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Hypertext and Literature: Facts and Fictions

A thesis presented in partial fulfilment of the
requirements for the degree of Master of Arts in English
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Abstract

This thesis examines hypertext as a new medium (but not necessarily *the* new medium) for literature, first setting an empirical base and then exploring more theoretical issues. I begin with a definition, identifying what makes hypertext qualitatively different from print text. Using the tools of semiotics I describe the essential features of hypertext as opposed to print text in order to lay a factual basis for further discussion. The second part of my thesis extends the definition of hypertext by describing and evaluating two examples of hypertext practice. The first example is Intext, my own hypertext system for creating hypertext tutorials for students of literature. The working Intext system is provided on floppy disk as a companion to this thesis. The second example of hypertext practice is Stuart Moulthrop's hyperfiction, *Victory Garden*. I follow a critical commentary of this hyperfiction as an essentially reflexive work with some consideration of the challenges hyperfiction poses to literary criticism, focussing on the experiences of reading, writing and criticising fiction in the hypertext medium. The third part of my thesis evaluates the claim, made by current hypertext critics and theorists, that hypertext, as a writing space for literature, is the successor to the medium of print. I background this by tracing the history of hypertext in practice, and by questioning the extent to which experimentation in print fiction can be said to prefigure hypertext. I set forth the rhizome as one possible model for the writing space provided by hypertext. I consider and reject the idea that hypertext embodies certain poststructuralist views of literature; and, by comparing hypertext to the writing space of oral literature, I find some political motivations for the claim that hypertext will succeed print as a medium for literature.



For Verity

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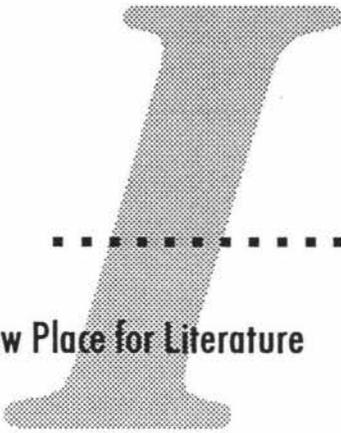
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Introduction

A New Place for Literature



Increasingly the computer text is replacing the paper text, especially in the business world. Up until recently, this simply meant that paper texts were being replaced by computer-generated replicas, which were usually printed out to produce a paper text. Now more and more computer generated texts never make it to paper and never *could* make it to paper. The 'virtual reality' of the computer (the space that it provides for writing) is being used to create new texts that are fundamentally different *kinds* of texts to the texts that can be presented on paper. Some of these texts are hypertexts.

A hypertext is a set of texts and links between those texts. Usually the texts and links are stored on a computer. The reader uses the computer to read the texts, and to follow the links between texts, thus 'navigating' through the network of texts. Any part of a particular text may contain a link that, when activated, brings another text to the reader. A reader interested in hunting dogs may enter a hypertext encyclopedia at a text about working dogs; from there she may find a link to a text on the dachshund. Discovering that 'dachshund' means 'badger dog', she may choose to follow a link to a text about badgers ... In this way the reader makes her own way through the hypertext.

Why should an English Literature thesis be written about hypertext? Hypertext is a new 'place' for the activities of literature. English scholars are not only reading, teaching and writing criticism *about* hypertext; they are reading hypertexts, writing hypertexts, and teaching with hypertexts and (to a lesser extent) writing criticism in hypertext form. Hypertext is a new form of text that challenges our theoretical models of text and exposes the

print-based nature of literary theory. Pedagogical hypertexts such as Brown University's Intermedia and my own Intext provide new tools to contextualise traditional literature and allow students to confront literary texts in new ways. Hypertext fiction is demanding to be understood on its own terms as a new art form.

Hypertexts may include information in formats other than words: video clips, sound, animation, pictures and icons. These hypermedia texts may be considered to be beyond the realm of literature. In fact they are also beyond the realm of film studies or music or even of computer science. However, many of these texts may include only words and pictures - the same information that is contained in the books we consider literature. If the same difference that makes a hypertext a fundamentally different kind of text to a normal paper text also disqualifies it from being literature, then the domain of literature will remain static while the range of kinds of texts expands enormously.

At present, it is true, computer-based texts show no sign of displacing the print and oral texts that are considered literature and studied as such. But displacement is not necessary for hypertexts to be considered literature. Inevitably the concept of 'literature' becomes problematic. Terry Eagleton compares the term 'literature' to the term 'weed', saying "'literature' and 'weed' are *functional* rather than *ontological* terms: they tell us about what we do, not about the fixed being of things."¹ If literature is what is treated as literature, then perhaps it is enough justification that hypertext is being treated as literature today by people like George Landow (in his book *Hypertext - The Convergence of Critical Theory and Technology*²) and Jay David Bolter. I will be defending the thesis that hypertext provides a space for the

¹ Terry Eagleton. *Literary Theory: An Introduction*. Oxford: Basil Blackwell, 1983, 9.

² George P. Landow. *Hypertext: The Convergence of Critical Theory and Technology*. Baltimore: Johns Hopkins University Press, 1992.

The second part of my thesis examines some examples of hypertext. Intext is a hypertext authoring system which allows teachers of English literature to create stand-alone tutorials based around a piece of literature - usually a short story. An Intext tutorial contextualises the short story, linking it closely with comments by the teacher, details of the author's life, excerpts from the criticism as well as a lecture by the teacher, bibliographic information and a glossary. Chapter IV describes the Intext system in some detail. Fiction in a medium which has no fixed linearity or single text poses a challenge to a literary criticism which holds as problematic such concepts as reader, author and text. Chapter V looks critically at *Victory Garden*, Stuart Moulthrop's hypertext novel; and examines the experience of reading, writing and criticising fiction in the hypertext medium.

Part Three evaluates the claim that hypertext, as a space for the production and consumption of literary texts, and as a medium for discourse, is the successor to the medium of print. Part three begins by considering some of the history of hypertext. Chapter VI considers to what extent experimentation in print fiction could be said to prefigure hypertext, or even to 'be' hypertext artificially restricted to the page. Chapter VII traces another history of hypertext: from the 'memex' of Vannevar Bush in the 1940s to the World Wide Web, the distributed hypertext that virtually surrounds us today.

Chapter VIII examines some possible metaphors for the 'writing space' provided by the new medium. Is hypertext a modern 'book of the world'? Does hypertext, as an information space, model the human mind? Is the vegetable metaphor of the Rhizome a good metaphor for the writing space of hypertext? In what way could these metaphors prove useful for an understanding of hypertext?

The relationship between hypertext and structuralist and poststructuralist literary theory is considered in some detail by hypertext critics. The general view is that hypertext embodies the

views of the poststructuralists and therefore is the ultimate deconstructed writing space. Chapter IX. criticises this view and the motivation behind it. The final chapter finds an echo of hypertext in orality as described by Ruth Finnegan and Walter Ong. I draw a comparison between the way the Romantics viewed the oral tradition, or 'folklore' as they called it, and the way hypertext critics see the writing space of the future. My thesis concludes with a consideration of the political motivations that accompany the criticism of hypertext.



III

Part I: INTENSION

Definition

..... ■ In asking the question “what is hypertext”, I am less concerned to construct a list of things that are considered hypertext than I am to establish some grounds for the consideration of hypertext as separate from the print-based texts that Literature takes for granted. Much of the existing hypertext criticism is content to describe hypertext; taking its existence as something different from print text as unproblematic instead of first identifying its essential nature. If hypertext is something different to print texts, then what brings about this difference? What are the essential features of hypertext, the consequences of which are the subject of hypertext criticism and of this thesis? Which features divide hypertext from print text?

..... ■ In the 1960s Ted Nelson coined the term ‘hypertext’ to mean “*nonsequential writing - text that branches and allows choices to the reader, best read at an interactive screen.*

A Definition

As popularly conceived, this is a series of text chunks connected by links which offer the reader different pathways”³ Nelson’s own hypertext he called Xanadu after the “magic place of literary memory” in Coleridge’s *Kubla Khan*. Today, ‘hypertext’ is defined by many critics, many different ways. Some assume an

³Theodor H. Nelson. *Literary Machines*. 1981, Cited in Landow 1992, 205.

extensional definition, where 'hypertext' is defined by the list of things that are called hypertext. Another type of definition is concerned with a description of hypertext - what it looks like, what you can do with it and so on. Here I am concerned with the identification of the features that are essential to a hypertext. From this definition we can proceed to examine the consequential extension and description of hypertext. Looking through the literature for descriptions that might serve as definitions we find:

"a hypertext consists of topics and their connections"⁴

"a series of text chunks connected by links"⁵

"text composed of blocks of text . . . and the electronic links that join them"(Landow 1992, p4)

"machine supported links (both within and between documents)"⁶

Apart from a variance of terminology (topics, chunks, blocks, documents), we seem to have an agreement here. A definition for our purposes reads "A hypertext is a collection of texts that are linked semantically". I have added the term 'semantically' here because I see this as a necessary condition for hypertext. If the links had nothing to do with meaning - of the texts and of the words within them - then the hypertext would be a completely random, meaningless collection of texts - in short no longer a hypertext⁷. The idea of a collection of semantically linked texts suggests a kind of *grammar* of texts, where texts are semantically

⁴ Jay David Bolter. *Writing Space; The Computer, Hypertext and the History of Writing*. New Jersey: Lawrence Erlbaum, 1991, 24.

⁵ Theodor H. Nelson. *Literary Machines*. 1981, Cited in Landow 1992, 205.

⁶ Jeff Conklin. "Hypertext: An Introduction and Survey" *I.E.E.E. Computer 20* (1987): 18.

⁷ I will later have cause to modify this opinion, in my definition of 'pure' hypertext - where the semantic nature of the links is disposable. However a 'pure' hypertext is strictly hypothetical, and useful only in theoretical comparison to 'real' hypertexts.

(footnote, reference, index) being retroactively included under the definition.

If our definition of 'hypertext' is to include only those things in which we are interested, perhaps we need a new definition of hypertext that does not include all these mundane features of print technology. A definition of those hypertexts would read something like: "A collection of texts stored on a computer which are linked together semantically and can be navigated through by a reader". In a sense, the remainder of this thesis will modify and test this definition.

It is obvious that the only difference between our two definitions is that the second one has the added phrases "stored on a computer" and "and can be navigated through by a reader". The second phrase is only there to clarify the fact that the computer allows access to the text by human readers, so the only difference between the hypertext that I described above as the world of scholarly texts and 'hypertext' as it is generally known is that the latter is implemented on a computer. If the difference between hypertext and print text is limited to the medium through which they are read then how is it that hypertext is considered to be a new kind of writing space, allowing the writing and reading of new kinds of texts?

Imagine two hypertexts. Firstly a print one. It consists of a stack of books and articles, annotated and cross-referenced. Secondly a computer hypertext with the same texts. Where, in the print hypertext we follow a citation that says "see Reardon page 155", opening the correct book to the correct page, on the computer we click a marker and the correct text is displayed before us. Is there really a qualitative difference between following a reference like "see Reardon page 155" and following a hypertext link with the same start and endpoints? If the basic experience of hypertext is the same in print or electronically, and if hypertext is therefore just a computer simulation of already

It must be conceded that this difference is only a quantitative difference. That the electronic links are easier to follow does not mean they are a different kind of thing: the link is the same, but some of its quantities have changed - it takes a smaller amount of time, a smaller amount of intellectual overhead to traverse, etc.

Terence Harpold attempts to describe the difference by saying that hypertext introduces "a qualitative as well as a quantitative change in the perceptual plane of reading: interrupting a sequence of lexias with the click of a mouse or the press of a key does not *feel* the same as flipping to the table of contents...The immediacy of the transition erases the sensation that you have moved between blocks of text that would on paper be inches, pages, or shelves apart..."⁹ For Harpold the difference lies in the experience, the 'feel', of the hypertext. This has been implicit, too, in my arguments above. However, this is hardly the definitive description I set out to discover. Landow is more precise:

"Electronic linking, which blurs the borders of any informatized text, also brings with it an almost incredible acceleration of certain reference functions. This dramatic change in the temporal scale for consulting a reference text turns the reader's experience into a continuing tutorial."¹⁰ Still the question remains: how exactly is it that this 'dramatic change in temporal scale', which is still only a quantitative change, brings about the qualitative difference that we 'feel' when reading a hypertext?

Perhaps an analogy to film, or even to the computer screen, might aid us here. In film or video the viewer is essentially just shown a sequence of photographs; but the viewer does not have the experience of seeing a sequence of photographs; rather he or she has the experience of seeing a moving picture. There is no

⁹ Terence Harpold "Conclusions." In *Hyper/Text/Theory*. Ed. George Landow. Baltimore and London: Johns Hopkins University Press, 1994, 196. (Henceforward cited as Harpold.)

¹⁰ George Landow "What's a Critic to Do?" In Landow 1994, 18.

qualitative difference between someone holding picture after picture up in front of the viewer as fast as he could, and the film picture; only a quantitative difference in speed. There comes a certain speed when humans perceive a series of pictures as a single moving image (about 24 frames per second). Despite this fact, nobody would deny the qualitative difference between a series of photographs and a film, at least experientially.

Similarly the computer screen is unable to display a diagonal line, only a series of square pixels arranged next to each other. However there is a certain threshold pixel size below which the experience for the viewer is of a diagonal line. The common factor here is that of a certain perceptual threshold below which a series of photographs becomes a smooth moving picture and a dotted line becomes a smooth one. Because of a perceptual threshold, a quantitative difference is experienced as a qualitative one. Perhaps there is an analogous threshold in our perception of a link or textual reference. On one side of this threshold is the print reference, on the other side, hypertext.

So my definition of hypertext rests on an experiential difference from print text which is the result of the electronic medium. It is this difference in the *experience* of hypertext which gives rise to the notion of an 'interactive' text. In the next section I will semiotically examine this interactivity. If we regard the text as an object without taking into account its reading (as New Criticism or Formalism might) then it is difficult to see how hypertext can differ qualitatively from print text. We must become reader-response critics to see that the two types of texts differ qualitatively in their actualisation.

The experience of reading hypertext, then, is a different experience to reading print text, and indeed it was with the first perception of this new reading experience, that Nelson coined the term 'hypertext'. A hypertext adds something to the texts that are gathered together to create it. In what way is hypertext 'hyper'?

..... The word 'hypertext' (along with 'hyperspace', 'hyperdrive', 'hypermart' etc.) sounds like a piece of meaningless science fiction jargon, certainly out of place in the world of English Literature. That is because the prefix 'hyper' (along with 'ultra' and 'supra' and others), while at one time respectable, has been overused for pseudo-scientific and science-fiction neologisms in the worlds of video games, comic books and the movies. 'Hyper' is defined in the Oxford English Dictionary thus:

Believe the 'Hype'

hy'per- pref. *w. senses 'over, beyond, above'*
 (hypergamy, hyperphysical), 'exceeding'
 (hyperbola, hypersonic) 'excessive, above normal'
 (hyperbole, hypersensitive; *opp. HYPO-*). [*Gk*
 (huper over, beyond)]

In what way can we say hypertext 'exceeds text' or is 'excessive text'? Probably most obviously it exceeds text in *number*, for a hypertext must comprise more than one text. But hypertext provides a kind of exponential exceeding rather than simply the geometric one that I have just suggested. In a hypertext, the texts are joined by multiple pathways. Every reader may read the hypertext in a different way. If we record every word read by a reader as she makes her way through the hypertext, in the order she reads them, we can make up a new 'text' that corresponds to that particular reading. Each reading puts the texts in a different sequence, leaves some out, only partially reads some. In even a small hypertext, the number of these possible readings is very large (but never infinite) and depends exponentially on the number of texts and the number of links. John M. Slatin says of hypertext that it is "in fact a collection of possible documents, any

one of which may be actualized by readers creating or pursuing links between elements of the system."¹¹ Slatin uses 'document' to mean what I refer to above as a 'new text' or a 'reading'. In this way the hypertext is numerically 'excessive text'. There are many more 'texts' in a hypertext than the number that makes it up, (the whole is greater than the sum of its parts) but they remain only *possible texts* until the reader actualises them. In fact, in a hypertext of more than trivial size, there are many more possible texts than can ever be expected to be actualised. Some of the possible texts will be, in terms of a reading of the hypertext, nonsense. The question of what makes a nonsense reading will be touched on when I consider the rhetoric of hypertext.

A hypertext may be seen as 'over' or 'above' text in quite a geographic way. Already in the course of my discussions I have been unable to avoid using geographic metaphors to describe the way a reader 'traverses' a link, or 'navigates' a hypertext. Hypertext, then, may be considered above text in that it enables us to look down on a topography of texts as if we were above it. The texts and their links are like places and roads on a map. Many hypertexts will have just such schematic maps to help the reader navigate the hypertext. The connotation then of the prefix 'hyper' is that of providing perspective, overview and guidance.

In what sense, finally, can hypertexts be considered 'beyond' text? If my thesis succeeds in showing that hypertext does in fact provide us with a new kind of textuality, (some kind of qualitative difference) then we can indeed consider that hypertext is not merely a numerical excess of text, but is in fact qualitatively 'beyond text'. The prefix 'meta' may in fact better describe what we call hypertext. A metatext, coming *after* or *behind* text, and being of a higher or second order, would seem to suit fit the writing space of hypertext both chronologically and structurally.

¹¹ John M. Slatin. "Reading Hypertext: Order and Coherence in a New Medium." *College English* 52, 8 (December 1990): 186.

However, 'hyper' it is and as I have shown above, the prefix is appropriate and illuminating.

I have, in the above paragraphs, already touched on an important differentiation between the hypertext, the texts that comprise it, and the readings that may be made of this hypertext. The Oxford English Dictionary defines text as (among other things) "Original words of author esp. opp. to paraphrase of or commentary on them" and "Main body of book opp. to notes, pictures, etc." When I refer to 'text', I do indeed mean the original words of the author, in other words the individual parts - texts - that make up a hypertext. I do not mean by 'text' one of the possible readings of a hypertext actualised by a reader. I will call these the 'readings'. Often the texts of a hypertext will have been taken from print texts. Again I do not mean by 'text' the actual print artifact, this will be called the 'book'. A single text could be instantiated in any number of different books, or become part of a hypertext and thus part of any number of possible readings.

The word 'text' comes from the Latin *texere* - to weave. As I will have something to say later on about simple coincidence of terms, it will pay now to be cautious. However, the concept of weaving is pertinent to hypertext. I quoted Landow above as saying that texts were 'woven' more tightly in hypertext than print. In what way is a text a weaving? Weaving is a regular entanglement of threads, which creates a material that is perceived as a continuous whole. It is easy to see how a literary text consists of a number of threads - narrative threads; threads of syntax that weave together regularly according to the pattern of grammar; threads of allusion, context and intertextual reference that tie a text to its surroundings. Hypertext is a weaving of these individual weavings. Hypertext makes explicit the allusive, contextual and intertextual threads to create a larger, more inclusive text. It is a weaving of weavings, a text of texts.

Hypertext, then, is more than just excessive text and more than just a convenient and more efficient instantiation of the existing devices of print reference. A reader experiences hypertext as 'beyond' text due to the electronic link's crossing of a perceptual or cognitive threshold. This difference in experience is the basic essence of hypertext which must both allow and cause the various effects claimed for hypertext - the non-linearity, lack of closure and intertextuality - and the effects of these effects (such as democratisation) which are the subject of my thesis. It is this difference in experience which creates a new kind of textuality.



The sign is the part of the triad to which we have physical access. Before we go further it is necessary to clarify a point of terminology. The word 'sign' is subject to a confusing diffusion. A 'sign', semiotically speaking, is the correlation between the signifier and the signified. Hence the phrase 'system of signs' denotes the whole semiotic phenomenon. Eco says "*a sign is not a physical entity*, the physical entity being at most the concrete occurrence of the expressive pertinent element" and later, "the classical notion of 'sign' dissolves itself into a highly complex network of changing relationships" (Eco 1976, p49).¹⁴ I will refer to the physical, expressive part of a sign, the thing we see, hear, feel or taste, as the *signifier*, while the term 'sign' will denote what Eco also calls the *sign-function* - the correlation between all three elements of the semiotic triad.

In a semiotic system, a subsystem of signifiers forms the *expression plane* of the system. The signifiers in this expression plane are structured according to their positions and differences to each other. I will follow Eco in calling this system an *s-code*. Because the word 'code' has a similar diffusion of denotation to the word 'sign', Eco says "I shall therefore call a system of elements such as the syntactic, semantic and behavioural ones. . . an *s-code* (or code as system); whereas a rule coupling the items of one s-code to the other s-codes. . . will simply be called a *code*." (Eco 1976, p38)

Similarly, of course, the system of signifieds (the content plane of the semiotic system) is also an s-code. Thus in Morse code, the systems of dots and dashes form an s-code (every value has its position in the morse 'space' defined by its differences to the other values) which is correlated by the code to the alphabetic s-code (the content plane). After Saussure, we would identify the system of words that make up language as an s-code, the word

¹⁴ See Eco 1976, 48-50 for a deeper analysis of the terminology of semiotics.

What is the place of the computer in semiosis? That is, what is the *role* of the computer in the process of semiosis that takes place when a hypertext is written and read? If, as we shall see Bolter argues, the computer acts within a hypertext as a sender and receiver of signs, a co-creator of texts; then we must regard the process of literature within a hypertext much differently than if the computer takes some other semiotic role.

A Semiotic Machine?

The computer, from its most basic level to its most complex, works by signification. At a basic hardware level, the computer is an organisation of addresses. The most basic computer programs, upon which all the other programs including hypertext are piggybacked, are lists of simple commands each referencing an address in memory by number. The address space of a modern computer is vast. The one I am working on now has four million addresses- containing data (such as the lists of letters that make up this text), pointers to that data (a pointer is a single number that refers to another address), lists of instructions, pointers to lists of instruction, even pointers to pointers to lists. Students of the computer visualise its architecture as a series of concentric shells. At the bottom is the hardware, at the top the software that the user sees. In between may be seven layers. Each layer refers to the layer underneath it. Each layer is a layer of programming usually in a different programming language. The programming languages are symbolic, and the symbols within them stand for other symbols, or groups of symbols in the layer below.

But too much can be claimed for the computer as a semiotic machine. Bolter says this of it:

The very process of semiosis, the movement from one sign to another in the act of reference, is embodied in the computer, and this embodiment is unique in the history of writing. In the computer, signs behave exactly as the students of

semiotics expect them to behave. We could say that the theory of semiotics becomes obvious, almost trivially true, in the computer medium. In earlier media such as the printed book, the signs only referred potentially to other signs. However, the computer as a text that can seem to read and write itself also provides its own semiosis.

Bolter, 196

Compare this to a quote from Andersen:

“there are two possible communicative roles the computer may be assigned to: it may replace humans in the roles of sender and receiver, or it may replace paper or sound as a media of communication. The first solution is adopted by AI, but I shall argue against this and for the second solution.”¹⁶

An Impoverished Semiosis

I also take Andersen’s position, although my argument will be with particular reference to the position of Bolter. To say the computer “provides its own semiosis”, is to overestimate the complexity of the computer and to underestimate the complexity of semiosis. The process of signification that goes on within a computer is completely without ambiguity, completely finite, predictable and measurable. Semiosis is not like this. It is open, signs slip from time to time, from person to person and certainly from culture to culture. Signs can be used to lie¹⁷. Signs can be misinterpreted, causing mistakes. I can be sure when I talk to you that because of your different history, upbringing, etc - all the

¹⁶ P.B. Andersen. *A Theory of Computer Semiotics*. Cambridge and New York: Cambridge University Press, 124.

¹⁷ For more on signs and lying, see Eco 1976, 6.

things that form your linguistic competence - what I think will never be what you think when you interpret my words (use abduction to posit a theory, then test it). But sign systems within computer science are impoverished in that they are univocal. And this is not just because of a different, less ambiguous semiotic system within the computer; it is because the computer's semiotic apparatus (it is doubtful it can be called that) is different to human semiosis.

Precision and Univocality

If I write a program in which there is a variable X which I declare, it will stand for a value at a certain address in the computer memory. When the computer runs the program and references firstly the text of my program and secondly the pointer to the address for the value of X, there is no possible slippage of reference and no connotations associated with the sign. In a computer the process of signification can be boiled down to signifier and signified. If we could say there was an interpretant it would not introduce the unlimited semiosis I described above¹⁸.

When the reader is the computer this is the only possible case. This, perhaps, is one difference between the computer and the human. When interpreting a sign, the human may say, "oh, that's *like* such and such" whereas that computer never will. For a computer a sign speaks only of its referent, an address speaks only of its location, not of other locations near it, or with similar numbers or of other locations with similar contents, or anything else. A human being may misinterpret a sign, while believing she understands it perfectly. However this cannot happen in a computer. The signs are either decoded or not. If not, nothing

¹⁸ In computer programming the interpretant that allows the symbols of the programming language to stand for symbols of a lower level language or for elements of the computer architecture is the code, (aptly called the *interpreter*), that translates the language to the lowest level computer language (machine language) and allows it to be executed. Machine language refers directly to the hardware. As far as semiotics within the computer is concerned, the hardware is the ultimate signified.

happens at all. *There is either full, perfect, univocal comprehension, or none at all.*

A computer program will never do something unexpected because it thought you meant something else, only because you *told* it to do something else. That is why the computer is an impoverished semiotic machine.

The computer can be programmed to *seem* to return random or 'fuzzy' results. It can be programmed to recognise when two words are similar to each other in a certain way, rather than to simply compare them for an exact match. However, this does not mean that the computer recognises *similarity*, just that is being programmed to recognise *sameness* at a smaller granularity - say at the level of syllable rather than word.

When a human is the reader of a semiotic system, there will always be connotations, a spreading activation of associations, recognitions of similarity; with a computer, never. Thus when Bolter says "What the computer promises is the embodiment of semiotic views of language and communication: that is, the views of Pierce, Saussure, Eco, and others." (Bolter, 195) He is mistaken, for the semiotic views of these people are more complex than those that allow for the computer as a reader. The computer can only be the medium. It is as a medium for semiotic systems that the computer is really a semiotic machine.

The Limitlessness of Semiosis

Ultimately Bolter argues, "the computer takes us beyond deconstruction" (204). He reaches this conclusion by saying that the computer provides a "new view of signs" (204). This new view is a realisation of the fact that semiosis is self-contained, and cannot touch the real world in any way. This realisation does away with the need that poststructuralists feel to refute the idea of the transcendental signified. Bolter says "All of deconstruction's work is to show that the transcendental signified cannot be achieved" (204). Thus the deconstructionists insist on an

unlimited process of interpretation, an unlimited semiosis. The computer makes this insistence obsolete, because its semiotic nature forces the user to realise that “the topical elements they create are arbitrary sequences of bits made meaningful only by their interconnecting links”(204). Now “there is no infinite regression, not because the reader eventually reaches the transcendental signified, but rather for the mundane reason that the resources of the machine, though vast, are always finite”(204).

Certainly the computer makes apparent the semiotics that define its function. However in this making apparent, the computer simplifies and unifies its semiotics. It is my contention that ‘you can’t have your semiotics and make it apparent too’. Bolter’s argument is that the computer is a finite environment, and yet semiosis is contained within it: “The computer is a self-contained world in which the whole process of semiosis can take place”(197) In fact the computer is a self-contained world and this is why the whole process of semiosis can *not* take place within it.

In order to show how the process of semiotics can take place within a limited domain, Bolter takes the example of a dictionary, explaining that “If we had the patience, we could examine all the words in the network of definitions contained in the dictionary. . . we could exhaust the dictionary’s writing space”(203). That is due to the fact that “A sign system is a set of rules for relating elements. . . the system they generate is self-contained. There is no way to get “outside” the system to the world represented, because, as in the dictionary, signs can only lead you elsewhere in the same system.”(197). Bolter confuses semiosis with individual systems of semiosis. The world of semiosis *is* self-contained - we cannot get beyond it to any ‘real world’ - individual semiotic systems are not. A dictionary is not semiotically self-contained. Following a trail of signs will not merely exhaust the dictionary (and therefore somehow the whole process of semiosis), but

rather lead one out into other sign systems by reference to interpretants belonging to other sign systems. Bolter says "We can only define a sign in terms of other signs of the same system"(197). He is confusing the signified (defined by other signifieds within the same s-code) with the sign (defined by interpretants from the same or other systems). Even in his example, the dictionary, we often find ourselves explicitly led out of the system of words by small pictures imbedded in the text¹⁹ (not to mention reference to Greek, Latin or other root words, etc) that act as interpretants, and draw us into the larger world of semiosis.

Anthropomorphism

In his attempt to show that the whole process of interpretation takes place in the computer, Bolter not only plays down the complexity of interpretation, but also exaggerates the capability of the computer:

... in [hypertext] signs also become active outside the mind in the electronic circuits where the text itself resides. The reader must therefore learn to read in a new way, by cooperating with a text that is directed by its own economy of interpretation. The interpretation and therefore the meaning of a text is generated by the interactions, the attractions and repulsions, of two poles: one pole is the reader's mind as he or she faces the surface of the text, and the other is the data structure located behind that surface. Both poles may be constantly responding to one another, making and breaking connections,

¹⁹ See for instance Webster's Dictionary.

perhaps altering the words themselves of the superficial text that lies between them. (198)

Bolter talks here of an active computer; one capable of participating as an equal with the reader. His phrase “outside the mind in the electronic circuits where the text itself resides” is telling: it opens itself to being read as stating that there is a ‘mind in the electronic circuits’. This accidental ambiguity illuminates the anthropomorphism underlying Bolter’s argument; an anthropomorphism which sees data structures as active - “responding”, “altering words”, etc.

This anthropomorphism results in the idea that the computer can be the receiver and sender of semiotic messages: “In earlier media such as the printed book, the signs only referred potentially to other signs. However, the computer as a text that can seem to read and write itself also provides its own semiosis.” (196). At the heart of this semiosis for Bolter, are the hypertextual links - “acts of interpretation that move the reader from one sign to another.” (199) Hypertext differs from print in the respect that because in print we must turn the pages (“we must move from page to page, looking up definitions, if we are to set in motion the play of signs” (198)), the reference really occurs “in our head, not in the book at all” (198), whereas hypertext does “duplicate within itself the process of interpretation” (199). It seems that somehow the ‘ghost in the machine’ turns implicit reference to explicit semiosis. However, unless advances in Artificial Intelligence can give the computer inferential powers equal to that of a human reader, the reference will always occur in our head as much when we read with a computer as it does when we read a book.

Bolter’s mechanistic view of semiotics allows him to place the site of the semiotic process within the computer where it cannot be. A sign is only a sign when it is interpreted as such and a computer can never interpret, only follow a list of instructions. He continues to talk of the hypertext as an independent agent

("the structure can alter or regroup its elements behind the screen as we look on"(197)). . He asserts that once the writer has set up the hypertext, the computer acts "without the direct and continuing intervention of author or reader." A computer does seem to act by itself, but it can only do so because of a specific list of instructions which it carries out - instructions that are written by a human author. A computer acts "without the direct and continuing intervention of author" only as much as a book can be said to act so by continuing to have words on the next page and the next even when the author is not present.

