

Cityspace, Cyberspace, and The Spatiology of Information

by

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Introduction

The concept of space has been critical to architectural theory for over seventy years now.¹ It remains however, an elusive idea, on the one hand meaning and referring to everything, on the other hand meaning and referring to nothing.

Why? Is it because "space," like "time," is a category outside of which thinking itself seems to be impossible, just as Kant asserted? Is it simply one of those irreducible, universal *givens* without which the world as such would cease to *be* in any sense, let alone be *thought* of, or perceived by, sentient beings?

Certainly to suggest that space itself is an active, causative agent of some sort risks opening that discussion up to universalizing of the most extreme and vacuous kind. For if I am not to be a dualist, positing a separate, a-spatial and a-temporal realm for thought and feeling, then what in the real world, I can easily ask, occupies neither space nor time? What is it that cannot be reduced, be analyzed, or be spoken of finally in the language of position, duration, connection, inclusion, transformation, and so forth? Nothing.

If we wish to reach deeply into the "nature" of "space itself" then, I believe we must allow into it, as it were, *a substance* of some sort: not the aether of Nineteenth century science perhaps, but a registering, tracing, questioning, remembering substance, spread as thinly as we can imagine but present nonetheless, and definitive of *here* versus *there* because of how it pools, how it vibrates, how it scatters difference, *différance*.

And what is this "substance?" Information.

And what does information require? It requires *us*. And it requires architecture.

With this proposition we are plunged very quickly into deep abstraction. I see no other way, however, to make progress with the question that ultimately confronts us--namely, of how space-*dissolving* technologies such as telecommunications on the one hand, and space-*making* technologies such as computer-graphical poesis in cyberspace on the other, restructure and re-prioritize the ordinary space of the city--than to address the abstract foundations of the concept of space directly. For most occurrences of the word "space" in architectural and urban theory are either redundant or metaphorical, hardly more than figures of speech. These occurrences, finally and at best, allow us to refer to the symmetries, repetitions, enclosings, similarities

and differences between entities that we experience as *existing* co-temporally. Moreover, we find that there is no space per se--architectural space or urban space--that is not really "space *for...*" or "space *of...*," "space *in...*" or "space *around...*" something tangible and/or perceptible. Indeed, without the concept of space we cannot have, think, or see plurality and identity, size and simultaneity; counting and grouping, position and disposition. And this observation is critical. For with "space" (and time) there is the room, so to speak, for the items of experience to array themselves maximally, without loss of uniqueness or variety...in short, without loss of *information*. In this sense, "space" and "information" are, if not identical, then reciprocal in relation. All space is *space for...* the information of things to disport itself. Space both *is*, and is composed of, information.² More of this argument soon.

One of the intentions of this paper is to inhabit the border zone, as it were, between the informal though useful employments of the concept of space in architecture and urbanism, and a stricter, information-theoretic rendition. It is from this ideational interzone, from this glimpse of a new discipline, a new study to which we ought to give the name *spatiology*, that I will try to address the radical continuity in one sense and discontinuity in another sense of *cityspace*, defined as the physical space of our streets and buildings and natural landscapes, and "*cyberspace*," defined as the electronic space of data and representations generated, organized, and presented consistently to all viewers connected to a set of globally-networked computers. The continuity of these two kinds of space, I will argue, is that they are both ultimately constituted by *information*, information spread through space and seeking, almost of itself, to maximize its own complexity and organization. The most basic discontinuity between cityspace and cyberspace exists because cityspace is bound up with the principle of least action, with energetics, with friction, gravity, occlusion and mechanical contact. Cyberspace and what happens there is all but free of these constraints. Of particular interest to me, however, is this fact: because each space can--indeed must--be experienced at some level spatiotemporally, *cyberspace, like cityspace, can be inhabited, explored, and designed*. Indeed, I am going to argue that community, economy, art, design, commerce, recreation, and other urban amenities are possible in both worlds, in the real and the virtual, in cityspace *and* in cyberspace.

The reader may already be wondering why, with cyberspace, we need to go to such extremes--to the very edges of science fiction--to look for "urban amenity." Why not keep our attention focussed on what architects and urbanists haven't taken it upon themselves to do historically, namely, to design and to manage the built environment, making real places for real people? God knows, our cities need all the attention they can get on this score, and the communication, entertainment, and computer industries seem to be taking care of themselves handsomely.

