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General Examination

1st Field: City Design and Development
2nd Field: Information in Urban Planning and Policy

DATES:

Written Exam: May 14-18,2001
Oral Exam: May 23, 2001

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May 18, 2001

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1 First Field: City design and development

1.1 QUESTIONS

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Answer either Question #1 or Question #2:

Question #1:

In your examination proposal you distinguish between "organic growth" and "designed growth" as modes through which cities take on their form, and you acknowledge that this distinction is somewhat fuzzy. Calling upon a number of the "classic" authors, e.g. Mumford, Kostof, Lynch, Sitte, etc., discuss how their constructs for the making of city form support, or do not support this distinction; and where they do, explain how they address the overlap or fuzzy edge between these two modes.

Question #2:

In the literature you have reviewed it is possible to find substantive differences between a European and a North American stance in terms of late 20th century public policy and its corresponding planning, regulatory, and/or other approaches that seek to shape the city in ways consistent with that policy. Draw upon three authors from each side of the Atlantic to characterize the two approaches to policy, planning and urban design practice. Discuss whether, and why, you believe these differences are likely to grow or diminish in the years ahead.

Answer either Question #3 or Question #4:

Question #3:

Lisa Peattie opens Chapter 6 ("Representation") of her book, *Rethinking Ciudad Guayana*, with the following text:[1]

> "Planners and designers are people, and collectively they constitute social groups. As such, they have social relationships with the world around them. As professional practitioners, however, they deal mainly with various representations of reality: maps, site plans, statistical tables, and the like, each of which is an abstraction of the reality out there. The planners' and designers' social relations no doubt interact with their professional practice to shape both the choice of representations and their interpretation. Nevertheless, it is possible to look at the vocabulary of representation which professional practice makes available at a given place and time as the instruments with which a given group of individual professionals has to work. In trying to understand the Guayana Project it seems particularly appropriate to look at the forms of representation, since the planners and designers were so socially isolated from the world of the site. Representations were not simply the way the planners presented a world, intimately known, in order to achieve some particular effect on an audience; the planners to a substantial degree experienced the city through their own representations of it." (page 111)

[1] Lisa Peattie, *Planning: Rethinking Ciudad Guyana* (Ann Arbor: University of Michigan Press, 1987), Chapter 6, "Representation."

Select a planning project with which you are familiar and explore it through the multiple lenses of representation as suggested by Lisa. Do you agree that practice is shaped by choice of representations and their interpretations? If so, show how that played out in the project you select. Do you agree with the idea that planners experience the city through their own representations of it? If so, show how that played out in the project you select.

How do other authors whom you have read agree or disagree with Lisa?

Question #4:

In the description of your first field, you make the statement, "A city can be truly changed both by modifications to its structures and/or to its activities. We can modify the 'container' and/or the 'contents' of the city. These are the only changes possible in the real world of cities." But your readings suggest a third possibility: that cities can be modified by modifying their packaging, that is, by affecting perceptions of them. Thus, one would focus on structure, activity, *and* perception.

Drawing on your readings and your coursework, explore the merits of this possibility. Assuming that perception is a valid third factor to be taken into account, how should one take it into account when thinking about the shaping of cities? Keep in mind that experience of the city and the representation of the city are not necessarily the same thing.

1.2 ANSWERS

Question #1

In your examination proposal you distinguish between "organic growth" and "designed growth" as modes through which cities take on their form, and you acknowledge that this distinction is somewhat fuzzy. Calling upon a number of the "classic" authors, e.g. Mumford, Kostof, Lynch, Sitte, etc., discuss how their constructs for the making of city form support, or do not support this distinction; and where they do, explain how they address the overlap or fuzzy edge between these two modes.

The distinction between "planned, designed or created" cities and the conversely "unplanned, spontaneous or organic" ones is, as Kostof put it "the most persistent, and crudest, analysis of urban form"[2]. With few possible exceptions[3], such a simplistic distinction cannot be easily made when analyzing the form of entire cities, old or new.

Every city has parts that are obviously planned and others that seem to have no overt design embedded in the urban fabric. But impressions can be deceiving, and Kostof himself points out how Siena's apparently organic layout was nonetheless guided by local ordinances that fostered a uniform streetscape[4]. Similarly, as I explained in one of my unpublished papers on the *Urban Design Politics of Venice*, even in my hometown, the apparent diversity of forms and styles was controlled, not only by the natural terrain that prevented the construction of heavy buildings that would have subsided into the soft soils of the underlying sandbars, but also, to some degree, by *dictates* such as the *Daulo Act* which attempted to restrain the ostentatious and socially destabilizing display of riches by mandating "*that all houses should be even, similar, of the same size and ornamentation*"[5].

Kostof dismisses this dichotomy when he clearly states that the "*fact is that no city, however arbitrary its form may appear to us, can be said to be 'unplanned'*"[6]. I agree with Kostof. In fact, a careful reading of my proposal will confirm that my adoption of a bipartite division between "evolution" and "shaping" of city form relates more to a chronological account of city development[7] than to a wholesale acceptance of a clear distinction between unplanned and planned urban growth. "Organic growth" is a pre-industrial and medieval mode of urban development in which planning-as-we-know-it played a minor role indeed, whereas the closer we get to the present day, the more overt and wide-ranging city planning efforts have become. After all, modern city planning, as a recognized professional activity, did not become a reality until the second half of the nineteenth century[8]. This rather recent concern with the large-scale planning of whole cities and towns is in part due to health and safety concerns, technological innovations and development of mass transportation systems, adopted in response to the extremely rapid growth of urban areas after centuries of slow and gradual growth patterns.

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2 Spiro Kostof, *The City Shaped*, p. 43.

3 Such as the top-down designs of some "new towns" (e.g. Milton Keynes), "garden cities" (e.g. Letchworth, Welwyn, Radburn, etc.), "garden suburbs" (e.g. Hampstead, Forest Hills) and "new urbanist" developments (e.g. Seaside), or the large monumental cores of some capital cities such as Canberra, New Delhi, Washington D.C. and Brasilia.

4 A 1346 Siena city council resolution insisted that: *"it redounds to the beauty of the city of Siena and to the satisfaction of almost all people of the same city that any edifices that are to be made anew anywhere along the public thoroughfares…proceed in line with the existent buildings, and one building not stand out beyond another, but they shall be disposed and arranged equally so as to be of greatest beauty for the city"* (Kostof, *op. cit.*, p. 70).

5 Tafuri, *Venezia e il Rinascimento*, p. 6 (personal translation).

6 *Ibid.*, p. 52.

7 Much like that adopted by Jonathan Barnett in the *Elusive City*, where he starts with the "preindustrial traditions" that preceded the advent of town planning as such.

8 Benevolo, in particular, in his book *The Origins of Modern Town Planning*, dates the start of the movement to the years right after the revolutions of 1848.

As Kostof frequently reminds us, "power designs cities"[9], so the separation between organic and designed cities is also based largely on the control of the development process. Organic cities, in my interpretation of the term, are those in which the development is due to incremental changes brought about mostly by individual land owners, who controlled their own private property with little or no influence from external political powers. In designed growth, the development is dictated primarily by some higher authority, whose totalizing view shapes the planning, often making "the urban form unambiguously readable"[10].

Implicitly, therefore, I was also separating the literature of the field along the scale dimension. One could argue, in fact, that even the construction of an individual building constitutes a "plan" of sorts. Indeed, Mumford, Lynch and Sitte subscribe to this view (more later). However, in accordance to Burnham's famous aphorism "Make no little plans!," and based on the aforementioned issue of the locus of control, I have considered large scale planning activities as conscious attempts at "shaping" the broader urban realm, thus making them fall within the province of town and city planning, hence in my second category. Nevertheless, if "design" intention is overt, I would consider even small incremental plans as "designed growth".

Moreover, my subdivision between "evolution" and "shaping" of urban form was also meant to separate the "descriptive" literature on urban history that looks at the gradual development of cities "as they are", even if some degree of planning went into them, from the more "normative" design literature that focuses on cities as "they ought to be", where planning would play a more dominant role. My investigation of the evolution of cities could have incorporated the planning literature as a subset, as it often does, but I decided to separate the two so that the literature about city planning is prevalently in the second group. Notice my use of words, both in the previous sentence (*"prevalently"*) and in my proposal (*"without major conscious (or at least discernable) attempts"*, *"much less planned and more spontaneous development"*), which should make clear that I was separating the two categories based on the "degree" of planning and design that went into them. To a large extent, my division between organic and designed growth is thus primarily based on whether long-term changes to the urban structure were pre-meditated and teleological or whether they were spontaneous, localized and, to a large degree, unintended.

Indeed, as Lynch said in the introduction to *What time is this place?*, "the arguments of planning all come down to the management of change"[11], so any such management action could in theory be considered a form of planning, regardless of the spatial and temporal scale of the change. Lynch, in fact, does not differentiate, as I otherwise do, between "organic growth" and "designed growth". To Lynch, every change matters and has the power of transforming the urban realm, but he does, however, come close to my interpretation when he states that his normative theory "is designed for use in this environment-modifying, piecemeal and gradualist mode" (using many of the same terms that I applied to my "evolutionary" grouping), though he admits also that "it can also supply educative information, or the fuel for a more radical change" (which would therefore constitute more direct "shaping" of city form, as I intended in my second category)[12]. Thus, Lynch's normative theory bridges the gap between the "organic" and the "designed", in essence suggesting that piecemeal change can be brought about by conscious design decisions.

In fact, all of the modern planning theories that I personally find appealing seek to "address the overlap or fuzzy edge" between the two modes of growth in which I divided my first field. They all try to recapture the "wholeness in space"[13] of organic cities of the past through a modern-day approach to urban

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9 Kostof, *op. cit.*, p. 52.

10 *Idem.*

11 Kevin Lynch, *What time is this place?*, p. 1.

12 Kevin Lynch, *Good City Form*, p. 43.

13 To quote Christopher Alexander, in *A New Theory of Urban Design*, p. 4.

design. It is precisely for this reason that I decided to distinguish between the two, although, as I stated in my proposal, it was difficult to cleanly split much of the existing literature along these lines, since many texts contain both descriptive and normative chapters. Thus, I opted to include the titles that are more overtly linked to city planning in the second subfield, including those authors who try to promote the "design" of organic cities, while incorporating urban history treatises as well as the more "mixed" (both descriptive and theoretical) texts on city form within the first subfield. The paragraphs that follow illustrate how most of the "classic" authors that I admire actually dealt with the dichotomy between organic and designed growth.

