04_P01_chap_02.fm Page 48 Tuesday, September 8, 2009 10:54 AM

2

Telepathically Urban

JENNIFER GABRYS

A medium is a medium is a medium. As the sentence says, there is no difference between occult and technological media. Their truth is fatality, their field the unconscious.

Friedrich Kittler, *Discourse Networks* (1990, 229)

Any sufficiently advanced technology is indistinguishable from magic.

Arthur C. Clarke, *Profiles of the Future* (1962)

CITY OF DUST

The urban ether swims with a multitude of invisible particles: the residue of ash and aerosols, signals and light. Circulating through the city is the dust of industry, a pixelated material history. But dust also circulates through the urban and technological imagination as a potentially "smart" material that shapes wireless sensor communication. In the wireless city, communication technologies have been described as "utility fogs" and "pervasive networks" as well as "smart dust" in order to capture the possibly miniscule yet ubiquitous extent of wireless infrastructures. While smart dust in particular has developed as much as a technology of conjecture as application, the notion of dust that circulates and communicates the details of an electronic urban ecology is pursued in this chapter as a resonant figure for imagining the transmission and sedimentation of signals in an urban context. Smart dust has been envisioned in the form of microscopic and drifting wireless sensors that coordinate radio signals from mote to mote. From clouds of signals to smart particles, the imagined wireless city becomes charged with invisible, instant, and

04_P01_chap_02.fm Page 49 Tuesday, September 8, 2009 10:54 AM

cryptic communication, which primarily occurs among machines. Within the traces of this machinic communication a city emerges that is telepathically urban, where the firing of messages assembles environments into immediate correspondence. Our primary access to this telepathic exchange is through the dust, that nearly imperceptible but electric remainder of technological conjecture.

Particular forms of dust materialize with every industry and era, and distinct cities emerge through the accumulation of debris sloughed off from modes of economic activity (Amato 2000, 8). Dust sediments as well as gives rise to material processes – it is a unit for capturing the transpiration – "the becoming and dissolution" of matter (5). Like firing neurons, dust blinks on and off as the minimum recognizable entity of material transformation and circulation. Amassing with the dust of the urban past, smart dust hovers as an imagined residue discharged by the future wireless city. Smart dust has been developed in the form of tiny wireless sensors that could be released en masse, so that countless machines are in constant relay, coordinating information about an environment.[1] Wireless sensors, distributed and embedded in environments, move the "information city" from a zone where digital media is produced and circulated by media workers, to a space where the city itself is a site of information generation – an urban information ecology. This sensor technology is less concerned with increasing computing power and more attentive to reducing the size of hardware, a technological shift that would allow millions of tiny machines to be deployed in drifts of simultaneous communication. Sensor systems have moved beyond the initial imaginings of smart dust, but both imagined and actual deployments generally are developed with a microprocessor and bi-directional radio and can be installed as distributed networks that can monitor everything from temperature and traffic to humidity and light. Applications ranging from the hypothetical to the mundane have included dropping as many as ten billion motes by airplane into the atmosphere in order to monitor the weather, or simply scattering motes across roadways in order to detect passing traffic (Broad 2005; Estrin et al. 2002).

Once installed, sensors are intended to operate relatively free of human interaction. Constantly transmitting and synchronizing messages in "the same unstoppable conversation" (Johnson 2000), these devices organize and collect environmental data and transmit select

04_P01_chap_02.fm Page 50 Tuesday, September 8, 2009 10:54 AM

information back to databases. The "unstoppable conversation" relayed from machine to machine forms an invisible background of communication in the wireless city. As this exchange among machines transpires remotely, beyond the limits of perceptibility, it gives rise to speculation about the (possibly telepathic) correspondence among machines. Telepathy or, literally, "remote sensation" occurs as invisible and instant communication beyond the channels of sense. This is a process of displaced sensation, of sensing in an extraordinary capacity, or of communicating impressions beyond the reach of usual communicative practices. Wireless sensors – particularly in the more hypothetical form of smart dust – perform this removal and rerouting of sensation. Urban ecologies are monitored, programmed, and made into transmittable information, but this sensory information transpires through relatively opaque machinic spaces – and the messages circulated may be decoded as much through conjecture as clear communication.

