

The Freudian Robot: Digital Media and the Future of the Unconscious

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Where is the Writing of Digital Media?

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[–] Abstract and Keywords

This chapter focuses on the constitution of the writing of digital media and where it is most likely to be encountered, and examines many of the presuppositions about the mind, machine, language, writing, symbol processing, and inscription technologies. There are a number of significant conceptual lacunae in new media studies and modern literary theory, which have been responsible for what we do not see and what we have not been able to conceptualize in regard to digital media. Namely, the *techne* of the unconscious has been revealed. The chapter helps open up some new avenues of research and understanding with respect to the social and psychic makeup of contemporary digital technology.

Keywords: digital media, digital technology, literary theory, unconscious

The two images, sound and visual, enter into complex relations with neither subordination nor commensurability, and reach a common limit insofar as each reaches its own limit. In all these senses, the new spiritual automatism in turn refers to new psychological automata.

Gilles Deleuze, *Cinema 2: The Time-Image*

It is reasonable and convenient to assume that the digital media have the power to transform our ideas about writing, language, memory, consciousness, and social reality. The vast majority of scholarly studies and popular literature on new media readily prove the point. An equally reasonable but much more difficult task is to suspend that assumption for the moment and reflect on how the identity and role of writing itself has evolved significantly enough to make the invention of digital media possible in the first place. This chapter attempts the task by investigating the situation of writing in the digital revolution.

I have set out to document and interpret the remarkable evolution of alphabetical writing that took place at the crossroads of literature and science and has profoundly impacted both. This evolution has brought about the new media as we know them today just as much as it had

inspired literary modernism in the early (p.16) decades of the twentieth century. Bearing in mind how alphabetical writing has become the symbolic sine qua non of both the literary medium and the mathematical medium in many regions of the world, we will explore how the transformation of this writing in recent history—what I mean by “writing” should not to be lumped together with “language” as a category or with any particular vernacular language—has led to the invention of digital media and furthermore to a contemporary civilization that theorists have variously characterized as postmodern, postindustrial, late capitalist, and so on. The question in the chapter title “where is the writing of digital media?” invites a critical examination of digital media and of what Deleuze grasped tentatively as “the new spiritual automatism.”¹ I hope that this approach will help open up some new avenues of research and understanding with respect to the social and psychic makeup of contemporary digital technology.

There is no simple answer to the question of where one is likely to encounter the writing of digital media. Is it in the hardware or the software of the computer? Is it in the “hardware” of the brain or the “software” of the mind?² To raise these questions is to place a new demand on our knowledge of the role and identity of writing in relation to machine and to have a new understanding of digital media itself. The priority of the notion of writing does not imply an exercise in idealist speculation; on the contrary, the book begins by taking into full consideration a shared understanding among archaeologists and historians that writing was invented, first and foremost, as a material technology and that it has been one of the oldest surviving technologies we still practice. In fact, the technological essence of writing has turned out to be much more resilient in the making and dissemination of knowledge and information than the much touted powers of phonetic symbolism attributed by linguists and others to alphabetical and some nonalphabetical systems of writing. What is ultimately at stake— (p.17) and what therefore must greatly concern us here—is none other than the changing face and psyche of civilization itself.

We begin, therefore, by questioning how the (world) civilization is doing these days. Is the future of a new spiritual automatism already in sight? Neither the description of the modern or postmodern condition nor the charting of capitalist and postindustrial developments from one stage to the next can adequately explain how the digital revolution happened the way it did and why it is impacting our lives at such multiple levels. The time is therefore ripe to reengage the notion of civilization and examine one of its most enduring and important technologies.

Why Civilization Matters

Civilization is unthinkable without writing.³ This common sense is best captured by the characters *wenming* 文明 (Japanese pronunciation: *bunmei*), which the Chinese and Japanese—who share this transgraphic script but not each other's language—have adopted to translate “civilization.” These two characters mean literally “illumination through written text(s)” or, literally, “text shines forth.”⁴ For a visual approximation of the same idea in today's mass media, let us consider the shimmering digits and codes that famously race across the opening frames of the film *The Matrix*. Symptomatically, the computer screen in that film shows no boundaries, as “a blinking cursor pulses in the electric darkness like a heart coursing with phosphorous light, burning beneath the derma of black-neon glass. The entire screen fills with racing columns of numbers. Shimmering like green-electric rivers, they rush at a 10 digit phone number in the top corner.”⁵ These racing columns of numbers appear to redraw the boundaries of nature and civilization and make them both new and strangely familiar. Over the past century, this notion of writing has expanded into all areas of knowledge and is even invading previously unknown areas

of scientific **(p.18)** research and technology to help “illuminate” genetic engineering, cybernetics, neuroscience, and so on.

Inasmuch as writing has been the oldest and one of the most enduring technologies we know, the characters *wenming* 文明 assert the technological core of civilization more manifestly than does the Latin root of the English word “civilization,” since the former puts emphasis on the *wen* or “written text.” Keeping these cross-cultural references in the back of our minds, we may now embark on our course of discovery to find out how the technology of writing has evolved to become what it is for digital media. What philosophical truths does this changing technology deliver to help us make sense of the digital revolution? By the same token, will the digital revolution throw new light on the theory of writing?

Bernard Stiegler remarks: “The informatization of knowledge is only possible because informatics, as a technique for recording, reading, and diffusing of information, is a kind of writing.”⁶ This is true, but we must press further and ask what kind of writing. From clay tablets to microchips, the technology of writing has always involved at least a twofold physiological process of preparing material surfaces on which signs or codes are to be inscribed and of coordinating the human motor skills (or prosthetic robot arms) required for making the inscription. This does not mean that writing is necessarily a visual medium, and in fact our common view of writing as an arrangement of visual signs on a surface can be very limiting. For instance, the six-dot matrix of marks known as Braille is one of the formal mechanisms that rely on spatial rather than visual arrangement.⁷ Moreover, this book demonstrates that writing has been entangled with numerical symbols since its early invention, and traces of their coorigination are easier to document than any particular visual representation of early speech across ancient civilizations. With the arrival of informatics and computer technology, writing has further penetrated the biomechanics of human speech to such an extent that sound (including speech) becomes a translation of text or an artifact of AI engineering—a notable example being TTS (text to speech) synthesis—rather than a visual representation of speech.⁸ What we need today is a global and integrated **(p.19)** concept of writing that is simultaneously historical and theoretical to guide us toward a richer knowledge of these extraordinary processes. And for good reason, we also need to incorporate numerical thinking and discrete analysis into the theory of writing, especially with respect to alphabetical writing systems.