Mumford advocates "organic planning" in which "what began as the seizure of an accidental advantage may prompt a strong element in design, which an a priori plan could not anticipate, and in all probability would overlook or rule out."[14] He is emphatic in his assertion that the growth of medieval towns embody a *bona fide* plan, a universal pattern that, although it "does not begin with a preconceived goal", "moves from need to need, from opportunity to opportunity, in a series of adaptations that themselves become increasingly coherent and purposeful, so that they generate a complex, final design, hardly less unified than a pre-formed geometric pattern."[15]

Lynch is of a similar mind when he espouses the niche roles that both "strategic" and "homeostatic" planning can occupy in the management of urban change. Lynch, in his modern approach to urban adaptability, one-ups Mumford by allowing a strategic teleological grand objective to guide the development process, while the day-to-day tactical decisions are made as "opportunity indicates"[16]. In essence, this is the approach followed by pope Sixtus V and his architect, Domenico Fontana, in laying out the "grand objective" for the city of Rome between 1585 and 1590. After they strategically installed their four obelisks and laid out the straight avenues connecting the main churches and monuments in Rome, this enlightened pair managed to do little else since the Pope died rather prematurely. Yet, the power of these urban elements has proven immortal, since, over the next four centuries, Rome grew and organized itself around the axial connectors subtended by the obelisks, in a slow process of tactical, opportunistic design decisions[17].

Similarly, Christopher Alexander, in *A new theory of urban design* proposes to develop a method by which the "organicness" of old towns can be brought about by a "process of urban growth, or urban design, that would create wholeness in the city, almost spontaneously, from the actions of the members of the community… provided that every decision, at every instant, was guided by the centering process."[18] He deals with the aforementioned issues of scale by reformulating his "overriding rule"[19] as follows:

"Every building increment must be chosen, placed, planned, formed, and given its details in such a way as to increase the number of wholes which exist in space".

His seven intermediate (derived) rules touch upon the principal characteristics of "organic" towns, prescribing that each designed element should: (i) promote piecemeal growth; (ii) promote the growth of the larger wholes; (iii) contain a vision of the larger whole; (iv) produce "positive" urban space; (v) produce wholeness within it; (vi) produce wholeness outside it, through its physical construction and appearance; and (vii) be a center in itself, while producing a system of centers around it. As Alexander recognized after his experimental application of this new theory, these rules do not necessarily guarantee that they will produce a "city that is moving, which has feeling in it, which is profound."[20] As Ruskin, Sitte and

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14 Lewis Mumford, *The City in History*, p. 302.

15 *Idem.*

16 Lynch, *What time is this place?*, p. 207.

17 Barnett, *Ibid.*, pp. 8-10. See also Edmund Bacon, *Design of Cities*, pp. 117-145,

18 Christopher Alexander, *op. cit.*, p. 5. Notice Alexander's use of the modifier "almost".

19 This is the final version of the rule, rephrased after the final evaluation of his experiment on the S.Francisco waterfront. *Ibid.*, p. 238.

20 *Ibid.*, p. 243.

Norberg-Schulz already recognized before him, Alexander imputes the lack of depth in the designs, that were produced by the systematic application of his seven rules, to a shallowness of spirit, when compared to the *genius loci* of older towns that grew as a whole due to the deep spirit of the ancient builders, that was manifested in the resulting organic urban forms. Such a depth of spirit cannot be "manufactured"[21]. "The essence of this argument is that in the past (and perhaps in today's pre-industrial world), societal memory and disciplinary memory were (and are) one and the same. Architects, vernacular or professional, were, through the centuries, just the most recent representatives of a long-standing tradition of mentality, culture and technique that "rooted" them in the memory of the place they were building in. They were full members of the society they were building for. They instinctively knew what would work (what would "fit", as Kevin Lynch would say[22]) in the urban landscape of their cities. They "metabolized"[23] the styles of the past and introduced innovations gradually and tastefully. They used native materials and maintained continuity with the adjacent buildings. Despite [or perhaps because of] the high density of edification of medieval towns, they designed their buildings with the context in mind."[24]

Sitte, much like Lynch and Mumford, disregards the dichotomy between planned and unplanned growth that I introduced, since he too tacitly acknowledges that every change to the built environment constitutes a form of urban design. In his discussion about the artistic principles that should apply to city planning, as a reaction to the engineering mentality that was pervasive in the German-speaking world of his day, Sitte focuses primarily on the size and shape of the public streets and squares and on the way in which buildings and monuments interact with these spaces. In his dislike of the "deadly tedium of a sea of tenement buildings in endlessly extending rows" and his conviction that "one ought not only accept curvature in streets, but also diverse widths and asymmetrical cross-sections, as well as occasional irregularities in building-frontage lines and in the width of sidewalks, wherever there is a legitimate need for them"[25], we can detect the same sort of attitude toward "organic planning" as will be found in Mumford more than half a century later, as well as an instance of the "opportunistic" and "existentialist" approach to piecemeal urban modifications discussed by Lynch in *What time is this place?*.

Mumford further emphasizes Sitte's principles when he states that the *"very departures and irregularities"* of the towns of the Middle Ages, *"are usually not merely sound, but often subtle, in their blending of practical need and esthetic insight."*[26]

One must not confuse the type of "organic growth" discussed so far with the "organic theory" of settlement that both Lynch and Kostof discuss at length in their writings[27]. Such a model of city development does not only denote the piecemeal, spontaneous and self-organizing patterns illustrated above, but implies a rather more literal analogy between the city and the human body, whereby each settlement is a separate self-contained entity made up of highly interdependent functional units set up in a hierarchical structure of sub-units and sub-sub-units. This biological simile is rejected by Alexander, Lynch and Kostof as inappropriate to describe "real" cities, and it actually presents some ominous aspects, such as the surgical treatment of urban pathologies through the amputation of diseased sections, much as was done with the slum clearances during the American urban renewal craze of the 60's and 70's. Obviously, I agree with this rejection.

The non-biological "organic growth" discussed in the previous pages, on the other hand, as pointed out by Norberg-Schulz, Kostof and Lynch, is primarily due the progressive expansion of cities

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21 *Idem.*

22 In *Good City Form*.

23 I owe this word to Attilio Petruccioli's remarks during the Advanced Theory of City Form seminar in the fall of 1997.

24 Quoted from my unpublished paper entitled *Is the lamp of memory still burning?* completed in 1998 for the Advanced Theory of City Form seminar.

25 From the first number of the magazine *Der Städtebau* (1904), included as Appendix II in the 1986 book *Camillo Sitte: The birth of modern City Planning*, by George R. and Christiane C. Collins, pp. 326-7.

26 Mumford, *Ibid.*, p. 302.

27 Lynch, *Good City Form*, pp. 88-98; Kostof, *op. cit.*, pp. 52-93.

based on topographical idiosyncrasies of the site, which create seemingly random, irregular patterns that uniquely distinguish each settlement, thus giving it an identity and character which most of us find very attractive[28]. Other forces that shaped the development of organic towns may also be concealed in their urban fabric, through the successive layers of construction that together cumulatively contributed to the layout we see today, such as: the location of original prehistoric shrines, the footprints of earlier buildings destroyed by war or fire or dismantled out of neglect or convenience, or the effects of ancient property boundaries or social mores.

The "picturesque" movement of the XVIII century represented an attempt to recapture the "natural" look of these medieval towns, by incorporating curving streets and domesticated landscapes in some circumscribed locations in lieu of the sedimentation of time. In turn these small-scale design experiments led to the Garden City movement, after the publication of Ebenezer Howard's classic *Garden Cities of To-morrow* in 1898, which, alas, reflected a more "biological" interpretation of the "organic" patterns. Despite their "natural" appeal, these examples of planned communities would not qualify as "organic growth" according to my definition, since they are overtly "designed". Kostof appropriately includes them in his chapter on "The evolution of organic patterns", because they are derivatives of the spontaneous organic forms of yesteryear. Since he considers any type of manipulation of the land a "planned bit of urbanism" – including the reclamation of lagoon marshes in my hometown – it is absolutely indisputable that garden cities are on the "design" side of the equation according to Kostof, as indeed they are for me too.

Today, organic growth in the purest sense is virtually impossible in much of the world, due to the constraints of zoning and land use regulations, building codes and other controls, although it could still be happening in many developing nations. Whether any modern-day unplanned growth will generate towns that Alexander would consider comparable to the "most beautiful towns and cities of the past" is rather doubtful. Although their growth – as well as the growth of modern American suburbs, for that matter – can still be considered "piecemeal and unpredictable"[29], they would probably lack two other essential features of "whole cities", i.e. "coherence and feeling"[30]. Present-day "conveniences" and the globalizing influence of supranational media have all but obliterated any hope for the resurrection of the spirit that would produce "place"[31] where the *genius loci* is rooted in the environment and thus "gathers meaning" from the surrounding natural setting.

The "organic growth" section of any literature review is destined to remain pretty much unaltered in the years to come for lack of fresh material. Our best hope for more livable places rests now almost entirely on "designed growth", so that the quality of life of future cities will depend in large part on the ability of urban designers, including MIT graduates, to capture and reconstruct the "wholeness" that characterized the best urban realms of the past, by consciously and deliberately incorporating some of the more successful principles of "organic growth" in innovative forms of urban design that will produce places with distinctive identity and meaning.

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[28] Witness the number of tourists that flock to the hill towns of Italy or the medieval burgs of the Alps, etc. See also Alexander, *op. cit.*, p. 2.

[29] Two of the "fundamental and essential features" of "growing wholes". Alexander, *op. cit.*, p. 14.

[30] *Idem.*

[31] i.e. "space with identity" as Norberg-Schulz defines it.

Question #4

In the description of your first field, you make the statement, "A city can be truly changed both by modifications to its structures and/or to its activities. We can modify the 'container' and/or the 'contents' of the city. These are the only changes possible in the real world of cities." But your readings suggest a third possibility: that cities can be modified by modifying their packaging, that is, by affecting perceptions of them. Thus, one would focus on structure, activity, and perception.