Telepathy is then a form of invisible communication that might describe how a wireless city continually talks to itself, circulating messages and programming urban ecologies. Organized in what Marshall McLuhan would call a "galaxy of machines," our electrical environment of communications – as an extended central nervous system – is at once invisible and pervasive (2003, 150). In fact, McLuhan's central motto revolves around this space of invisibility, as he explains: "'The medium is the message' is not a simple remark, and I've always hesitated to explain it. It really means a hidden environment of services created by an innovation, and the hidden environment of services is the thing that changes people" (242). The technological medium is a charged electrical environment. It can even put into play a set of automated processes and correspondences that appear fanstastical. This chapter examines how the wireless city shifts – through the circulation of remote sensing and sensation – to become telepathic, and to stimulate uncanny forms of urban communication.

ELECTRIC ATMOSPHERE

From the time of telegraphy and radio, wireless signals have permeated the city. Previously, wireless communication typically involved correspondence from person to machine, yet this transfer of communication now occurs predominantly from machine to machine.

04_P01_chap_02.fm Page 51 Tuesday, September 8, 2009 10:54 AM

Wireless clouds are suspended over cities, marking the frequency for the relay between microprocessors. Machines speak to machines to facilitate urban surveillance and automation: the operation of CCTV cameras, the monitoring of noise levels, the recording of traffic density, and the updating of local temperatures. In the future wireless city, it is not just multiple forms of urban dust that circulate: urban ecologies also circulate. The environmental attributes of the city become animated by sensors (Gabrys 2007). Above and beyond the circulation of messages moves a flood of material descriptions, not metaphysical claims but hyperphysical documentations. The city circulates as extended phenomena. Traffic moving at 5 MPH, noise at 72 decibels, temperature registering 40 degrees Celsius: the air vibrates with local detail that searches for remote modes of assembly.

In his discussion of the "overexposed city," Paul Virilio suggests that electronic telecommunications changed the physical fabric of the city. The surge of communications through the "electronic ether" gave rise to a city "devoid of spatial dimensions, but inscribed in the singular temporality of an instantaneous diffusion." For Virilio, the city is overexposed: it exists all at once and so lacks "here and there" (2003, 272–3). Yet the city of telecommunications, this supposed virtual mirage, does not efface the physical city as much as alter and even intensify its modes of space and time. Electricity, automation, together with multiple modes of communication, rework the ratio and intensity of space and time in the city.[2] With wireless communications, another assemblage of space and time emerges through the operation of invisible frequencies. As an electromagnetic *field*, of the sort that nineteenth-century physicists imagined, the city contains "neighbourhoods" of electricity and magnetism (Luckhurst 2002, 75–88). With the wireless city, communication is more than a process of instantaneity. Electricity exceeds the wires.[3] It is atmospheric, drifting through spaces without edges, pervasive but located with differing intensities. It accumulates as a shifting temporal archive, saturated with ancient static simultaneous with the pulse of the new. Signals do not transmit via a process of conduction but are *induced* across stretches of space.

The relay from mote to mote hovering in this atmospheric surround is suggestive of another era of wireless communications, where the transmission of invisible signals gave rise to fantastic conjecture. At the turn of the nineteenth century, wireless technologies

