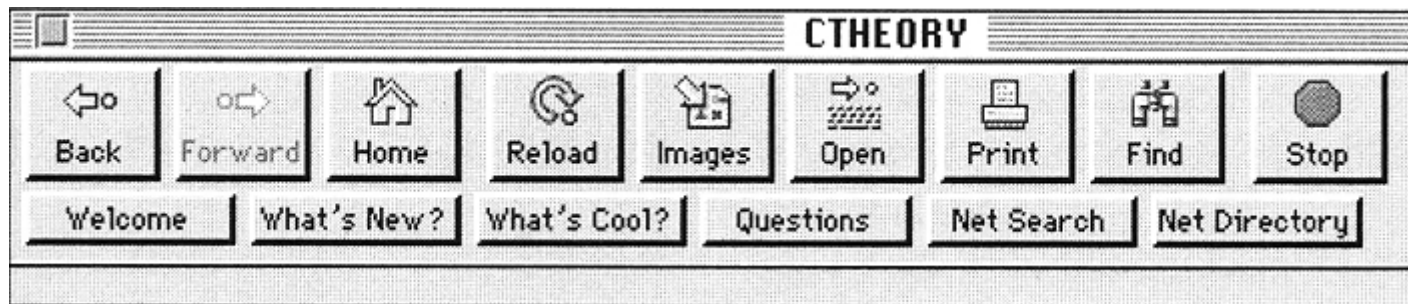
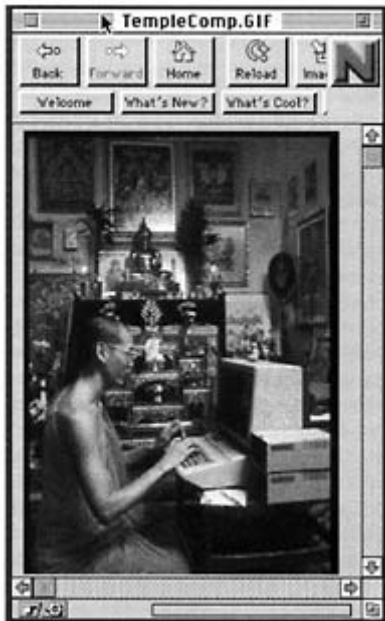


I. NETOPOS ... NOTOPOS

Timothy Druckrey





The cyborg would not recognize the Garden of Eden...
Donna Haraway

There is little feedback in human affairs, and the bandwidth is less than we think.
Marvin Minsky

Time and space died yesterday.
F. Marinetti

Space and duration have come to dominate discourses of the shift from modernity to postmodernity. Decades of scientific, critical, and philosophical writing have yet to fully theorize the end of space as a consequence of the temporalization of events, and simultaneously, the distinctly material space of the transaction with the world has overwhelming potency. Obviously, the two structures of the spatial and the temporal share a reciprocal effect.

And while the debate surrounding the linkage between the various imperialisms of the spatial and the temporal hound, and limit, critical thinking about culture, the smooth contradictions

between identity (national and otherwise) and presence persist. Space might be the "final frontier," but the issue of the territorialization and inhabitation of the communication matrix outdistances the fictional dimension of sociological space. Yet, the geo-spaces of modernity are still embedded in global politics. Space, it seems, like history for Frederic Jameson, "hurts."

Justifying the attacks on Chechnya, Russian foreign minister Andrei Kozyrev invoked intervention into "post-imperial space," the territory of identity, the territory of history and the territory of resistance — all, of course, to be conquered. Ironically, President Clinton resists intervention into Bosnia as an invasion of sovereign territorial integrity. Similarly, a debate is raging about the construction not of the "information superhighway" but of the Trans-Amazonian highway linking Brazil and Peru that will endanger further the ecosystem of the Amazonian rain forest. Brazilian President Cardoso, according to a report in *The Guardian* (4.4.95) refused "even to shake the hands of visiting G7 ambassadors and environmental leaders in the state capital," saying, "We don't need these outsiders telling us what to do. If they want to help, they can give us technology." The interplay of technology and space has become crucial in articulating the significance of the electronic cultures.

If we are indeed entering what Virilio calls "the noplacement of teletopical technologies," then a theory of interaction and communication based not on mere physical presence but on forms of telepresence must accompany the transition into "vectors of representation," as Virilio writes, "which, in the electronic interface, affect the order of sensations." Worn traditions of the public sphere, the sociology of post-industrialization, the discursive identity constructions of postmodern "presence," the embeddedness — or better, immersion — in the mediascapes of tele-culture must co-evolve a communicative practice whose boundaries are not mapped in physical space. Instead, a neuro-geography of cognition, autopsies of networks, forms of electronic reception, and of post-territorial community are emerging in digital territories whose hold on matter is ephemeral, whose position in space is tenuous, and whose presence is measured in acts of participation rather than coincidences of location.