- *Drawing on your readings and your coursework, explore the merits of this possibility.*
- *Assuming that perception is a valid third factor to be taken into account, how should one take it into account when thinking about the shaping of cities? Keep in mind that experience of the city and the representation of the city are not necessarily the same thing.*

Perception certainly plays an important role in urban change both in the positive and in the negative sense. Perception may guide and inspire material improvements to the built environment and a more civilized social behavior, or it may engender physical neglect and anti-social activities. Nevertheless, packaging or representation will not change the urban reality *per se*, but may only lead to change in the two fundamental components of a city: *structure* and *activity*[32]. Perception can definitely be an "agent of change" but it does not constitute urban change as such.

We need to distinguish at least two forms of perception as it relates to the urban realm:

- The unmediated[33] perception of a place, developed from direct experience – or, more precisely, from the interplay between direct experience and preconceived ideas and biases. This is the personal "image of the city" we construct in our mind through habitation or visitation, by interacting directly with the structures and activities of a city. This image is "tested against the filtered perceptual input in a constant interacting process"[34].
- The mediated perception of a place that we develop without direct experience, based on images fed to us through a variety of media. This is an image that we pre-conceive in lieu of actual visitation or habitation. It may be altered or confirmed once we get a chance to be in the real place.

As pointed out in the last sentence of the question, these two "perceptions" are not the same. The first one is based on "experience" and the second on "representation". If the two coincide, then the mediated image can be considered to be an "accurate" representation of unmediated reality. Such is the case when we visit a place that we have read and heard a lot about and we come away with a feeling that it has lived up to the expectations. Sometimes, we are disappointed and our tour of a new city contrasts with our pre-conceived notions.

Frequently, a "mediated" representation of a city is put forth to inspire positive change. If successful, this "packaged" perception (sometimes called a "vision") can lead to physical or socio-economic change, which in turn can affect the unmediated (or "experiential") perception of place. Similarly, negative stereotyping of a city in the media can lead to more physical and social degradation and thus to continued deterioration of the experiential image one would acquire *in loco*, in a downward spiraling and self-perpetuating cycle[35].

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[32] See my General Exams proposal for more about these two fundamental elements of a city.

[33] Although "pure" unmediated experience is virtually impossible, as discussed later on page 19, I use this term as a proxy for "hardly-" or "mildly-mediated" perception.

[34] Lynch, *The Image of the City*, p. 6.

[35] Intuitively, it seems that a "vicious" cycle may have more momentum and staying power than a "virtuous" one, which would appear to be much more ephemeral. This hypothesis may be worthy of scholarly investigation, as was done, in part, by Raj Singh vis á vis the "boarding up" of properties in some Boston neighborhoods.

Both of these types of images are stored in the minds of individuals, but they can also be shared by large numbers of people. If "there seems to be substantial agreement among members of the same group" with first-hand knowledge about a place, then the "experienced" perception can be considered a shared "public image", based on the "interaction of a single physical reality" (structure) and "a common culture"[36] (activity). The second type of image – the perception without experience – can also be shared by many, at least on some level, when it is disseminated by a widely publicized advertising campaign (say, for a specific vacation spot).

One could argue that, in fact, both of these types of perception actually originate outside the individual and are subsequently internalized, and both are "mediated" in some way. This is a legitimate objection, but I would counterargue that direct experience is all that really matters to planners who seek to always improve the livability of cities for those who experience them directly and not for those who only imagine them in their mind's eye. So there is a drastic difference between these two for those of us who strive to imrove the urban quality of life.

Experience-based perceptions often incorporate some pre-conceived bias, based on an *a priori* representations, assembled over time through a variety of inputs. But if "shared images" are produced by the real place, once it is experienced directly, and especially if these group images are shared across cultural and generational gaps, then any preformed biases can be assumed to be superseded by the experiential power of "concrete place" itself.

The final arbiters of the quality or degree of change – positive or negative – are the inhabitants and/or the visitors who experience the changed city first hand. These first-hand "experiencers" of the city may not necessarily agree on the nature of change (or even on its very existence), but they will express their opinion through their actions, when appropriate[37]. No amount of packaging will make a city better if there are no corresponding "concrete" changes to the material or socio-economic and cultural fabric of the unmediated city itself, which can be shared only by those who witness the city in person.

If the packaged perception is fabricated or concocted by a team of public relation experts without real factual counterparts, it will not stand the test of time. Mediated images of a city are ephemeral and, unless they stimulate "real" changes in the "real" world, they will fade away and will soon be forgotten. A persistent and shared perception of a city is one which is constructed on tangible characteristics experienceable by those who visit or inhabit the city. "It is these group images, exhibiting consensus among significant numbers, that interest city planners who aspire to model an environment that will be used by many people"[38].

The construction of an internal Image of a city and the convergence of individual mental Images toward a common "public Image" of a place are complex processes affected by a number of factors. I agree with Norberg-Schulz, and I am personally convinced, that the true essence of the "spirit" of a place can only be acquired through repeated and intimate exposure to the real place in question. This process will lead to a "truer" Image since the only mediation would come from our own internal biases and states of mind. As planners, we can affect this path to the true Image by making the structures and activities of a city more "meaningful" – that is more legible, more memorable and more significant. If we are able to embed the "spirit" of the place in the physical structures, this embodied meaning should somehow be perceived by future citizens as well, thus giving the place a "strong identity"[39]. The activities that we are capable of promoting or discouraging with our policies, incentives and regulations – and the fit between

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[36] Lynch, *Ibid.*, p. 7.

[37] For instance, by moving away from a place or by moving in. Or by visiting a place repeatedly and even buying a vacation home there.

[38] Lynch, *Idem.*

[39] See also Alexander, *op. cit.*, p. 2.

form and actions[40] – will also contribute to such a "strong identity" that will spontaneously gather meaning around it.

But because many of us have accumulated a rough Image of many cities we have never visited, based exclusively on "representations" of those places, it is almost impossible for us to have a purely experiential Image of a city, in this age of information overload. Some exposure to mediated imaging is probably inevitable nowadays and this may affect even the purer and more direct experiential path toward the grasping of a city's essential character, spirit, identity and meaning.

Experiential Images

As Beinart put it: "A well-formed city is its own best advertisement"[41]. Experiencing a city without interposed filters will reveal to us its true nature in due time. A city's identity will eventually emerge through the crusts of superimposed images. While no two people will have the same exact experiences in a complex place, the meaning of a city's structural make-up and of its web of human activities will produce some sort of a "common Image" of the place that will be shared by a majority of long term residents. To put it in Jenkins' terms, a *gemeinschaft*[42] will emerge. This "public Image" will carry negative or positive meaning, and it will be subject to revision as the city's structures and activities change, making the fit between the two more or less broadly acceptable.

Familiarity will make the gaps between "individual city Images" less and less pronounced, as each of us files away more and more meaningful information about the visual cityscapes we encounter in our habitation[43]. Visitors will not have the benefit of the long exposure that local citizens have, but they will still have an opportunity to experience a city's real identity first hand. Both the lives of citizens and the visits of tourists will be enhanced by ephemeral expressions of community values, such as festivals, celebrations and other such cyclical and non-cyclical events.

In all of these experiential Image-building situations the planner can play a very important – and perhaps primary – role, with image-savvy professionals relegated to a secondary and less influential position. It is at this level that a city's true essence is revealed in spite of any attempt to alter its meanings through various media.

As explained by Sennett, habitation is a fundamental image-building activity. To answer the second part of the exam question, when thinking about the shaping of cities, it would be great if planners and architects were to dwell[44] in the places for which they designed urban spaces. The *Books of Praise* introduced by Beinart[45] are attempts, on the part of rooted inhabitants, to convey the meaning of places to outsiders. He says that "*what distinguishes the experience of a city's own inhabitants from those of outsiders is the access that citizens have to 'embodied' meaning'*". Such a meaning needs to be made known to citizens through the work of planners and designers, who "*are the true craftsmen of the city's form*"[46]. So, it would be great if planners and urban designers – the shapers of cities – were an integral part of the urban milieu, which they shape, so that their "perception" of the city conformed to the "group image" of the local inhabitants[47].

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40 See Lynch, *Good City Form*.

41 Quoted from a paper presented at the *Imaging the City* seminar: "Image Construction in Premodern Cities", soon to appear in an upcoming book based on the seminar series (Vale *et al*., eds.).

42 Also from the forthcoming book on *Imaging the City:* "Mapping the Urban Imagination through Holliwood Film".

43 *Ibid*., "Process and Form, Work and Place", by Richard Sennett (forthcoming).

44 As Norberg-Schulz intends the term "dwelling": *"the total man-place relationship"*, in *Genius Loci*, p. 19.

45 See note 41.

46 *Idem.*

47 See also Lisa Peatty, *Planning: Rethinking Ciudad Guyana* (see footnote n. 1 and corresponding quote).

Another form of experiential image-building is that of visitation. It differs from habitation in its ephemeral nature and hence produces shallower Images. Structure and activity will engender visual impressions of varying intensity in the mind of the tourist. The filter in their mind will be probably quite different from that used by those steeped in the local culture. Thus the meaning of the composite Image may be quite different in visitors as opposed to inhabitants. Mediated "representations" play a larger role in the minds of visitors than they do in the minds of the locals.

Only a small sliver of a city's identity is revealed in the short span of a visit. On the other hand, large numbers of visitors can (and do) alter the "activity" of a city and hence, in the long run, will alter the experiential perception of the city. Structural changes may be brought about to cater to visitors, further changing the nature of the city. The identity of the city may eventually be affected to such an extent that the shallow images of the tourists, due to the sheer number of them, may progressively overwhelm and slowly obliterate the richer and deeper Image of the inhabitants[48].

This is a clear example in which "perceptions" (mediated through the representations of touristic advertising) can significantly alter cities, but, as I said before, the changes brought about by these perceptions can only truly materialize through changes in the built environment or in the activities therein. The true test of change is the experiential image, which is overwhelmingly based on the perception of the built environment and of the cultural life therein. This "downward equalization", as well as that noted by Martin and Bass-Warner[49], are both due to the dominance of a mono-culture (the tourist culture and the automobile culture, respectively). Planners should play an active role in preventing such monothematic assaults on the diversity and rootedness of our cities.

The ideal of "visitation", for the more sophisticated travelers, is that of blending in with the locals and being largely inconspicuous. This allows one to experience the city for what it really is and to take in all of its meanings in as unadulterated a form as possible.

