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THE COMPUTER AS COMPONENT:  
HEIDEGGER AND MCLUHAN

I

**H** EIDEGGER AND COMPUTERS: an odd juxtaposition? No philosopher highlights the clash between technology and human values so sharply as Heidegger. Not only did he make technology central to metaphysics, Heidegger also came to see in it the root evil of the twentieth century, including the Nazi German catastrophe, which he described as “the confrontation of European humanity with global technology.” Both in his life and writings Heidegger felt technology to be an overwhelming force that challenges the reassuring maxims of traditional morality. Yet his death in 1976 did not permit Heidegger to see the century’s most powerful technological revolution: the proliferation of the microcomputer. He saw only the first glimmerings of computerization, the mainframe dinosaurs of the computer age. But because his work spans the gap between the days before computers and the increasingly computerized present, Heidegger can become a springboard for understanding the new situation of the sciences and the humanities.

The images we have of Heidegger the thinker, both photographic and mythic, place him in another time, another generation. In posed photographs, we see him sitting in a hut on the quiet mountaintop of the Todtnauberg, surrounded by shelves of books as he bends intently over a wooden writing table. The sun pours in the window. Under his pen, the manuscripts bristle with marginalia and scrawled notations of every kind, his pages a palimpsest heaped with layers of minute revisions. Heidegger the thinker is Heidegger the scholar, and the scholar searches ancient texts for clues about the history of Being. He looks for hints

about where our essence, our heart, is today and whither the pull of the future.

This image of Heidegger feeds on nostalgia. Even the Heidegger of the photos, seated in his hut a half century ago, working with pen on paper, had a keen sense of just how faded this picture was soon to become, how quickly this image turns antiquarian. Because he connected being with time, Heidegger knew that reality changes and with it the task of thinking. He sensed the pace of change in the twentieth century, and he seemed to foresee what librarians realize today: "The image of the humanist scholar in the book-crammed study, thinking deep thoughts, will continue to be less and less viable in professional scholarship."<sup>1</sup> This recent observation by the director of a great college library confirms what Heidegger in his writings surmised: our rapid technological advance challenges the legacy of human thinking. Who better than the contemporary librarian knows the inner trend of today's scholar? Bid adieu to the "hochgewölbtes, engen gotischen Studierzimmer" of Goethe's Faust. The *Schreibstube* is giving way to the computer workstation, and scholarship requires a cybersage.

Computerized libraries already exist today without paper books, and by the year 2000, nearly every text of human knowledge will exist in electronic form. Heidegger sensed, with anguish, that his works would one day come to light in a world of scholarship that had grown alien to the meditative pathways that nurtured his thoughts. In 1967, he saw a rising crest of information which, he suspected, might soon swallow his own writings: "Maybe history and tradition will fit smoothly into the information retrieval systems which will serve as resource for the inevitable planning needs of a cybernetically organized mankind. The question is whether thinking too will end in the business of information processing."<sup>2</sup> In "The Age of the World Picture," Heidegger unearthed seeds planted by seventeenth-century Cartesian philosophy which would blossom today as science merges with computer science.<sup>3</sup> The computer began to appear indirectly in Heidegger's mid-century writings as he took up the theme of calculative versus meditative thinking, for the computer was to become the supreme calculator.

The first time I ran across the conjunction of Heidegger and computers was in 1977 when Joseph Kockelmans returned from giving seminars in Europe. While in Trier, he made the acquaintance of two graduate students, Rainer Bast and Heinrich Delfosse, who were at the time breaking new ground in Heidegger studies. Professor Kockelmans showed me some work from these two students by handing me a stack

of computer paper twenty centimeters thick. It was a series of computer print-outs listing the textual discrepancies among the various German editions of *Being and Time*. Since the 1960s, the computer analysis of texts was applied occasionally by humanists but they used it mainly to detect stylistic differences in classical works like Homer or Shakespeare. There in my hands lay the first discomfiting conjunction of Heidegger and computers. That computer print-out eventually became the *Handbuch zum Textstudium von Martin Heideggers "Sein und Zeit,"* published in Stuttgart by Frommann-Holzboog in 1979.