Postmodernity and New Media

Scholars of postmodernity have provided comprehensive analyses of the ways in which postwar socioeconomic developments and information technology have transformed advanced societies in late capitalism. One of the hallmarks of such transformation they point to is the storage and retrieval of a colossal amount of electronic information, including digitized written and printed records, in data banks, libraries, museums, archival centers, and global communication networks. From the time Jean-Francois Lyotard proposed the idea of “computerized society” in the 1970s to characterize the kinds of technological breakthroughs that were taking place in advanced societies, not only has the digital revolution happened and taken hold, but the momentum it generated has swept across every corner of the world and brought about the networked globe we inhabit today.⁹ The effect of the digital revolution upon social life has been variously compared to the introduction of the printing press or photography into early modern Europe but is widely acknowledged as being more powerful and irreversible than anything human society has experienced before. This is largely due to the fact that “the computer media revolution,” in Lev Manovich's idiom, “affects all stages of communication, including acquisition, manipulation, storage, and distribution; it also affects all types of media—texts, still images,

moving images, sound, and spatial constructions.”¹⁰ These totalizing and universalizing processes indicate how much the technology of writing has developed to reshape modern life and the future of humanity with vast implications for planetary and interplanetary ecology.

Reflecting on the history of digital technology, Manovich, the author of *The Language of New Media*, shows us that the outcomes of these accelerated developments over the past few decades actually represent the convergence of two separate trajectories. One trajectory concerns the invention of the modern digital computer that performs calculations on numerical data faster than the mechanical tabulators and calculators it has replaced. **(p.20)** The other involves modern media technologies that allow images, image sequences, sounds, and text to be stored on photographic plates, film stocks, gramophone records, and so on. The effective synthesis of these developments has led to the translation of all existing media into numerical data accessible through computers. The outcome is the new media through which graphics, moving images, sounds, waves, shapes, spaces, and texts all become computable at the digital level. Manovich identifies five principles whereby the new media organize these computable data. These are numerical representation, modularity, automation, variability, and cultural transcoding (20). All five principles undoubtedly bear on the central aspects of digital media examined in this book, and a number of them are also shared by writing and print media in general. The first principle—numerical representation—receives special attention in this chapter because it implies the indispensable notion of “discrete unit,” which has provided the universal conceptual basis for digital technology.

In mathematics, a discrete unit is considered indivisible and is opposed to the continuous. A thing, an individual, or a symbol may qualify as a discrete unit when that unit cannot be further divided without losing its identity. Individuals are treated as discrete units by population census and are computed as data in that sense, but continuous lengths or waves must first be converted into discrete units, such as time series, to be computed in digits. For the purpose of the machine's processing of symbols, printed letters and numerals are regarded as discrete units whereas handwritten symbols are not, such as the letter B on the left (Fig. 1).¹¹ A detailed discussion of this technical distinction and other distinctions in chapter 2 should help clarify the importance of this theoretical point.

One question that the numerical principle of digital media has raised for us is why modern media technologies must rely on discrete units in order to generate data. Manovich alludes to a number of historical circumstances such as the Industrial Revolution, the assembly line, the standardization of types and fonts in the publishing industry, the standardization of image dimension and temporary sampling rate in cinema, and so on. These are undoubtedly important dimensions but the numerical representation of discrete units also involves a certain kind of abstract thinking and algorithmic manipulation that needs to be explained as well. Interestingly, instead of going to modern mathematics for an answer, Manovich **(p.21)**

turns his attention to semiotic theory and the human language as a natural ground for discrete analysis, the evidence being that we speak in sentences and a sentence is made up of words and a word consists of morphemes, etc. Roland Barthes's definition of language is cited to show that "language is, as it were, that which divides reality (for instance, the continuous spectrum of the colors is verbally reduced to a series of discontinuous terms)."¹² After setting up the parallel between language and digital media, Manovich quickly adds that "the discrete units of modern media are usually not units of meanings in the way morphemes are" (29). Namely, the difference lies in the perceived disjuncture between symbol and meaning. Chapter 3 addresses the question of symbol and meaning in digital media, since the identity of discrete unit is the focus here. Note that Manovich's conceptualization of the discrete leaves "writing" out of the picture, and what he says about language and linguistic representation cannot but get him into a certain philosophical quandary: if language is made up of units of meaning that divide reality—a hypothesis more often asserted than proven—what reality or unreality do the discrete symbols of digital media divide?

(p.22) It is well known that the study of phonemes—more so than morphemes—has been the strong suit of structural linguistics in its approach to discrete analysis. Structural linguists have introduced elaborate distinctions among the sound units and phonemes of various languages and have routinely relied on written alphabetical symbols to measure discrete units. These linguistic studies, as Jacques Derrida and others have noted, are premised upon the unacknowledged mental slippage between writing and language—for example, when the theorist mistakes written alphabetical letters for speech sounds. It is this metaphysical slippage, rather than the ineffable morpheme or units of meaning as Manovich has contended, that troubles the linguistic understanding of digital code and discrete analysis.