04_P01_chap_02.fm Page 52 Tuesday, September 8, 2009 10:54 AM

emerged simultaneously with a burgeoning interest in telepathy. Telepathy, and the murky, all-encompassing medium of ether, were figures of technological imagining that at once anticipated and responded to more "applied" technologies. In this sense, these more hypothetical devices performed in direct relation to the qualities of telegraphy. In fact, as Laura Otis points out, Marconi's wireless telegraph suggested new explanations and legitimacy for telepathy (2001, 187). While radio operators were sorting out how to intercept and interpret the transmission of wireless signals, telepathists were similarly exploring modes for communicating through the ether without apparatus. Although both telepathy and the ether have been at turns debated and dismissed as processes of creative interpretation, they have enabled an expanded understanding of the space and operation of wireless communications. There are cases where the practice of "poetic induction," or "pulling signals out of the air," as John Durham Peters writes, initially even surpassed the actual capacities of wireless technology (1999, 106). For this reason, he suggests, "it is misguided to construct a history of radio in which the spiritualism is an excrescence; it was one key to the medium's very development" (ibid.). Through the process of induction, it is possible not to narrowly delimit the scope of technology but rather to expand it beyond the obvious and verifiable into spaces of suggestive possibility. Telepathy and ether, those conjectural leaps into the unknown aspects of wireless transmission, are resuscitated in this chapter as ways to poetically induce signals from the contemporary wireless city.

As an imagined space of conductivity and transmission, the ether was the medium that allowed the envisioning of wireless technologies. The ether was a transducer of signals, a space for the correspondence of obscure communication, a figure of technological imagining. "The mother of all media," ether was the construct that "allowed light, electricity, and magnetism to work at a distance" (102). The development of wireless technologies depended on the ether, and it was a critical construct for physicists, including James Clerk Maxwell, who imagined the possibilities of wireless communication through the fantastic medium of the ether. Ultimately, while the ether enables the sense that "the universe seems to be in constant communication with itself" (ibid., 102–3), this idea in many ways was not taken literally, but more speculatively, as a way to imagine new communication capacities. This conjectural aspect

04_P01_chap_02.fm Page 53 Tuesday, September 8, 2009 10:54 AM

of the ether then prompted numerous speculations on wireless communications. Writing on telepathy in the nineteenth century, Roger Luckhurst characterizes the ether as an "expansive matrix with unknown limits" (2002, 90). This imagined but unmapped space of transmissions enabled technological speculation, just as it was eventually rendered obsolete through the development of these same technologies to which it gave rise.

The ether is a space where matter and signals both vanish and appear. The electric transference of communications dissolves into the ether, but the ether is also an infinite reservoir of retrievable particles. In her study of scientific developments that influenced the work of Duchamp, Linda Henderson traces the transformation of matter at the turn of the nineteenth century, where dissipating and dematerializing atoms and electrons eventually found their way back to the ether. Writing on the work of Gustave Le Bon, she notes that he sought a relationship "among ordinary atoms, ions, electrons, x-rays, and energy" and observed that "matter dematerializes little by little; it disincarnates itself, as a spiritist would say. An atom becomes an ion, an ion becomes an electron, then an x-ray, and, finally, energy and ether" (Henderson 1997). At the limits of matter, the smallest detectable unit of sense – whether speck of dust or electron – gives way to conjecture about what lies beyond.

Within this zone, the charged particles of smart dust inhabit the world of the miniature, similar to the bit, electron, atom, and chip, another iteration on the miniscule that achieves infinite expanse through absolute reduction. The ether of the nineteenth century, where the sky was imagined to be replete with infinitesimal and "smart" particles, in many ways resembles the clouds of wireless motes that are locked in endless conversation. With smart dust, the ether becomes operational, so that the urban atmosphere assembles quite literally into clouds that could "scan a city and detect traffic patterns or blow through the atmosphere to monitor the weather." With these proposed scenarios, the Internet is inverted to become environmental, an invisible surround that one writer suggests "will be like an ocean, the air, a biological system" (Johnson 2000). Like the weather, this system describes an atmospheric drift of communication that moves through its own accord – a sensory system scanning and spontaneously taking shape.