Until then, Heidegger and computers had been for me an odd juxtaposition, an abstraction under the heading "the question of technology." What my hands held was not an abstract treatise but a concrete, oxymoronic fact. Heidegger speculated on an all-enframing *Gestell* [technological system], ominous and threatening, but an abstraction looming like a metaphysical sphinx, terrorizing thought with a puzzling lack of specificity. Now here was computer text concretely manifesting that abstraction. The stack of print-outs highlighted both the inevitability of a technologically informed scholarship and the soundness of Heidegger's fears that his work would soon become an object of technological scrutiny. Heidegger was now on computer. The question of technology had become the question of how to go about studying Heidegger.

Just what were the specific dangers of computers? At that time, the main philosophical answer to this question was what I call the computer as opponent. In this approach the computer appears as a rival intelligence that challenges the human being to a contest.

## II

In 1972, Hubert Dreyfus had called attention to the danger of computers. Applying phenomenological analysis, he argued that we must delineate carefully what computers can and cannot do, lest we become unrealistic about computers and fall into a misunderstanding of the kind of beings we ourselves are. In *What Computers Can't Do*,<sup>4</sup> Dreyfus observed how mid-twentieth-century culture tended to interpret the human being as an information-processing system. Researchers spoke of the brain as a heuristically programmed digital computer. Because the brain is a physical thing, Dreyfus noted, and because we can metaphorically describe the brain as "processing information," we easily slip into the unexamined dogma that human thinking operates in formal patterns and that properly programmed computers might be able to

replicate these patterns. If computers could replicate thought patterns, might we not then justifiably say that computers think or have an artificial intelligence? Research funds were flowing into AI when Dreyfus raised his doubts. Dreyfus argued—and continues to argue in his 1985 *Mind over Machine*<sup>5</sup>—that we delude ourselves if we believe we can create machines to replicate human thought. Dreyfus sought to establish the limits of artificial intelligence, and he saw the computer as a metaphysical opponent.

Most philosophical reasoning about computers still moves within the narrow confines of artificial intelligence, the computer as opponent: Is it possible for computers to think? Can human mental and perceptual processes fit the formulas of digital programs? How far can computers advance in simulating or surpassing human reasoning? Such are the questions that held, and still hold, the attention of philosophers from Hubert Dreyfus to John Searle. This line of inquiry goes only a short distance in exploring the existential questions raised by the conjunction of Heidegger and computers. The computer as opponent line takes for its paradigm the chess match. More combative than the Turing test, the chess board places the human in a duel with the computer, the winner claiming superior intelligence. The game paradigm ensures that the relationship remains antagonistic. The combative paradigm still holds sway over the popular imagination, the human-versus-the-machine contest, with a winner/loser outcome. Dreyfus first connected Heidegger with computers by working within this model. Observing an unbounded enthusiasm for artificial intelligence research, Dreyfus drew on Heidegger's critique of technology to set limits on the kind of research that defines the human mind as an information processor. Dreyfus challenged the very idea that a chess-playing program "of any significance" could be built, and in 1965 he published a paper equating "Alchemy and Artificial Intelligence." This ruffled the AI researchers and they took Dreyfus up on his challenge. In 1967, MIT researchers confronted Dreyfus with a computer chess program named MacHack. To the delight of the AI community, Dreyfus lost to the computer in a public match.<sup>6</sup> Later, in *What Computers Can't Do*, Dreyfus explained his philosophical point, namely, that he was concerned not with generic predictions but with the underlying comparison that hastily identifies intelligence with formal patterns or algorithms.

Dreyfus sharpened Heidegger's critique of technology by focusing on the formal patterns that computers use. Because software programs run by explicitly stated instructions, the computer works on a level of

intelligibility that Heidegger characterizes as derived and not primordial. Formal patterns process reality but filter it through a screen of lucidity. What fails to fit the patterns gets lost in the process, even if we try to reintroduce the unknown into our interpretations. The tendency to interpret reality as essentially lucid or representable goes back to Plato, according to Heidegger's early reading of Plato (*Platons Lehre von der Wahrheit*). Dreyfus sees in the computer, in the claims of artificial-intelligence researchers, the apotheosis of metaphysics. Plato postulated the Good as subsistent in itself. The Good, the *agathon*, energizes the forms of things, making them stable and self-consistent. So too artificial-intelligence research—at least in one of its early phases—postulates formal patterns as the be-all and end-all of intelligence. (Much recent AI research is turning away from the priority of formal algorithms and looks to “fuzzy logics.”)