Lynch's Travel Journals show his analytical mind at work in the way he tried to organize his personal Image of the cities he visited in 1952-53 according to the following "characteristic elements" of the cities' identities: *spaces* ("including light and atmosphere"), *orientation, middle distance picture* ("the characteristic views seen in one fixing of eye, ahead and slightly above horizon, most often obliquely across the space, characteristically of street facades and 2nd and 3rd story one or two blocks down the street"), *eye level detail* ("just ahead or abreast of walker, seen in interrupted snatches"), *floor* ("visual texture and form and color, extension and levels as a place, feel to feet"), *human activity, traffic, noise and smells*.[50] These perceptual elements are useful active ingredients that participate in the experiential Image construction process of both inhabitants and visitors, and they obviously include both structure and activity. The shapers of cities should keep these perceptual qualities in mind as they work to implement positive changes in our urban realms.

Ephemera are the ultimate experienceable phenomena[51]. The Image of the city, being composed of fragments of cognition about structure and action in a city, will definitely be strengthened by epehemera that express the spirit of a place and are not mere make-believe ploys to attract visitors. The active participation of locals to ephemera lends them credibility. Well-attended festivals are truer reflections of a local culture than made-for-tourists costumed parades.

Festivals, parades, carnivals and other festive human activities can be aimed at reclaiming public space to make it "safe" and civilized (as Bonnemaison suggests[52]), or they can be means for local citizens to

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48 Unfortunately, this is what seems to be gradually happening to Venice.

49 Also in the forthcoming volume on *Imaging the City*, "The Images of Commonplace Living in Modern City Regions".

50 Banjeree and Southworth, ed., *City Sense and City Design*, p. 118.

51 See Schuster, in upcoming *Imaging the City* volume.

52 Bonnemaison, "City Policies and Cyclical Events".

reaffirm their "nativeness" (as MacCannell purports[53]), or, as Lynch asserts "[p]laces and events can be designed to enlarge our sense of the present, either by their own vivid characters or as they heighten our perception of the contained activity"[54]. Lynch placed ephemera in the same basket of *Identity* in his *Good City Form*, under the performance dimension of *Sense*, where he equated the "sense of place" provided by a clear spatial identity with the "sense of occasion" of events with a clear social identity.[55]

In both of these quoted works, Lynch obviously confirms the inextricable dichotomy between structure and activity that gives rise to place identity.

Although they are experiential phenomena, ephemera can lend themselves to mediation in the same vein as in the tourist example described above. If a concocted pageant is set up purely for the benefit of the touristic image of a place, it will alter the image of the place to some degree. Thankfully, though, because of the temporary nature of these events, it is doubtful that they will engender permanent change in a city, thus they will probably not alter the experiential image of a place in a long-lasting way.

Packaged Images

Since the question directly addresses the issue of "packaging", I will conclude my reply with some considerations about "imaging", as a way to create mediated perceptions of a city.

Imaging occurs for a variety of reasons and attempts to affect the Image of a City through a variety of channels. Frequently, imaging efforts are concerned with fabricating an Image of a place within a specific dimension. Place promotion ads, as found in trade magazines such as *Expansion Management*, "seek to change [people's mental images] and, in doing so, to change behavior"[56]. The Image being manipulated here is the city's Business Image, which is more specific than a city's overall Image. The latter can also be the target of manipulation – for instance through such media as the recent P.R. pamphlet by Mayor Menino, which bragged about the ratings Boston received in many national rankings[57] – but, more frequently, these imaging efforts are focused on specific aspects of a city's operation, such as its housing market, its cultural vitality, its educational prowess and so on.

I suggest there are several ways for non-experiential images to be propounded to target audiences, through the tweaking of the multisensory inputs that reach each of us through all the media:

- Orchestrated display of selective snippets of Identity, through:
  - Selected structural features of a city, or
  - selected activities in the city, or
  - both
- Manipulation of Identity through visualizations, visions or revisions of structure and activity
- Manipulation of meanings through narrative
- Manipulation of meanings through associations

Moreover, one needs to be clear about who is controlling the imaging, to whom the mediated images are directed, and for what purpose imaging is being used. So we have, for example:

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53 MacCannell, "Staged Authenticity: Arrangements of Social Space in Tourist Settings".

54 Lynch, *What time is this Place?*, p. 83. Notice the juxtaposition of "structure" (places) and "activity " (events).

55 Lynch, *Good City Form*, p. 131-132. Another example of the dual nature of place as structure and activity.

56 Holcomb, Briavel, "Place Marketing: Using Media to Promote Cities". Contribution to the forthcoming volume *Imaging the City.*

57 Discussed in John de Monchaux's presentation at the *Imaging the City* seminar.

- An Outsider's Image of a City (like that of a visitor or an urban critic)
- An Insider's Image (often prettied up to attract outsiders)
- Political Images for local consumption (negative ads and boasting ads)
- Informative Images to aid in decisions (planners' visualizations)
- Heritage Images to evoke links to the past (preservationists' revisions)
- Guided Visits (mediated experiences)

In the following paragraphs I will look at some of the main types of mediated images that attempt to bring about change to the physical and cultural make up of a city.

First of all, I would clearly differentiate between messages intended for tourists and for businesses. While the former may add some value to the latter, an ad would generally be directed towards one or the other of these major target audiences. I think the marketing of places to either tourists or businesses provide a very intriguing venue of research to someone who's interested, as I am, in discovering what it really is that people like or dislike about cities.

I would then divide the "claims to fame" that appear in place-ads into two fundamental classes: *hard* claims and *soft* claims. *Hard* claims are (more) factual, quantitatively measurable (to some extent) and – I would argue – almost necessary to provide a "real" basis for an ad campaign. *Soft* claims reach into the intangible (and perhaps ephemeral) and are best related with photographs and evocative prose than with numbers and facts.

Hard claims include: infrastructural assets (highways, harbor, rail connections, etc.), inexpensive labor, cheap land/office space, tax incentives and "centrality" claims, among others[58]. I cannot see how an ad campaign could successfully attract new business to an area without significant operational benefits being put on the table. At a more personal level, the decision on the part of employees as to where exactly to relocate to, once the company has decided to move to a new city, is also often based on very functional criteria such as: quality of education, cost of houses, distance from work, and the like. Function is much less of a factor in tourism, although gateway cities prosper with visitors simply because of their position.

Soft claims reach deeper into the subconscious and try to "strike a cord" with some of our most intimate feelings. This is where the concept of beauty will often be employed, as well as serene concepts such as community, tranquillity, safety and pleasure. More dynamic characteristics are also associated with quality-places, for instance: arts, music, lively street life (both day and night), a variety of entertainment possibilities, great culinary experiences, and other "cultural" aspects. Both structure and activity are what create positive or negative images. Quality claims must therefore select the "most attractive" urban streetscapes coupled with the most appropriate activities, based on the target audiences. The really interesting questions for planners are: are there certain stereotypical "positive" images that are commonly peddled as high quality? What do the "good" buildings and streetscapes look like? What are the people doing? What are the activities?

Good City Form carries meaning with it automatically – *gratis* – and is a result of a deep identity rooted in the labor of the people who lived in it and who constructed their places of work, their churches, their civic buildings and their dwellings in it. When architecture and urban design are not the product of this rootedness, the resulting identity will not be as strong and the need to "crystallize meanings into recognizable and transferable packages of identity"[59] will emerge.

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[58] See Holcomb, *op. cit.*

[59] See Beinart, *Idem.*

In the end, however, image building for cities of today probably attests to a widespread yearning for "better" cities. Why would we advertise our town, if everything was already great and everyone was well-off?

Boosterism is very akin to place promotion, but it is always generated by insiders and it is not necessarily meant to attract outside visitors or businesses. Very often, boosterism has very local political aims. It's often an insider-to-insiders deal. Cleveland's Vision 2000[60], as well as many other such initiatives around the world, are visions used to boost a sagging local economy or a decaying downtown.

Many of the PR campaigns by city halls around the country combine a good dose of boasting about the idyllic qualities of the place with a modicum of bragging about the great business base and infrastructure, all for the sake of boosting the image of the current mayor. If the promotional materials attract some additional business to town, great! But as long as all the local voters receive the brochure, the mayor will be guaranteed reelection.

The opposite of boosterism is basherism, of course, so as soon as the mayor releases the PR materials, an opposition group puts out its own pamphlet pointing out all of the failures of the current administration. Intense imaging techniques are employed in bashing efforts. Pictures of urban squalor are often used to bring the point home.

Planners should pay attention to the type of images that are used to represent success as well as failure. We should strive to produce visible successes and obliterate images of failure in the real world. We should however be careful about such Imaging efforts, since they have the potential of altering our own definition of successful places. Perhaps the new buildings that look so good on a brochure and are touted as great achievements are not after all such great contributions to habitation. We should always find out what the local inhabitants think of the "trophy building" through the lens of their unmediated perceptions. This is one of the areas where imaging has the greatest potential for causing real damage to urban fabric.

Trophy architecture, like the massive skyscrapers of Asia that Larry Ford presented at the *Imaging the City* seminar[61], generally looks good only at the scale of a skyline view, thus making it excellent for iconographic branding and for inciting boosterism through massive changes in the structure of the city. Meanwhile, these "totemic buildings" are usually miserable failures at the street-level, where they generally negate human habitation and discourage communal activity. It is this vicious loop that needs to be broken to prevent more and more "signature skyscrapers" from going up simply to become the new "symbol" of a city, while the livability of the sidewalks is gradually destroyed by massive cementification (usually to provide parking for the patrons of the signature building), and by the proliferation of bland and boring façades, where these concrete giants meet the pedestrian urban fabric.

Planners would do well to concentrate on the nuts and bolts of identity (structures and activities) and let "facts boast for themselves".

The media plays a semi-impartial role in the mediation of images, but its power to persuade is far greater than self-promotion or marketing, as Birch, Jenkins and the Cleveland case showed us[62]. When national media gives a city a boost, the effects are powerful, as in the case of a recent *Fortune* magazine article about Cleveland[63]. Movies, documentaries, TV programs and TV ads reach broad audiences and can feed large amounts of image-building materials to viewers.

It would seem to me that the strength of the Images produced by popular media is in some ways proportional to the number of people exposed to them, as well as to the strength of the message. Movies

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60 See Burgess, Durack and Hill, "From Re-Imaging the Rust Belt to 'Whose downtown is it, anyway?'", in upcoming volume, *op. cit.*

61 Ford, Larry, "Architectural Mega-Projects in Asia: New City Images and New City Form" in the upcoming volume, *op.cit.*

62 In the upcoming volume, *op. cit.*

63 See Burgess *et al.* , *op. cit.*

and TV sitcoms may send out subliminal clues, but many successive coats of such clues will paint permanent stereotypes in the minds of regular viewers.

