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MAPPING TRADITIONS: HISTORICALLY TENDENCIES OF AN URBAN DESIGN METHOD

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ABSTRACT

Mapping has a long tradition as a method within urban design and landscape practice and is generally used in three ways: To analyze spatial conditions, generate design interventions, and communicate design ideas or spatial knowledge. It is a tool for thinking through the activity of reformulating and interpreting the complex and three-dimensional world into often simplistic, two-dimensional visual representations. Looking at mapping in retrospect, historically positions and tendencies that reflect contemporary society and urban landscape is revealed. This paper seeks to trace the mapping positions and tendencies through time. The paper takes its historically starting point in the period of the industrialization and seeks at outlining shifting understandings and perspectives of the spatial and physical world, which has affected plans and design of urban landscapes. From this unfolding of various mapping tendencies and ways of doing thought time, the paper wishes to discuss the contemporary tendencies of urban design mapping. Here the paper discusses the implication of technological improvement in mappings. Technology has and is affecting mappings in two ways. Firstly, technology has and still is advancing the accuracy of measures of urban structure, and it increases geospatial knowledge usable in mappings as GIS (Geographical Information System) is a result of. Secondly, technology enables new ways of sensing and understanding the world, which makes it relevant to reflect on how new technologies extend the human senses and what new spatial knowledge they might enable. Hence, the paper discusses the possibilities and implications of a more technology driven urban design mapping practice.

Keywords: mapping; urban design; urban design history; urban mapping technologies; remote sensing

INTRODUCTION: MAPPING MEDIATION

Mapping as an urban design method, becomes a mediator between the designer and the world, through which the designer analyzes, explore, and understand the world. When it comes to technologies and artefacts the 'I-world' relation is therefore rather an 'I-thing-world' relation (Ihde 1990). The mediation of spatial knowledge through mapping is implicated by at least three things. First, the designer's professional glance or ways of seeing

influence how the world is perceived. The glance is carried as a fixed but evolving part of the moving and sensing body, consisting of learning, memory, and experience of subjects such as spatiality, aesthetics, materials, and mobilities. It will unavoidably color the way in which the designer perceives and interact with the world, and it brings about a critical reflection of contemporary society and urban landscape. Second, the human gaze will influence the knowledge creation. The designer's personality related to emotion, experience, approach, upbringing, attachment, and motivation will likewise affect the knowledge creation through mapping. And third, different technologies or artifacts, which are used within the mapping method, forms part of shaping new understandings and connections between the designer and the world. The technologies are optional equipment that can be used to advance readings and descriptions of the world and extend the human sensing capacities. The technologies become what Don Idhe (2016, 135) terms an 'epistemology engine', meaning that the technology produces knowledge of the world and is enrolled in specific ways of knowing. In this paper we focus on two of the three implications of knowledge creation through mapping, one being *the professional glance* and the other *the utilization of technology*. Before moving into this, we will briefly unfold how we conceptualize urban design mapping.

As a situational filter between the designer and the physical world, mapping is an instrument to produce spatial knowledge. It is a method of visual thinking (Nijhuis et al. 2017), that can be divided into two main parts. One part that collect spatial data of a specific site, and another part that through visual representation explore, rethink and 'learn' about the site. In the first part of collecting spatial data different methods can be used, such as empirical field studies or desktop research and different tools can be applied, including technologies. In the second part the process of map making, combines and relates selected data and findings in new ways, visualizing spatial conditions. It uses a set of representational conventions, such as scale and projection along with analogue or digital representational techniques to communicate interpretations and reformulations of the site, which makes mapping distinct from a one-to-one copy or 'tracing' of the world (Deleuze and Guattari 1987, 12). Hence, mapping is much more than map making, including an exploration and examination of the world that goes beyond map making.

