

The City as Index

RICHARD SCHERR

Pratt Institute

The continuing crisis of the modern city is essentially based in its weakening capacity to convey meaning, or perform as a referential text of larger cultural/social ideals. This is due, among numerous causes, to a deepening confusion of messages, media saturation, and cross-cultural plurality that make clear readings all but impossible. The enduring description of the city as a specific and symbolic text of signification and belief has become more than suspect given the continually shifting definitions and interpretations of signs, and the loss of specific cultural meanings, now furthered confused by contamination through universal access to global communications and the impact of mass advertising.

This rupture between form and content is broadly based. No longer are institutions a singular locus of collective cultural belief. The role of both the private and public realms have become confused and sometimes interchangeable through the ongoing corporate privatization of space. More insidiously, the overwhelming impact of popular culture has reduced the city into a manipulated commodity based in the simulation of earlier forms and traditions; the impact of globalization and communication technologies defy any sense of spatial locus, the uniqueness of place, and the specificity of cultural traditions.

Given the degree of transformation and demise of the historic city as documented by innumerable cultural and urban critics,¹ it becomes questionable as to whether any traditional physical/spatial criticism of the city is meaningful, or indeed, possible. Theories of city form developed only over the last thirty years, such as Colin Rowe's researches in contextualism, Robert Krier's analyses of urban space, Aldo Rossi's theories on typology and Edmund Bacon's work on urban infrastructure, have been challenged in the face of this a-spatial, interchangeable, information based city without geographical boundary or cultural specificity.²

It is suggested that we must define another basis for investigating the city which can develop a basis for reclaiming the ability to conceive and analyze the city as a physical construct that evolves within a larger temporal and cultural continuum. The idea here is to reclaim that which connects us to something more enduring and authentic, based in the specificity of place and culture. The goal is to formulate a method of inquiry that accepts the continuing need to resolve the city in physical, objective terms grounded in the authenticity of experienced conditions and events as a determinant of form.

Such a strategy of analysis is proposed through the possibility of understanding (and designing) the city in terms of a desire to enforce connections to other sources and influences, whether removed, or more immediate, to a given site. The premise is that city can be conceived as a form of "index" which has a capacity to evolve and establish meaning through making direct, causal relationships to *physical* circumstance and human activity. An index can be understood as a sign that arises out of a non-representational manifestation of a directed, physical cause, as opposed to a "symbol," which performs as a sign that refers to something

other from itself, and must be learned and interpreted. Rosalind Krauss (who has contributed some of the seminal thinking in this area related to 20th century art) further defines the index as follows: "As distinct from symbols, indexes establish their meaning along the axis of a physical relationship to the referents. They are the marks or traces of a particular cause, and that cause is the thing to which they refer, the object they signify."³

An index circumvents intermediary coding and translation—the condition is directly understood as "effect" directly arises out of a particular "cause," with little possibility for semantic coding, or interpretation. This cross-referencing between cause and effect is key here, as it forces a *relational* reading of the object, or event. Instead of singularities (separate buildings, spaces, events with little or no connection to anything else) one attempts to establish dualities, or multiple relationships, whereby a site's meaning (and possibilities for organization) is established through its directed context.⁴

Indexes occur in many forms, both manmade and natural. The most common understanding of the term is the literal use of the index found in the back of books, a listing of subjects which provides direct access to specific content mixed within the text. Other examples would include: footprints, or fingerprints, as traces of human habitation; a "shadow" as a result of an intermediary object that stands between the sun and another surface; the gathering of dust to signify the passage of time; or, any photograph, which is the result of a physical imprint transferred by light reflected onto a surface, resulting in an image which serves as an index of the object to which it refers. In general, any kind of "clue" expressed as a physical circumstance, or disturbance is an index that points to some other condition, event, person, or place, that at the same time refers back to the trace of the original cause.

The fundamental idea of an index as applied to the city is that any object, or condition establishes a cross-reference, or relationship with something *else*—another object, or condition which has an inalterable, causal relationship to its referent. As an index, a building, or any other physical element can never stand alone, or be self-sufficient; meaning is only attained through its directed relationship to some manifestation, or effects, within a larger context. A site is never a neutral condition, or *tabula rasa*, but is to be examined as a container of traces of earlier building, memories, events, actual leftover fabric of earlier construction, and physical circumstances around its periphery and immediate context, both actual and implied.

