

## Electronic Mediations

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# What's the Matter with the Internet?

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Electronic Mediations  
Volume 3



University of Minnesota Press  
Minneapolis  
London

Mark Poster. from What is  
the Matter with the Internet?

## CHAPTER FIVE

### Authors Analogue and Digital

#### Analogue and Digital

The change from print to computer writing requires a material change in the trace, in the way writing enters the world, circuits through it, and is stored in it. This alteration in the material structure of the trace is not given much importance by most scholars in the human sciences,<sup>1</sup> yet it is fundamental to the reconfiguration of authors and readers, of subjects and objects of speech and all forms of cultural exchange, be they text, image, or sound. When Marx, in *The German Ideology*, writes of language as puffs or perturbations of air, he calls attention to the materiality of language—that it only appears in a material form—but strangely he does not raise the question of the change from speech to print. Print is precisely not puffs of air. This is a surprising omission on his part, since print technology was so important to his own work of disseminating the critique of political economy and because the forms of print were undergoing major changes in his day. The introduction and spread of the cheap newspaper brought current political information to the working class, extending considerably the scope of class consciousness, and the introduction of the typewriter later in the century changed work opportunities for women and altered significantly the means of literary production both for writers and readers. The example of Marx's neglect of the problem of technological mediation in the case of print is hardly exceptional. Critical theorists have generally read through and past the message of the medium.

The shift in the material form of the sign from print to computer writing may be approached initially as a change from analogue to digital. This formulation is often posited by technically expert commentators whose understanding of the attendant philosophical questions is often limited. It is crucial for humanists to recognize the technical side of the issue and for engineers to come to grips with its cultural aspects.<sup>2</sup> I shall focus on the analogue/digital distinction, attempting to explore both its technical and the theoretical dimensions.

The term *analogue* refers to an aspect of the relation between a copy and an original. A taped recording of a sound, for example, transforms waves/cycles of air emitted by a person, for instance, into a configuration of metal oxide particles on a Mylar band. This is accomplished by an electromagnetic transducer that responds to the waves/cycles and moves the particles from a random into a patterned configuration. The relation between the configuration of particles on the tape recording to the original waves/cycles of air is one of analogy; that is, the specific density and distribution of particles resembles the characteristics of the waves/cycles in their amplitude and frequency, their loudness and pitch. The same relation of resemblance is found in the older technology of vinyl records. The grooves on the record, in their width and length, form an analogous configuration to the acoustic waves/cycles so that the stylus or needle tracing the grooves reproduces the shape of the sound. Even though the sound recording, on tape or vinyl, is a different material form from the acoustic event of the sound, there remains an isomorphic relation, or one of similitude, between them. Because of this analogy, some individuals are even able to "read" the grooves on vinyl disks and say which piece of music is inscribed in it. In the case of photographic, film, and television images, the analogous relation pertains between light and the recording medium.

Not so with digital reproduction. In this case the sound as waves/cycles is sampled some forty thousand times a second. (This figure allows two results for what is considered the highest frequency available to the human ear, twenty thousand cycles.) The computer changes the input into a series of zeros and ones according to a formula that maps the sound event, both in loudness and pitch. The formula relating the characteristics of the sound to specific combinations of zeros and ones is arbitrary. In the case of digital recording there exists no resemblance, no analogy between the configuration of digits and the sound. The digits

in no way “look like” the sound. The relation between the copy and the original in the case of digital reproduction is much more one of difference than in the case of analogue recording. In both cases, let us not forget, the reproduction includes a material transformation of the original, but in the case of digital copying the material configuration of the copy bears no resemblance at all to the original. As an aside it may be noted that many argue that the reproduction of the sound from a digital recording is superior to that of analogue recording in its coincidence with the original. Digital differs from analogue, therefore, in the extent of their correspondence to the original. The advantage of digital copying over analogue derives from some aspect of this difference.

There are two separate but related questions that follow from the analogue/digital distinction. The first concerns the qualities of difference between the analogue and the digital. The second concerns the specific attributes of the digital as a material form, its electronic character, its numeric character, its ability to be reproduced exactly, transmitted at the speed of light, and stored very efficiently. The implications of the answers to these questions are potentially great for social, cultural, and political issues. They raise the specter of nothing short of a revolution in the figure of the author and the reader.

Analogue and digital copying are both material transformations of an original signal or input. A written or printed word is not the same as a spoken word. The latter is fixed in time and space, evanescent and local. Writing, by contrast, as a material trace, is stable in time and movable in place. Handwriting introduces one relation of the writer and the reader to the text; typewriting and print, different ones. Spoken words rely upon the ear for copying and reproduction; writing depends rather upon the eye. Each change in the form of writing is momentous in its effects upon authors and readers; from cuneiform and papyri to codices and books, the history of writing enormously varies the cultural and social forms of its production and reception. Yet the distinction between speech and writing is much greater than the variations in the written form. That much must be conceded. Is then digital writing to be understood as yet another variation within the history of writing, or is it a more momentous change on the order of the shift from speech to writing? I leave this question to the reader to decide, turning instead to the characteristics of the print/digital distinction.