Dreyfus applied Heidegger's critique of technology to computers, but he conceived the computer too narrowly as an artificial-intelligence device. He saw the computer only as opponent. Yet the opposition of computer and mind/brain remains, as Heidegger would say, ontic rather than ontological. The two terms, mind/brain and computer/program, refer to beings, to definite entities within the world. We can compare and research the nature of these entities. We can investigate the causes of their operations, sizing up their powers and limitations, but still we treat them as beings, as entities delimited by their respective natures. The mind-versus-computer question is not ontological. Nor is it existential. Whether or not the computer could in principle outsmart the mind or simulate consciousness, however intriguing a question, does not touch what is happening to us through computerization. The chess paradigm distracts us from the present issue, because it makes us construe our relationship to computers as confrontational rather than collaborative.

Very different from the computer as opponent is the computer as component. The computer has become an ingredient in human knowing. Instead of confronting a potential rival, we find ourselves interfacing with computers. Computers are woven into the fabric of everyday life, and they have become an important thread in the texture of Western civilization. Our daily reliance on computers affects the way our culture proceeds, in everything from architecture to zoology. Instead of regarding computers as opponents, we collaborate with computers. Increasingly rare is a computer-free stance from which to regard the computer as a separate device. Even the research and development at

major corporations is now moving away from artificial intelligence research, where the computer functions separately, to research on the human/computer symbiosis, including information environments which augment human bodily perception and create “virtual realities.”<sup>7</sup> While we may legitimately inquire into the power wielded by computers independently of humans, the existential-ontological question really cuts in a different and deeper direction than AI. As we now live and work with computers in our writing, building, banking, drawing, and so forth, how does our reality change? As Heidegger might put it, What is the meaning of this intimate connection of Being with computers? When he pondered technology as our destiny, Heidegger seemed to have had something in mind more intimidating than an external challenge to our dignity as human beings. What Heidegger saw was something even more sinister than a revolt of the machines.

What Heidegger called “the essence of technology” infiltrates human existence more intimately than anything humans could create. The danger of technology lies in the transformation of the human being by which human actions and aspirations are fundamentally distorted. Not that machines can run amok, nor even that we might misunderstand ourselves through a faulty comparison with machines. Instead, technology enters the inmost recesses of human existence, transforming the way we know and think and will. Technology is, in essence, a mode of human existence, and we could not appreciate its mental infiltration until the computer became a major cultural phenomenon.

Already in 1957 Heidegger noticed the drive for technological mastery pushing into the human interior where thought and reality meet in language. In his essay on Hebel, he wrote:

The language machine regulates and adjusts in advance the mode of our possible usage of language through mechanical energies and functions. The language machine is—and above all, is still becoming—one way in which modern technology controls the mode and the world of language as such. Meanwhile, the impression is still maintained that man is the master of the language machine. But the truth of the matter might well be that the language machine takes language into its management, and thus masters the essence of the human being.<sup>8</sup>

What did Heidegger mean when he referred to the “language machine” (*Sprachmaschine*)? He did not say “computer”—the only computers around then were huge mainframes like the UNIVAC which filled several rooms and performed only numerical calculations. Could we,

twenty-five years later, translate what Heidegger meant by using the English term “computer” instead of “language machine”?

