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What's Next for Text?

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ABSTRACT *This article describes and illustrates the fundamental changes which alphabetic text undergoes when it moves from the printed page to the digital screen.*

In 1932, the famous English typographer, Beatrice Warde, designed a type-display poster 'to show off Perpetua Titling to good advantage.' A reproduction of it by the Monotype Corporation hangs in my office.

THIS IS
A PRINTING OFFICE

CROSSROADS OF CIVILIZATION
REFUGE OF ALL THE ARTS
AGAINST THE RAVAGES OF TIME

ARMOURY OF FEARLESS TRUTH
AGAINST WHISPERING RUMOUR

INCESSANT TRUMPET OF TRADE

FROM THIS PLACE WORDS MAY FLY ABROAD
NOT TO PERISH ON WAVES OF SOUND
NOT TO VARY WITH THE WRITER'S HAND
BUT FIXED IN TIME HAVING BEEN VERIFIED IN PROOF

FRIEND, YOU STAND ON SACRED GROUND
THIS IS A PRINTING OFFICE

In the present cornucopia of print, this splendid declaration still rings true. It cheers me every time I walk by it. But my copy of the poster includes a very small footnote: 'In keeping with the look and feel of the original, this version integrates electronic publishing technologies with letterpress printing methods. The type was set on a Windows™ system. Film output

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http://www.tandf.co.uk/journals/routledge/1463631X.html or http://www.open.ac.uk/eci
DOI: 10.1080/1463631012004803 8

was produced on a PostScript™ imagesetter.' Beatrice Warde's printing house now stands on a digital foundation. The generative substructure is electronic; only the final display mechanism remains the printed page.

We might begin here in thinking about the future of text in the attention economy in which we find ourselves. Casting the present as a titanic struggle between the Forces of Print and the Digital Raiders no longer makes sense. All text is digital in origin. Fixed print has become printout, one substrate of expression for a pre-existing digital code. And it is no longer the only game in town. Other, digital, displays—regular cathode ray tube computer screens, liquid crystal display flat screens, book-sized electronic display devices, digital screen projectors, heads-up displays, goggles, helmets, immersive virtual reality environments—now compete with the printed page for final display. These digital displays can recreate the full electronic expressive space, a three-dimensional, dynamic world, as the flat, fixed world of print cannot. *Fixity* stands at the center of Beatrice Warde's brave declaration: 'not to perish on waves of sound, not to vary with the writer's hand, but fixed in time.' That fixity comes unglued in the diversity of display devices in which text can now become manifest. Text will find its future as the various ways we can now display it compete for the privilege.

Print publishing is a $750 billion business worldwide, not, as its literary proponents seem to fear, a consumptive heroine expiring on a couch in the fifth act. It has its yearly ups and downs but the long-term trends justify our daily feeling that we are threatened by too many books to read, not too few. Libraries worry about how to buy them all and where to put them. In the USA, at least, gigantic superstores are revolutionizing the retail book trade and their on-line avatars like Amazon.com are revolutionizing this revolution almost before it has had a chance to happen. (And the on-line auction, a genuine advance in the market's price-clearing mechanism, may revolutionize Amazon before it has turned a profit.) We are living in the great age of print, if only we could take a long view of it. Let me cite just one example. In the USA in 1947, there were 85,000 titles in print. Now there are 1.3 million. And these are by no means all mass-hyped bestsellers. 'In 1990 alone, over two billion copies were sold in the United States. The number of copies sold of the fifteen best-selling books throughout the entire 1980's accounts for less than one percent of this figure' [1]. So books are not going to die, and neither is the literature contained in them. That is not the question the future market place will debate.

And it will, we might pause to reflect, be a *market*. For half a millennium, print has held a monopoly of textual inscription. So much has this been true that just the possibility of competitors has seemed to many the end of the world. And the competing substrates for textual display find themselves surrounded by a larger sphere in which text must compete against image and sound in all kinds of mixtures, many of them much

newer, more complex, and more adroit than our familiar villain, broadcast television. I am not thinking of films here, or theme parks either, though they may stand for a yet larger circumambience of competitive attention-structures. I am thinking of new ways to express what text has traditionally expressed.

Our first reflection on what's next for text must, then, be an *economic* one. Economics is the discipline which studies how society allocates its scarce commodities. We hear on every side that we are living in an information economy, one in which knowledge constitutes the central value rather than physical stuff you can drop on your foot [2]. But information is not scarce. We are drowning in it. The scarce commodity is the human attention required to make sense of the data tsunami. The competition for it, we already see and feel, is fierce. Many of us wordy types fear this kind of competition because it is new but many of us may also fear it because it is *competitive*, for the same reason that we fear the unregulated market place in the world of stuff. Much of the 'book vs. computer' debate has been, *sub rosa*, about markets vs. central planning and not about technology *per se*.

The economics of attention has, of course, its supply side, too. In the world of fixed print, writers had to decide which genres and which styles answered their expressive desires. The typographical conventions and metaphorical densities which separated prose from poetry were also decisions about how to compete for readerly attention. So were the basic decisions about verbal style—high/middle/low, running/periodic, etc. So were the rhetorical figures of sound and arrangement which the Greeks invented to smuggle oral power into written utterance. Now those expressive decisions cover a much wider expanse. Superimposed on the traditional choice of styles, prose or verse, a new layer of stylistic choice faces anyone who would communicate in text. What display device do I choose? And what stylistic rules come with it? And above this, another layer yet. Since digital information exists in a code which can be displayed in words, sounds, or images, these three modes constitute yet another kind of stylistic decision. *Text itself* is a self-conscious expressive choice as it has never been before.

Writers who decide not to compete in this new market place but to dedicate their text to fixed print only have become the clerks of a historical mode. No bad decision to make—it still includes the vast majority of writers (including me, right here)—but unmistakably antiquarian and, as the modes of textual display improve and proliferate, increasingly so. Writers living fully in their own time cannot afford this narrowing choice. As one student at Middlesex University in the UK commented after a lecture I gave there, 'As an apprentice information designer, I regularly have to decide whether to communicate information in words, images, or sounds. How do I decide this? And what guidance am I getting from my teachers, or people like you, about how to do so?' [3] The question was put

politely but with pertinacity, and I have been haunted by it ever since. It supplies the foundational question for the future of text.

The 'Middlesex Question,' if I may so style it, must be asked again at the second new level of stylistic decision for text: what display mode will I use? Many of them—goggles, helmets, virtual environments—have not yet been tried as means of textual display. Most writers hardly know what they are, much less ponder the rules of expression, the stylistic decisions, which they might impose. One of the most intriguing, the 'heads-up display,' has been explored only in the narrow military world of the fighter cockpit [4]. The only one known to, or explored by, a significant body of writers is the Internet, and here bandwidth constraints have prohibited asking the Middlesex Question with anything like its full force. The World Wide Web provides, as yet, only a constricted version of the expressive space which bloomed briefly on the CD-ROM substrate (more about this quick life and death later).

Here I must pause to recognize a hippopotamic difficulty and a strange anomaly. The hippopotamus first. I am going to discuss some of the new competitive modes of textual expression within the constraints of the old monopolistic one, print. Go to a car show in a horse and buggy. Can't be helped, at least not here, but nevertheless, a very limb lopped off. The anomaly develops, at least partly, from the hippopotamus. In all the hyperventilated discussion about the death of the book, of literature, of text itself at the hand of image, I have found very little discussion of what in fact the new kinds of text are like and where they are going [5]. In what follows, I want to look at some examples of text in its new digital environment. I can't really show them to you, only flat snapshots of a process that occurs in dynamic three-dimensional space. And, of course, I can't begin to replicate immersive environments. But if we are going to keep on discussing, in print, what's next for text in the digital space, we should at least try to look at what is happening, however imperfect the means [6] we use to do so.

Let us start easy and close to home. Imagine an ordinary page of text from a scholarly monograph, Marvin Minsky's *The Society of Mind*. It has been published as a printed book but here (Fig. 1) appears on a computer screen. [7].

