

IPHONE CITY: UBIQUITOUS MOBILE COMPUTING AND CONTEMPORARY URBAN SPACE, A BIBLIOGRAPHIC REPORT

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Introduction:

Nowhere is the challenge of operating simultaneously in the city and the virtual space of the Internet as acute as in London's Brick Lane. Barhopping hipsters looking down at their smartphones ricochet off lampposts and rubbish bins, suffering injuries ranging from bruises to concussion. The city's solution: wrap the lampposts with protective cushions. (1)

These are hazards of "a new societal condition spurred by the maturing of the Internet and mobile telephony," which Kazys Varnelis calls "Network Culture." (2)

Network Culture is the third stage in the evolution of the "Information Age," which began with corporate mainframe computers in the 1960's. The second phase, which Varnelis calls "Digital Culture" quickly emerged after the introduction of the first Internet service providers such as CompuServe in 1979, and the IBM PC in 1981, and accelerated with the introduction of graphical user interfaces such as the Apple Macintosh and Microsoft Windows in the mid 1980's.

Widespread broadband access and sophisticated mobile devices made possible the third phase of this evolution, Network Culture. Landmarks in its growth were the introduction of the BlackBerry in 2002, 3G wireless networks in 2003, and the iPhone in 2007, along with interactive software, such as Facebook, Flickr and Youtube, which made possible the many to many (M2M) communication known as Web 2.0.

Roots:

One of the first to analyze the impact of networked information systems on urban structure was Manuel Castells, who documented the simultaneous dispersion and concentration of populations and institutions caused by electronic technology. He is best known for showing how the new society, based upon information, is made up of flows, and organized around networks. The informational city is structured by what Castells terms the "space of flows." Institutions and people not connected to the space of flows are relegated to the "space of places." (3)

Saskia Sassen studied how, since the 1970's, spatial dispersion and global integration have created the need for expanded central control and management, which has established a strategic role for major cities and spawned a new type of metropolis, the Global City. Cities such as London, New York, and Tokyo have become the command centers for the global economy and the sites of production for key financial instruments. (4)

Critical Theory:

Whether digital or physical, the space of exchange and public discourse is, as Henri Lefebvre affirms, a superstructural phenomenon; it is socially constructed and grows out of specific conditions of production. At the same time, social space serves as a tool of capital, and expresses certain relations of power and control. (5) Jameson sees the contemporary cultural condition as the superstructural expression of a particular global economic and military hegemony. Following Ernest Mandel, Jameson characterizes this condition as the purest form of capital, its expansion into previously uncommodified areas. (6) According to Varnelis, Network Culture is the superstructure of a new wave of global capital expansion, accompanied by military

conflict characterized by remote-controlled networked wars and a culture of security and surveillance. (7) Galloway and Thacker note that networks, by their mere existence, are not liberating, they exercise a novel form of control that operates at a level that is anonymous and non-human . . ."The role that communication and information networks have played in terrorism and the "war on terror" has meant that media have now become a core component of war and political conflict." (8)

Early Research:

Seminal research on the social and psychological effects of digital networks grew out of the early days of digital culture: Howard Rheingold documented the social life that developed on the Well, an early online community. He coined the phrase "Virtual Communities," which he defined as social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace. (9)

Sherry Turkle studied participants in MUDs (multi-user domains), researching the psychological effects, particularly on women and young people, of role-playing and sustained periods of time on the Internet. (10)

Michael Benedikt's early book includes research by Roseanne Alluquere Stone on the role of the body in on-line communities, detailed analysis of the spatial and temporal structure of cyberspace, and some quaintly dated projections about the virtual space of the future.(11)

In *City of Bits*, Bill Mitchell described the effects of digital culture on architecture and urbanism, showing how the libraries, bookstores, theaters, shopping malls and even universities, hospitals and prisons of the future will be changed by ubiquitous digital display and data collection. (12)

Network Culture:

Networked Publics, edited by Kazys Varnelis, is one of the most cogent analyses of network culture. Varnelis and his team show how the Internet's ability to offer both peer-to-peer (P2P) communication and many-to-many (M2M) distribution has spawned new economies in the form of niche marketing of products, on-line discussion and sharing of ideas, new cultural products, and new forms of political organization. (13)