It is interesting to compare the computer's 'continuance of action' to writing and print's continuance of meaning. Both can be seen as the characteristic that sets each medium apart from the media that preceded it. Derrida privileges writing over speaking because of writing's continuance of meaning; similarly we may see hypertext's continuance of action as the reason hypertext critics privilege hypertext above print. Certainly the continuance of action is one factor giving the computer its power, but we must not allow it to incite an anthropomorphism of the computer.

In the 1990s it is easy to assign to the computer more and more human qualities. We are used to discovering the computer taking over roles previously only filled by people. As Andersen says "We receive letters untouched by human hand, decisions about our financial affairs are made by computers . . . The computer is seen as the incarnation of the impersonal system that functions without human intervention" (Andersen, 121). Telecom even gets its computers to ring you up and coerce money out of you. The distinction between what a computer can and cannot do is unclear to many. In science fiction, computers often exhibit amazing behaviour, some of it true to life. One of the features of sci-fi computers that is the most fantastic is also the one that is most taken for granted by viewers - the attribute of speech and language. Because to a human, speech is simple and intuitive,

whereas building an electron microscope is difficult; we may be forgiven for making the assumption that a computer that can be made to do the latter should surely easily accomplish the former. To date no computer even comes close. As Andersen says, "A strict functional analysis of what happens when machines seem to exhibit intelligence or master a language, will give the result that it is really the designer or programmer that shows his faculties through the machine."(137)

The pathetic fallacy that Bolter seems to encourage has an interesting corollary. Not only does the computer become human, but the human becomes computer: "Texts themselves become programs that the writer builds and the reader executes"(Bolter, 200) For Bolter here, the text has become a program, the reader a computer. The two acts of interpretation (a human reading a text and a computer executing a program) cannot be equated. A computer is no more human than a person is mechanical²⁰. The computer acts only insofar as any other machine acts. Its illusion of action does not constitute an act of interpretation such as a human makes.

Bolter's thesis leads him to compare a written text to a computer program, saying that "Each textual program embodies a range of possible meanings, many of which even the writer may not have foreseen."(200) Bolter's equation of a text with a computer program ruins his thesis, because the crucial difference

²⁰ People's fears of computers becoming like the evil robots of science fiction and taking over the world are grounded in a misplaced anthropomorphism. In reality it is people that take control of each others lives. A 'Conspiracy Theory of Anthropomorphism' might argue that it is in the interests of some to encourage an anthropomorphic view in order to divert attention from the real, human nodes of power. A theory like this might see the anthropomorphism as providing a diversion, a scapegoat, a paper adversary upon which people might vent their frustration without upsetting the real balance of power. While suggesting this as a possible political motivation for encouraging anthropomorphic views towards computers, I do not wish to imply that Jay David Bolter (or any of the other critics of hypertext) are part of any conspiracy.

between a text and a program is just that in a computer program every meaning is exactly foreseeable by the writer and any reader.

Andersen rejects the analogy between a computer and a human as semiotic machines on different grounds than I have. He compares the concepts of human linguistic *schema* and *usage* with the computer concepts of *system structure* and *system process*. If the computer may be said to interpret as a person does, these concepts will be analogous. However, Andersen finds that the analogy cannot hold, among other reasons, because "Computer systems presuppose a system description, because no system can exist without a system description," whereas "human semiotic schemata can and do exist without any description" (Andersen, 136). He sums up his position thus: "the communication model of user-computer interaction where the computer acts as a communication partner may be a good metaphor, but it cannot be used as a basis for a more systematic understanding of computer systems." (168)²¹

(Just) The Electronic Medium

If, as I say, the computer is not the site of the whole process of interpretation - is neither the writer nor the reader of signs - then I return to my original question: what is the place of the computer in semiosis? The computer is simply the medium through which signs are presented and interpreted by human writers and readers. But the writer-reader interaction is by no means as simple as that

²¹ I would argue that what makes a good metaphor for something often creates confusion when vehicle and tenor are assumed to have more in common than what was first meant. A poetic metaphor has precisely this purpose, to endow the tenor with as many of the qualities of the vehicle as the reader might imagine. Thus when I say 'love is like a rose' the images of beauty, mortality and possible pain are all valid. When we use a metaphor to compare the computer to a human, we open ourselves to the same unbidden uprising of images: not only do we 'talk' to the computer in that we type words into it, but the computer 'interprets' what we type, and therefore knows what we mean, and understands us. We will see this problem again later as a problem that I would term *metaphor by terminology*; where terminology from one domain is applied to another domain similar in some respects. This cross-application of terminology then results in an implicit equivalence between the two domains that is not, in all cases, valid.

with a printed book. In a printed book the text is physically before us, uninterrupted. The author of the text is not before us, but we are well used to the relationship between writer and text, and we never imagine that the book itself speaking to us. In fact, it is rare in literate cultures that an individual learns to read without learning also to write. In the electronic medium it is not so easy, partly because it is a new writing space. Many readers are asked to read in a medium in which they could not be writers. The screen contains many different messages of uncertain origin: buttons, dialogue boxes, menus, icons and more. Furthermore, some of these are messages we can answer, seemingly entering into a dialogue with the computer. We enter a metaphoric world in which the computer is metaphorically 'active'. Andersen explains the real site of this apparent action: "apart from the normal senders and receivers, a third party is always involved in computer-based communication, namely the designer. He or she sets the limits of communication and creates a stock of signs that users may activate but not produce themselves in the same sense as they produce words."(Andersen, 169)

The computer is a communication channel, not the start or end point of the communication. Thus a hypertext is a multi-way conversation, consisting of the voices of the writers of the texts, and the voice of the hypertext designer signified by buttons, links, menus, and the overall structure and metaphor of the system. The user or reader has a voice in that he activates the actions allowed by the designer. While the computer has no voice, it certainly inflects the communication. In the following section, I will examine the nature of this inflection, the semiotics of the computer interface in literature.

The Significance of the Computer

The computer may take another role in semiosis. Before I leave this section, let me look briefly at the computer, not as the medium for communication, but as a sign in itself - a sign that is

subject to interpretation superadded to the interpretation of the signs presented through the computer medium. I will compare the computer as a sign to the book as a sign. The computer raises connotations of its own that complicate its function as a medium; and that are not a significant factor in the semiosis of a book.

Any object may be considered to be a sign in itself. Umberto Eco gives the example of early man using a stone to smash the skull of a baboon (an unnecessarily violent example, perhaps!) Eco asserts that culture is born when the stone is recognised, not just as a stone on the ground, but as the "sign-vehicle of a possible function" (Eco 1976, 23). Similarly a computer, as an object, may be the sign-vehicle for its function or functions. In practise the computer, and people's attitudes to it, (how they interpret it as a sign-vehicle) plays a large part in determining how hypertext is interpreted and used.

The computer and the book may each be examined as two kinds of signs. A book may stand firstly for the concept <book> and secondly for its contents as an individual book, say <Bleak House>. In this sense a computer may stand for <computer> but the second reading is more complex and multiple than that of the book. I shall consider them one at a time.

A computer, is not merely the medium for other sign systems, but is associated with a range of possible concepts such as <technology>, <complexity>, <control>. We may make a distinction between this untrusting reader, at one end of a continuum, and the 'ideal' reader at the other end. The ideal reader is able to read the computer with as little complicating interference from these connotations as possible (the medium may never be 'invisible', but we may say it tends towards invisibility). The untrusting reader may see the computer as a barrier to the communication he is used to. To these readers, all computers may seem as one, all standing for the same thing, and any further readings of signs through the medium of a computer

are touched with this perjorative context. To the ideal reader of a computer as a sign, the computer is merely the medium of any number of signs. All computers to the ideal reader are different, and represent their function - the work that may be done on them: their applications: Games, Word processing etc.

Where a book as a sign may stand for its content, <Bleak House>, a computer must stand for a range of possible contents. For even an individual example of the sememe "computer" almost always has more than one content. There are some examples of computers that have only one content - the computer that measures and displays the level in your petrol tank. However this is at the very lower threshold of the definition of the word "computer", and indeed a computer might usefully be defined as a flexible and *multi-purpose* electronic tool. We stray however into a definition of "computer" which is irrelevant here, except to note that a computer cannot stand univocally for its content in terms of transmission of knowledge as a book can. If an individual computer as a sign can signify any one and single thing, (apart from its very multiplicity) it could only be the collection of hardware and software elements that define its ability to be multiple, that define its function. Thus the computer I write on now may be a sign for its 4 megabytes of RAM and 68030 chip, its 342 x 512 pixel screen, its 8 bit bus and its Macintosh operating system. It is the fact that a computer can only, univocally, stand for this complex and technical group of features that make it difficult to interpret for many readers, and perhaps accounts for some of the mistrust I noted above.

A hypothetical empty book, like a computer, may be a sign for a multitude of possibilities, the medium for an infinite number of possible communications. It has certain features that must dictate what subset of possible texts can be contained by it: It has a certain number of pages, of a certain size and it has one kind of binding. In other words, it has certain limits. However, though it

tion (and as a sign raising its own connotations), I wish to move on to consider the first question.

What is the place of semiosis in the computer interface? How does the computer (as a reading and writing tool, as a medium for literature) effect the way those signs are generated and received. What semiotic effect does the computer have on the process that is literature?

In exploring the semiotics of hypertext, in creating a kind of semiotic definition of hypertext, I am mainly concerned with those features that separate hypertext from print - notably the computer interface and the hypertextual links. The semiotics of language, text and reading, while a part of the semiotics of hypertext, would fill several theses and still not help describe hypertext.

Technically, because hypertext need not be implemented on a computer, we should separate the hypertext from the computer interface in our analysis. However, because we are studying hypertext as it is implemented on a computer; the two are, in practice, inseparable - as I have shown in the discussion of definition above.

Andersen defines the computer *interface* as the "collection of computer-based signs, viz. all parts of system processes that are seen or heard, used, and interpreted by a community of users." (Andersen, 129). The interface is what we as users have access to. As such, the hypertext is the content-plane of the sign system of which the expression plane is the computer interface. Content is not independent of form, they are not semiotically separable, so our analysis will consider the computer interface as a part of the hypertext. This study of form along with content is similar to the way some kinds of reader-response criticism emphasise the artifact of the book or page, as well as graphology, along with the 'meaning' of the words - or as *part of* the meaning of the words.

I will start from the smallest component of the hypertext and move through to the larger components, ending up with an examination of the whole hypertext as a semiotic entity.

'Letter Quality' - The Pixel and Virtuality

To the user of a computer, the letter is a formation of pixels on a computer screen. This formation corresponds to a code number standing for that letter (usually in a code called ASCII). That code number is part of a string of numbers representing the text which is stored, for a time, in random access memory (RAM) along with other code, such as the instructions on how to display the letters. The RAM is coded in binary - each number is a string of electronic 'ons' or 'offs' called a byte. If the text is being stored on disk, it is written in binary in magnetic ons and offs. To display the letter, the computer follows a procedure which takes as its inputs the ASCII code number of the letter, and information as to the font, font size and spacing and position on the screen. The result of this procedure is a list of the pixels that must be turned on to display a letter on the screen.

The letter is part of the semiotic system of language. Like a phoneme, it has no significance on its own; but the alphabet forms an s-code which has rules of collocation. The physical manifestations of these combinations form the meaningful expression-plane of written language. What is the difference between a letter on the screen and a letter on a printed page? The bare minimal difference, first of all; the difference if the screen letter is trying its hardest to imitate a page letter. The difference is none: semiotically they are the same sign, taking part in the same system of signs. However, in interpretation, connotations arise as a consequence of the medium through which the expression plane is manifested.

Sometimes the medium may seem 'invisible', it may seem to arouse no connotations of its own. However, I would venture that even in the medium of print, connotations due to the

medium always arise, even if the reader is not always conscious of them. For example, we may be reading a book with a font that is in some way unusual. A very old book, or a book in which a noticeably different font is used on purpose - say a Gothic font for a horror book. In advertising we can see many examples of the font being used to arouse certain connotations; for example a 'crazy' font to advertise a sale, or a fonts that support certain themes in the advertising. The courier font, which imitates a typewriter typeface, may be used to suggest the text is homemade, or straight off the press. In his short fiction "Word Authority More Habit Forming than Heroin," William S. Burroughs uses the courier font along with non-alphabetic typewriter symbols to support his stream-of-consciousness style prose.²²

Even when the font is not foregrounded by the writer, as in the above examples, it is used *significantly* in the print medium. Bold fonts are used to signify headings; italics for titles; quotes or emphasis and superscripts to signify a reference to a footnote. The screen letter adds more possibilities of connotation to those of the print letter, adding more possibilities of signification to the electronic text.

The screen letter is either glowing, or on a glowing background, and is being electronically updated several times a second (in fact just enough times per second to give the illusion that it is static). The screen letter is on a computer screen displayed vertically. Rather than being a continuous, analog shape, the screen letter is made of discrete dots, called pixels. The resolution (pixels per square centimetre) of the computer screen determines how closely the pixel formations can imitate continuous shapes. A straight, horizontal or vertical, line is easy, but curves and diagonal lines are problematic. Low resolution

²² William S. Burroughs. "Word Authority More Habit Forming Than Heroin." In *Breakthrough Fictioneers*. Ed. Richard Kostelanetz. Barton: Something Else Press, 1973, 198-202.

screens make obvious the fact that the letters are only pixel approximations; serif fonts are particularly ungainly in low resolution. In the early days of computer science, special computer fonts were developed that could be easily read on a low-resolution screen, and these clearly connote their computer origin. Ironically, these low-tech fonts are often used to give a 'hi-tech', computerish feel to movies or book covers. However, nowadays screens are capable of producing almost 'letter quality' resolution.

The pixels signify the attribute of the screen that is most unlike print. They have the potential to change. They are fleeting. The actual physical space upon which you may place your finger, the pixel at the end of your fingernail, may - simply by being on or off - be occupied by any letter, any word, any text imaginable. The text carries within it the ghosts of other texts underwriting this one on the screen - by extension, one has the sense that it 'covers' every text in the world - not in allusion or literary influence, not in unlimited semiosis of ideas but in its very physicality. This is the immanence of the computer writing space. All other writing may exist within the same space. All that is now absent is physically spoken of within what is present (is immanent) and may at any time become present itself (is also imminent).

This is in contrast to writing in print where all other writings may be metaphorically, conceptually immanent but where the physical form is univocal. If the corpus of literature is a conversation of which each text is a sentence, a computer screen is like a tape recorder that can play any part of the conversation at any time.

I have been talking about the physicality of the pixel. In fact the pixel has no real physicality. It is described as being *virtual*. The Oxford English Dictionary defines something that is 'virtual' as something "That is such for practical purposes though not in name or according to strict definition." So a screen letter is a

virtual letter, not really a letter at all, just used as if it was one. This is in keeping with the description of the ideal screen letter as being of 'letter quality', a phrase which seems to suggest that the screen letter is never really a letter though it may approach the quality of one.

If the above is an 'up-side' of computer screens as writing spaces, in the sense that it corresponds with current literary thought in which texts speak through each other, there is also a down-side. The text, the letter, the word on the screen now is fragile and fleeting. In Derrida's terms it is 'sous rature' - under threat of erasure. It may seem to have no certain future, able to disappear from one moment to the next. The letters and words, on a screen, may signify not only the possibility of other letters and words, but the possibility of their own disappearance. Their physical existence is questionable. Where are they? They occupy no space. They carry no weight - literally, and perhaps, by extension, also metaphorically.

Actually, virtual letters and texts *are* enduring - it could be argued, more so than print texts. What makes a screen text at least as enduring as a physical print text is the binary representation's ability to be stored, retrieved and duplicated. If the very *ease* and efficiency of storage, retrieval and duplication can overshadow the pure physicality of print, then we can argue that the computer text is indeed more durable. Most texts nowadays start out as binary. They are written and stored on computers, while being read mainly in print form. A text may be kept on hard or floppy disk. It may be given away and kept at the same time; sent down phone lines and appear on a screen at a remote location; and then printed out to physical form. All of these possibilities are connoted by the screen representation of a text. It is at once fleeting *and* enduring. It is simultaneously non-existent and multiple.

Thus the electronic text is essentially dual. We must take caution in assigning primacy or privilege to either part of that duality as Landow does in *Hypertext*, calling the text on disk the "electronic primary version" (Landow 192, 19). Although the stored version is the version that has the permanence that I spoke of above, it is only through virtual versions of the text that we can read, copy or transfer it. In a real sense, the disk version is only an intermediate code, a channel of communication. In *A Theory of Computer Semiotics*, Andersen warns against assigning primacy to the disk version of the text, recommending attention be paid to the sign as it appears on the screen, as we produce it, as we read it. His warning is directed mainly to programmers and hypertext designers, who could be forgiven for privileging internal representations, English scholars cannot.

Another feature of the electronic letter is that its manifestation may change over time; not randomly, but according to some rules that allow it to be interpreted differently from time to time according to its form. For example, imagine a hypertext in which each word may or may not be linked to other texts. It may be a large hypertext that is continually being added to. A word containing a link may be identified by its screen characteristics - a word in bold face containing a link, a word not in bold not containing one. As the hypertext grows, more links are added. Words that today have no links, tomorrow have links and are in bold face. In this way a text gains another form of changeability - a text may change over time, a single word may have significance added to it and taken away in a fashion unavailable to print text.

This temporal changeability has further possibilities which remain largely unexplored. Texts may be imagined where whole words may change (regional spellings could be substituted). Whole sections could be substituted for others, omitted, or altered slightly from reading to reading. Thus the text would be in some way a new text on each reading. In a non-fiction text, this change

could be sensitive to the context in which the text is being read, to the nature of the reader (links to certain advanced material could be omitted for novice readers and so on). In a hyperfiction, this change could be so that a story remains interesting on a second, or third reading. Indeed, this changeability is a feature of some current hyperfiction such as Michael Joyce's *Afternoon, A Story*.

The Word

In hypertext, in that a word is the smallest meaning-bearing unit²³, it is the smallest unit that is able to carry a link. Every word in a hypertext has the potential to be linked to every other word, in this text or in any. So one of the connotations of a word is <possible site of a link>. This will be further talked about in the context of the semiotics of a link. Apart from this important difference, and the virtuality we examined above, the word is essentially the same, semiotically, in a hypertext or on a page.

Sentence and Line - How the Text has Changed

At first glance, the physical and virtual representations of lines and sentences seem to be semiotically equivalent. One aspect of the virtual line, though, gives us a further insight into the nature of the virtual text. This aspect is the possibility of change in representation of the same text in the same physical space. For instance, in a virtual text, the length of the lines may be changed, often by the reader. It is the same text, but there are fewer, longer lines; or more, shorter lines.

When the reader changes an aspect such as the line length, or when she sees it change before her eyes, it reveals to her something which is only usually important to the programmer of the hypertext: the fact that there exists both a screen representation of the text, and an internal representation, and that

²³ It can be argued that there are smaller meaning-bearing units in language, such as prefixes and suffixes. For simplicity I will subsume these under the heading of 'word'.

there is a degree of independence between them. More importantly for us, when the user is able to change the screen representation, it makes the difference between the two entities important semiotically. Because now the reader interprets the screen representation as a not equal to the internal representation, but as a sign for it, whereas before only a computer programmer would be interested in this correspondence.

Often with virtual text, there is this distinction between internal and apparent representations. Internally the text is a list of characters with minimal formatting - paragraph breaks, etc. When presented on the screen the text is fit into the representation demanded by its virtual context. The width of the window and the size of the screen (not part of the internal representation of the text) define the length of the lines and the font size etc. If the user sees only one representation of the text, then the fact that this internal representation exists is of no interest to us, but changes in the virtual representation not only highlight the text's virtuality, but give the idea that the internal text is in some way essential, and the representations are (inter)changeable and therefore inessential to the meaning of the text. The consequence is that the text exists outside of its physical representations. It can change and stay the same.

Of course this is a contentious point from a literary point of view. In particular the New Critics and some reader response critics would argue against this view, on the grounds that the experience of reading the text is changed if the representation is different. In the case of poetry, it is clear to see that we cannot change the length of the lines without changing the text. Is this not the case in any text written for a certain length of line? In theory an author could use line endings as a physical caesura, and thus the physical appearance of the text be part of the rhetorical apparatus; and this must be kept in mind when we claim that the

text exists outside its physical representations. There is no easy answer to this question. Because a printed book is a fixed representation, the question only arises in the print medium when a book is reprinted - which aspects of representation are then essential? Must the pages, lines, font and size of print be exactly the same? Clearly these things are usually (in most genres) treated as inessential; for example think of the number of different editions of Shakespeare's plays there are. However, though we consider these as different representations of the same texts, it is interesting to note that when teaching or performing the plays everyone involved will use the same edition.

In a hypertext that provides different views of a text - as virtual textuality allows for, even encourages - the reader may view any representation as just one possible expression of an underlying essential text. She sees the screen representation as a sign for the 'real' text, which for her is somewhere 'within', 'behind', 'under' or perhaps 'beyond' the screen. We can also say that virtual textuality which allows changing representations answers the question (of what is essential, and what is not) for itself.

Virtuality in the computer interface may be defined as an *extra layer of semiosis*. The virtual text signifies the 'real' text. This layer would be said to be an invisible layer of semiosis (and therefore not part of the semiosis at all) if no connotations were excited in the reader as a result of the virtuality. However, as I will continue to show, the virtuality of hypertext does raise connotations and therefore remains significant.

Window Imitates Page - the Cuckoo Medium

If one was asked to name the largest difference between reading a print text and reading the same text on a screen, the answer would probably be that there are no pages on a screen. The closest thing to a page on a hypertext is a window.

The screen representation is a product of the human-computer interface employed by the program. This simply means the way

that the text is presented to the reader. Variable factors, as we saw above, include amount of information on one screen, text size and font, inclusion of graphics, etc. Some hypertexts, in an effort to be more readable, take on the metaphor of a book that dictates the appearance of their interface. In a book metaphor interface (such as that employed by Intext), the screen has graphics on it that appear book-like. The text is within these graphics in black on white. The text may be divided into pages, which can be metaphorically 'turned'. It may be even more elaborate: for example, indicating how far through the 'book' the reader is by graphically showing varying amounts of 'pages' on the left and right hand sides of the screen book (pages read and pages left to read); or having the virtual analogues of bookmarks, curled pages, animation that imitates pages turning, and so on. The aim is to encourage the interpretation of linguistic signs with as few medium-caused connotations as possible, or more correctly, with the same connotations that arise during a print reading. In short, to make the communication medium as invisible as possible.

No medium can be completely invisible. But for our purposes, we may define an invisible medium as the one through which we usually expect to receive a certain kind of text. For example when we see a love note on a billboard, our attention is drawn to the medium as well as the message (because it is an unusual medium for that message) whereas seeing an advertisement on the same billboard brings no attention to the medium. Or when we see a shopping list printed in a book in the form of a poem our attention is drawn to the medium again. Many people are unused to receiving any kind of text (least of all literary) via computer, hence the computer continually denotes, connotes and generally draws attention to itself and away from the text.

By disguising the hypertext as a book (supposedly the medium a text usually comes through) developers hope to make the

medium invisible. Of course which medium is more readable²⁴ depends entirely upon the reader and the text. The text "We've got your dog, give us \$50,000 or else" may be more readable written in bits of cut-out newspaper stuck onto a piece of paper wrapped around a rock and thrown through a window. Whereas a bank statement on this medium would be most unreadable. Hence readability in this sense is not an objective measure but depends on the type of text expectations and competence of the reader. An attempt to model a Human-Computer Interface for a hypertext on a book is simply an acknowledgment that readers expect texts to appear in books²⁵. As reader expectations change, this attempt will seem as superfluous and silly as making soyabean products taste like meat for vegetarians²⁶.

Further complications may arise in the use of a graphical metaphor such as that of the book. However close the representation may seem, and however much this aids readers in understanding the actions they must carry out in order to read the hypertext, the book metaphor must, while connoting <book>, also connote <book metaphor>. The very devices of imitation draw attention to themselves, as devices of imitation are often supposed to - whether it is stated or not. When we admire a model of a car, or a dolls' house; or if we visit a wax museum; part of the entertainment we enjoy is the appreciation of the imitation,

²⁴ I am suggesting an inverse proportionality between visibility of medium and readability of a text in that medium. The more attention is drawn to the medium through which a text is presented, the more attention is diverted from the text itself, and therefore the less 'readable' is that text in that medium.

²⁵ Hypertext is by no means the only example of this. Many computer texts are presented as nearly as possible to their real world counterparts for ease of learning. An example is form-filling programs in which clerks fill in on-screen forms designed to look just like paper ones. Often the ease of learning that is gained is balanced by an inefficiency of speed once learned. Once trained, users are faster entering the same information (or retrieving the same information) from an interface designed to suit the information, not the old paper medium.

²⁶ This refrain will be taken up again later as we look at some hypertexts that have been designed to imitate the writing and reading processes of print.

rather than an interest in looking at the object of the model. Only indistinguishable replicas can fail to bring attention to the artifice of their mimicry. Often a failure to attain indistinguishability brings derision rather than enjoyment. Formica, vinyl, Harveyplank, the shooting of the arrow *over* the flame at the Barcelona Olympics²⁷ are all examples of imitations that get called fakes for trying but failing to replicate exactly enough. Hence the interface, never being a perfect replica, will be interpreted with connotations - either good or bad or both ("it's a fake book, not bad though!"²⁸). In the end the imitation cannot avoid drawing attention to itself, and hence away from the text.

I will return to the idea of the book metaphor when I examine the interface of Intext. Here, it may be important to note that whatever the metaphor used to contextualise the apparatus of the hypertext for the reader, the interface signs will always have a dual nature. While the signs used in the interface stand rigidly and univocally to the designer for system entities; they stand multivocally to the reader for real world entities. The trash can of the Macintosh interface may have a precise and well-defined denotation to the designer of the interface, but the reader is reliant on her competence as an interpreter to decode the sign. She may imagine correctly that she may put files into the can to dispose of them, but she may also imagine incorrectly that she

²⁷ For readers not familiar with this event, I will relate it here. The Olympic flame (representing the continuity of the Olympic tradition) was brought into the Barcelona stadium, and used to ignite an arrow. The flaming arrow was shot across the stadium by a Spanish Olympic archer, towards the brazier in which the Olympic flame burns during the games. Ostensibly, the arrow struck the brazier and ignited the Olympic flame there; but actually the arrow was shot *over* the brazier which was ignited artificially at the exact moment the arrow passed near it. It was very spectacular, and reasonably convincing; but not convincing enough. The Olympic flame was a fake, it was not the 'same flame' that had been brought into the stadium by the athletes.

²⁸ Talking of imitations, fakes and duplicates, Umberto Eco says "The sign aims to be the thing, to abolish the distinction of the reference, the mechanism of replacement." (Eco 1986, 7). To this kind of imitation he gives the name *hyperreality*, employing the same prefix as that which separates text from hypertext. For further discussion of imitation and hyperreality, see the first chapter of Umberto Eco. *Travels in Hyperreality*. London: Pan Books, 1986.

must drag the trash can icon somewhere to 'put the trash out' on Tuesday night in order to be rid of the trash for ever. When the impoverished semiotics of the computer meets the multivocal semiotics of our culture, it is the metaphor that mediates. The metaphor is the third side of the triangle, connecting how the reader interprets the signs with how the designer interprets them.

Let's say that the medium, having been well used over a period of time, becomes 'invisible' and stops drawing attention to itself as long as it remains consistent within itself. Now it is fair to say that the reading of a text on a computer in chunks called pages is semiotically equivalent to the reading of a book with the same pages. Certainly some actions are substituted for others; but assuming an invisibility of medium, the reading experiences are the same, the semiotic activities identical. How close the semiotic activities of physical and virtual text can practically become is a question which we may be able to answer in the future. At present, they remain significantly different.

Pages, Screens, Windows, Scrolling and Illusion of Movement

A computer screen can only hold a certain amount of text at one time. In this way, we may compare it usefully to a page of a book. Like screens of text, the pages of a book are no more than a device to break up a large mass of text into pieces that can easily be manipulated. If the virtual interface is not being designed to signify the pages of the book, it must still divide up the text in some way to fit it onto the screen.

The prevalent devices for dividing up text are the object *window* and the action *scroll*. The window is a box on the screen with text within it. It will usually also have other attributes such as a title, and the apparatus for resizing, moving, closing and scrolling. Interestingly, though the metaphor used is 'window', the screen window has little in common with a real window except that you can see things 'through' it. The view through a screen window is constantly changing. Either the text is moving

behind the window, or the window is moving over the text. A screen window can usually be moved about, change size, overlap other windows, etc. None of these are attributes of real windows. The screen window is a magic window. Perhaps the most important concept involved with the window is that, like a real window, it gives a partial view of something. The window looking onto a file is not the file, but the only way to view the file is through the window. The feeling is given of something which we cannot have complete access to, something only able to be viewed through something else.

'Scrolling' allows the reader to move through the text continuously in either direction. As one line disappears out the top of the screen or window, another appears at the bottom. An indicator, either graphical or textual shows how far through the text the reader is. As a metaphor, 'scrolling' recalls the original writing medium, the papyrus scroll. The scroll is 'underneath' or 'through' the window and moves past the window at the reader's command. By using the scrolling and window metaphors, the designers of computer interfaces provide readers with ready answers to many questions about the screen text: "where is the rest of the text?" (out of sight of the window); "why aren't there any pages?" (because the text is on a continuous scroll); "how can I see more of the text?" etc.

The metaphor of scrolling is most interesting for the *movement of text* that it implies. When we perform the action that scrolls the text, we interpret the consequent changes in the screen as the text moving underneath the window. There is a constant need for interpretation in the electronic writing space. We must interpret not only the pixels as letters etc, but we must interpret this constant motion of the text. All this motion is carefully designed to be interpretable. In fact, nothing actually moves. When we scroll up or down, the whole screen is rewritten to show a new portion of the file. In fact, as I mentioned above, the screen is

rewritten several times a second anyway (just faster than we can discern) so our feeling of stasis is an illusion, as well as any feeling of motion. Things turn on and off, but it is our *necessity to see the text as an object*, as it is in print technology, that compels us to see it as a movement, rather than a turning on and off. The element of time is important here, because the computer is the medium of change. The computer's internal clock is ticking, and while a print text is solid and unchanging, the computer screen can as easily change as stay the same.

Although we are encouraged to think the text is moving, in fact the metaphor of the computer interface demands that it is indeed us, or the window that is moving. The scrollbox moves the same way as the arrow we press. The text moves the other way. So if we move the scrollbox up, the idea is the window moves up over the scroll of text - what we actually see is the text moving down. If the metaphor was supposed to be the text moving, the text would move up when the up arrow was pressed. So the metaphor works against the idea of textual motion. The window is supposed to move, but stays still, the text is supposed to be still but appears to move, in fact nothing is moving, because nothing is an object, and only objects can move.