Planners should be aware of these stereotypes and work toward eliminating negative ones by acting on the real world of structure and activity, in concert with other public and private agencies. All of the news media are concerned with facts, and planners should make sure that "good facts" are produced in the urban realm, by designing good plans and producing good habitable places. Planners should also make sure that success stories are reported in the news media to produce honest boosting and boasting materials that will benefit the citizens.

There is a category of mediated images that brings us directly into planners' territory. These are what I call "informative images", which are produced based on solid research and careful planning. Visualizations, drawings, plans, graphs, tables, navigation maps, GIS electronic maps, aerial views and analytical maps all fall within this category and they all have an effect on decisions about the urban environment.

Hayden and MacLean[64] showed us the potential usefulness of aerial views which could aid our understanding of edge sprawl. Martin and Bass-Warner showed us a collection of images and descriptions of travel routes within urban and suburban landscapes[65].

Many of us have had personal experiences with drawings, plans, spatial analyses on GIS, photographic documentation, census data and many other useful tools to convey information to decision makers and to the public. The images used by planners and architects can be both objective, i.e. based on facts, or they can be speculative, based on hypotheses and opinions. It is important that both of these types are handled with care so that our work is accurate and rational, since planners' images are in the end the ones that really make change happen in the "real" city, modifying structure and consequentially activity, thus re-imaging the essential identity of a place.

Lisa Peattie, mentioned in question #3 of this exam[66], issues a strong warning about planners' reliance on images to change the fabric of places. It's another confirmation of the fact that mediated perception is no substitute for direct experience, but it also confirms that "representations" have the power to induce alterations to the physical structure of cities. Planners would do well to heed Peattie's warnings.

Interestingly, more than a century ago, Camillo Sitte also urged planners to "combat the banal regularity which always threatens to dominate plans that are worked out on the drafting table"[67]. He was an ardent proponent of experiential perception through *in situ* surveys, which provided "that fund of experience and rules on which [the professional city planner] depends in drawing up his plans for the parceling of land"[68]. He also advocated thinking three-dimensionally, so planners could envision the effect of urban modifications from all angles and viewpoints, as one would experience them walking in that space.

Finally, I would like to conclude with my personal opinion that architecture and planning education is a major source of mediated images that have affected, consciously or not, the minds of generations of planners and architects who then went out into the real world to produce places with more or less imageable identities.

It is hard to build a Good City if we cannot agree on what good means or what good looks like. Trophy architecture may have originated in the halls of academia, more so than in some Madison Avenue

64 Hayden and MacLean, presentation at the *Image of the City* seminar.

65 Martin and Bass-Warner, *Idem.*

66 See quote on page 3 and footnote n. 1.

67 Sitte, p. 277.

68 Sitte, introduction to the first edition, p. 138.

office. Many of the ills of our cities may be traceable to our great institutions of learning. It would be appropriate for some of us to have the courage to rummage through our own closets to see what skeletons may be hidden there.

Scholastic imaging is an area that deserves serious and unbiased scholarly attention from urban academics.

Perception and City Shaping

There is one thing that emerges from this discussion that reconciles the apparent rift between the producers of mediated urban images and planners/designers. This is the urge to measure change, portray it and evaluate it. We may not agree with the methods used to produce place-promotions and place ratings, but we all feel that some means for evaluating the "before-and-after" of a planning intervention would certainly be useful, especially if comparable across different interventions on different places. Such measures may not be possible at all, but, as John de Monchaux suggests[69], they should certainly be explored by researchers in the planning profession. Kevin Lynch certainly tried to point the way in *Good City Form* and the "Dimensions of Performance" that he presented were aimed at this worthy goal: *vitality, sense, fit, access,* and *control* plus the "meta-criteria" of *efficiency* and *justice.* Most of these measures are what I would call "functional", pertaining to infrastructure for activity or to other measurable aspects of "life", instead of aspects of "place", but they are certainly a good place to start.

Quality of Place, which De Monchaux and Landis and Sawicki[70] find to be missing from place ratings, is so elusive that even Lynch couldn't quite nail it down. He did a better job than most, in that he identified performance dimensions that "reflected" quality of place, but these dimensions were really still *activity* dimensions, merely reflecting *structural* dimensions; they did not tackle structure *per se.*

I think, in keeping with Lynch's indications in *What Time is This Place?,* we should strive to come up with measurable performance indicators to evaluate "the change of place over time".

But if place is "space with an identity", and identity is made up of "structure plus activity", then what we need in order to measure the qualities of place is to come up with some useful performance indicators for measuring performance, both in the physical world of structure, and in the social world of human activity. Many of these measurable dimensions can be gleaned from Lynch's *Good City Form,* but many others may need to be developed, especially to measure visual preferences for certain streetscapes and buildings in order to arrive at measures of "pleasantness" or "visual satisfaction" and other such fuzzy concepts[71], that are usually avoided, but are essential, in my view, for the assignment of meaning to the unmediated experiential perception of place.

The bottom line is that the true Image of a City, the collective Image that will emerge spontaneously from a process of habitation, is built upon successive exposures to the physical environment of the city and to the variety of activities that take place in this environment on a daily basis. The planner and architect still continue to play a major role in the shaping of the two basic constituents of place: structure and activity. I am not too sure that we have done an adequate job at that.

Unfortunately, imaging, despite its promising potential for the promotion of positive change, seems to have the power to substantially modify and somehow alter our perception of Identity – and even to reshape our concept of meaning – in such a way as to make even the direct experience of place no longer purely unmediated. Preconceived notions about certain places predate our visitation of such places and

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69 In the upcoming *Imaging the City* volume, *op. cit.*

70 Landis and Sawicki, "A Planner's Guide to the *Places Rated Almanac.*

71 I have personally dabbled with such issues in past papers, using such tools as "Visual Preference Experiments" and "Fractal Analysis" of facades (from Bovill, 1996).

guide our image-building even in the immediacy of the real world. Although habitation will generally allow us to tap into the embodied meanings of place, thus allowing us to break through the layers of imaging, the pervasiveness of media is making it more and more difficult to have an unadulterated experience of place.

In fact, the role of imaging in the modification – or, even "downward equalization"[72] – of the attitudes of architects and planners may be one of the more worrying potentials of imaging. Besides being primary actors in the production of visualizations, visions and revisions, planners and architects are also the first to be exposed to "brainwashing" through the imaging that they are subjected to in college.

Distorted notions of meaning may be nesting inside most of us because of what we "learnt in school". Perhaps we should be the first to re-inhabit the towns and cities that we are called to re-design, so we can purge our minds of adulterated images and re-learn the intuitive process of unmediated experiential perception. Although we need to become well-aware of the pros and cons of the various types of images, and we shall study them carefully and scientifically, we must remember that our primary role is that of shapers of city identity and not that of direct manipulators of meaning. *"We may even be wise to concentrate on the physical clarity of the image and to allow meaning to develop without our direct guidance"*, as Lynch suggests[73].

Informative imaging, like visualization and the like, should be a tool in our repertoire, but we should not let ourselves get sucked into the "business of imaging". Instead of becoming Image Mediators, we should improve our skills at being "immediators"[74] of sensate perception, providing venues for the immediate perception of embodied meanings in structures and activities, so that "shared meanings" will spontaneously emerge through the experience of habitation or visitation.

[72] To use Sam Bass-Warner's term.

[73] Lynch, *The Image of the City*, p. 8.

[74] I like this term because it conveys the double notion of "Non-mediation" and "Immediacy".

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2 Second Field: Information in Urban Planning and Policy

2.1 QUESTIONS

The questions highlighted in bold are answered on pages 24-34.

Answer either Question #5 or Question #6:

Question #5:

In his paper, "Environmental Management,"[75] Michael O'Hare makes the case for a "managerial style" for public and private actions with respect to the built and natural environment:

> "The characteristics define a managerial style by reference to the relationship between a manager (person or institution) and individuals in an organization. First, the central activity of management is information transfer that has only partly predictable effects of what a polity or its members produce. Second, choices are made with conscious attention to their implications for a dynamic future (not arrival at a finished world) and the constraints of a dynamic past (not correction of particular errors). Third, policy is directed not only at an environment but also at its inhabitants; the managerial task is to make better people and a better people, not just better environments." (p. 125)

O'Hare is staking out a ground that falls squarely between your two examination fields.
What do the key readings on the shaping of urban form have to say about this issue?
What do the key readings on information and its influence on planning, urban management, and organizational behavior have to say about this issue?
Is there a way to reconcile them so that they occupy the middle ground that O'Hare is urging us toward?

Question #6:

In her book, *In the Age of the Smart Machine*, Shoshana Zuboff[76] distinguishes between using information technology to automate existing procedures and transforming work processes to capitalize on a richer information infrastructure. She claims that "informating" the firm is much different and deeper than "automating" the firm.

In answering the following questions draw in the work of other authors to illustrate, amplify, and set a broader context for your responses.

How applicable are these ideas to urban management and the use of the GIS and database management tools you mention in the "information and urban management" section ofyour description of your second field?

How applicable are Zuboff's ideas to information and urban planning (rather than to urban management as discussed above)?
Zuboff's book was written before the Web was invented and before internet access was widespread. How does this development impact the applicability of her argument?

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[75] Michael O'Hare, "Environmental Management," in Winthrop Knowlton and Richard Zeckhauser (eds.), *American Society: Public and Private Responsibilities* (Cambridge, Massachusetts: Ballinger, 1986), pp. 99-135.

[76] Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York Basic Books, 1988).

Answer either Question #7 or Question #8:

Question #7:

Some metropolitan areas (such as San Diego, Singapore, and Hong Kong) have utilized "top-down", big budget approaches toward developing "enterpise GIS" infrastructures for urban management and planning. In far more cases, municipal GIS has evolved from "bottom-up" efforts with limited budgets in individual agencies.

Contrast the development paths that are typical for each approach and identify several of the important advantages and disadvantages of each strategy.

It seems reasonable to suggest that some middle ground is preferable to either extreme. What skills, organizational structure, technical choices, and the like can help carve out that middle ground?

In what ways are the development paths that are generally being recommended today different from those of the late 80s and early 90s (when the boom in municipal GIS efforts first hit)?