For the past decade, the trajectory of so much research has aimed at the development of systems of representation that are mediated by the link between communication and computing. The collision of media converging in motion imaging, hypertext, sound, and the development of the Internet is of considerable importance. So many of the discussions about the potential of digital imaging, hypermedia, networks, and representation were limited by a failure to either develop or sustain the medium in which these techniques would evolve, that the merger as it is occurring on the network has a sense of frenzied coherence about it that clearly necessitates a new field of discourse, one in which hypermedia finds a referencing system not limited by the tradition of footnoting and in which the linking of information extends far beyond the local entries of texts. It is not much of a coincidence that by the late 1940s the inexorable merging of mathematics, physics, and biology with cybernetics, communication theory, and genetics was to lay the groundwork for an utter reconfiguration of culture, one based on the ideology — if not yet the actuality — of programming and algorithmics. Not surprising too that the shift from a matter-based industrial system was being supplanted by a mediabased post-industrial system in which the engineering of consciousness played a deeper role. Joining televisual and informational technologies was the basis of a social transformation in which broadcast media seemingly swept across the "global village" at the same time providing what Hans Enzensberger called a "reactionary doctrine of salvation."

But the McLuhanization of media — from *Understanding Media* to *The Global Village* — was not to fulfill the imperatives of the collapse of Modernity so much as it served as a patch

linking utopic (and perhaps even avant-garde) dispersions of media with the broad objectives of the cold war in which these technologies were developing. Indeed the absent discourse of McLuhan was that of politics — even as the urgency of media ecology was pivotal to the message and the medium. Recognizing that television and telecommunications (at least in the state in which they were in the 1970s and early 1980s) merged the textual, visual and auditory, McLuhan went on to revamp the "savage mind," the multi-contexted perspectives of non-literate cultures. In some ways this reinvention of oral in terms of the media *The Global Village* was to represent. No wonder that the ideology of homogenization across severely demarcated territorial borders seemed so inspired. The technological imperialism of western representation found its metaphor in the not illogical bond between broadcast media and democratic capitalism.

While reproducibility and the issues of mass psychology set the agenda for a critique of culture during the 1930s, and the technologies of transmission and consciousness wound themselves into the broadcast era after the 1950s, the issues for the end of the millennium conjoin the maturation of distributed computing, cognitive science, genetics, and networked communication. It is significant that Enzensberger's "consciousness industry" essay came on the heels of the post-war fascination of cybernetics, information theory, the announcement of the transistor, and the genetic pivot of the revealed structure of DNA — no less the cold war! Norbert Wiener's 1948 *Cybernetics: or Control and Communication in the Animal and the Machine* signified both a watershed event in the sophistication of postwar technology (euphemistically — and psychoanalytically — characterized as the "military-industrial complex") research and a signpost for the development of computing that would implode and find its metaphors in the realm of consciousness itself. "Every instrument in the repertory of the scientific . . . is a possible sense organ," he wrote, recognizing that the interface between the machine and the person was losing its objective ground and weaving itself into the established relationship itself. In the same year as the publication of *Cybernetics*, Claude Shannon and Warren Weaver co-authored a technical paper to be published as "The Mathematical Theory of Communication" (1949). As much a mathematical analysis of the ratios between signal and noise in communication, the publication linked the symbolic structure of mathematics with messages at the level of technique.

The converging issues of the interface, the systemization of communication, media theory are only part of the issue. The 1953 announcement by James Watson and Francis Crick that the codes of DNA could be understood as sequenced information (the double helix), initiated yet another bond in what would develop into the field of bioinformatics. Writing about the implications of the announcement, François Jacob wrote that "The programme is a model borrowed from electronic computers. It equates the genetic material of an egg with the magnetic tape of a computer. It evokes a series of operations to be carried out." Undoubtedly the merging of disciplines engaged in the systematic elaboration of the formation of behavior was reaching to find algorithmic components, discrete codes whose cumulative effects might be inexplicable but whose function was nevertheless quantifiable. But the concept of mathematical essentialism could not yet either rationalize or transform the self except through the form that it took in the development of early computer modeling and the early development of expert systems — harbingers of emerging immersive and cognitive systems. At the same time, the fetishization of technology in cold war and then space programs led to the obsessive development of computing, imaging, and communications (including the crucial development by DARPA of the Internet backbone).