In the same way that the ether was imagined to be a force guiding the movement of energy and signals, wireless sensors assemble into

04_P01_chap_02.fm Page 54 Tuesday, September 8, 2009 10:54 AM

an intelligent communication ecology. In the furthest imagining of the capabilities of wireless sensors in the form of smart dust, some proposals have suggested that in the future this unknown medium may be completely captured and harnessed, so that "wherever you go, this obedient, intelligent ether will anticipate your needs and await your every command" (Johnson 2000). Such ordering of the electric atmosphere resonates with the declarations of Futurist artist Filippo Marinetti on the triumph of wireless in the early 1900s. He claimed that "wireless telephones" could even be used to plant fields, that vegetables would sprout with the surge of electricity. In this way, "all the atmospheric electricity hanging over us, all the incalculable electricity of the earth, is finally harnessed." Finally, in this totally charged planet, "electricity stimulates assimilation everywhere" (Marinetti 1971, 105). Wireless electricity enables a sort of planetary intelligence, and gives rise to uncanny correspondences among humans, vegetables, environments and machines.

The force of growth and the means of assemblage are all achieved by tapping into the electric atmosphere that surrounds us. But this assimilation develops as a fantastic pursuit, where the space of the unknown gives rise to strange imaginings. Prior to the parcelling up of the electromagnetic spectrum to control frequencies for commercial purposes, the ether was an operative space for technological speculation and unusual connections. Yet earlier conceptions of ether resurface, as Joe Milutis suggests, "in unstable moments of technological shift" (2003, 72). This other ether "is the idea of a network mind that allows for indiscriminate connections and animistic insight" (ibid.). The imagined correspondence between cosmos and radio sets, or between plants and telephones, is a critical way in which the technologies of communication are fabricated. These are practices of uncanny and telepathic communication, where unusual ideas can be "pulled" from the ether, or seemingly disparate concepts can collide in a space of apparent similarity. Perhaps these practices are even most compelling for how they elicit the curious and latent aspects of communication.

CITY OF COINCIDENCE

With the network of wireless communication and ubiquitous computing proposed in the form of sensors and smart dust, it is not telepathic transference from person to person but rather from machine

04_P01_chap_02.fm Page 55 Tuesday, September 8, 2009 10:54 AM

to machine that presents the possibility for the most unusual connections and correspondences. The atmosphere of wireless sensor communications suggests an even more expanded dimension of machinic telepathy. "The future" has even been characterized as "a world of connecting machines" (Paul Saffo, cited in Johnson 2000). Such autonomous machines would function autonomously, "talking to other machines *on behalf of* people," so that communication among people is projected to be "less than half a percent of the traffic on the Net" (ibid.). Such a degree of automation effectively enables machines to "read and write by themselves" (Kittler 1997, 147). But the feedback loop from machine to machine that plays out in these scenarios for the near future establishes an even more cryptic scenario for communication, where we are immersed in and yet relatively unaware of the surrounding – telepathic – exchange.

Perhaps this is why, when Alan Turing endeavoured to determine whether machines think, he required a "telepathy-proof room." In his well-known essay "Computing Machinery and Intelligence" (1950) Turing modifies his original experiment conducted with a man and woman in one room, and an interrogator (or machine) in another room, to account for the possibility of extra-sensory perception, or ESP. In this modified experiment, the interrogator must tell the difference not between a man and woman, but between a man with telepathic powers and a computer. Yet because telepathy would throw into disarray the entire basis for assessment, Turing concludes, "if telepathy is admitted it will be necessary to tighten our test up. The situation could be regarded as analogous to that which would occur if the interrogator were talking to himself and one of the competitors was listening with his ear to the wall" (1950, 454).

At this point, telepathist and machine, and even interrogator and machine, become conflated. Telepathic chatter is the one constant – and it proves difficult to trace the source or limits of this errant communication. With the prospect of machines talking to machines, one wonders if Turing was finally attempting to limit the possible interference from *machinic* telepathy. What would be the salient difference between a person communicating telepathically and a computer simulating human communication? Perhaps the differences between these – and the possible means for clearing up the interferences between telepathic people and humanoid computers – were too difficult to identify. But the possibility for such telepathic-machinic interference is ubiquitous in the wireless city, which is far

04_P01_chap_02.fm Page 56 Tuesday, September 8, 2009 10:54 AM

from an impervious space. The wireless city is full of leaking telepathic signals and the wayward hum of garrulous machines.