Print relies upon the alphabet, and alphabets are not analogue types of reproduction. Though early alphabets like ideograms are indeed analogue in that they depict in traces what they refer to, the Greek alphabet is composed of units that, in their combination, bear no relation to the meaning of the words they generate. The word *tree* does not look like a tree. Alphabets in this sense are digital in the sense in which I am using the term. All material variations of writing in alphabets like Greek benefit enormously from their liberation from the constraints of analogue reproduction. Contrasted with the thousands of characters that compose ideographic alphabets, the Greek alphabet contains fewer than thirty distinct units. Yet alphabets do bear isomorphic or nearly isomorphic relations with sounds. This is their abstraction, their increased level of generalization, compared with ideographic writing (Porush 1998, 50). An *a* in a certain language is limited to a repertoire of sounds. Yet, as a material trace, the *a* does not look like any of these sounds and in this sense is not in a relation of analogy to it.<sup>3</sup> Nonideographic alphabets introduce a level of articulation beyond that of ideograms, although even ideographic alphabets must include phonetic elements to account for proper names, for example (Ducrot and Todorov 1979, 194). The phonetic elements stress a relation between a written symbol and the thing represented. The Greek alphabet introduces a relation between a written symbol and its utterance, between two forms of language, writing and speech. The relation between the word and thing becomes conventional, arbitrary, whereas the relation within language between trace and voice is stronger, more direct.<sup>4</sup>

Printed forms of writing enable easy reproduction. They change culture by retaining the temporal dimension already evident in older forms of writing, its endurance and stability, but extend considerably its spatial dimension, disseminating texts widely. Print democratizes writing by its mere distribution of texts in space. But print retains the material constraint of earlier forms of writing: the requirement that a trace is produced on an enduring substance like paper, a substance that is scarce. There is no escape from this characteristic, one that drastically limits the inscription of print in time and space. Regardless of the type of technology through which the trace is achieved—from Gutenberg’s mechanical contraptions to the most advanced, automated apparatuses—print means inscriptions on durable materials. With print, language is

set loose from speech and handwriting but is also bound tightly with the material in which it resides.

Digitization does not surrender the advantages of writing and print in extending language in time and space or of the alphabet in deepening the articulation of language. Digitization introduces yet another level of articulation of language, however, by introducing sequences of ones and zeros as representations of letters. This simple addition would be cumbersome in the forms of writing and print, somewhat equivalent to the disadvantages of roman numerals in comparison with arabic. But by introducing this change to ones and zeros, the material form of language can shift to the microworld of electrons. In Katherine Hayles's words, "When a computer reads and writes machine language, it operates directly on binary code, the ones and zeros that correspond to positive and negative magnetic polarities" (1999, 274). The basic difference introduced by the digital code is that it is translatable into a simple presence or absence and therefore into a minimal physical trace such as a pulse or an electron. Telegraphy achieves some of this reduction but remains tied to the Newtonian, macroworld of sounds. Once the alphabet is translated into digits, it transcends the constraints of printing and enters another, far different, physical regime: electric language. Digitally coded language remains tied to the umbilical cord of the social world where, in the last instance, it will return and enter human writing or speech, being read or heard and perceived by conscious beings. But before this occurs, electric language moves within an imperceptible dimension and is governed by its material determinations. Digitized language may be placed in the electronic form of the computer, and these may be connected through telephone lines or radio waves, enabling the simultaneous presence of words at any point in the globe.

### The Book as Machine: Two Views

Digital writing presents a colossal problem of focus: What aspect of the technology should receive priority? Which part of digital writing impinges on the author and reader and in what way does it do so? Is the important aspect of digital writing the computer as machine, the software program, the graphical interface, the network, the programming code, or the binary storage system, to mention a few possibilities? In order to explore the question of focus I shall analyze the work of Friedrich

Kittler and Vilém Flusser, two theorists of the media who paid particularly close attention to the materiality of technology.

Kittler has written several major works on the question of culture and information technologies: *Discourse Networks: 1800/1900* (1985), *Gramophone, Film, Typewriter* (1986), and *Dracula's Legacy: Technical Writings* (1993) present and explore technocultural difference with an originality matched by few others.<sup>5</sup> Kittler contrasts technocultures on the basis of their ability to store, transmit, and compute the real. He does so from a most productive standpoint: retrospectively from the development of networked computing. He looks at book technoculture, for example, in relation to its ability to store the real. Printed books are limited to words in this respect. Unlike phonograph records and tapes they omit sounds, and unlike film they omit moving images. Since sounds and images are features of experience, the reader incorporates them into the reception of the book regardless of their absence. Kittler writes, "Around 1800 the book became both film and record simultaneously—not, however, as a media technological reality, but only in the imaginary of the readers' souls" (Kittler and Johnston 1997, 39). The reader produced the missing information in acts of imagination. In a brilliant passage, Kittler captures the media effect of the material constraint of book technology: "As long as the book had to take care of all serial data flows . . . words trembled with sensuality and memory. All the passion of reading consisted of hallucinating a meaning between letters and lines" (40). In the next century, around 1900, the phonograph and film began to record audio and video, transforming forever the place of books in culture. Kittler writes, "The dream of a real, visible, or audible world arising from the words is over" (44). The book lost its monopoly over the storing and dissemination of cultural material.

