambridge, 1994). Giddens likens 'expert systems' to 'abstract systems', wherein credibility and 'truth' are accorded to certain abstract systems of representation precisely and only because they are constructed by experts. Similarly, much of mapping and planning goes unquestioned because of the apparent sophistication of their respective abstract systems, a sophistication that in itself is taken to be true and correct. See also Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, 1995). Porter demonstrates how 'mechanical objectivity' shown in various abstract forms of representation is more effective in democratic bureaucracies than expert 'judgement' or expert 'opinion' because the latter are always still suspected of holding self-serving interests.
 - 6 See Scott, *Seeing Like a State*, pp. 44–63; Peter Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century* (Oxford, 1988); Söderström, 'Paper Cities'.
 - 7 See Söderström, 'Paper Cities', pp. 272–5. Söderström argues this point from the perspective of the institutionalized scientification of planning methods that has occurred throughout the twentieth century, where objective, empirical procedures have become so ingrained in state bureaucracy and decision-making processes that fresh approaches towards urban issues remain intellectually repressed.
 - 8 See Rudolph Arnheim, *Visual Thinking* (London, 1970), p. 278. See also Arthur H. Robinson and Barbara Bartz Petchenik, *The Nature of Maps* (Chicago, 1976), pp. 1–22.
 - 9 See James Corner, 'Operational Eidetics in Forging New Landscapes', in *Recovering Landscape: Essays in Contemporary Landscape Architecture* (New York, 1999) and 'Representation and Landscape', *Word & Image*, VIII/3 (1992), pp. 243–75.

- 10 See Robert Marks and R. Buckminster Fuller, *The Dymaxion World of Buckminster Fuller* (New York, 1973), pp. 50–55, 148–63.
- 11 See Robert Storr, ed., *Mapping* (New York, 1994).
- 12 *Ibid.*, p. 26.
- 13 There have been a few exceptions, but none has exerted a particularly strong influence upon design practice. Some of the more interesting explorations are summarized in Jane Harrison and David Turnbull, eds, *Games of Architecture: Architectural Design Profile 121* (London, 1996).
- 14 See Hall, *Cities of Tomorrow*; Söderström, 'Paper Cities'.
- 15 Harley, 'Deconstructing the Map', p. 231.
- 16 Jorge Luis Borges, 'Of Exactitude in Science' (1933), reprinted in *A Universal History of Infamy* (London, 1975).
- 17 Jean Baudrillard, *Simulations* (New York, 1983), p. 2.
- 18 *Ibid.*, p. 2.
- 19 D. W. Winnicott, *Playing and Reality* (London, 1971).
- 20 Jacob Bronowski, *Science and Human Values* (New York, 1965).
- 21 Ernst Cassirer, *The Philosophy of Symbolic Forms*, vol. 2 (New Haven, 1955), p. 30; quoted in Robinson and Petchenik, *The Nature of Maps*, p. 7.
- 22 See Reyner Banham, *Los Angeles: The Architecture of Four Ecologies* (London, 1973).
- 23 Rem Koolhaas and Bruce Man, *S,M,L,XL* (New York, 1995), p. 1248.
- 24 David Harvey, *Justice, Nature, and the Geography of Difference* (Cambridge, 1996), p. 419.
- 25 *Ibid.*
- 26 *Ibid.*, p. 420.
- 27 Michel de Certeau, *The Practice of Everyday Life* (London, 1984), p. 94.
- 28 Jean Piaget and Barbel Inhelder, *The Child's Conception of Space* (New York, 1967), p. 452; quoted in Robinson and Petchenik, *The Nature of Maps*, p. 101.
- 29 *Ibid.*, p. 454.
- 30 Robinson and Petchenik, *The Nature of Maps*, p. 74.
- 31 Brand Blanshard, *The Nature of Thought* (London, 1948), p. 525; quoted in Robinson and Petchenik, *The Nature of Maps*, p. 103.
- 32 See Ken Knabb, ed., *Situationist International Anthology* (Berkeley, 1981); Cristel Hollevoet, Karen Jones and Tim Nye, eds, *The Power of the City: The City of Power* (New York, 1992).