The urban atmosphere circulates and sediments with random shadowy particles, so that the process of wireless correspondence is inevitably subject to interference. Telepathy is a similarly imperfect exchange, a process of communication that is riddled with interference and so relies upon considerable acts of induction and conjecture. Studying the possibilities of telepathy in the 1920s, Upton Sinclair and his wife, Mary, performed their own elaborate series of telepathic experiments. Attempting to understand the telepathic exchange, Sinclair asks if it is "some kind of vibration, going out from the brain, like radio broadcasting?" (1930, 4). The resulting study, "Mental Radio," documents the process of thoughts transmitted wirelessly between husband and wife while in separate rooms – much like the Turing experiment, without the third party. They produced a series of comparative drawings, and although their success rate was not astounding (23 per cent successful matches, 24 per cent failed matches, and the remaining 53 per cent a murky mismatch), the Sinclairs were convinced that the matches far exceeded any possibility for random guessing and were evidence of the veracity of telepathic powers.[4]

Regardless of whether their experiments are "proof" of telepathy, the system of correspondence that plays out suggests other dimensions of wireless communication. The Sinclairs' telepathic correspondence matches up an inverted roller skate and a hairy horse, a hanging monkey and a trumpet, a volcano and a beetle with antennae. In the graphic fold of imagined similarity, a shadowy form of communication allows unusual connections to be made, while at the same time rewriting the rules for correspondence.[5] An interpretive leap is often required to match the figures that are sent and received. When the feedback is set sufficiently low, so that a pony and roller skate become one and the same, a system of curious miscorrespondence is put in place. Between input and output, telepathic clarity emerges not in a one-to-one ratio but rather as an expanded space of interpretive resonance. Durham Peters has suggested that the dream of telepathy leans toward a type of "communication without remainder" (1999, 16).[6] But the mental radio experiments demonstrate that telepathy is full of remainder and mis-correspondence. These are sites where interference and residue surface repeatedly in the process of transmission.

04_P01_chap_02.fm Page 57 Tuesday, September 8, 2009 10:54 AM

Then as now, the wireless city is infused with these telepathic correspondences, the convergence and timing of machines, the instant transfer of messages, the strange conflation of events, and the lingering remainders. In nineteenth-century Paris, the Eiffel Tower was rigged for wireless transmission and could be tapped into with receiver sets from home balconies. Douglas Kahn has called this structure the "emblematic oracle of simultaneity," even a "wireless landmark" (1999, 53). Today, the ambition to fill the urban skies with such oracular signals continues unabated. Paris has – in turn with many other global cities – been called "the first large wireless city in the world," equipped as it is with contiguous and continuous access to wireless signals (Dembart 2003). Electrical signals enable processes of simultaneity, and the city plays out these synchronized, telepathic possibilities. McLuhan speaks to this process of electricity and instantaneity found in automation, going so far as to suggest that "any process that approaches instant interrelation of a total field tends to raise itself to the level of conscious awareness, so that computers seem to 'think'" (1994, 351). This field of simultaneity, intelligence, and interrelation resonates with Marcel Mauss's definition of "savage telepathy," a scene in which "the whole social body comes alive with the same movement" (2001, 133). The play of instant correspondence suggests an "intelligence" of exchange, where anticipation and event coalesce – in the savage communication of machines. The synchronized sensing and transmissions – the automated stirrings of the city – appear intelligent because of their programmed spontaneity.