There is one more reason why language itself cannot properly ground a theoretical or historical understanding of discrete units for new media. For we no longer have at our disposal a pure linguistic theory or semiotic theory across the humanistic disciplines that remains untouched by information theory or long-distance communication technologies. Barthes's semiology and Jakobson's linguistics were both historical responses—successful or unsuccessful—to the pressures of information theory as each tried to refigure language and semiotic behavior in general on the model of a communication machine.¹³ Series, division, discontinuity, and so on put Barthes and Jakobson in the company of their fellow structural linguists and philosophers who never tried to hide the fact that their semiotic view of language was specifically indebted to information theory. The same can be said of the other major figures of Structuralist or Poststructuralist persuasion in the twentieth century—Claude Lévi-Strauss, Julia Kristeva, Pierre Bourdieu, Jacques Derrida, Gilles Deleuze, Félix Guattari, and Jacques Lacan, to name a just few. We have no choice but to go back to the founding moments of information theory and cybernetics in postwar America and rediscover which symbols were figured as discrete units and

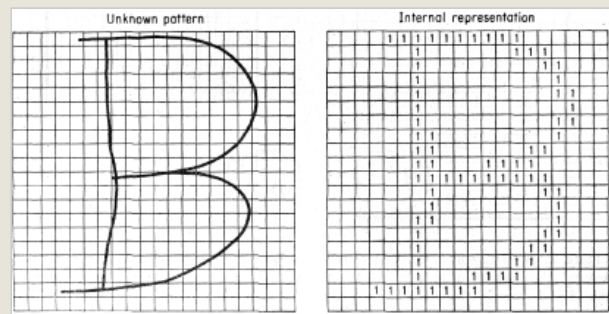


Figure 1. Continuous handwritten letter B versus its digital conversion into discrete symbol as a 20 × 20 matrix. From Leonard Uhr and Charles Vossler, "A Pattern-Recognition Program that Generates, Evaluates, and Adjusts Its Own Operators," in Edward A. Feigenbaum and Julian Feldman, eds., *Computers and Thought* (New York: McGraw-Hill, 1963), 253.

which were not and reconsider how the communication machine began to dominate the theory of language and shape structural linguistics itself.

For example, when Michel Foucault conceptualized the identity and role of power across modern disciplinary regimes, he made a decisive methodological foray into cybernetics and the communication machine. Power is no longer viewed by him as an exercise of brute force or a source of homogeneous domination, nor does it separate those who have it and **(p.23)** hold it exclusively from those who are subjected to it. Instead, Foucault writes:

Power must, I think, be analyzed as something that circulates, or rather as something that functions only when it is part of a chain. It is never localized here or there, it is never in the hands of some, and it is never appropriated in the way that wealth or a commodity can be appropriated. Power functions. Power is exercised through *networks*, and individuals do not simply *circulate* in those *networks*, they are in a position to both submit to and exercise this power. They are never the inert or consenting targets of power; they are always its *relays*. In other words, power passes through individuals. It is not applied to them.¹⁴ (my emphasis)

It is almost as if the author was suggesting that individuals are discrete fixtures of a gigantic communication machine. Perhaps Foucault is right after all; perhaps he offers some unique insights about the relationship between power and communication technology in postwar global politics. However, is Foucault speaking in metaphor? Yes, but if we take his language of “networks,” “circulation,” and “relays” as nothing more than metaphorical expressions (as if nonmetaphoric expressions were remotely possible), we would have a difficult time explaining how the broad epistemic shift toward a cybernetic outlook took place among the major intellectual figures of Foucault's generation. In particular, we would not be able to explain Jacques Lacan—the most rigorous and difficult of the so-called French theorists—whose theory of language and the symbolic order is more often miscomprehended than understood. Chapter 4 offers a new interpretation of Lacan from this angle.

For technical and other reasons, the question of the discrete unit has occupied the attention of a good number of media theorists who try to explain why and how the discrete versus the continuous has been central to the communication machine. N. Katherine Hayles tackles the problem by introducing a set of distinctions amongst code, speech, and writing. In *My Mother Was a Computer*, Hayles points out that the phenomenal world we experience belongs primarily to the order of analog or the continuous, but human civilization has consistently developed technological prostheses to impose digitization on these analog processes progressively from speech to writing to digital computers. It should be noted that her idea of “analog” here means everything or anything that is not digital, and this **(p.24)** new meaning no longer reflects how Charles Sanders Peirce grasped the concept in his rigorous distinction between logical reasoning and analogical reasoning in semiotics. The concept of “analog”—which used to connote “similarity,” “resemblance,” and “correspondence” in older media—is itself being remolded and entangled with the rapid developments in digital computing and media technology. From the digital point of view, life itself becomes a kind of analog. It follows that a continuous stream of breath is analog in contrast to speech, which is made up of distinct phonemes that can turn the stream of breath into discrete units. So when writing arrives, it “carries digitization farther by adding artifacts to this physiological process; developing inscription technologies that represent phonemes with alphabetic letters.”¹⁵ But is it not the digital that makes the analog appear as such, something distinct from itself? The conceptual

shift is striking and ought to be registered as such. Instead of taking the conceptual shift as a straightforward evolutionary progression from analog to digital, McKenzie Wark has pointed out that “[t]he digital rules a line between analog and digital, making a slippery difference into a clear distinction. But perhaps having made the distinction appear, the perspective can be reversed, and the digital can be perceived from the point of view of its analog residue.”¹⁶ We will explore this other point of view in robot engineer Masahiro Mori's dream of a Buddha-natured robot in chapter 5.

Hayles makes a distinction between speech and writing and sees them as mutually implicated by the means of representation. Like Manovich, she also underscores “the act of making something discrete rather than continuous, that is, digital rather than analog,” hence the centrality of discrete unit for numerical representation (56). But as we have already seen, a discrete unit in natural language for Manovich is a unit of meaning, whereas Hayles now takes that linguistic unit to be the phoneme, which divides the continuous stream of breath—rather than Manovich's “reality”—into distinct units. This process of linguistic digitization, by her account, is followed by inscription technologies that push the process into further abstraction. In short, speech and writing are historically distinct orders and belong to different realms of digitization.