- 33 De Certeau, *The Practice of Everyday Life*, p. 95; see also Cristel Hollevoet, 'Wandering in the City', in Hollevoet et al., eds, *The Power of the City*, pp. 25–55.
- 34 Fredric Jameson, *Postmodernism, or the Cultural Logic of Late Capitalism* (Durham, NC, 1991), p. 51.
- 35 See Hollevoet et al., eds, *The Power of the City*.
- 36 See Richard Long, *Richard Long* (Düsseldorf, 1994); R. H. Fuchs, *Richard Long* (London, 1986).
- 37 See de Certeau, *The Practice of Everyday Life*. This book is about how everyday 'users' 'operate', arguing for various modes of situated and tactical actions. Things such as 'making do', 'walking in the city', 'reading as poaching', 'diversionary practices' and 'détournement' are cited as techniques by which dominant structures are resisted.
- 38 See Bernard Tschumi, *Cinegramme folie: le Parc de la Villette* (Princeton, 1987); Bernard Tschumi, *Architecture and Disjunction* (Cambridge, MA, 1994), pp. 171–259; Koolhaas, *S,M,L,XL*, pp. 894–935;
- 39 See Jean-François Bedard, ed., *Cities of Artificial Excavation: The Work of Peter Eisenman, 1978–1988* (Montreal, 1994), pp. 130–85; Peter Eisenman, *Eisenman-amnesia: Architecture and Urbanism* (Tokyo, 1988), pp. 96–111.

- 40 See Jonathan Jova Marvel, ed., *Investigations in Architecture: Eisenman Studios at the GSD, 1983–1985* (Cambridge, MA, 1986).
- 41 Bedard, *Cities of Artificial Excavation*, p. 132.
- 42 *Ibid.*, p. 132.
- 43 See Raoul Bunschoten, *Urban Flotsam* (Rotterdam, 1998); Raoul Bunschoten, 'Proto-Urban Conditions and Urban Change', in Maggie Toy, ed., *Beyond the Revolution: The Architecture of Eastern Europe: Architectural Design Profile 119* (London, 1996), pp. 17–21; Raoul Bunschoten, 'Black Sea: Bucharest Stepping Stones', in Peter Davidson and Donald Bates, eds, *Architecture After Geometry: Architectural Design Profile 127* (London, 1997), pp. 82–91.
- 44 Bunschoten, 'Proto-Urban Conditions', p. 17.
- 45 Bunschoten, 'Black Sea', p. 82.
- 46 *Ibid.*, p. 83.
- 47 See de Certeau, 'Walking in the City', and 'Spatial Stories', in *The Practice of Everyday Life*, pp. 91–130; Scott, 'Thin Simplifications and Practical Knowledge: Metis', in *Seeing Like a State*, pp. 309–41.
- 48 Deleuze, *A Thousand Plateaus*, p. 6.
- 49 *Ibid.*
- 50 *Ibid.*, p. 12.
- 51 *Ibid.*, p. 4.
- 52 See Charles Joseph Minard, *Tableaux graphiques et cartes figuratives de M. Minard, 1845–1869*, Portfolio (Paris, 1869); E. J. Marey, *La méthode graphique* (Paris, 1885); Arthur H. Robinson, 'The Thematic Maps of Charles Joseph Minard', *Imago Mundi*, 21 (1967), pp. 95–108; Tufte, *The Visual Display of Quantitative Information*, pp. 40–41, 176–7.
- 53 See Greg Lynn, ed., *Folding in Architecture: Architectural Design Profile 102* (London, 1983); Sanford Kwinter, 'The Reinvention of Geometry', *Assemblage*, 18 (1993), pp. 83–5; Davidson and Bates, *Architecture After Geometry*.
- 54 See Winy Maas and Jacob van Rijs, *FARMAX: Excursions on Density* (Rotterdam, 1998); 'Maas, van Rijs, de Vries, 1991–1997', *El Croquis*, 86 (1998).
- 55 See James Corner and Alex MacLean, *Taking Measures Across the American Landscape* (New Haven, 1996).