Since Nolli's 'figure ground' map *Pianta Grande di Roma* from 1748, the mapping of urban spaces has become a key instrument to create urban design knowledge, (see e.g., Corner 1999a, Cosgrove 1999, Pinder 2005, O'rourke 2013, Amoroso 2010, and Sadler 1999). Early examples from the period of the industrialization show the vast potential of the method. One is Harold Fisk's collection of maps *The Alluvial Valley of The Lower Mississippi River*, 1944. In these maps the historical formation of the Mississippi river valley and its dynamic changes are visualized. Harold Fisk was a cartographer and geologist whose professional glance clearly appear in his interpretation of the valley formation, that makes use of technical geological borings and aerial photography. Through a layering technic and use of earth-colors he attempts to display the dynamic nature of the river in a static and two-dimensional map. Another example is Charles Joseph Minard's map *Napoleon's Russian campaign*, 1869, which is an example of the fact that the history of maps is the history of warfare and colonization, meaning

that maps is never neutral but loaded with knowledge and power. The map binds several complex information together in a simple information graphic. It tells the story of the French Armies march to the war in Moscow in 1812-1813, where the loss of men is related to geographical location, time, and temperature. The map reflects Minard's profession as a civil engineer, who sought to simplify huge amounts of data in diagrammatic ways. The two examples demonstrate, how the visualization of quantitative data, relating to geographical position, can visualize otherwise invisible spatial knowledge of dynamics, forces, and flows, which showed potential for designers to see and imagine in new ways (Amoroso 2010).

This paper intends to address two things. First it will outline shifting understandings and perceiving of the world, by tracing mapping positions in the form of key mapping methods and figures through time. As previously described, the focus will be on *the professional glance* and *the utilization of technology*. Second it will discuss the implication of technology in contemporary mapping, focusing on the influence technology has on the design profession and its knowledge production.

THEORY: TRACING MAPPING TENDENCIES

Based on an incomplete listing of key mapping methods and figures from post-war period until today and a following examination of the method's specific techniques and approaches, the authors envisioned variations and differences across time. We hypothesize that the key mapping figures and methods can be divided into three categories: *narrative driven* mappings, *taxonomy driven* mappings, and *data driven* mappings, which each is an expression of differing tendencies of mapping throughout time. Figure 1 is a result of the division, that gives an historical overview and visualizes the key figures and methods and their related representational techniques and data collection approaches. It is important to notice that the division of approaches, techniques and key figures and methods must be understood as evolving and re-emerging through time, as represented by the figure's flowing structure.
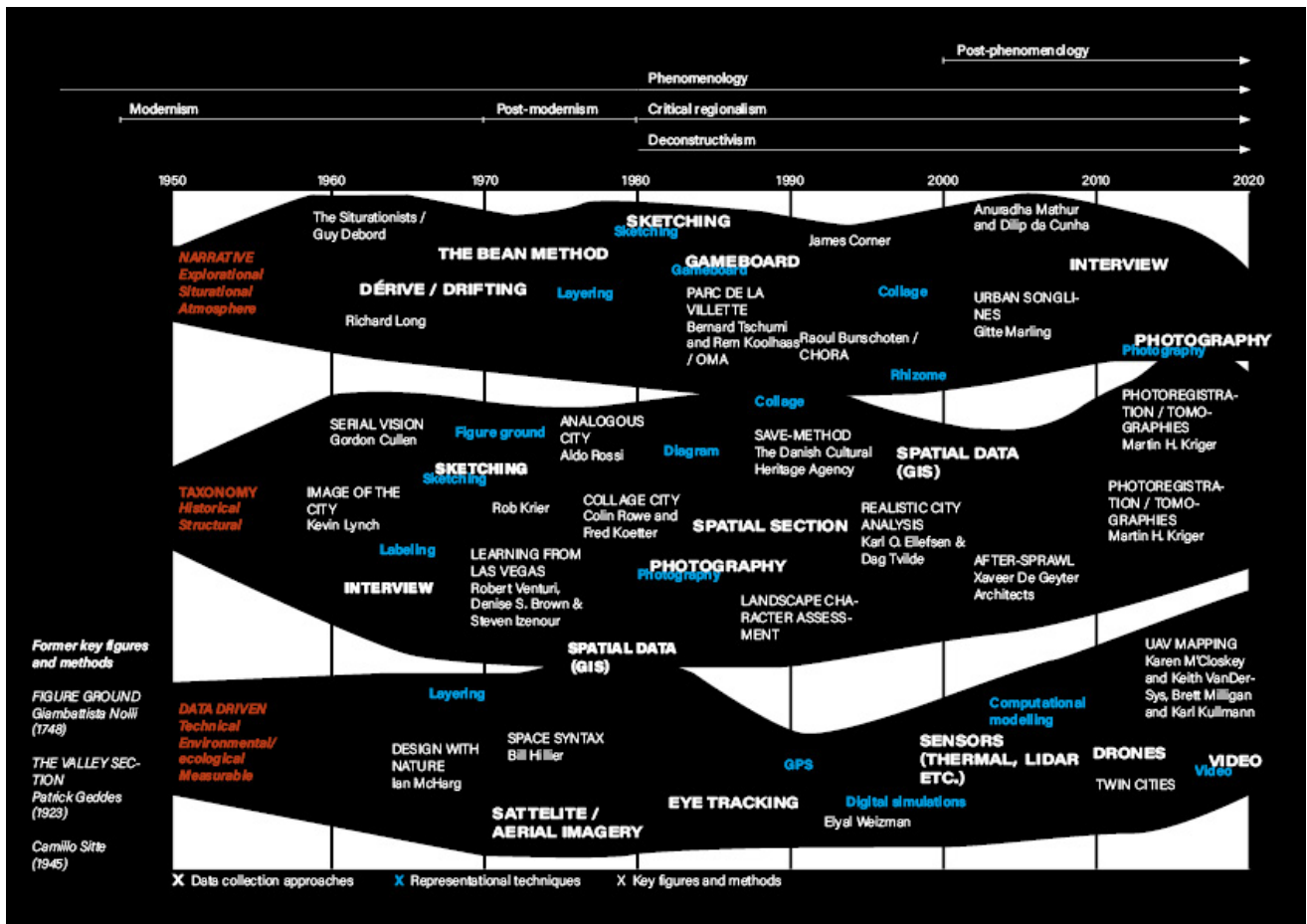
Figure 1 An overview of mapping development from the mid-19th century until today