Question #8:

It is now commonplace for development proposals to include computer-based models and renderings of proposed plans. But, these "visualizations" tend to be generated late in the design process and often after a site plan is completed.

Review one or two examples of effective use of visualization in planning or in some related fields, being sure to specify what you consider to be "visualization"?

Discuss the actual and promised roles of GIS in visualization. What are your thoughts on using GIS-based visualization to gain insight into the functioning of places and to help improve the quality of life in urban communities?

Traditionally, CAD tools have focused on representing 3D geometry, GIS tools have focused on representing 2D spatial relationships, and neither technology has supported animation at the level of sophistication typically found in popular computer games. Do you see these technologies converging into a form that suits urban design and visualization? If so, how? If not, why not?

How are improvements in distributed processing, object oriented databases and interoperable Web protocols likely to impact tool development in ways that impact urban design, land use regulations, and public planning processes?

2.2 ANSWERS

Question #6:

In her book, In the Age of the Smart Machine, Shoshana Zuboff[77] *distinguishes between using information technology to automate existing procedures and transforming work processes to capitalize on a richer information infrastructure. She claims that "informating" the firm is much different and deeper than "automating" the firm.*

In answering the following questions draw in the work of other authors to illustrate, amplify, and set a broader context for your responses.

- *How applicable are these ideas to urban management and the use of the GIS and database management tools you mention in the "information and urban management" section of your description of your second field?*
- *How applicable are Zuboff's ideas to information and urban planning (rather than to urban management as discussed above)?*
- *Zuboff's book was written before the Web was invented and before internet access was widespread. How does this development impact the applicability of her argument?*

Informating Urban Management

Urban Management is a multi-faceted enterprise. There are numerous textbooks, guidebooks and manuals aimed at city managers that address all of the principal concerns of the various departments that comprise a typical local government, namely the political and executive branches (City Council, City Manager, City Clerk), internal services (Legal, Finance), public safety (Fire, Health and Human Services, Police) and common city services (Library, Parks and Recreation, Planning and Building, Public Works)[78].

DBMS tools can be, and in fact already are, used in several departments. An emblematic example is the town library, which is quite likely to be equipped with a library database, through which books (and nowadays videos too) can be looked up, checked out and returned. This is a typical case of automation. The patron comes in, searches the database for a particular text, gets the call number, walks to the stacks to pick it up, and brings it to the circulation desk. He or she presents the library card to the librarian, who scans the card code in. At this point the first instance of the informating power of the library system becomes apparent. If the patron has some outstanding books or late fees, a message will alert the librarian immediately and action will be taken. As with many of the examples in Zuboff's book[79], it could be argued that this hardly represents informating, but is rather an example of more advanced automation. A more poignant example of the informating power of this technology, however, might be the potential for the library staff to review all of the transactions, both for videos and for books, to determine which types of materials the patrons are checking out more frequently, thus providing a very useful input toward future library acquisitions. Similarly, one could find out which books have not been checked out for years and may therefore be candidates for permanent removal from the stacks, to make room for new arrivals.

The town library, though, is not a town service that one would immediately associate with urban management, so I will limit my other examples to aspects of municipal services that have no equivalent counterparts in other walks of life.

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77 Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York Basic Books, 1988).

78 The actual names of the various departments may vary from town to town. These labels are taken from Kemp, *Managing American Cities.*

79 See, for instance, the example on page 157-8, where Zuboff hails as demonstration of "at least some of the positive effects of the technology's informating power" the fact that a clerk at Consolidated Underwriters Insurance was able to access all of his/her information "right there at my fingertips" whenever a shareholder called on the phone.

GIS tools, coupled with databases, could definitely be applied to any municipal service that deals with spatial issues. For example, the Town of Cary, North Carolina[80] has used GIS in almost every department, including Finance (e.g. tax collection), Fire (e.g. fire call analysis); Police (e.g. incident pin maps); Public Works (e.g. road repair, solid waste collection, etc.); Personnel (e.g. directional maps); Construction Management (e.g. inspection districts); Engineering (e.g. traffic counts); Planning (e.g. rezoning); Parks and Recreation (e.g. park site planning), etc. Some of these applications are obviously automating pre-existing services, such as "directional maps" and "incident pin maps", but others seem to have tapped into the informating potential of the GIS tools, as in the case of the "fire call analysis". These are just some concrete examples of the application of GIS and DBMS to urban management in one particular town. The literature is full of examples such as these[81]. I have personally been involved in a variety of applications of these technologies in my hometown of Venice, Italy[82].

Therefore, it would seem that all of the standard departments of a municipal government could benefit from automation and therefore could, in theory, tap into the transformative potential of "informating". In order to fully apply Zuboff's notions, one would need to identify, first and foremost, the potential for the introduction of automation in the workings of each department. Subsequently, we could explore the informating potential of such automation. In a departure from Zuboff's concepts, it is quite possible that, in some cases, the use of GIS and DBMS may not really automate pre-existing manual operations, but rather jump directly to an informating role, adding functionalities that were simply not available before the introduction of the new technologies.

Regardless of the specific application, though, the key to informating is not so much technical as it is organizational. The potential for informating is inherent in any current-day application of DBMS (and GIS) tools to just about any organization, including agencies involved with Urban Management at the municipal level. Whether informating happens or whether simple automation prevails is a matter of empowerment and control, affecting both the managers and the front-line subordinates[83]. On the one hand, managers may feel threatened by the distributive dilution of their control, which is implicit in the adoption of "transparent" Information Technologies (IT)[84]. They may also feel belittled by their own lack of proficiency in the use of such tools. Subordinates may feel equally inadequate vis á vis the technical skills required by the new tools, plus they may resent the more "hands-off" and passive role that may result in the automation of their job,[85] unless they feel stimulated by a renewed sense of empowerment which allows them more latitude in day-to-day decisions. The very prospect of their continued employment may be threatened by the new technology. Moreover, the "panoptic" power of IT, while appealing to the top managers, may be another source of distrust among the lower ranks, including middle managers, who are simultaneously spied on by their bosses, while they in turn scrutinize every action of their own inferiors[86]. The resolution of this "tension between the apparent capacity for increased control and surveillance on one hand and the transformative possibilities promised by greater flexibility, 'leanness' and autonomy on the other"[87] is central to the actual success of informating technologies in public urban management agencies, as well as in any other organization.

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80 Mull, *Proving the worth of GIS in local government*, (1998).

81 For example: Brun *et al.* (1999), Henderson and Ahearn (1998), DiSera (1997), Inouye (1998), Slutzah (1998), Lerner and Durgin (1997), O'Connell *et al.* (1997), Thomas (1998), Sussman and Kemp (1997). Also, the entire section 4(a) of Longley *et al.*, eds., *Geographical Information Systems*, pp. 791-908.

82 See, for instance, the book that I co-authored and edited entitled "Venezia la Città dei Rii", which contains several examples of the application of DBMS and GIS to Urban Management and Planning.

83 See, for example, Thomas W. Malone, *Is Empowerment Just a Fad?* (1997).

84 Sometimes called Information, Computing and Telecommunication (ICT) technologies.

85 As Zuboff makes clear when she differentiates between "acting on" and "acting with".

86 Zuboff, pp. 315-386.

87 McLoughlin, *Creative Technological Change*, p. 63.

Organizations can be viewed and understood through a variety of lenses, using a number of metaphors[88], and managed in a variety of styles[89], and there is no clear "silver bullet" that will guarantee that the introduction of IT in an agency will lead to success in automating, in informating or even in "cybernating"[90]. In fact, it seems possible that " a willingness to 'mix metaphors'"[91] may enhance the chances of success. Zuboff suggests embracing "metaphors of wholeness – interdependency, fluidity, and homogeneity" to contribute to "organizational integration" in what she terms the "concentric organization" in which "learning and integration constitute the two most vital organizational priorities"[92]. This "posthierarchical" structure in which "differentials of knowledge, responsibility, and power" still remain, but fluctuate among the various players, blurring the boundaries between managers and subordinates, requires "new forms of relationships governed by the necessities of learning and performance rather than by the rules of an older faith"[93].

"Much of the work of community governments involves information; thus, the changes in information technologies now under way portend great changes for these governments. The key question is how the changes will affect them. It seems likely that the consequences of new information technologies will be new services, different work processes, and new challenges."[94]

This added complexity in the work environment does not preclude the successful implementation of an informating strategy in municipal urban management, but it does suggest a gradual approach to the shift between automating and informating, to allow for the necessary adjustments in roles and responsibilities to take place. In essence, this is the approach that I have personally taken in my own professional involvement in automating and informating many municipal activities both in Venice and, more recently in Cambridge and Boston. As it turns out, my gradual approach fits very well within the "social interactionist" perspective, propounded by A. J. Campbell in his article entitled *Institutional Consequences of the use of GIS*[95]. Such an approach, which reflects the organizational concerns raised by Zuboff and McLoughlin, "implies that organizational learning must proceed alongside technical design and not behind it. Early consideration must be given to the impact of the technology on job content, lines of responsibility, status and remuneration."[96] In a more realistic approach to the informating process, Campbell suggests that the introduction of GIS in the workplace "will not change the fundamental ways in which an organisation operates", at least not right away, but rather the process will need to be "nurtured and cajoled over many years" and only gradually may it contribute to "an ongoing programme of change"[97].

Informating Urban Planning

In terms of the informating potential in Urban Planning, all of the aforementioned considerations would still apply. The main difference between urban management and urban planning is that the latter is an inherently information-driven pursuit, much less amenable to automation and much more projected

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88 Gareth Morgan, in the classic *Images of Organization*, identifies 8 different metaphors, that alternatively "imaginate" organizations as: machines, organisms, brains, cultures, political systems, psychic prisons, flux and transformation, or instruments of domination.

89 E.g. "decentralized", "centralized" and "connected decentralized", as described by Malone, op. cit.

90 McLoughlin, p. 1, quoting Jones, B. 1997. *Forcing the Factory of the Future: Cybernation and Societal Institutions*. "Cybernation" is defined as "automation of automation".

91 *Ibid.*, p. 164.

92 Zuboff, pp. 399-400.

93 *Ibid.*, p. 402.