Pointer - the Reader in the Text

An interface that utilises windows to show the text, will also have some kind of user-controlled pointer. The pointer is an icon which moves about on the screen. The movement is dictated by a device at the command of the user - a mouse or a trackball, or even arrow keys. The pointer can be used for any number of functions. In a hypertext it is used to place the insertion point in a text, to activate a link, to move a window etc.

The pointer is a sign for the reader within the hypertext. The signifier is the virtual icon on the screen, be it a little arrow, a pointing hand, or a wand. The signified is the reader himself. When the reader moves his hand, the pointer moves. The reader

is semiotically represented among the play of signs that is the hypertext. How do we interpret this presence of the reader? The reader seems to leap the boundary that separates the medium of the communication from the receiver; becoming himself represented in the same medium as the text.

The status of the pointer within the screen environment indicates the status of the user with regard to the text. Many environments have changing pointers that indicate what actions are allowed. In hypertext systems such as Hypercard, the normal 'hand' icon pointer changes to a text pointer when the user is allowed (by the designer) to alter or add to the text. The text pointer, like the hand pointer, is the sign for the user and allows the user to position the text insert bar within a block of text. An absence of the text pointer signifies a blocking of the user from participation in the writing. The user is not signified within the text (only outside or over it, with the 'hand' icon) and must be satisfied to be an outside observer as he or she is when reading a book.

That the reader finds himself literally involved in the semiotics of the hypertext interface is reflected in the way we refer to our interaction with a hypertext. As Bolter has pointed out, the reader will say "I'm lost," rather than "I've lost my place." It is a matter for further research to examine and compare the way readers describe their interactions with print texts and electronic texts (including games, databases, spreadsheets, word processing documents etc) to indicate where they place themselves in relation to the text. For now it must suffice for me to say that while a reader is outside the semiotic of the print text, he or she is represented within that of a hypertext.

Representation and Manipulation

When a window is a scrolling window, there is an object called a 'scroll bar' along one side. The scroll bar represents the length of the text. A box in the bar indicates the position of the portion

presently on view relative to the text's length. It is a two dimensional, electronic recognition of the fact that it is important to know how far through you are, as you can with a book. But it is more than that. In many hypertexts, as in the computer writing space in general, *the representation becomes the means of manipulation*²⁹. Using a cursor and a mouse, the scroll box may be moved in the bar and the text will scroll to the new position. So the on-screen signifiers that accompany the text signify not only some state of the text, but also their ability to change that state. When the representation becomes the means of manipulation, the signs take on another level. The signs speak of themselves as signs, not just of states of the world. They become meta-signs. It is this recognition of itself as a system of signs, this drawing attention to its semiotic that distinguishes the computer writing space.

This nature of the scrollbox to be both a representation and a means of manipulation may be generalised to include many signs in the hypertext interface. A hypertext may be not only represented but manipulated in many more ways than with a book, where the pages may be turned and the book brought closer to your face. It is possible on a computer not only to view the text as a continuous whole, but to jump to any place you wish in the text (with word searches, page numbers or links); to change the appearance of the words; even to change the words of the text. In the world of print, the means of changing the text (rewrite and republish), of changing the part of the text that you view (turning pages), and of performing any other manipulation of the text are separate from the representation of the text. In the computer medium, all these processes are represented in the same medium.

²⁹ In the language of Human-Computer Interaction (HCI) an interface where this is possible is called a *direct manipulation interface*. A direct manipulation interface includes objects which not only represent functions or objects, but which can be used to manipulate these internal entities. Objects in a direct manipulation interface are characterised by continuous and reversible motion.

The user participation in a hypertext is often seen as a dialogue between the user/reader and the designer of the system who decides answers to user questions and responses to the user actions. This is a communication with a limited domain of possible signs (since all the responses must be programmed in beforehand), with a strictly defined s-code of signifiers which are the pointer and keyboard actions, interpreted by the designer through the medium of the interface and programming language.

Andersen gives the system of signs through which the reader may communicate with the system a name. *Handling features* are features of signs in the expression plane of the hypertext which allow the user to send messages to the computer via a mouse, trackball, keyboard, and so on. Like words or phonemes, handling features may carry meaning on their own, or a sequence may be needed to make a meaning. So we see that the user has a limited *language* of signs with which to create a dialogue.

When we follow a link, the computer screen changes before our faces. New windows swing into view, old ones disappear, an effect may accompany it. The feeling is of control and subservience. The technology is a live thing at our command, much more so than a print book which is simply there to be manipulated. In the electronic writing space we give the command and the machine works on the texts for us. Sometimes there is a time lapse as if somebody is going away and doing something for us. It is this time lapse which gives the feeling of the computer doing something on our behalf, this feeling that we are removed from the text by one step, that our hands never actually touch it, that there is an intermediary between us and the text, an active intermediary that (who?) might at any moment conceivably veto a decision we make. This removal is an effect of the extra layer of semiosis that is the virtuality of the text. There is no analogue to this in print media, nothing between us and the physical text.

Frankenstein's Text

I noted above that the electronic text seems like a live thing at our command. The mistaken view that the text is in motion gives rise to the idea of the *animated* text. The idea of animation can be seen from two sides. Firstly, the text is animated just as film and video is animated. The changing text appears to move as the rate of change crosses our perceptual threshold. This gives rise to the qualitative difference between text and hypertext that I discussed in the last chapter.

The second side to the animation of the text is related to the anthropomorphism of the computer that I discussed above. The animated text is indeed a live thing. We may imagine, as I stated above, that there is some agent controlling the text for us, or we may imagine that the machine has animated the text just as Frankenstein animated his monster. In his paper "Magister Macintosh," Richard Gess describes hypertext authoring as if he was building a monster: "watching my linking and layering accumulate into something that behaved like a life-form ... the inert lines of text became sentient,"³⁰ and later, "I wanted to make a mind, feverishly free-associating, that would use that illusion to invade that dark space in each reader's skull and take it over. Something alive." (41) It is the animation of the text which separates text from hypertext, which allows it to jump to our command, to distort itself at our will and to destabilise itself at our order. When text becomes hypertext, *anima* becomes *animus*, the machine is inspired, and the control we have over the text is supplemented by the fear that the 'monstrous' text may some day escape our control.

³⁰ Richard Gess. "Magister Macintosh." *The Drama Review* 37, 4 (Winter 1993): 39.

Multivocal Media - the Flat screen Babel

Air is a medium for many, diverse sign systems. As the carrier of sound, it is a medium for speech (in any verbal language) and other sound-based sign systems like music and the electronic beeping of a microwave oven. It is also the medium for wave-based signs like radio and television, themselves media capable of presenting different semiotic systems. In a similar way, the computer screen is a rich medium, filled with signifiers from many different s-codes and sign systems. Even the most basic hypertext imaginable will use different semiotic systems, all presented through the one medium.

One semiotic is that within the text. The words are signifiers. The interface is another s-code, or group of s-codes, consisting of icons, menus, windows, pointers etc. The hypertext itself, with its text blocks and link markers, is another system of signs. Not only are these signs part of different sign systems, but they are different types of signs. Icons like the pointer are pictorial signs, requiring different kinds of interpretation from the word-based signifiers of menus and text. So we have what is like a babel of languages and of kinds of languages on one screen, on one extremely flexible and malleable medium. Sometimes the same sign can belong to different codes at once. The word 'insert' might be in my text as well as on my menu, and signify two different things. Only its context - where it is on the screen, what font it is in, what kind of pointer can manipulate it - identifies which s-code the 'insert' belongs to.

As Bolter says "The unified character of the electronic space is unusual, though not unprecedented in the history of writing." (Bolter, 72) Egyptian hieroglyphics and medieval illuminations are both examples of different kinds of sign systems mingling in the same expression space. Kurt Vonnegut can be seen as experimenting explicitly with a mixture of sign types with the pictures within his text. Even a sentence such as "there are

1,235 people there” is a mixture of phonetic and non-phonetic codes. But the screen is perhaps the most flexible medium: “On the screen . . . verbal text and image interpenetrate to such a degree that the writer and reader can no longer say where the pictorial space ends and the verbal begins” (Bolter, 74). True the codes intermingle, but they do so on a side-by-side basis.

Although there is a babel of sign systems, the competent reader of a well-designed interface can always say where one system ends and where another begins.

It is the triumph of the digital medium that one single element - the pixel - can so flexibly combine and recombine to render the computer screen the multivocal meeting place of signifiers that it is.

The Link - A Semiotic Device

So far I have been discussing semiotic traits that, while inseparable from the practise of hypertext, are not definitive of it. The link is the defining characteristic of hypertext and is in itself a semiotic entity in that its function and its meaning are a reference to something else.

What is the place of the link in the semiotic system of hypertext? Let us begin to answer this question by dividing the link into its parts. A link consists of its virtual expression which the reader sees in the text; the mechanism of the link, which can be characterised as a pathway; and the link destination.

The virtual expression of the link may be called the link *marker*. Every text in a given hypertext may have markers within it that signify links to other texts. The links are a part of the text; and the text, like all texts, is made up of signs and systems of signs: the language, the story, and all the things the structuralist critics might examine. The links are a different kind of sign within the text. They are a sign that has, as its expression, a physical marker within the text somehow. It may be attached to a word, a phrase, a paragraph or to the text as a whole. The marker may be

manifested in any way. It may be a box around a word, an asterisk, a superscript number, or the underlining of a paragraph. If there is more than one kind of marker in a hypertext (signifying different types of links), they may form an s-code of different markers performing different kinds of links, or links to different kinds of texts. The markers as an expression plane may then gain meaning by the differences between them, as phonemes do. They may gain further meaning from an attached icon or word - for example the Intext link "To Story".

What does the link marker signify? It signifies both another text, and the path to that text. Let us divide the possible link markers into two broad categories. Firstly there are those link markers that carry no clue as to the destination of the link. It could be said that the marker denotes the link which denotes the destination text. However, since the link is only accessible through its marker, it is hard to see how a reader can have access to it as a signifier. The text is *connoted* by the link which is the referent of the marker. The reader interprets the marker as signifying an item <link>, which has semantic markers (meaningful items that make up its intensional definition) including 'leads to a text'. In this way the marker denotes the link and connotes the destination.

The second kind of link has a marker that includes some mention of its destination, i.e "To Story". This kind of link is profitably compared to a road sign giving directions - say a yellow AA sign with a name and a direction. The road sign denotes both a route and a destination. In the same way a hypertext link marker denotes the text it leads to and the link that leads there.

If the link marker gives no indication of the destination of the link, then to follow the link is to learn to name it. The text at the end is the interpretant of the link. It provides the link with a meaning. An unidentified link is presented, then identified by means of the text at the end of it. Now the reader has a new

competence: when he sees that link marker again it will denote the link and its destination.

Link markers, then, are the signs of other texts within a text. They are also signs for the link that will lead to the other text. In this sense, they are the signs for a possible action, an invitation (or possibly an order - "go here") to the reader to branch to another text. The link marker is the site of this possible action, and as such, is a 'button' which the user can press to initiate this action. Now the marker is a part of a communication not from the designer/writer to the reader, but the other way around. In activating the marker the reader interprets the marker as the expression plane of the link. The reader also uses the marker as the object of her action, and the marker is used to carry a message (ultimately to the system designer) to say "do this action". The reader uses a marker as he would use a voiced or written command and the marker is the medium through which the hypertext system interprets the user's sign. The expression is the 'mousedown' event, the medium is the marker and the content is the command that compels action. Now, what happens inside the computer is of no concern to us; but what is important and meaningful for a discussion of hypertext is that the reader sees items of the user interface as media for expression - both from the computer (or designer) and to it. The reader interprets the link marker as both expression and medium of two different but coinciding semiotic systems. This is not so for a book. The signs in a book only ever form the expression plane; no matter how you manipulate a printed reference mark, you will not traverse the signified link. One could argue that the paper can be a medium upon which the reader may write something, but the blank parts of the paper are not also expressions which say "use me to write on" any more than anything in the world that can be written upon does - a softball glove or pillowcase, etc.

Here, I reiterate the fact, discussed above, that the expression plane of hypertext becomes the medium for both representation and manipulation. Returning to my definition of hypertext, we now see that this is a further way in which hypertext is qualitatively different to print text. In hypertext the expression plane may be used to manipulate the text, to follow links, whereas in print text this is not the case. We may now define hypertext as “a collection of linked texts; where the expression plane and manipulation plane of the links coincides”.

Link As Interpretant.

At a detailed, microscopic, level, the above is the semiotics of the hypertext link. However, if we switch the scale of our vision, we can see that the link plays another semiotic role in relation to the hypertext as a whole.

It is possible to see the links as the interpretants that allow one *text* to signify another. Eco also says it (the interpretant?) may be “the index which is directed to a single object, perhaps implying an element of universal quantification (<all objects like this>).” A link does not function as a universal quantifier. It does not define one text in terms of others, but it does support the signification of one text through another. Of course this can be a never ending chain. Text signifies text and thence, through other links, other texts.

Hypertext links underpin the intertextuality of a text by providing interpretants for the existent intertextual semiosis of allusion and other literary reference. Eco describes one form the interpretant takes as “the equivalent (or apparently equivalent) sign-vehicle in another semiotic system.”(Eco 1976, 70). A hypertext link placed by a system designer provides the ‘sign vehicle in another semiotic system’ for the existing intertextual link. Of course this intertextual link as a semiotic entity already has other interpretants that exist in the competence of readers;

but the link is a physical (or rather virtual) manifestation of the interpretant that makes explicit signs of one text in another.

The idea of the link-as-interpretant is obviously different to the interpretant of a link. When a link signifies a pathway and a text, this reference is underpinned by the program code that allows the link to be traversed. Although this code is not available as a semiotic object to the reader, it is the execution of the code (visible as the 'movement' from one text to another) that is available as the interpretant of the link.

Link as Sign

The concept of the link, then may be likened to the concept of sign with which I started this discussion. The word 'link' stands not only for the link marker, but for the whole link-function including the signification of the text referred to. Like the sign, the link can be separated into link expression, content and interpretant. It is the sign-like nature of the link that makes hypertext very semiotic in nature.



PART II. EXTENSION

Intext

A Small-domain Hypertext

..... Intext is a system for the authoring and reading of small-domain hypertext tutorials. Each Intext tutorial centres on a literary text, usually a short story. This text is surrounded by related texts to form a hypertext environment which a student may explore.³¹

In any short story taught to students of English, there will be many features which a teacher will want to bring to the students' attention. These may include stylistic features, allusions, features of narrative or character etc. The Intext system has its genesis in the difficulty of providing students with printed resources that link the comments the teacher wishes to make with particular passages in the text. Often separate study guides are provided which may refer to the text by saying "The mention of 'hats' in line 5 of page 22 is repeated on page 33 (line 14), page 34 (line 23) and on page 44 (line 3)" This method is unwieldy and prevents a comprehensive examination of the text being available to students.

Intext provides a hypertextual solution to this problem by allowing words or phrases in the text to be linked directly to comments by the teacher. While reading the text, the student has the teacher's comments available at the click of a mouse. Furthermore, the text is

³¹ I developed the Intext tutorial system with David Dowling while I was on a Massey University Summer Research Scholarship in 1991. At time of writing the system is being used in several schools throughout the country. I wrote the Intext Authoring System in 1994 as part of this thesis.

surrounded by contextual material that the student may explore. Alongside the teacher's comments are a lecture by the teacher, a set of critical excerpts, a multimedia biography of the author, a bibliography, and a glossary of literary terms.

The student may further interact by annotating the text (and the teacher's comments) himself. His annotations may be gathered together and worked into an essay.

The Intext logo (see the title screen of the Author Stack, below) illustrates one of the primary aims of Intext. 'In' and 'ex' are highlighted to show that Intext is designed to enhance a readers movement within and without the text; to allow the reader to examine the text closely from the inside, and to move about in the context; to provide intratextual and intertextual links to aid study.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The Intext tutorials are designed for teaching literature to late high school and undergraduate university students. It is important to stress that the tutorials are not supposed to replace the traditional means of teaching literature at school or university, but to complement it. They are particularly useful in distance learning situations, where student access to tutorials and lectures is limited. In these cases, Intext imitates the dialogue between teacher and student. Each student can be given their own copy of the Intext tutorial on floppy disk (or in their partition of the hard disk). They can they feel free to read and annotate that copy. The teacher may assign the students written exercises to complete within the Intext tutorial environment.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The Intext system supports a pronounced division between author and reader. Although the reader may annotate the text and the teacher's comments, she cannot

The Authors and the Readers

otherwise alter the tutorial that the teacher has authored. The Intermedia system implemented at Brown University supports a much more equal relationship between writers and readers. However, the Intermedia system is a centralised hypertext in which all the readers and writers have access to the same copy of the texts, allowing a collaborative method of writing (See Landow 1992, 95-100). Students using the Intext tutorials each use a different copy of the text, so the collaborative writing opportunities are not available. Intext is more a resource than an evolving literary environment, so the powers of the reader to change that resource are limited.

A Description Of Intext

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Intext is implemented on Hypercard, a hypertext programming environment for the Macintosh computer. The dominant metaphor that controls Hypercard is that of the *Stack of Cards*. The basic unit of information in Intext, as in any Hypercard program, is the card. A user of a Hypercard program views one card at a time. A card contains a graphic background and may contain *fields* of text, and *buttons* which perform actions (such as going to another card). For example, the Intext Text stack contains a card for each page of the text. The text is in a field on each card and buttons connect the text hypertextually to the teacher's comments on the text, to the readers annotations on the text, and to the other pages of the text.

The reader does not need to understand the stack and card metaphor of Hypercard to use an Intext tutorial, but it will be useful for us in this discussion of the Intext program.

..... ■ The Map stack is the usual point of beginning of an Intext session. The main map card (see Fig 1.) has three functions.

Map

Firstly it provides an overview of the contents and structure of the Intext tutorial. Hypertext readers can easily get a feeling of being 'lost in hyperspace'. This map allows readers to get a bird's eye view of the whole terrain. It is useful to orient readers at the beginning of the section, and to re-orient them at any time in a session if they get lost. Secondly, it provides a brief description of each stack in the tutorial, and instructions on how to get there. When the reader clicks once on a stack icon, the instructions for that stack appear. Thirdly, the most important function of the main map card is that of a navigational device. Double-clicking on the icon for a stack will bring up the window for that stack (or, 'navigate' the reader to that stack). The Massey logo icon is the identifier for the map, and appears on every card in the Intext program. This allows the user, at the click of a button, to return to the main map card at any

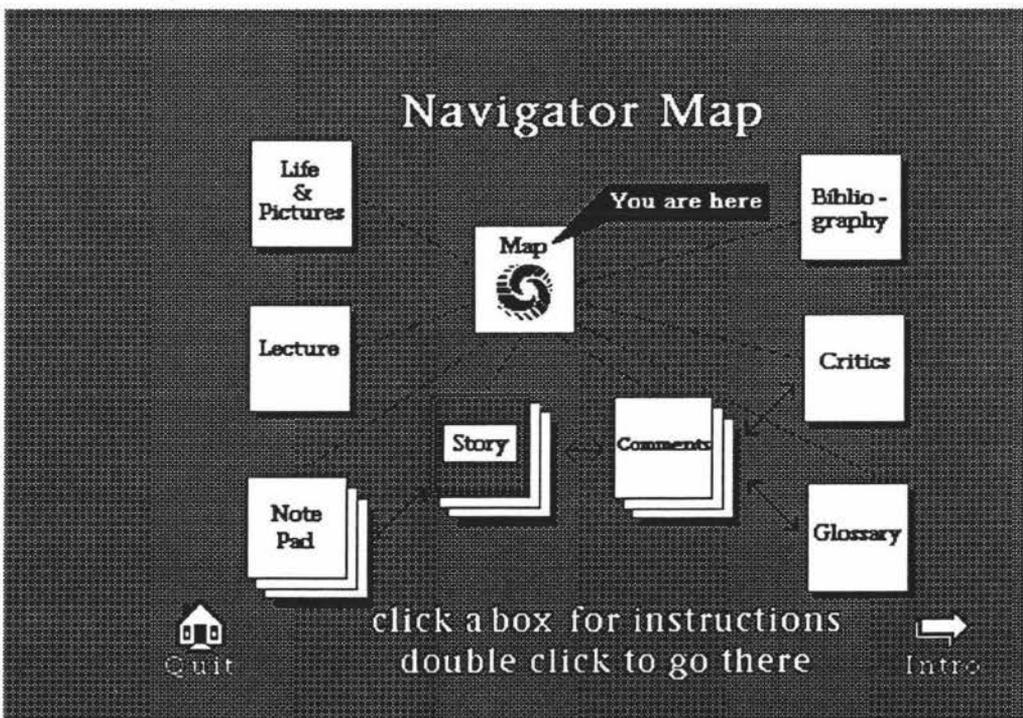


Fig 1. The Main Map Card of the Map Stack

time. Thus any stack in the tutorial can be reached from any other stack, if not directly, then via the main map card.

It seems odd to head a discussion of what is essentially a part of a literary text with the title 'function' (meant in the most mechanical sense), but the main map card is a kind of meta-text that does indeed perform a function. If we are to make an analogy to the world of print, the map is like the contents page of the study guide, the reading list for the class and instructions on how to use the library. It is the part of the Intext system that is 'outside of' or 'laid over' the texts under study. It is what Andrew Monk calls an 'external navigation aid'.³² Because it is not like any of the texts we use in the teaching and learning of literature using print, the map is the only stack for which the design of the interface is not evocative of one kind of print text or another.

Navigation Theory

Hypertext practitioners and theorists identify navigation as one key problem area for readers of hypertexts. Because the medium is new, and often contains large amounts of information in many different formats, and because the information is largely unstructured; the reader may find it difficult to find the information she is looking for. Even when the reader is simply 'browsing' - not looking for any specific piece of information - feelings of disorientation are common (see Conklin, 1987). Various solutions have been offered to this problem, including a personal map which is constructed as the user visits nodes of the hypertext (Monk, 1990) or a knowledge-based system for aiding in navigation (Boyle and Snell, 1990). However, because Intext is a small, fairly structured hypertext, the map I have created should be an adequate navigation device. The map can show the whole extent of the hypertext on one screen, so is not an unwieldy device.

³² Andrew F. Monk. "Getting to know locations in a hypertext." in *Hypertext: State of the Art*. Ed. Ray McAleese and Catherine Green. Oxford: Intellect, 1990, 20-27.

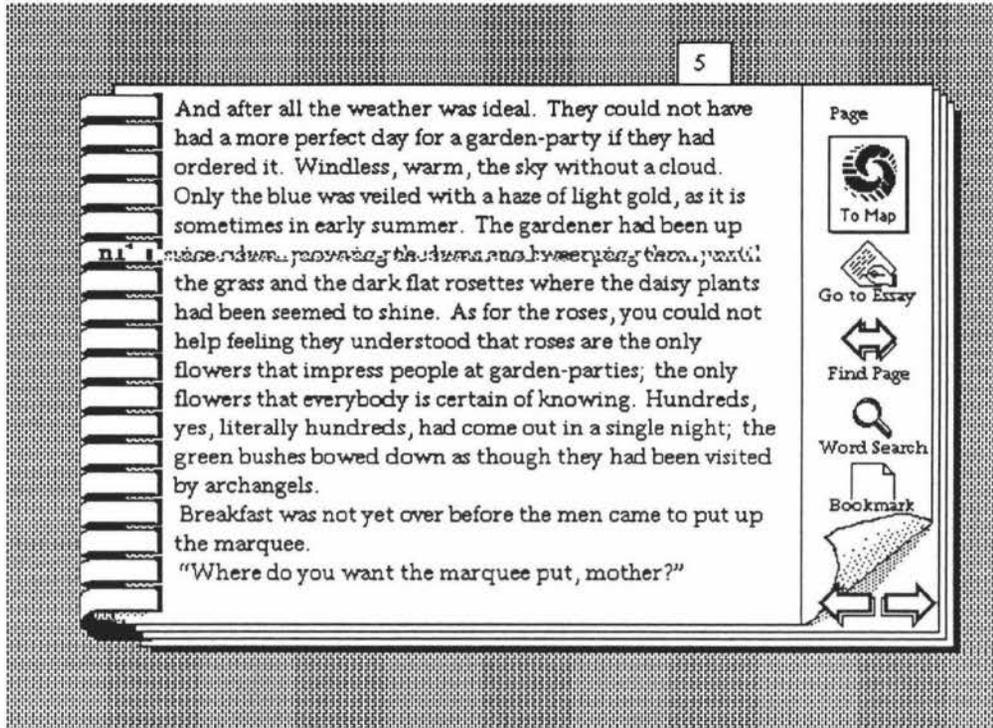


Fig 2. A Page in the Text Stack

Hidden Links

The Text stack is designed to encourage the reader to read straight through the text, especially on the first reading. This is because the texts being made the centre of the Intext tutorials are all texts written for print. They have been 'designed' to be read straight through, and, being short stories, are short enough to make this practical. A text may have as many links emanating from it as the tutor requires. If every link was marked in the text, reading would be hampered by the continual temptation to 'see what this leads to'. Furthermore, the student's initial reactions to the text may be coloured by links displayed like this: the student may assume that the only parts of the text worth taking note of are those that contain links to teacher's comment.

When the reader holds down the mouse button with her cursor somewhere over the text, all the links to text on that page are indicated until the user releases the mouse button. Links are indicated in Intext by text style. Words or phrases that become

boldfaced when the mouse is held down are the sources of links. Clicking on these words or phrases leads the reader to the teacher's comment on that particular word or phrase. In this way the reader can discover which parts of the text have been commented without the links interfering with a reading of the text.

Intext's use of hidden links is a form of filtering. Brown University's Intermedia hypertext employs a different kind of filtering. Intermedia employs a different 'web view' of the textual database for each different use of the hypertext. Each web view is a different set of links laid over the texts in the database. Different web views may include different texts, but a single text may participate in any number of web views. So a reader exploring Darwin's writings as part of a study of Victorian literature will see only the relevant links, and not be overloaded with a profusion of links that are relevant to a study of Biology. Similarly, the hiding of the links in Intext provides a filter to allow the student to avoid the profusion of links related to the academic study of the text, when reading it for the first time.

Navigation and Study Aids

Arrow-shaped buttons, placed at the bottom right of the page (where it is curled up as if the page is turning) allow the reader to go to the next or previous page of the text. The reader can choose the 'Find Page' button to go to any page of the text by entering the number of the page. The page numbers are clearly marked at the top right of the page (see Fig 2.)

Another means of navigation within the text is by the use of the bookmark. At any page, the reader may click the 'Bookmark' button. This places a bookmark (as shown in Fig 2.) somewhere along the top of the book. The bookmark has the page number on it and remains visible no matter which page the reader is on. At any time or place in the text, the reader may click on the bookmark to turn to the marked page. The reader may place up to fourteen bookmarks in the book at a time, and remove and replace any bookmark at any time.

Because the bookmarks have no text associated with them it is easy to forget what they were supposed to note, therefore they are most useful for temporarily marking related passages during study (say marking all the occurrences of a particular motif for comparison) rather than keeping permanent notes. Just as real bookmarks do, they allow instant access to any marked page of the book from any other page. They also make it easy to flick quickly between pages of the book to compare passages of text; without going through the intermediate pages, or using the "Find Page" tool repeatedly.

Permanent notes about a particular passage in the book can be kept by making a note in the margin of the text. When the reader clicks on a ring of the binding next to a line of text, a link marker is placed on that ring and a new card in the Note stack is opened for the reader. The reader may make as lengthy a note as required on the Note card, and it will remain linked to the line of text. In Fig 2. the link marker 'n2' (It is the second note the reader has made in the text) marks the fourth line. Clicking on this marker will navigate that reader to the Note card he made when he created the note. The note function allows the user, then, to annotate the text directly and extensively. The methods of interaction with the text that it provides are analogous to both scribbling in the margins of a text, and keeping a reading journal. The Intext note provides a more extensive 'margin' to scribble in, and adds functionality to the notes that are scribbled. While the actual notes are not visible when reading the text, the notes are instead collected all together, and may be assembled, compared, and compiled if the user wishes (see the description of the Notes stack, below). Seen another way, the Intext notes give direct cross-reference between the reading journal and the text, again adding functionality to the journal.

Down the right hand margin of the text are the navigational tools available to the user. I have already mentioned the Next/Previous arrows for turning pages, and the button for creating bookmarks. In addition there are buttons to go to the Map, to the Essay (see the

description of the Notes stack below), and to go to a certain page, or to find a certain word in the text. It is standard in hypertexts (and electronic texts in general) to provide search mechanisms to enable the user to navigate to occurrences of a given word or phrase. The Intext word simply prompts the reader for a word or phrase, then turns to the next page on which that word is found. By repeating this process the reader could follow that word throughout the text.

The Book Metaphor

The prevailing metaphor of the Text stack is that of the book. The stack is designed to look like a ring-bound book lying open. The metaphor is carried throughout the operation of the stack for consistency: the Hypercard 'cards' on which the text is stored, are called 'pages' in Intext; the text will not scroll as it will in most electronic texts; the device to mark the cards is called a 'bookmark'; the bottom right corner of the page is curled up to indicate the possibility of more text on more pages; and there are no marks within the text (such as link markers).

The book metaphor is a commonly used one in electronic texts in general. In his paper "A hypertext system with controlled hype" (McAleese, 52-63), Ian Benest describes his hypertext displayer called the 'Book Emulator', which Benest offers as the replacement for the "chaotic work environment" (53) caused by the mixing of the desktop metaphor with use of multiple scrolling windows and other information modelling metaphors used in electronic texts. The Book Emulator is designed as a global metaphor for the presentation of all the electronic texts that a user writes and reads. The Book Emulator displays text on a graphic which looks like a book lying open with two pages showing. Page turns are animated. The size of the piles of page edges beneath the pages being viewed shows the user both how far through the text she is, and the approximate size of the text.³⁴

³⁴ These are two orientation factors which users often have problems with in hypertext - see Cliff McKnight. "A comparison of linear and hypertext formats in information retrieval." in McAleese, 10-19.

The Book Emulator structures text with contents at the front, index at the back, and ordered chapters - just like a real book. A reader may even flick to a random page further on or further back by clicking in the graphic area representing the pile of pages edges before or after the pages being viewed. Benest's system, then, is a much more complete implementation of the book metaphor than the one I have created for Intext, but the motivation behind them is the same. Similarly too, Benest utilises the interactivity possible with an electronic text to add functionality that a print book does not have - such as hyperlinked references, footnotes and index.

Although the book metaphor is common, it is not universally embraced. In his summary, Benest states that "the book presentation, with all the engrained expectations that it arouses and the simplicity with which it may be navigated, is both visually appealing and less disruptive during information acquisition than the older 'new medium demands a new approach' techniques that have so far been adopted." (McAleese, 63) The book metaphor, then, allows readers to read easily using techniques of information retrieval that they have been trained in since childhood. The computer can be made to behave as one would expect a printed text to. The drawbacks of this approach are obvious, and indeed the Book Emulator is not the chosen form for presentation of the large scale hypertexts in use today. The book metaphor is arbitrary and artificial in the computer environment. It imposes restrictions on text representation, working against the flexibility of the computer medium.