At the same time, they express concern about several aspects of network culture, for example the question of network neutrality. Should large aggregators such as Google and Yahoo have the right to control Internet traffic, potentially allowing governments to filter content or block access? Should they distribute all data at equal speed, or could they give priority to certain users based on their ability to pay? These questions have huge implications for non-profit and grassroots organizations, especially in countries where free speech is not regarded as a right. (14)

Although it gives access to a phenomenal range of global culture, the Internet risks creating "echo-chambers," in which people talk to others with the same point of view; lacking a common platform for discussion, progressives talk to progressives, and conservatives talk to conservatives. This tendency of the Internet encourages "cyberbalkanization," the growth in the

edges at the expense of the center. Accompanied by the decline in the public sphere, this phenomenon gives rise to concern at the loss of shared discourse at the center. (15)

Networked Publics offers two competing theories about the fate of the subject in network culture. Using Castells' quotation from Alain Touraine, Varnelis suggests that: "in a post-industrial society, in which cultural services have replaced material goods at the core of its production, it is the defense of the subject, in its personality and in its culture, against the logic of apparatuses and markets, that replaces the idea of class struggle." Manuel Castells, *The Rise of the Network Society*, p.221. But today, in the world of on-line social networks, the defense of the subject has dwindled in importance. In keeping with Bruno Latour's Actor Network Theory, it is the subject's relationship to other nodes on networks that defines identity. We define ourselves in relation to multiple networks composed of both humans and things, such as, for example, the iPod. (16)

The body and the physical, however, do not wither away in front of the screen; instead, flesh and virtual body are intimately linked. Players in video games earn real money; real fortunes are made and lost in the virtual world of *Second Life*. The Internet relies on a global network of server farms, linked by high-bandwidth fiber-optic cables, and supported by carrier hotels and broadband service providers, vulnerable not only to natural disasters, but also to intrusion by terrorists and government agencies alike. (17)

Varnelis likens the lack of privacy that has become accepted with the rise of online social networks to the phenomenon of "boiling the frog:" a frog dropped into boiling water will immediately jump out, but if the temperature of the water is slowly raised, the frog will be boiled alive, oblivious to the danger. (18)

In their book *The Exploit, a Theory of Networks*, Galloway and Thacker (G&T) provide a penetrating study of the relationship of power, politics, and control in networked societies, beginning with an analysis of the structure of networks themselves. For them, networks are always related to sovereignty and power. "Perhaps there is no greater lesson about networks than the lesson about control." (19)

This control is not the disciplinary society of modernity described by Foucault, but what Deleuze terms "ultrarapid forms of free-floating control." (20) G&T show how this control is achieved through the network *protocols* themselves, whose primary function is to control the direct flows of information, exerting massive control over technologies on a global scale. They follow with a detailed unpacking of the topology of the protocols of both informatic and biological networks. (21), showing how crucial they are for controlling and regulating the flow of data, and for structuring relationships within protocological networks.

Following the work of Paul Baran, one of the founders of information networks, they show that there are three types of networks: centralized networks (pyramidal, hierarchical schemes), decentralized networks (a core "backbone" of hubs each with radiating peripheries), and distributed networks (a collection of node – to - node relations with no backbone or center)(22). Rather than a distributed system, the Internet is in fact a decentralized network, which, as Varnelis notes, gives opportunities for surveillance, censorship, and blocking. Networks change over time, however, moving towards more centralized systems and vice-versa, and furthermore, multiple topologies can exist within a single network, so multiple conflicting networks and

incompatible political structures can coexist simultaneously. (23)

For G&T, the video games which are the dominant mode of contemporary fiction are training for life inside what they term the “protocological network:” “The more video games appear on the surface to emancipate the player, raising his or her status as an active participant in the aesthetic moment, the more they enfold the player into codified and routinized models of behavior . . . games from State of Emergency to Dope Wars are training tools for life inside the protocological network, where flexibility, systemic problem solving, quick reflexes, and indeed play are as highly valued and commodified as sitting still and hushing up were for the disciplinary societies of modernity.” (24)