With Kittler's framework one can comprehend effectively the difference between cultural media, say, virtual reality systems and novels. Individuals disciplined by, interpellated by, and accustomed to novels in the form of books often find it very difficult to grasp the innovation of virtual reality systems. Such bookish types regard the novel as already a virtual reality system. But this is only so, after Kittler, because these readers of books "hallucinate" the audio and video data missing from the printed word on the page. In the technoculture of the book, these individuals have developed a certain form of imaginary that works to supply

the absent information. As subjects constituted in the technology of the power of books, however, they are not aware of this function as related to the material form of the book, assuming its naturalness and inevitability. Yet precisely this productive imaginary is what is changed in later media such as virtual reality systems. Book readers may find no use for virtual reality systems, film, and the rest, even complaining that the book is superior to these media when in fact they merely register their preference for one technology over others. They often fail to see how individuals constituted by other media—film, television, or virtual reality—might prefer these over books because, constituted in a different technoculture, they have developed different capacities of reception, perhaps visual imaginaries, producing cultural meaning out of visual and aural information or data flows. With the mind-boggling multiplication of media technologies in the twentieth century (not to mention what we are likely to witness in the twenty-first), it becomes imperative, in institutions of higher learning especially, to understand the multiple capacities of subjects constituted by various media, instead of blindly and repeatedly insisting that only one media—the book—and only one set of cultural skills—the imagination or rationality—deserves recognition as intelligence.

With regard to the question of the interpretation of digital writing, Kittler makes some choices concerning the pertinent aspects of technology that I think are less than optimal. In certain places, he interprets the change in writing tools from typewriter to computer as one of loss of perception. He characterizes the change as “a rather sad statement” since “written texts . . . do not exist anymore in perceivable time and space but in a computer memory’s transistor cells. . . . [Computer writing] seems to hide the very act of writing: we do not write anymore” (Kittler 1997, 40).<sup>6</sup> These perhaps pessimistic conclusions are achieved by configuring digital writing as a machine process. Such writing is invisible to its author, unlike typing, because signs are stored as sequences of zeros and ones in a file format on a disk. Even though the words appear on the computer screen, for Kittler they are really invisible, inaccessible to inspection by the writer because of their tiny location on the machine. Kittler here ignores the connectivity of digital texts in favor of their physical characteristics in an isolated computing machine. He overlooks the distributed network of textual presence in favor of its containment on a hard disk inside a single machine. In short, Kittler limits his inter-

pretation of digital writing to his own relation to his texts stored in *his* computer. He approaches the question as an analogue author and is dismayed to find his presence missing from his writing. One might just as easily take the stance of a digital author and find an anonymous murmur in the links of hypertexts on the Web.

Kittler accounts for the subject constituted by the book in the form of the imaginary. He reinterprets early-nineteenth-century literary culture from a discovery of the imaginary and the consequent depth of the individual as a historical by-product of a certain discourse network. What philosophers and literary theorists of the period celebrated as transcendental interiority, Kittler links to the material constraints of printed volumes. Vilém Flusser (1992) looks instead to the array of traces on the page of analogue texts, the linear progression of letters composing words; of words composing sentences; sentences, paragraphs; and so forth. Also concerned with the material trace of the printed page, Flusser depicts the constituted reader of books as a linear mind, well suited to logical argument and historical explanation. He writes:

The first examination of writing reveals that the line, the linear sequence of the characters, is its most impressive aspect. Writing appears here as the expression of a one-dimensional thinking, and thus also of a one-dimensional way of feeling, willing, evaluating, and acting. . . . Writing, this linear stringing together of signs, actually made possible for the first time a historical consciousness. Only if one writes in lines can one think logically, calculate, criticize, pursue science, philosophize—and act accordingly. (11–12)

Contrary to Kittler’s understanding of the book as constituting a subject with interiority and an extended imaginary function, Flusser configures the analogue author as having a linear mentality, as one who amplifies certain forms of rationality.

Since the study of print technoculture is in its infancy, it is not necessary to choose between Kittler and Flusser, between understanding the book as constituting subjects through its absence of sound and image or through its linear sequence of signs. At this point it suffices to note the difficult question of focus. The decision about the precise machinic character of media is crucial to the understanding of their cultural consequences. Yet essentially it is impossible to choose. Rather the researcher benefits from exploring a line of investigation—taking a limitation of a media, or its phenomenal appearance—and experimenting with cultural

analysis by making links with institutions and figures, with practices and subject positions of a given time and place. My choice is first to broaden the field of study by looking at the figure of the author in relation to copyright, at the complex institutional matrices in which the author emerges in its analogue form.

### Analogue Authors

The history of copyright is complex, differing from country to country and from region to region. In all cases, however, the legal system of copyright is connected with the question of the author. At first, copyright concerned books; later other cultural objects, such as film and brand names, would also be included in the question. In its origins, however, copyright developed around the figure of the author, the individual who had created something distinctive, something that warranted special legal protection. In the case of Anglo-American law, however, it may be argued that in effect what was actually protected was not the creative cultural object—idea or work of fiction—but the book, the material casing in which the novel creation was embodied and reproduced (Lury 1993, 25).<sup>7</sup> As long as books were the major or even only instance governed by copyright, the legal distinction between the idea and the book was nullified in cultural practice by the analogue notion of the author, the spirit contained within the book, governing its meaning.