In the extra-wide left margin, we notice a cube. A click on one side produces a drop-down menu from which we select a topic. Professor Minsky then walks onto the margin from the lower left corner and begins to talk to us and wave his hands around. No cutting-edge technology needed here: you film the speaker against a blue screen and the mouse-click calls up the clip. No change to the text, either. It remains exactly the same as in the book. But notice what happens.

The author divides himself into author and critic, into writer and lecturer. The lecturer is not reading the work of the writer but commenting, as an external critic, on the general topic which begins at this point in

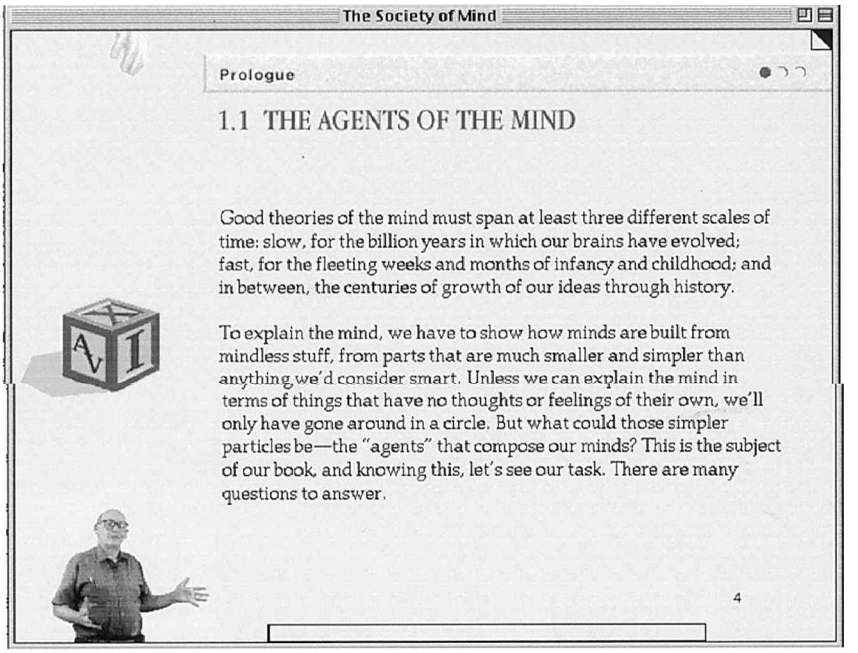

FIG. 1. *First Person: Marvin Minsky: The Society of Mind.* CD-ROM (New York, Voyager, 1996).

the text. As reader/listeners, we deploy two different patterns of expectation, one appropriate to the writer of a fixed text, the other to a professor lecturing. Our attention is divided and bifurcated in kind. We are used to attending to both modes of presentation—they form the foundation of academic discourse—but not to both at once.

We notice, too, that Professor Minsky is wearing a sport shirt. He talks with a certain accent. His whole manner, informal and arm-waving, contrasts with the formal fixity of the text. Front stage in the text confronts back stage in the margin. The back-stage informality expands when you click another face of the marginal magic cube and enter Professor Minsky's living room. Electronic hot spots here and there have transformed it into a memory theater; click on one and our host Professor Minsky tells you about what has attracted your attention. Later on in the text, a cube-click brings the author back for a short talk, but he begins by mixing up single and plural verbs, then confesses he can't remember which is right, and walks off stage amidst laughter. The out-take is left in, as part of a back-stage presence. Our attention oscillates between back-stage and front-stage decorum as we make our way through the text.

We may respond to the marginal animation in ways text would never elicit. I showed this CD-ROM to a friend who lives up the road, a film director, and asked him what he thought. 'The shirt is terrible.' Well, what's wrong with the shirt? 'Wrong color; look how it bleeds into the background. And the lighting stinks, too.' Our responses to the speaking

lecturer—not only the shirt and lighting (neither of which, I should confess, I had noticed before), but the voice, dress, and general address—feed back onto the whole text, not just that page. The text, without changing, has undergone a subtle metamorphosis. We know this familiar metamorphosis of old and court it every time we go to hear a famous author lecture. Sure, she will probably repeat the arguments of her book, but just seeing and hearing her gives us a sense of how to read the book, tells us what kind of person wrote it [8].

Gesture, and the presentation of self of which it forms a central part, constitute an enormous band of our expressive spectrum. Print banishes it [9]. The electronic form of 'printout' here, and in much electronic text, invites it back in. Professor Minsky is a mathematician and computer scientist. It is only recently that scientific prose has allowed the author to be anything but 'the author' in a passive construction. So, a big change occurs when he walks into the margin and starts to wave his arms around and argue with us. A step not into the future, though, but backwards, into an oral past.

Text, Father Walter Ong has reminded us, is 'contumacious' [10]. It won't change its point of view. You can argue with a printed text but you can't make it change its mind. Literacy can record oral argument but it cannot engage in it. Here is Father Ong again, in his famous study of Peter Ramus:

> *In the economy [of print] where everything having to do with speech tends to be in one way or another metamorphosed in terms of structure and vision, the rhetorical approach to life—the way of Isocrates and Cicero and Quintilian and Erasmus, and of the Old and New Testaments—is sealed off into a cul-de-sac. The attitude toward speech has changed. Speech is no longer a medium in which the human mind and sensibility lives. It is resented, rather, as an accretion of thought, hereupon imagined as ranging noiseless concepts or 'ideas' in a silent field of mental space. Here the perfect rhetoric would be to have no rhetoric at all. Thought becomes a private, or even an antisocial enterprise.* [11]

But, in an electronic textual 'printout,' the oral world stands there in the margin talking to the literate world. Two different worlds slide uneasily against each other like two tectonic plates. The ideal rhetoric of print, 'no rhetoric at all,' as Father Ong says, contends with the inescapable rhetoric, the 'thick description' of human behavior [12]. This uneasy juxtaposition of oral and literate rhetorics occurs repeatedly in the alternative means of textual display that digital notation permits. *How* this juxtaposition occurs is quite new. But the juxtaposition itself, the infinitely various wrestling match between oral and literate coordinates and the different conceptions of self and society they bring with them, is as old as Western literature. Indeed, I argued some years ago that this relationship *constituted* Western

literature [13]. When tectonic plates grind together, they produce earthquakes in expression as surely as in the earth itself. Thus, an unassuming multimedia text like this, which leaves its fixed text fixed and adds only the most familiar kind of academic 'animation,' nevertheless positions itself on a crucial fault. The interface between oral and literate, over and over, has generated the power in Western expression. *How* it works here is new, but the generator, and its power, have existed from the beginnings of Western literacy.

Text, I said earlier, seeks to monopolize our attention. The attention structure here breaks that monopoly, elicits a series of bifurcated responses. Response to text and its argument vs. response to voice, gesture, clothes, lighting. Response to a fixed two-dimensional space from which the distractions of ordinary three-dimensional behavioral space have been carefully sieved out vs. response to exactly that world of ordinary three-dimensional behavioral space that floods the margin when Professor Minsky is allowed out of his box. Two different kinds of space, two-dimensional symbolic vs. three-dimensional behavioral. As we shall see, these two spaces contend often in the attention structures through which digital text is finding its way.

I have cast these contrasts as 'X vs. Y.' Is that right? Do the kinds of attention asked for by this textual presentation *compete* or do they *orchestrate*? I pose the question only in a general way here, but it is *the general question* which must be asked in the market place economy of electronic textual display. Put into such an attention economy, text destabilizes and begets in us a fundamental unease, an unease print has from the beginning sought to banish.

'Well, well,' you might be saying at this point, 'but doesn't this same kind of thing occur in an illuminated manuscript?' Certainly it does. The filtered and stabilized text, though present from the Greek beginnings, has not always had its own way. Look, for example, at a historiated initial (the 'I' in '*In illo tempore*') in a thirteenth-century Evangeliary from the Sainte Chapelle in Paris [14] [Fig. 2].