On the other hand, the book metaphor does have the short term advantages of allowing novice readers to quickly become oriented in a new medium. In a small scale hypertext, like Intext, the limitations of the book metaphor are not unduly constraining (scrolling and overlapping windows, for instance, would not be a distinct advantage to the Intext system) and the constraint is a fair trade-off for the instant familiarity the metaphor gives students. When the printing

press was introduced, it was many years until typefaces were designed for ease of cutting and ease of reading, rather than to emulate the Gothic or Roman bookhand;³⁵ similarly it may take some time before the new electronic medium is used efficiently, rather than to imitate the print medium.

Comments

Each card in the Comments stack is linked to a word or phrase in the text. When the reader clicks the text phrase, the link is traversed and the appropriate Comments card is shown. Every Comments card contains four main fields of information.

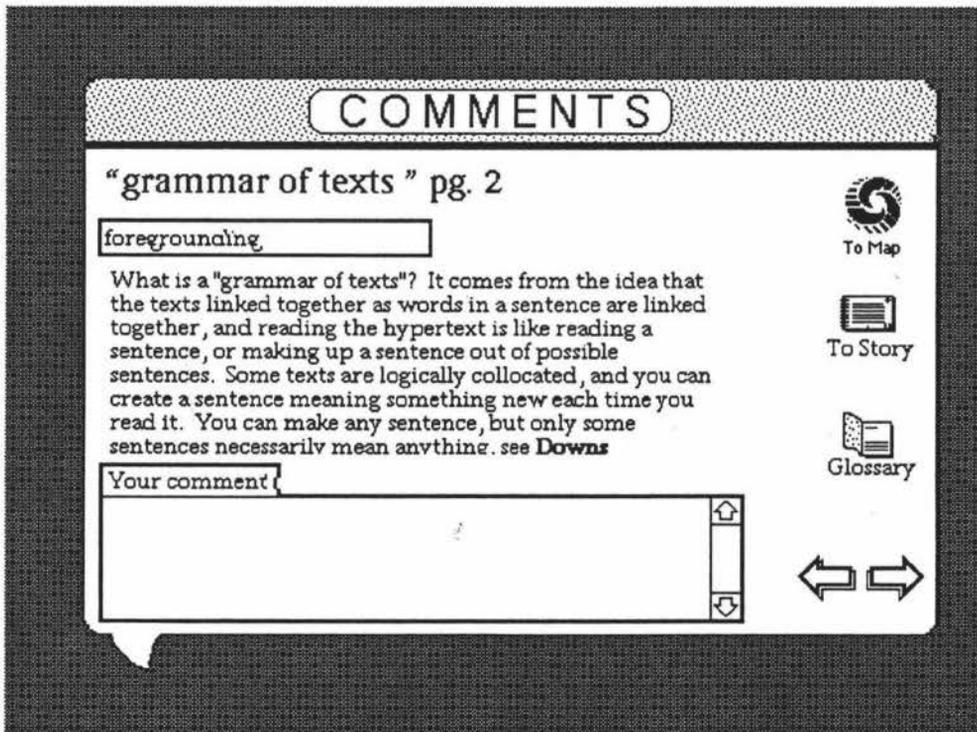


Fig 3. A Comments Card

The first is the quote from the text that the reader clicked on, and that the comment is about. The page number is given. The second field shows which *type* of Comment this is. The Intext author may

³⁵ See Elizabeth L. Eisenstein. *The Printing Revolution in Modern Europe*. Cambridge: Cambridge University Press, 1983, 201-7.

include whichever types of comments he or she deems important in the study of the text. For example, an Intext tutorial written to accompany a first year English course's study of a short story may have Comment types such as *Alliteration*, *Motif*, *Diction*, *Character*, etc. The third field, which is the main Comment field, contains the teacher's comment on the quote from the text. It can also contain hypertext references to critical excerpts contained in the Critics stack and simple exercises for the reader to perform. The final field is a space for the reader's own comments - either on the quote from the text, or on the teacher's comment. This field is scrollable and may contain as much text as the reader wishes to write.

From a Comments card the reader can choose to travel in one of a number of directions. Clicking on the "To Story" button leads the reader back to the text where the phrase that contained the link will be highlighted. The reader may choose instead to browse through the Comments stack, for instance to see the Comments on other instances of the same Comment type. From any of these the reader may of course return to the text. Furthermore, the reader may click on a reference to a critical excerpt (if any) or click the "Glossary" button to read the Glossary definition of the Comment type. By clicking the "Map" button, the reader can go to any of the other stacks.

Sometimes a Comments card may be linked to more than one occurrence of a quote in the text. For example, all the examples of "pear-shaped" may be linked to one Comments card. In this case, when the reader chooses "To Story" from the 'Pear-Shaped' Comment cards, a 'choice box' is displayed to allow him to select the occurrence of the phrase 'pear-shaped' to which he wishes to go. The choice box displays all the occurrences of the phrase to which the Comment is linked by showing the whole text line on which they appear and giving the page number. The reader can then choose the desired occurrence. In this way the user can easily visit all the

occurrences by bouncing back to the Comment, and then back to the next occurrence in the text...

To help reduce possible disorientation the buttons are designed (where possible) to be miniature pictures of the destination. The "To Story" button is thus a small picture of the Text stack. This provides important visual cues that aid in navigation.

The Comments stack is not designed around a book metaphor. This is simply because there is no recognisable visual form for teacher's comments which might arise in a tutorial or lecture. For this reason, a speech-bubble shape is used. This gives rise to the suggestion that the Comment is 'out of someone's mouth' and thus is opinion, rather than authoritative fact. This suggestion is supported by the inclusion of a space for the reader to discuss, qualify or disagree with the teacher's comment.

Taken together, the Text and the Comments stacks are the backbone of the Intext program; and, depending on the particular tutorial, probably make up the bulk of the information. Our first tutorial - Katherine Mansfield's "The Garden Party" has 34 pages of text and over 200 Comments.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The Critics stack contains excerpts of critical commentary on the primary text. These may support the teacher's comments on the text by being linked to Comments cards. The name of a critic in the text of a Comment card is a 'hot' link to a Critic card. Any number of Comments cards may contain links to a single critical excerpt; and a single Comment card may cite any number of critical excerpts.

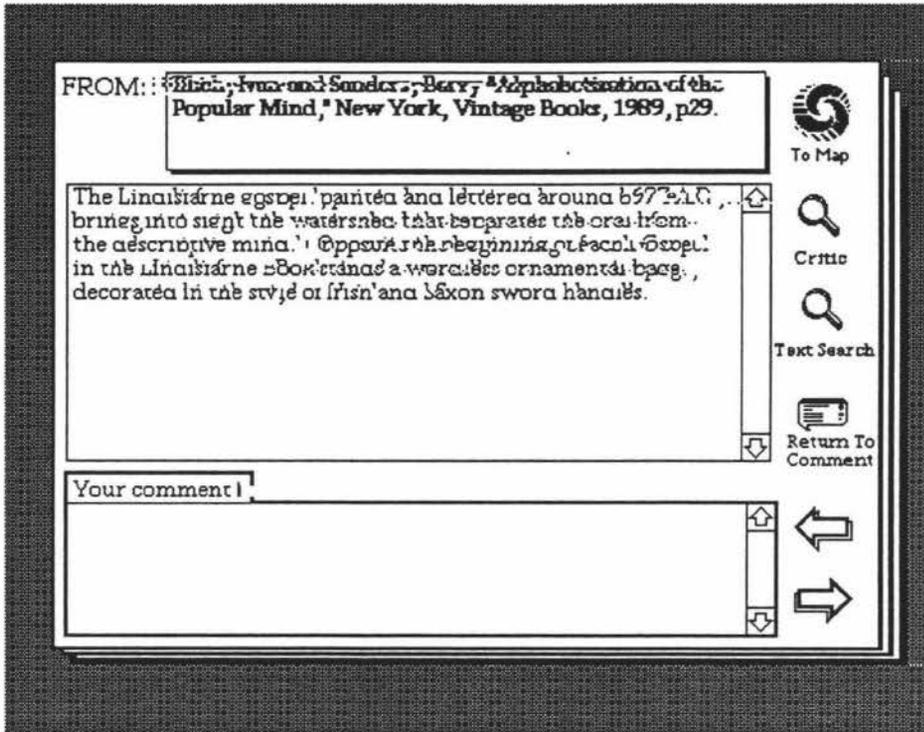


Fig 4. A Critics Card

From a Critics card, the reader may browse through the Critics stack, go through the map to other stacks, or return to the Comments card. She may use the search buttons to look for criticism on a certain subject or by a certain critic.

In an ideal hypertext the whole critical work would be available to the student (and that work would be linked to its context...), instead of an excerpt provided by a teacher. This expanding context is impractical in an Intext tutorial, but each Critics card can contain up to about 5000 words.

- ▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ Because the Intext program is meant for undergraduate study, the Bibliography stack is not as powerful a tool as hypertext could provide. It consists of just one card, containing a scrolling field in which bibliography information is entered by the tutorial author.

Bibliography

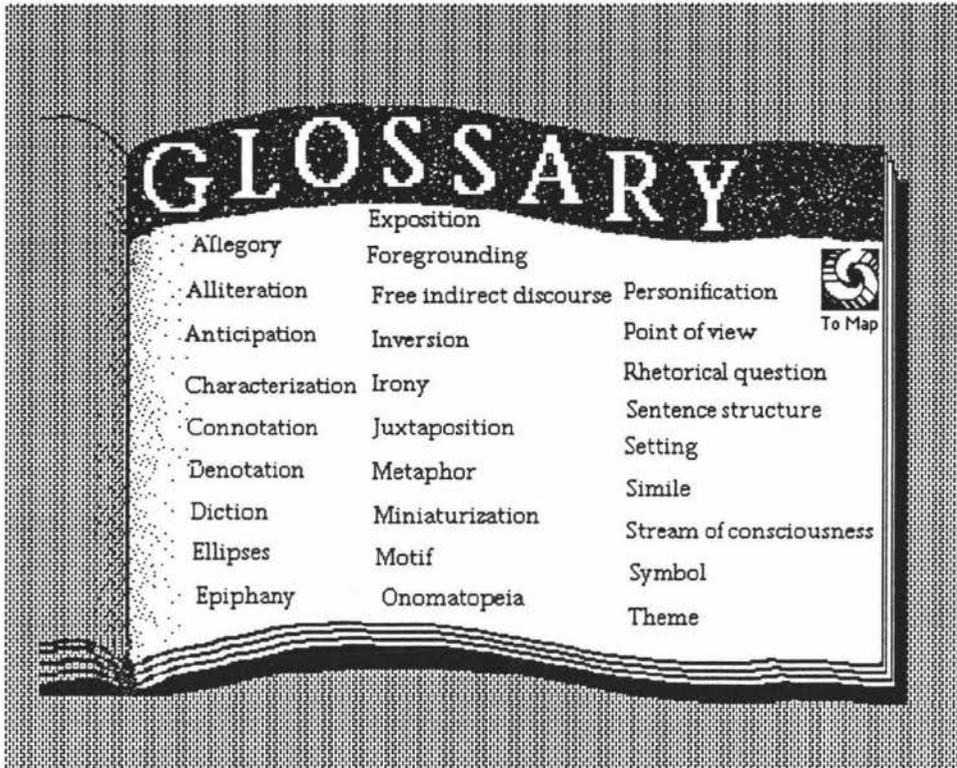


Fig 6. The Glossary Index Card.

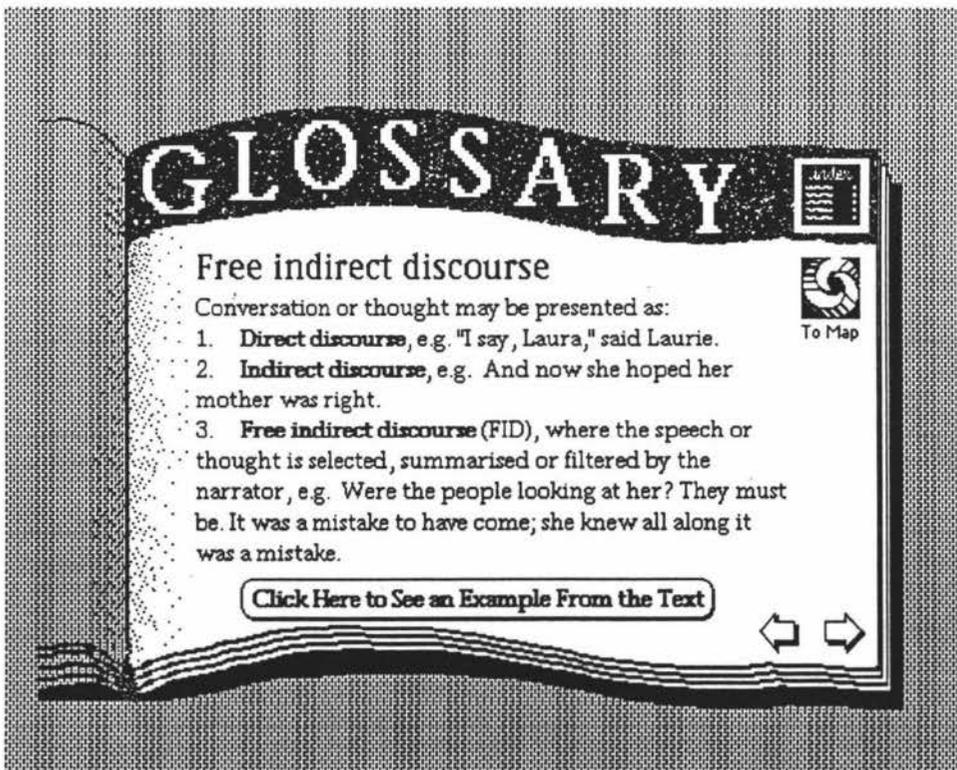


Fig 7. A Glossary Card.

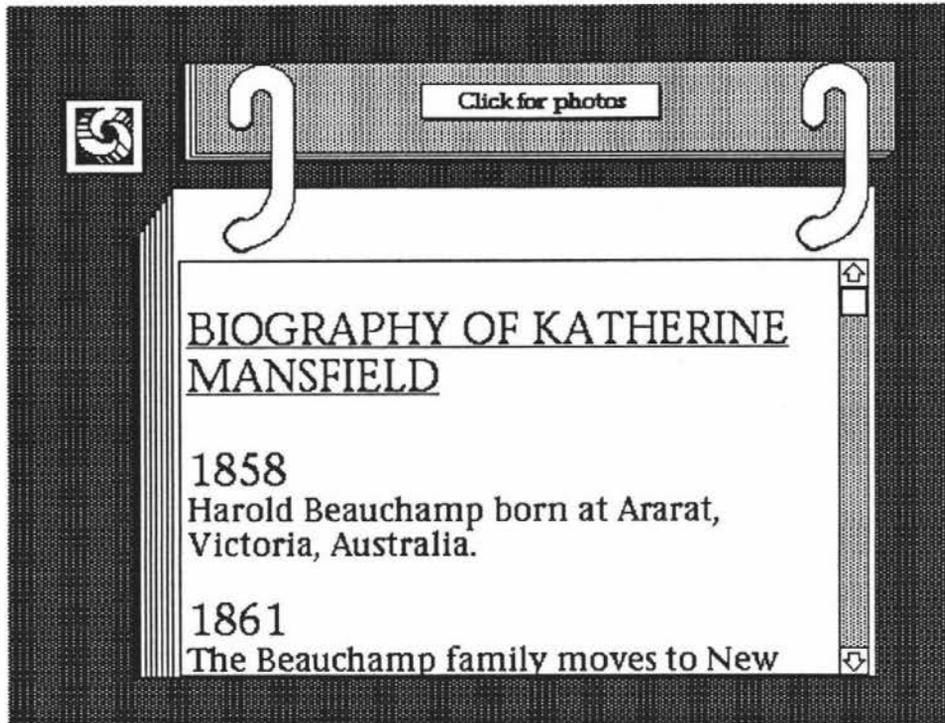


Fig 9. A Timeline From the Biography Stack.



Fig 10. A Photo from the Biography Stack.

- Cards in the notes stack are linked to lines in the primary text. When the user clicks in the margin rings of the Text stack, a link marker is placed in the margin ring, and a new Notes card is created. The first field of the Notes card tells the user which note he or she is editing, for example "Note 2 of 10".

Notes

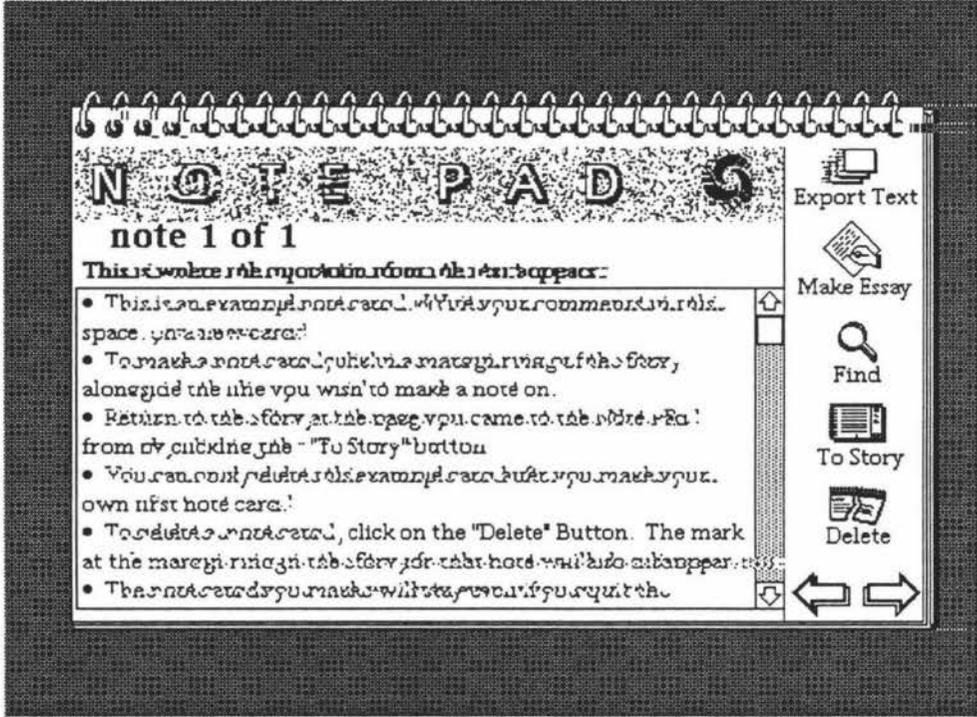


Fig 11. The Notes Stack

The card that is headed "Note 2 of 10" is linked to a link marker that is displayed in the margin ring of the text as "n2". When the Notes card is created, Intext automatically places the line of text adjacent to the margin ring into the second field of the Notes card so that the reader can refer to that line without returning to the text. The third field is a scrolling text field where the reader can write his response to the line of text he is annotating. He may write as much or as little as he wishes.

After a new Notes card is created, the user may return to the page of text from which the note arises by clicking the "To Story" button. He may return to the Notes card at any time (to edit or just read the note) by clicking the link marker in the margin ring. He may also

would allow a teacher of English with no expertise in Hypercard (let alone Hypertalk scripting) to create a brand new Intext tutorial. Just like the reader of an Intext tutorial, the teacher need not see the Hypercard menu bar or use any tool other than the browsing tool that is basic to Hypercard.

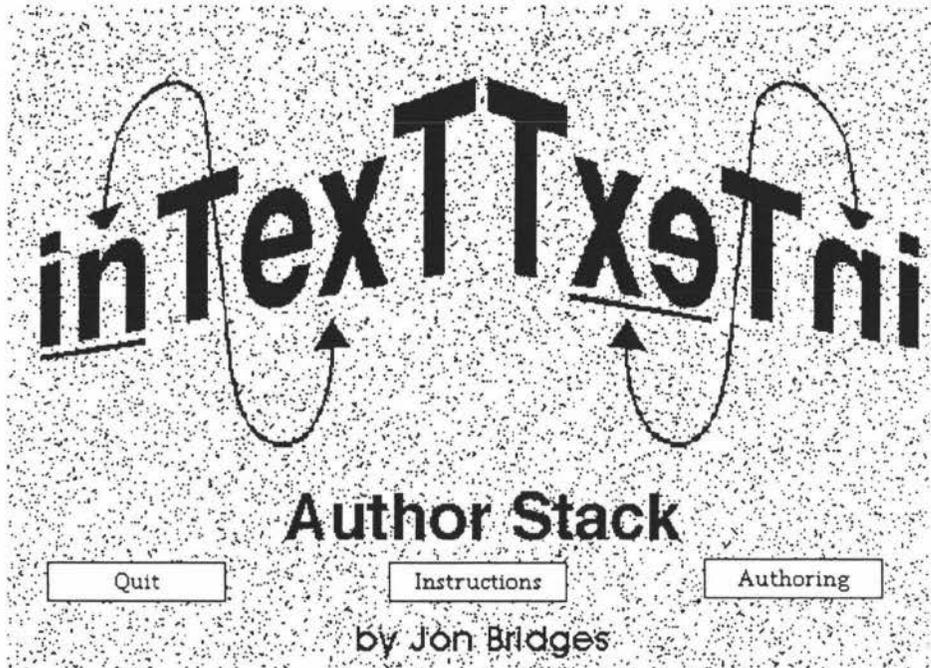


Fig 12. The Welcome Screen For the Intext Authoring System.

The teacher starts with the blank Intext shells, the Author stack, and her teaching material - including the texts that fill the stacks. In all cases, the teacher can import this information from files that she has created on a word processor (or had the secretary type in!), or she may use the authoring system to type the information in directly.

The end product is a working Intext tutorial that a student may use to study the primary text.

THE ELEMENTS OF THE AUTHORING SYSTEM

The style of the author stack is very plain. There is no overall metaphor used, but a common speckled background is utilized to give the stack coherence (it is also designed to look appealing - you can judge for yourself how well I succeeded in that!). Simple

consistencies are followed: Links within text are indicated by CAPITALISATION; the buttons apart from the text that allow the user to navigate the hypertext are aligned down the right hand side of the card, and have display icon with text below it; and the buttons that perform the authoring operations are very large, and display only large bold text (see the screen snapshots below).

The Authoring System is itself a hypertext. It is designed to allow the author to navigate easily within it, always knowing both where she is and how to get to other places. It is divided into two parts: a hypertext of instructions and the authoring cards themselves.

The Instructions

Although the Authoring System is laid out in clear and simple steps, the process is nevertheless complex and requires some instructions so that a novice author can feel confident that he is going about the authoring correctly. The authoring instructions are a hypertext in themselves; designed to allow the author either to read straight through them, or to access just the information required at any given stage in the authoring. The instructions are thoroughly intra-linked and thoroughly inter-linked to the Authoring cards themselves.

The instructions are headed by the Instructions Contents card which gives a list of all the topics available. The list is 'hot' so the contents can be used to navigate to the instructions for individual tasks in the authoring process.

Each instruction card describes a task, or a part of a task, and is linked several ways:

- to related tasks through capitalised 'hot' words,
- to the authoring card where that task is carried out,
- to the index of instructions,
- to the next and previous instruction cards.

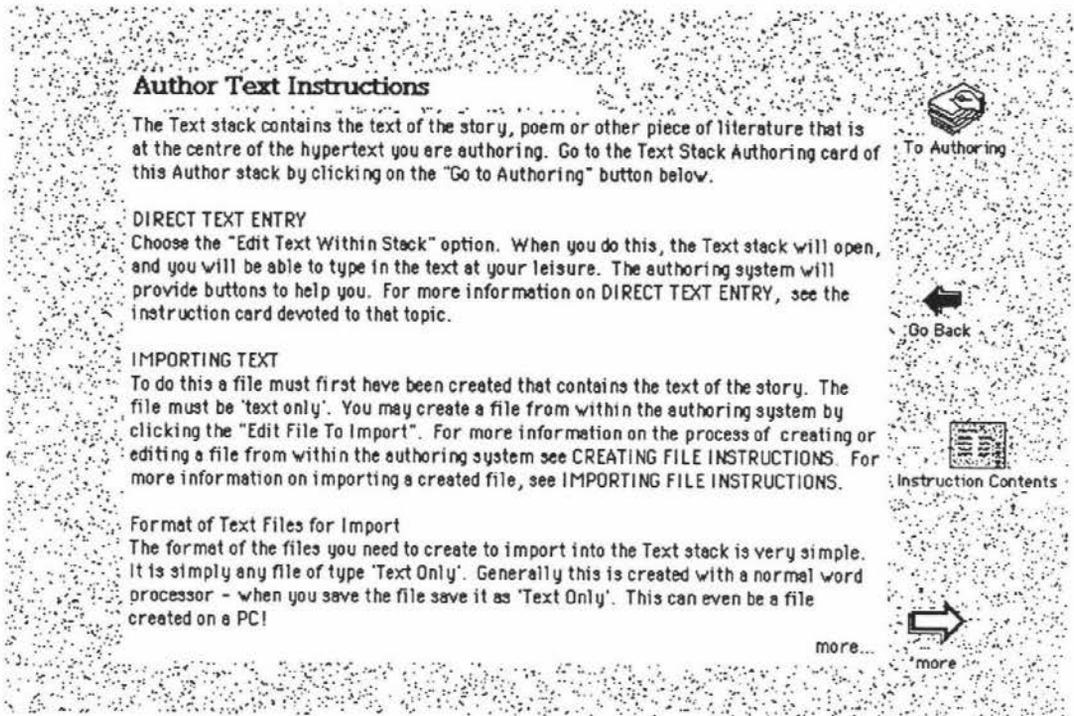


Fig 13. An Instructions Card.

The most useful aspect of the instructions is the extensive hypertextual linking. If you are carrying out an authoring task, you can click a button to see the instructions for just that task, and then return (or read related instructions then return). The instructions include a glossary of terms and a search facility to find any piece of text within them.

The Authoring System

The task of authoring an Intext tutorial is basically to fill each provided Intext stack 'shell' with the text, comments, photographs, lecture, critical excerpts and glossary items for that particular tutorial. These tasks are automated by the Authoring System.

At the 'centre' of the Authoring System is a map³⁷. The map serves a similar function to the Instructions Contents card, but is

³⁷ I enclose the word 'centre' in quote marks because the structure of the Hypercard environment is linear. The controlling metaphor is a stack of cards, and every stack has a certain order. This means that the idea of a 'next' card and a 'previous' card is meaningful, but of that of a 'central' card is not (unless the card halfway through the stack can be called central). However,

represented as a picture. The picture has the same structure as the map of the tutorial that the student sees when navigating around the tutorial program.

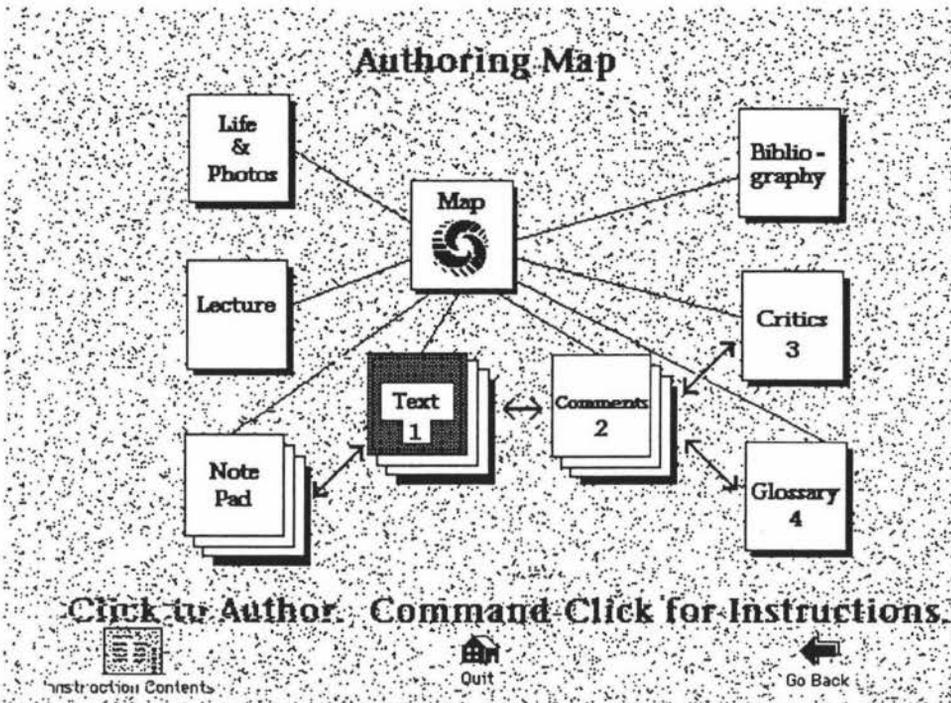


Fig 14. The Authoring Map.

This is because the authoring system is divided up into separate tasks for authoring the different stacks of the Intext tutorial. Thus, the author gets an easy feel for the parameters of the task she is performing, and can see how the separate authoring tasks relate to one another. The author can use the map to go to the cards for authoring each Intext tutorial stack by clicking on the stack icons. By holding down the 'command' key while clicking, the author can go to the related Instruction cards.

Each Authoring card represents the authoring of a stack in the Intext tutorial. Each card is headed with brief instructions in the imperative tense. On each card are buttons representing the sub-tasks the user must perform to author each system. Clicking on a

the reader of a hypertext tutorial need not see the stack hidden in the hypertext, so the map card can be made to *seem* central.

button carries out that sub-task, command-clicking takes you to the instructions for that sub-task.

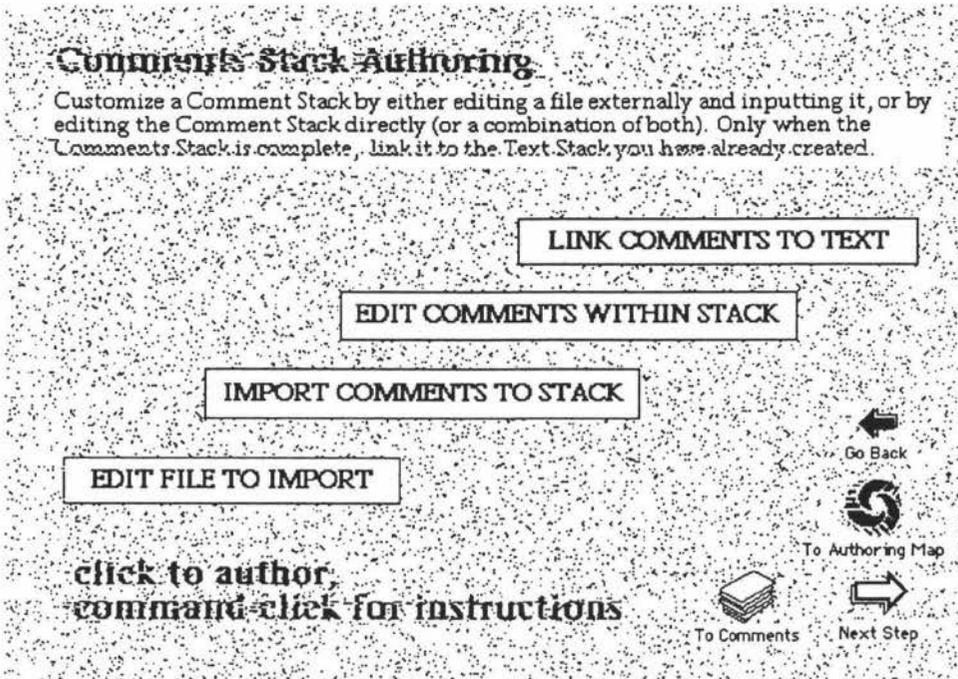


Fig 15. An Authoring Card.

