The Woof and the Warp of Architecture: The Figure-Ground in Urban Design

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Introduction

To borrow a metaphor used by Georg W.F. Hegel in the *Philosophy of History* to describe historical processes, architecture should be understood as a series of complex threads wherein one understands the physical forms as the warp, and the temporal, socio-political, natural, and aural contexts as the woof.[1] Using the term fabric to describe the attributes of urban design is not new; it is now part of the designer's vernacular when describing the *physical form* of towns and cities. In fact, the analogy is usually further nuanced to include the grain of such fabric, in reference to distinctions about the physical pattern of streets, buildings, blocks, and open spaces and their relative size: with coarse-grain fabrics referring to large blocks, large footprint buildings, and fewer street intersections that are farther apart; and, fine-grain urban fabrics defined by smaller blocks, smaller building footprints, and more frequent and closely spaced street intersections.[2] These distinctions in grain (and, therefore fabric) also carry implied references to modern and contemporary design (coarse grain) and premodern modes of building (fine grain).

The commonplace use of the term fabric (and its concomitant reference to grain) narrowly delineates architecture and design as only an act of form making. It reduces the role of designer and designed to the mere *objet d'art* of singular genius divorced from the complexities of everyday human and environmental experiences. The employing of Hegel's terminology of woof and warp is meant to shift the current use of fabric so that the physicality of buildings is defined as a critical, but not singular, component in the design of the built environment. If the warp of the fabric represents the physical form of the built environment, then the other threads - the woof - are equally as critical in the construction of this (urban) fabric. The interdependence of these other threads - which include, but are not limited to, the temporal, socio-political, natural, and auditory - with each other *and* with physical form are what constitutes the (urban) fabric.[3] Thus redefined, fabric now implies a definition of architecture that does not emphasize a hierarchy between these threads, but their mutual reliance in the making of the whole, and, by further implication, that change in one type of thread impacts the fabric in its entirety.

Fabric is asserted as a concept broader than the immediate spatial and physical situation in which individual buildings are located; and, the threads of the fabric are all of those elements that aid in making the built environment both a designed and lived experience. The emphasis on the woof and warp of a fabric indicates a preference for the *process* of design over the product. In this way, built fabric is more than a physical entity, but a milieu of conditions (social, political, economic, ecological, visual, auditory, aesthetic, etc.) to both simultaneously produce and be produced by the architecture. In other words, a panoply of external circumstances creates the architecture or urbanism that goes beyond the formal manipulations of the designer. When so conceived, the woof and warp

together reveal the fabric of the built environment as a coherent, yet complex, set of variables that make a peculiar topography of place.

In order to discuss this proposed understanding of fabric, this paper will look at how drawings informed the process and theory of urban design in the mid- to late-twentieth-century. The discussion will focus on the origins of the Nolli plan and its 'rediscovery' by the Cornell School and their use of the figure-ground as a primary tool in the formulation of an urban design theory. The trajectory of the figure-ground can reinvigorate contemporary urban design praxis once more by reasserting drawing as more than mere illustration but as a means to conceptualize design methodologies that support a holistic notion of fabric.

The Figure and the Ground

Despite its clean and simple graphics, the figure-ground is not merely an exercise in pattern making. Nor is it neutral and merely illustrative. The trajectory of the figure-ground begins with an Italian, with papal commissioning, who sought to map eighteenth-century Rome.[4] At its most simplified, Giambattista Nolli's (1701-1756) plan of Rome (*La Pianta Grande di Roma*, 1748) shows the buildings of Rome in black and the streets and spaces in white.[5] The Nolli plan represented a significant change from previous depictions of cities as it was one of the first to represent the city ichnographically, rather than in quasi-bird's eye perspective [fig. 1].[6] Nolli's mapping technique displaced the graphics of the Middle Ages and the Renaissance, which either tried to include individual buildings drawn in a skewed axonometric style, as an elevation folded down onto the page, or as a perspectival vignette. Louis Marin writes about this change in the representation of the city in which a concern for geometry and rationality influenced drawing and surveying techniques and led to a desire to not distort the plan relationship and still provide a view of the whole.[7] Nolli benefited from this Enlightenment-influenced scientification of drawing techniques because his careful preparation of the base drawings and engravings allowed for an unprecedented and detailed depiction of Rome (to include an architectural scale and compass rose). Consisting of twelve engraved copper plates, the final plan measured approximately six feet by seven feet when assembled. The accuracy of Nolli's plan has been tested and confirmed via modern surveying techniques and satellite imagery as containing only small margins of error.[8] While the map may contain only small margins of error, it is more than the mere recording of the streets and squares in white and buildings in black. The black and white gradient also included the delineation of the interior plans of nearly 2,000 buildings, which would, in turn, prompt a twentieth-century discussion on the role of public space in urban design. Nolli's decision to draw the map at the ground plane was critical to stimulating this conceptualization of public space as a critical design tool almost two hundred years later. As Michael Graves points out:

Imagine for a moment one's regard for the plan if Nolli had elected to draw the city from the roof rather than taking section through the ground floor as he did. Nolli's description captures more accurately, I think, the relationship of piazza to threshold to internal public room with a sense of marche *or promenade that would be unimaginable using other graphic assumptions. Alternatively, if Nolli had included the private domain as other than a secondary condition of poche, one would have been unable to assess the legibility of public enclosure to the extent that his plan offers.*[9]

Graves would not be the only twentieth-century architect attuned to Nolli's graphic decisions in representing eighteenth-century Rome.

In reaction to the devastations wrought by a modernist-influenced urban renewal, a few designers turned back to drawing - and specifically Nolli's figure-ground - as a way to formulate a new theory

Fig. 1: A section of Giambattista Nolli's *La Pianta Grande di Roma*, 1748.

of urban design in the 1960s and 70s. Colin Rowe, Fred Koetter, Léon Krier, and Rob Krier argued that it was the role of the designer to make legible the distinctions between *res privata* and *res publica*, mostly through orchestrating a sequence of public forms and spaces that are identifiable, distinct, and memorable when set in contrast to a private realm.[10] They were able to make this argument because they drew the city as a mode of thinking, as a way to understand what to do next. They interpreted the figure-ground as a graphic technique capable of depicting a gestalt (whether it was one that was pre-existing or being designed) - with the black on white graphics allowing a pattern of elements to illuminate a larger whole [figs. 2,3]. Key to their interpretation of Nolli's figure-ground was the reduction of the black and white technique to the representation of buildings and 'not' buildings in order to show the patterns created by physical forms within the city. While this graphic distinction from Nolli may seem minor, it will provide a fundamental difference to thinking about designing a holistic fabric versus designing only physical objects.

As Wayne Copper and Thomas Schumacher have argued, the convention of the figure-ground renders the residential pattern of blocks as a normative and uniform background (the ground) and the public spaces as identifiable, unique voids (the figures) cut into this ground.[11] In other words, Nolli's graphic technique exposed a version of the city that allowed the public spaces of Rome to appear as if they were carved out of a solid mass. In doing so, they believed Nolli revealed the topographic and spatial structure of the city, instead of focusing on buildings as isolated objects free from context, which was how the medieval city was depicted and the modern city utopically designed. In addition, the ichnographic plan allowed for what the bird's eye perspectives could not, namely direct comparison of the size, shape, and position of the formal components of a city and their concomitant reading as a fabric.

The figure-ground proved to be the perfect intellectual and representational tool to deploy against the object-focused architecture of Le Corbusier and other modernists; with the graphic highlighting the perceived flaw of buildings designed only as figural objects, and space as only a *back*-ground to those figures [fig. 4]. The early postmodern urbanists used the figure-ground as a graphic revelation wherein the interplay between public and private, between solid and void could become a physical dialectic that was often ambiguous and ambivalent about what was a figure and what was the ground (in other words, buildings and spaces could be both). With this use of the figure-ground, the city became the complex and contingent spatial structure that postmodern ideology believed it was and should continue to be. It also elevated the (physical) context as the paramount design concern.