In the early 1980s I ran into the meaning of language machine just as I was finishing the translation of another book by Heidegger, *The Metaphysical Foundations of Logic*. The translation required a lot of detailed organization, since the main body of the text includes extensive citations in Latin, French, and Greek. As a scholarly publication, the text had not only to render but also to preserve many of the references in their original languages. The translation required laborious cross-referencing with other texts and other English translations. Index cards and cut-and-paste scraps swamped my kitchen table. Perseverance was all. The work took me more than two years. Then, just as I finished typing the third and final draft of the translation, I discovered the language machine, the connection between Heidegger and computers. Not long after mailing the final draft of the translation, I installed my own personal computer for word processing. Imagine my mixed feelings when I came to realize that the two years of labor on the translation would have amounted to no more than one year if I had used a computer to handle the text and references. The meaning of language machine began to take shape in my mind.

### III

Soon after trading in my electric typewriter for a portable computer in 1983, I came to believe that the machine in my hands was indeed the language machine of Heidegger's speculations. The “language machine” was Heidegger's groping term for the incipient phenomenon of word processing. Of course, word processing did not exist in Heidegger's lifetime, at least not as a cultural phenomenon. It existed only in the dreams of inventors like Doug Engelbart and Ted Nelson. Though he did not see the word processor, Heidegger did have a keen eye for the philosophical implications in the shift of writing technologies. He saw in writing technology a clue to the human relationship to language and to our awareness as beings embodied in the world:

Not by chance does modern man write “with” the typewriter and “dictate”—the same word as “to invent creatively” [*Dichten*—“into” the machine. This “history” of the kinds of writing is at the same time one of the major reasons for the increasing destruction of the word. The word no longer passes through the hand as it writes and acts authentically but

through the mechanized pressure of the hand. The typewriter snatches script from the essential realm of the hand—and this means the hand is removed from the essential realm of the word. The word becomes something “typed.” Nevertheless, mechanical script does have its own, limited importance where mechanized script serves as a mere transcription for preserving handwriting, or where typewritten script substitutes for “print.” When typewriters first became prevalent, a personal letter typed on a machine was regarded as a lapse of manners or as an insult. Today, handwritten letters slow down rapid reading and are therefore regarded as old-fashioned and undesirable. Mechanized writing deprives the hand of dignity in the realm of the written word and degrades the word to a mere means for the traffic of communication.<sup>9</sup>

Heidegger focuses on the increasing typification brought about by modern rationalist models of standardized intelligibility, models which underscore the advantages of repetition and instant recognition.

Heidegger’s criticisms of the typewriter are somewhat off the mark now that the personal computer has replaced the mechanical typewriter. Unlike the typewriter, the word processor guides the hand into a non-mechanical process. The fingers on the keyboard might just as well be a voice that activates the information device, for the computer removes the writing activity from script and mechanical imprints. Word processing can also have a graphic interface which brings the hand back to bodily gestures like pointing and moving things around with a graphic pointing device or mouse. The actions are done in an already typified, digitized element. Unlike the typewriter, the computer does not simply replace direct hand movements with the industrial-mechanical action of springs, pulleys, and levers. The information environment allows gestures to work in ways that leave behind the industrial machine with its cumbersome but efficient mediation of human energy and attention. The electronic element shifts the quality of action to another level. The formulation of ideas on a word processor can establish impersonality while achieving a directness and flexibility undreamt of with the typewriter.

Heidegger sensed the power of the machine as an agent for changing our relationship to the word. In fact, the word processor changes our relationship to written language at least as much as the printing press. Nor can scholarship go unchanged. Heidegger correctly feared that electronic digital text might absorb his own work. In 1967, he feared that a rising tide of information might soon swallow his own writings: “Maybe history and tradition will fit smoothly into the information

retrieval systems which will serve as resource for the inevitable planning needs of a cybernetically organized mankind. The question is whether thinking too will end in the business of information processing.”<sup>10</sup> If it has already transformed the epistemic stance of the natural sciences, the computer is transforming the humanities as well. The word processor is the calculator of the humanist. This electronic machine gives its users the power to manipulate written language in new ways. Just as the printing press altered culture and scholarship soon after its invention, so too the computer automates the composition, storage, and transmission of written words. And if the computer affects all written communication, will it not in turn affect the way we regard and use language in general—not only when we sit at the word processor, but, by after-effect, whenever we speak and listen, perhaps even whenever we think.