Limited by the circulatory system of a one-way street. The broadcast media served as the bully pulpit of western culture. Unaccustomed to participatory democracy, the formation of

content evolved to sustain some of the ideological imperatives of the cold war west, while the technologies were finding wider availability. These technologies — video, early computer, and interactive — provided what are the roots of the development of alternative media strategies and distribution systems. Indeed the development of what is currently provoking dazzling global prospects for communication, the internet, was being constructed by the defense department for secure international communication and data exchange. The history, maturation, and move to provide public access to the Internet is an ongoing saga whose story has yet to be written. Suffice it to say that the shift towards public access has fundamentally challenged a vast array of cultural practices and initiated the formation of a communicative network that often seems to verge on a kind of anarchy. This, along with decisive alterations in the fields of graphics, image processing, and animation have fueled what is undoubtedly the deepest transformation in the epistemology of western culture. Knowledge, information, and representation have been merged with a communication technology that establishes an experiential link within a distributed system. To be connected now means to be distributed. As Henri Lefebvre writes: "Knowledge falls into a trap when it makes representations of space the basis for the study of 'life,' for in doing so it reduces lived experience."

The object of knowledge is, precisely, the fragmented and uncertain connection between elaborated representations of space on the one hand and representational spaces (along with their underpinnings) on the other; and this "object" implies (and explains) a subject — that subject in whom lived, perceived, and conceived (known) come together within a spatial practice.

If the analog world no longer serves to signify cultural narrative. then one must assess those emergent electronic narratives whose legitimacy exists within the relationship between technology and culture. These forms exist at the point of collapse of the matter-bound metaphysics of modernity. Indeed, modernity's undoing began as the trope of the enlightenment reached critical mass in the 1920s. As much for politics as for science and representation, the period between the wars witnessed the apotheosis of modernity — its triumphs and disasters. And what emerged in the wake of modernity was a science without a coherent material model, a politics on the verge of destruction, and a field of representation in which abstraction prevailed — a momentous time in which the status of form was based on hungover legitimacy and lapsed authority. What materialized in the postwar period was a crisis of the symbolic, what Arthur J. Miller described as "visualization lost."

Computing re-established the image as a bearer not of the illusory "truths" of photographic systems but as a means, like consciousness, of transferring information. Visualization was supplanted by imaging that bore a new layer of epistemological meaning. Merged into the compressed infographic representation is a space in which perception and information seem unified. In *Discourse Networks*, Friedrich Kittler established the reciprocity between technologies of representation and archaeologies of information. The discourse network can "designate the network of technologies and institutions that allow a given culture to select, store, and process relevant data" (p. 369). Further, Kittler's work realizes the limits of rhetorical theory unmediated by technology itself. Practices of information exchange plagued the culture of modernity — as they would its economic practices. Writing, that process of inscription aligned with data transfer, rooted catastrophic shifts in the relation between developing technologies and culture. By 1900, "the ability to record sense data technologically shifted the entire discourse network ... For the first time in history, writing ceased to be synonymous with the serial storage of data, The technological recording of the real entered into competition with the symbolic registration of the Symbolic." More pertinently, the strained continuity of exchange exposed the semiotic constitution of both the

mechanism and meaning of information: "To transfer messages from one medium to another always involves reshaping them to conform to new standards and materials. In a discourse network that requires 'an awareness of the abysses which divide the one order of sense experience from the other,' transposition necessarily takes the place of translation."

Transposition might serve as a metaphor for the development of communication technologies that establish a metascape in which experience evolves collaboratively. In networked media, hypermedia and discourse are linked in a duel with substance.

Marshall McLuhan's *Global Village*, Manuel Castell's *Informational City*, Marvin Minsky's *Mentopolis* stand beneath and astride the fictional cities of William Gibson in *Neuromancer* and Neal Stephenson in *Snowcrash*. In these environmental spaces, shifting events are the key to experience. Castells writes:

The fact that new technologies are focused on information processing has far-reaching consequences for the relationship between the sphere of socio-cultural symbols and the productive basis of society. Information is based upon culture, and information processing is, in fact, symbol manipulation on the basis of existing knowledge. If information processing becomes the key component of the new productive forces, the symbolic capacity of society itself, collectively as well as individually, is tightly linked to its developmental process.