I have no doubt that the illuminator would have had Christ walking around in the margin arguing with Levi the tax collector (as he does in Luke 5) if he could have contrived it. Again and again, medieval manuscript illuminations look like stills from an animation in progress. I use this small example to introduce a large argument. The expanded palette of textual display offered by digital expression again and again pulls us back into the history of Western notation. The whole weight of these alternative display modes recaptures this history instead of, as the media prophets of doom argue, repudiating it. We have always craved rich, mixed, competitive, antiphonal signals.

We have been considering two instances of flat text which remains fixed but finds itself juxtaposed with three-dimensional behavioral space. Now let us look at an instance of fixed text which is plunged *into*

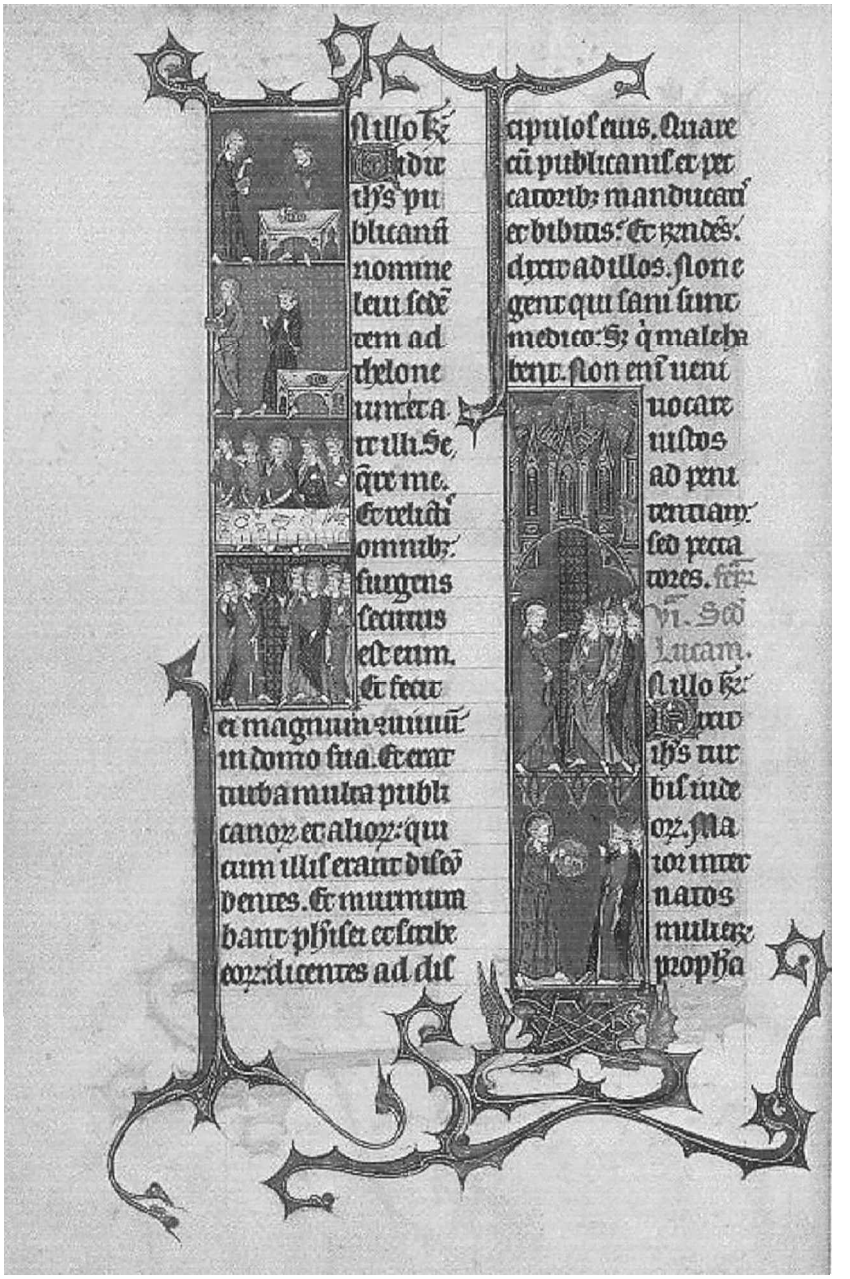

FIG. 2. Evangeliary of the Sainte Chapelle, Paris. 1255–60. J. J. G. Alexander, *The Decorated Letter*, Pl. 32, New York, 1978, p. 103.

three-dimensional space. Here the handicap of print really begins to chafe. Imagine a complex text, let us say a corporation's annual report, but laid out in three dimensions rather than two. Information is literally layered into an infinitely deep expressive space. Figure 3 provides a snapshot of such a notational system, called '*Pad*' [15].

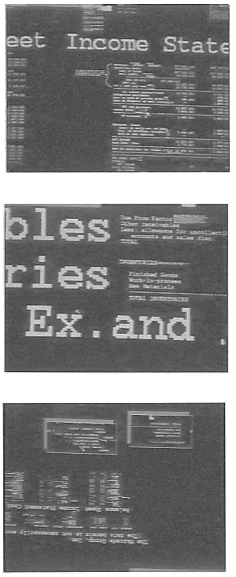

FIG. 3 a, b, c. Pad*: an alternative approach to the computer interface*, prod. Ken Perlin & David Fox (New York: Siggraph Video Review 96) #3. See http://www.catchword.com/mmedia/routledg/1463631X/v1n1/figure/fig3.mov or http://www.open.ac.uk/eci for the animated file.

The reader flies into and around such a space, pursuing clusters of related information using the three-dimensional navigational instincts we were all born with.

Audiences to whom I have shown this system have always felt it to be outré and its potential uses unfathomable. Yet, several ligatures connect it to the expressive world we know. The uninterrupted linear text you are reading right now evolved to maximize a scarce resource—the expressive substrate. Papyrus, parchment, paper, all cost a lot. Writing on them was laborious and time-consuming. As white space became cheaper, designers arranged type on the page's two dimensions so that our visual cortex could correlate abstract subdivisions of matter with physical subdivisions of space. What more logical extension of conventional layout than to step into three dimensions when, as now, we can do it? Here, as so often when we ponder electronic text, it seems to reach out and reclaim the metaphors we customarily use for fixed text, as if we were fulfilling long-suppressed urges. We speak, when dealing with a complex text, of 'getting our bearings,' of 'taking a position on an issue,' of 'drawing back from an implication,' of 'getting to the bottom of the matter.' When reading text in three dimensions, the reader's 'position' or 'viewpoint' becomes literalized. The primary stylistic, and social, skill, *situational awareness*, takes on a three-dimensional positional equivalent.

We move in simulacra of such a sign field every day, of course. Ever since the poster first came to the fore of Paris's cityscape in the nineteenth century, we have navigated a three-dimensional city of layered words. If Las Vegas were more like ancient Athens and less like ancient Corinth [16], perhaps the phenomenon would now be more thoroughly studied. The pop artists in the sixties pointed out this new landscape of words and signs, and stressed its three-dimensionality. James Rosenquist, for example, painted huge, billboard-sized canvases before which we stood, art gallery-wise, close-up, as if we had flown through the air from the street to the billboard soaring overhead. He imagined a beholder who flew through a three-dimensional expressive field just like the one *Pad* creates. When Claes Oldenburg created huge numbers overstuffed like chairs, he put us in the same position, suddenly, through magical scale-change, able to shrink and walk among them as equals.

Fixed print designers have recently been trying to map this three-dimensional world back onto the two-dimensional page. David Carson pioneered this effort in his designs for California beach culture and skate-boarding magazines (Fig. 4) [17].

It moved uptown when an alembicated version was adopted by *Wired* magazine as its presentational signature (Fig 5) [18].