Proceeding from this basic distinction between speech and writing, Hayles argues that computer coding is unique and different from both speech and writing because the idea of “compiling” makes sense only with respect to a complex web of processes, events, and interfaces that mediate **(p.25)** between humans and machines. She argues that the act of compiling has emerged with code that, though not unknown in speech and writing, operates in ways specific to networked and programmable media and mediates between the natural languages native to human intelligence and the binary code native to intelligent machines. The concept of code therefore implies a partnership between humans and intelligent machines in which the practices of each can penetrate and influence the other (59).

If we leave aside the issue of speech for the moment, Hayles's emphasis on the singularity of computer coding implies a certain situated view of writing, for the singularity of code is sustainable only if we strictly adhere to a logocentric view of alphabetical writing, one that takes writing to be a set of inscription technologies that represent phonemes with alphabetic letters. As soon as this position on writing is taken for granted, the numerical and coding systems of the precomputer era, such as Morse code, will quickly fall by the wayside. Should one classify these earlier systems as writing or code? If we decide that Morse code is a code after all, how does it fare conceptually with computer coding, which presupposes “compiling”? And what if we make a further discovery that writing enjoys a much greater affinity with computer coding at the conceptual level than it ever does with symbolic representations of speech or phonemes? When it comes down to fundamentals rather than technicality—this book is mainly concerned with the former—there is no reason why one cannot conceptualize computer code as the writing of the digital media just for the sake of the argument. Of course, that is not what I propose in this book; to do so before considering the issue of “where” (as suggested by the chapter title) would be premature and too limiting. What we need is a more supple and inclusive theory of writing to help explain the new digital processes, new events, and new interfaces between humans and machines in the world of networked and programmable media.

Hayles's emphasis on the partnership between humans and intelligent machines deserves special notice for very different reasons. She draws our attention to the fact that the interpolation of the user into the machinic system does not require his or her conscious

recognition. She sees this partnership as inherently ideological because it targets the unconscious more effectively than ever before. The subject is simultaneously disciplined by the machine until he or she becomes a certain kind of subject for the machine, as “interpolation is most effective when it is largely unconscious” (61). This is an important insight, one that my book pursues by demonstrating how psychoanalytical speculations have already been implicated in the making of digital media and cybernetics. This insight **(p.26)** also justifies Hayles's plea for the humanist's intervention in new media studies, showing why we must not ignore code or let it be confined to the domain of computer programmers and engineers.

Three Conceptual Lacunae

This study addresses the issues that have been considered central to any critical study of new media: discrete units, numerical representation, automation, human and machine interface, etc. At the same time, my research and interpretation are being shaped by a growing awareness of some of the conceptual lacunae in the current scholarship. On account of these lacunae, some fundamental aspects of modern digital technology have unfortunately escaped the analytical framework of new media studies. Chief among these are:

1. the ideographic turn of alphabetical writing as the basis of a new universalism in the digital revolution;
2. the cybernetic reframing of the unconscious and the arrival of the Freudian robot in our midst; and
3. the self-understanding of an emergent digital civilization that is limited by what we can know about our writing machines and the minds that have invented them.

The chapters that follow trace the evolving technology of writing to ponder its implications for analyzing the *techne* of the unconscious in posthuman society. This particular focus implies that we must come to grips with the import of what Mark Hansen has termed *technesis* or techno-thinking in Poststructuralism. Whereas Hansen wants to leave writing behind in his exclusive emphasis on nondiscursive *affective* bodily life,¹⁷ I emphasize the importance of writing—perhaps much more than does Hayles—not because I think the French Poststructuralists got it right after all (in fact, so-called French theory was manufactured largely in the United States).¹⁸ The reason this book emphasizes the importance of writing is that it is a powerful technology interacting with newer and digital technologies that centrally address human-machine interactions. The recognition of this fact runs deep in the histories of several of the world's major philosophical traditions and wherever the traditions of writing or print technology are encountered. **(p.27)** countered. No matter how much one may be justified in one's criticism of the limited validity of modern semiotics and linguistics, the technology of writing—and symbolic life in general—can be shown to mark our social lives with a degree of intensity that is almost unprecedented in history; and this technology can be shown to affect our contemporary civilization in ways that need not preclude our experience of nondiscursive life with digital media. In short, to address the first lacuna outlined above, this book will show how alphabetical writing has transformed information technology as well as nondiscursive bodily life in general and is in turn transformed by them. We can trace the material basis of a new universalism that has grown out of these processes to a specific historical moment in the evolution of alphabetical writing; that is, the moment when alphabetical writing completed its movement toward total ideographic inscription.

To anticipate my analysis of how information theory seals the ideographic destiny of alphabetic writing, consider this obscure but interesting fact: when Claude Elwood Shannon pioneered the mathematical theory of communication in 1948, one of the first things he did was add a twenty-

seventh letter to the English alphabet to code “space.” This letter is a positive sign in information theory and can be read as such by any blind or unconscious communication machine. Shannon's twenty-seven-letter English alphabet has since led to the creation of highly discrete and sophisticated systems of telecommunication code, but the significance of his invention greatly exceeds the functionality of communication machines. Derived, as it were, from the basic building blocks of traditional literacy and Morse code, the novel “space” letter has made electronic literacy possible but goes itself unrecognized, even as we all tend to agree that electronic literacy has an enormous impact upon the lives of people around the world—both those who have access to electronic literacy and those who do not by virtue of their exclusion or their subordination to those who do.

Consider other related developments in such fields as biology and philosophy. The interesting “code-switch” in biology toward the language of molecular biology is often understood correctly as a consequence of information theory being translated into life sciences. As Lily E. Kay's study has shown us, this mechanism of translation allows the biochemical processes of the living cell and organisms to be reconceptualized as coded messages, neural networks, information transfer, communication flow, and so forth.¹⁹ With strong echoes of military cryptography, out of which information theory itself developed, the scientific research on the letters, codons, and **(p.28)** punctuation marks of nucleic acids has evolved into definitive procedures for decoding the secret writing of DNA in the Book of Life. In philosophy, Derrida's project of grammatology was no less indebted to this broad trend to privilege writing in biological and social discourses under the pressures of information theory and cybernetics. In the same vein, Lacan—who read widely and thought creatively about cybernetics and game theory in the 1950s—developed a notion of the symbolic order on the basis of his cogent grasp of the discrete nature of the symbol-processing machine. His work on the symbolic order brings us to the second of the conceptual lacunae in relation to new media: the cybernetic reframing of the unconscious and the arrival of the Freudian robot in the digital civilization.