The Authoring cards, too, are extensively linked to:

- the instructions for that task and the sub-tasks,
- the authoring map,
- the next and previous Authoring cards,
- the Intext tutorial stack being authored in that task.

The authoring cards are in a certain logical order; however the system is designed so that (on the whole) the authoring need not be carried out in any particular order. Thus the user never need remember where she is 'up to' in the authoring. In the authoring process there are one or two tasks that cannot be done without a prerequisite task having been performed. The user is alerted to this if she tries to do these out of order.

Function of the Authoring System

The system has many features to automate authoring as completely as possible.

Link Handling

The system automatically creates the links between stacks. This is a complex task, especially between the Comments and Text stack where there may be hundreds of links to be made. Several difficulties arise:

Non-Uniqueness of Quotes

Comments are identified by the quote from the text that they comment on. This quote may not be unique within the text. If it is not unique, the user is prompted as to which occurrences of the quote are to be linked. As many occurrences as the user wishes can be linked to one comment card.

Non-Existence of Quotes

If the quote on the Comment card is not existent in the text the user can either modify the quote and search again or can choose to abandon that link. If the link is abandoned the user may also delete that Comment card.

Creation and Placing of Link Markers

The link markers in Intext are buttons placed over the text. When the link is made, the buttons must be lined up exactly with the text so that the words on the buttons line up with the words on the text and the button 'disappears'. I achieved this with a procedure called 'placeButtons' (see the script of the 'Link Comments to Text' button on the Comments author card). If the quote being linked to goes over a line, the button must be divided in half, each with the correct text on it, and each placed nicely.

Miscellaneous Tasks

The authoring system carries out numerous miscellaneous tasks when it imports text and creates links. When importing text into the Text stack, the text is divided into pages and a card created for each page. The pages are numbered. After the Comments are linked the page numbers are added to the quote on the Comment card. These are examples of the small tasks the system carries out.

Features of the Authoring System

The authoring system is designed to easily take the author through the authoring process in an interactive, hypertextual way. The author provides the input the system needs to create the Intext tutorial. Most of the input required of the author is either a) the location of text files or b) his preferences for linking.

Mistakes

If there is a mistake during editing and a stack is not authored properly, or the author realises the stack is not to his liking, the stack can simply be authored again with no need for the him to erase it first. If the author tries to author a stack that has already been authored, he is given the choice either a) to cancel the task, b) to re-author the stack completely, or c) to append the stack with the new additions.

Importing Text

Text files may be imported and pasted into the Intext shells. At the click of a button the user may fill an Intext shell with the text she has created with her favorite word processor. The system prompts her with dialog boxes as to the location of the file. If she is unsure of the format the files must take, the instructions are quite clear. In all cases, the formats for the files are easy to set up and require no special editing skills apart from typing and pressing 'return'.

Editing Files to be Imported

If the user wishes, she can create the files to be imported from scratch using her favorite word processor, launched from within the authoring system.

Editing in the Stacks

The Authoring System allows the stacks to be edited directly. If the author chooses this method, the stacks are displayed and a couple of automatic authoring buttons added to them to aid the user in entering information directly into the stacks. If she wishes, the

hypertext (Intermedia or Intext) make better use of *printed* texts in subsequent study³⁸.

One of the most important characteristics of the Intext tutorial, touched on above, is the student control of the hypertext. While the tutorial may be a model of the dialogue between student and teacher, it is one in which the balance of power switches to the student. Normal classroom situations mean that the teacher cannot devote his entire attention to one student, but must give all students what may best suit only some of them. Intext responds directly to a student's commands: at the basic level of the computer interface the student uses the mouse to control the Intext interface; and at the level of the tutorial as a whole the student controls how long is spent on each text, which order the texts are studied in, and what controlling idea he centres his reading on. This control is always tempered by the fact that all the materials have been chosen for him by the author of the tutorial.

The limitations of the Intext system reflect the choices made in the development: it is important for simplicity of distribution that a tutorial fit on a single floppy diskette (1.4 megabytes); and the tutorial must 'stand alone' (rather than being part of a larger literary hypertext like Intermedia), allowing the extramural student to use it on their home computer. For these reasons, the intertextuality modelled in Intext is limited to an immediate academic context, a tutorial written by a single teacher. At the margins of every tutorial, the texts point outwards at the larger literary context (in the Bibliography and Critics stacks especially), but the demands of useability mean that this pointing remain implicit.



³⁸ See George Landow. "Hypertext in Literary Education, Criticism, and Scholarship." *Computers and the Humanities* 23 (1989): 183.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ In the foetal canon of hypertext literature published so far, two stand out as the early 'classics'. The seminal work is Michael Joyce's 1987 *Afternoon, A Story*.⁴⁰ Writing in the *New York Times* Book Review, Robert Coover calls *Afternoon* "the bench mark ... the most widely read, quoted and critiqued of all hypertext narratives."⁴¹ One line from Joyce's work has come to epitomise hyperfiction: at the beginning of his hypertext, on a screen by itself, Joyce writes "There is no easy way to say this." As Coover says, "[Joyce's sentence] has become identified with the effort to describe hypertext to the uninitiated, or indeed to explain to oneself the odd experience of reading in this unique environment." (Coover, 10) More than this, Joyce's line, in its reflexiveness, predicts the reflexive preoccupation of many hyperfictions.

The second major work of hyperfiction, which I will examine in some detail, is Stuart Moulthrop's *Victory Garden*.⁴² Although, as a medium, hypertext defies the concept of a 'plot summary', Robert Coover, in his *New York Times* article, writes what we might call a 'hyperplot summary' of *Victory Garden*. As background to my examination of the hypertext I quote from that article:

...Victory Garden is, essentially, a very conventional academic novel, easy to follow, easy to read, about a group of professors and students at a Southern university at the time of the gulf war in 1991. There are the usual intellectual affairs

⁴⁰ Michael Joyce. *Afternoon, A Story*. Cambridge MA: Eastgate Systems, 1987.

⁴¹ Robert Coover. "Hyperfiction: Novels for the Computer." *New York Times* Book Review (August 29, 1993). This article is an important survey of the hyperfiction genre up until the middle of 1993: Coover briefly reviews every major hyperfiction (eleven of them) published at that time.

⁴² Stuart Moulthrop. *Victory Garden*. Cambridge MA: Eastgate Systems, 1991.

*and passionate disputes, the parties, the politics, the familiar bedroom and campus tavern scenes, along with protests and counterprotests about the war, curriculum reform and other hot topics. It is all stitched together with the customary epigraphic gathering of the author's favorite quotations, a kind of "interanthology," as Michael Joyce calls a similar device in his own "Afternoon."*⁴³

Down the Garden Path ...

In his article "Nonlinearity and Literary Theory," Espen Aarseth describes a methodology, called *textual topology* for describing non-linear texts: "Textual topology describes the formal structures that govern the sequence and accessibility of the script, whether the process is conducted manually (for example, by convention) or mechanically (for example, by computer)."⁴⁴ I do not take up Aarseth's methodology for describing nonlinear texts. In a discussion of a hypertext, though, there is a necessity to describe this textual topology before moving on to a conventional commentary on the text.

Like *Afternoon*, and many other hyperfictions, *Victory Garden* is published by Eastgate Systems on their hypertext software, Storyspace. It is interesting to note that many of the most vocal proponents of hypertext have a vested interest in the hypertext business. Many are involved in the Eastgate Systems company. Jay David Bolter, George Landow and Jane Yellowlees Douglas are three major hypertext critics (whose works I have used extensively in this thesis) who have links to Eastgate. Bolter is co-author of Storyspace, the software used to read and write hypertext fictions, while both Landow and Douglas have hypertext products for sale

⁴³ Coover, 9. See pages 1, 8-9 for more plot details.

⁴⁴ Espen Aarseth "Nonlinearity and Literary Theory." In Landow 1994, 60.

through the company. While it is not unusual for critics to be authors, it is worth keeping in mind where the vested interests of these academic proponents of hypertext might lie.

Victory Garden consists of 993 text spaces (nodes) and about 2,800 links between them. *Victory Garden* is not a 'pure' hypertext (where all nodes and links are equal, where there is no structure and where any path through the nodes is as likely as any other)⁴⁵ but is structured with paths defined by the author. A map at the beginning⁴⁶ of the hypertext invites the reader to think of the work as a garden (hence the name) with paths (links) that connect places (textual nodes). Any place in the garden can be on any number of paths.

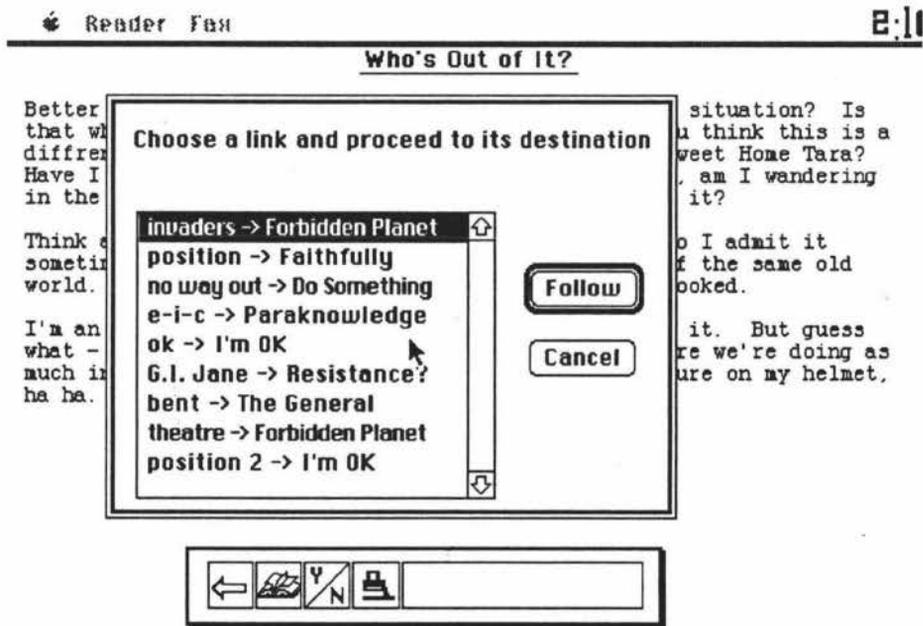


Fig 16. A Place in Victory Garden, and its Link Box.

⁴⁵ I introduce this notion of a 'pure' hypertext, not because it exists, but as an imaginary standard by which to compare the relative structuredness of hypertexts. Two further features that it could be said a 'pure' hypertext should have are: complete linkage - where, from a given node, all other nodes are equally accessible; and infinite granularity - where the nodes are as small as imaginable. Obviously this notion of 'purity' is equivalent to 'uselessness', and it is used here only as a standard for comparison. In Chapter VIII below, I will examine a model of hypertext, called the 'rhizome' which incorporates many of the features of what I have here called pure hypertext.

⁴⁶ It is not always correct to talk of a 'beginning' to a hypertext, but in the case of *Victory Garden*, there are certain places where a reading is begun.

From any place in *Victory Garden*, there are four ways to travel to another place. The first is to press the 'Return' key, which accepts the default link⁴⁷. This takes you to the next node on the current path. The reader is given no notice as to which path she is on, but pressing 'Return' keeps her on the same path; until that path runs out and she passes (without noticing the change) onto another one.

The second way to travel is to choose a word in the text which has a link to another node. Pressing the 'Option' and 'Command' keys together displays the words (or phrases) that contain links (in much the same way that the hidden links are displayed in Intext). Choosing a word in this way, the reader has no idea what kind of connection she is following, except for the expectation that the new place will somehow expand on the word chosen.

The third way to choose a link is to click the book icon in the control bar (see Fig 16.) This brings up a box which contains a list of all the names of the paths that run through the current place. Each path leads to another place, and clicking on the path name takes the reader to the next place on that path. The name of the next place on each path is displayed alongside the path name. Included in the list displayed is the path the reader is currently on, and the paths the user can divert onto by clicking on the linked words in the text, as well as any paths onto which the reader cannot divert by those two methods. The final way to travel is to choose the left-pointing arrow in the control bar. This takes you to the last place you visited (not the previous place on the path you are on).

The above four choices mean that the reader may either accept the author's choice for the next node, or choose one for himself. It is possible to follow the default through many, many nodes in a sequence (though every now and then, a node has no default, and

⁴⁷ In Computer Science, the term 'default' means the choice taken if the user makes no explicit choice of her own.

forces the reader to use the linked words or link box to choose the next node). Each path has some kind of organising unity - it is either a scene containing dialogue or action, a correspondence, or a set of thematically linked texts.

Choosing an example more or less at random, the path called 'no' links ten places: "In the No", "Nice Girls", "Adoration", "Listen Up"... Each place has between about 50 and 200 words. Each place on the path continues to describe the scene at the Just Say No Café where two of the characters, Harley and Boris, are drinking and Veronica, Harley's lover, is waitressing. In most cases, choosing the default link keeps you on the path 'no', except between the first two places, where the default takes you on another path to a different place. In this case, to continue on the 'no' path, the reader must bring up the link box and choose the path marked 'no'. Of course, if the reader does not bring up the link box, she will have no idea that she has changed paths, because the places only show their names, not which path they are on. At each of the ten nodes in this example path, there are opportunities to divert onto other paths. Through each node in the 'no' path, there are between zero and five other paths (average: 2), leading to other nodes. Some of these paths might be only one link long, meaning that they just link one place to another, rather than creating a thread. Other paths are longer, which means that some nodes in the 'no' path are also part of other long paths; are on the crossroads of paths.

At the end of the 'no' path, the default link is to a place called 'See No Evil' which begins a discussion between Harley and Boris, at Boris's house. It begins "It was early October..." The path (called 'evil') is only one link long (or, as I explain below, it could be the end of a longer path). Taking the default from 'See No Evil' takes us to 'Story of Your Career'. From here, for many nodes, the default takes us on a path called 'Harley' which continues Harley

and Boris's discussion and relates the history of Harley's career as a television journalist.

When reading, it is difficult to appreciate the structure of the paths. This is partly because the path names are not apparent without calling up the link box. It is also due to the fact that you cannot travel backward along a path you haven't travelled forward along. To explain: say place 'X' lies at the crossroads of two long paths (Paths 1 and 2), and is not the first (or last) place in either path. If a reader travels along Path 1 to X he can then choose to divert onto path 2 and follow that path. However he can only go forward along Path 2 from X, he cannot go back to the places that preceded X in Path 2. If he moves a few places along Path 2, then backtracks, he will backtrack through X, then back through Path 1 (the way he came). For this reason, not only can the reader not go to the early part of Path 2, he cannot even know if there *are* earlier nodes: if a place in *Victory Garden* seems to be a continuation, a reader can see which paths it is on; but he cannot follow any of them back to see if it is a continuation, or what might come before it.

Furthermore, as the introductory booklet states "*Victory Garden* keeps track of your path through the novel, and takes your previous choices into account when choosing a path to follow." So, while I have explained the default pathway in the example above, it may only be the default pathway for the reading I was making at that particular time. If I had made different choices earlier, the default pathway may have been different.

As you can see from the complexity of the above examples and explanations (meant to clarify the structure!), the mechanisms superadded to the 'pure' hypertext in *Victory Garden* make the reading space of *Victory Garden* an extremely complex one to comprehend. To give the reader some perspective on the hypertext, the author provides a map near the beginning places of *Victory Garden* :

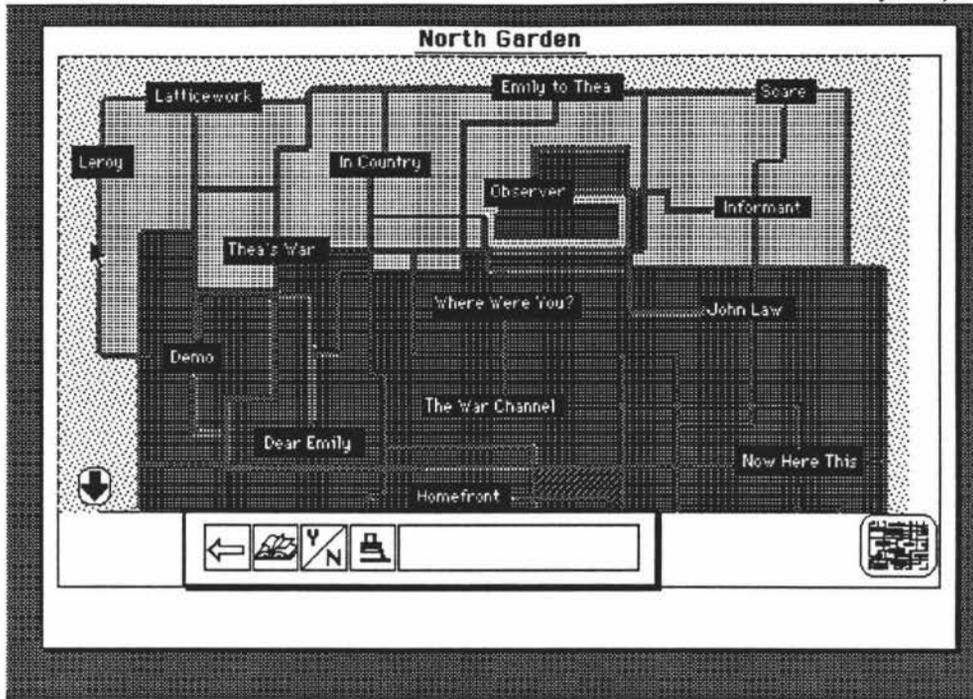


Fig 17. The Map of the North Garden

The map divides the virtual space of *Victory Garden* into three parts. Fig 17. shows the north third of the garden. Clicking on any place on the map leads the reader to that place in the hypertext, and he finds himself in the midst of the story. In practice, though, the overview is of limited utility: while you may go to any place represented on the map, there is no way of knowing how to navigate between the places except through the map. In other words, while the places on the overview map clearly onto the places in the text, the paths between them do not.

A 'Hyper-Critical' Reading of *Victory Garden*:

Victory Garden is an essentially reflexive work. It is not only written in hypertext, but it is *about* hypertext; and concerns itself, at every level, with the medium in which it is written. Hypertext provides the paradigm for the themes of the fiction. The world of *Victory Garden* is the world of hypertext, not only in the structure and medium of the work, but also thematically. The characters

see their political, psychological, social, sexual and physical world in a manner which we can characterise as hypertextual.

In an introductory node of *Victory Garden*, Moulthrop writes “Perhaps, hypermediated and post-modernized, we now live in a universe that looks suspiciously like a Garden of Forking Paths.” (The Place of the Big Wind⁴⁸) Moulthrop is referring here to Jorge Luis Borges’s short fiction *The Garden of Forking Paths* which describes a novel that resembles a labyrinthine garden: “In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others; in the fiction of Ts’ui Pên, he chooses—simultaneously—all of them. He creates, in this way, diverse futures, diverse times which themselves also proliferate and fork.”⁴⁹ In Borges’s story, there is a dialogue between, on one hand, the convergence of time; and on the other its divergence. Ts’ui Pên’s novel is based on “an infinite series of times, in a growing, dizzying net of divergent, convergent and parallel times.” (28) Stephen Albert is the Sinologist who has discovered the secret of the novel, and shares Ts’ui Pên’s vision of time. The narrative voice of the story, Yu Tsun (a descendent of Ts’ui Pên), feels the multiplicity of time in a ‘swarming sensation’ where the infinite possibilities of time impinge on his consciousness. The fixed linearity of the story, however, works against the divergence of time and of possibility. The narrator describes his mission as “My irrevocable determination” (24) and later says “the future already exists,” a view of the future which hardly fits with the “various futures” (26) of Ts’ui Pên. At the climax of the story, the swarming sensation felt by Yu Tsun is solidified in the figure of his pursuer, Captain Richard Madden, whose arrival spurs the resolution of the

⁴⁸ As I cannot give a page number for this quotation, I shall give the name of the ‘place’ in *Victory Garden* in which the quote occurs.

⁴⁹ Jorge Luis Borges. “The Garden of Forking Paths.” In *Labyrinths; Selected Stories and Other Writings*. Ed. Donald A. Yates and James E. Irby. New York: New Directions, 1962, 1964, 26.

narrator's determination - the murder of Stephen Albert. After the murder, the narrator sums up the events quickly, neatly, in a single paratactic paragraph wherein the events follow each other deterministically.

So, although the text described in Borges's story is multiple, divergent, and infinite, Borges's story itself is necessarily single. Although the reader is unaware of the exact nature of Yu Tsun's mission and the reasons for it until the denouement, and although we may feel that the murder is only one possible climax, not determined until Richard Madden arrives; the story is, finally, fixed in print. In the final line of the story, the narrator expresses his "innumerable contrition and weariness". His contrition is 'innumerable' (rather than 'immeasurable') because it is only calculable by counting the other possible futures from which he turned away in murdering Albert.

In the light of Borges's story, we may see Moulthrop's *Victory Garden* as an attempt to reproduce Ts'ui Pên's achievement, not in a "chaotic manuscript", but in a hypertext which can escape the singularity and fixity that Borges couldn't. One of the characters in *Victory Garden* repeatedly experiences the same swarming sensation as Yu Tsun does. Indeed, the reader, surrounded as she is by the ghosts of other possibilities, often feels the swarming too. In the sense that "The Garden of Forking Paths" is forced, by its medium, to express the fixed, deterministic and single nature of time, *Victory Garden* responds by questioning the fixity. One of the places in *Victory Garden* states, as Yu Tsun does, "The future already exists," but the next place asks "but which one?". The reference to Borges's story works reflexively, for we are drawn to compare *Victory Garden*, to Ts'ui Pên's "indeterminate heap of contradictory drafts" (24). This comparison leads us to evaluate Moulthrop's hypertext for its nature as a labyrinth, for its infinity,

for its divergence and for its fulfilment of multiple, contradictory futures⁵⁰.

Victory Garden is by no means the only hyperfiction that is concerned with its own structure. Jane Yellowlees Douglas talks of another of Michael Joyce's hyperfictions: "Like Robbe-Grillet's *In the Labyrinth*, James Joyce's *Ulysses* or Virginia Wolfe's *Mrs Dalloway*, WOE—Or a Memory of What Will Be is a narrative 'about' its own structure."⁵¹ Similarly, in John Barth's *Lost in the Funhouse*, Douglas says, "the Funhouse was both a physical place visited by Ambrose, the protagonist, and a metaphor for the structure of the story—and of fiction itself." (182). It seems that reflexivity is a recurrent theme in hyperfiction.

It seems odd that a hypertext, the most intertextual (self-effacing) of texts should be reflexive (self-absorbed). In a way, reflexivity is the opposite of intertextuality. However, as we might expect, this opposition soon dissolves itself in *Victory Garden* where the very reflexivity is hypertextual. This comes about because when the work refers to itself, it refers to its own interconnectedness, its own multiplicity, its own standing on a crossroads, its own broadcast, its own intertextuality. In this brief exegesis, I will be concerned to show how hypertext provides the

⁵⁰ This is not the place for a full comparison between Ts'ui Pên's novel and Stuart Moulthrop's hypertext; however I will make a couple of points. Stephen Albert says "in the work of Ts'ui Pên, all possible outcomes occur". (26) whereas in *Victory Garden*, only a necessarily small number of outcomes can occur (eg. Emily dies in the gulf, and she comes home - but Emily does not become a bullfighter). Most of *Victory Garden* is consistent with only one fork of time. There are only a few 'places' where conflicting events occur. The agents of choice in Ts'ui Pên's novel are not the readers (as in Moulthrop's hypertext), but the characters within the story themselves (see 26). The work of Ts'ui Pên is described as "a riddle, or a parable, whose theme is time" (27) Stephen Albert has solved the riddle by noting that the word 'time' is not mentioned at all in the work. If there is a similar solution to *Victory Garden*, I don't know what it is. Certainly the word 'time' occurs frequently enough. In fact, one of the themes of *Victory Garden*, as I will show later, is that there is no single solution or answer to the hypertext - unless it is the very theme that hypertext does not provide solutions or answers.

⁵¹ Jane Yellowlees Douglas. "How Do I Stop This Thing?: Closure and Indeterminacy in Interactive Narratives." In Landow 1994, 173. (Henceforward cited as Douglas 1994.)

thematic paradigm for *Victory Garden*, and how this reflexivity in turn reflects on the writing space of hyperfiction.

A Physical Hypertext

The physical world of *Victory Garden* is divided between Tara and Saudi Arabia. These places are connected, in the fiction, by texts. The written correspondences (between Emily in Saudi Arabia, and her lovers Boris and Victor, and between Emily and her thesis supervisor Thea), provide a textual pathway between the two sides of the globe that the reader traverses by reading. Many of the 'places' in *Victory Garden* are reproductions of the letters between these characters. They are displayed in a different font, to suggest handwriting, and are signed in script. Emily's job in Saudi Arabia is to sort the incoming and outgoing mail between the USA and the servicemen in the gulf. This highlights the importance of these texts in providing a 'connectedness' between the physical places. Emily says: "This [Saudi Arabia] ain't no alien planet, tho I admit it sometimes looks that way. It's just the other side of the same old world. Everything was still connected last time I looked." (Who's Out of It)

Another sort of text, the television broadcast, also connects the geographical locations of *Victory Garden*. A large part of the work concerns the live television coverage of the war: the dialogue of the news anchors and the comments and opinions of the characters watching the coverage. The television networks connect every home in America (and most of the world) to the events in the gulf. The world is seen as a network of physical places, connected by texts.

The whole text of *Victory Garden* is also seen as a network of physical places joined by texts. The metaphor for the space provided by the text is that of a garden. As we have seen above, the places in the garden (shown on the map) are joined by pathways of texts. So the text's subject matter reflects on, and refers to, its own construction.

A Psychological Hypertext

Paranoia - The Author and His Plotting

A large part of the story in *Victory Garden* is about Boris Urquhart's speedy descent into a kind of paranoid schizophrenia. If the reader clicks on the phrase "Everything was still connected" (Who's Out of It?), she is lead to the place called "Paraknowledge" where paranoia is defined as "a sensitivity to patterns, parallels, correspondences. A higher scrutiny, in every sense of the word. Cause-and-effect yes, but also a hint of something far more deeply interfused...symmetry, synchronicity.. ..coincidence, chaos?" (my ellipsis indicates graphological separation) If we have the 'paraknowledge' that Boris does, we see that paranoia is about seeing connections in coincidence, synchronicity in chaos. This symmetry is not only infused, but *interfused* - fused *between* events. Paranoia then is the state of reading the world as a hypertext, of reading meaningful (semantic) links between things. The paranoid sees the same kind of links between events as the hypertext reader does between isolated texts. In an essay on Hypermedia, Moulthrop writes "In dealing with vast and nebulous information networks - to say nothing of those corporate-sponsored 'virtual realities' that may lie in our future - a certain 'creative paranoia' may be a definite asset. In fact the paragnosticism implicit in hypertext may be the best way to keep the information game clean."⁵² McLuhan notes that "Schizophrenia may be a necessary consequence of literacy,"⁵³ perhaps we might add to that: 'Paranoia may be a necessary consequence of hyperliteracy.'

Paranoia is the hypertextual way of reading the world, the defining characteristic of the hypertext reader; and Boris, in his

⁵² Stuart Moulthrop. "You Say You Want a Revolution? Hypertext and the Laws of Media." *Postmodern Culture* 1, 3 (May, 1991).

⁵³ Marshall McLuhan. *The Gutenberg Galaxy; The Making of Typographic Man*. Toronto: University of Toronto Press, 1962, 22.

paranoia, reads his world as a kind of hypertext, a connected web of people, events and texts which he can never get outside of.

Watching the coverage of the gulf war, Boris's crisis begins:

Urquhart watched the news stream in and tried to call up the familiar distancing, the well-practiced art of spectatorship. Keep telling yourself it's only a movie, it's only television, it's just some dark imagining brought to you by those nice folks who gave you Pearl Harbor.

It was a line he'd taken often enough in the past but this time it wouldn't do.

This time his heart would not be still. The seal wouldn't hold, his worlds kept colliding, there was no way to be apart from it, no possibility of an Outside...

"Do Something".

Telecommunications pierces the seal between Boris's worlds just as links pierce the seal that keeps texts separated; allowing the signs of each into the others, and illustrating that "everything is connected". But there is more than this to be explored in the reflexiveness of *Victory Garden*. Paranoia, as a mentality, posits a threatening source to the connections it finds. In other words, paranoids find something threatening in the ubiquity of meaningful links around them. But there are no links without a link maker, a connector, an *author*. When Boris answers his own question, "What makes you think of me as a paranoid?... Could be the way everyone spends his time plotting against you," the author of the threatening connections is 'everyone' and 'plotting' is the sinister action. Moulthrop, then, places himself (as ultimate 'plotter' in the world of *Victory Garden*) as the sinister being, and in doing so alters the way the roles of reader and author are perceived in hypertext. Theoretically, hypertext is

'democratising'⁵⁴, the reader has more freedom than he did in print text, and becomes more like the writer; reader and writer share the job of creating the text. It is his place in the creation of events that Boris is worried about. He is trapped inside a system which he is forced to help create. This is mirrored in the plot line concerning Boris's job as a virtual reality expert. His boss Tate has big plans: "a vision of the End of History" ("Engineer"). Boris is not let in on those plans except to know that he "must ... engineer a System..." So Boris becomes (or fears becoming) the unwitting engineer of a system (writer of a text) that is plotted for him.

Moulthrop's implication, then, is that there is something sinister to be recognised in the links of hypertext and the world.⁵⁵ Hypertext does not posit a free reader, but a reader trapped inside the text. Indeed, as I will discuss below, the labyrinthine paths of *Victory Garden* inspire the feeling of being trapped in the reading experience.

A recurrent theme in *Victory Garden* is the opposition between the paranoid view and that which sees everything as pure coincidence, born of chaos. In "Regards Dick", the author describes the scene on television where Secretary of Defence signs a warhead: "Dear Baghdad, This Bud's for you, Regards, Dick Cheney". It goes on to say how a bomb of the same type later destroyed a bunker, killing between three and four hundred civilians. The text node ends "Of *course* it wasn't the one Cheney personally endorsed...Of *course* it wasn't." ("Regards Dick") The default next node, "Anonymous" goes on to say "There are no patterns here, no true correspondences. The world cannot be understood in terms of providence, fate, tragedy, spatial form. The world is only a complex problem in nonlinear dynamics, the

⁵⁴ See my Chapter X, Hypertext and Literary Theory.