Wired wanted to create a fixed-print journal that insisted, through its typographical design, that its heart lay elsewhere, wandering in unfathomed three-dimensional textual space. It seldom tried to integrate this allegorical type design with the arguments in its text. The two-dimensional world of

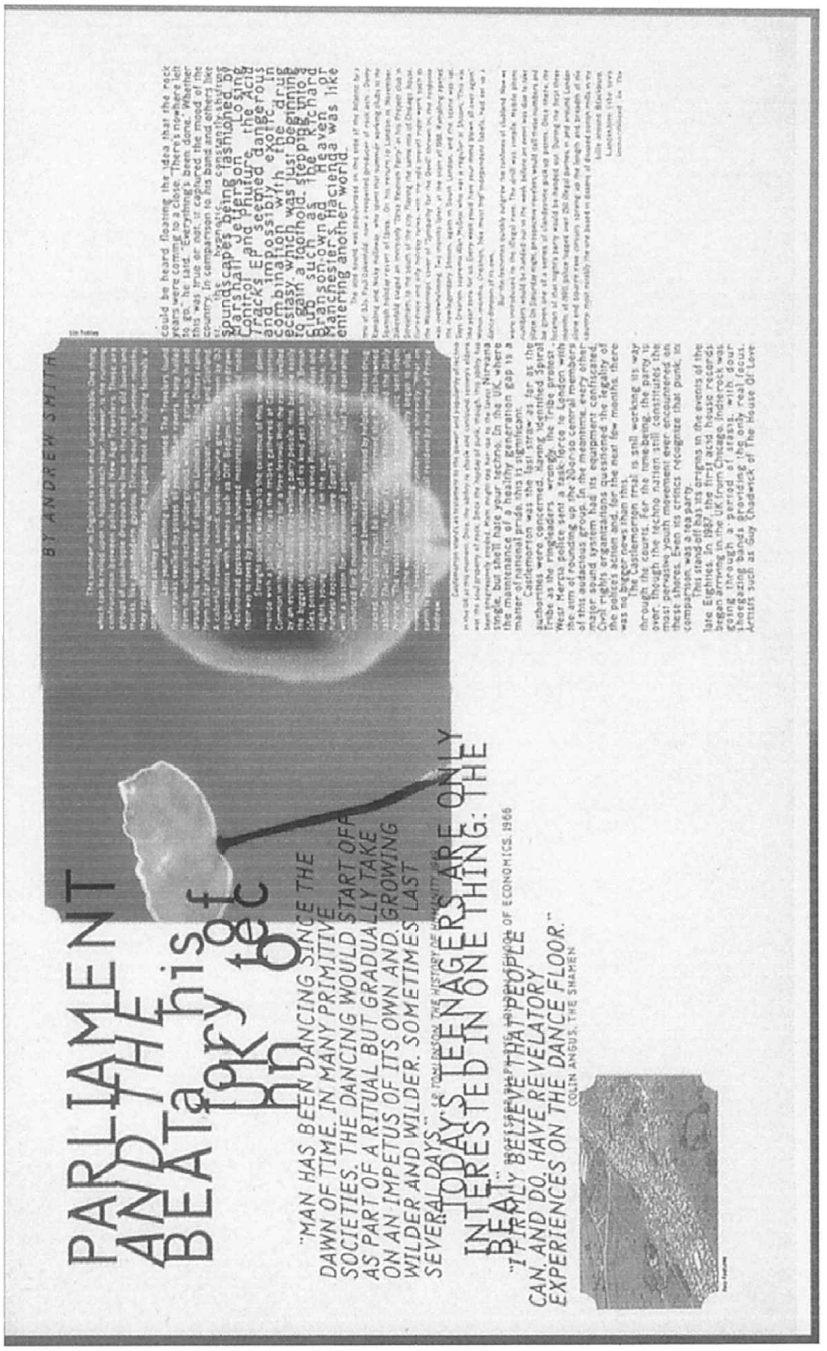

FIG. 4. Lewis Blackwell & David Carson (1995) *The End of Print: the graphic design of David Carson* (San Francisco, CA, Chronicle Books, not paginated).

In the basement-like LunaPark nightclub in the heart of West Hollywood, HBO's Dana Gould, *Saturday Night Live*'s Julia Sweeney, *Reality Bites*' Janeane Garofalo, and *All American Girl*'s Margaret Cho are holding court with the Un-Cabaret, a live comedy show featuring material too quirky for the mainstream. Un-Cabaret is a place where comics can work out edgy routines: stories about nervous breakdowns, weird sexual habits, and those bizarre Mentos commercials.

Un-Cabaret's live audience is small – the usual 100 or so that can fill a basement club. But on the World Wide Web, websters are tuning into the online version at a rate of 7,000 logins a day. Accessed through the Web's "Underground Net" page (*http://underground.net/*), the program features weekly updated video excerpts from performances at the comedy venue.

Un-Cabaret went online July 4, after Charles Como, 29, a former stockbroker and closet computer maven, approached Un-Cabaret showcase's producers Greg Miller and Beth Lapides about programming for his fledgling Web page.

"It was a new idea to put a weekly show on the Internet," says Como. "The response has been tremendous. I've actually overheard people in restaurants talking about it."

Initially conceiving the site as an outlet for alternative expression, Como,

Comedy

who has been supporting the venture out-of-pocket, is now looking for corporate sponsors to facilitate expansion.

Un-Cabaret's comics were quickly sold on the idea. "Charlie brought his PowerBook to the club and punched up my set from the week before," says Gould. "It was the most Star Trekkie thing I ever saw in my life. It's a great match. The Internet can only be accessed by smart people – and Un-Cabaret is performed by smart people. That's our motto: 'Smart comedy for smart people.'" – *Susan Karlin*

DANGER HIGH VOLTAGE

purchases are driven largely by entertainment and education rather than work-at-home applications. Fun fact for the month: *Mortal Kombat II*, the even bloodier sequel to the controversial rip-off-the-skull-and-see-the-spine-dangle videogame, sold US$50 million in its first week this past fall. That beats every hit movie's comparable receipts, from *Forrest Gump* to *The Lion King*. One more fun fact: The number of international phone calls made worldwide rose from 23 billion minutes' worth in 1988 to 43 billion minutes' worth in 1993, according to *BusinessWeek*. That's nearly 82,000 years' worth of one country talking to another. A good sign? Who Are We?: A recent Internet-based survey turned up some not-so-surprising numbers on who is using the info highway. According to a summary of the survey, respondents "were predominately male (nearly 80 percent), white (again nearly 80 percent), and young (median age of 31 years). About 40 percent classified themselves as single and never-been-married. The median household income of the 310 US citizens who responded was between US$40,000 and $59,000 annually. More than 22 percent of these

JARGON WATCH

Barney Page
Web page designed to capitalize on a current trend (such as Barney-bashing). "Have you seen the new O.J. Simpson Barney page?"

Render Wander
Walking around the building chatting to people while the progress bar of AfterEffects/Premiere/Infini-D makes its ponderous journey across the screen.

Pointcasting
Even more precise than narrowcasting. What you get when you can talk one-on-one with your clients.

Fast Tracking
In architecture, when a building's design and construction documents are finished just days ahead of the actual construction.

Flight Risk
Used to describe employees who are suspected of planning to leave a company or department soon.

IC/OOC
(abbreviations for "In Character/Out of Character") Used in MUDding or other online role playing when someone is moving in or out of character. "OOC: I have to leave soon."

See Through
An office building, built during the economic optimism of the late '80s, that remains unrented.

Nesting
What Jay Chiat accuses his employees of doing if they sit at the same table more than two days in a row.

Dual-Channeller
A person who gets all their information by channel-flipping between MTV and CNN.

A tip of the propeller beanie to: malik, Mitchell Rasor, destry, Kevin Marks, Tony Mosa, Hugh Brackett, Ray Smith. – Gareth Bronwyn

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FIG. 5. *Wired* (1994) December, p. 49.

abstract expression and the three-dimensional world of ordinary behavior, which we saw as antiphonal chorus in the Minsky text, here, more often than not, just floated one on top of the other. They did not complement each other, neither did they quarrel. It made, more often than not, for annoying reading. One wanted to say, 'OK, OK, you're *hip*, for God's sake. Now just give it a rest, can't you?' They seem to have thought so too, for in the last few issues, they have.