Whether we like it or not, the old conundrum “can machines think?” has continued to haunt our thinking about digital media. The implications of the universal discrete machine typically associated with the Turing computer and with the cybernetic studies of the human brain notwithstanding, we should reexamine this conundrum in the occulted interplay of the phenomenology of consciousness and the psychoanalytical *techne* of the unconscious. The *techne* of the unconscious here means the scientific, social, and political framings of the ineffable mental processes that Freudian psychoanalysts have termed “the unconscious.” As a concept, the *techne* of the unconscious refers to such framings as well as their disavowals in the persistent reiteration of that conundrum by the followers and detractors of intelligent machines. Martin Heidegger's observation that the essence of technology is by no means anything technological remains highly relevant to the philosophical rethinking of technology inasmuch as technology never confines its own manner of being and operation to itself. The concept of *techne*, which shares its etymology with “technology” from the Greek root *technikon*, is related to the work of *enframing* with which Heidegger developed his highly original approach. He argues: “What is decisive in *techne* does not lie at all in making and manipulating nor in the using of means, but rather in ... revealing.”²⁰ In his view, scientific knowledge cannot be a cause or origin of technology but is dependent upon the development of technological devices for testing, measuring, verifying, and so on. The essence of technology lies not in instrumental productions or manipulation of material, but in the process of a special kind of knowing through the *techne*. If the computer or a robot is made to mimic “thinking” at the unconscious level, does it mean that the *techne* of the unconscious is bringing out the essence of digital media in a guise

people generally fail **(p.29)** to recognize? For example, when the neuroscientist discourses on neural networks, is he or she merely speaking in metaphors, or are they imputing unconscious processes in the human mind that happen to resemble the cybernetic processes of circular causality in the communication machine?

This book will show how the framing or *enframing* of mental processes by the word-association games and other technical devices in earlier psychoanalytic studies may serve to reveal the essence of the Freudian robot in our own time and put the work of today's neuroscientists and AI scientists in perspective. The “odd and even” game in literature and word-association games and other guessing games in psychoanalysis can all be shown to precede and inspire the theoretical and experimental agendas of information technology and cognitive science. We have long been led to believe that scientific reasoning is all about rationality and that scientists regard human beings as rational animals, but this is a red herring. Evidence points in a number of other directions. If the engineers at Bell Labs and scientists elsewhere took an interest in schizophrenia and developed their association games to speculate about the random processes in the human mind, Lacan's reworking of the Freudian unconscious sets out to meet the formidable challenge posed by their work and by communication machines in general.

That leads to a third, methodological pondering: to what extent can we assume that the unfolding of digital media makes the conditions of its own critique legible when the self-understanding of a civilization is often limited by what it knows—or what it does not yet know—about its writing machine and the mind that has invented it? Is our critical stance not mimicked or contained by the cybernetic logic of feedback loop, double bind, and circular causality? I raise these methodological concerns to remind myself and my readers that the postmodern criticism of science and technology tends to proceed as if the conditions of self-reflexivity were automatic, available, and fully self-generating within the established discursive traditions, such as the philosophy of consciousness (for example, the debate on subjectivity and objectivity), or the centuries-old theological speculations on chance and free will, or embodiment versus disembodiment, and so on. The usual argument against technological determinism, for example, masks the aporia of the inherited theological debates on chance and free will more often than it can inform us about how contemporary civilization opens itself to critical inquiry.

So rather than complain about technological determinism, which entails almost no intellectual risks these days, we may still learn a few things by examining, for instance, how the very problematic of chance and **(p.30)** determinism has evolved in the stochastic speculations of game theory and cybernetics, which, as we will see, put rigorous mathematical reasoning to the service of a new digital civilization. Stochastic speculations and reflections on chance and determinism also strongly characterize the experimental literary works by modernist poets, writers, and Surrealist artists such as Stéphane Mallarmé, James Joyce, Marcel Duchamp, and others. James Joyce's stochastic experiment with alphabetical letters in *Finnegans Wake* (chapter 3) sheds fascinating light on the kinds of random word games that Shannon's colleagues at Bell Labs adopted and fed into the model of information theory as they tried to simulate machine-generated verse and music and speculate about machine and schizophrenia.

Fundamental Challenge to Literary Theory

There is no better place to tackle the above lacunae in new media studies than from the ground up, that is to say, where we first encounter the elementary building blocks of literacy: alphabetical writing.²¹ Until recently, literary theorists have remained relatively silent on how the incontestable presence of information theory, cybernetics, and molecular biology in the modern world bears upon the theory of writing and how the recent evolution of alphabetical

writing has impinged upon the very question of *literary form*, which has been our central preoccupation for about a century. The regularity and experimental potentials of verbal and semiotic sequences seem eminently adaptable to the idea of form in literary theory, whether it comes in the old dualist sense of form versus content or is framed in Gestalt register. The narrative trajectories charted out by Russian formalism, the New Criticism, Structuralism, psychoanalysis, Poststructuralism, and even certain schools of Marxist literary criticism seem to affirm the centrality of form in literary studies.²² At least, this is what we are led to believe in our textbook understanding of Western literary theory (and social theory).

Nevertheless, can form in one discipline migrate into another as content? What could be more formalistic than the notion of life as genetic code? Do humanists, mathematicians, and molecular biologists speak the **(p.31)** same language of form? Has the aggressive expansion of cybernetics and information technology suspended the old metaphysical dualism of form and content? Aside from the metaphysical imperative of having to take care of a content, it seems that the inherent dualism of form can no longer capture the changing identity of alphabetical writing in our time, nor is it robust enough for conceptualizing the newly organized unities of surfaces, temporalities, spaces, inscriptions, machines, and the unity of theory.