Computer technology is so flexible and adaptable to our thought processes that we soon consider it less an external tool and more a second skin or mental prosthesis. Once acclimated to the technology, we play it much as a musician plays an instrument—identifying with it, becoming one with it. Writing on the language machine produces a new kind of writing and thinking. At our fingertips is the calculating machine dreamt of by Pascal and Leibniz, the fathers of modern metaphysics, but now this calculator operates on our language as we spontaneously produce it.

Heidegger sensed that the language machine belongs to our destiny. What did he mean when he said the language machine would “take language into its management and master the essence of the human being”? Was he simply reacting to change? Should we place him historically among the reactionaries of his time?<sup>11</sup> I think not. Political terms of reaction or progress are too crude here. Heidegger’s statement invites us to insight, not political agendas. He was meditating on a technology still in the bud. Now that this technology is blossoming, we need to consider what he was getting at. Neither Luddite nor technophobe, Heidegger resisted every attempt to categorize his views as either optimistic or pessimistic. Whether the glass was half-empty or half-full, Heidegger was interested in the substance of its contents. He was a soft determinist, accepting destiny while studying the different ways of absorbing its impact. In this respect, he resembled the Canadian philosopher of communications, Marshall McLuhan.

#### IV

Like McLuhan, Heidegger believed he had grasped something unique and essential about the twentieth century. Both Heidegger and McLuhan felt an inner relationship to their epoch. Each believed he was interpreting a destiny the next generation would receive, and each believed that the legacy of his reflections on technology was far more important than his own personal value judgments about technology. McLuhan wrote that he held back his own value judgments from the public because they create a "smog in our culture." He wrote: "I have tried to avoid making personal value judgments about these processes [of technological transformation] since they seem far too important and too large in scope to deserve a merely private opinion."<sup>12</sup> Similarly, Heidegger held back statements of personal values from his philosophy, whether statements of self-justification or of a moral agenda. The point was to reflect on the radical shifts brought about by an unprecedented development.

Both Heidegger and McLuhan saw intimate connections between information technology and the way the mind works. If Heidegger is the father of information anxiety, McLuhan is the child of the television media of the 1960s. What synchronized their visions is the crucial role technology plays in defining reality, in operating as an invisible backdrop within which the content or entities of the world appear. Behind the visible entities of the world McLuhan glimpsed a hidden backdrop: "To say that any technology or extension of man creates a new environment is a much better way of saying the medium is the message. Moreover, this environment is always 'invisible' and its content is always the old technology. The old technology is altered considerably by the enveloping action of the new technology."<sup>13</sup> For Heidegger, likewise, the question of technology was not an ontic one, not one about the proliferation of devices nor even about the possible supremacy of the machine over human beings. His ontological question touches the world, the clearing or backdrop against which things appear. Ontology has to do with our understanding of the being of things, not with things as such. The ontological question probes the invisible background. As McLuhan saw it, "The content of the new environment is always the old one. The content is greatly transformed by the new technology. . . . Today the environment itself becomes the artifact."<sup>14</sup> Technology would not sweep the older things away but would transform them while placing them before us as though nothing had changed. Similarly, according to Heidegger, the future takes up the past while making it present, and the

environment we live in quickly becomes an artifact in the omnivorous future of the technological system.

McLuhan helps us understand what the computer does specifically as a language machine, as a component of human knowledge. Both McLuhan and Heidegger considered the most awesome power of technology to reside in its newly achieved intimacy with language. McLuhan noted with approval Heidegger's treatment of language as a transcendental aspect of Being:

The alphabet and kindred gimmicks have long served man as a subliminal source of philosophical and religious assumptions. Certainly Martin Heidegger would seem to be on better ground [than Kant was in assuming Euclidian space to be an a priori] in using the totality of language itself as philosophical datum. For there, at least in non-literate periods, will be the ratio among *all* the senses. . . . An enthusiasm for Heidegger's excellent linguistics could easily stem from naive immersion in the metaphysical organicism of our electronic milieu. . . . There is nothing good or bad about print but the unconsciousness of the effect of *any* force is a disaster, especially a force that we have made ourselves.<sup>15</sup>

McLuhan suggests that Heidegger's ideas have a greater appeal to a culture organized electronically because such a culture has already left behind the detached, linear, individualistic mentality of literate or print cultures. He agrees with Heidegger in asserting that language technology belongs to us more essentially than any tool. When a technology touches our language, it touches us where we live.