Composed of nodes, servers, phone connections, and fiber optics an interactive electronic space is culminating the bond between communication and community. Technologies of networked communication offer remedies for the deracinated cultures of modernity and confrontations with the return of the polis to the condition of political affiliation and discursive collaboration. As much concerned with ideology as with identity, the electropolis is more than a new sociological issue. It stands as a location for the establishment of new cultural logic, one premised on interaction as intervention and on the reestablishment of historical identity in terms of the conditions of postmodernity. One might think of the emerging networked communities as postgeographical. Yet, they are linked by the imperative to sustain continuity in the midst of a nomadic digital culture wired for uninterrupted contact but alienated from the utilization of technology as intimate and empowering. The issues raised by the relationship between the development of cybernetics, communication, urbanism, identity, and the network pose stunning challenges to the traditions of culture.

Simultaneously, these issues once again accentuate the need to consider the whole function of culture within the technological conception of connectionism and distributed systems. It is clear that systems theories of communication, intelligence, biology, identity, collectivity, democracy, and politics will not fully suffice to encompass the meaning of digital cultures. Instead, theories of communication will need to be refigured in terms of interaction, dispersal, and technology.

On the countless sites on the network — MOOs, MUDs, World Wide Web pages — there are enclaves of a borderless social world inhabited not by virtual beings but by actual people engaged in real associations. The geographical dispersion of these communities is of no consequence. Borders, as Jacques Attali has written, have become porous. Communities have become sites of intersection and discourse. The "space" of knowledge, the "space" and the "space" of perception are merging. The network breaks the grip of the point-to-point limitations of telephony and shatters the imperialism of the broadcast media. In their place is a dynamic system in which distribution is more than an economic relation, in which the abandonment of location is not a signifier of placelessness, and in which representation is not a sign of the loss of the real.

The ramifications of this accelerated social shift are difficult to assess. No cultural transformation has occurred without a corresponding technology. Networks, expert systems,

artificial intelligence, immersion, biogenetics, etc" are forms in which the practices of the future are grounded. How much this relates to the issues of cognitive research and representation is pivotal to grappling with the development of hyper, inter, cyber, virtual, and networked media. Indeed, the development of digital media, networks, and technology form much of the basis for social communication. And if the cultural logic of technology succeeds in mastering a universal digital system of exchange (as seems likely), then a far-reaching critique of communication will be necessary, one that would account for the cultural meaning of technology in terms of the meanings it forms — aesthetically and politically. Of course, even in the distributed system of digital communication, the issue of power is crucial precisely because it seems dispersed: "The cyberelite is now a transparent entity that can only be imagined" (Critical Art Ensemble). Conjoin this with a range of effects concerning everything from surveillance to identity and the ramifications of electronic culture take an staggering proportions. As Virilio writes:

With the industrial proliferation of visual and audiovisual prostheses and unrestrained use of instantaneous-transmission equipment from the earliest childhood onwards, we are now routinely see the encoding of increasingly elaborate mental images together with a steady decline in retention and recall. In other words we are looking at the rapid collapse of mnemonic consolidation.

This collapse seems only natural, if one remembers a contario that seeing, and its spatio-temporal organization, precede gesture and speech and their co-ordination in knowing, recognising, making known (as images in our thoughts), our thoughts themselves and cognitive functions, which are never passive.

II.

The opening note in McLuhan and Powers' *The Global Village* cites Nathaniel Hawthorne's *The House of Seven Gables*:

It is a fact ... that, by means of electricity, the world of matter has become a great nerve, vibrating thousands of miles in a breathless point of time? Rather, the round globe is a vast head, a brain, instinct with intelligence! Or, shall we say, it is itself a thought, nothing but a thought ' and no longer the substance which we deemed it!

Inspired, no doubt, by the telegraph, Hawthorne recognized the shifting ecology occurring in the 19th century. Indeed the telegraph, fueled by the development of the railroad, broke the limits not only of space but of time. Unimaginable speeds of transmission across a vast web of sites communicating in a language that precursed binary code surely suggested "instinct with intelligence" and the end of "substance" as a signifier of material presence. No small surprise that McLuhan evolves a communicative practice riding on the problematic of technological progress as a measure of social transformation. Political to the extent that the techno-logic of western economies seemed again triumphant, the issues of the media/message bond wasn't so different from that of the linking of signifier and signified in semiotics, Encoded discourse, indeed, is rooted in the research environment of 19th century, whose "mastery" of nature was entwined in systems. These discourses — of representation, surveillance, mechanics, medicine, physics, and communication — are the basis of the theoretical frame that seems to haunt our relationships with the world. And while the grand schemes of modernity were so allied with the discourses of power politics and mastery, they both established and demolished the linear concept of progress they so blithely presumed, Nature, linear and distributed, was not a suitable metaphor for progress. As the industrialization of technology reached its first apex in the 1920s, it was sundering the flawed principle of development it so relied on. Technology reconfigured the equation between nature and culture. What we inherit from the development of communication technology, visualization, and representation is a legacy of empowerment rooted in expertise camouflaging power. Deeply implicated in the systems

structure of technoscience, are the practices of domination that ground the various utopias of the network.