⁵⁵ This paranoid view is an interesting contrast to the view held by those I have dubbed the New Romantics of Hyperspace (see Chapter IX) who see only good in linking and in hypertext in general.

ultimate chaos experiment,” and later, “No signed bombs, no bullets with anyone’s names on them. No names...Coincidence”(“Anonymous”).

It is obvious that the authorial voice is ‘protesting too much’ here. Why mention the coincidence of the bombs, if it is only a coincidence? The very nature of coincidence is that it is not worth mentioning. So by bringing it up at all, the authorial voice, while denying meaning in links, instils in us the paranoia to search for that very meaning. Furthermore, the path that leads from “Paraknowledge” to “Regards Dick” to “Anonymous” demands interpretation as a meaningful link.

The Garden as Maze

The opposition between paranoia and coincidence is the opposition between maze and rhizome in hypertext⁵⁶. Umberto Eco identifies three kinds of labyrinth, including the maze and the net, or rhizome. A maze “displays choices between alternative paths, and some of the paths are dead ends. In a maze one can make mistakes. If one unwinds a maze, one gets a particular kind of tree in which certain choices are privileged in respect to others. Some alternatives end at a point where one is obliged to return backwards, whereas others generate new branches, and only one among them leads to the way out.”(Eco 1984, 81) A net is described thus: “The main feature of a net is that every point can be connected with every other point, and, where the connections are not yet designed, they are, however, conceivable and designable. A net is an unlimited territory...the abstract model of a net has neither a center nor an outside.”(81) Is *Victory Garden* a net or a maze? Is the world, as conceived in *Victory Garden* a net or a maze? Linking is threatening if there is a force behind it that could be malevolent. If there is no force then linking is random, and the maze becomes a net.

⁵⁶ For a full description of the rhizome, see my Chapter VIII.

The question is left unresolved in *Victory Garden*, but the reading space of *Victory Garden* is certainly more mazelike than netlike. In *Victory Garden* the reader pushes against the maze walls, trying to get to *the story*, trying to get to a point, to find the way out of the maze. But she is continually being forced to follow the paths the author has designed. She reaches dead ends, backtracks, tries and rejects side paths. Although she must follow paths the author has made, the reader can't trust the author, for the paths don't lead where she wants them to, the story is never univocally set down, it is contradictory. In one version Emily is killed, in another she is alive at the end. Ultimately the reader must be content to just explore the maze, rather than to try and find the way out. While exciting the search for an ending (or an exit) by its mazelike structure; *Victory Garden* ultimately frustrates this search.

Reader response theory places the responsibility for creating meaningful links, not upon the author, but upon the reader who must manufacture meaning 'on the run', in the very act of reading. Indeed, Boris feels the responsibility to create his own meaning ("we make it up as we make it up, more-than-half-creating that which we perceive" ("Know About That")) and his paranoid obsession ultimately turns in on himself. Boris relates Tate's words to him: "...and we have only now entered the age of the autonomous and self-modifying simulacra, the moment of convergence between the IS and the COULD BE. Which is where you come in." ("Create...") Boris's task, to "create a system, or be enraged by another man's" is also the task of the reader, to create the 'IS' from the 'COULD BE', to make a reading from any number of *possible* readings (*could be's*).

Boris finds himself dispersed and disseminated in the labyrinth. He loses his sense of identity, and finds himself at first doubled (looking in the mirror he sees two of himself) then tripled... His use of pronouns reflects his dispersal. He repeatedly feels the

same “swarming sensation” that Yu Tsun feels in Borges’s short fiction; a sensation, as I noted above where the his multiple possible futures invade his consciousness. He refers to himself in the third person: “But this time it’s something alien, altogether outside *bis* ken. He feels distributed, disseminated, broadcast”(“Broadcast” my emphasis); and when he says “What U know about that” he seems to refer to himself (U for ‘Urquhart’) in the first, second and third person at once. His letters to Emily double and triple, the paths through them leading us through many versions of the letters, or a single, evolving letter. In the aptly named place, “Reflex”, Boris becomes confused as to whether he is talking to Emily or himself “Emily, maybe I’m just talking to myself again...Talking to myself again.”(“Reflex”)

Boris’s multiple self reflects the multiple reading space of *Victory Garden*, and the multiple role of the reader in that space. If the reader identifies with Boris, he must suffer the multiplication of Boris’s personality along with Boris. Just as Boris becomes “I”, “U” and “He”, the reader must take on the roles of reader, writer and critic. *Victory Garden* refers not only to its own structure, but to the experience of reading it. Just like Boris, Moulthrop’s work is talking to itself.

Hypertext the Tease

Another form of connection (perhaps the most important) in *Victory Garden* is the tangle of relationships between the characters. Emily Runbird, a mail sorter with the United States army in Saudi Arabia, is Boris’s lover. Emily has an affair with Boris’s friend Victor, but breaks it off. During a bomb alert, Emily tells some of her fellow mail sorters that with Boris she never reaches orgasm - she comes near to it, but stops at the brink each time. In a letter to Emily, Boris describes their lovemaking thus: “When I lie with you I pass into a wonderful space, a garden of endless approaches and turnings back, a labyrinth”(No *Complaints*). Again we have an obtuse reflexiveness. Their

lovmaking, like *Victory Garden* itself, is a “garden”; it is a labyrinth of “endless approaches and turnings back” - a maze that denies orgasm as *Victory Garden* denies ending and closure.

Sex is a maze: it is connective and in its possibility for reproduction, it is genealogical and hierarchical. As a maze, it has a central experience which the participants seek - the orgasm. Emily experiences orgasm once - with Victor. It frightens her, and when her fellow mail sorters ask her why she was afraid, she says, “It felt too much like dying”. Orgasm (as is not unusual) is likened to death. Boris seeks Emily’s orgasm in the same way that we, as readers, seek her death in the story; and both are denied their goal by the maze, the labyrinth. At the same time, it is the denial that itself brings pleasure: “It’s this reticence of yours that makes each encounter sublime” (“No Complaints”). As J. Yellowlees Douglas says, hyperfiction also provides pleasure by allowing any number of encounters, “Unlike most print narratives, however, interactive narratives invite us to return to them again and again...” (Douglas 1994, 85) The reader returns to the hypertext like Boris returns to Emily: each reading of a hyperfiction is thus likened by Moulthrop to a love-making without orgasm. The lack of orgasm (closure) means that further encounters are possible and pleasurable.

The hypertext critic Espen Aarseth touches on this topic: “When we look at the whole of such a nonlinear text, we cannot read it; and when we read it, we cannot see the whole text... The text, far from yielding its riches to our critical gaze, appears to seduce us, but it remains immaculate, recedes, and we are left with our partial and impure thoughts ...”⁵⁷ The denial of fulfilment, then, is not limited to *Victory Garden*, but is an effect of hyperfiction in general. It seems an examination of hyperfiction as the literary tease is called for.

⁵⁷ Espen Aarseth. “Nonlinearity and Literary Theory.” In Landow 1994, 64. (Henceforward cited as Aarseth.)

Ending in *Victory Garden*

How elusive is ending in *Victory Garden*? There are many places that could be called endings in *Victory Garden*, and none that could be called *the* ending. These quasi-endings often have no default 'next' place: if the reader presses 'return' to pass on, nothing happens. Though there is no last page, there are parties, returns, and deaths - the kind of narrative events associated with endings.

Quasi-endings often have completely black, or almost bare screens- containing just one or two words, or the infinity symbol: '∞'.

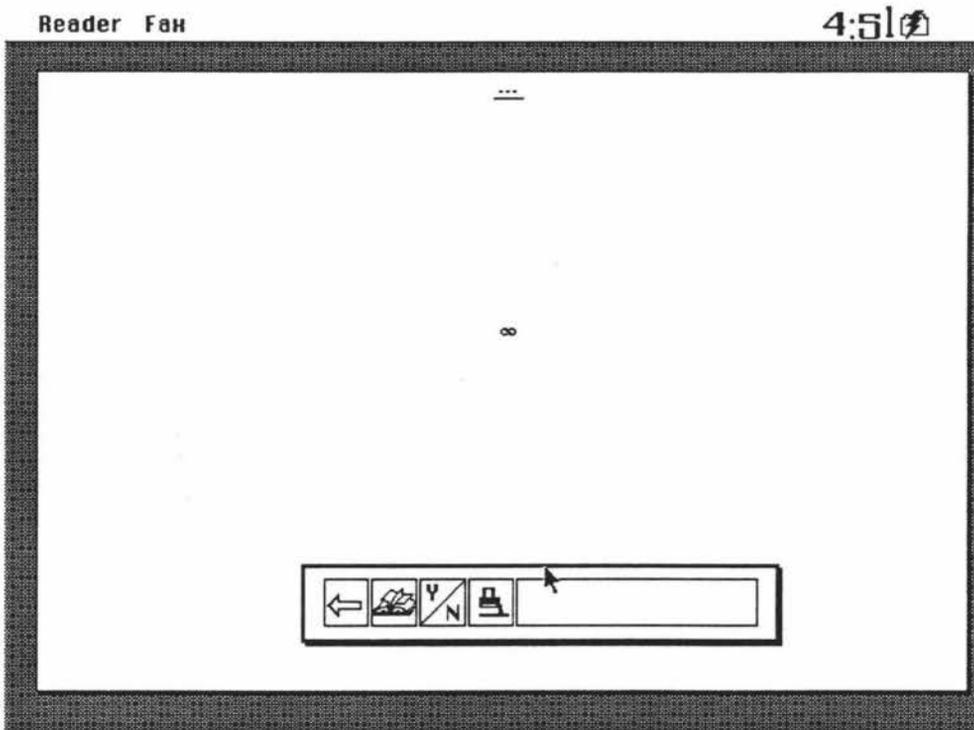


Fig 18. A Quasi-Ending

This screen leads to three quasi-endings. At this place in a reading, the reader is at an edge of the maze where Emily has come home. Depending on which paths you take there are scenes of her homecoming, her continuing affair with Victor, and a scene where Boris and Victor come to a kind of understanding over Emily's affair with Victor. Each is capped with a quasi-ending:



Fig 19. And Now, A Quasi-Ending

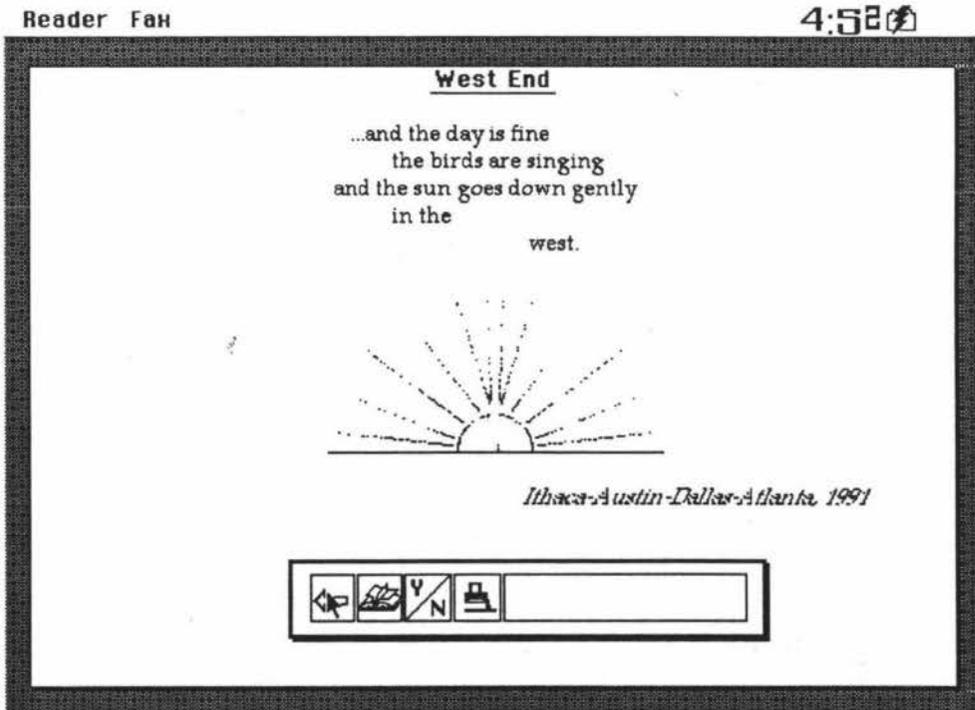


Fig 20. The West End

“The West End” comes after a particularly unconvincing, bathetic ending. The authorial voice is sarcastic, snatching away

any feeling of finality and closure. The rays of the sun in "The West End" mirror the way that *Victory Garden* seems to fan out and disperse, rather than end. The sun's rays in this way, are analogous to the use of the adjective 'innumerable' in the final sentence of "The Garden of Forking Paths", both suggesting a multiplicity of possible endings. The endings we experience in *Victory Garden* are places for the readings, the 'encounters', to end, but not for the story to end. Like Emily's quasi-orgasms, they keep us looking, seeking; they leave the way open for the next encounter.

Moulthrop's fiction, then, has a significant reflexive element. The physical and psychological world of the text mirrors the structure of the text and the experience of reading it. From this exploration of one aspect of a hypertext, I pass now to a more general consideration of the experiences of reading, writing and criticising hypertext.

Discussions of reading, writing and criticism are often part of separate discourses, carried out in different documents, even in different institutions. Here I wish to discuss them alongside one another to get a broad but integrated perspective of the experiences of reading, writing and criticising hypertext.

..... The question, 'what is the text?' has long been part of theoretical debate. With hypertext a new dimension is added.

The New Text

Computers provide a new writing space, and this writing space is the home, not just of new texts, but of new kinds of texts. I identify three kinds of texts in the world of hypertext:

Node as Text

Each node is a text - be it verbal, visual or a mixture of both. As the subject of literary criticism, it is possible for a node to be the same in kind as a print text (ignoring for now the semiotic

differences stemming largely from the virtual nature of the text). We may imagine a node having no link departures within it, making it a linear reading unit just as a print text is. In practice, however, the signs of other texts within a node mean that a node cannot meaningfully be studied separately from the hypertext as a whole. Each individual node can contain the kinds of texts that in the print space are called books, articles, stories or poems. It could also contain texts such as footnotes, prefaces, chapters, headings etc. Conceivably, (though unlikely in practise) a node could contain a journal, an anthology, even an encyclopedia, or a library!

Possible Document

Hypertext is chiefly interesting in the possibility of creating different kinds of text than print provides. Slatin defines a hypertexts as a collection of 'possible documents' created by each individual reading of the hypertext.⁵⁸ These 'possible documents' are a second kind of text. They are a linear path through the maze. The possible document, however, is not simply equivalent to the imaginable print text made up of the nodes read and the links followed. The two kinds of texts are not equivalent, because the possible document is marked throughout its reading with the signs that it is just one possible document. The breaks in its structure each mark a place where a choice has been made, a direction decided, a sequence *constructed* rather than just followed. So, though a possible document could be (post hoc) printed and bound, the experience of reading it is different to reading this printed document. The possible document is a text marked with other possibilities - in fact the existence of all the other possible documents in the 'hyperspace'.

⁵⁸ See John M. Slatin. "Reading Hypertext: Order and Coherence in a New Medium." *College English* 52, 8 (December 1990): 870-82.

longer recognisable as the traditional reader of traditional or reader-response literary theory: "Since the object is unstable, both in a syntactic and semantic sense, it cannot be read, only glimpsed and guessed at." (65) In the following sections I will examine experience of 'reading' hyperfiction.

A Craftsman with no Tools

Schlomith Rimmon-Kenan makes the distinction between text and story in narrative fiction.⁵⁹ In her theory, the same 'story' may be told in different ways in different texts. 'Order', 'duration', and 'frequency' are the three basic variables that allow a text to vary the way it tells a story. A reader following a narrative builds up the story in her head, assembling it piece-by-piece from the text. This is not to reduce text to story. Although two texts may tell the same story, the *effect* of reading them may differ greatly depending on the narrative techniques used - for example, the handling of order, duration and frequency. In a hypertext, the author abdicates some of his control of the text to the reader. In particular, the reader now has responsibility for order and frequency.

Jay Bolter sees this new responsibility as a necessity for the hyperfiction reader to regard the text differently than she would a piece of print fiction: "whenever [the reader] comes to a link, the reader must look *at* the text, as a series of possibilities that he or she as reader can activate." (Bolter, 167) Bolter distinguishes between 'looking at' and 'looking through' the text, claiming that "Rapid oscillation between the transparent and the opaque (between looking through and looking at) is a defining characteristic of hypertext." (167) For Bolter, this oscillation makes for "interesting fiction" (167). Bolter's views the reader as

⁵⁹ Schlomith Rimmon-Kenan. *Narrative Fiction: Contemporary Poetic*. London: Methuen, 1983.

both author and critic, for it is the critic's function to look 'at' the text.

Landow sees the task of the "active reader-author" as akin to that of the oral bard: "who constructed meaning and narrative from fragments provided by someone else, by another author or by many other authors." (Landow 1992, 117) Like Aarseth, Landow recognises that the term 'reader' is no longer completely sufficient, modifying it, here, to "reader-author". Landow, though, is optimistic about this new relationship: "since readers always, but particularly in this environment, fabricate their own structures, sequences, and meanings, they have surprisingly little trouble reading a story or reading for a story." (117) Gunnar Liestol says "With hypertext fiction the reader is invited to take interactive part in the operations of what we may call the narrative machinery."⁶⁰ Indeed, if the reader is to turn author and fabricate the structure of the text, she will be not only invited but *required* to learn how to operate the 'narrative machinery'.

Liestol concurs with Landow in comparing the hypertext reader to J. Hillis Miller's view of a public speaker. Both, says Landow, create meaning on the run. "The speaker posits a "syntactically incomplete fragment, ... without any idea ... of where the sentence is going to end" (Landow 1992, 116) The completed structure results from a need to fulfil the syntactical requirements of the grammar. Landow says "the active author-reader fabricates text and meaning from 'another's' text in the same way that each speaker constructs individual sentences and entire discourses from 'another's' grammar, vocabulary and syntax" (117).

I am not as optimistic as Landow and Liestol. The hypertext reader differs from the speaker in at least one important respect. The speaker, while admittedly using "another's text", has a competence in that text (a vocabulary and a knowledge of the

⁶⁰ Gunnar Liestol. "Wittgenstein, Genette and the Reader's Narrative in Hypertext." In Landow 1994, 98. (Henceforward cited as Liestol.)

grammar) which allows him to form a meaningful sentence. The hypertext reader is not similarly competent, his craft is random (in a pure hypertext) or at least restricted by the (usually minimal) information given to him before he chooses a link. The hypertext reader might more accurately be characterised as a speaker with nothing to say, trying to say it in a foreign language! Landow and Liestol's examination highlights the fact that, while the author abdicates her responsibility for creating discourse from story, the reader does not, indeed cannot, take it up. Hyperfiction is a state with no ruler, an anarchy.

Readers of traditional fiction are *not* used to fabricating their own structures and sequences. They are used to having them ready made by authors. As I have shown in my examination of *Victory Garden*, the maze-like structure of hypertext fiction is not conducive to the construction of story from text. The reader who now has responsibility for order and frequency is like a home handyman who has all the materials but has not the professional skills to put up a wall, or wire the house. Even leaving aside, for now, the question of whether a reader *wants* this added responsibility, it is hard to see how a fiction 'created' by a reader from a set of possible texts, can be as 'good' (entertaining, satisfying, meaningful) as a text assembled by a writer.

A writer uses the tools of narrative to create certain effects, such as tension, foreshadowing, suspense, set-up and pay-off. Proponents of hyperfiction must be prepared to either forgo these narrative effects, or to develop tools that allow these to be built into a hypertext without authorial control of order.

Hypertext may be used to replicate at least some of the narrative effects we expect in traditional fiction. For example, the technique of foreshadowing may be seen as an association (link) between two events in a text. Hypertext can allow a reader to traverse this link directly. The reader, coming to the second event, can follow a direct link back to the first event to examine

the foreshadowing. However, some restrictions must be placed on the link in order to maintain the characteristics of the device we call foreshadowing. Firstly, because foreshadowing is only realised when the reader has read the second of the associated events, the link must not appear until the reader reaches that second event, having already read the first event. Secondly, the relationship between the two events is not symmetrical, and this must be reflected in their hypertextual linking. The second event does not foreshadow the first event, therefore traversing the link should be a different experience depending on which way the reader travels.

This treatment of foreshadowing has severe limitations. The linking of the events does not create the foreshadowing, but only allows the reader to review it. The foreshadowing itself is still dependant on the reader reading the two events in the correct sequence. The failure of this small attempt at creating a rhetoric with which hypertext can imitate narrative fiction suggests that the task may be a fool's errand.

If we are willing to forgo traditional narrative effects in hyperfiction, we will have to develop new models, not only of the reader and the writer, but of satisfaction. Furthermore, if we see the reader's task in hyperfiction as the building of a narrative from textual blocks, do we not reduce hyperfiction to a kind of kitset fiction, where the reader ends up with nothing more (and I think, considerably less) than a linear fiction. Hyperfiction theory, then, still speaks to old expectations of fiction where it might be better to strike out on its own.

Reading as Combat

A reader's effort to reconcile the hyperfiction with her notion of what a narrative *ought* to be results in a kind of combat between reader and text. As Bolter notes, an adversarial view of reader and text (or, at least, reader and author) is not new, but hypertext "makes visible the contest between author and reader that in

previous technologies has gone out of sight 'behind' the page." (Bolter, 124) Bolter characterises this struggle as a battle "for control of the writing space. This engagement is apparent in 'Afternoon,' where the reader must make an effort to find and stay on the path he or she wishes to travel." (154) I will modify Bolter's description of the struggle. In my view, the reader struggles, not to gain control over the writing space, but to try and abdicate that control. A reader's attempt to find narrative, closure and unity where there is none is an attempt to get back to the writing space of linear fiction, an attempt to construct a 'proper' authorial voice who will dictate a 'proper' narrative. The reader's struggle is continually frustrated as the reader oscillates between (trying to) look *through* and (being forced to) look *at* the text - between wanting to be a reader and having to be a critic.

In his reading of *Afternoon*, Espen Aarseth finds "the unpredictable changing of scenes...constantly undermines the would-be reader's attempt to identify with the narratee, as well as the identification of the narrator and the (implied) author or exo-narrator, as it were. In *Afternoon* there seems to be an anti-narrator at work, giving the narrator (and me) a hard time." (Aarseth, 69) The reader tries to identify with the narratee in order to engage with the text as he would a linear narrative. Aarseth further disagrees with the Landow's optimistic view that the reader-author has no problem constructing meaning and narrative. Instead, Aarseth "felt constantly sidetracked, turning and turning in the dilating text, dead sure that important things were being whispered just beyond my hearing" (70)

It takes two to tussle. The struggle that hyperfiction readers experience must be catalysed by something within the text. Richard Gess characterises *Afternoon* and *Victory Garden* as "radical structures enclosing mainstream texts" (Gess, 39). If Gess is right then the struggle I describe is the reader of hyperfiction responding to conventional cues in the text, but being frustrated

by the radical structure. The combat between reader and text is reflected within the text as a struggle between form and content.

"Are We There Yet?"

In a reading space that has no physical start or end, and that resists narrative closure, how does a reader know when to stop reading? The hypertext author and critic Jane Yellowlees Douglas conducts a thorough consideration of this question in her paper "How Do I Stop This Thing?: Closure and Indeterminacy in Interactive Narratives"⁶¹

Douglas's article is ultimately optimistic. In hypertext, she claims, as in modern fiction, closure is not given by the text; readers manufacture their own closure. After her fourth reading of Michael Joyce's *Afternoon*, she reached a certain, "albeit stylised," (168) version of closure. This closure came about, not through any determinacy in the 'story' of *Afternoon*, but for reasons she enumerates: first, she reached a place where there was no 'default' next place; second, this place represented a resolution of the tensions set up at the beginning of the narrative; third, this particular resolution accounts for the greatest number of ambiguities; and fourth, she had read most, if not all, of the places in the hypertext, and felt she had reached a deeply imbedded and relatively inaccessible place in the narrative.

Again we see that the hyperfiction reader must become a critic as well. Douglas gains closure only after four readings of *Afternoon*. Closure is achieved only in a critical reading, a rereading. Furthermore, Douglas has gained what she terms an "approximate, albeit stylized, version of closure." (168) Douglas concludes: "If we as readers truly do long for a sense of an ending as we might for loaves and fishes, it is not necessarily the definitive, death-like ending foreseen by Benjamin—it seems that merely a plausible version or versions of the story among many

⁶¹ Douglas 1994.

will suffice equally well.”(185) This measure of satisfaction took Douglas four complete readings to attain; meaning she will have read a fair proportion of the 539 places as many as four times (and some even more). If, as Douglas says, the closure is what underpins the whole reading of narrative, it certainly seems a disproportionate investment of time to get this measure of closure. I suggest that there comes a time when a reader decides he or she is merely throwing good reading after bad; and that for most readers this time would come before he or she got to the stage at which Douglas decided she had gained closure.

In saying all this, I do not necessarily mean to disparage hyperfiction, as much as to question the way in which critics are reading it. Again, the new medium is being read on the conditions of the old medium. Douglas measures closure in hyperfiction against the yardstick of closure in print text. That it doesn't measure up is perhaps an indicator that she is using the wrong stick. A hyperfiction has a lack of closure only because there is such a thing as closure. If all novels were hypertextual, they would no longer resist closure, they would simply *be* in a different way. It seems we need to either find more efficient ways of achieving closure in hyperfiction, or to abandon the notion of closure as inappropriate to the medium.

Satisfaction

If we abandon the notion of narrative closure in hyperfiction, what is to replace it? While some critics try (and I think fail) to show how hypertext fiction can live up to current models of reader satisfaction, Espen Aarseth advocates the search for a new model of satisfaction: “If we want to know what is going on between nonlinear texts and their users, we must come up with a concept that implies both more and less than reading and redefines literary satisfaction as well as hermeneutic behavior.”(Aarseth, 67) Jane Yellowlees Douglas hints at a new model for reader satisfaction in her article “Are We Reading Yet?”

which is published in the introductory booklet that is shipped with *Victory Garden*. Douglas likens reading a hyperfiction to wandering through a museum: "You don't need to peer intently at every exhibit in every room of a museum to feel that you've 'done' the museum. What prompts us to leave the museum is not the sense of having digested its every aspect, but the sense of having satisfied – or exhausted – something in ourselves."⁶² Rather than comparing the hypertext fiction to post-modern fiction as Douglas does in "How Do I Stop This Thing?" she finds a completely different analogue. To model the hyperfiction museum as a browser in a museum (the idea of a 'browser' is basic to theories of navigation in hypertext) may be to go some way toward defining an "established (meaningful) ritual, which must absolve the user from the burden of reading, which in the case of nonlinearity may be defined as the frustrating attempt to harmonize contradictory scriptons from the same text." (Aarseth 1994, 66)

If the satisfaction that is to be gained from reading in a hypertextual environment is new, then it may be some time before readers gain the competence to read the text in a new way, instead engaging in a struggle to make the text conform to their expectations; a struggle which leads even a detached critic to make comments like "I cannot deny it was a very fascinating literary experience" (70)

Robert Coover says "Only when the analytic of consciousness can be suspended can the truly New emerge" (Coover, 10) Coover advocates, not just a new model for the activity of reading hypertext, but a new "dreamlike" state of consciousness for reading hypertext. Perhaps the best advice to a hypertext reader is straight out of a soap opera or a 'B' movie: 'don't fight it'. If we stop trying to read hypertext for narrative satisfaction, stop

⁶² Jane Yellowlees Douglas "Are We Reading Yet? A few pointers on reading hypertext narratives." (Accompanying Moulthrop 1991.)

choreographer, the reader is the dancer, and the text is "something like outlines of feet for the dancing readers to skip on and off." (42) Elsewhere (as quoted above) "hypertext reading is traveling; so hypertext writing is creating countries to travel through." (41) In both of these descriptions the collaboration between author and reader is one where the two roles are clearly separate.

If the roles of the author and reader are diverse, so too are the *experiences* of writing and reading hyperfiction. Gess advocates a reading experience in hypertext that most hypertext rhetoricians warn against: that of disorientation. "Without a visible or invisible author to guide you, you will get lost: this should be desirable, illuminating, a loss of ego of the sort associated with artistic, sexual, and religious epiphany." (40) This loss of ego, sounds very much like the suspense of the analytic consciousness that Coover recommends to the hypertext reader. However, this is an experience that Gess recommends for the reader, but not for the author. Gess tells how he painstakingly created the 759 links between the 308 text places that he had already written. He says "Other hypertext writers like to write and link at the same time; I'd be afraid of getting lost." (42) While lostness is desirable for the reader, it is to be avoided when writing. So it seems that the traditional division between writer and reader is largely maintained, at least in this instance.

Gess does describe his creative efforts as a struggle ("I fought with the software" (39), "I fought with the Macintosh" (39)) but this battle is with the technical aspects of creating the text, rather than with the structure of the text itself. Gess diffuses any struggle with narrative by deciding to link the texts "extrarationally—through imagery, through echoes and resonances, through juxtapositions that were gnomic instead of revealing" (41). Despite absolving himself of any narrative responsibility, Gess still describes his efforts to create the structure of the hypertext from the individual

texts as a fight: "late at night I would wrestle these schemata into the Macintosh." (41) In this way, the hypertext reader and author seem to share a certain combative relationship with the text.

The most interesting aspect of Gess's paper is not what he has to say about hypertext authoring, but the way he structures his prose. Although the paper's subtitle, "Shuffled Notes on Hypertext Writing," suggests we might expect a hypertext-like structure, the structure of the paper is in fact remarkably linear. The paper begins with the conception of the idea to write a hypertext, and the parents of that idea (the author and his friend Robert Cheatham). It then goes on to describe the creation of the hypertext, its growth, and ends with its publication and the possibility of the texts' erasure. It is a perfectly ordered and linear narration of birth ("delivered to Robert Cheatham" (42)), growth ("growing the thing" (39)), development, maturity, reproduction ("I made 50 copies, one disk at a time" (43)), and death ("being erased is the special despair of hypertextualists." (43)). It seemed to me that Gess was making up for the (disappointing?) experience of creating his hypertext, by writing a completely satisfying narrative about that experience. I contacted Richard Gess by electronic mail and asked him for a response to that idea. I quote at length from his reply:

*Your take on "Magister Macintosh" is dead accurate. This is not to say that I was more than incidentally aware of the structure you see as I was writing the piece. The linearity I was deliberate about while writing was, I recall, just enough to make me feel that I was being friendly to the majority of *TDR* readers who would have no idea of what I was talking about.*

*The thing you've really got right (as everyone I've shown your note to agrees) is your notion that the linearity is a reaction to the experience of writing a hypertext. "Magister Macintosh" was written at a time when I was feeling intensely ambivalent about HYPERTEXT. I was being asked to write about it, present papers about it, guest-edit journals, etc., all on the basis of a barely circulated and diminutive text that I felt was mostly a creation of smoke and mirrors. I wasn't satisfied with either my HYPERTEXT or most of the others I'd seen; their geometry was sometimes dazzling, but as art they seemed to fall short. Kind of like some of the big D.W. Griffith movies where the technical innovations are revolutionary but the scenarios are bathetic and sometimes odious. I felt in my own case a swing away from my trust in "lostness." So I suppose I ended up making "Magister" a straight line out of exhaustion with and mistrust of the mare's nests of *Halo.**

These days I feel more relaxed again about HYPERTEXT. The (very tentative) new ideas I have involve texts made mostly of sequences of

Which Text?