One other feature of copyright needs to be mentioned at this point, and this concerns the technical nature of the book. Mechanical print technology enabled multiple copies. The simple fact that many copies could be produced changed the relation of the author to the reader. The audience lost specificity, becoming more anonymous and general. The author, in turn, internalized a new, vaguer addressee. The distance between the author and the reader led to new practices of writing in which the author was stimulated to develop textual means to control the reading process. More attention had to be paid, in the composition of the text, to methods of leading the reader, one less familiar to the author, in directions the author chose. An analogue of the author was thus implanted in the text in the form of a controlling voice. The authority of the author had to be embedded in the content and structure of the text, as well as in the material layout of the signs. The book took its modern shape as an array of signs in sentences, indentations, para-

graphs, pages, footnotes, and illustrations in the context of its mass reproduction, its increased distance of author and reader.

But the emergence of the figure of the author and the normalization of the printed book as an emanation of the author and as a reliable duplicate was not at all sudden. As Nietzsche and Foucault remind us, origins always occur in a field of forces, with the new struggling and adapting to the old, changing and taking shape only in a historical process of birth. Now that the analogue author may be giving way to a digital one, it is important to recall the historical circumstances of the birth of the analogue author. By doing so we can avoid setting up the analogue author as an abstract figure against which the digital author becomes either demonized or celebrated. We can also avoid the confusion of technological determinism.

Of great assistance in the study of the origins of the analogue author is recent work on the beginnings of the printed book (Goldberg 1990). One work in particular I find most helpful, Adrian Johns's magisterial *The Nature of the Book: Print and Knowledge in the Making* (1998). Johns's accomplishment, one that now seems so right and so obvious but that none before him had noticed, is to show that books were first made in the social-cultural-economic world of the guild. The new technology of print was born in the midst of a precapitalist, feudal, artisanal structure. Guilds were organized to produce a consistent quality of a type of commodity without strong attention to the inventive capacities of the individual. Commodities produced by guilds were above all the result of *collective* labor. When we look at the origins and shaping of the analogue author we must understand that its present figuration in the market structure of a fully modern or even postmodern society was the outcome of a long process of transformation, one that began in a context in which authorship as we think of it was impossible.

Our print culture contains two principles, neither of which applied in the first century or so of book production: that the copy one sees in one's hands is an exact duplicate of all others, especially those of the same edition, and that the "author" of the book may be trusted to have written the words one reads. These are the essentials of print culture and they did not exist during the origins of the book. "The first book," Johns writes, "reputed to have been printed without any errors appeared only in 1760. Before then variety was the rule, even within single editions"

(31). Only two hundred and some years after Gutenberg did a reliable book exist. What is more, the practice of artisans in book-producing guilds—practices that Johns spells out in some detail—encouraged what might be called creative compositing. As he says, “A compositor did not just slavishly copy a writer’s manuscript. On the contrary, he enjoyed substantial freedom in his settings” (87–88). The writer of the text in those years had little prestige as an “author.” Instead the book was credited to the guild that produced it, as was the case with all objects made in the artisanal mode of production. The guild that printed books was the Stationers, within which a long battle for control of the book was played out, not with the author but between the printers and the book-sellers. Guild masters were the highest authority in this very hierarchical society, and printing was done in the home of the master, mixing family life and work in the unique blend of early modern European life. The “author” was at best a guest in this setting, someone without much command (102). In the wider society, among the powers that prevailed and among people in general, the Stationers were recognized as the “authors,” not the writer of the text (138).

Another general feature of these first two centuries of print that nullified the modern analogue author was piracy. Guilds could not in the end completely control the production of books. Piracy was inherent in the structure of the Stationer’s guild, so much so that pirates “at times were among its most prominent and upstanding members” (167). The term *piracy* was applied to books by their users and was an effort by them to designate one aspect of the uncertain status of the object before them. How could one place trust in objects in 1600? In a society that was generally one of face-to-face interactions, that was extremely hierarchical and based on personal relations of allegiance and command, objects only attained the moral status of trust through the individuals and groups who made them. What counted, then, for the reader was the moral fiber of the stationer: “The character of the Christian Stationer was properly assessed in terms of domestic virtue, personal credit, religious constancy, and moderate temperance. . . . links were constantly being constructed between vocation, family life, piety, and soteriology” (143). These qualities of the stationer were what people read on the title page of the book, not the character of the author, and these ensured reliability. In this world of face-to-face relations, oral words alone had epistemic value. If one did not know the Stationer, what one heard

from friends framed the value of the printed words on the page. As Johns writes, “Occupying such confined and encompassed premises, surrounded by gossip and conspiracy, a successful book-selling business consequently required the active preservation of delicate systems of trust and honor among people in constant proximity to each other” (113). In this context, piracy was but one element in the mix that constructed a relation of trust between the reader and the words on a page.

Most important in understanding the conditions in which analogue authors emerged is the fact that authors themselves were not cultural figures of great trust. Authors were precisely those one did not know, those whose character was a blank to the reader. The first impulse of people in this world was to distrust authors. What Johns shows so effectively is that the moral act of reading in the early modern period could not constitute epistemic value in the author’s words. This trust had to be learned by readers in the course of centuries. When today we question the truth value of words or images on the Internet, we are simply in the same position as readers of books were in the seventeenth century. And perhaps it was more difficult for our forebears to learn to trust authors of printed works than it is for us to learn to trust digital authors on the Net because they made the leap from trust in spoken words uttered in proximate practices to the disconnected splash of ink on paper.