The simultaneity, instantaneity, and smartness of wireless communications acquire a "presence," as Sconce would suggest, by virtue of their "liveness" (Sconce 2000, 6). These qualities of presence, moreover, suggest a transition in communications from that of a *channel* to an atmosphere of communication, an "all-enveloping force occupying the ether" (ibid., 11). Like the pervasive presence found in ether-bound communications, a similar presence is located in the ubiquitous computing enabled by smart dust. Replacing what is similarly seen as the "conduit" of the Internet, it is possible to imagine information transformed into landscapes – environments and cities. An atmospheric mode of communication – like the ether, telepathic and electric – delineates a particular type of urban space that is composed not of distance and duration but rather a space of etheric density that gives rise to new forms of presence (Gabrys forthcoming).

04_P01_chap_02.fm Page 58 Tuesday, September 8, 2009 10:54 AM

Stephen Graham asks how we can "imagine the 'real-time' city" so that we may account for the ways in which telecommunications reconfigure our notions of urban space and time (1997, 31–2). The atmospheric communication hovering over the city like a sensate cloud moves beyond even the architectures of conduit and screen, not to the virtual but to the imperceptible. This atmosphere is the space in-between: not an idealized representation but a particular mobilization of urban matter through pervasive and automated computation. In fact, with wireless sensors and the proposed applications of smart dust, the virtual collapses. Information is no longer a degree removed but completely embedded. Machinic telepathy reconfigures urban ecologies so that we no longer map the virtual or physical but take inventory of the telepathic *migration* of dust: how does this sensorial information circulate within and transform our urban settings?

DUST OF MACHINES

With autonomous machines connected to autonomous machines, the city is now in telepathic communication. Increasingly instant and automated, urban space circulates through the transitory and monitored circuits of web cameras, surveillance systems, timers, and traffic monitors – all the constitutive parts of a communications city that talks to and watches itself. As a city geared toward infomatic output, this environment is highly coded: at once invisible but thoroughly documented. Smart dust presents the furthest imagined instalment of the programmed city. It enables ways of navigating the city that redirect sense and orientation toward a store of telepathic data. "You want to be able to simply say, 'Take me to the projector in room 515,'" says Hari Balakrishnan, an assistant professor of electrical engineering and a researcher with MIT's Project Oxygen. Or, "'Take me to the nearest projector in the building, or in the neighborhood, or find the nearest Chinese restaurant that serves low-sodium food.' Cafés, drugstores, post offices, any place you might want to visit – all would be sending out digital beacons to vie for your attention" (cited in Johnson 2000). But the initial – and now even historic – imaginings of this technology have over time reached actual application. It may not yet be possible to telephone your garden, but it is possible to consult mobile phones for low-sodium restaurants. In the smart-dusted wireless city, both

04_P01_chap_02.fm Page 59 Tuesday, September 8, 2009 10:54 AM

landscapes and artifacts are specked with sensors to facilitate way-finding and consumption. An urban "network mind" can be continually dialled and consulted, revealing not just the circulations of urban messages and information but also informing the pathways of people who are reliant on these systems of navigation.

Locative technologies, wireless sensors, geotagging, and Web 2.0 or Environment 2.0 technologies are now all-pervasive in urban settings. Mobile phones are GPS enabled, and even commodites are tagged with radio frequency identification tags (RFIDs) – a technology that has also been a source of speculation through smart dust, which could similarly be deployed in any number of products. Dust-specked and "smart" commodities circulate in the city to eventually become another type of dust – waste – as the ever-accelerating cycle of production, consumption, and obsolescence ensures the rapid decay of objects (Gabrys, forthcoming).[7] The initial "inventor" of smart dust, Kris Pister, elaborates on such a merging of products and information: "Every conceivable object would have a recoverable history, a place in the cybernetic realm: physical space and cyberspace would truly melt into one" (cited in Johnson 2000). This urban space is far from virtual, when the physical world becomes the basis and location for information. This is an attempt not to collapse space and time but to fill it with dense layers of data and dust.

With the project of completely monitoring the physical world and putting the environment "online," there is no limit to the data to be retrieved. The data-gathering task is broken down into the smallest possible scale, so that previously large-scale measurements can be refigured as micro-data. With billions of motes forming detailed sensory networks, an increasing amount of information may be extracted from the urban environment. Smart dust finally offers the possibility of all-encompassing sense technologies that can continually scan, generate data from, and even regulate and modify, our natural-cultural environments.