What is it that has allowed alphabetical writing to stand as the shared code of inscription across the fields and disciplines of “world literature,” literary theory, mathematics, molecular biology, information theory, international law, and other regimes of desired and desirable knowledge?²³ Is it the intrinsic value of the script? Is it by mere chance that alphabetical writing—English alphabetical writing in particular—has emerged as one of the most important sites of universalism in today's world? Whatever conclusions we wish to draw in answering these questions and reflecting on the latest developments in digital media, one thing is certain: literary theory must engage with the changing technology of writing to remain relevant to the task of interpreting text, life, social reality, and the world. This represents our own chance not only of gaining deep knowledge about how literary modernism happened the way it did in the twentieth century but also of raising some new questions about psychoanalysis, biocybernetics, and imperial networks of communication from the periods before and after World War II.

Recasting the biochemical processes of the living cell as coded messages, information transfer, and communication flow, the code switch in life sciences has done more than substitute one set of scientific idioms for another in the manner of what literary critics call “sustained metaphor.” What it implies is that alphabetical writing has shed its old image of phonetic symbolism to become the “speechless” inscription of the genetic code. This new system of inscription is not only “speechless” but has become thoroughly ideographical. To avoid misunderstanding, we should draw a preliminary distinction between ideography and pictography. Ideography here defines a mode of abstraction that addresses the conceptual, spatial, **(p.32)** and modular (or systematic) aspects of the material sign, whether written, printed, deaf-mute, indexical, numerical, optical, etc. An ideographic sign can be visual but not necessarily so—the computer's manipulation of symbols is blind and does not require visual display, for instance—and the ideographic sign exists independently of linguistic production, although it may be arbitrarily linked to sound production and even to a linguistic system, such as the case of Hindu-Arabic numerals or traffic lights, which can carry as many different kinds of pronunciations as there are languages in the world.²⁴

Pictography, on the other hand, exhibits primarily the visual, iconic, and mimetic properties of the material sign—picture, film, photography, painting, some drawings, etc.—which are less

abstract than ideography but richer in the amount of information the sign can convey.²⁵ Does a pictograph turn into an ideograph when it achieves sufficient abstraction and simplification? The answer is that mere abstraction will not suffice, because ideographs are modular and exist in a system of other equivalent signs whose combination is governed by semiotic rules. This is the sense in which the molecular biologist approaches the “speechless” writing of the genetic code, which includes letters, numbers, punctuation marks, and spaces but excludes phonetic and verbal expressions. And it even changes the game of figurative representation by destabilizing the conceptual ground of metaphoric play that literary critics associate with conventional texts. So when Jacques Derrida began his criticism of phonocentrism and metaphysics in the Western philosophical tradition, he had one of those language-based systems of writing in mind, those that marginalized numerals, spaces, calligraphy, or cryptograms. For that reason, mathematics represented a privileged enclave to him, and we are told that mathematics is one place “where the practice of scientific language challenges intrinsically and with increasing profundity the ideal of phonetic writing and all its implicit metaphysics.”²⁶ Mathematical thinking is thus shielded from **(p.33)** Derrida’s critique of metaphysics. What I hope this book makes clear is that mathematical reasoning lies at the heart of the ideographical movement of the phonetic alphabet in information theory, cybernetics, and molecular biology but that the movement itself cannot challenge metaphysical thinking so much as reinforce it with the fundamentals of binary digits, which inscribe the logos of digital media. This inscription set the course to conquer all fields of knowledge on behalf of imperial technoscience. The English language, which might have supplied the ideographic alphabet with the original hegemonic code, is subjected to the same process of ideographical inscription from the time of Basic English to Shannon’s information theory.

It should become clear that literary theory has somehow lost touch with the major technological advances that have been eroding its own home turf—alphabetical writing—over the past sixty-odd years. The latest explosion of research activities in the areas of postmodernism and new media has likewise bypassed the key theoretical questions surrounding the identity of alphabetical writing. This book is intended to identify and evaluate the fundamental challenges that the universal system of ideographic inscription in digital media presents to literary theory and social theory. If my effort is modestly successful, it will have at least made one concrete step toward reframing the theoretical work on text, media, and society and reclaiming the study of digital writing from informatics and computer programming.

The *Techne* of the Unconscious

Shannon’s mathematical foundation of information theory has raised fascinating issues about numbers and spaces as digital constructs in the English alphabet. Are numbers and spaces inherent to alphabetical writing? Is there a stochastic structure in how English letters combine to form sequences and sentences, etc.? It seems that the ruse of digital writing leaves surprising traces as to where mathematicians might go to find their intellectual resources. Mathematical reasoning, which has provided symbolic logic and code to information theory, is not in itself the *raison d’être* of the digital media. As already mentioned, Shannon and his colleagues adopted random word games at Bell Labs to calculate the frequency of each letter of the twenty-seven-letter alphabet, but such games may be traced to Carl G. Jung and other psychoanalysts who developed innovative word-association experiments and other mind-testing experiments for the purpose of gaining scientific insight about the workings of the Freudian unconscious. In **(p.34)** the beginning of the twentieth century, the psychoanalysts began to fashion the view that the mind was a psychic machine susceptible to chance, error, and repetition automatism (*Wiederholungszwang*). The theory was endorsed and in part developed by Freud himself.²⁷

Within the space of half a century, the association experiment evolved into a privileged *techne* of the unconscious spanning across the disciplines of sciences and the social sciences that came under the sway of cybernetics. This is the immediate context in which Lacan interpreted Freud's notion of *Wiederholungszwang* in his celebrated reading of Edgar Allan Poe's "The Purloined Letter."