This mid-century, postmodern graphic re-evaluation of the city reached its apex in the competition, *Roma Interrotta*. Held in 1978, then-Mayor Giulio Carlo Argan invited twelve internationally prominent architects to re-imagine a sector of Nolli's Rome. Given Mayor Argan's background as a prolific art and architectural historian, the choices of architects was not arbitrary.[12] Concerned with the changes brought to Rome via industrialization, modernization, architectural modernism, and more, the historian–turned-politician invited architects - who were sympathetic to issues of contextualism - to imagine that time and history had been interrupted since Nolli's delineation of the city.[13] In a city already interrupted by the operations of the aforementioned multiple modernities, these twelve designers inserted their predilections into the historical context. Despite their sympathies for the Rome that once was, the twelve designers did not produce a homogenous guide to the future Rome. Alan Chimacoff would describe the differences in the twelve design conceptualizations of Rome as:

Fig. 2

Fig. 3

Fig. 2: Figure-ground of Wiesbaden, Germany. Drawn by Jordan Terry (in reference to the work of Wayne Copper).
Fig. 3: Figure-ground reversal of Wiesbaden, Germany. Drawn by Jordan Terry (in reference to the work of Wayne Copper).

Violence and destructive confusion (Sartogo); irrational rationality (Dardi); poetic mysticism (Grumbach); the triumph of modernism and self (Stirling); the last, hopeless, gasp of Team X (Portoghesi); the gridiron as ultimate urban paradigm (Giurgola); an a-cultural world of kitsch (Venturi); paradisiacal city of architectural garden (Graves); an unintelligible confusion of images (R. Krier); early industrial surrealism (Rossi).[14]

Whether one ascribes to Chimacoff's (often glib) delineation of the schemes, it is not contested that the resulting designs provided a key moment in the development of postmodernism and Italian rationalism to include Aldo Rossi's focus on historical typologies as memory forms, Romaldo Giurgola's mapping of the morphology of North Philadelphia blocks, a pop-kitsch scheme by Robert Venturi that represented a very different American urbanism, that of the sign of Las Vegas, and James Stirling's insertion of his unbuilt work into eighteenth-century Rome. Stirling would claim that his choice of unbuilt work is limited to those appropriate to aspects of context and association either to the circumstances of 1748 or to JS projects at the time they were designed […] This 'contextual-associational' way of planning is somewhat akin to the historic process (albeit timeless) by which the creation of built form is directly influenced by the visual setting and is a confirmation and a complement to that which exists. This process may be similar to that of 'Collage City' (and the teaching of Colin Rowe) […] and stands in comparison to the irrationality of most post-war planning - supposedly 'rational', but frequently achieving a reversal of natural priorities.[15]

Whether one believes that Stirling's insertion of a museum of his work into Rome represents a collagist or even contextual approach, his association with the entry by Rowe is significant to this discussion, for it was the urban collage scheme from Colin Rowe that codified the use of the figure-ground as a significant theoretical design tool. Rowe's team entry revealed a *Collage City* that slid seamlessly into the Roman urban fabric, a feat not posited or achieved by the other entrants. In other words, his form of interruption was to render the disruption invisible. The continuation of the existing physical grain became the proposed design agenda.

Rowe's Roman *Collage City* served as a codification of the Cornell School design methodology, which included a reliance upon figure-ground analysis, urban spatial typologies, an insistence that the designer's first responsibility was to the white space of the city, and the development of a discipline distinct from planning in its focus on physical form.[16] The Cornell School, under the intellectual (and administrative) direction of Rowe, embraced this representational technique because it freed the designer from the distortion and editing implicit in the perspectival pictorial representation. In addition, it allowed a conceptual framework for engaging the city that was measurable and comparable. As Steven Hurtt notes:

In the studio, figure/ground plans became a design shorthand that carried rich perceptual potential analogically […]. *In the early studio years, it was felt that the figure-ground plan carried the crucial information, the genetic code for future design decisions. Specific 3-D implications were explored primarily to make a case to planners and developers that the schemes could be realized with standard technology and building types.*[17]

By isolating and generalizing the patterns of buildings and spaces into fields and zones, the city became an urban ensemble made up of a physical fabric that contained both a public woof and a private warp, each of which had a distinctive morphology. The figure-ground, thus, was used to define a new scale at which architects would and should design: the city. Steven Peterson defined the 'new' discipline in the issue of *Architectural Design* devoted to the *Roma Interrotta* exhibition:

Fig. 4: Figure-ground of Le Corbusier's proposed design for St. Die, France (1945). (in reference to the work of Wayne Copper).