This database is global in scale, and reflects what McLuhan refers to as an "ecology of media." With the launching of Sputnik, the planet became visible for the first time as an artifact, and as McLuhan writes, "transformed the planet into Spaceship Earth with a program problem" (2003, 242). The environment became programmable, a coherent system. An ecology of media was transposed to this space, and the electric nervous system of

04_P01_chap_02.fm Page 60 Tuesday, September 8, 2009 10:54 AM

communications enshrouded the entire globe (as the subsequent launching of satellites confirms). Such a media surround resonates precisely with the objectives of the purveyors of smart dust, who "have visions of sending billions of these machines into the atmosphere so that the entire planet could be wired. Far-reaching networks of communicating sensors would give the earth a digital nervous system accessible to the web and giant search engines, from which we could instantly access anything about the state of the planet" (Anderson 2003).

With the implementation of micro-data, the question becomes how to make sense of the welter of information. The planet is at once observable as an artifact, such that we can call it an object of data, and yet surrounds us as a space of potentially limitless data production. Wireless sensors are now in place on ocean buoys and in soil matrices, across urban roadways and within the skeletons of buildings. The applications for environmental sensing are inexhaustible. But a critical operation continually emerges from within these extensive data sets. A means of filtering the data is necessary.[8] And so we return to telepathic machines. It is not just the relay from mote to mote that is telepathic; so too is the process of sifting through the static of all possible data to arrive at decipherable communication. In order to read through the haze of information, the machinic radio must be tuned to a legible frequency. Without this capability, smart dust encounters its double: the dust that is noise.

ENDLESS CITY

> Neo-geological, the "Monument Valley" of some pseudo-lithic era, today's metropolis is a phantom landscape, the fossil of past societies whose technologies were intimately aligned with the visible transformation of matter, a project from which the sciences have increasingly turned away.
>
> Virilio, *The Overexposed City* (2005, 297)

> By refusing "technological miracles" the artist begins to know the corroded moments, the carboniferous states of thought, the shrinkage of mental mud, in the geologic chaos – in the strata of esthetic consciousness. The refuse between mind and matter is a mine of information.
>
> Smithson, *A Sedimentation of the Mind: Earth Projects* (1996, 107)

04_P01_chap_02.fm Page 61 Tuesday, September 8, 2009 10:54 AM

The wireless city is a space for the production of dust in all its modalities. The city abounds with compressed and errant signals. Yet instead of dissolving urban space, as so many writers suggest, these communication and sensing technologies fill it with signals. In this space of machines speaking to machines, an inexplicable transference, correspondence, exchange occurs in the noise that irrupts between signals. As Friedrich Kittler suggests, the "noise of the real" – another kind of dust – produces an infinitely dense static discharge. "Molecular swarms and whirling electrons" appear in one instance as "dancing sun particles," but "in the real are the noise on all channels" (1999, 51–9). Every medium, and every machinic attempt to access full "the real," is saturated with noise – the dust of transmission. The use of the term "smart dust" to describe the possible occupation and ingestion of all the possible data offered by environments – urban and otherwise – then encapsulates this other sense of dust, as it reveals the difficulty of capturing and making operational such a large store of environmental data.

The dissipation and appearance of dust equally describes the formation of cities, as they lapse into wasted zones and residual districts. But as Yves-Alain Bois suggests, dust – particularly the dust of cities – is often not visible until it has settled (1997, 228). Dust is immanent and inescapable, it spreads and multiplies, promising to overwhelm. The modalities of dust offer further insights into the self-organizing, diverse forces of urban systems. Cities, as Nigel Clark writes, "are dynamic and open systems, the multiple forms of matter-energy (including minerals, biomass and genes) which pass through them entering into complex, non-linear relationships whose outcomes tend to exceed the calculations of their human component" (2000, 24). These urban systems – and the devices that would track and circulate information about them – typically surpass our available operating systems. They generate residue – they give rise to remainder that may even be best understood through telepathic modes of correspondence.