In such a state of dependency, the reading of the city begins to become an interactive series of causal linkages, which would result in a rich dialogue between individual design acts. This interpretation suggests the reading of the city as a highly charged urban field, with the density and power of these relationships forming the basis of both the analysis of existing conditions, or a strategy for asserting particular information (the intentional dropping of clues?) that provides new layers of information yet to be discovered.

PENTIMENTI, OR THE ARCHITECTURAL RUIN

One possibility for the reading of the environment as a system of indexes, or physical cross-references between causes and effects is through the idea of the "trace." Traces can take on several different forms: a physical remnant that allows the reading of an invisible condition made visible by some physical manifestation; a clue of some condition that existed previously, of which only a fragment remains; or, the reading, or presence of historical information intertwined within newly established fabric. One example of the invisible made visible is readily found when one observes the landscape from the air, in which one might observe plowing patterns as evidence of topographic variations, or coloration of vegetation signifying varying amounts of moisture, or the presence of underground drainage.

The painter Richard Diebenkorn spoke of aerial views of landscape, noting that "wherever there was agriculture going on you could see *process* [my italics]—ghosts of former tilled field, patches of land being eroded... a contrast between apparently random and spontaneous, and the geometrical scaffoldings... a polarity between stasis and flux."⁵

In Diebenkorn's own work, he builds upon this realization of the trace as the clues to an extended process of transformation which take the form of "pentimenti," or, the reappearance of formal structures which have been partially painted over, but can still be read through as the ghosts of earlier decisions. In the final painting one can read the complex process of its own making, in which faded lines and marks are the index to its history, while the "final" layer contains the clues to further development, should the process be once again set in motion. Thus, the painting becomes a mapping of experiments, decisions, relationships, and reconsideration, from which emanate compositional logic and visual meaning.

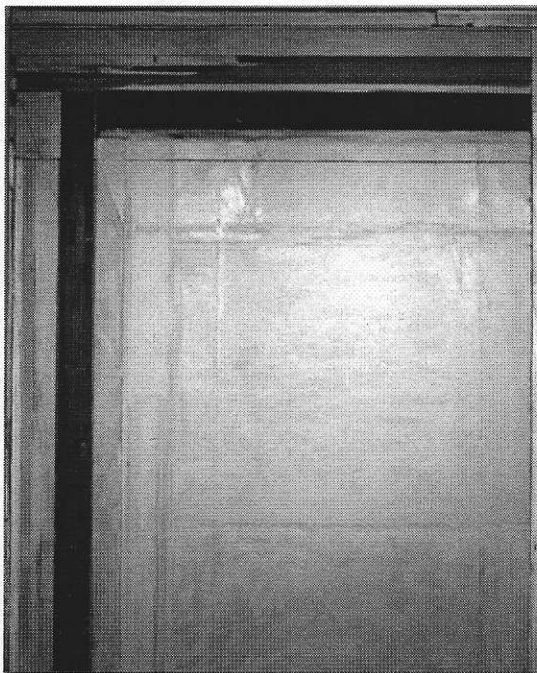


Fig. 1. Richard Diebenkorn, Ocean Park #87, collection of the National Gallery of Art, Washington D.C.

Such pentimenti conditions can also be applied to the city, in which parts of its fabric are read as traces which either reference the presence of earlier conditions which no longer exist, or provide partial evidence of remaining fabric. The obvious example is the enduring presence of the ruin that performs as literal reference to an earlier manifestation of the city. The ruin is not a symbol, a reminder, an interpretation, or

stand-in for the original, but rather, is the actual artifact co-existing within a present context, a partial re-presentation of its original form and material presence.