The narrative driven mappings

The *narrative driven mappings* are characterized by their focus on situational phenomenon that goes beyond the visual appearance. As a critic of modernism's experiential passivity, they focus on phenomenological experience and interpretation of visible and invisible spatial conditions such as political, social, and natural processes, interrelations among spatial things, and local stories. They are highly explorative, using both interpretations of qualitative and quantitative data to build up site-specific narratives of the site, represented in maps.

In the 1950's and 1960s, the Situationists, cultivated experiential and explorative ways of constructing the geospatial environment, though psychogeography. They invented the 'dérive' or drifting, which is a non-planned city walk of experiences, moving from site to site, only controlled by the situational impulse (Sadler 1999). The front runner, Deboard used the method to relate spatial experience and perception of different city areas represented in maps. A collage-technique that follows its own logic is applied, to densify fragments of qualitative data. With a different agenda, land artist Richard Long also used drifting to describe atmosphere and experience, represented in maps that use describing words in relation to imaginary positions. In both cases the street-level gaze and the everyday experience of the city and landscape are foregrounded, emphasizing the individual's

engagement and perception of sites. This sensitivity towards the individual's experience of the city is further developed in the much later post-phenomenological method, Urban Songlines by Gitte Marling (2003). Here data from interviews with local citizens are gathered, to capture the personal everyday routes and narrative of the city and unfold aspects of attachment, preferences, and experience, which are represented as songlines in maps that makes use of photos.