While for Bois the city is "pure noise," as it exceeds the limited "transmission of the message" (1997, 230), for McLuhan it is exactly the noise – or dust – that is most characteristic of the medium – as extended environment. The medium, through its side effects and unintended changes, gives rise to this environment of communications, which exceeds the message as sound-bite (Cavell 2002,

04_P01_chap_02.fm Page 62 Tuesday, September 8, 2009 10:54 AM

153). But in a medium that is noise and extended effect, how does that other kind of "smart" dust filter through the urban background, replete as it is with interference, to extract information? Here the operation of smart dust must be telepathic on another level: in order to sift through the urban environment and coordinate correspondence from mote to mote, a telepathic filter must be in use. Even though wireless sensors are tuned to specific forms of input, a completely accurate reading of the city is impossible (as the Surrealists and Situationists have demonstrated, and exploited). The noise of the environment inevitably impedes the clear transmission of messages. Sensing, moreover, is not a singular mode of communication. Wireless sensors operate as a multitude of devices that make tentative attempts to assemble a whole.

But the matter is not whether they arrive at an accurate assemblage but how they will filter through the noise and dust, and what sensorial arrangements and circulations will be the most compelling and pertinent. This is the telepathic imperative. Data exists everywhere in excess. In the wireless city, it floats and settles in a hazy surround. Sifting through the modalities of dust to sense and communicate through the urban medium will ultimately require a well-tuned telepathic sense.

NOTES

1 Smart dust was developed by Kris Pister et al. at the University of California at Berkeley between 1997 and 2001, and originally funded by the US Defense Advanced Research Projects Agency (DARPA). Smart dust utilizes microelectromechanical systems, or MEMS. For further technical information, see "Smart Dust: Autonomous Sensing and Communication in a Cubic Millimeter," http://robotics.eecs.berkeley.edu/~pister/SmartDust/; and Brendan I. Koerner, "What is Smart Dust Anyway?," *Wired* 11, no. 6 (June 2003); and Mohammad Ilyas and Imad Mahgoub, eds., *Smart Dust: Sensor Network Applications, Architecture and Design* (CRC Press, Taylor & Francis: Boca Raton, Florida, 2006).

2 This argument draws upon and extends McLuhan's notion that new media extend and alter the ratio of the senses (see *Understanding Media*).

3 See Luckhurst (2002) for a discussion of telepathy within a spatial framework and electricity as an emanation, 12 and 89.

04_P01_chap_02.fm Page 63 Tuesday, September 8, 2009 10:54 AM

4 In a subsequent edition of the text, Albert Einstein also wrote the Preface for *Mental Radio,* where he briefly asked the reader to maintain openness to the experiments Sinclair presented.

5 This slipped system of correspondence is also suggestive of the opening discussion in Michel Foucault's *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage Books, 1994).

6 If for Durham Peters communication is most fully revealed when it breaks down and fails, then telepathy may be the ideal form of communication for just this reason. Noting the successes of telepathy, however, Laura Otis cites British scientist William Barrett, who argues that telepathy, for all its failures, is actually more effective than "the clumsy mechanism of speech." What's more, Otis writes, "in efficiency, telepathy surpassed telegraphy, which had not yet transcended the primitive, organic vehicle of spoken language" (185).

7 For a discussion on what may be considered the "dust" of commodities, see Will Straw's "Exhausted Commodities: The Material Culture of Music," *Canadian Journal of Communication* 25, no. 1 (2000).

8 See also Brendan I. Koerner's "Intel's Tiny Hope for the Future," *Wired* 11, no. 12 (December 2003), where he writes, "Sensors can't become the next big thing until a host of mundane technical issues are resolved: How to get the chipset radios off the crowded 900-MHz spectrum? How to program the networks to not just spew reams of information but be intelligent enough to figure out which measurements are vital and which are junk?"