Fig. 2. Anhalter Bahnhof ruins, Berlin

Related to the idea of ruin is the notion of "palimpsest," (in its original manifestation, the rubbing away of text on a parchment) which allows the introduction of another text over the remnants of earlier writings. In terms of a renovation, at either architectural or urban scales, Rodolfo Machado has suggested that the artifacts of the site can be merged, or bleed through into the required superimposed layers of new development. Thus, while some portions of an earlier project are necessarily altered or removed, other remnants can remain in place, so that the new projects are combinations, "re-writings," or mergers of pre-existing structure (the clues to the site's actual history) with the newly imposed fabric that redefines the site. Thus, the site's "aura" and history still live within the new development and establish a directed dialogue across time that refers to multiple cultures, programs, and intent.⁶

The power of the dialogue is generated through the contrast of the original condition, or surface, with its undisturbed patina of disturbed surfaces subjected to time and program in contrast to the new fabric which is pure, undisturbed and perfectly executed. The act of design is no longer an arbitrary selection of preexisting organizations, or worse, stylization, but acts of exposure, accommodation, masking, dueling, carving away, filling in, surfacing, and scaling to allow distant, or conflicting relationships to collide. The engagement of memory becomes a form of resistance that denies the possibility of an imposed architecture to slice itself off from its temporal and physical context, but rather, an assertion of an authentic, if not contradictory statement of an evolving culture.

Examples of temporal collisions of residual pentimenti, or earlier historical fragments within other temporal layers are common in Rome and other Italian cities which so highly value earlier (and perhaps greater) stages of cultural development, and make the development of virtually any site an inevitable dialogue between different historical interventions. Of particular interest are conditions which evoke history as a discontinuity in the evolution of the site, and maintain the ruin as a form of resistance, sharply drawn, say, at the Teatro Argentina, less so at the Roman Forum. In other cases, such as the embedding of the mixture of fabric within Tragen's Market, and the continuing excavation of the adjacent Forum, the pentimenti merge within other successions of layers, that give form to an ongoing text of the city's transformation.

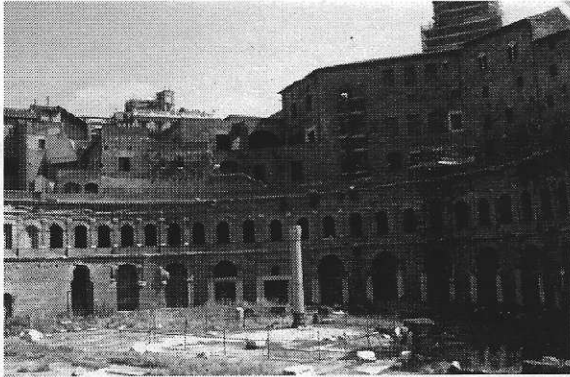


Fig. 3. Trajan's Market, Rome

In the center of Verona, ruins such as the Porta Leoni are merged with later buildings as well as extending from the earlier Roman substructure exposed through cracks in the superimposed ground plane of the modern city. Nearby, the elaboration of the city's development continues at Carlo Scarpa's Castelvecchio Museum, which underwent renovation through an archeological excavation of the building's stages of development, with the final reconstruction exposing different architectural and historical junctures throughout the site.

Mexico City has also mandated that earlier Mayan ruins discovered during excavation for subway or building construction remain in situ, most notably, at the "City of Three Cultures" and are prominently featured along the public passageways in the subway system. In these cases, there occurs a cross-referencing between the historic fragment and its perceived reinstatement in the present, which coexists on equal terms with new overlays of more recent vintage. Rather than allowing new development to turn the site into a blank *tabula rasa* (typical of how a site is "prepared" in the modern city), clues to the site's history are provided by the discovery and preservation of earlier accretions, additions, transformations, and other physical remnants found within the site.

In the United States, the construction site is typically cleared of earlier remnants, denying all clues of earlier occupation. On rare occasions, an earlier fabric is absorbed into a new project as an act of preservation, such as Mitchell/Giurgola's Penn Mutual Tower of 1975 built within the Society Hill Preservation District in Philadelphia. The building incorporated the Egyptian Revival facade of the original 1835 Penn Mutual building at the tower's base, to form an articulated screen, or transitional entry into the tower. At the site of the home of Benjamin Franklin, also in Society Hill, Venturi/Scott-Brown evoked what was presumed to be the original home by constructing a framed "outline," or diagram of its probable form, and also carved and encased views down into the actual foundations of the original house, establishing both material and empirical references to the site's history.