But fruitful complement *or* quarrel—that is, fruitful *dramatization*—can occur in three-dimensional typographical space. *Pad* puts an annual report in such a space and begins to show how it might work. But any layered text *wants* such an arrangement. We *want* to be able to read in layers, for main arguments, secondary ones, detailed evidence, in ways not linear but, as now we must call them, hypertextual. Legal prose, for

example, would gain readability by several orders of magnitude if put into such an environment. So would any other complex and layered argument.

To throw out a couple of ligatures to the past, think first of the memory theaters of classical rhetoric. What did they do but map complex abstract arguments onto familiar landscapes from the ordinary three-dimensional world we walk around in? Or think of the basic patterns of Greek (and subsequent) prose styles, the running style and the periodic. The running style (*lexis eiromene*) sought to model the passage of events in the oral world by spatial continuity. The periodic style (*lexis katestrammene*) sought to construct figures in two-dimensional space that would spatially imitate the relationships of abstract thought. The rhetorical 'figures of arrangement,' as we usually call them, are full of spatial residue. Indeed, it is an interesting exercise to interrogate the history of Western prose style for such three-dimensional spatial hungers. You find them in unexpected places, and they remind us that three-dimensional letter space is not only where we are going but where, on more than one occasion, we have been. Following Marshall McLuhan and Walter Ong, we have long been accustomed to think of print as a 'visual' medium, as against the auditory oral world. But vision for two-eyed *Homo sapiens* is a stereo, a three-dimensional spatial event, and three-dimensional space was outlawed by the flat, consecutive text created by the Greek alphabet. It tries its best to *avoid* spatial self-consciousness, to be cerebral without passing its signal through the visual cortex at all. It would be fun to rewrite the history of Western prose style as a long effort to compensate for this avoidance.

I suppose this is as good a place as any to say a word about Virtual Reality, not so hot a button as it was several years ago but still the logical terminus of reflections such as we have been making. It can't be duplicated here, or on a computer screen, or anywhere else without special expensive equipment. But a biologist who wanders around inside the model of a complex molecule, trying first one kind of fit and then another, comes as close to uniting spatial intuition and conceptual thought—Minsky in the margin and Minsky in the text—as we are likely to come. Does such a space offer an expressive niche to text?

Well, we might remark that contemporary computer graphics conducts its daily business in such a world. We have for the last twenty years found ourselves flying in and around corporate logos, product names, and advertising slogans. Fig, 6 tries to reproduce such an experience in a illustrative series of stills [19].

What effect does such wandering have on us? I don't know if it moves more product or whether it has been done just because it can be done, but it does ring one bell in the history of Western notation, and a big one. Such voyaging in a virtual typographical cityscape makes us maximally aware of letters as letters by making them into three-dimensional physical objects, things we can bump into and stumble over. The perception psychologists tell us that only two-dimensional information is presented to the retina of

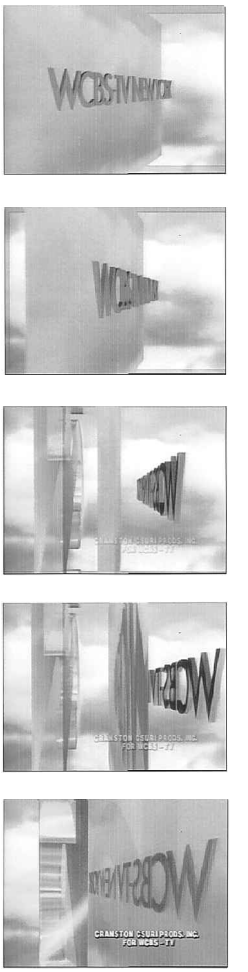

FIG. 6 a, b, c, d, e. G. de Valois & D. Cohen (Prods) (1987) *Dream Machine: the visual computer. An Anthology of Computer Graphics,* vol. 1. Videodisk, track 23 (Santa Monica, CA). See http://www.catchword.com/mmedia/routledg/1463631X/v1n1/figure/fig6.mov or http://www.open.ac.uk/eci for the animated file.

the human eye, and that the three-dimensional world is constituted in the brain [20]. When computer graphic techniques constitute a virtual three-dimensional world of two-dimensional print, when they oscillate between two-dimensional and three-dimensional images of a letter, they are—I doubt they intend this or perhaps even know it—re-enacting the act of seeing. They are making us *see how we see*, and *doing this around a core of letters*. Computer graphics has been intensely self-conscious about the act of seeing from its beginnings, necessarily so if it is to recreate the visual world as it has done [21].

To use *letters* as the 'objective correlative' (as we used to say long ago in literary criticism), as the object lesson, hits conventional alphabetical expression in a vital spot. The history of Western alphabetical notation has constituted one long flight from such self-consciousness. The Hellenist Eric Havelock argued that the Greek alphabet underwrote Western literacy because it was simple enough to learn in early youth, and thus to internalize totally. It became transparent to the conceptual arguments it set forth. The letters themselves, bleached by the very force of thought, lost their visual content. In serious, genuinely literate, reading, they had no calligraphic power, *never* made you think about them at all.

> *It is a sign of the arrival of modern scientific and socialized man that calligraphy as an art form has largely expired. This is a welcome development. ... A successful or developed writing system is one which does not think at all. It should be the purely passive instrument of the spoken word even if, to use a paradox, the word is spoken silently.* [22]

The alphabet in digital three-dimensional space returns us to the world Havelock dismissed. It *makes us think*. We ask, for a start, questions that never occur to us in conventional reading. Looking at Figure 4, we can ask, for example, what does *the back o*f a letter look like? (Literalizing those metaphors again, 'What's *behind* this assertion?' [23]) How does spatial awareness work as the fundamental reading skill in this kind of literacy? What architectural disciplines are needed to illuminate such an expressive field? To what expressive ends might such a notational space work?

Here is one answer to this last question. Look, in Figure 7, at another still frame from these typographical virtual realities [24].

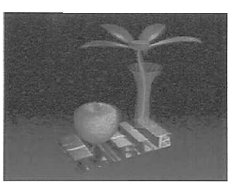

FIG. 7. G. de Valois & D. Cohen (Prods) (1987) *Dream Machine: the visual computer. An Anthology of Computer Graphics,* vol. 1. Videodisk, track 27 (Santa Monica, CA).

This snapshot freeze-frames a solution to a much-debated question, the relation of a word to the thing it represents. Here the word 'table' and its referent are compressed into a single visual pun. Such visual punning seems to arise spontaneously and across the board in computer graphics work. It forms part of a larger effort to heal the split driven between visual intelligence and abstract thought by an alphabet forbidden to think. Healing that split, after all, constitutes the usual commercial task of computer

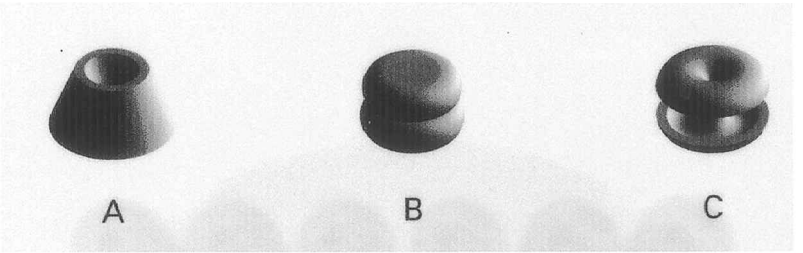

FIG. 8. J. Abbot Miller (1996) *Dimensional Typography*, pp. 25–26 (Princeton, NJ, A Kiosk Report, Distributed by Princeton Architectural Press).

graphics artists. And it seems to be an emergent purpose of electronic text and the new substrates which display it.

Another lifeline back to the past. Isidore says somewhere in the *Etymologies* that every word once looked like its object. That idea dies hard. We want the shape of words to look like the structure of thought they express, if only because we evolved to live in a world of shapes. We were born into three dimensions, not two (or four, or however many modern mathematics can devise), and we feel intuitively at home nowhere else. We can read silently in two dimensions, but part of us always wants to get back to the world we evolved in. Once again, the future of text seems comprehensible only in terms of its past.