I offer two reasons.

First, because, the very phrase *New Urbanism* in the title and theme of this volume invites consideration of a braver future, one in which questions of space, information, meaning, work, value, and the "good life" have been re-thought from the ground up and quite agnostically with respect to whether these occur in cityspace or cyberspace or both. After all, it is not beautiful cities per se that people want, or nice houses and cars, but meaningful, interesting, sustainable, long, and pleasurable *lives*. Together. Who can prejudge the forms such lives might take in the future, or the venues in which "life, liberty, and the pursuit of happiness" might continue?

The second reason we ought to be open to cyberspace as urbanists is because cyberspace already exists, if in precursory form. We are in cyberspace every time we are "on the phone," every time we use a cash machine or log into a networked computer. We are there every time we drift through a magazine, go to a movie, listen to the radio, or watch television. Indeed, virtual worlds in the form of communities of interest and the of imaginal lives of institutions like corporations and religions have long captivated our attention as fully as has the real and "unmediated" world. *Not* to live simply and attuned, animal-like, to every forest sound and passing scent, but, rather, to be caught up in human intention, invention, and conversation is in large part what it means to be civilized. To be civilized necessitates the having of memories and plans and dreams, unphysical things all three.

Today, and for better or for worse, Walkman-fitted heads float deep into this human-made aether. Just as they once did from the unconscious of medieval man, urgings and provocations, stories of dread and desire, fragments of music, news, ideas, data, and gossip, *pour* out of the dark of the electromagnetic spectrum--from screens and speakers, from every urban surface--and into streets and parks, homes and workplaces...penetrating our consciousness as perhaps never before. With recorded images duplicated and transmitted everywhere at the speed of light it is simply a fact that we hardly need head-mounted displays and gloves, the technology of "virtual reality," to experience the irrelevance of spatiotemporal distance, to understand what it means to dwell in a global sea of pure information and to come to believe implicitly, indeed pragmatically, that "I plug (or tune or log) in, therefore I am." Nature and old buildings stand silently by.

And if cyberspace is already with us in this contemporary form, then what might we say of the coming reality of cyberspace in its yet fuller, Gibsonian expression? What might we say, that is, of a time when super-fast computers, singly and together, generate and sustain totally absorbing virtual worlds, populated and teeming with avatars and scoundrels and gigantic, dizzying databases tilting like drunken electric pyramids...when, in the silicon banks of machines whirring in stuffy rooms there breathe whole alternative cities, the sites of a delirious new urbanism entire?

I would refer the reader to my recent book for some descriptions, studies, and prognostications of cyberspace and its burgeoning reality.³ But I would also refer the reader to his or her daily newspaper, generally in the Science and Business pages, where the infrastructure of cyberspace can be watched being put into place satellite by satellite, optical cable by optical cable, computer chip by computer chip, interface innovation by interface innovation, software company by software company, and alliance by alliance of global telecommunications, entertainment, and computer corporations. Cyberspace is on its way as surely as a freight train heard two valleys away.

Having outlined the major themes and claims, I am now, finally, going to begin this article. After a brief review of the history of concepts of space, I launch into three thought experiments, each seeking to clarify the relationship of space to information at a fundamental level. Without this understanding we would be hard pressed to negotiate the complex cleavages and continuities between the information in cyberspace and the information in cityspace with any objectivity or confidence. I will then return to the question of telecommunications' impact on the form and condition of the city, first as propounded by Manuel Castells' notion of *the space of flows*, and then in terms of what cyberspace offers as the structural complement, and perhaps alternative to the space of flows, namely, the space *in* flows. I end with some specific advocations.

Space, in Historical Perspective

Positive space, negative space, Baroque space, Modern space, urban space, domestic space, architectural space, urban space, pictorial space, abstract space, inner space and outer space, secular and sacred space, phase space, parameter space, color space, psychological space, auditory, tactile, personal, and social space...what are the adjectives qualifying exactly? No one knows. Thinking about the problem has vexed philosophers since Plato. A quick review is instructive.