How can we philosophically reflect on the word processor? How can we get beyond the vague general talk about the dangers of the calculative mentality? McLuhan's work can help track the impact of word-processing technology more specifically and clearly. But for me it was not McLuhan but an illustrious student of his, Walter J. Ong, who provided a more precise conceptual angle from which I could better see the language machine. For specific insight into the way the word processor alters our thought processes and even our sense of reality, I found help in the writings of Ong who treats the psychodynamics, the shifts in mentality, that occur in Western history as new technologies for language storage come into prominence.

Ong traces two major shifts in knowledge storage: the oral-to-literate and the chirographic-to-print shifts. The first occurred when the culture moved from a predominantly oral-based society to a society increasingly based on the written word. The second shift moved from handwritten

(chirographic) texts to the more widely disseminated, mechanically produced printed books. With more detail and coherence than his mentor, Ong traced these shifts in writing technologies as they affected human awareness and in turn influenced interactive epistemology (knowledge as it occurs in relation to tools and to other persons). Unlike an absolute stance, this epistemological approach takes seriously the changes that mark the history of human knowledge. The studies by Ong and Eric Havelock (*Preface to Plato*) provide concrete material for distinguishing different historical epochs by their characteristic ways of symbolizing, storing, and transmitting truths. The patterns of psychic transformation they trace dovetail nicely with Heidegger's history of being.

According to Heidegger, we notice the eclipse of the truth of being occurring already in Plato's metaphysics. Once the truth of being becomes equated with the light of unchanging intelligibility, the nature of truth shifts to the ability of statements to reliably reflect or refer to entities. With the steadiness of propositional truth comes the tendency to relate to being as a type, form, or anticipated shape. With being as steady form, entities gain their reality through their being typified. Already in Plato we see the seeds of the Western drive to standardize things, to find what is dependable and typical in them. Truth as the disclosure process, as the play of revealing/concealing disappears behind the scene in which the conscious mind grasps bright objects apprehended as clear, unwavering, rational forms. As humans develop the ability to typify and apprehend formal realities, the loss of truth as emergent disclosure goes unnoticed. All is light and form. Nothing hides behind the truth of beings. But this "nothing" finally makes an appearance after the whole world has become a rigid grid of standardized forms and shapes conceived and engineered by humans. As the wasteland grows, we see the devastation of our fully explicit truths. We see there is, must be, more. The hidden extra cannot be consciously produced. Only by seeing the limits of standardization can we begin to respond to it. We have to realize that each advance in typifying and standardizing things also implies a trade-off. When we first reach forward and grasp things, we see only the benefits of our standardization, only the positive side of greater clarity and utility. It is difficult to accept the paradox that, no matter how alluring, every gain in fixed intelligibility brings with it a corresponding loss of vivacity. Because we are finite, every gain we make also implies a lost possibility. The loss is especially devastating to those living in the technological world, for here

they enjoy everything conveniently at their disposal—everything, that is, except the playful process of discovery itself.

The McLuhan-inspired theory of cultural transformation brings out the impact of the word processor even more sharply. But this theory lacks a poignant sense of loss or a feel for the trade-offs happening in finite historical transformations. Walter Ong's version of cultural transformation has about it something of a grand Christian optimism, seeing in the global network of electronic radio, television, and film a way of reintegrating a fallen, fragmented humanity, creating a closer community. For Ong, the shift from a predominantly oral culture to a literate culture shattered the original tribal unity. In bringing about greater individualism and fostering the logical faculties, literacy cut into the psychic roots of belonging and severed the attachment to immediate interpersonal presence. The print culture even further reinforced literacy, spreading it ever more widely, lifting individualism to unprecedented heights. Then, in Hegelian fashion, Ong sees the electronic media sublating the earlier oppositions, the oral and the literate, so that electronics achieves an encompassing synthesis. Electronic visuals, supported by voices, recreate human presence and reunite the individuated members of the community. Underneath, however, the electronic images still depend on the reading of scripts, prepared messages, and a print-informed society. So the electronic media preserve individual literacy while at the same time surpassing it. Because of his hopeful Hegelian dialectic, Ong omits the critical evaluation that can only take place in the existential moment. While McLuhan remained publicly silent on the adverse effects of the new media, Ong appears to have absorbed criticism in a larger picture based on the Christian narrative of Garden to Fall to Paradise Regained.