94 Banovetz *et al.*, *Managing Small Cities and Counties*, p. 335.

95 In Longley *et al.*, eds., *Geographical Information Systems*, pp. 621-631. Campbell contrasts "Social Interactionism" with two other managerial perspectives: "Technological Determinism" and "Managerial Rationalism", which "are the norm in GIS implementation yet are deeply flawed".

96 *Ibid.*, p. 627.

97 Campbell, *op.cit.*, p. 628.

toward the informating side. Zuboff's argument is focused on capitalizing on the informating potential of automation and she seems only implicitly to allow the possibility of informating strategies to sidestep automation altogether. In fact, the planning process is indeed predicated on the availability of a myriad of information, but this information is only rarely available as a consequence of automation in government agencies. Rather, "[t]o develop new land-use plans and proposals (or to form opinions as new opportunities and proposals surface), all of these agencies typically spend considerable energy researching and analyzing land use and ownership in the neighborhoods surrounding the sites that are targeted in the plans."[98] Urban Planning is based on ad-hoc collections of information, gathered on an "as needed" basis in what I term a "plan-demanded" mode of operation. Every time a plan is envisioned or proposed, "we need to integrate, and reinterpret many data sources now dispersed among agencies and groups that are administratively isolated and focused on different issues and goals"[99]. Automation plays a certain role in this process, in that some planning data is collected fairly rigorously by some government agencies, but the tendency toward automation in this field has been limited, for the most part, to areas that are under strict legal control (like land use) or generate municipal revenue (like parcel ownership). Record keeping in such instances has always been necessary to the proper functioning of civil society, so the introduction of IT has been merely a convenient way to make the process smoother. Despite such automation, this "speed-up" effect "may not make much of a dent in the considerable amount of time that our prototypical neighborhood planner must spend studying land use and ownership"[100]. What's lacking is a decentralized informating strategy to make such data available and Ferreira proposes a "middle-out" approach to resolving this issue (more about this in my answers to question #7).

In fact, my own approach to the development of "plan-ready" (and possibly "plan-demanding") city knowledge is, in a sense, an attempt to bring more "automation" into the planning process, so that the "informating" is based on solid, systematically collected and updated data. My approach moves somewhat in the opposite direction of Zuboff's argument. While information about many aspects of urban life is somehow available – on demand and with substantial effort – there is little or no automation to feed the demand for such information. Many areas of urban management and planning do not have any automation in place at all. GIS and DBMS are scarcely used to keep track of essential urban elements, such as roads, trees, sewers, etc. in an "automatic" fashion. These informating lacunae exist despite the fact that many of these elements leave a paper trail that would seem to lend itself to automation. Roads are regularly re-paved, cleaned and cleared of snow, so someone is issuing work-orders or stipulating contracts for these services. Similarly, trees are bought, planted, removed and trimmed and paperwork is produced to make each of these actions happen and to keep track of the corresponding expenditures. Sewers, like many other components of the urban infrastructure, are subject to similar record-keeping procedures, plus they are also regulated and licensed.

My middle-out approach, somewhat similar to Ferreira's, is an attempt to promote a gradual, modular and methodical process of data collection and organization, that will eventually perpetuate itself through automation, and will naturally feed into the informating requirements of urban planning (more on this in my answer to question #7).

In summary, as Yeh succinctly put it: "[t]oday, the main constraints on the use of GIS in urban planning are not technical issues, but the availability of data, organizational change, and staffing"[101].

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[98] Joseph Ferreira Jr., in *High Technology and Low-Income Communities*, second page of chapter 7.

[99] *Idem.*

[100] *Ibid.*, p. 4 of chapter 7.

[101] Yeh, A. G.-O.o, "Urban Planning and GIS" in Longley *et al.*, eds., *Geographical Information Systems*, p. 887.

Informating in the Age of the Internet

Despite the fact that Zuboff's book was written before the web, I think its main message remains as valid today as it was in 1988. If anything, the advent of the Internet and the World Wide Web may accelerate the centrifugal forces that are flattening out Zuboff's "concentric organization" and thus potentially exacerbate the conflicts between managers and subordinates that were mentioned above. The technology itself, once again, is not the solution, nor the problem. But it may contribute to a more rapid transformation of the internal organizational dynamics of government agencies toward a "connected distributed" [102] *modus operandi*, that will enfranchise the citizenship as well as the front-line civil servants.

This, in turn may set the stage for a truly devolved informating "wholeness"[103], where managers and managed contribute together, "holistically"[104], to a middle-out approach for the management of urban affairs. The Internet and the WWW would certainly facilitate such an approach, as I explain in more detail in my answer to question #7.

Finally, all of these innovative approaches may incrementally lead to "*a truly interactive, timely planning dialogue between neighborhood planners and city agencies – as well as* [to] *a mode of interagency* [and – I would add – 'intra-agency'] *coordination that might allow agencies to keep pace with one another*"[105] and with their public constituency. Once again, the interconnectivity provided by the WWW today makes this interactive approach all the more feasible and affordable, both for our cash-strapped public agencies and even for the less fortunate groups in our society.

[102] Á la Malone, *op. cit.*

[103] Zuboff's term.

[104] This term borrowed from Evans and Ferreira, "Sharing Spatial Information in an Imperfect World: Interactions between Technical and Organizational Issues", p. 458.

[105] Ferreira, *Information Technologies*, *op. cit.*, last paragraph.

Question #7:

Some metropolitan areas (such as San Diego, Singapore, and Hong Kong) have utilized "top-down", big budget approaches toward developing "enterprise GIS" infrastructures for urban management and planning. In far more cases, municipal GIS has evolved from "bottom-up" efforts with limited budgets in individual agencies.

- *Contrast the development paths that are typical for each approach and identify several of the important advantages and disadvantages of each strategy.*
- *It seems reasonable to suggest that some middle ground is preferable to either extreme. What skills, organizational structure, technical choices, and the like can help carve out that middle ground?*
- *In what ways are the development paths that are generally being recommended today different from those of the late 80s and early 90s (when the boom in municipal GIS efforts first hit)?*

Top-Down approaches

Top-down approaches to developing enterprise GIS reflect the heritage (or "legacy" as much of the literature seems fond of calling it) of mainframes from the early eras of computing. This centralistic attitude has some advantages, but also many serious drawbacks. In the earliest days of GIS (1970's), hardware was still very large and very expensive, so there was only one mode of operation available: users could only access the mainframe through dumb terminals. Graphics were very crude and the closest thing to GIS that existed back then was some form of "computer cartography"[106]. Similar centralized configurations persisted through the rapid advances of computer graphics and the advent of GIS as-we-know-it in the 1980's. Most of the use of the first rudimentary GIS systems of the 80's was geared toward the production of maps and not much else. Spatial analysis was pretty much unknown at that time.

After the advent of the PC, the first "desktop" GIS systems became available in the late 80's. I personally purchased my first copy of the DOS-based Mapinfo in 1988. Though still rudimentary, these desktop systems began to clarify the true spatial-analytical power of GIS, which went beyond mere map-making. Nevertheless, map-making remained an important application of these early GIS systems since there were very few vector maps available to use in these new systems at that time. The few available GIS layers were closely guarded by those agencies that had invested in their development. I ended up creating my own maps of Venice by tracing them on a digitizing tablet from a published book. In a sense, though, desktop GIS opened the door to bottom-up approaches to the management of urban spatial data and marked the beginning of widespread use of GIS in urban management and planning. Any agency in any town could now afford the hardware and software tools that would support GIS applications. Money was no longer an obstacle.

From then on, bottom-up and top-down approaches have co-existed until today. There are good reasons why neither method has faded out of existence. Both development styles have pros and cons, which make both of them appealing to different individuals and institutions under different circumstances. To date, the primary use of GIS, whether in a top-down or bottom-up environment remains mapping or visualization, followed by database management and spatial analysis[107].

The issues of top-down versus bottom-up are no longer guided or limited by technological capabilities in today's highly-connected society. Instead, they reflect primarily a choice vis à vis the locus of control and ownership of the information that is being used.

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[106] Batty, "New Technology and GIS", p. 311.

[107] Yeh, A G.-O., "Urban Planning and GIS", p. 879.

Top-down systems are usually found in large public or private settings. They are expensive, but usually well-funded. Everything is decided and carried out at the top and the lower branches of the hierarchy are completely dependent on what happens above them. Since they are highly sensitive to funding cutbacks, their structure makes the lower branches, in particular, quite vulnerable over time.

Although top-down schemes originated from host-based, hub-and-spoke systems, this hardware configuration is no longer a prerequisite for this approach today. Top-down infrastructures don't have to be composed of a central server with dumb terminals hard-wired into them. They can be fully-networked systems, in client-server configurations, with intelligent terminals (PC's or workstations) and lots of computing capabilities at the fringes. The data itself, however, will be held in a central repository, though this server actually need not be "central" as such any more, but could simply be one of the many computers connected to the network. Centrality is no longer a physical attribute, but rather a merely logistical and hierarchical one. The "central" server is where the "master" files reside… Paradoxically, a top-down system could even be made up of several stand-alone workstations or PC's with no network at all, so long as the data itself is distributed, via disks or CDs, to each location from a single control center. So, top-down and bottom-up today are "states of mind" more than physical configurations of hardware equipment.

In top-down GIS enterprise applications, all of the data and layers are produced, validated and made available from the top down. Regardless of where you sit in the top-down hierarchy, you are at the mercy of the central administrators. If you need a certain map layer that does not yet exist, you need to wait until the central office gets around to making it. If you find a mistake in the data or on a map, the only thing you can do is report it to the top level and wait until a correction is made to the "master" files[108]. Priorities are set at the top and if your branch is low-priority, tough luck!

Obviously, there is one clear advantage to this approach, i.e. that the integrity of the basemaps and datasets is guaranteed by the "gatekeepers". Moreover, the security of the data and maps can also be assured by restricting access and by making the data non-exportable[109]. Everyone is on the same page at all times. There are no incompatibilities. Upgrades are uniform and synchronized throughout the structure. Generally, the central administrators of such systems are highly trained, "experienced data processing specialists"[110] who guarantee a high level of quality and reliability for the system.

The disadvantages are also quite evident. This approach is cumbersome, rigid, inflexible, generally very slow to react to changes called for by the end-users, and not at all incremental nor modular. It also engenders a certain dose of rejection and rebellion in the lower ranks, who find it domineering and frequently frustrating to work with. As long as your needs are "standard" you are OK, but if you step outside the beaten path, you will find yourself quickly stuck in the techno-bureaucratic quagmire of top-down politics.