Enormous social and cultural changes had to occur before the analogue author familiar to us would emerge as an important figure. Literacy had to become general, diminishing personal authority relations; markets for books had to expand and replace guilds with capitalist commodities; legal systems of copyright had to be perfected and political regimes had to make such laws effective; and, above all, the cultural sign of the author had to displace the guild master. For this latter to happen, individuals had to be defined as interior consciousness, which could then be externalized first in manuscripts, then in print. The value of originality in consciousness had to grow, and readers had to develop skills to interpret it and render it significant. All of this began to fall into place, Johns contends, in the early nineteenth century. But as we shall see by the end of the nineteenth century, analogue authors began losing their prominence to the captains of the culture industry, who manipulated copyright in their lust for lucre. The irony of this history is that academic disciplines in the humanities became institutionalized just as analogue authors began to lose control of cultural commodities. It has been the

burden and the glory of the humanities to preserve the analogue author just as this figure became socially irrelevant.

### Analogue Authors in the Regime of Broadcast Media

The special relation of author to copyright changed as new media developed. With the rise of the electronic reproduction of text, voice, and image, limitations on copying characteristic of print gave way to broadcast. The electronic broadcast enabled far greater reproduction, reaching truly mass audiences, from the thousands to the millions. Such a change in the material means of reproduction, as Celia Lury (1993, 51) points out, enlarged the economic scale of cultural objects. With a truly mass audience, cultural works became economically significant. Culture, in Adorno and Horkheimer's words, became an industry. In this new context of material reproduction, the position of the author and the status of copyright shifted: with larger sums of money at stake, those in control of the means of production took a greater degree of control over the production or creation of the cultural object. Displacing the author, the film producer, the radio channel, or the television network intruded upon the process of cultural creation to ensure market success in ways that book publishers of the eighteenth century could not. The media, as Adorno (1978) complained, created the success of the cultural object. The mere repetition of songs on radio stations, he noted, shaped their reception (270–99). With the media playing such a great role in cultural creation, the figure of the author began to decline. In Lury's words, "The commercial exploitation of the new technologies of replication has required a new emphasis on the processes of reception rather than the authorial moment as the basis for defining the terms of intellectual property" (1993, 56).

With the broadcasting model of cultural reproduction, brand names, logos, images, and trademarks displace the author from the center of the cultural object and the focus of copyright (Coombe 1998, 70). The question of intellectual property shifts to these features of the cultural object,<sup>8</sup> but the privileges of copyright are kept. Cultural objects are the second leading export of the economy of the United States, behind weapons. Their importance also resides in the general transformation of all industrial into postindustrial economies, in which information plays a greater and greater role in every level of economic life. Copyright law, with its analogue author, has become, in the broadcast age of cul-

tural reproduction, an entirely different legal structure. Instead of protecting authors and cultural innovation, it is nothing less than the general law of property. Wealth increasingly is defined as information and copyright is its police force. Crimes against property are less and less the appropriation of or damage to a physical object than the illicit copying of text, image, and sound.

### Digital Authors

How, then, are authors affected by digitization? As a hypothesis, we may explore the proposition that the shift in the scene of writing from paper and pen or typewriter to the globally networked computer is a move that elicits a rearticulation of the author from the center of the text to its margins, from the source of meaning to an offering, a point in a sequence of a continuously transformed matrix of signification. I say "elicits a rearticulation" rather than "directly *moves* a rearticulation" in order to avoid any hint of technological determinism. If there is one rule that may obtain to the introduction of new technologies, it is not determinism but unpredictability. For example, Marshall McLuhan foretold the disappearance of books with the spread of broadcast media. But one trend that is emerging with computer technology is the oxymoronic digital book. Manufacturers are now falling over themselves to market a computer in the form of a book, a computer that combines the advantages of the book's ease of handling and portability with the computer's strength of storing and manipulating vast quantities of data. One company sells a 2.9-pound, 8 1/2-by-11-inch object that contains the exact format of book pages and is even leather bound! Another company markets a booklike computer that weighs only 1.25 pounds (Silberman 1998, 98, 100–102, 104). This doubling back of new technologies upon old, creating unforeseen combinations, renders futile linear predictions. Whatever happens to the author function will occur through a congeries of discourses and practices that are so complex that they will be an event. Nevertheless a horizon of visibility is at least plausible: the move is or may be one from the author function of modernity to a multiple, unstable author of postmodernity.

### Stability of the Sign in Time and Space

The space/time configuration of the analogue author is different from that of the digital author. Set firmly on the printed page, the words of

analogue authors speak to readers without a response. The traces of ink on the page are unaltered by the reader response, be it in a cognitive event, a marginal inscription, a printed review, an essay, or a book. In each case, the printed page is unaltered by the reader so that others may read the same page or another copy of the page and see the same traces, the same arrangement of signs. This page also exists uniquely in space and time. This page is here and now. One must physically move it to displace it or one must displace oneself to approach it. The page is an object in the world, obstinately enduring from moment to moment, subsisting in a place through the laws of inertia. Even if there exist multiple copies of the page, each one is subject to the identical conditions of material embodiment. True enough that time wears away at the paper. It shows its age to the reader and to the chemical analyst. That is the way of objects in space. They disappear, however slowly. But for long periods, they are enough the same to yield themselves to different readers with the exact display of traces.

In the digital world, texts are mobile and changeable. I can move a digital text around the world in an instant. Space offers no resistance to bytes on the Internet. A few nanoseconds is all it requires to circle the globe. From the point of view of a reader, a digital text is everywhere at once, so long as the appropriate technical conditions apply. Time constraints of bits are those of electrons. They apply as surely as those that apply to the molecules that compose pages, but they are different laws with different effects on the practice of reading. Insofar as digital texts are everywhere at once, they extend the power and authority of the analogue author. If digital texts did no more than disperse themselves more efficiently and ubiquitously than paper, the analogue author would perhaps be expanded.