Extracted from the Situationist's affective mappings and collage-technic, James Corner (1999a; 1999b; Corner and MacLean 1996) draw attention to mapping's performative mode by stating that mapping has 'agency'. For Corner, the mapmaking process plays an active role as an agent in the knowledge formation of the world. Compared to the Situationist's mappings that are detached from traditional mapping conventions, Corner, as well as the later Anuradha Mathur and Dilip da Cunha (2001) uses projections, scales, and units of measures in their collage-maps together with an assemblage of selected experiential and measurable fragments. Also, photography including aerial photos are used in multiple ways in the collages, to emphasize occurrence of a specific condition or phenomena. Through these types of maps the designer both learn about site conditions that can feed into the design processes, as well as it sparks the imagination of new futures as the mapmaking process poses new constellations and relations between different fragments – hence being performative. The performative aspect is further experimented with by Raul Bunschoten, who used collage-map to work with dynamics of cities (Bunschoten et al., 2001). He developed a 'game-board' technique that use the map as a base on which the city's identified forces consisting of 'players', such as actors, interests, or conflicting groups of people with an impact on the urban 'flow', play out different scenarios. The map is used to visualize and test urban constellations.

As an alternative to the abstract collage-technic, the 'layering-technique' makes a separation of different layers of knowledge possible. Bernard Tschumi and Rem Koolhaas (1983) demonstrate in their design proposal for Parc de la Villette in Paris that layers can break down different logics of a design narrative, by showing layers of elements and organizational principles in isolation. This technic can display a site's complex, tangled, and composite conditions in densified layer 'cakes' and by the separation of layers display the intermediate rationales.

The taxonomy driven mappings

The tendency of *taxonomy driven mappings* is concerned with the urban landscape's visual appearance and its related aesthetics. The mappings are based on defined rules, characterizations and systematizations of the visual components that makes up the physical space. It investigates morphological aspects, including spatial configuration of buildings and open space. The visual mappings are based on a variety of approaches and techniques that can help structuring and categorizing the urban landscape, thus they are highly instrumental.

A significant contributor to the taxonomy that has become a common urban design language is Kevin Lynch. Different from the narrative driven mappings, Lynch (1960) draws closer to more objective conclusions of subjective urban experiences. Through the development of an anthropological method that capture mental images regarding legibility of citizens by using interviews with the citizens and field surveys by trained observers, 'mental maps' are created and represented as flat sketch maps of the city overlayed with symbols that represent Lynch's five elements of path, edge. The sketching technic is also used by Gordon Cullen (1961) in his serial vision method. The urban realm is by Cullen defined as a series of spaces, where *relation* between the spaces and the *relation* between the observer and the spaces are key. Through a combination of planes, sections, photography and sketches, the method is a showcase of representing classic readings of sequences and progression of urban spaces, focusing on the historical diverse city and individuals experience. Quite differently, the manifesto of 'Learning from Las Vegas' (Venturi et al. 1972) explore the experience of the city from the high-speed car. Through the car window, the city appears as symbols and signs opposed to classic readings of the city as architectural form and space. Diagrammatic mappings and the use of section, plans and photography, represent the architecture of styles and signs in the case of Las Vegas that is 'antispatial' (Ibid., 8). The mappings tell the story of the commercial city loaded with signs, symbols and settings of different media, a landscape of semiotics, targeted people who moves in high speed.

Among the taxonomy driven mappings are a tendency of focusing on structure, instrumentalization and history. As a counterpoint to modernism, architects and theorists reformulated concepts of the city and explored historic urban spaces through mapping to revive typologies within design. Aldo Rossi used the collage-technic in 'the analogous city' from 1976, to instrumentalize the city through the thinking of analogies based on individual and collective thought. The analogous city is a handmade collage map, build up by urban fragments of architectural references that compose a plan of an imaginary city. The map is evoked by collective memory and display how the city is composed of analogies, an assemblage of architectural forms and ideas, that are experienced by our lived lives. With the use of other representational techniques, Colin Rowe and Fred Koetter (1978) in their project 'the collage city' and Rob Krier (1975) used figure ground and sketching to represent the historic city and its spatial qualities to establish these in theory and design. Later more systematic and operational approaches emerged. On of these are Karl O. Ellefsen and Dag Tvilde's (1991) 'realistic city analysis' that is used to describe principles of order and the architecture of the city. The city's history, primary elements, building structures, and division of zones are analyzed using historical maps and simple diagrams that are stated to be objective truths. The method works with a variety of scales from single objects, such as buildings to coherent city areas and structures, and use sketch diagrams and historic maps to represent structures and build objects organized in tables. Also, mappings made in both the 'SAVE method' (Ministry of Culture, the Danish Cultural Heritage Agency 2011) and the 'landscape character assessment method' (Department of the Environment 2007) work across scales and are used to preserve historically valuable buildings, urban areas, or landscapes and accommodate new development to past structures. The analyses are highly systematic and structural, outlining thematic mappings and registrations of architectural, cultural and landscape qualities. Often field surveys are

necessary to conduct spatial observations, while there is a high degree of freedom to use whatever tools or techniques, such as sketches or digital data, to represent the characteristics.