Bottom-up approaches

Bottom-up approaches are liberating for the end-users, who are free to go about their own business without interference from the top. Frequently, bottom-up is used as a synonym for stand-alone and is associated with the many isolated desktop GIS efforts that sprung up in several municipal agencies once the price of hardware and software made these tools widely affordable. If these stand-alone applications of GIS were truly independent and isolated, then to call them bottom-up would be a misnomer, since there would be no "up" for them to connect upwards to.

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[108] See, for example, Ferreira, in *High Technology and Low-Income Communities*, page 7 of chapter 7.

[109] Obviously , this aspect would be difficult to enforce if master files were distributed on physical media, like diskettes or CD's.

[110] Coleman, "Geographical Information Systems in Networked Environments", p. 318.

However, in most situations, there is always a need to share information with other agencies, therefore the term is appropriately used, but this is also where it reveals its inadequacies. In fact, while, on the one hand, such distributed approaches allow great flexibility, are cheap and fairly easy to implement, produce incremental improvements and are generally well-accepted by the workforce, they also present numerous disadvantages. The data that are produced are often incompatible with those of other agencies; they are frequently of poor quality, redundant and almost always out-of-synch with what other agencies are doing. The same layer may be modified by dozens of agencies, making a reconciliation of the changes impractical. Nobody is in control and, even if standards are adopted, their enforcement is arduous at best, so a lot of the benefits of this approach are lost to everyone outside of the agency who produces the datasets or layers in the first place. When looking at the big picture, progress in bottom-up systems is not really incremental, but rather inconsequential. In essence, unless a rigid mechanism is in place to transmit updates and changes to everyone else, bottom-up efforts are, in the long run, wasteful and fragmented. They will not contribute to the long-term achievement of a full-fledged information system incorporating all aspects of the urban environment.

Middle-out approaches

Indeed, a "middle-out" approach would seem to mediate these opposing strategies. It could "combine the best of both worlds so that the end-user flexibility of the bottom-up approach is not lost in the effort to ensure"[111] the integrity of the master basemaps and datasets and the uniform propagation throughout the cooperating agencies of any incremental additions to the knowledgebase.

Ferreira proposes one method that would achieve such a middle ground. He suggests that end-users accept whatever master files are provided by the official agencies that maintain such data and, instead of modifying them to suit their needs or to manually repair any errors that they might contain, they should instead set up "look-up tables" to transform these files, on the fly, into locally usable copies that reflect the needed changes. Such transformations, once set up, can be re-applied to future versions of the "official" files without incurring any major penalty in terms of lost or wasted time, and, more importantly, without having to re-invent the wheel by manually reconciling or re-applying brute-force changes the next time around[112]. This is obviously a very valid and sensible approach that would work in many instances, but, unfortunately, not all.

Imagine, for example, that the end-user is an agency (say the Parks dept.) that was directly responsible for the maintenance of map layers regarding street trees and it had developed a system for placing pins on the aforementioned "official" maps to represent the tree locations. Suppose that the "official" maps, produced by the Housing department, contained the locations of all buildings, but when trying to place a particular tree, the Parks department's GIS staff discovered that a specific building on the "official" map was misplaced and actually occupied the location where the tree was supposed to go. Assume that the Parks staffers, to make sure there was no mistake on their part, went out with a GPS and confirmed that the coordinates of the tree were in fact correct, thus proving that the error lied in the Buildings layer provided to them by the other agency. Then what? I don't think a "look-up" table would solve this and many other similar problems. What one would need, in this case, is a mechanism to report such errors to the appropriate agency in charge. Meanwhile, the Parks department could flag the building and reposition it to suit its needs, without waiting for the updated Buildings layer to come back corrected.

Whereas "look-up" tables and the like can be fruitfully employed when dealing with official databases, many problems that are embedded in map layers are not as easily corrected with on-the-fly procedures that can be reapplied over and over. One department (or neighborhood citizen group) could

[111] Ferreira, *op. cit.*, p. 7 of charter 7.
[112] *Ibid.*, pp. 8-14 of chapter 7.

have collected data in a particular place, which they call X, while another department calls the same place Y. If it was as simple as a difference in label, a look up table could take care of this problem too. But, say X and Y are referring to a particular street or block. Frequently, the problem is not just in the label, by in the extent of the object itself. Street X may start at a different intersection that street Y, even though they are supposed to be the same street… Then what? The answer is that the end-user would make do, so long as the analysis was of limited currency and suited a particular purpose and it did not affect other agencies or citizen groups. But it's obvious that a more stringent approach would be preferable. If one specific agency were put in charge of determining the official name and extent of each street, then there would be no qualms. Anyone who collected information that somehow referred to a street would use the official name and there would be no ambiguity. Unfortunately, this is often not the case in the real world.

My "middle-out" approach would try to resolve these issues. It would have a top-down component of sorts in that every agency would be the central repository of a certain slice of the urban fabric. It would maintain both the official master layers and the official master datasets concerning the urban elements under its jurisdiction. If jurisdictions overlapped, a single agency would be unambiguously put in charge of the shared elements[113]. At the same time, this approach would have a strong bottom-up component, in that each agency would retain the flexibility to manage and maintain its own datasets and maps without significant outside interference.

The only overarching, hence somewhat top-down, aspect of this approach would consist in the development and enforcement of standards that would ensure that all of this city knowledge could be shared by all interested actors, including the citizenry. Unless the data and maps were of a particularly sensitive of proprietary nature, they would be available to the outside world, though access procedures may be needed to protect privacy. Permission levels and assignments of passwords would also need to be handled and agreed upon cooperatively in a pseudo-top-down fashion.

Integrity would be assured within each limited domain and thus cumulatively in the entire distributed information system. Data quality and abidance to standards would need to be validated by skilled professionals in each agency. Some overall supervision of the whole system may be necessary and a sort of "GIS inspector general" may act as the overall supervisor of the entire knowledge infrastructure. The depth of knowledge collected in each domain would be controlled not only by the immediate needs of the agency in charge, but also, upon request, to satisfy needs that go beyond those of the controlling agency, but fall within its assigned domain, and are of interest to either an outside agency or to a citizen group. As long as interoperability is maintained, I do not foresee the need to impose particular standards both in hardware and in software, especially since it is quite likely that legacy databases or applications may need to be dealt with. In the long run, though, a certain convergence on standard software packages may become desirable, at least from the standpoint of reduced overhead.

Past and Present Development Paths

The GIS development paths, prevalent in the late 80's and early 90's, can be categorized in two separate camps . On the one hand, there were big-league top-down efforts that nevertheless suffered from a variety of technological limitations, that only recently have begun to be resolved, such as limited processing power, narrow bandwidth, awkward (or non-existent) interoperability and an overall dearth of standardization. Parallel to those efforts, there was a growing number of scattered, haphazard, bottom-up GIS approaches that popped up ubiquitously in public agencies all around the world. These efforts, due to their insularity, were able to sidestep many of the technological hurdles that hampered the success of their contemporary top-down approaches, but suffered from a myriad of other problems, as discussed above.

[113] In the case of overlapping jurisdictions due to different levels of government, the lowest level would prevail.

The more recent top-down enterprise GIS examples in San Diego, Singapore and Hong Kong are direct descendants of the earlier top-down efforts, but they are benefiting from a much improved hardware and software infrastructure, which has essentially resolved most of the technical issues. These "enterprise" approaches seem to be the most appealing to today's public agencies and private businesses. Planning agencies are now attempting to develop fully-functional Spatial Decision Support Systems (SDSS) and Planning Support Systems (PSS)[114], mostly adopting a loosely-coupled architecture whereby data is exchanged through shared files, though tighter coupling is becoming more and more possible (though not necessarily desirable, in my view), especially between GIS and modeling packages.

Advances in DBMS, such the SQL standard and ODBC, are making the interoperability of dabasases more and more seamless. Graphics and multimedia can now be intermingled with vector maps and alphanumeric data, through OLE standards, and thanks also to the customization capabilities provided by GIS-specific OCX tools (e.g. Mapinfo's MapX) for the development of front-ends that can bring together a variety of data elements under a unified Visual Basic or C++ interface[115]. Collaborative Planning Systems (CPS) have been envisioned, and pioneered in our own PSS group here at MIT[116], which will make multimedia a more integral part of the planning process.

The World Wide Web represents the next frontier in GIS development, with new possibilities emerging thanks to the advent of web-mapping packages such as Mapinfo's MapXtreme, though bandwith limitations still prevent direct interaction with server-based maps through the web. The current mode of operation still relies on the transfer of map images (in raster format) from the back-end server to the front-end client, though JAVA applets are making the actual client interfaces look and feel more and more like "real" GIS.

Despite the current "enterprise GIS" trends, I would promote a different approach, which is not yet accepted in mainstream circles. My middle-out approach would be similar to the Digital Earth effort[117], but limited, at first, to individual municipal boundaries and to the agencies operating therein. The City of Cambridge has begun an effort of this sort, by distributing GIS specialists in the main city departments under the orchestration of the MIS department, but such endeavor is still in its infancy. The current technological trends described above would make my approach much fore feasible today that it would have been in the past. In particular, the loosely-coupled nature of web-based applications, and the overall architecture of the WWW provide a natural infrastructure for my middle-out approach.

Some development paths being recommended today resemble this middle-out approach[118], championed by Ferreira, both in the aforementioned specific application[119], but also (with Evans), in their more general approach to the "messy" technical and organizational issues confronting GIS today[120]. What these new methodologies have in common is a recognition that "GIS technologies are *not* divorced from the interplay of organizational life: rather they are subject to its vagaries and power relationships"[121]. A middle-out approach will not only simplify the more technical pitfalls of pure top-down and bottom-up approaches, but also promises a more gradual, hence smoother, and less traumatic path for the organizational transformations needed to ensure a widespread acceptance and a successful adoption of GIS technologies in municipal agencies.

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114 Yeh, pp. 882-884.

115 I have personally been involved in several projects that produced these types of hybrid, multimedia interfaces.

116 Schiffer, "Managing Public Discourse".

117 http://www.digitalearth.gov/

118 See for instance Campbell, *op.cit.* and Yeh, *op. cit.*

119 Ferreira, *op. cit.*

120 Evans and Ferreira, "Sharing Spatial Information in an Imperfect World: Interactions between Technical and Organizational Issues".

121 Campbell, *op. cit.*, p. 628.

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