Instances of three-dimensional typographical awareness have popped up on the root level, in type design itself. Type designers nowadays refer to an effort called 'dimensional typography.' Figure 8 offers an example, an ABC from a font called 'Univers Revolved,' conceived by Ji Byol Lee in 1996 as a homage to Adrian Frutiger's 1957 font 'Univers' [25].

Take a flat letter and revolve it 360 degrees. But why would one want to do this? The very lack of motivation, the playfulness, of the exercise carries a whiff of something in the air. Figure 9 illustrates a complex visual pun called 'Ligature' created by Bart Overly in 1996.

This form welds letters into a single form which yields alternate readings from different perspectives: maximal alphabetic self-consciousness, and at a high level of granularity. Precisely what Havelock's argument outlaws. In the world these figures adumbrate, alphabetic notation does not turn off the visual cortex, block three-dimensional spatial impulses at the retina. And so, as one answer to my foundational question, What's next for text in the new methods of display, we can say that 'Text is being put back into three-dimensional space.'

It is also being *put back into time*. Fixed print provides, it has to be said, an impossibly refractory medium in which to illustrate such a movement. Snapshots will carry little conviction, but let me at least start

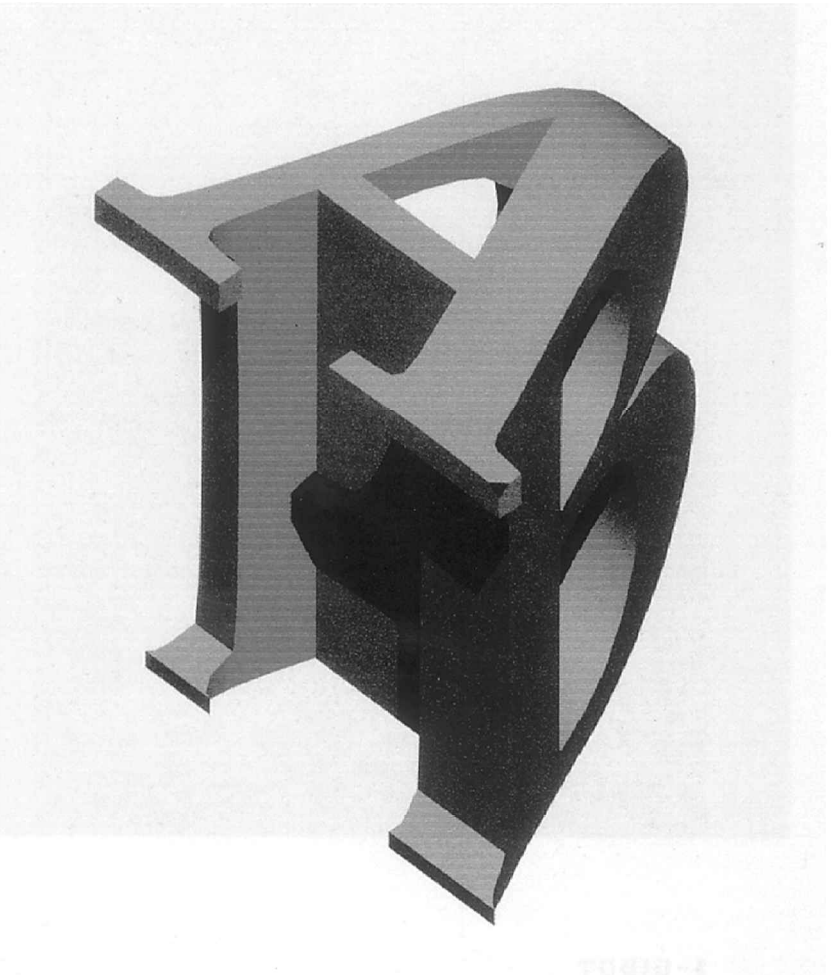

FIG. 9. J. Abbot Miller (1996) *Dimensional Typography*, pp. 54–55 (Princeton, NJ, A Kiosk Report, Distributed by Princeton Architectural Press).

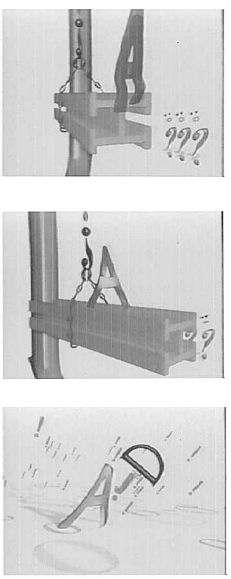

FIG. 10 a, b, c. *McEwan's L.A. 'Walk in a Straight Line,'* prod. David Botterell, Snapper Films (New York, *Siggraph Video Review* 53) #24. See http://www.catchword.com/mmedia/routledg/1463631X/v1n1/figure/fig10.mov or http://www.open.ac.uk/eci for the animated file.

with a lively one. Figure 10 illustrates three still frames from a favorite television commercial of mine, one made in the UK [26].

It is a great commercial, lively, witty, packed with meaning and propelled on its way by a super soundtrack. And a good thing too, since the product it sells needs some selling—non-alcoholic beer. It sells it by depicting the perils of finding your way home with a skinful. The protagonist is the Letter 'A,' as perhaps in 'Adam,' perhaps in 'Ale,' or maybe in 'Alcohol.' Animated letters turn up everywhere in commercial iconography nowadays. But why? Why force the human body into a graphic pun with the alphabet? Why force concept and actor into one dynamic entity? Let me suggest an answer from Homer, using again the brilliant analysis of Greek literacy with which Eric Havelock has provided us [27].

In the oral world of Homeric heroes, Havelock argued, there were no concepts, only actions. Concepts came embodied. You did not discuss *courage*. You observed *Achilles*. Animated letters rush into the breach between the two. They seek to heal the breach between orality and literacy. Perhaps this fundamental argument works for animation of all sorts. I think that perhaps it does, but it certainly does so here, and often in the world of electronic text. We might think of the animated alphabet which digital computer graphics has reasserted with such skill as a counterstatement to Boole and Frege and Russell and Whitehead, to the search for a notation of complete abstraction. Most of us, with our less formidable conceptual apparatus, recoil from such a dry battlefield of conceptual courage. We long for Achilles.

Our lifeline ligature to the past here falls easily to hand—the long tradition of animated letters [28]. In Figure 11, a fourteenth-century alphabet by Giovanni dei Grassi provides one snapshot from this history of frozen movement.

The letters in this remarkable alphabet seem to be test tubes which constrain and compress the three-dimensional life within. The forms of the letters allegorize the pressures of abstract thought on the life it tries to contain and understand.

As far back as we care to look, letters have always wanted to move. In digital display, at long last, they can. I want now to instance something that has come to be called 'kinetic typography.' In trying to quote in print from a dynamic method of alphabetic display, I feel like one of those figures imprisoned in the test-tube letters from the Bergamo alphabet. To keep things simple, let me instance a student exercise submitted to a class in kinetic typography at Carnegie-Mellon University [29]. Created by Ramsey Hong, it describes 'the most exciting thing that happened to me last summer'—in this case, getting stuck in an elevator at work. Figure 12 reproduces some stills from the sequence.