For Plato, space was the totality of geometric relations possible, i.e. the totality of numerical facts applicable to distances and directions, and vice versa, in short, *proportion*. The attention to proportion that characterizes classical architecture to this day, as well as the link that still exists between *ratio* as a comparison of two quantities and *ratio-* as the prefix to words denoting reason itself, derive from this Platonic definition.

For Aristotle, space was nothing other than *place*, or the generalized sum and place of all places. If Plato's definition was geometrical, Aristotle's was more topological: (the) place (of something), he said, was the inner surface of the first, stable, environing container. The place of a chair is the room it is in, the place of a river is the river bed, the place of the moon is the next-outward celestial sphere.

The Medieval period saw these views commingled; but a new and spiritual element was added. Space was light, or Spirit, or God Himself. Whence, and why else, the apparent infinitude, insubstantiality, immanence, and permanence of space?⁴

By the time Descartes put his mind to the problem, space per se had become an impossibly mystical notion. Descartes brought back to it a dynamic and mechanical aspect. In classifying space and everything physical as "Extension" and by opposing this to "Thought," Descartes reasoned that space was simply *that which permitted* mechanical motion. One atom impinged upon the other directly, like so many ball bearings but without any empty space between them. Vacuum, void, was impossible; space was full of atoms-in-contact. Rather than specify what space *is*, he specified what it *did*: space allowed motion.

Dissatisfied with only mechanical terms, Leibniz was to extend this kind of operational definition further. Space, he argued, was that which permitted not only atoms and motion but the very existence of *identity* and *simultaneity* as such. Without space, he said, things could be neither unique nor countable. Everything would be collapsed to a single "point," to one thing, which is to say, to no-thing, since there would be no room for an-other thing to distinguish itself from the first. Moreover, in order to introduce change, such as motion, and in order for there to be *more* than one object in motion, not only simultaneity, but also an object-identity-that-survives-motion is required so that the motion can be said to have happened at all. With his principle of the Identity of Indiscernibles--as this doctrine is called, and which we will discuss presently--Leibniz probably came closest to what we could call an information-theoretical view of space.

Newton, for his part, thought of space as pure vacuum, Absolute and unmoved, a plenum of nothing but positions--points--continuous and empty in every direction. This view remained largely intact for a hundred years. But by the Twentieth Century, space could no longer be thought of without *time*. After Einstein in particular, the project enlarged to understand space-time as the four-dimensional, fundamental "unified field" providing both the totality of all cosmic frames of reference in relative motion as well as the "substance" of reality itself as the ultimate weaving of light with gravity.

Now, the physicists' and philosophers' idea of space-time was to have enormous impact on artists and architects of the Twentieth Century, as we know. We also know that this impact had little to do with what Einstein was getting at with his theories of relativity.⁵ Rather, space-time and "relativity" were taken as invitations to investigate the extremes of openness, "multi-perspectivalism," dematerialization, and mobility as worthwhile aims for the design of buildings and cities. To this very day, ACSA surveys report that the text thought by architecture teachers to be the most important for students to read is Siegfried Gideon's 1941 *Space, Time, and Architecture*, surely one of academe's most mistaken explications of Einstein's ideas.

It is quite beyond the scope of this article to rehearse the concepts of space as propounded by architects and architectural scholars during this long history, except to note that it was not until the 1750s that the notion arose that space as such had anything to do with architecture,⁶ and that it was not until the Twentieth Century that the idea caught on that what architecture *primarily* did was "shape space." Consider these passages:

...though we may overlook it, space affects us and can control our spirit; and a large part of the pleasure we obtain from architecture...springs from space. The architect models in space as a sculptor in clay. (Geoffrey Scott, 1915)

Space and Time are reborn to us today. Space and time are the only forms on which life is built and hence art must be constructed. (Antoine Pevsner, 1920)

...the new reality that is space instead of matter. (Frank Lloyd Wright, 1943)

To get a hold of space, to know how to see it, is the key to understanding buildings. (Bruno Zevi, 1957)

(This) is easier for architects because they are used to dealing with the slippery impalpable stuff. (Sinclair Gauldie, 1969)

(Walls) tightly stretched by the pressure of the continuously open spaces inside them... (T)he interior space, maternally rounded and swelling... (Vincent Scully Jr., 1961)