Fig. 4. Venturi & Rauch, Franklin Court, 1972.

One source for indexical markings is the archeological information at a site's edge conditions as occurs on adjacent party walls after a building has been torn down, which typically refer to certain architectural elements of the original building. The pattern of earlier stairs, fireplaces, interior partitions, ornament, etc. remains on the party wall, and is now open to public scrutiny. This interior private layer has now entered into the public realm, caught within the voyeur's gaze; inside has become outside, exposing the earlier presence of the demolished building, along with its associated history. This in itself has some significance in terms of leaving evidence of some record of the site's history in the context of the ongoing change in its surroundings. It may also be possible to use the traces on the adjoining wall as a form of palimpsest, being either literally exposed in portions of the interior, or perhaps act as an instigator of interior organization, which refers back to the actual imprint of history.



Fig. 5. Party wall remains, 53rd Street, Manhattan

INDICES OF MEMORY

Commemorative monuments are typically not indexes—they usually take the form of a simple geometric marker that has little to do with an actual person or event in terms of physical representation. They instead perform as cognitive signs, which present varying levels of knowledge or information about a particular person or event, that might sponsor at best, a reawakening of historical knowledge. But as in the case of Proust's dipping a Madeleine into his tea as an instrument of memory, it might be far more effective to conceive of monuments that perform as indexes, i.e., make a direct, or immediate connection with the past through a physical or tactile relationship between form and event that generate an involuntary emotional response, rather than written narratives or symbols that require more indirect cognition and interpretation.

An example of the power of such a strategy is the Monument to the USS Arizona in Hawaii, which commemorates the bombing and sinking of the battleship, and loss of 1,177 lives in the attack on Pearl Harbor on December 7, 1941. The monument is designed as an instrument to bring the visitor to the artifact itself, and is designed simply as a floating viewing platform directly over the hull of the ship, precisely positioned where it went down, resting only a few feet below the surface of the water. Fuel still continues to leak from the ship's engines, forming oil slicks on the surface; the actual human remains are still interred within its interior. The platform serves as an indexical marker of the ship, which is the actual artifact resulting from the attack, leaving little room for personal interpretation. Another example is the recent monument to the bombing of the World Trade Center, which commemorates those who died and were wounded in the blast. While the monument itself, a ring approximately 12 feet in diameter of irregularly broken slabs of stone is not a true artifact of the bombing, its location on the platform



Fig. 7. *Mary Miss*, South Cove, Battery Park City, New York.

Perhaps the ultimate architectural resolution of this idea is Carlo Scarpa's restoration of the Fondazione Querini-Stampalia in Venice, which is designed to let the water of the canal to penetrate the interior, and allow flooding. The floor in the library is designed as a series of levels that articulate higher and lower surfaces, suggesting walkways over underlying planes that would be covered by varying degrees by rising waters, or almost totally submerged at times of major flooding. Yet even when the canal doesn't flood, the multiple floor levels refer to the continually fluctuating nature of the waters in Venice and both the memory and *possibility* of flooding, which has occurred throughout the City's history.

CRITICAL INVESTIGATIONS

The ultimate potential of applying notions of index to the development of the city is to reestablish formal relationships, or dependencies between architecture and the city. While contemporary examples are rare, an extraordinary series of urban temporals for "artificial excavations" were investigated by Peter Eisenman in the 1980's, culminating in the building of the Wexner Center for the Arts at Ohio State University.⁸ Equally significant are the proposals by Daniel Libeskind undertaken in the 1990's, the most renown of which is the Jewish Museum in Berlin, completed (although still unopened) in 1997. Due to space limitations, the following will provide a brief description of only the Jewish Museum relating to archeological/mapping strategies apropos to our understanding of index; a more comprehensive presentation of the museum and other projects by Libeskind can be found elsewhere.⁹

The Jewish Museum in Berlin was the result of a design competition initiated in 1989, and since its completion has received critical acclaim. The generating plan of the project starts with the mythic form of the Jewish star that undergoes a series of distortions, in which each stretch, extension and contraction represents an evolutionary timeline referenced to prior and successive stages of design transformation. Within this configuration is inserted a linear void of absence which cuts off the temporal continuity of the museum and can not be inhabited, representing the human loss exacted by the Holocaust. Both of these formal narratives fundamentally work on a symbolic, rather than indexical level, yet it is the nature of their pure physical/spatial confrontation that lies at the heart of the building's emotional power.