'Urban design is a synthetic, inventive mapping of physical conditions which establishes and explores whole areas of the city. In other words, it is architecture - but encompassing more in scale, intention, and technique.'[18] Rowe and the Cornell School embraced the figure-ground on these terms as the cornerstone to engage in this 'inventive mapping of physical conditions'.

Other academicians have spent time parsing the visual lineage of Rowe's thinking, linking both *Collage City* and his previous seminal essay 'The Mathematics of the Ideal Villa' to the formal and theoretical underpinnings behind cubism, with some noting a split and others seeing continuity. As Mark Linder extends:

In fact, pictorialism is deeply implicated within the history of modern architectural theories, criticism, and practices. Both the Cornell school and deconstructivism are made possible by a latent, enduring pictorialism, whether it is the realism that allows a whole city to be imagined in plan or the illusionism that feasts upon decorative pleasures of angular, complex, formal compositions. The consequential issue of Rowe's legacy is whether pictorialism in architecture is so habitual and irrepressible that collage techniques will continue to be crudely transformed, rather than creatively translated, into architectural practices.[19]

Linder asserts that pictorialism so influenced Rowe's thinking, that he reduced urban plans (and the architecture therein) to the status of a real fragment. In Linder's view, 'Rowe imagines that such realistic realism might engender an engaged, effective, and ethical architecture, one which eschews object fixation and operates contextually'.[20]

Cornell's *Collage City* (and its kindred spirits, Collision City and Contextualism) stressed a self-proclaimed architectonic and formal agenda which asserted that abstraction and a certain level of fiction must be introduced into the urban design process in order to achieve this ethical architecture. As understood internally, Contextualism looked at not just the physical, but also the 'psychocultural field' with an emphasis on 'history and culture and their preservation and extension as a generative base to form'.[21] Collision City's physical ordering of urbanism sought to recognize the process of 'competition among social, political, and economic institutions' within the physical form.[22] Finally, *Collage City* intended to be a physical contextualism 'that embraces culture through history'.[23] Despite these intents, *Collage City*/Collision City/Contextualism results in a flattened city, where difference and complexity (beyond the formal) are rendered invisible by the ubiquity of the black on white (or white on black). While Hurtt notes that the acknowledged limits of the figure-ground were meant to liberate and induce complexity, all too often in the end they did not reveal the protean nature of the city in its social, cultural, temporal, auditory, and ecological forms. The figure-ground became less tactically flexible and more a formally contextual-driven strategic plan.

Despite the internal proclamations to connect the physical with the historical, culture, social, political, and economic, the Cornell School was unable to use the figure-ground as a means to those ends. Instead, they reaffirmed Peterson's circumscription of urban design as an activity in mapping and manipulating the physical aspects of the city. Their fabric was solely morphological with an assumed definition of the public and private whose delineation remained a purely physical will to form. When Peterson asserts that, 'The Nolli map epitomises [sic] the basic condition of urbanism. The city of Rome is represented primarily as the interwoven relationship of spaces, incorporating the entire spectrum of sequences which connect the public and semi-public to the private,' he reaffirms the Cornell School's understanding of the public-private relationship as one rendered and sustained purely

by physical form.[24] While the Cornell School sought to achieve a warp and a woof that intertwined the physical with the non-physical aspects of the city, their fabric ultimately was only designed with one type of thread.

Toward a Warp and the Weft of Urban Design

Direct links between Rowe and the praxis of the New Urbanism (one of the most significant design and development processes to emerge in the late-twentieth century) are self-evident; as are those which Harrison Fraker terms the field of Transformative Urban Morphology.[25] Their concern with rational analysis of urban patterns as a key methodological component toward the goal of establishing a master plan means that the figure-ground remains critical to their pedagogy, practice, and emphasis on the role of the designer as expert analyst.