It only becomes possible to perceive and experience space when it is enclosed by architectural forms. (Miles Danby, 1963)

In the writing of architect-planners, from Camillo Sitte in the 1890s to Rob Krier in the 1970s, these same ideas abound. Streets and plazas are outdoor rooms; their shaping "control(s) our spirit ." Far from exempt from the European discourse on space, the American highway and gridiron city, the skyscraper and strip, were seen as simply another *kind* of space. As early as 1908, Hendrik Berlage, scorning nostalgia for the picturesque space of the European street, square, and plaza wrote: "Feeling for space: only those equipped with that feeling can understand the beauty of the American city." And most recently, under the impact of postmodern realities, theorists have pushed beyond the essentially aesthetic discourse that has preoccupied architects. "Space is political and ideological," proclaimed philosopher Henri Lefebvre, inspiration of many architect-planners today. "It is a product. It is a product filled with ideologies."⁷

Oh, what a load space must carry! Every responsibility devolves upon it: from supporting the innocent play of geometry to being answerable for our well being, from providing the ground of physical reality to accounting for political and economic evolution. Clearly there is more being asked of the concept of space than space alone could possibly supply. Indeed, as we look over this sample of what modern architects and urbanists have propounded about space, we are reminded strongly of the medieval identification of space with pure spirit, with *geist*, one might even say with "*raumgeist*," inextricably bound up with *zeitgeist*. And what is *geist* if not information? What is an ideology if not information?

As for the accounts offered by modern philosophers and scientists: for all their precision they offer us no real alternative. They prove also to rely upon acts of measurement, perception, feeling, counting, referring, and knowing...cognitions all, "spirit" all, *information* all. Even the infinite, absolute, empty night of Newtonian space presupposes a plenum of radiation and gravity with differences in their distribution enough to locate "points" in principle anywhere (and to locate someone or some thing to *take note* of these points anywhere as well).

The question naturally begins to arise: *is information in space, or is space is in information?* I submit that this is a pivotal question. In fact, we are ready to take the next step, which is to explore the more radical idea that *space and information are one and the same "thing."* Consider:

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Notes:

¹I take as a significant beginning, at least in the English-reading world, Sir Geoffrey Scott's perennial *The Architecture of Humanism* (New York, Norton, 1974 [1914]).

²And so, while one must concede that describing information as that "...*substance*: not aether, but thought-substance, a registering, tracing, questioning, remembering substance, spread as thinly as we can imagine..." does tend to dissolve the phenomenal world's luscious specificity and palpable solidity into a single, magical gruel, we might remember that magical indeed is that gruel. The entire set of specifications for building a human child, for example, is given in a single molecule consisting of (roughly) three billion pairings of the molecules adenine (A), guanine (G), cytosine (C) and thymine (T), A to T and G to C only, in sequence. The score for Beethoven's Fifth Symphony runs 50 pages, and its every performed nuance can be imprinted on a small and circular plastic disc called a CD. The sequence of ink marks that are these words, slithering by under your eyes and filling you with that mild dread of things-about-to-get-more-difficult...is information. It is nothing but information, and a hair's breadth away from a thousand thousand ones and zeros.

³Michael Benedikt, Ed., *Cyberspace First Steps* (MIT Press, 1991).

See also: Howard Rheingold, *Virtual Reality* (Simon and Schuster, 1991), Benjamin Woolley, *Virtual Worlds* (Oxford Univ. Press, 1992), Michael Heim, *The Metaphysics of Virtual Reality*, (Oxford Univ. Press, 1992), David Gelernter, *Mirror Worlds* (Oxford Univ. Press, 1991).

The reference to Gibson is to William Gibson's trilogy *Neuromancer*, *Count Zero*, and *Mona Lisa Overdrive* (Ace Books, 1984, 1986, 1987).

⁴One cannot help thinking here of Louis Kahn's sentiments about Form.

⁵See Linda Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Princeton University Press, 1983).

⁶This according to Peter Collins' *Changing Ideals in Modern Architecture, 1759--1950* (McGill Univ. Press, 1965).

⁷Henri Lefebvre, *The Production of Space*, transl. by D. Nicholson-Smith (Blackwell, 1991 [1974]).

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