Heidegger, on the contrary, reminds us of the inevitable trade-offs in history. His philosophy does in fact proceed from the Hegelian sweep of historical epochs, but it denies the possibility of an integrative summation from one absolute standpoint. History is a series of ambiguous gains bringing hidden losses. The series of epochs that makes up the history of reality (*Seinsgeschichte*) expands or contracts with different hermeneutic projects but never permits a single cumulative narrative. Each moment of historical transformation brings a challenge of interpreting the losses and gains, the trade-offs in historical drift. The drift of history allows no safe haven from which to assess and collect strictly positive values once and for all.

In our era, Heidegger's notion of the intrinsic trade-offs of history

can spark a critical analysis of computerized writing. Existential criticism can investigate the implications of a specific technology in all its ambiguity. Because it accepts historical drift, existential criticism proceeds without possessing a total picture of the whither and wherefore, without accepting the picture promoted by either technological utopians or dystopians. There is no need to enforce a closure of pro-or-con, wholesale acceptance or rejection. While recognizing the computer as a component in our knowledge process, we can attend to what happens to us as we collaborate with technology. Because human history is a path of self-awareness, as we deepen our understanding of computer interaction, we will also increase our self-understanding.

## V

What changes can we expect? I have detailed many of the changes in my book *Electric Language*,<sup>16</sup> and students of communication are designing ethnographic studies to corroborate or modify those speculations. Here I will conclude by mentioning only two main points.

For one, computer text differs fundamentally from printed text. Computer text is not confined to material pages; it stretches without limits to all other texts, potentially linking all the data and citations it refers to. In essence, all texts make up a universal hypertext. Digital text is thus quintessentially postmodern in destabilizing and making text flexible. There are no more originals. Magnetic information makes local manifestations but makes no physical source text. The commentary and responses to texts tend to gain the same footing as the author's text, similar to the Japanese *tanka* poems which originate with a group of writers.

The procedures of composition change too. Calculative thinking gradually edges out contemplative thinking as the habits shaped by book culture give way to habits formed at the computer screen. The user calls up what is known, connects it with other pieces of information, and then rearranges the results to suit a specific purpose. The text appears kaleidoscopically. If the process of knowing with computers does not take a creative turn, the sheer amount of available information leads to cognitive chaos. With the computer's command of so much data, the user must mediate between information overload and too narrow a set of facts. Neither the book nor the traditional library provides so much information all at once and so flexibly.

The computer tempo tips contemplation toward calculation. On the

surface, our productivity speeds up, while underneath we remain bound by human limits. We need to develop significant contexts over a period of time that allows for the gestating and formulating of thoughts. For humans, significant language depends on the felt integration of our own limited experience. We are biologically finite in what we can attend to meaningfully. When we pay attention to the significance of something, we cannot proceed at the computer's breakneck pace. We have to ponder, reflect, contemplate.

Computer texts spread infomania and produce information maniacs. This is neither all good nor all bad. It is our destiny. Each epoch has its love affair, its grand passion, an enthusiasm that gives it distinction. Pyramids or cathedrals do not distinguish us and shopping malls will never last. Ours is not the age of faith or reason but the age of information. Mania, Plato points out, is ambivalent; it can be divine or insane, inspired or crackpot. Lovers, inventors, and artists are maniacs. So are computer enthusiasts.

But infomania can erode our capacity for significance. With a mindset fixed on information, the attention span shortens. We collect fragments. We become mentally poorer in overall meaning. We get into the habit of clinging to knowledge bits and lose a feel for the wisdom behind knowledge. There is a law of diminishing returns: the more information accessed, the less significance is possible.