The legacy of the figure-ground is not merely in its successors, but also in its positioning of urban design discourse in its entirety at the turn of the twenty-first century. Whether one ascribes to Doug Kelbaugh's articulation of three urbanisms - Everyday Urbanism, New Urbanism, and Post Urbanism - or Harrison Fraker's six 'force fields' of urban thought - Everyday Urbanism, Generic Urbanism/ Hyper-Modernity, Hybrid Urbanism, New Urbanism, Transformative Urban Morphology, and Urban Ecological Restoration - the figure-ground abounds both in acceptance and rejection in its relevance to the urban design project.[26] It is not just that one has to have a position on the use of the figure-ground in delineating a postmodern urban design dialogue. It is that the figure-ground moved the issue of how to map the fabric of the city to the forefront of post-modern urban design discourse. The mid-century figure-ground proponents were establishing not just the figure-ground as their primary tool, but, as Peterson asserts, a broader definition of the discipline of urban design that put it squarely in the hands of architects and, as quoted above, engaging in 'synthetic, inventive mapping' as its core project or *raison d'être*. Twenty-first-century urban designers have not challenged Peterson and his colleague's premise for the project of urban design as a distinct discipline. What varies are the definitions of the type of fabric (from the socio-cultural to the global-political, economic, performative, and morphological) and the types of inventive mapping with which these designers engage this fabric.

These various contemporary urban practices both affirm and challenge the figure-ground based representations of the city set up by the mid-century designers. To borrow Fraker's classification system, Hybrid Urbanism, New Urbanism, and Transformative Urban Morphology all incorporate the figure-ground as either a primary or ancillary mode of representation without any major challenges or reinterpretations to its role. The three other urban design fields, Everyday Urbanism, Urban Ecological Reconstruction, and Hyper-Modernity reject the domination of morphological urban practices set up by the figure-ground in favour of human, environmental, economic, and political threads and modes of representation that capture everyday activities, ecological systems, fragmented realities, and a consumer-conscious built environment (to name just a few). Yet these later urban design practices need not reject the figure-ground in their quest to define a fabric for the city beyond the morphologically based master plan that reinforces a classical notion of the *polis*. As Hurtt asserts, regarding the Cornell School's use of the figure-ground, the 'theory was mutable, not fixed'.[27] It is possible to once again recoup the power of the figure-ground to serve the design of a fabric that incorporates more than the physical (as was intended, if not fully realized, by the Cornell School). One needs look no further, again, than the Nolli as the exemplar for the mutability of the figure-ground, as long as the plan is interpreted as more than just representing physical form.

The lack of neutrality of Nolli's plan, and its ability to convey power and politics, is embedded

in its origins. Nolli's cadastral map determined and defined land ownership in eighteenth-century Rome. This measurement of building mass allowed for 'a new reading of the power immanent in the city, not as the houses of the court and generals, but as the warehouses and manufactories of the bourgeoisie'.[28] John Macarthur notes that Nolli changed the conception of the city as no longer being controlled by the king by transferring power from his 'sovereign gaze […] to his agents of taxation'.[29] The black of the figure-ground is, thus, political in its origins. And by extension, the Nolli as a conduit into reading the public and private spaces of the city is only one *of many* readings it provides; another is that these buildings represent two classes of power - the taxable and the non-taxable, the merchants and the church/king. This graphic technique pulls Nolli's map from illustrative survey of Rome into one of narrative. The plan provides a code that allows a reader to understand a story. Thus, in this case, the Nolli's multiple readings are dependent on the reader and his/her preference for scale and measurement versus his/her knowledge of the socio-political climate of eighteenth-century Rome.

Perceiving the city as primarily a morphological phenomenon, gave the Cornell School a self-proclaimed ability to understand the complexity of the city in order to propose ethical, contextually based interventions therein, as Linder suggests. Nevertheless, its legacy has become an exercise in pure formal pattern-making. The socio-cultural and ecological specificity of the city has been rendered invisible. The Nolli, as critiqued, appears to remove the designer from the experience of the city and its messy humanity. The easy duality of the black and white seems to miss the rich ambiguity of walking the city, à la Michel de Certeau. The figure-ground is only a totalizing, neutral, utopian formal exercise if it is allowed to languish as such. But a slight modification of how the drawing is employed is all that is needed to reinvigorate the graphic and its concomitant ability to engage both the woof and warp as equal design components.