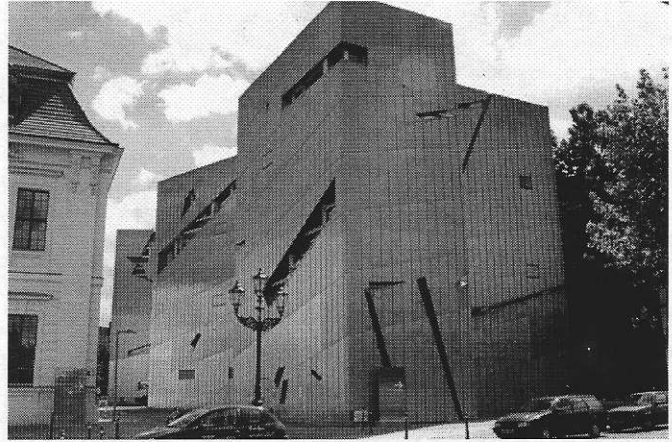


Fig. 8. Daniel Libeskind, *Jewish Museum*, Berlin, 1989-98.

Perhaps the most interesting aspect of the project is the structure of the windows that read as abstract cuts in the wall, forming a series of linear collisions that seem to be randomly extended at all angles and alignments across the facade. The methodology of their derivation begins with Libeskind's discovery of the *Gedenbuck*, a book that contains the names and addresses of Jews living in Berlin who were deported to the camps. Through a mapping strategy, the locations of the names are designated on a map of Berlin, and Libeskind searches for a structure of relationships, what he calls an "urban constellation of Universal History."¹⁰ The connection of the names establish avenues of memory, referring to the lives of those lost, now made manifest by lines inscribed on a horizontal field, which when rotated to a vertical dimension, become the voids on the facade. These cuts are thus an index of loss, or negative presence; they refer to the subtracted lives that have been memorialized by the documentation of their mapped alignments and interrelationships in the urban field. The conceptual weight of the project is the fact that the structure of relationships, while appearing to be arbitrary, or vaguely symbolic, is not an invention, but *real*, a narration *caused* by the physical location of those who once lived in the city, thus fulfilling its mission "to integrate the German and Jewish histories of Berlin." Form is less a matter of composition or invention, but more a desire of following in the inalterable track of historical facts.

CONCLUSIONS

1. The notion of index as design method refutes the notion of the city based on topological organizations, or, the arrangement of preconceived formal types as constants. The city as a collection of urban types has resulted in an arbitrary redundancy, a denial of site specificity, and forced agreement as to how forms are represented and what they mean. It is clear that no such agreement can exist today—the relationship of urban forms to particular meanings, and the suggestion that such forms carry some institutional imperative is no longer possible. The other possibility is to develop formal relationships that are more open and flexible than preconceived typologies, and more aligned with a contemporary condition of shifting meaning, continual flux, and almost instantaneous cultural shifts. Thus, it is proposed that the city becomes conceived and read as a system of physical relationships, or contingencies, whose formal characteristics are based on the specificity of place, physical circumstance, and the focused relationships of internal program and built form to external cultural causes.

does serve as a marker of the exact epi-center of the blast, a physical fact which provides heightened knowledge, and reactivates one's consciousness of the actual event.