But the temporal instantaneity of digital texts undermines their spatial stability. Embodied in computer files, digital texts subsist in space only at the whim of the reader. The author of digital texts loses the assurance of their spatial continuity. Pages of digital text have the stability of liquid. They may be altered in their material arrangement of traces as they are read. They may be combined with other texts, reformatted in size and font, have sounds and images added to them or subtracted from them. And all of this may be done with almost no effort. No doubt about it: bits may be moved, erased, or changed as easily as they are read. Digital texts thus have more permanence than paper in the sense

that they may be distributed or copied without alteration. At the same time they have no permanence whatever. Digital texts are subject to a material regime fundamentally different from analogue texts. I contend that the author function of the analogue period of textual reproduction cannot endure the change to the technology of the power of bits.

Analogue authorship took form in the placid world of the printed page. Here signifiers succeeded one another without alteration. The reader could return time and again to the page and reexamine the words it contained. A readerly imaginary evolved that paid homage to this wonderful author who was always there in his or her words, ready to repeat him- or herself, always open to be admired or criticized. The world of analogue authors was leisurely, comforting, reassuring to the cognitive function, and expanding through continuous exercise of the visual function. Authors of printed pages controlled the meaning of the page in Foucault's sense and were invested with aura in Benjamin's sense in good part through the material configuration of pages of paper. A printing industry, a market for books, an educational system all developed around the page and the continuity of its arrangement of ink. Modern culture as we have known it in the West is inconceivable without the space/time constraints of pages and books. As we move into digital authorship, we can expect serious alterations in the author figure and in the readerly imagination evinced by mobile bits and liquid pages traveling at the speed of light. These natural laws of digital authorship are yet only in their beginning stage of development. We can expect that someday they will constitute the formative conditions for a new regime of authorship with its own definition of author's rights; its own practices of distribution, editing, and production; and its own legal, political, and economic configuration. Practices of digital authorship have already begun to bring changes to the character of the text, most notably in hypertext.

### Hypertext and Digital Authors

The case of hypertext may be seen to confound copyright law as it affects authors. Legal experts agree that authors deserve copyright in U.S. jurisprudence because they have expressed original cultural ideas in their work; they have implanted analogues of their mental creativity in the text. But digital authorship raises many questions about the relation of an author's creativity to a work. For example, does the translation of an encyclopedia into a hypertext format for publication as a CD-ROM or

a Web page constitute new intellectual labor, asks copyright lawyer Pamela Samuelson? She continues: "Someone who designs a hypertext system may be able to speed up delivery of graphic images from the computer's memory to a display screen by using highly efficient graphics compression and decompression algorithms. Would these algorithms be part of the copyrightable 'expression' of the hypertext product?" (1992, 699). Or further, if one makes links in a hypertext, is this an act of authorship that is capable of being subject to copyright? Indeed, perhaps authorship is constituted by the reading of a digitally formatted text, recorded as a series of links or as a rearrangement of the text. And finally, if a hypertext circulates on the Web, undergoing numerous additions and even deletions, who may claim to be the author of the text?

Hypertext may be taken as the paradigm of the digital author. Hypertext is a digital text that may be read not in the fixed direction suggested in a printed book but as a series of links that jump across the presented text in any direction. It may exist on a CD-ROM, a hard disk on an individual computer, or on a site on the Internet, on any medium compatible with digital technology. These links may be provided by the author, by the reader, by previous readers, or by any combination of these. Many scholars have noted the novelty of hypertext in comparison with printed books and its implications for theory and literature (Bolter 1990; Landow 1992; Lanham 1989; Murray 1997; Ryan 1999). Hypertexts may stand alone, being read in a program on a single computer (Joyce 1987; Moulthrop 1991) or be connected to a database, such as George Landow's Dickens project, which combines novels, criticism, history, and philosophy in text and graphic form (Landow 1997).

Katherine Hayles (1997), searching for the limits of the analogue/digital divide, explores the implications of hypertext even when it appears in the form of print. Hayles insists that hypertext is a form of symbolic expression that appears in all media. For instance, a work like *Dictionary of the Khazars* (Pavic 1988) appears in print but is in many respects hypertextual. Yet Hayles is more convincing when she connects the materiality of the media to cultural formation in her analysis of Shelley Jackson's *Patchwork Girl*, a hypertext that is published in digital form on the Internet. After a stunning analysis of the fragmentary body of the woman in this narrative, its connection with Mary Shelley's *Frankenstein*, with gender theory and the construction of the subject, Hayles argues for the specificity of hypertext to its material manifesta-

tion in networked, digital form: "The construction of multiple subjectivities in this text and the reconfiguration of consciousness to body are both deeply bound up with what I have been calling flickering signification, constituted through the fluidly mutating connections between writer, interface, and reader" (1997, 28). Hayles argues eloquently for a literary analysis that heeds the medium, for changes in the habits of textual interpretation to account for the shift from print to digital hypertext.