First, the figure-ground gives the opportunity to explore the tensions and elisions in what is meant by public and private in the contemporary, multi-national context. Instead of one figure-ground depicting the public/private spaces of the city, a layered series of them might start to reveal such cultural complexity. If Nolli showed the space of the church as white, what is the white space of today? A series of figure-grounds could begin to tease out the tensions of what is meant by public and for whom. In other words, one figure-ground alone cannot possibly represent the totality of how the public and the private in the twenty-first century (or early time periods for that matter) is and was performed and inhabited. The terms are socio-political and economic constructs that change with the historical context; and, while played out in physical space, are not solely defined by them. To represent the various public-private tensions embedded in urban form at any given moment requires a series of drawings that map the economic, cultural, gendered, and political aspects of what is meant by public and private in a given temporal and spatial location. For example, in present-day Dubai, one must pay to enter the 'public' park spaces. While the fee is not much for those who work in service or business jobs, it is exorbitant for the expatriate workers who are constructing this twenty-first-century city (and live at its periphery in slums). Rendering Dubai's parks as white in a figure-ground and calling it public does not achieve the nuances of who really has access to this space.

How one defines the public and private spheres is not merely a matter of either political or economic power, but also of how gender lends to both different definitions and spatial locations of publics. This is true in both the West and East, in the past and present. The radical step nineteenth-century French painters took in popularizing the method of taking their work out of the studio and into the streets, aka

Fig. 5: Cairo was planned so that each house would be in reach of the call to prayer. This Nolli-inspired diagram by Mahmoud Riad tests this claim and also reveals the acoustic space of historic Cairo as mapped onto its physical space.

painting *en plein air*, revolutionized modern painting and subjects, particularly when it came to the city. But female painters, like Berthe Morisot and Mary Cassatt, showed a very different Paris, both in subject and in point of view, as the publics accessible to females were often performed in gardens or from balconies or in domestic settings.[30] If one were to map via figure-ground the locations of their version of the Parisian public realm and then map the locations (and points of view) painted by their colleagues, like Edouard Manet and Camille Pissarro, the resulting drawings would differ to a great extent. They would both be Paris, but the whites and the blacks would reveal a Parisian public that is not static, but dynamic and shifting based on its social (in this case, in terms of gender) conditions. This gendered revelation of public space should be (and has been) applied more rigorously and more often to the conceptualization of urbanity via the figure-ground.

Rachel Kallus has already employed the figure-ground as a means to mapping a more complex differential urban fabric.[31] She asserts that the figure-ground can never provide an objective reading of the city, but offers its own subjective lens. She embraces that subjectivity by mapping how women encounter public space. This moves the figure-ground from the abstract to an integration of the abstract and the concrete (similar to the diagramming methods of Everyday Urbanisms, which seeks to understand how real people perform the city). Her graphic studies - conducted in Hadar, Israel adjacent to Haifa's major commercial business district - merge 'traditional' use of the figure-ground with observations of women's preferred walking routes and mapping public spaces where they feel unsafe. When combined with other formal studies, interviews, and demographics, a series of intertwined socio-morphological threads of the city are revealed.

As Kallus demonstrates, the socializing of the formal abstractions of the figure-ground could allow postmodern urbanism to move from pure theoretical speculation to a lived, social, temporal, *and* physical fabric. The figure-ground can be used to map not just form but also activity, sound and/or light within the spatio-visual consciousness of the city. Mahmoud Riad does just that in his Nolli-inspired diagrams that test the claim that Cairo was planned so that each house would be in reach of the call to prayer.[32] His explorations of the auditory nature of urban design reveal the acoustic space of historic Cairo as it is mapped onto its physical space [fig. 5]. The resulting representation demonstrates the possibility of rendering Cairo's holistic fabric beyond a mere physical mapping of its form.