Ubiquitous Mobile Computing and Locative Media:

The availability of the Internet on mobile devices creates a condition that Adam Greenfield and Mark Shepard refer to as *ambient informatics*,

“a state in which information is freely available at the point in space and time someone requires it, generally to support a specific decision Maybe it’s easiest simply to describe it as information detached from the Web’s creaky armature of pages, sites, feeds, and browsers, and set free instead in the wider world to be accessed when, how, and where you want it: persistently and effortlessly available, just there, like the air.” (25)

Varnelis describes a key feature of this condition: how mobile devices change our relationship to place by allowing us to be present in both physical and networked space at the same time. The dangers of this phenomenon include the physical hazards described in the introduction above; the effects range from the continuous contact it makes possible, to the “telecocoon,” or private space created in the city or the family home by users of mobile devices in contact with a small group of friends. (26)

Since May 1, 2000, when President Clinton removed selective availability in the GPS (Global Positioning System), location-aware handheld devices can interface with the Internet, giving place-specific information to users on the spot, creating *locative media*. Mobile social networking allows users to continuously update their locations and activities with location-specific photographs; bottom-up software such as Flickr encourages location-specific communication from many to many, and geo-annotation makes data place-specific for applications such as museum guides and utility company field operations. (27).

Locative media create the *augmented space* of the city, an information-rich matrix, out of which we can draw GIS data on everything from public urination to marijuana growing, (28) remote sensing data on environmental conditions, commercial data such as movie theaters and restaurants, situated photos and videos, and the locations of our friends and upcoming events. As Anthony Townsend foresees it, a cloud of sensors and aware systems will surround inhabitants and intervene to increase convenience, personalization and efficiency. (29)

At the same time, Varnelis notes the moral panic about privacy, the ownership of personal data, and the opportunities for surveillance induced by the proliferation of locative media and remote

sensing information gathering. To some, such systems offer a terrifying vision of surveillance and control by governments and capital.

Bill Mitchell provocatively suggests that with the advent of locative media, the idea of virtuality, which the novelist William Gibson used to distinguish “Cyberspace” from “Meatspace,” has outlived its usefulness. Locative media counter the idea that digital content is placeless, located in the amorphous and other space of the Internet. Instead, electromagnetically encoded information now establishes new types of relationships among *physical* events occurring in *physical* places (Mitchell’s italics) (30).

The iPhone and the Turing City

In a 2009 article, Benjamin Bratton makes two provocative suggestions. Firstly, he suggests that half the architects in the world concentrate on developing software to enable existing buildings to be used more efficiently, a reasonable suggestion considering that in many developed countries, 70% of the buildings that will be in place in 2050 have already been constructed. (31)

Secondly, Bratton asks: if we have the city in our pockets, do we still need the physical city? If the first function of the city is proximity (to people, markets, goods, transport, information), the smart digital handset condenses the city itself into “an extensible software+hardware platform.” For Bratton, the iPhone face is a window into a world that is real in its own right, not merely a surface with icons that mimic other things.

According to Bratton, much of what we used to ask of architecture in the functional organization of people and organizations in space and time, we now ask of software. (32) Mitchell addressed a similar question in his *City of Bits*, suggesting that in the future, architecture could provide generic spaces that could be configured by users and their software for different uses. (33)

For what he calls the “Turing City,” the digital city of the future named after Alan Turing, one of the founders of computer science, Bratton invokes Archizoom’s 1969 No-Stop City, a proposal for a city of infinite extension without boundaries, for its “overlapping geographies and concurrent assemblages.” In buildings he foresees that the “sectional stacking of many discrete zones of behavior into a single envelope will give way to interior and exterior sites that can be activated in any number of different ways by different people using different software in hand . . . more like the iPhone deck itself than an OMA building.” (34)

The same logic applies at the urban scale, except that with locative media, it is the interfaces with other protocols that are critical. The iPhone city is “zoned;” whole groups interact differently with each other depending on what software they are running. It is the architecture of the software stack, the Geostack, as Bratton calls it, which is “the set of tools that create and use the data of the geographically intelligent Web.” (35)

The Future of Networked Culture:

Industry analysts have characterized three potential developments in Network Culture. Firstly, while recent communication has generally been between people, next few years will see a dramatic increase in communication between people and things, and between things and things (P2T and T2T). *Interfaciality*, the ability of objects to be network-accessible, will proliferate. The Smartphone will allow the user to communicate with anyone and anything from friends to advertising hoardings, to the car, to ATMs, transit systems, and even parking meters, trees, and

building facades. Bratton suggests that addressable architecture could gather metadata “and build more complex structures based on the relationships caused by this metadata, “ in just the same way as “things, formally or informally, contain the human memories we have attached to them.” He imagines the digital or Turing city as composed of layers, or folds, multiple channels of data that we will learn to manage simultaneously, creating an *augmentation* of the perceived city. (36)

Individual objects can also be tagged with RFIDs (Radio Frequency Identification Devices), small tags containing information that require no power, but which respond to queries about the object. The proliferation of such devices offers a chilling vision of invisible trackable devices implanted in humans and in every product that they buy. (37)

But the devices attached to objects do not have to be passive, awaiting scanning; the next development is an Internet of things, that will permit communication from humans to things, (H2T) and from things to things (T2T); the fridge could let the user know when there is no more milk, the light bulb when it is about to expire, and be able to communicate directly with the grocery store, ordering a delivery. (38)

As Varnelis notes, Bruce Sterling has coined the word *Spime* to describe an object that, thanks to a tag such as an RFID can contain data about how it is made, its location and qualities, and how it can be disposed of once it is no longer needed. (39)

4G networks will be ubiquitous, making mobile cloud computing work as it should, letting users store all their digital life remotely on secure servers, tapping into it at will using their mobile devices. Cloud computing offers the possibility that users of even low-end devices can store data remotely and safely and have access to the latest software.

Advances in devices themselves will allow for improved functionality, lighter weight, and dramatically improved battery life and charging speed. Although direct neural connections may not be common until after 2020, interfaces such as contact lenses will be available, overlaying virtual space on top of the view of the physical world, and making walking down the street a “positively psychedelic experience.” Everything around will appear to be smart. (40) Contact lenses and retinal projection offer the possibility that gamers can enjoy the space of the game projected over their view of the space of the city, much as fighter pilots see a heads-up display of navigational and target information projected on the windshield.

But the control society facilitated by locative media and ubiquitous mobile computing will also engender resistance. As Galloway and Thacker (G&T) put it, (41) control always implies resistance, what Hardt and Negri call “being-against.” (42) G&T describe this resistance as “life-resistance,” the act of living. (43)

For G&T, in contrast to the mass movements and collective struggle that caused power shifts under modernism, because “information systems obey only logic, whereas traditional systems bow to political pressure,” political acts within protocological networks happen by exploiting holes in existing technologies, what hackers call “exploits.” Using examples from computer viruses and biological epidemics, they show how bugs and holes can be exploited to threaten massively networked global ecologies. (44)

The Future of the City

As many experts acknowledge, cities will not disappear any time soon, they will just become much smarter. (45) Just as the theater and cinema did not disappear with the advent of television, customers still value the touch and feel of the merchandise in “bricks and mortar” stores, but they become smarter shoppers. For example, in Japan and Korea shoppers receive a blizzard of data about potential purchases and competitive pricing from their smartphones while they try on the clothes and shoes; they have not given up retail stores for online purchasing, instead they practice *augmented shopping*. Smart buses and taxis will give travelers accurate and up to date information about transit systems, taking the uncertainty and worry out of public transportation. Although mobile cloud computing and 4G connectivity will truly make it possible to work from anywhere, for the reasons that Sassen and others pointed out, the city will still play an important role.

Postscript: The Internet as an Intelligent System:

The Internet is the only network made by man that approaches the complexity of the human brain. Will it develop the power to work autonomously, and recreate itself? Bratton proposes that as networked devices communicate more and more with objects and each other, communication between non-humans will be intensified, and devices will have an evolutionary trajectory of their own, independent of man, that he calls “the Darwinism of the device.” This trajectory suggests that “the devices themselves and their capacities will appear to be evolving more in relation to each other than to us.” We are their media, and not the other way around. (46)

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