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1. The statement was made by Ralph Holibaugh, director of the Olin and Chalmers libraries at Kenyon College. It appeared in *The Kenyon College Annual Report 1988–90*, p. 5.
2. From the preface to *Wegmarken* (Frankfurt: Klostermann, 1967), my translation.
3. Don Ihde, for one, sees science merging with its instruments in *Technology and the Lifeworld: From Garden to Earth* (Bloomington: Indiana University Press, 1990).
4. Hubert Dreyfus, *What Computers Can't Do: The Limits of Artificial Intelligence* (New York: Harper Colophon, 1972; revised edition, 1979).
5. Hubert Dreyfus, *Mind over Machine: The Power of Human Intuition and Expertise in the Era of the Computer* (New York: Free Press, 1985).

6. The history of this chess match appears in Howard Rheingold's *Tools for Thought: The People and Ideas behind the Next Computer Revolution* (New York: Simon & Schuster, 1985), pp. 161–62. Dreyfus explains what he takes to be the point of the match in *Mind over Machine*, p. 112.
7. See *Cyberspace: First Steps*, ed. Michael Benedikt (Cambridge: MIT Press, 1991). The term “cyberspace” originated with William Gibson who used science fiction to explore the symbiotic connection of humans and computers. On virtual reality, see my “The Metaphysics of Virtual Reality,” in *Multimedia Review*, no. 3 (“New Paradigms”), 1990, published by Meckler Publishing.
8. In *Hebel—der Hausfreund* (Pfullingen: Günther Neske, 1957); translated as “Hebel—Friend of the House,” in *Contemporary German Philosophy*, vol. 3, trans. Bruce Foltz and Michael Heim (University Park: Pennsylvania State University Press, 1983), pp. 89–101.
9. In *Parmenides* (Frankfurt: Vittorio Klostermann, 1982), originally lectures given in the winter of 1942–43, vol. 54 of the *Gesamtausgabe*, my translation; the interpolations in brackets are mine. In this passage, Heidegger is commenting on the ancient Greek notion of “action” (*Pragma*), pp. 118–19.
10. From the preface to *Wegmarken* (Frankfurt: Klostermann, 1967), my translation.
11. A recent study that locates Heidegger's theory of technology within the cultural reaction of the Weimar Republic is Michael Zimmerman's *Heidegger's Confrontation with Modernity: Technology, Politics, Art* (Bloomington: Indiana University Press, 1990).
12. In a letter to Jonathan Miller (April 1970), in *The Letters of Marshall McLuhan*, selected and edited by Matie Molinaro, Corinne McLuhan, and William Toye (New York: Oxford University Press, 1987), McLuhan wrote: “I take it that you understand that I have never expressed any preferences or values since *The Mechanical Bride*. Value judgments create smog in our culture and distract attention from processes. My personal bias is entirely pro-print and all of its effects.” In other places McLuhan will not be so open about his stance. In writing to Eric Havelock (May 1970), for instance, he says: “My own studies of the effects of technology on human psyche and society have inclined people to regard me as the enemy of the things I describe. I feel a bit like the man who turns in a fire alarm only to be charged with arson. I have tried to avoid making personal value judgments about these processes since they seem far too important and too large in scope to deserve a merely private opinion” (pp. 405, 406).
13. Letter to John Culkin (September 1964), *ibid.*, p. 309.
14. Letter to Buckminster Fuller (September 1964), *ibid.*, p. 398.
15. From *The Gutenberg Galaxy: The Making of Typographic Man* (Toronto: University of Toronto Press, 1962), p. 66, in a section entitled “Heidegger surf-boards along on the electronic wave as triumphantly as Descartes rode the mechanical wave.”
16. *Electric Language: A Philosophical Study of Word Processing* (New Haven: Yale University Press, 1987; paper 1989). The proposal for ethnographic studies comes from Leona Flim in a forthcoming paper, “Bookish versus Electronic Text: Ivan Illich and Michael Heim,” in *The Canadian Journal of Communication*.