Conclusion

At the same time that Rowe and his allied colleagues were working on their urban projects, another designer was using drawing to push landscape design praxis into another direction. Like his colleagues, landscape architect Ian McHarg exemplified a mid-twentieth-century design process free from the trappings of modernist thinking. It is not surprising that landscape architecture would more thoroughly embrace a broader conception of fabric before the building-object obsessed architects, as landscape architects have nature as their palette and, therefore, are attuned to issues of temporal and environmental change - be it the life cycle of a plant, the seasons of the year, or the geological shifting of the earth itself. Best known for his seminal work *Design with Nature* (1969), McHarg pioneered the field of ecological planning.[33] His work popularized the use of drawing various layers of the site as a critical mode of design process for understanding the qualitative notion of a place. The extension of his system almost 40 years later has been the quickly evolving contemporary digital drawing device, Geographic Information System (GIS). McHarg's desire to map every site layer - history, topography, vegetation, hydrology, social

values, land values, wildlife, recreation, scenic, dwelling, etc. - has now manifested as a sophisticated digital mapping tool that allows designers, planners, geographers, natural resource managers, foresters, and a whole host of others to examine the complex systems inherent in the built environment. *Design with Nature* and its layered system of thinking was, in part, a manifesto against modernist ideas that humans should dominate nature, in favour of an ecological sensibility that accepted the blurring of the boundaries between the human and natural worlds. His polemic sought to provide a design process that saw the human world as working in concert with setting, climate, and ecology in deference to, not in defiance of, not against, or in denial of it. Like McHarg, the Cornell School understood that drawing was more than a means of illustrative or instrumental representation, but a way to achieve a significant challenge to the thinking behind modernist design processes and products. And while the Cornell School intended to make drawings that represented the urban fabric as having forms dependent on historical, cultural, and/or economic processes, it is unfortunate that they were not able to leverage the figure-ground as a method to integrate all of the exigencies of urbanism into their desired design thinking.

While McHarg and the figure-ground enthusiasts achieved a fully realized design methodology, based on drawing that left a deep and broad impact on their disciplines, the urban designers never reached the same level of engagement with the multiple threads of the designed fabric. Design praxis enriches itself when it thinks about lateral contexts (or threads) concurrently. Nolli's figure-ground is the antecedent to the work that should be happening in the twenty-first-century built environment to achieve such simultaneity.

Notes

1. Hegel's *Philosophy of History* was based on a series of lectures delivered in 1822. They were compiled and published after his death in 1831. Georg W.F. Hegel, *The Philosophy of History*, trans. by J. Sibree (New York: Prometheus Books, 1991).
2. In 1954, Kevin Lynch wrote: 'A city is the characteristic physical and social unit of civilization. It possesses size, density, grain, outline and pattern.' His discussion of these elements predates the Cornell School and their use of the figure-ground, but his discussion of grain and pattern are often casually associated with them. In fact, in this article, only his definition of pattern allies with the Cornell School, physically based interpretation of the urban fabric. Lynch defined grain of the city as 'the texture of its functional differentiation' and in his examples referred to occupational and class organizations of the physical pattern. Nevertheless, it is the physical interpretation of grain as the size of blocks, buildings, and streets and their resulting pattern that is the implied definition in use today. Kevin Lynch, 'The Form of Cities', *Scientific American*, vol. 100, no. 4 (April 1954), pp. 1 & 11.
3. By aural, the author refers to hearing (or audition) as one of the five traditional senses. Sometimes the word auditory will be used instead as a synonym for aural in this paper.
4. Maria Giulia Aurigemma, 'Giovan Battista Nolli', *Architectural Design*, Profile 20, nos. 3-4 1979, pp. 27-29.
5. Giambattista Nolli, *Rome 1748: la Pianta grande di Roma di Giambattista Nolli* (Highmount, New York: J.H. Anonson, 1991). The University of Oregon hosts an excellent and interactive website on the Nolli plan. 'The Nolli Website', <http://nolli.uoregon.edu/preface.html> [accessed 15 July 2010].
6. The first ichnography was Leonardo da Vinci's map of Imola in 1502. Lucia Nuti, 'Mapping Places: Chorography and Vision in the Renaissance', in Mapping, ed. Denis Cosgrove (London: Reaktion Books, 1999) pp. 90-108. Giulia Aurigemma also asserts: 'In contrast to other bird's-eye or oblique perspective views of Rome, intended to render an overall and organic image, Nolli's plan is the first (after Bufalini's) to adopt the technique

of vertical projection […],' Aurigemma, ibid., p. 27. She cites 'A. P. Frutaz, *The Plans of Rome*, Rome 1962' as her source.