Literary criticism was born with the invention of print, and we rely on the mechanics of print for our notions of mastery and authority. In hypertext, Landow says, "one can only sample, not master, a text."⁶⁶ To apply the tools and forms of traditional literary criticism to a hypertext is necessarily to fix that text, to privilege one (or two, or sixteen) readings of it over the others. The hypertext critic, then, becomes author - having to write her own text before criticising it.

The Critic With No Tools

Apart from the disappearance of the critical text, the hypertext critic suffers from the lack of the critical tools we take for granted in print. For example, in *Victory Garden* (and other Storyspace hypertexts) there is no electronic equivalent to the bookmark. Unless you can remember exactly the path you took to reach a place, you may never be able to return and reread it. You could spend hours trying to find it again. Furthermore, if you return to it by a different route, you could find it altered!

Similarly, the basic tool of criticism, the page reference, is unavailable. A critic cannot reliably refer her readers to the part of the text that she is discussing. Obviously, we can imagine or design hypertexts in which a mechanics for reference was provided; but we should be suspicious of the urge to have the needs of criticism dictate the form of the art.

A Crisis for Critical Forms

If hypertext "disappears" our critical tools, it also *disables* our critical forms. Something as simple as a plot summary becomes quite inappropriate. In his article for the *New York Times* Book

⁶⁶ George Landow "What's a Critic to Do?" Landow 1994, 35.

Review, Robert Coover is forced to use the conditional tense to describe the events of *Victory Garden*⁶⁷.

Hyperfiction may demand new forms of criticism. Aarseth sees the critics role in the world of hypertext as being more like that of an anthropologist, studying not a static text, but text as process. (Aarseth, 82) In his paper "The Miranda Warnings," Gregory Ulmer illustrates the difficulty of criticising hypertext from within the tradition of print. In his unconventionally-written paper, Ulmer describes the invention of conceptual thinking that accompanied the first use of writing. Where the epic narratives may only describe Achilles and his actions, the writing of Hesiod and Solon can describe the concept of 'Justice'. Ulmer sees the electronic age as ushering in a revolution in thought as basic as that provided by writing, and he describes his task thus:

"My assignment is to repeat Hesiod's experiment, formally and conceptually. Such is the project of grammarology as discipline, discovering and inventing the shift from a print apparatus to an electronic one. ... In the same way that alphabetic literacy made conceptual thinking possible, electronic literacy requires another means for arranging diverse particulars into classes and sets.

⁶⁷ See Coover 1,8.

*The new arrangement has to be invented out of the old one, involving a new form and a new style of reasoning. The process of invention cannot occur in general, but, as in the passage from the oral to the alphabetic, must evolve in terms of a specific action and topic.*⁶⁸

Ulmer goes on to formulate this 'specific action and topic' in terms of a complex series of pun and allusion that involves Turing, Groucho Marx, the samba, Carmen Miranda and Wittgenstein. However, I think there is a basic flaw in Ulmer's self-assigned project. Ulmer is trying to formulate his new kind of reasoning from within print. Surely the limitations of print must prevent the successful completion of this task, even if they don't prevent its very definition and 'conception'. Would the change from the 'to do' of Achilles to the 'to be' of Hesiod's concept of Justice have been able to be described in epic narrative? Ulmer's whole point is that it would not.

I include the above example as an illustration of the difficulty of using print to criticise hypertext. Aarseth suggests that we create "a new terminology that lets us name the representation and composition principle that relates to nonlinearity as narrative relates to linearity." (Aarseth, 71) Perhaps we also need a nonlinear writing space for criticism.

A New Hypercriticism

In an interesting way, the latest hypertext criticism (especially that in Landow's *Hyper/Text/Theory*) is already somewhat hypertextual. The criticism is marked by a certain reflexivity, many authors (myself included) are practitioners of hypertext and the parenthetical phrase "(myself included)" is a common refrain. In

⁶⁸ Gregory Ulmer. "The Miranda Warnings: An Experiment in Hyper rhetoric." In Landow 1994, 348. (Henceforward cited as Ulmer.)

Moulthrop's paper "Rhizome and Resistance"⁶⁹ he refers to Rosenberg's paper "Physics and Hypertext"⁷⁰. This would not be unusual except for the fact that Rosenberg's paper also refers to Moulthrop's. Obviously a fair amount of collaboration has taken part; the critics are the authors are the readers. It is a kind of hypertextual way of criticising—circular reference, and self-referentialism—within print crit culture. When reading this criticism one gets the feeling it would be more at home linked up in a hypertext.

In his paper "What's a Critic to Do?" George Landow advocates a "merging of the creative and discursive modes" which he says "simply *happens* in hypertext." (Landow 1994, 39). Landow is not simply recommending a shift of medium for conventional criticism, but implicitly, a change in the *kind* of criticism that we do. To suggest criticising hypertext in hypertext form is to suggest a new form of criticism which may be as far from traditional literary criticism as hyperfiction is from linear narrative.



⁶⁹ Stuart Moulthrop. "Rhizome and Resistance: Hypertext and the Dreams of a New Culture." In Landow 1994, 299-322. (Henceforward cited as Moulthrop 1994.)

⁷⁰ Martin E. Rosenberg. "Physics and Hypertext: Liberation and Complicity in Art and Pedagogy." In Landow 1994, 268-98. (Henceforward cited as Rosenberg.)

VI Part III: WRITING SPACE

The Writing Space of Print

The new medium is the fourth great technique of writing that will take its place beside the ancient papyrus roll, the medieval codex, and the printed book.

Bolter, 6

My Writing Space, Your Communication Technology

..... In this chapter I will be considering hypertext as one of many 'writing spaces' or 'communication technologies' that humans have at their disposal. I will use these terms interchangeably, though they have quite different connotations. Bolter's defines his term 'writing space' as "the physical and visual field defined by a particular technology of writing" (Bolter, 11). This term implies that a technology essentially is a provider of some kind of 'space' to write on. It is the characteristics of this space that define the technology. The term 'communication technology' is preferable when we wish to compare hypertext to oral communication, as oral communication can hardly be said to provide a 'writing' space (or, for that matter a writing 'space'). However, we may wish to see print and hypertext as providing the technology for more than (or at least other than) 'communication', as some schools of criticism find see this term inappropriate to describe literature. Students of 'oral literature' have a similar terminological problem. Walter Ong avoids the term 'oral literature' completely (as a "strictly

this book words and pictures can be printed with ink. The words are printed to almost fill each page. Usually just one text is printed in one book. The text fills the book from the page at the top of the pile (the first page) to the page at the bottom of the pile. The pages are usually numbered in one of their corners. Half way through the pile is half way through the text. Things can be interleaved into the text to mark a place or to make a note, or the pages can be written on, for there is a margin that is blank on each page. The words of the text are printed in lines on the pages, from left to right and the lines are printed from the top of the page to the bottom. After a page has been read, it can be 'turned,' effectively splitting the pile at the next possible place. The next piece of text is printed on the leftmost top of the two pages now showing. . . Perhaps that is enough to show how little we regard the physical object of the book and our physical process of reading. It is difficult to describe something as important as the basic topographical layout of words on a page without sounding as if I was talking to an alien, or playing some inane parlour game. Yet I believe it is important to gain this perspective on our writing space.

Consider this quote from the back cover of Ben Elton's novel *Gridlock*:

The Ben Elton Gridlock is a thirty chapter, plot-charged, word-injected comedy-thriller with a GPC (gags per chapter) ratio superior to any novel currently in the showrooms. Its tough, impact-resistant cardboard body shell surrounds a state-of-the-art interior featuring real paper in a luxuriant two-ply format with individual page numbering fitted as standard. The Gridlock's ergonomically designed spine is precision engineered to fit snugly into the hand of the consumer who demands professional level reading equipment even on a leisure novel.

*Features such as chapter headings, stylish dust jacket and manual page turning are identical to those found on far more expensive books imported from Japan and Germany.*⁷²

When a book is advertised in this way, it is funny. Phrases like "reading equipment" are surprising because we are unused to thinking of a book as a kind of equipment and because when we do think of it we realise it is just that. From a consideration of the concrete phenomenology of the book, we may move to a consideration of the consequent abstract features of print. In what ways might our current 'reading equipment' be inadequate?

A book is a linear writing space. This means that the words are arranged in only one sequence. In a book, you can always say which word is next, from the first page to the last. The reader is forced to make no choices, he or she may merely follow the sequence decided upon by the writer. Secondly the book dictates the size of our reading unit. A book has an optimum size of between sixty-four and about a thousand pages. This means most texts fit into this size too. Of course the printing can be made smaller, the pages thinner, the size of the pages larger or smaller, but standardisation brought about by mechanisation of the printing press makes a 'usual' size more likely. Texts of just a few pages are unwieldy - too many would be inconvenient to keep, and uneconomical to bind - so smaller texts are gathered together under subject headings and bound in journals, or books of short stories, etc. Even smaller texts like poems are almost always published in groups of however many it takes to get at least sixty-four pages. Texts too large have to be split and multiply bound. As a physical object a book must be stored lying down in a pile or standing in a row on a shelf, and only a certain amount can be fit into a room. All that is visible of a text in storage is the spine. If a text is required, we must look for its spine. The title of a book is

⁷² Ben Elton. *Gridlock*. London: Macdonald, 1991.

a summary that can fit on the spine printed large enough to be read at about two paces.

Another consequence of the physical book is that a text is not only isolated as a separate conceptual whole, but it is also isolated as a physical object from all other texts (unless it is bound with another text). In the print world, a text that refers to another text, refers to a separate physical entity that might be lying next to it, or standing in a library on another continent. Wherever it is, there is some effort to be made to locate, access and read the text referred to.

There are many more features of the current writing space which may be seen as directly or indirectly resultant of the physical features of the book. These include political, legal and economic aspects such as publishing. A book may be written, but unless it is published, it will not reach a readership. It costs a lot of money to publish a book, because only a large print run is economically viable. A book is a physical object and thus it is not just a text, or a reading site, but also a commodity, a good. In fact, Marshall McLuhan identifies the book as "the first uniformly repeatable commodity, the first assembly-line, and the first mass-production." (McLuhan, 125) As an object it is manufactured, sold, stored, advertised, and re-sold. It takes part in the human commercial system, as well as the intellectual, artistic, or academic system. Thus it is not only the reader, writer and critic that participate in the production and consumption of print texts, but the publisher as well as advertisers, retailers, truck drivers, manufacturers, lumberjacks, sawyers and lawyers.

The physicality of a book dictates how, where, when and what is written, stored, found again, and read. All of the limitations listed above are real and there are many more. Many are limitations that writers can avoid. I have already suggested how the limits on the size of a book are stretched. The linearity of a book can also be modified somewhat by such innovations as the page number, the contents page and the index. While providing a numerical sequence for

reading the book, the page number also provides the mechanism for reading the book out of sequence. It allows reference by one part of the book to another. If I say "see page 54," the reader can then turn to page 54 and read it without first having read pages one to 53.

Reference can be made in the body of the text, when ideas not sequentially joined have some conceptual association. Reference can be made in an index or a table of contents, or a concordance.

Reference to a certain page of one book can be made in another book.

Another method for allowing a book to be read out of sequence is to order the information in such a way that any piece of it can be found without reading all the others. A dictionary does just this, using alphabetic ordering. The limitation of this is that the information so ordered must be able to be described reliably by just one keyword. In the case of a dictionary this is obviously possible, as the keyword is identical to the subject of the information. It turns out that the dictionary is the only application for which alphabetical ordering will work perfectly. Encyclopedias of various sorts (and other things calling themselves dictionaries, but which are really small-domain encyclopedias) use alphabetical ordering too, but they can never be one hundred percent reliable. A reader can never count on the fact that the keyword she would use to encompass the information wanted is the same as that used by the authors.

In computer programming an unintentional mistake (a bug) in a program often produces an effect which, though unexpected, is not necessarily a drawback for the final function of the software. Programmers often euphemistically refer to these bugs as 'features'. Many of the limitations (bugs) of print have become features through our use of them over the centuries. There is no doubt that hypertext can remove some of these limitations of print: for instance fixed sequentiality and discrete physicality. It also introduces limitations of its own. The different bugs and features of these two communication technologies, and their relation to the functions they

are required to perform, will determine their role in the future of human communication.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ This claim with which I began this chapter is the basis of Jay David Bolter's book *Writing Space: The Computer, Hypertext and the History of Writing*. The claim is a stronger one than I have been willing to make so far, but as we will see in this chapter, it is a provocative prophecy. Critics of hypertext support this claim in a number of ways: They see hypertext in its historical context as both a release from the restrictive bonds of linear print, and as a medium for expression which fits our changing world view and view of ourselves better than print does. They compare hypertext to oral literature, finding that hypertext shares some features with oral literature as a medium. They also see hypertext as the embodiment of new critical views of text, and of new views of the roles of author and reader. The remainder of this part of my thesis will examine the claims made by these prophets of hypertext.

My purpose in this part of my thesis is twofold: to examine hypertext as possibly the 'fourth great technique of writing', and to examine the *claims* that hypertext is the fourth great technique of writing; to do a meta-examination of hypertext. We can, I hope, find out as much or more about hypertext and its context by this meta-criticism as we can from the criticism itself: "We need to interpret interpretations more than to interpret things."⁷³

⁷³ Derrida uses this quotation from Montaigne to begin his article, "Structure, Sign and Play in the Discourse of the Human Sciences." In *Critical Theory Since 1965*. Ed. Hazard Adams and Leroy Searle. Tallahassee: Florida State University Press, 1986, 83.

..... "The history of every art form shows critical epochs in which a certain art form aspires to effects which could be fully obtained only with a changed technical standard, that is to say, in a new art form." (Walter Benjamin, cited in Landow 1992, 37)

The Anticipation of Hypertext in Print Fiction: *In Memoriam* - Tennyson's First Hypertext?

Hypertext critics see in print literature the shadow of the new medium. Writers in print, increasingly frustrated by their medium, begin to question it in different ways. The literature that they produce shows signs of this questioning, and these signs anticipate hypertext. George Landow sees Tennyson's *In Memoriam* as a 'proto-hypertext' resulting from Tennyson's questioning of nature, God and poetry after Hallam's death. Seeing *In Memoriam* as "an antilinear poem of fragments" (Landow 1992, 37), Landow imbeds the poem in an Intermedia web where intratextual links can connect the fragments that echo each other, allowing a student to free the poem from its printed linearity and read it along any of many different axes - following a certain metaphor or motif through the poem. In this way "the *In Memoriam* web attempts to capture the nonlinear organisation of the poem" (38). It is with the assumption that the poem was somehow 'antilinear' as it was written that I take issue.

Landow offers as evidence of the poem's antilinearity the fact that the poem is written in numbered fragments rather than in the conventional elegiac style. What it is that makes a fragmented poem antilinear, he does not say. On the contrary, the numbering of the fragments seems to solidify and cement the linearity of the poem, dictating a clear order in which the fragments are to be read. The echoes and recurrences within the poem are meant to be just that, and their effect is gained by their separation from one another. If we read sections 7 and 119 concurrently, they no longer 'echo' each other, but form a pair with a certain unity; just the kind of unity that

Landow says is denied by the poem, in the same way that unity is denied by hypertext. Landow says Tennyson “constructed a poem of 131 fragments to communicate the ebb and flow of emotion, particularly the way the aftershocks of grief irrationally intrude long after the mourner has supposedly recovered.”(37) The linear movement of time is essential to the structure of the poem, and to the ebb and flow of the emotions in it. Any similarity in effect the poem has to a hypertext is dependent precisely on the features of the poem that are quite un-hypertextual: its fixity and its linearity.

It would be foolish to say that juxtaposition of related fragments is not valuable in study (rereading) of the poem; of course it is, and hypertext is an excellent tool for doing just this; but there seems to me to be no evidence to say that the poem is ‘antilinear’ as it is written. It may be accurate to say that the structure of *In Memoriam* creates a tension between linearity and allusion, but while this may be a questioning of the linearity of print, it does not make the poem ‘antilinear’ or ‘proto-hypertextual’. Statements like Landow makes about *In Memoriam* give the succession of hypertext an air of inevitability that it does not deserve; and should be carefully examined.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Bolter makes a similar claim about the works of James Joyce: “*Ulysses* and particularly *Finnegans Wake* are themselves hypertexts that have been flattened out to fit on the printed page.”(Bolter 24) This is an even bolder claim than Landow’s, and similarly flawed. Bolter sees Joyce’s narrative strategy as “too complex and too dynamic for the medium of print.”(137) Scholars who have access to draft versions of *Finnegans Wake* can “chip away layer upon layer of revision and discover that much of the *Finnegans Wake* does have a storyline . . . but the reader who has only the final printed version cannot imagine this genesis. He is forced to read *Finnegans Wake* along

the final temporal layer and then try to work his way down through the layers of allusion”(137) Bolter’s contention is that because “Print technology was all that Joyce had available”(136) both writer and reader have to settle for something that suffers from being squashed into the print medium against its nature. There is the implicit assumption that Joyce was aiming to produce a certain text, or a certain effect, but failed due to lack of an electronic medium. To deduce an authorial intention in this way from a text is questionable. *Ulysses* is *Ulysses*. It is written, and supposed to be read, in print. Any different text that can be read in a different way will not preserve the experience of reading *Ulysses*. David Kolb puts it thus: “[Joyce’s work, particularly *Finnegans Wake*] is sometimes cited as a proto-hypertext. But this is misleading; Joyce’s work depends on the simultaneity and the emerging together of the multilingual play of meanings and structures. Separated into discrete links, the combinations would lose much of their power.”⁷⁴ Although it is therefore clearly wrong to say that Joyce’s novels are hypertexts that have been flattened out, we can nevertheless agree with Bolter in recognising that Joyce frustrates the readers’ attempts to follow a linear narrative.

Little Dorrit: The Multiplot Hypertext?

..... Kathryn Sutherland’s paper *A Guide Through the Labyrinth: Dickens’s Little Dorrit as Hypertext* again has its genesis in the idea that Dickens (and other Victorian novelists) anticipated, with the multiplot novel, the writing space that would be provided by hypertext: “It is our central contention that the narrative procedures of the Victorian novelist are comparable to the structures of hypertext and that the Victorian novelist’s stated understanding of narrative as a series of

⁷⁴ David Kolb. “Socrates in the Labyrinth.” In Landow 1994, 329. (Henceforward cited as Kolb.)

shifting groupings by affinity predates the non-sequential interlinking of text which is hypertext.”(Sutherland, 306) The narrative procedures Sutherland identifies as analogous to hypertext are the “multiplication of narrative strands”, “competing centres of interest”, “conflicting modes of presentation”, the representation of society as “a shifting system of texts and contexts”(306), “the democratization of information”(307) and the lack of a consistent narrative voice.

Sutherland sees the hypertextualising of the Victorian multiplot novel as a way of providing a tool for study and understanding of a difficult genre - “By these means hypertext becomes an informing adjunct to (though not a replacement for) the conventional sequential reading of the printed text.”(303) Students reading the hypertext *Little Dorrit* can follow threads of narrative directly and incorporate contextual material such as Dickens’s number plans and working notes, bibliographies etc. Sutherland’s project is in many ways similar to the Intext hypertextualising of short stories.

Sutherland begins one of the sections of her paper with the heading “The hypertext edition”. A few important questions are raised by the concept of producing a hypertext ‘edition’ of a novel like *Little Dorrit*. What relation does the hypertext bear to the original novel? It is certainly not a replacement, as Sutherland acknowledges. Further than that, it is important to see that it is not really an ‘edition’ or ‘version’ of the original novel at all. An edition is a “form in which a literary work is published”(OED) That the work can be published in different forms (and in this case different *media*) and remain the same work is the assumption behind Sutherland’s heading. A hypertext must, however, be ‘beyond text’, another text with a different effect and a different meaning. It is a text the sequence of which is created by the reader, whereas the sequence of *Little Dorrit* is created by Dickens. Despite Sutherland’s assertion that “multiplot novel is a hypertext”(307), it is not. This is nowhere made more clear than in the quote from Dickens which Sutherland

chooses to begin her paper: "It would be a new thing to shew people coming together . . . and to connect them afterwards, and to make the waiting for that connection a part of the interest..."(Dickens, cited in Sutherland, 305) A hypertext allows the elision of that waiting, destroying the narrative structure in the very act of making it explicit. Though hypertext allows us to closely examine a narrative structure, it is only by breaking the structure down - severing the linear connections, and allowing things separated to be brought together - that this is achieved. In the same way that a biologist must be willing to kill an animal in order to examine the relation of its inner parts, we must realise that to expose the relation of the parts of a piece of literature by hypertextualising it is, in one way, to kill the piece of literature.

Sutherland intimates that *Little Dorrit* is dead already in the sense that the "real seamlessness and radial networking of its social vision" is implanted "within the deep structure of a narrative *distorted into artificial linearity* by the limiting perspective of the page sequence"(308 my italics). Again we encounter the opinion that the print text is somehow 'artificial' and implicitly that hypertext is the 'natural' medium for such a seamless and radially networked text. Like other critics of hypertext, Sutherland seems to waver between two ways of seeing the relationship between pre-hypertext literature and hypertext. The first way, as we have seen above in the writing of Bolter and Landow, sees some pre-hypertext literature as being artificially constrained to print, as being hypertexts trapped on the paper pages of a book. The second way, which I favour, sees the literature as questioning the bounds of print literature from within those bounds - as sharing some features with hypertext, but depending completely on its pagebound linearity to bring about these features.

The consequence of the first view of hypertext and literature is that a you can imagine making a hypertext version or edition of a novel or other work which frees that work from the shackles of print

and allows it to be read as it was 'meant' to be read. The second view sees any such hypertextualisation not as a version of a text, but as another text, ideal for study, for exposing the intratextual and intertextual structure, but essentially dispersing and dissolving the work. Sutherland implicitly recognises this fact in a footnote where she sees any hypertextual reading of a piece of literature not as a reading of the original work but as *are-reading*.

If we employ the second way of thinking about the relationship between print literature and hypertext, we can see that throughout the history of print literature, writers have been questioning the literary and rhetorical conventions, as well as the physical boundaries, of their medium. In many cases hypertext can be seen as the answer to this questioning - whether by design, by necessity or by coincidence it is difficult to say; but it is worth noting a few salient cases.

Hacks become Hackers: The Hypertextual Scriblerians

▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ Perhaps the first instances where questioning the conventions of literature lead to questioning the medium of print itself can be seen in the writings of the 'Scriblerians' in the Augustan period. In an unpublished essay entitled "A Matter of Importance: The Tradition of the Book from the Scriblerians to Our Own Time" David Dowling identifies the methods by which the Scriblerians satirised the publishing industry, and the book itself.

Swift's *A Tale of a Tub* tears the conventional book apart, unbalancing it with a series of false starts including an apology, a dedication, a note from the bookseller to the reader, another dedication, a preface and an introduction. The book itself is fragmented by extensive footnoting, which intrudes upon the linearity of the reading experience, and by many clearly signposted 'digressions' which pervert the linearity of the narrative. The text is further broken by the frequent 'Chasms': passages of asterisks

replacing text that has been deleted. It is easy to draw the analogy between the dissolving of the book that Swift achieved in *A Tale of a Tub* and the similar dissolving we see in hypertext; and that analogy can be extended to much of the writing of the Scriblerians.

There is little gain to be made by further cataloguing of analogies to hypertext in early experimental fiction such as Pope's *The Dunciad*, Hogarth's *The Analysis of Beauty*, Sterne's *Life and Opinions of Tristram Shandy*⁷⁵, and more modern works such as those of Vonnegut. It is nevertheless interesting to note that in most cases, the authors directed their satire at the book industry as a whole: including its political, economic and legal aspects. These three aspects of publishing are as problematic today (and will be increasingly interesting) as the electronic publishing industry struggles through its infancy, as they were in the days of the Grub Street Hacks.

Breakthrough Fictioneers

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The cover of the book *Breakthrough Fictioneers* edited by Richard Kostelanetz, is a page of text. All the words are light blue except the title, the editor and the publisher's name, which are part of the text but are highlighted by being printed in bright red. The cover states: "Included are visual works, schematic, linguistic sequences and even a few almost-traditional yarns". Indeed the cover is almost the only page in the book that is printed as a normal book is. The book is very conscious of itself as a physical artifact, just as the editor is openly conscious of the both the limits he is exploring and limit-exploration that he is doing. In his introduction, Kostelanetz says "one collective aim of innovative literature is developing our bookish technology." (Kostelanetz, xviii) and states the purpose of

⁷⁵ Bolter performs an exegesis of *Tristram Shandy* as a conversation between author and reader that anticipates the blurring of the author/reader boundaries in hypertext. See Bolter, 132-5.

this development as being “to reshape the history of printed books”(xviii). The fiction he collects is challenging the writing space of print. That is its effect and, as Kostelanetz states, that is also its purpose: “What is new in contemporary art often deals inventively with the essentials of the medium; in fiction's case, the possibilities of language and narrative form, as well as the potentialities of both a rectangular printed page and the rhythmic process of turning pages”(xvi) Kostelanetz identifies the same print limitations that I have above: “The most obvious formal limitations stem from the practical publishing convention of printed rectangular pages of uniform size, bound in a fixed sequence and limited in color to blacks, whites and occasional greys”(xix)

In questioning our writing space these Breakthrough Fictioneers often seem to imagine, desire, or prophesy the writing space of hypertext. The fiction itself is all short, giving the book a quite modular nature and Kostelanetz's questioning of print seems to cast a shadow shaped like hypertext. One example from *Breakthrough Fictioneers* deserves attention. “Conjectures on a Famous Process” by E. Lagomarsino is a four page ‘fiction’ (I use Kostelanetz's word as it belongs to no genre). It consists of fifteen short passages (10 - 80 words approximately) spaced out on the pages. The subject is difficult to encapsulate briefly, but is a kind of advice and instruction manual for hiding and discovering poems written on cards: hiding them in banks, in St. Paul, in buses, in shoe stores, in Chicago, in Baton Rouge: “it will probably be as entertaining to place the cards in a Denver department store as to discover them there.”⁷⁶ The spacing out of these pieces of text on the pages of Lagomarsino's work suggests both these little poems on cards placed about, and the nodes of a hypertext. The spacing of the pieces allows the reader to read

⁷⁶ E. Lagomarsino. “Conjectures on a Famous Process.” In Kostelanetz, 210.

them in any order (at least within a page - it is harder to imagine many reading the pages out of order). The most obvious parallel to hypertext is that the fiction is about texts that are spaced out topographically: "post offices, schools, churches and supermarkets are a few public buildings that might contain cards. doctor's offices, beauty shops and restaurants are other choices." (210) Mention of place names is foregrounded, as are lists of specific spots within larger areas where cards may be found, placed or lost. Hypertext is writing that is most easily seen as being distributed in space, as being topographic writing; as Bolter calls it, "writing with places" (Bolter, 25). Most of the pieces of text are entirely in capital letters, while some are entirely in lower case. The 'last' (it is closest to the bottom right hand corner of the last page) piece ends "it is clear that cards reconstructed from pieces of other cards mark a poem authored by the restorer." (210) This reconstruction of a text from pieces of text is again both like the hypertext process and the process of reading this fiction; and this question of the 'restorer' becoming the 'author' is a salient part of the theory of hypertext.

The embarrassment for Kostelanetz as editor is that try as the writers might, none of them can escape the two dimensional, spatial nature of the page. Even the linear, sequential nature of prose is inescapable (at least outside of fiction) as Kostelanetz as much as concedes in making his introduction in just that form. This is a common aspect of new or experimental types of writing - much is written about the new form in the old form. Two possible reasons for this are: firstly, to examine it from outside; and secondly to win the conservative reader over by appealing to her in language she is used to. This phenomenon applies to hypertext as well: this thesis for example being written not in hypertext, but in conventional style⁷⁷. A corollary aspect of new types of writing is a reflexive

⁷⁷ I gave considerable thought to the idea of writing my thesis in the form of a hypertext. It seemed to me that it would then be both an examination and an

preoccupation. The new form talks about itself incessantly, even within fiction. Kostelanetz explains this: "The primary 'meaning' in most truly new writing is the demarcation of yet another alternative possible in literary form"(xviii). As I have shown in examining the reflexivity of *Victory Garden*, this is true also of hypertext.

Post-Modern Fiction

Before I leave my exploration of pre-electronic literature, let me draw attention to two particularly interesting pieces of fiction which anticipate a new writing space much more literally than the works we have so far examined. Jorge Borges' book of short fiction *Labyrinths* and Marc Saporta's unbound box of fiction *Composition No.1* are both briefly reviewed by Bolter (Bolter, 137-42). Borges' short fictions (particularly "Library of Babel", "Circular Ruins" and "Garden of Forking Paths") are *about* fiction, about the world of books and the form of the book. As Bolter says "The *Ficciones* are themselves conventional pieces of prose, meant to be read page by page. Yet the

illustration of hypertext. The critical problem of referring to hypertext from within print would be obviated; I could make hypertext explain itself. Hypertext seemed an appropriate medium for a thesis which gathers arguments from Computer Science, Linguistics, Literature, Education, and Philosophy, linking them together to form a new structure. Landow and other hypertext critics discuss the convergence of literary theory and hypertext. What better way to take part in this convergence than to perform my scholarship in hypertext?

However, a thesis, as such, has an 'prescribed' form which is dependent on the medium of print. The academy requires its subjects to be studied on its own terms, in order to maintain an objectivity. Those terms include the use of print as the medium of discourse. It is for this reason that most of the critical discourse on hypertext is in print. Ironically, the only way for hypertext to join the fold of academic discussion is for it to remain outside, to be held at arms length and discussed in print. The growing use of electronic mail and the WWW in academic discussion may begin to change this print bias, but since academia is founded on print, it will be a new academy that results.

It occurred to me to write two theses. The first this thesis *about* hypertext, the second a thesis *in* hypertext. Because the medium alters the message, they would not be the same text or say the same thing. In fact it is doubtful if the hypertextual thesis could 'say' or 'mean' anything in the sense that I hope this one does (if it did mean something, that meaning would be created as much by the reader as myself - I could hardly call it 'my' thesis). Rather than being two 'versions' of my thesis, they would be two things both called 'my' thesis. My thesis in hypertext could seamlessly include critical excerpts, Intext, hyperfictions and other texts. Ultimately a third text comparing the two theses would be required. What form would that take?

One thing is certain: in my hypertextual thesis, this would not be a footnote.

works [Borges] describes, the novels of Herbert Quain or the "Garden of Forking Paths", belong in another writing space altogether." (139) Whether or not we wish to say this new writing space is hypertext is another question. For further consideration of this question, see my brief examination of "Garden of Forking Paths" in the chapter on hyperfiction, above.