The history of the link between technology, communication, and new representational systems will provide some much needed tooting to the understanding of the affinities between surveillance and propaganda, the increasingly visible spectrum, the implications of the globalization of media, the transnationalization of exchange. But more pertinently the delirium to inhabit the network has emerged as the crucial arena of activity in the past year. With the network "population" growing at 20—30% a quarter, the frenzy to establish critical, creative, and political identities explodes at a maddening pace.

The home page has become the launching pad for the establishment of identity in cyberspace. Corporate, government, media, or institution — identity isn't necessarily rooted in the self. Indeed the electronic dispersal of the self, and its replacement by a kind of index, is a sign of deep problems with the idea of culture on the network. Yet the number of sites burgeons, crosses disciplines, and suggests that distributed ideas are as much a measure of social dispersal and connectivity, as they are a signifier of identity. The cites in the series of images that follow indicate some of the scope of the material on the network.

Whether it is the Human Genome initiative, the digital superhighway, or the development of cities, the issue of information — from ownership to economics — has achieved status as a powerful element of culture. The issue that Castells raised in terms of the constitution of urban space is precisely the same as that raised by hypertextual media. Discursive space is becoming distributed space. Virilio identifies this with the "victory of sedentariness, behavioral inertia, discreteness." With all the potential of hyper, inter and networked media, we are compelled to find threads of influence that link every aspect of representation with elements of culture and history, Finding ways to express this concept of eco-systemic association is the challenge of hypermedia and interactive communication.

Indeed, in interactive or hypermedia, the merger of text, sound, and image with narrative, cognition, and information extends the implications of discourse formation into the simulated, the immersive, and the network. Indeed one would have to consider a range of technologies and cultural discourses to understand the movement toward interactivity in the twentieth century. Much of the century has grappled with the ruptured continuity initiated by physics, psychology, philosophy, literature, cinema, etc. Quantum physics, discursive identity, phenomenology, stream of consciousness literature, cinematic montage, photographic montage, scientific visualization . . . among many these disruptions root the history of the destabilized narratives of postmodernity. Linking these disciplines are diverse practices of representation that converge in digital media, Revamping representation in electronic culture is a key to tracking the complexity — and subtlety — of the configurations of communication.

Emerging from networked media there is a rethinking or extension of the issues surrounding the simple semiotic constitution of messages ("techno-semiotics," as Brian Rotman calls it), and a concern with the "space" of electronics. Technology brings a systemic language of mathematical rationality into the realm of production, a language that is to be distinguished from the discursive language of communication. Interfacing communicative discourse with technological discourse becomes a philosophical, intellectual, creative, political issue of the greatest importance. Cybernetics, biology, Artificial Intelligence, simulation, interactivity, in short, almost every form of cultural engagement is immersed in the technosphere. Its languages and its implications are fundamentally significant to considerations of electronic

media. Programming determines a set of conditions in which the represented is formed as instruction, while language destabilizes the conditions through the introduction of formations in which the represented is extended. The terms of the deconstruction of imaging will be forced to adapt to the systems imperatives of digitally coded messages as well as to the aesthetic imperatives of interactions whose constituted meanings are no less significant than any previous symbolic system.

At the same time, a differentiated "space" emerges in which the image is transmitted through the screen. The repercussions of screen-based media are consequential for a number of reasons: distributed sites of reception, human-computer interface issues, reconfigurations of experience, integrated use of text/sound/image, and a relation to critical theories of representation on technoculture. The she of the assimilation of social content is shifting toward the immaterial, toward the programmed, toward the intrinsic power of the medium. As Baudrillard writes:

We used to live in the imaginary world of the mirror, of the divided self and of the stage, of otherness and alienation. Today we live in the imaginary world of the screen, of the interface and the reduplication of contiguity and networks. All our machines are screens. We too have become screens, and the interactivity of men has become the interactivity of screens. Nothing that appears on the screen is meant to be deciphered in depth, but actually to be explored instantaneously, in an abreaction immediate to meaning — or on immediate convolution of the poles of representation.