At the other extreme from Hayles's argument that hypertext may appear in print form, *American Quarterly* devoted a special issue to the question of hypertext. The novelty introduced by this official journal of the American Studies Association was to publish four articles on-line, solicit responses to the on-line essays, and publish some of the responses to the on-line articles in print. As the editor of the special issue notes, the experiment allowed the exploration of the differences between on-line and print publication (Rosenzweig 1999). The on-line essays, unlike their print versions, included moving pictures, sounds, images, entire databases of documents, and virtual world, or three-dimensional, images. If publication on-line in hypertext format introduces startling possibilities, it also entails great technical burdens, such as incompatibilities between browsers accessing the pieces, problems that simply do not exist in the print format.

But in principle the entire World Wide Web may be taken as one hypertext since any site may be linked to any other site. The profound implications of this for the subject of writing are just what Donna Haraway (1997) notices in the case of science and Mosaic, the first Web browser: "Mosaic was about the power to make hypertext and hyper-graphic connections of the sort that produce the global subject of technoscience as a potent form of historically contingent, specific human nature at the end of the millennium" (126). Although many literary critics are skeptical about the novelty of hypertext in relation to books, the issue appears in quite a different guise when digital texts are understood in relation to the totality of the Web. In fact, the principle of hypertext is easily deduced from the problem of data storage, as Vannevar Bush (1945) did with his Memex (MEMory EXtender) project in 1945.

Since the issue of digital texts is crucial to the argument of this book, it is worth dwelling for a moment on positions that deny the importance of the change from analogue to digital texts. Among writers on this topic there is one who has posed the issues in a most systematic

and interesting form. Espen Aarseth (1997) argues for the unique nature of digital texts, which he calls "ergodic." In this respect he differs from other literary analysts who refuse any difference at all to hypertexts. Yet Aarseth claims that ergodic texts depend for their qualities not on the material structure of the text but on its relation to the reader (59). Aarseth is opposed not only to skeptical literary critics but also to terminology that relies upon what he calls "computer industrial rhetoric"—terms such as *hypertext*, *interactive*, *virtual*, and *nonlinear*. His denial of the importance of the material casing of the text is most peculiar. He writes, "The politics of the author-reader relationship, ultimately, is not a choice between paper and electronic text, or linear and nonlinear text, or interactive or noninteractive text, or open and closed text, but instead is whether the user has the ability to transform the text into something that the instigator of the text could not foresee or plan for" (164). But does not the material form of the text dictate whether the user can change it or not? And in the end he reverses himself on the issue of materiality, defining an ergodic text as "one that in a material sense includes the rules for its own use" (179). He even complains that literary theory, including that of poststructuralists, "seldom" accounts for the "materiality of literature" (164–65).

His illustration of independence of the "user-text relationship" from "the physical stratum of the medium" is the change from long-playing records to compact discs, in which, he argues, the shift in the cultural object from analogue to digital "did not change any substantial aspects of the cultural production or consumption of music" (59). As we have seen in chapter 3, the advent of digital music not only changed the production and consumption of music but in fact is stimulating a revolution in this domain of the culture industry. The early shift to digital music did have an impact on the user: it reduced the ability of the listener to influence the quality of the reproduced sound. The introduction of compact discs destroyed the listener's ability to tinker with playback technology. All one could do is buy a better-sounding CD player. With long-playing records, the audiophile had much greater flexibility in extracting sound from the grooves of the storage medium. If anything, the introduction of CDs diminished the ergodic quality of the text, to use Aarseth's term, reducing the user-text interaction to a passive mode of playback.

However, when digital music is extracted from the compact disc and transferred into a file format such as MP3 on the hard disk of the com-

puter, and further when the file is placed on the Internet for exchange and copying between users, the music becomes ergodic to an extent that is unimaginable. Music reproduction, as we have seen, returns to the folk level of participation: the cultural object becomes open to the user for reproduction, distribution, and even transformation. As in digital texts, digital music files transform the user into a creator, a manufacturer, and a distributor. A better example of the profound impact of a change in the material form of the cultural object could hardly be found.

The issue of the digital author must not be reduced to that of hypertext. Hypertext may most profitably be approached as a special case of writing on the Internet. E-mail, chat rooms, MUDs (multi-user domains), MOOs (multi-user domains, object oriented)—all forms of synchronous and nonsynchronous communications in digital form across networked computers raise the fundamental issue of the medium and its reconfiguration of the author. If we restrict the discussion of digital authors to hypertexts, the literary model of authorship plays too much of a role in our thinking. Digital authors are mediated by a vast apparatus of interconnected information machines. Digital authors are not simply separated from their words, as they are in the print media, but reconfigured by their relation to the machinic apparatus. Because digital writing may be rewritten with ease, the stability of words on paper is lost, severing the link between author and text that was established with so much difficulty during the first centuries of print, as we have seen. The cultural practice of taking authors of books as trustworthy authorities, as persons of possibly great creativity, is difficult to reproduce in the case of digital texts on the Internet. This, of course, by no means prevents the establishment of a new cultural practice in which authorship as we know it is somehow sustained. But the case of digital texts does indicate a rupture in existing practices and the need for a new invention of authorship.

When analogue authors were installed in the cultural landscape the modern subject was being articulated in discourse and practiced in daily life. The figure of the analogue author fit well with the emerging sense of the body as private, the self as separate from the world of objects, and the investment in rationality as human essence and consciousness as the source of meaning. It fit well with the practice of distanced relations of the free enterprise market, the theory of representative democracy, and secular education in literacy and mathematics. It fit well, in

addition, with the narcissistic arrogance of European superiority and imperialist adventure and with patriarchy in its new articulation in the urban nuclear family. Each of these hallmarks of modernity had its own temporality; by no means was all of this some unified essence, some spirit of the age, or even some revolutionary project of a well-defined group of political agents.