The printed phrase 'The Elevator' comes on screen and slowly divides like the doors of an elevator opening. The doors return with 'was bizarre where I worked last summer,' and the text continues to jiggle like an elevator, bouncing slightly up and down, lights blinking. It is a witty creation and, like all good wit, it evaporates when explained. Let me try to gloss it without dissolving it in pickle. First, what is it? A title; four frames of text; a frame of cartoon balloons; two more frames of text; The End. A short, short, short story? A textual cartoon? A haiku-like short poem? It works partly by interrupting the linearity of prose, changing its basic operating system. When 'tense' appears on screen before 'It was a kind of____moment,' the linear order of word position gives way for a moment to the inflection-powered emphasis of Latin or Greek. We are asked to ponder the shape and weight of a single word because it is presented by itself on screen, creating a visual accidence that counterpoints the regular word order. The image of the elevator is created out of the words and

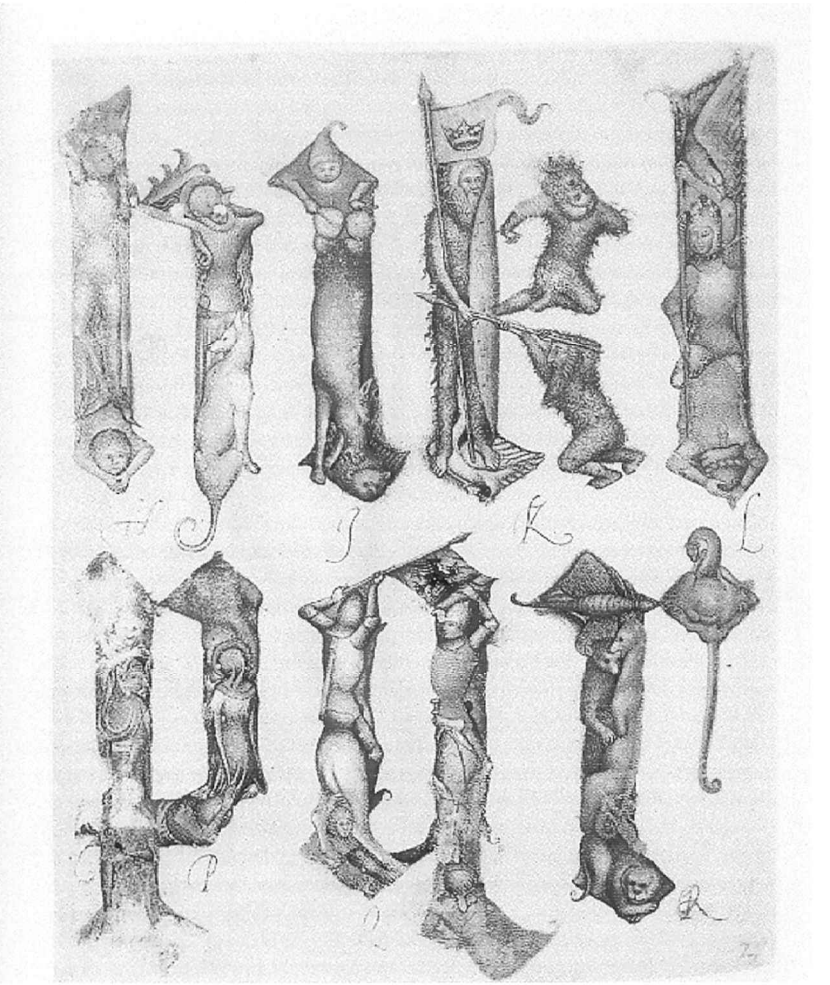

FIG. 11. Hugues Demeude (1996) *The Animated Alphabet*, p. 29 (New York, Thames & Hudson).

superimposed on them. Imagistic animation and written story happen all at once but in different timescales. Prose is sequential; image is instantaneous. Our imagination is asked to combine two kinds of perception, two ways to understand the world, words and things, or at least to put them into very rapid oscillation. We might think of the whole exercise as a complex dynamic pun yoking word and thing together.

But 'pun' wasn't what I thought when I first saw Mr Hong's work in a professor's office at Carnegie-Mellon. My response was oversized, epiphanic: 'So *that's* what shape poetry is all about!' *That's* where it has been trying to go all these years since 300 BC when Simias wrote an 'egg poem' in the shape of an egg. *That's* what Apollinaire really wanted to do in *Calligrammes*. *That's* how the Futurists, with their explosive gusto for motion, really wanted their posters to work [30]. *That's* what the rhetoricians' long discussion about *ecphrasis*, a 'speaking picture,' was all about.

FIG. 12 a, b. Ramsey Hong, student exercise, Dept of Design, Carnegie-Mellon University.

Never have I heard sound so strongly the dominant chord of electronic textual display. *This stuff isn't repudiating the past. It is redeeming it. Galvanizing it. Showing us, for the first time, what this whole suppressed agenda was all about.*

'Suppressed agenda' may seem a melodramatic term for this long tradition of alphabets which think, of notational displays which counter point the typography of abstraction. I can say in its defense only that it came to me early on as the right phrase to describe what happens when digital display allows us to put text back into space and time. Think of how proud we have always been that text takes us *out of* space and time. That it builds monuments *aere perennius*. That it provides, to hark back to Beatrice Ward's poster, a 'refuge of all the arts against the ravages of time' which will not perish on waves of sound nor vary with the writer's hand. Here is the literate mentality speaking for the record, looking at orality as an enemy. Any textual display that smacks of time and space, of animation, should be suppressed. Cartoon-like. Primitive.

For a long time, we might remember, our thinking about Western literature itself labored under the same delusion. Western literary history provided, according to Erich Auerbach's famous *Mimesis*, one long build-up to unselfconscious realistic fiction. The persistent, continual ingredient of stylistic self-consciousness which formal rhetorical study has always provided was dismissed as vestigial, one long mistake [31]. The main critical endeavor of the last half century has been to correct this imbalance. I have been exfoliating here a similar imbalance in Western textual notation.

The correction will not be trivial. If we ask what disciplines are needed to understand just the texts we have considered in this painfully compressed survey, we can compile a formidable list. The disciplines which treat of orality and literacy—classics, folklore, anthropology, linguistics, and literary criticism—all are needed to explain the fundamental plate tectonic as print chafes and growls against the new forms of textual display. When text moves into three-dimensional space and we fly in to follow it, we need the wisdom of architects and city planners. If spatial awareness has become a central skill in digital literacy, we will need the avionics designers and air controllers too. When text begins to dance, the choreographers and scene designers come on stage. Happily, all these folks are part of the current disciplinary scene. Less happily, they dwell in separate capsules, which, if not hermetically sealed, seldom breathe the same air. The clever and light-hearted exercise by Mr Hong, which I have so murdered by dissection, makes nonsense of the distinction between prose and poetry, between 'creative' and 'expository' writing, yet literature departments fix such separations in concrete. Disciplines, departments, concentrations of study, the whole ossified apparatus trains clerks of a forgotten mood [32].

The digital display of text implies a yet deeper change, one captured by the Swiss sculptor of motion, Jean Tinguely.

> *Static, static, static! Be static! Be static! Movement is static! Movement is static! Movement is static because it is the only immutable thing—the only certainty, the only unchangeable. The only certainty is that movement, change and metamorphosis exist. That is why movement is static. So-called immobile objects exist only in movement. Immobile, certain and permanent things, ideas, works and beliefs change, transform and disintegrate.* Immobile objects are snapshots of a movement whose existence we refuse to accept, *because we ourselves are only an instant in the great movement. Movement is the only static, final, permanent and certain thing. ... Immutability does not exist. All is movement.* [33] *(emphasis added)*

Here is the fundamental alteration brought by an economics of attention. When our reference point is stuff, when physical objects are what is 'really real,' then our attitude toward these objects, our attention, while real enough, is fundamentally derivative. And, inevitably, less important. Stuff doesn't change. Our attitudes toward it change all the time. *Fashions* and *fads*—what else can you expect of them? When the scarce commodity is not stuff, however, but the attention we bestow on it, then *change* is not the special case of *stasis* but vice versa. Stasis is the printout, the snapshot; change is the underlying reality, the enduring code. Tinguely's kinetic sculptures made this point all the time; the *process* was the thing, not the artistic *object*. Christo's events, his fences, umbrellas and wrappings, happenings, conceptual art of all sorts, the pop explosion—all moved 'art' from fixed objects to human attention. Artists have been trying to model this background/foreground switch for nearly a century.

The move from print to digital text precisely models this change. We could, had we been working in a metamorphic display mode rather than a fixed one, have flown into many more radical examples of dynamic text than could be dealt with here. But we have seen enough, perhaps, to suggest that we are not simply voyaging on strange new seas of thought but plowing the old Homeric ones as well and trying to make sense of both as one whole and comprehensible textual world. We cannot exist, after all, only by breathing out abstraction, alphabets which do not think; nor only by breathing in animation, alphabets which do; but only by respiration, the life-giving oscillation of the two. That oscillation is what's next for text.