What is the writing of digital media, and where? The answer cannot simply be "code" or "computer programming" unless we are content to be guided by the dictates of the hardware and software of digital machines themselves. There is always something else going on besides the Os and Is within the architecture of the computer, because *the central problem in the digital revolution is the recasting of the human mind as a psychic machine on the model of the computing machine*. This engineering requires a certain *techne* of the unconscious that embodies the concept of stochastic processes as well as definitive procedures for capturing those processes. Our answer to the question in the chapter title lies, therefore, somewhere in the broad cybernetic spaces opened up between the neural nets of the brain and the computing machine. McCulloch and Pitt's pioneering work in that regard—which is discussed in chapters 2 and 4—suggests that the cyberneticians have been preoccupied with what is *digital and computable* within the psychic machine. The continual development and refinement of the *techne* of the unconscious has rendered the cybernetic engineering of the mind particularly amenable to digital media. It is illuminating to see how the intuitive mind-testing games have migrated from psychoanalysis and psychophysics to the engineering programs of information technology, neurophysiology, cybernetics, artificial intelligence, and even mass media. Marshall McLuhan's comment on the television's bombardment of the viewer with light pulses of three million dots matrix per second merely scratches the surface of how the mass media exploited the continuum of consciousness and the unconscious for effective socioeconomic and ideological gain.²⁸ Hayles's perceptive remark about the interpolation of the user into the machinic system, which presumes the subject's lack of awareness and his/her automatic response, continues to raise pertinent issues about the arrival of the Freudian robot in our midst.

(p.35) Of course, the cultural industry and mass media are not the only places where the manipulation of the unconscious may actively be contemplated. The formidable challenge that confronts the cultural critic is the scenario where the battlefield of ideology has shifted predominantly from the control of political consciousness to the technological manipulation of the ineffable unconscious, the latter by no means being limited to the use and abuse of mind-altering drugs manufactured by big biochemical companies, which critics have amply documented and analyzed. In this regard, the insights of the Frankfurt School critics prove instructive in helping us rethink the conditions of critical imperative, and they are instructive precisely by virtue of their rigorous critique of technocracy and instrumental reason and their failure to engage with information theory and cybernetics in their time. This failure can be crippling because, if the unconscious rather than consciousness has turned into the primary field of ideological manipulation by the dominant class, what is the future of reason and reasoned critiques?

The mass deception criticized by Max Horkheimer and Theodor Adorno in their well-known study of the cultural industry in *Dialectic of Enlightenment* qualifies as "deception" only to the extent that the conscious mind grasps it as such through a process of moral reasoning. However, the light pulses of three million dots matrix per second that hit the viewer's retina do something powerful to the unconscious that may escape moral reasoning altogether. This is what the managers of the advertising industry have understood very well. Sensing the ideological ruse,

Habermas is forced to make a distinction between conscious deception and unconscious (self-) deception. By unconscious deception, he means the pathological manifestation of “systematic distorted communication” caused by the defense mechanisms and the repression of conflicts in the psyche.²⁹ But the distinction works only insofar as his theory of communicative rationality can effectively stabilize the objective norms of communication to measure subjective distortions against them. From a psychoanalytical viewpoint, consciousness and the unconscious as well as the spaces in between are open to manipulation through hypnosis, visual/aural saturation, mind-altering drugs, and psychological warfare, which renders the distinction between conscious deception and unconscious deception extremely tenuous.³⁰

(p.36) Sharing no such conviction in the power of reason and communicative rationality, Freud has explored how pathological disturbances always trouble the psyche and may never be cured. In his innovative work on the Freudian unconscious, Lacan argues that communication deals with something very far removed from rational verbal exchange, and this is especially true of communication conducted through modern technologies of communication. That which goes under the name of communication, he argues, is often our recognition of “the modulation of a human voice” and the appearance of understanding, which merely means “that one recognizes words one already knows.”³¹ This process of communication was studied by Lacan with specific reference to cybernetics and postwar communication technologies (chapter 4). To elucidate this relationship between communication and the unconscious, Mark Taylor draws an interesting connection to the Hegelian spirit in *The Moment of Complexity*. He writes:

Information processing does not presuppose consciousness or self-consciousness, though consciousness, self-consciousness, and reason are impossible without it. From neurophysiological activity and immune systems, to computational machines, to financial and media networks, information is processed apart from any trace of consciousness. Such information processing forms something like what Hegel describes as “objective spirit,” which emerges in and through natural and social processes.³²

The Hegelian connection pointed out by Taylor can indeed be traced back to Lacan's work on the symbolic order. And we will see in chapter 4 how Lacan conceptualized the information-processing machine in conversation with Hegel in the mid-1950s and how Lacan developed the notion of what I call the cybernetic unconscious in that context. In particular, he was intrigued by how the breakdown of communication or the moment of non-recognition entails a greater measurable degree of entropy—rather than mere distortion—with respect to the “bits” that can be transmitted as information. In fact, the relationship between psychoanalysis and information theory can further be glimpsed in chapter 5 through the lens of how each appropriated the idea of entropy from the second law of thermodynamics.

Indeed, the central conceit of information theory is that of entropy. Shannon has adopted this idea to calculate the stochastic structure of Printed English in the mathematical theory of communication. One of the **(p.37)** interesting questions that his experimental work raises for us is: how does a stochastic view of writing correlate to the received theories of language, literature, and modernism on the one hand and to psychoanalytical speculations about the unconscious on the other? This question is pertinent to our inquiry because many of the earlier modernist literary and psychoanalytical experiments on language, automatic writing, and thought-reading had anticipated Shannon's Printed English and his “mind-reading machine” in numerous ways. For instance, Shannon cites James Joyce's *Finnegans Wake* as one of the texts exemplifying the lower threshold of redundancy and higher entropy rate in his stochastic model

of Printed English. What makes entropy and its possible linkage with Freud's *Todestrieb* (death drive) such an interesting problem for the study of digital media is the ways in which certain ideas migrated into psychoanalysis first and then got into information theory. Furthermore, Freud's work and psychoanalysis in general may suggest some interesting clues as to the shared theoretical impulses or implicit exchanges among information theory, cybernetics, and modernist literature. Spanning across these moments of broad intellectual confluences is the *techne* of the unconscious that continually articulates itself to digital writing, machine, and social engineering. We turn next to the invention of Printed English by Shannon and its implications for a theory of digital writing. (p.38)

Notes:

(1.) Gilles Deleuze, *Cinema 2: The Time-Image*, 265–66.