War monuments provide indexical references not to the history of built additions, but tragic moments of removal, the voids and destruction bought about by modern warfare. Berlin is filled with ruins and bullet-pocked walls throughout the city, serving as very real references to the devastation resulting from World War II, as well as indices of an earlier city fabric, such as the remains of the Kaiser-Wilhelm Church, or the façade fragment of the Anhalter Bahnhof (Fig. 2). But equally as interesting is what is not there—the voided scars, the empty spaces that signify the removal of some part of the city cleanly extracted out of the normal flow of time. These voids sometimes carry an exceptional conceptual weight inversely proportional to the actual remaining fabric, such as a newly constructed embedded steel “line” in the street that marks the position of the earlier Berlin Wall, or the “Topography of Terror,” a cleared away area now officially designated as an anti-monument to earlier Nazi operations, formerly the site of the SS Police Headquarters. All that remained of the building after the war were the basement masonry walls, originally used as cells to torture prisoners, and now partially restored as a museum of Nazi atrocities.



Fig. 6. Steel line marking original location of the Berlin Wall, Niederkirchner Stra., Berlin.

FORMAL RELATIONSHIPS

Manfredo Tafuri has framed one of the enduring paradigms of the 20th century American grid city: the complete independence of architecture and its defining armature.⁷ The notion of indexical relationships in the city, however, is to suggest the opposite: that the physical cross-referencing between architecture and the larger structure of the city can reestablish formal dependencies which are caused by and responsive to conditions found in the immediate or distant context. Architecture can be shaped by indirect, often invisible information that is either not visible from the local surroundings, was present in another time period, or presents a discrepancy within the dominant local order which is typically submerged so as to not overly distort the purity of a given idealized typology.

Within the grid city, buildings can conform to normative relationships to the local street grid, and refer to other conditions or anomalies that do not conform to typical site characteristics. Buildings along Manhattan's Broadway built before the development of the 1811 Commissioner's Plan typically have lot lines that are perpendicular to the street, but if built subsequent to the development of the Commissioner's Plan, will conform to the prevailing orientation of the surrounding grid, so that buildings according to their age now provide references to different phases of the city's development.

Other formal dependencies are purely visual and more immediate, in which a building, or portions of a building are indexically cross-referenced to other vistas, forming a kind of interdependence, or reciprocity between the object (as cause) and its visual association (as effect). Particular sightings from a particular point to a desired destination tend to reinforce, or enhance a discovered alignment, or visual relationship that draws singular events together into larger perceptual gestalts. Or, a particular building may act to frame another, develop a kind of pedestal for a distant feature, or perform as a viewing “site” that directs one's vision to a preferred destination. The result is a formal dependency between two or more separate buildings or events, in which one acts as the index to the other, providing visual clues and effects that perform as evidence of the original cause.

INSTRUMENTS OF MEASUREMENT

Architecture possesses a capacity to perform as a kind of instrument that both “measures” and clarifies certain physical aspects of the city's form, or orchestrates particular relationships between buildings. Buildings can be designed to enhance a particular understanding of fluctuations of topography, whereby a dominant horizontal feature of the massing acts as a datum that allows one to measure degrees of variance. This could be accomplished locally, in which a building might clarify the degree of surrounding topographic variation (found along many of the extreme gradients in San Francisco). At a macro scale, a series of building interventions or articulations in the façade that mark a consistent elevation from sea level could mediate the extended topographic fluctuations that occur along a street, ultimately generating a kind of mapping of the city's landform.

A type of indexical measurement occurs in the phenomenon of tidal fluctuations, in which the varying water level constantly changes in relation to the invariant limits of the built edge and adjacent land elevations. The slowing rising and lowering of the tides is difficult to comprehend, unless measured against a constant point, or zone of reference. One possibility of improving the perception of transitional changes in water levels is to establish a physical index along the water's edge as a precise datum of built form relative to the impact of tidal fluctuation observed along edge, which then has the ability to become a primary characteristic of the site. In other words, the designed index provides a clear reading of varying water levels, which in turn becomes the cause of an appropriate design response, such as surfaces (either horizontal or vertical) that are sequentially covered and exposed as the tides come in and out.

This is realized by the work of Mary Miss at the South Cove in Battery Park City, New York, where a portion of the artificial decking over the river was removed, exposing the underlying structure of concrete supports submerged within the river. At one level, the supports perform as an index of how the overall man-made platform is constructed, making clear that *everything* above ground is actually artificial. One can also observe the fluctuating level of the water that variably exposes the fixed level of the supports, thus performing as a precise index of the changing tides throughout the day.