The data driven mappings

Data driven mappings are often based on an assumption that more data will help solve societal challenges such as the ecological devastation and biodiversity loss. Data driven mapping practices are often technology-led (if not determined). Hence, they are intertwined with different (and often "new") forms of mapping technologies such as drones, eye-trackers, thermal cameras etc. (Jensen et al 2024).

Most famously, Ian McHarg (1969) with his large-scale regional development introduces an interdisciplinary method that makes use of the layering of data. By layering large amounts of geospatial and quantitative data related to specific disciplines such as geology, ecology, and hydrology, McHarg creates suitability maps for land use. The purpose of the densification of quantitative data is to utilize and work with 'the deep structures' of a region, so that urban development takes place in accordance with environmental conditions. Although there are examples of mappings that use digital tools to generate visual maps of e.g., infrastructure conditions, of which space syntax (Hillier 2007) is an example, most of the data driven mappings are used to address societal issues such as ecological devastation, climate change and violations of human rights. Different technologies such as eye-tracing, sensors, GPS, drones, and combinations of these are explored and utilized to refine, collect, and represent complex spatial data to extend the knowledge of often invisible systems, flows, and dynamics (M'Closkey and VanDerSys 2022; Milligan 2019; Kullmann 2017; Weizman 2017). Moreover, computational modellings overlaid with information and digital simulations are used to represent the complex world in more 'correct' ways, moving away from two-dimensional representations towards three-dimensional. An example it 'twin cities' that builds on the concept of smart cities. They are three-dimensional city modellings that are incorporate urban real time data, showing mobilities, microclimate, temperatures etc., that can be used to advance, test, and inform new design and sustainable development (Schrotter, G. and Hürzeler, C. 2020). Another example is Eyal Weizman / Forensic Architecture who use different technologies, techniques, and three-dimensional models that overlay both quantitative and qualitative information to make visible states of violations of human rights related power structures.

DISCUSSION: TECHNOLOGY AND THE DESIGN PROFESSION

Across the two dimensions of *data collection approaches* and *representational techniques* and the three approaches (*narrative driven* mappings, *taxonomy driven* mappings, and *data driven* mappings) we find that urban design mapping practices are a multi-facetted field. It reaches from 'scientific' ambitions to document and 'capture' the world to more artistic and performative dimensions where the ambition is to 'do things with maps' rather than mirroring an external world. This distinction is deeply rooted in urban design as something that must seek to understand

and analyze the world, as well as to try to transform and change it. In this paper, we wanted to draw lines of genealogy back in history to trace ways of mapping practices to earlier times. However, our contemporary research ambitions are pointing in another direction. From our urban design research utilizing for example eye-trackers, thermal cameras, and drones (Jensen et al. 2024) we find that the mapping 'toolbox' of urban design to be rich and accommodating. Much as the field (both as an academic as well as a professional practice) is complex and has many dimensions, so are the mapping tool available at hand. At times one must exercise a critical attitude to the 'hype of the new'. In our opinion not by ex post dismissing the tool, but after trials, tests, and errors. We think of urban design mapping technologies as critical-creative tools that reaches from being 'epistemology engines' defining 'what we can know' to more expressive, affective, and performative dimensions where maps enable us to act in and upon the world. Knowing one's history is not just interesting at an intellectual level. It may indeed also enable a critical and reflective attitude towards these new mapping technologies. Moreover, by seeing the genealogies and legacies of historic urban design mappings made with different technologies and tools strengthen our understanding of the potential future role of new technologies in urban design mapping.

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