(2.) The brain-mind duality of this formulation has shadowed the work of many contemporary neurophysiologists and cognitive scientists. Some have tried hard to leave the Cartesian theater behind and seek to ground animal consciousness in the functions and material processes of the brain's nervous systems, Daniel Dennett's *Consciousness Explained* and *Kinds of Minds: Toward an Understanding of Consciousness* being notable examples. But as Cary Wolfe has pointed out, Dennett's view of language is fundamentally dualistic as he takes language as something that can “represent rationales in a nervous system.” This representationalist view “reinstalls the disembodied Cartesian subject at the very heart of his supposedly embodied, materialist functionalism.” See Wolfe, *What Is Posthumanism?*, 36.

(3.) This consensus amongst the historians of writing does not deny the value of oral cultures but points to the emergence of social organizations of large, heterogeneous areas that depend upon mediated communication, such as writing. See Harold A. Innis, *Empire and Communications*.

(4.) The character *wen* 文 suggests “text,” “writing,” “texture,” “traces,” etc., whereas *ming* 明 borrows the combined strength of the sun and the moon to connote supreme brightness. It is interesting that Jacques Lacan, who studied Chinese, also dwelled on the character *wen* 文 as a sign of “civilization” in his 1971 seminar devoted to the discussion of “l'écrit et la parole” (Lacan, “L'Écrit et la parole,” 87). For my detailed analysis of Lacan's concept of writing in relation to the cybernetic machine, see chapter 4.

(5.) Larry and Andy Wachowski, *The Matrix: The Shooting Script*, 1.

(6.) Bernard Stiegler, *Technics and Time*, 2: Disorientation, 108.

(7.) For a powerful argument about writing as an organization of graphic space rather than visual surface, see Roy Harris, *Signs of Writing*, 45.

(8.) Text-to-speech conversion is a branch of artificial intelligence that deals with the computational problem of converting written text into linguistic representation. This is one of the areas where the relationship between writing and speech can be fruitfully investigated for both engineering and theoretical purposes. See Richard Sproat, *A Computational Theory of Writing Systems*.

(9.) Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge*, 3.

(10.) Lev Manovich, *The Language of New Media*, 19.

(11.) See Leonard Uhr and Charles Vossler, "A Pattern-Recognition Program that Generates, Evaluates, and Adjusts Its Own Operators," 253.

(12.) Manovich, *The Language of New Media*, 28–29. The quote is from Roland Barthes, *Elements of Semiology*, 64.

(13.) Manovich briefly mentions Jakobson's involvement with information theory and cybernetics in Manovich, *The Language of New Media*, 77.

(14.) Michel Foucault, "Society Must Be Defended": Lectures at the College de France 1975–1976, 29.

(15.) N. Katherine Hayles, *My Mother Was a Computer: Digital Subjects and Literary Texts*, 56.

(16.) McKenzie Wark, *Gamer Theory*, 097.

(17.) See Mark Hansen, *Embodying Technesis: Technology Beyond Writing*, 20.

(18.) For a detailed discussion, see chapter 4.

(19.) See Lily E. Kay, *Who Wrote the Book of Life?*

(20.) Martin Heidegger, *The Question Concerning Technology, and Other Essays*, 58.

(21.) Of course, competence in alphabetical writing does not equal literacy. There are numerous nonalphabetical writing systems worldwide that take full part in modern social and business life. In the context of my study, however, alphabetical writing has a special role to play because of the global hegemonic position the English language has come to occupy in science and technology.

(22.) For an earlier Marxist critique of "form" within the discipline of literary studies, see Fredric Jameson, *The Prison-House of Language: A Critical Account of Structuralism and Russian Formalism*.

(23.) It would be naive to believe that "world literature" refers to literatures of the world. It is rather an exclusionary mechanism, not unlike international law, whereby modern secular pedagogy and academic research practiced primarily in the West choose to recognize or not to recognize the *sovereignty* of any writers or literary works in the world. On the contemporary literary scene, works written and published in nonmetropolitan languages (usually outside of English, Anglophone, French, or Francophone) are sometimes granted token privilege and are made available in translation, hence part of "world literature."

(24.) The presumed equation of the Chinese writing system to ideography has long been contested and is addressed in chapter 2.

(25.) Due to the primacy of the abstract graphic line, drawings tend to exist on the borderline between pictography and ideography as they are often indexical, abstract, and self-referential. Walter Benjamin has offered intriguing reflections on the distinctions between painting and drawing. He sees paintings as vertical and longitudinal with a referential and representational dimension whereas drawings are horizontal and transversal like writing and bear primarily symbolic and semiotic meanings. Unfortunately, he did not live long enough to develop these

thoughts fully. See Benjamin, "Painting and the Graphic Arts," 219. For a systematic account of this type of drawings as "metapicture," see W. J. T. Mitchell, *Picture Theory*, 35–42.

(26.) Jacques Derrida, *Of Grammatology*, 10.

(27.) For detailed discussion, see chapter 2.

(28.) McLuhan, *Understanding Media: The Extensions of Man*, 313.

(29.) Jürgen Habermas, *The Theory of Communicative Action*, vol. 1: *Reason and the Rationalization of Society*, 332–33.

(30.) This is not to invalidate Habermas's insightful critique of psychoanalytic knowledge as a category of self-reflection in *Knowledge and Human Interests*, 214–73.

(31.) Lacan, "The Circuit," 82.

(32.) Mark C. Taylor, *The Moment of Complexity: Emerging Network Culture*, 230.

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