2. The implication of the city as index is to suggest a different method of reading of the city's fabric, typically understood as being made up of whole buildings, whole complexes, or whole blocks, each read as completed statements based on their internal resolution. Another reading of the city could be based on deciphering or designing portions, or fragments of the city, buildings, or parts of buildings that develop specific indexical relationships, vs. other portions that are essentially neutral, or mute, and do not perform at the same level of intent. The emphasis might now be placed on the specific content and dialectic between smaller parts, or fragments that exist independently of the "project," a more complex order of residual relationships that exert new readings across functional, ownership, social, and even temporal boundaries. The index prefers the unruly part to the straight-jacketed whole, "where concept and experience of space abruptly coincide, where architectural fragments collide and merge in delight....no metaphorical paradise here, but discomfort and the unbalancing of expectations."¹¹

3. Finally, the notion of index suggests the possibility of developing the "city of shadows" as a system of marking, in which the city establishes a physical mapping of its own history, culture, events, and process of development. In some cases, to suggest the city as index is to promote policies of preservation, and the resulting benefits of tourism attracted to the entertainment and nostalgia of seeing the remnants of an authentic history that become ever more rare and minuscule in the context of the electronic city. But one would like to suggest a more critical form of index, where events and places are marked not by a mere plaque or monument, but an actual demarcation of boundaries that are articulated through specified surfaces/materials within the actual fabric of streets, buildings, and urban spaces. A partial excavation in certain areas will expose actual remains in their original location; in other cases, traces of earlier buildings will be incorporated into new development.

The city can become an instrument for the activation of memory by *experiencing* the authenticity of the historical trace, allowing its aura to resonate within the present. The result would be a dense network of mapped cross-references, linkages,

pentimenti, clues, directed vistas, and analogues that envelope the city, that reestablishes dependencies between the part and the whole, cause and effect, and reclaim possibilities of memory, and meaning. Such was the essence of the historic city, which once again, could provide possibilities of restoring content for a rapidly emptying city of the future.

NOTES

¹To list a few: Michael Sorkin, "Introduction" and "See You In Disneyland" from *Variations on a Theme Park: The New American City and the End of Public Space* (New York: Hill and Wang, 1992); Rem Koolhaas, "The Generic City," from *S,M,L,XL* (New York: Monacelli Press, 1995); Christine Boyer, *Cybercities* (Cambridge: M.I.T. Press, 1995).

²Colin Rowe and Fred Koetter, *Contextualism* (Cambridge: M.I.T. Press, 1978); Rob Krier, *Urban Space* (New York: Rizzoli, 1979); Aldo Rossi, *The Architecture of the City* (Cambridge: M.I.T. Press, 1982); Edmund Bacon, *Design of Cities* (New York: Viking Press, 1967).

³Rosalind Krauss, "Notes on Index: Seventies Art in America," *October* 3 (1977), p. 70.

⁴Richard Scherr, "Architecture as Index: Toward A Theory of Contingency," *Journal of Architectural Education* (May, 1991).

⁵Jack Flan, *Richard Diebendorn, Ocean Park* (New York: Rizzoli/Gargosian Galleries, 1992) pp. 21, 23.

⁶Rodolpho Machado, "Old Buildings as Palimpsest," *Progressive Architecture* (March, 1977).

⁷Manfredo Tafuri, "Toward a critique of Architectural Ideology," from Hays (ed) *Architecture Theory Since 1968* (Cambridge: M.I.T. Press, 1998), p. 13.

⁸Peter Eisenman, *Cities of Artificial Excavation: The Work of Peter Eisenman, 1978-88* (New York: Rizzoli International Publications, 1994). Also, for a discussion of the Wexner Center, see: Scherr, *op. cit.*, pp. 179-180.

⁹Daniel Libeskind, *Radix-Matrix* (Munich: Prestel-Verlag, 1997).

¹⁰Ibid, p. 34.

¹¹Bernard Tschumi, *Architecture and Disjunction*, Cambridge: M.I.T. Press, 1994, p. 93.