7. Louis Marin, *Utopics: Spatial Play* (New Jersey: Macmillan Humanities, 1984), see chapter 6, 'The City'.
8. 'The Nolli Website', ibid.
9. Michael Graves, 'Roman Interventions', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 4.
10. Colin Rowe and Fred Koetter, *Collage City* (Cambridge, Mass.: The MIT Press, 1984). Rob Krier, *Urban space = Stadtraum* (New York: Rizzoli International Publications, 1979). Richard Economakis, ed. Leon Krier: Architecture and Urban Design, 1967-1992 (London: Academy Editions, 1992). See also B.D. Wortham-Galvin and Isaac Williams, 'Walking the City', in The Value of Design: design is at the core of what we teach and practice, Phoebe Crisman and Mark Gillem, eds. (Washington, D.C.: ACSA Press, 2009), pp. 240-248.
11. Thomas Schumacher, 'Contextualism: Urban Ideals and Deformations', *Theorizing a New Agenda for Architecture*, ed. Kate Nesbitt (New York: Princeton Architectural Press, 1996) pp. 294-307. Wayne Cooper, 'The Figure/Grounds', M.Arch Thesis, Cornell University, 1967. Wayne Copper, 'The Figure/Grounds', *Cornell Journal of Architecture*, no. 2 (1983), pp. 42-53.
12. Argan's most famous published work is: Giulio Carlo Argan, *Storia dell'Arte Italiana* (1968). The genesis of the exhibition itself came out of discussions between architect Piero Sartogo, Michael Graves, and Argan (this is described in part by Graves, ibid,, p. 4).
13. The twelve architects and their associated Nolli panels were as follows: I. Piero Sartogo, II. Constantino Dardi, III. Antoine Grumbach, IV. James Stirling, V. Paulo Portoghesi, VI. Romaldo Giurgola, VII. Venturi and Rauch, VIII. Colin Rowe, IX. Michael Graves, X. Rob Krier, XI. Aldo Rossi, XII. Leon Krier. The competition and all twelve entries are examined in detail in *Architectural Design*, Profile 20, nos. 3-4 1979, which was guest edited by Michael Graves.
14. Alan Chimacoff, 'Roma Interrotta Reviewed', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 7.
15. James Stirling, 'Nolli Sector IV - James Stirling' *Architectural Design*, Profile 20, nos. 3-4 1979, p. 63.
16. Collage City first appeared in *Architectural Review* in 1975, three years prior to *Roma Interrotta*, and fortified the growing trends in historicism and postmodernism. As noted in endnote 6, Wayne Cooper's 1967 Cornell thesis on the figure-ground was subsequently published in 1983.
17. Steven Hurtt, 'Conjectures on Urban Form. The Cornell Design Studio 1963-1982', *Cornell Journal of Architecture*, no. 2 (1983), p. 56.
18. Steven Peterson, 'Urban Design Tactics', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 76.
19. Mark Linder, 'From pictorial impropriety to seeming difference', *ANY: Architecture New York* 7-8 (1994), p. 27.
20. Ibid.
21. Hurtt, ibid., p. 67.
22. Ibid., p. 68.
23. Ibid., p. 71.
24. Peterson, ibid., p. 76.
25. Harrison Fraker, 'Where is the Urban Design Discourse?' *Places* 19.3 (2007), pp. 61-63.
26. Doug Kelbaugh, 'Toward an Integrated Paradigm: Further Thoughts on the Three Urbanism', *Places* 19:2 (2007).
27. Hurtt, ibid., p. 56.
28. John Macarthur, 'Doubts About Black and White: some thoughts about figure-ground drawings prompted by Brian Schutz' winning design for the competition *Companion City'*, Transition 35 (1991), p. 82.
29. Macarthur, ibid.
30. Griselda Pollock, *Vision and Difference: Feminism, Femininity and Histories of Art* (New York: Routledge, 1988), Chapter 3: 'Modernity and the spaces of femininity', pp. 70-127.
31. Rachel Kallus, 'From Abstract to Concrete: Subjective Reading of Urban Space', *Journal of Urban Design* 6:2 (2001), pp. 129-50.
32. Mahmoud Riad, *Architecture: Music, City and Culture* (University of Maryland, M.Arch Thesis, 2009).
33. Ian McHarg, *Design With Nature* (Garden City, NY: Natural History Press, 1969).

Biography

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