Digital writing emerges at a very different point of history, which might be characterized as follows: The broadcast media, as many have argued, have done much to diminish or even dissolve the rational, autonomous ego. Global capitalism is reconstructing planetary relations along very different lines from older colonialism. The viability and even legitimacy of leading modern institutions is no longer secure, even though alternatives are by no means obvious. Digital authorship arrives, then, in a specific context and the shape it is given in the decades to come will owe much to that context as well as to its material characteristics. It is my contention that the more beneficent configuration of digital authorship can come only from practices that explore its particular potentials, perhaps with an eye to the best that analogue authorship has offered but by no means with a sense that at best we can only repeat its achievements. This is a great moment to experiment with digital forms of writing and communication, even though these experiments will be resisted by the gatekeepers of authorship—the watchdogs of copyright, printing establishments, tenure committees, and so many others.

### Visual Texts

As another example of the complex relation of technology to culture in the shift from analogue to digital,<sup>9</sup> let us consider the case of the effects of virtual reality technologies on the classic visual order of Renaissance perspectivism. The discussion of visual culture often focuses on a change from the literary to the visual, from text to image as the dominant form of mediation (William Mitchell 1994). What is often overlooked in this regard is that text itself is visual; the printed page, just like film, is accessed through the eyes. Yet the cultural force of perspectivism obtains in both cases. As long as the culture positions the viewer or reader as an interior subject confronting a discrete object, as Norman Bryson (1988) contends, “vision is still theorized from the standpoint of a subject placed at the center of the world” (87). The Cartesian subject may en-

sure through vast changes in media. Indeed most virtual reality technologies present the viewer with a field of vision that resembles to a surprising degree the drawings of Leon Battista Alberti, a world of space in which Euclidean geometry is enhanced by the illusion of three-dimensionality. The representation of Renaissance perspectivism continues even in the classic novels of cyberspace. As Sandy Stone (1995) notes, “the geometry of cyberspace as Gibson described it [in *Neuromancer*] was Cartesian” (34).

The paradox of virtual perspectivism must not obscure the transformations that are under way. Digital space, as I have argued, introduces underdetermination as the material novelty of the Net, upsetting the cultural coherence of the subject/object split and reconfiguring this relation into a human/machine assemblage. Alberti’s Renaissance city does not translate into the medium of the Internet (William Mitchell 1997, 1994). In the simulated three-dimensionality of virtual reality on the Internet such as in *Active Worlds*, in a game like *SimCity*, or in the architecture of MOOs, digital space is not experienced as linear or Euclidean. The on-line participant jumps from one location to another in associative moves that are much like those in hypertexts. When the body moves in territorial space or when the viewer images this movement in film and, *mutatis mutandis*, in printed pages, the eye and flesh construct the horizon as object, one that may be negotiated. Of course there are important exceptions, such as the garden in Daniel Liebeskind’s new Jewish Museum in Berlin, where a slanting floor and standing concrete slabs produce disorientation and nausea, where the subject collapses within the field of the object. In digital realms one moves only with the machinic apparatus; one’s eyes and flesh incorporate and are incorporated by the space constructed by the networked computer. The “realism” of this domain is virtual and digital (Heim 1998). Just as one may in the domain of discourse ask with Foucault, “What does it matter who speaks?” in cyberspace one may ask, “What does it matter who is on-line?”

### Conclusion

Many of the features of digital authorship, as they affect the conditions of work in the humanities, are in some sense anticipated in the modern period. From the novels of Lawrence Sterne to the theoretical practice of Roland Barthes, anticipations of hypertext, for instance, may be gleaned. If the digital imaginary is here foreshadowed, the practice of digital

authorship had to await the material inscription of networked computing. Only when this rearrangement of ink into bits, this profound destabilization of the trace, occurred could the regime of the author function be transformed in countless practices of symbolic culture. Only then could the Gutenberg Galaxy become overlaid with a universe of cyberspace.

## CHAPTER SIX

### Nations, Identities, and Global Technologies

It may have been by the ghostly light of a computer screen that some of the men and women found dead in the Rancho Santa Fe house-turned-temple first got word of the oft-changing cult now called Heaven's Gate.

—Terence Monmaney

#### Fear and Trembling in the Halls of Power

As a political unit, the nation is facing an ever expanding set of challenges. Modern systems of transportation and communication facilitate global exchanges of commodities, populations, and information, often evading the borders and jurisdictions of the nation-state. Faced with an increasingly interconnected globe, the nation may no longer be able to sustain its territorial hegemony. Some commentators conclude that the nation-state has ceased to be a viable political entity, placing democracy itself in jeopardy (Guéhenno 1995). Most observers, however, note with some trepidation the globalizing trends that put the nation into question. In this chapter I shall briefly examine these trends, look at the various anxieties provoked by globalizing information flows, and attempt to outline a way of conceptualizing the current situation with an emphasis on its emancipatory possibilities. Although I will focus on the anxieties aroused by globalizing trends, I recognize that there are also great expectations in the scene, from the drooling of free marketers at the fading away of tariffs and quotas on commodities, to the broad grin of liberal democrats as dictators disappear from perches of power, to the