- 56 Paul Virilio, *The Art of the Motor*, trans. Julie Rose (Minneapolis, 1995), p. 139.
- 57 Rudolf Arnheim, *Art and Visual Perception* (Berkeley, 1964), p. viii.
- 58 This 'extension' of pervasive conditions towards new, more critical ends underlies in part some of the arguments made in Corner and MacLean, *Taking Measures*. Here, there is an attempt to view the mostly technocratic, utilitarian approaches that are assumed in shaping the larger American landscape as things that are potentially positive. Measure, in both its numerical and instrumental sense, is less criticized or replaced by some other concept than it is expanded and enriched. In design and planning terms, the suggestion here is to see logistical, technical, economic and environmental constraints not as limits but as vehicles of creativity and efficacy. See also Stan Allen, 'Artificial Ecologies', *El Croquis*, 86 (1998), pp. 26–33 and note 5.
- 59 Much of the profession of architecture and planning today is concerned more and more with complex tasks of management and organization, especially of information. The forms of creativity suggested in this essay suggest a shift from a traditional emphasis in design upon forms of space to new, emergent emphases upon creative forms of practice. The difficulty today lies less at the level of formal innovation and design talent but more at the level of operational innovation: how to set new and exciting things in motion given the general inertia that currently surrounds planning and design projects. See Beck, *Reflexive Modernization*; Allen, 'Artificial Ecologies'; and

- Koolhaas, 'Whatever Happened to Urbanism?', in *S,M,L,XL*, pp. 961–71, and Corner, 'Operational Eidetics'.
- 60 See Jeffrey Kipnis, 'Towards a New Architecture', in *Folding in Architecture*, pp. 46–54; see also James Corner, 'Landscape and Ecology as Agents of Creativity', in George F. Thompson and Frederick R. Steiner, eds, *Ecological Design and Planning* (New York, 1997), pp. 80–108.
- 11 *Wystan Curnow: Mapping and the Expanded Field of Contemporary Art*
- 1 Svetlana Alpers, *The Art of Describing: Dutch Art in The Seventeenth Century* (Chicago, 1983).
 - 2 Peter Fend, 'Building a Bridge from Art to Architecture', in P. Fend, ed., *Mapping: A Response to MoMA* (New York, 1994), p. 11. It is worth noting that only one of the exhibitions mentioned here, *Under Capricorn/The World Over*, treated its own site as an act of mapping, despite the fact that some of them went on tour. This exhibition offered mapping opportunities for artists making new work for both its sites in Amsterdam and Wellington; I discuss below the works Ruth Watson made for them.
 - 3 Robert Hobbs, *Robert Smithson: Sculpture* (Ithaca and London, 1981), p. 105.
 - 4 J. B. Harley, 'Deconstructing the Map', in Trevor J. Barnes and James S. Duncan, eds, *Writing Worlds: Discourse* (London and New York, 1992), p. 246.
 - 5 R. H. Fuchs, *Richard Long* (New York), p. 99.
 - 6 *Ibid.*
 - 7 *Ibid.*, p. 206.
 - 8 See Hamish Fulton, *One Hundred Walks* (Netherlands, 1991), pp. 80–81.
 - 9 See David Reason, 'Echo and Reflections', in Stephen Bann and William Allen, eds, *Interpreting Contemporary Art* (London, 1991), for an extended reading of a Fulton text.
 - 10 Michael Auping, 'Tracking Fulton', in *Hamish Fulton: Selected Walks, 1969–1989* (Buffalo, 1990), p. 7.
 - 11 See Georges Bataille, *The Accursed Share* (Cambridge and London, 1988), pp. 19–41.
 - 12 Robert Storr, *Mappings* (New York, 1994), p. 19.
 - 13 Denis Wood and John Fels, 'Designs on Signs: Myth and Meaning in Maps', *Cartographica*, XXIII (1986).
 - 14 Germano Celant, 'Luciano Fabro: The Image that Isn't There', *Artforum International* (October 1988), p. 108.
 - 15 Herbert Muschamp, *Man about Town: Frank Lloyd Wright and New York City* (Cambridge, MA, 1983), p. 117.