NOTES

1. Tyler Cowen (1998) *In Praise of Commercial Culture*, pp. 46–47 (Cambridge, MA, Harvard University Press).
2. Peter Drucker claims to have been the first to argue that the basic economic resource is now knowledge, not land or goods. Herbert Simon was the first person, to my knowledge, to point out that in such an economy human attention would be the scarce resource. I have cited these discussions as well as opening the argument from a

rhetorical point of view in (1997) The economics of attention, *Michigan Quarterly Review*, 36, pp. 270–284. Two recent books discuss this new kind of economics: Stan Davis & Christopher Meyer (1998) *Blur: the speed of change in the connected economy* (Reading, MA, Addison-Wesley); and Carl Shapiro & Hal R. Varian (1999) *Information Rules: a strategic guide to the networked economy* (Boston, MA, Harvard Business School Press). Firm exception to this argument has been taken by the classical scholar James J. O'Donnell: 'The earliest complaints of infoglut are downright ancient. Seneca, the Roman philosopher, mocked people in the first century C.E. for owning so many books they never had time to do more than read the labels on the outsides. …What is perceived as infoglut is mainly infoguilt—a sense that I should be seeking more.' (J. J. O'Donnell [1998] *Avatars of the Word: from papyrus to cyberspace*, pp. 174, 175 (Cambridge, MA, Harvard University Press).

3. I am quoting from memory, no transcript having been made of the Q & A session.
4. The 'heads-up' display superimposes alphanumeric data describing a landscape on a view of that landscape itself. It asks us to register at the same time a three-dimensional landscape like the one we evolved in and a symbolic description of that landscape. The flight simulator games use it and a couple of automobiles have essayed tentative experiments.
5. A notable exception: Jay David Bolter's (1991) *Writing Space: the computer, hypertext, and the history of writing* (Hillsdale, NJ, Lawrence Erlbaum Associates) and his more recent (1999) *Remediation: understanding new media* (Cambridge, MA, MIT Press), written with Richard Grusin.
6. A web site, http://www.open.ac.uk/eci, provides an electronic version of this printed article to ameliorate this difficulty.
7. The codex book: Marvin Minsky (1985) *The Society of Mind* (New York: Simon & Schuster). The CD-ROM: (1996) *First Person: Marvin Minsky: The Society of Mind* (New York: Voyager).
8. This feedback on the text works especially well when authors, as increasingly they do, talk about their texts on television.
9. And then, of course, tries to recreate it in myriad indirect ways.
10. Walter J. Ong (1982) *Orality and Literacy: the technologizing of the word*, p. 79 (London, Methuen).
11. Walter J. Ong, S.J. (1958) *Ramus, Method, and the Decay of Dialogue*, p. 291 (Cambridge, MA, Harvard University Press).
12. I have borrowed the phrase, of course, from Clifford Geertz. See C. Geertz (1973) *The Interpretation of Cultures*, pp. 3–30 (New York, Basic Books).
13. In (1976) *The Motives of Eloquence* (New Haven, CT, Yale University Press).
14. J. J. G. Alexander (1978) *The Decorated Letter*, Pl. 32, p. 103 (New York, George Braziller).
15. Pad: *an alternative approach to the computer interface*, prod. Ken Perlin & David Fox (New York, Siggraph Video Review 96) #3.
16. A city fabled in ancient times for its brothels and other diversions. The now classic study of Corinth's modern counterpart, *Learning from Las Vegas*, by Robert Venturi, Denise Scott Brown & Steven Izenour (rev. edn 1985) (Cambridge, MA, MIT Press) began the reconceptualization of Vegas as a landscape of signs.
17 Lewis Blackwell & David Carson (1995) *The End of Print: the graphic design of David Carson* (San Francisco, CA, Chronicle Books, not paginated).
18. *Wired* (1994) December, p. 49.
19. G. de Valois & D. Cohen (Prods) (1987) *Dream Machine: the visual computer. An Anthology of Computer Graphics,* Videodisk, vol. 1, track 23 (Santa Monica, CA).
20. Donald D. Hoffman (1998) *Visual Intelligence: how we create what we see*, p. 23 (New York, W. W. Norton).
21. Recent work on rendering three-dimensional worlds from two-dimensional photographs provides an interesting instance of this self-consciousness about seeing. See (!), for example, the FACADE photogrammetric modeling system developed at the University of California at Berkeley (*Siggraph Video Review*, 124 #11).
22. Eric Havelock (1976) *The Origins of Western Literacy*, Monograph Series/14, pp. 15–16, 17 (Toronto, Ontario Institute for Studies in Education).

23. A professor of accounting to whom I showed a three-dimensional letter sequence recently, said to me, 'That's what I *always* ask my students: ' "What's *behind* these numbers?" '
24. de Valois & Cohen (see n. 18), track 27.
25. I have taken these two examples from J. Abbot Miller (1996) *Dimensional Typography*, pp. 25–26, 54–55 (Princeton, NJ, A Kiosk Report, Distributed by Princeton Architectural Press).
26. *McEwan's L.A. 'Walk in a Straight Line,'* prod. David Botterell, Snapper Films (New York: *Siggraph Video Review* 53) #24.
27. Eric A. Havelock (1963) *A Preface to Plato*, ch. 10, esp. pp. 172–174 and 199 ff. (Oxford, Basil Blackwell).

    It is interesting to compare the efforts of animators with Havelock's description of classic Greek orality. For example: 'But what I care for above all in animation is the power to master the tempo of thought and emotions in the audience' (Alexander Alexeieff [1976] Reflections of motion picture animation, in: Robert Russett & Cecile Starr *Experimental Animation: origins of a new art*, p. 94 [New York: Da Capo Press]). Compare this with Havelock: 'What we call the Greek sense of beauty, in architecture, sculpture, painting and poetry, was more than anything else a sense of elastic and fluid proportion. … It was the popular mastery of the shaped word, enforced by the needs of cultural memory, which brought the Greeks to a mastery of other kinds of rhythm also' (*A Preface to Plato*, p. 128). The reader might also be amused, as I was, to think of the arguments advanced for oral culture by McLuhan, Ong, Havelock, and others while leafing through Frank Thomas & Ollie Johnston's (1984) *Disney Animation: the illusion of life* (New York, Abbeville Press, popular edition).

    The connection between animation and the oral world's basis in action rather than idea seems to have come full circle in the recent experimental work in real-time virtual avatars. See, for example, two articles in the August 1999 issue of *Communications of the ACM* (vol. 42, no. 8): Demetri Terzopoulos, Artificial life for computer graphics (32 ff.), and Norman I. Badler, Martha S. Palmer & Rama Bindiganavale, Animation control for real-time virtual humans (64 ff.).
28. Hugues Demeude's (1996) *The* Animated *Alphabet* provides a good introduction to this tradition, (New York, Thames &Hudson). The dei Grassi figure occurs on p. 29.
29. I use this exercise with the permission of the Department of Design, Carnegie-Mellon University.
30. For an introduction to this world, see Johanna Drucker (1994) *The Visible Word: experimental typography and modern art, 1909–1923* (Chicago, IL, University of Chicago Press). For an interesting discussion of *Lettrisme*, the most recent manifestation of this impulse, see 'Lettrisme: into the Present,' a special issue of *Visible Language* (vol. XVII, no. 3, Summer, 1983).
31. Here is where I first came into the conversation as a graduate student. The dominant discussion of sixteenth-century English literature, when I first came to study it, was C. S. Lewis's *English Literature in the Sixteenth Century*, and it told the story, intentionally, *with all the 'rhetoric' left out*. This was an omission I tried to correct in my *The Motives of Eloquence* (New York, Yale University Press, 1976), but correction on a larger scale has come with 'literary theory' in all its manifestations.
32. I borrow this phrase from Charles Horton Cooley's *Life and the Student*, where he uses it of a professor who lectures from stale and outdated notes.
33. Quoted in Pontus Hulten (1987) *Jean Tinguely, A Magic Stronger than Death*, p. 67 (New York, Abbeville Press).

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