Composition No. 1 is a work that escapes the bounds (or at least the bindings) of print fiction. The 150 playing-card sized pages are each printed with one or more paragraphs of text. The reader is invited to shuffle and then read the cards. It is like a hypertext but with random links between the textual units, instead of a set of meaningful links set up by the author and actualised by the reader. The author has left the order of reading completely up to the reader; and the reader is left to find meaning himself in the juxtaposition of two cards.

A Bridge to the Future?

..... What can we learn from the analogies we find between these works and hypertext? In the course of describing the works, Bolter indicates the conclusions he makes from these analogies. Bolter sees experimental fiction as being a bridge from the end of printed fiction to the beginning of electronic fiction: "...we can also see in Saporta's experiment [*Composition No. 1*], and in others like it, not only the end of printed fiction, but also a bridge to the literature of the electronic medium." (Bolter, 142) Similarly Bolter says Sterne's *Tristram Shandy* "seems to anticipate the work of 20th-century writers who have brought the novel to its end." (134) Thus the novel in its printed form is ended and "interactive fiction is the next inevitable step, like the take-off of an airplane that has been gaining speed on the runway." (132) But as we have seen above, and as Bolter himself states, experimentation with the form of the novel is nothing new. The experiments of the Scriblerians were just as

challenging to the boundaries of the medium as are the modern experiments; and the early experiments did not herald the death of the novel - certainly the greatest moments in the development of the print novel have postdated the Scriblerians. To postulate a gathering momentum seems unwarranted. Similarly, Bolter's assumption that the printed novel is at an end seems at least premature. We must be cautious in basing sweeping predictions for the success of hypertext on experimentation in print, because these experiments all rely heavily on print for their success as works of fiction. If we compare these works to containers of water; it is the bounds of the print medium that are the walls of the container. The works press out against the container, exploring its every contour and limitation; while the container limits the work, it is the pressure between the water and the container that gives the work shape. Take away the container and the water runs away; dispersed, formless.

It is easy to find examples of experimentation in print that augur not hypertext, but other media. The trilogy of books by Nick Bantock that begins with *Griffen and Sabine*, comprise a collection of postcards and letters which form a narrative. The books are visually stunning: each page is a postcard, beautifully printed in full colour, or a letter inside an envelope which is physically glued into the book. Much of the print is not in type, but in handwriting; and what is in type is in the courier font as if it had been typed on a typewriter. The experimental nature of these narratives point not towards a hypertextual writing space, but simultaneously to three dimensional art, and to the writing space of *writing* itself.⁷⁸ It would be absurd to conclude from this experiment in print (and the many others like and unlike it) that the medium of writing will succeed the medium of print.

⁷⁸ When I say 'writing' here, I mean writing without printing - the communication technology that preceded printing.

As Landow suggests, Bolter's finding of a prophecy of hypertext within such canonical works of fiction as those of Sterne, Borge and Joyce has the "political advantage of making it seem less threatening to students of literature and literary theory"(Landow 1992, 103) It seems to me that a greater political advantage is gained by Bolter in having his prophecy of the succession of hypertext appear to be inevitable - rooted, as it is, in these canonical texts. Unsurprisingly Landow does not question this inevitability, in fact he finds Bolter's analysis "attractive and even convincing"(103). Politically, Landow's motivations coincide with Bolter's.

A more constructive way to see experiments in print fiction is to use them as lessons in how to combine narrative and the idea of non-linearity: as lessons, in other words, in the rhetoric of hypertext. An avenue of further study could be to analyse the relative success of these experiments in order to help create such a rhetoric. We might immediately see, for instance, that a wholly random linking between text nodes (such as in Saporta's *Composition No.1*) is frustrating and boring as soon as the novelty has worn off. If we find that the success of a piece of fiction varies inversely as the lack of structure of its narrative we might conclude that the experiments in print fiction, rather than predicting the succession of hyperfiction, foretell its failure.



VIII A Brief History of Hypertext

The Idea is Born

At the same time as some of the later print fiction writers were experimenting with their medium, innovators in the area of information science were tunnelling towards them from the other side. In this section I will briefly explore the meeting of the two ends of this tunnel and follow the tunnel to where it has led us up to this point (I will not be further labouring the tunnel metaphor!)

The bare facts of the evolution of hypertext up to its present form are well documented (see for example Conklin 1987). The idea was first postulated in 1945 by Vannevar Bush, the science adviser to President Roosevelt. The first successful implementation was made by Douglas Englebart in the late 1960s and was called NLS (a quasi-acronym for oNLine System). The term 'hypertext' was coined by Theodore Nelson, also in the late 1960s, to describe his hypertext system called 'Xanadu'. Since then many hypertexts have been written, and much research has gone into both the theoretical and practical aspects of hypertext, in many different areas of study including Computer Science, Cognition, Information Science, Education and Literature.

I explored the idea above that 'experimental' writers were questioning the limits not just of their genre or of literature, but of their writing space, of the print technology. If writers such as Saporta and Borges *implicitly* predicted a new writing space for literature, the pioneers of hypertext were *explicitly* imagining the same writing space. But they were not (at least at first) imagining it

from a literary point of view.

Vannevar Bush was concerned with efficiency of information retrieval. Already, in the 1940s, Bush considered the amount of scientific literature too large to be efficiently accessed by an individual. The root of the problem, as he saw it, was that information (books or articles) was stored by some alphabetical or numerical system. Bush saw these systems as cumbersome, requiring an individual to translate his or her associative, semantic train of thought to an artificial means of storage. What if the means of storage were more like the working of the human mind? He began to design a system to implement "selection by association, rather than by indexing", aiming to surpass the human mind's "permanence and clarity of the items resurrected from memory" if not entirely equalling the "flexibility with which the mind follows an associative trail".⁷⁹ While the writers above were experimenting with their writing space, Bush was questioning what we might call the 'information space'.

The information space had been questioned before. The writers of encyclopedias were concerned with the same questions of information retrieval. They had in common with Bush a desire to store information in a meaningful, not just an alphabetic, way. Bush, however went a step beyond. His design, which he called the 'memex', envisioned, not just a new method of storage, but as a consequence, a new method of representation - a new writing space.

Bush's system was never implemented. He consciously designed something to be built only when technology caught up with him. He wrote before the invention of digital technology and his memex is designed imagining a system of microfilm and photocells. The memex "is a device in which an individual stores his book, records, and communications" (Bush. Cited in Landow 1992, 15) and allows the reader to "add marginal notes and comments, taking advantage

⁷⁹ Vannevar Bush. Cited in Conklin, 20.

of one possible type of dry photography, and it could even be arranged so that he can do this by a stylus scheme, such as is now employed in the telautograph seen in railroad waiting rooms, just as though he had the physical page before him.”(15) Writing about these features of the memex, George Landow makes two points: that Bush “reconceives reading as an active process that involves writing” and that Bush’s “remark that this active, intrusive reader can annotate a text ‘just as though he had the physical page before him’ recognizes the need for a conception of a virtual, rather than a physical text”(Landow 1992, 15). It is this demand for a virtual text which both foresees the computer and defines the new virtual writing space.

It was not only the virtuality of text that Bush described with his memex, but also many or most of the other features of today’s computer hypertexts. In his system the reader made trails of links through his books. Bush saw these trails of links as new books. The trails could intersect, in which case a text would participate in more than one new book. In Bush’s description of memex, Landow sees a “seminal, even radical, conception of textuality”, in fact a “multiple textuality, since within the memex world *texts* refers to (a) individual reading units which make up a traditional ‘work’, (b) those entire works, (c) sets of documents created by trails, and perhaps (d) those trails themselves without accompanying documents.”(17)

Conklin notes that Bush “felt that [memex] was a technological achievement worthy of major expenditure”(22). It is ironic that the technology, while creating the answer to Bush’s demands, was created quite independently of Bush’s search for a new information space, in fact, in the search for what we might call a new “computational space”. Perhaps the most remarkable thing about Bush’s idea is not that he imagined a new information space and a new writing space, but that he imagined a technology that combined the two - the integration of the means of writing, reading and accessing information.

..... ■ Douglas Englebart's computer implementation of a hypertext system was designed with the purpose of amplifying the intelligence of the user. His NLS system, first implemented in 1968, evolved into a commercial product which is on the market today as *Augment*. The Augment system was basically an office automation system providing facilities for "document production and control, organizational and project information management, and software engineering." (Conklin 1987, 23) These things are not remarkable now, but were in the late sixties. Conklin notes that the file structure of NLS is "primarily hierarchical, but . . . allows nonhierarchical links as well." It is hard to see the desire or imagination of a new writing space in NLS which, although pioneering, does not really explore the possibilities of a hypertext system in terms of providing a new writing space, rather letting it serve the old one.

Hypertext Incunabula

Ted Nelson's Xanadu project has as its vision, not an augmentation of individual power, but a global augmentation of human readers and writers. Nelson says his motivation is "not technical but literary"⁸⁰ and Conklin identifies Nelson's goal as "facilitating the revolutionary process of placing the entire world's literary corpus on line." (23) The project was named after the "magical place of human memory" in Coleridge's poem *Kubla Khan*. Indeed, if ever realised, the "unified literary environment" (23) would be a "stately pleasure-dome" of some grandeur. Maybe the fact that Coleridge never completed *his* Xanadu prefigured a similar outcome for Nelson's Xanadu project! What has stopped his vision from being realised? (Surely not a man from Porlock). Before we can have a unified literary environment, there must be a unified computer environment on which to implement it. As yet there is no such

⁸⁰ Ted Nelson. Cited in Conklin, 23.

thing, although the technology seems to be nearing, if not complete unification, then at least a kind of universal compatibility.

Furthermore, there are legal and intellectual issues which will block this unified literary environment. Copyright and other notions of proprietorship must be radically revised before (or while) we fully conceive Nelson's Xanadu⁸¹.

Intermedia at Brown University

■■■■■■■■■■ From the point of view of literary studies, the hypertext applications developed at Brown University are perhaps the most interesting.

Beginning in the late 1960s with a system developed by Ted Nelson and used to write the documentation for the Apollo space missions, Brown's hypertext program is now in its fourth generation. Intermedia is a large-scale hypertext system that has been used as a tool for Brown staff to write, organise and present their course material; and as an interactive medium allowing students to study the materials, annotate them and compose essays - all within a seamless environment using the Macintosh graphical user interface.

A student using Intermedia can have any number of screen windows open at one time. These overlaid windows can contain the course materials created by the teachers (such as text, graphics, timelines, video, animation etc) and aids to navigation through the material (web diagrams, overviews and maps of the information space). Links can lead from any region in any window to any region in another, and are indicated by small link markers which can be clicked upon to activate the link.

Intermedia is a Multi-User, client server, environment; which means that the course materials are stored centrally, and access to

⁸¹ Bill Gates, owner of Microsoft, and perhaps the wealthiest person in the USA, has called his new mansion, in Seattle, 'Xanadu'. Given the disturbingly imperial nature of Microsoft (they have been questioned in regard to breaches of anti-trust laws in the United States) we may find ourselves living, not in Nelson's Xanadu, but in Bill Gates's.

this database of material is gained through individual workstations. Subject to having access rights, a student or teacher may add material, annotate existing material, and add links between nodes. These changes to the Intermedia web can then be seen by all the users of that web.

One of the most important aspects of Intermedia is that the documents stored on the server can be seen from different points of view. A 'web' is a set of links between documents representing a particular point of view overlaid on the documents. For example, in a web used for teaching Victorian Literature there may be a link between a poem by Tennyson and the writing of Charles Darwin. The Darwin document provides context for the Tennyson poem when studying Victorian Literature. At the same time, a web used for teaching Biology may have a link from the document teaching evolution to the same Darwin document, without necessarily having a link to Tennyson's poem. Different web views allow different users to have access the same universe of documents in different ways. In the age of information proliferation, filtering like Intermedia's web views protects the reader from being drowned in documents and links, allowing the information to be used more efficiently. In this way the same document may be involved in many different webs. It may be the crossroads for many different links; it may be seen by different users in different contexts.

Since 1987, Intermedia has been used at Brown University to teach English as well as other disciplines such as Biology. George Landow, one of the developers of Intermedia, sees Intermedia not only as a powerful tool for reading and understanding literary texts and their social, political, cultural and historical context; but as a powerful writing space where students may participate collaboratively with their peers as well as with their academic superiors. Students in Landow's courses are set assignments requiring them to add to the webs by writing new documents and linking them to the existing documents, or by creating more links between the existing

documents. The best contributions each year are kept, studied and added to by the pupils of the next year. Students using Intermedia are therefore reading and writing in an interactive hypertext where primary texts are surrounded by not only traditional secondary texts (published criticism, relevant historical and sociological study etc) but also the contributions of their professors and peers. Landow claims that this writing space “provides a model of scholarly work in the humanities that better records what actually takes place in such disciplines than does traditional book technology.” (Landow 1992, 144)

**The World Wide Web: Xanadu
Around Us**

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ My final example in this brief history of hypertext is, like Intermedia, a hypertext that is still being used and still growing. The World Wide Web (WWW) is a distributed hypertext that exists across thousands of computers all over the world, and is read and added to by thousands of users. Here is a description extracted from a file I copied from the web:

The official description describes the World-Wide Web as a "wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents". What the World-Wide Web (WWW, W3) project has done is provide users on computer networks with a consistent means to access a variety of media in a simplified fashion. Using a popular software interface to the Web called Mosaic, the Web project has changed the way people view and create information - it has created the first true global hypermedia network.

Entering the World-Wide Web: A Guide to
Cyberspace By Kevin Hughes, Honolulu
Community College⁸²

There is no central World Wide Web program on any computer; users who wish to access the World Wide Web need a modem (to access the Internet) and a program (called a 'browser') on their computer. A World Wide Web browser allows the user to read files and documents that are stored at remote locations (called 'sites') all over the world. Every file that can be read with a WWW browser has a specific address (i.e. "http://is.rice.edu/~riddle/hyperfiction.html" is the WWW address of a hyperfiction file at Rice university in the United States) which allows the browser to locate it on the worldwide Internet. The browser then displays the files (which may be text, graphics; even video or audio). Imbedded in any file may be hypertext links; linking that file to another file in the Web. When a

⁸²The document I extracted this paragraph from is an 'unpublished' document in that it cannot be purchased in printed form. The fact that I was able to locate this text, copy it to my computer and include it in my thesis file all in ten minutes without leaving my seat, highlights the problematic nature of a term such as 'unpublished' in the age of electronic texts. In a certain sense of the word, Hughes's document is more thoroughly 'published' than any printed book could be.

user is reading a file, he or she may click on a link and the browser use the address supplied by the link (the user doesn't need to know the address herself) to locate the file and display it. Users can create their own files (or 'pages') with links to any parts of the web in which they are particularly interested. The web is continually being added to and updated, and the number and range of documents accessible through the web is astronomical: continually updated pictures of the earth from space, literary texts, scientific reports and data, lyrics to pop songs, indices to the Web, the computer systems of university libraries... Anything 'published' on the Internet can be accessed through the Web, as well as the documents specifically created for the Web that include hypertext links.

The World Wide Web, then, is the nearest thing we have to Ted Nelson's vision of a unified literary environment. It is characterised by the peculiar anarchy that is the *modus operandi* of the Internet⁸³. Nobody controls it; anybody can use it and add to it. A completely democratic web may never be attained. As it is now, access is limited to those with a fairly sophisticated computer system; and though these are becoming easier and easier to obtain they are by no means universal. At the same time as these become more widespread the practice of charging for access to certain documents or areas of the Web will no doubt become more common.

The theory and practice of hypertext continues to evolve. While the World Wide Web and other large-scale hypertext networks (such as hyper-g and WAIS) evolve; smaller, isolated hypertexts abound. These hypertexts use special authoring software to allow hypertext authors to assemble and structure the texts and links for limited domain hypertexts. Intext is an example of a limited domain hypertext. Other authoring systems include Intermedia, Notecards, Storyspace, WinHelp/Viewer, Mosaic and Supercard. Hypertext

⁸³The Internet has been described as the only successful anarchy in human history. There is no central government or rule-making body. Standards and codes are adhered to because if they weren't, the network could not function.

applications created with these and other authoring products include instruction manuals, teaching aids, hyperfiction and non-fiction hypertexts on any and all topics.

Hypertext: The Answer or the Question?

Hypertext is unusual in the world of computer applications in that it was envisioned long before the technology became mature enough to implement it. Many of the modern applications of computer science are technology driven. They are produced because they can be produced. Their subsequent survival depends on how well they are received. Hypertext is in a phase of rampant production now that is to some extent technology-driven. To what extent hypertext is technology driven is a matter for debate. Criticism that sees the fiction I examined above as 'anticipatory', as creating a demand for hypertext, is countered by views like that expressed by Walter J. Ong who says the "Present-day de-plotted narrative forms are part of the electronic age, deviously structured in abstruse codes (like computers)."⁸⁴ So he sees these experimentations in print, not as a demand for a new writing space, but as an imitation of computers. If Ong is correct here then the computer space does not fulfil an existing desire to escape from print, but the inspiration goes the other way; the computer is a pre-existing model for print experimentation. The computer then is not the answer to a question, but is the question itself, answered by print authors and critics. Put another way, "we are still in the potential solution-seeks-compatible-problem stage of development"⁸⁵

Of course, hypertext proponents see the intellectual precursors for hypertext as predating computers. These precursors were not only the authors of the early print works that I explored above. Gunnar Liestol sees in the writing of Wittgenstein (writing at the same time as

⁸⁴ Walter J. Ong. *Orality and Literacy*. London and New York: Methuen, 1982, 159.

⁸⁵ Alexander J. Romiszowski. Cited in Charles Ess. "The Political Computer." In Landow 1994, 227.

Bush), evidence that he could not force his thoughts into a linear structure; and that these thoughts were in a form that was not linear, but jumped about, structured into connected and unconnected remarks (Liestol, 87).

Parallelling the production of hypertext is a growing discussion of theoretical aspects of hypertext. This discussion can be seen as an attempt to integrate hypertext with well-established disciplines of study: Literature, Computer Science, Cognitive Science, Semiotics and Education. This integration is to some extent an attempt to predict the place of hypertext in the future of these disciplines. It can also act reflexively: the study of hypertext can allow us to see our own disciplines from a new (non print-centred) point of view.

Maturing technology has brought us within sight of Vannevar Bush and Ted Nelson's visions of the new medium of human communication. Whether hypertext is the fourth great medium or not may be predicted by computer scientists, authors, teachers or prophets of the electronic age; however, hypertext's success will be determined by the essential elements that determine its nature as a new medium; and it will be indicated by the marketplace.

■

The World View and the Rhizome

We can expect contemporary scientists and scholars to come more and more to the conclusion that the book of nature is a hypertext, whose language is the computational mathematics of directed graphs. this is an intriguing prospect. For if scientists are studying the interdependencies of nature, while humanists are reading hypertexts, then our vision of nature can be reunited with our technology of writing in a way that we have not seen since the Middle Ages.

Bolter, p106

The Book of the World

..... It seems worthwhile to outline the arguments which lead Bolter to the conclusion that the book of nature is a hypertext. For the medieval scholar, the very structure of the world was mirrored in the great books such as the encyclopedias and summae. The hierarchical nature of books, nowhere illustrated better than in the great tables of contents of modern encyclopedias, mirrors the hierarchies that medieval scholars used to classify the world about them: the great chain of being, the Porphyrian tree, and the hierarchical divisions of knowledge.

Modern science, says Bolter, has altered our world view. Hierarchies are not as important as they were: "The biological sciences dispensed with the great chain of being over a century

ago—long before the advent of the electronic computer. More recently, but also long before the computer, physics rejected simple hierarchical views of matter and energy.”(105) Landow similarly sees a modern “revolution in human thought”(2) which leads people to “abandon conceptual systems based on ideas of center, margin, hierarchy, and linearity and replace them with ones of multilinearity, nodes, links, and networks.”(2) The old metaphor of the book of nature no longer holds; hypertext offers us the opportunity to once more make an analogy between our world view and our writing space.

Why is it considered a good thing for our view of nature to mirror the structure of our writing space?⁸⁶ It certainly confers no notion of ‘correctness’ upon either construct. The medieval view of nature was, by modern standards, quite wrong. No doubt at least some elements of our current view of nature will be seen as ‘wrong’ in the future.

Furthermore, whose ‘view of nature’ are we talking about? To postulate a unified view of nature, either synchronically or diachronically, is a difficult task. The metaphor that Bolter identifies comes from the writings of a certain group of people in a certain time and a certain place. Did Eastern culture find a similar correspondence at the same time, or ever? Our view of nature varies widely from person to person and from time to time. Although we may be able to identify broad trends of thought, it is not easy to pick out which of these might be universal enough to compare to the structure of our writing space.

No doubt, the claim that hypertext is the new book of nature is ultimately a rhetorical device to lend weight to the imminence of the new writing space. It is evidence of a need to postulate a convergence of ideas such as the convergence that Landow

⁸⁶ Deleuze and Guattari say, “At any rate, what a vapid idea, the book as the image of the world.” Gilles Deleuze and Félix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. London: Athlone Press, 1988, 6.

This may be seen as a circular relationship: cognitive science lends its tools to artificial intelligence, but also borrows back the resulting models of mind ('frames', 'semantic networks', 'spreading activation', 'concept processing').⁸⁸

The models that cognitive science takes from artificial intelligence are necessarily 'computer-compatible' since they have been explicitly developed to model human behaviour using computers. Similarly, in that Vannevar Bush's memex was envisioned as a machine to enhance our intelligence, hypertext also springs, in at least a historical way, from Artificial Intelligence. Therefore, it is almost tautological to state that our models of mind are like the structures of hypertext since they both come, at least indirectly, from Artificial Intelligence. Having said that, it will be interesting to note a few ways in which this theory might be appealing. The associationist view of knowledge sees learning as associating. It is the link between the two isolated 'pieces' of knowledge that is an extra 'piece' of knowledge. A 'piece' of knowledge is not assimilated until it is linked into a network of existent knowledge. Thus, we do not find the idea of a 'piece' of knowledge meaningful, as knowledge is only knowledge when it is associated, joined.

The associationist view of knowledge finds considerable experimental support from cognitive scientists. Linking has also been seen as a good metaphor for the activities of traditional scholarship. Forming new ideas by scholarship is compared to linking one part of a text to another, linking one text to another, drawing relationships between texts. Every link of this kind is given an explanation, perhaps able to be summarised in a limited number of ways - 'imitates', 'causes', 'refutes', 'is like', 'means' etc. Hypertext is seen as providing not only a model for the activities of scholarship, but simultaneously a space in which these activities may take place.

⁸⁹ Interestingly, this is the University at which Jay David Bolter teaches, yet he makes no mention of the WE group that I can find.

The corollary of this view is that print is an essentially unnatural form: "as Derrida emphasizes, the linear habits of thought associated with print technology often force us to think in particular ways that require narrowness, decontextualization, and intellectual attenuation, if not downright impoverishment." (Landow 1992, 81) As I noted above, Gunnar Liestol sees the effects of this impoverishment in the writing of Wittgenstein. However, as Derrida also emphasises, linear habits of thought may be necessary for the formation of arguments. Scholarship is analysis (disassociation) as well as association, and the most basic logical exercise, deduction, cannot be represented by unstructured links between propositions and conclusions, but requires a certain structure: *if A and B then C*.

Some hypertext authors are less willing to give up the idea of linear or hierarchical structure. Jeff Conklin describes the work of a group at the University of North Carolina at Chapel Hill who, at that time, were developing what they called a *writing environment* called WE. Says Conklin, "Their research is based on a cognitive model of the communication process which explains reading as the process of taking the linear stream of text, comprehending it by structuring the concepts hierarchically, and absorbing it into long-term memory as a network. Writing is seen as the reverse process" (Conklin, 25) If the group at Chapel Hill are using a good cognitive model, then it seems we may be wrong to try and dispense the idea of hierarchy altogether.⁸⁹ If we cannot in the end dispose of hierarchy in learning or in understanding, then hypertext would be better seen as a tool, not for freedom from hierarchy, but for allowing different hierarchies to be disassembled, rearranged and examined. Similarly linearity will not be escaped, but merely multiplied - the hypertext allowing as many different linearities to be made as there are pathways through the network.

It is interesting to look more closely at the equivalence being drawn between the writing space of the electronic hypertext and the writing space of our own minds. In the virtual writing space,

the location of the text is problematic. But the mind and the computer are both virtual writing spaces. If we think of text as being located in our minds, then the writing space becomes a metaphor for the human mind. Seen this way, the metaphor controls how we envision our minds. The metaphor set up by artificial intelligence that uses the human mind as a metaphor for the computer is turned back upon itself. Now we *create ourselves* when we create our changing writing space. This enables us to have more control over the world, to write the world as if it were a text, and to turn ourselves into a metaphor in that text, a metaphor of our own creation.

Whether or not the above is one motivation for seeing the computer writing space as a model of the mind, it must be pertinent, in the end, to ask, "*why* do we want a writing space that mimics the organisation of our memory?" Shouldn't we be after a writing space that provides the organisation that our memory can't; and that doesn't try (inevitably with limited success) to imitate the mind? Our writing space, as a tool or a machine that allows us to do things we couldn't otherwise do (as Walter Ong describes the print space), is comparable to the car, the plough or any other manufactured tool. Seen this way, modelling a writing space after our minds is comparable to trying to make a car that walks.

The Virtual 'Realty' of Hypertext

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Both the book of nature metaphor and the correspondence between hypertext and human cognition have the advantage (if we accept them) that they increase our understanding of the writing space provided by hypertext. If we reject them, we are without a metaphor to describe what I call the 'virtual reality' of hypertext. Virtual reality is the 'space' within the

computer that we write on when we write hypertext⁹⁰. Hypertext is seen as an essentially spatial medium. Communication in the oral medium is completely restricted to the temporal axis. Print is still tied to the temporal axis by its linearity, and its spatial element is hierarchically structured. Bolter identifies the spatial nature of hypertext as "topographic." (Bolter, 25) In hypertext, he says, we are "writing *with* places, spatially realized topics." (25) In this section I will outline one metaphor that describes the virtual reality of hypertext.

The Encyclopedia and the Rhizome

In the metaphors used by semiologists to describe semiosis, we may find images that also describe hypertext. Eco finds the best metaphor for our linguistic competence is the encyclopedia. Every signifier is linked to a 'sememe' which is defined by a list of semantic markers. These semantic markers are a cluster of properties or associations that go with the sememe. Thus the signifier 'whale' is linked to the sememe <whale>, a cultural construct consisting of semantic markers such as <fish>, <Moby Dick>, <dangerous>, <endangered>, <mammal>, <large>, etc. Notice that these semantic markers belong to several different axes, and may even be contradictory (i.e. <fish> and <mammal>). Depending on the circumstances in which the signifier is being interpreted, different semantic markers will be activated. Now, the semantic markers themselves are also sememes which have, in turn, clusters of semantic markers, and so on. The world of semiosis is therefore a very complex interconnection of reference which can never be fully mapped. The most we can hope for is to map it a little at a time, to reduce the encyclopedic complexity to small local tree-like structures that activate just one structure. For example we might try to map the meaning of 'whale' in the context of the novel *Moby Dick* in which

⁹⁰ It is not an accident or a difficulty that the term 'reality' has economic overtones - for the hypertext space is as inseparable from economic practice as it is from politics.

case our impoverished local structure would concentrate on markers such as <hunter> vs <hunted> and ignore such markers such as <endangered>. The encyclopedic structure of interpretation is called the semantic net. Eco describes it thus:

The best image of a net is provided by the vegetable metaphor of the rhizome suggested by Deleuze and Guttari (1976). A rhizome is a tangle of bulbs and tubers appearing like "rats squirming one on top of the other." The characteristics of a rhizomatic structure are the following: (a) Every point of the rhizome can and must be connected with every other point. (b) There are no points or positions in a rhizome; there are only lines (this feature is doubtful: intersecting lines make points). (c) A rhizome can be broken off at any point and reconnected following one of its own lines. (d) The rhizome is antigenealogical. (e) The rhizome has its own outside with which it makes another rhizome; therefore a rhizomatic whole has neither outside nor inside. (f) A rhizome is not a calque but an open chart which can be connected with something else in all its dimensions; it is dismountable, reversible, and susceptible to continual modifications. (g) A network of trees which open in every direction can create a rhizome (which seems to us equivalent to saying that a network of partial trees can be cut out artificially in every rhizome. . .

Eco 1984, 81

I will consider these points individually below. For now I note that the theoretical (or 'pure') hypertext is rhizomatic in that every point in the network can be connected to every other point. The

not with the rhizome but with the tap root “with its pivotal spine and surrounding roots”(5) The classical model of reflection ‘One becomes Two’ is multiplied endlessly by the book: “the book as a spiritual reality, the Tree or Root as an image, endlessly develops the law of the One that becomes two, then of the two that become four...Binary logic is the spiritual reality of the root-tree.”(5) Deleuze and Guattari say that this figure of the book still dominates thinking in linguistics, psychoanalysis, structuralism and even information science.

In the modern view, Deleuze and Guattari say, the book is seen as a fascicular root (fascicule is a bundle, fascicula is a part of a book published in instalments - OED). Deleuze and Guattari say the moderns successfully show the book as multiple in a linear axis, but it remains unified on a circular axis (6). Joyce for example: “Joyce’s words shatter the linear unity of the word, even of language, only to posit a cyclic unity of the sentence, text or knowledge”(6) Dismissing these two views of the book as inappropriate, Deleuze and Guattari propose the rhizome as a better description:

A rhizome is not amenable to any structural or generative model. It is a stranger to any idea of genetic axes or deep structure. A rhizome is a map, not a tracing. It does not follow the tree logic, aimed at reproduction and the establishment of powers, but rather the rhizomatic logic, aimed at experimentation and action. It has multiple entrances rather than a single viewpoint ⁹¹

Deleuze and Guattari elaborate several points that characterise the rhizome. Although their writing is characterised by bold statement,

⁹¹ Deleuze and Guattari. Cited in Alejandro Zaera. “Notes for a Topographic Survey.” *El Croquis* 53 (1992): 32-52.

and contradiction, I will choose some salient features of the rhizome to see how far it may be considered a useful model for hypertext.

When Deleuze and Guattari say, "Any point of a rhizome can be connected to anything other, and must be."⁽⁷⁾ We have a basic coincidence of 'points' and 'connections' ('nodes' and 'links'). All points in a hypertext are potentially connected to each other (through the others if not directly). Elaborating on the nature of these connections, Deleuze and Guattari say, "A rhizome ceaselessly establishes connections between semiotic chains, organisations of power, and circumstances relative to the arts, sciences, and social struggles."⁽⁷⁾ In a hypertext like the World Wide Web, the texts themselves exist across and are entangled in the very lifelines of the political and social organisms within and without which it exists - the telephone lines. Apart from this physical entanglement, the network of texts themselves cross all the boundaries of arts, sciences, etc.

Deleuze and Guattari state that "contrary to a deeply rooted belief, the book is not an image of the world. It forms a rhizome with the world, there is an aparallel evolution of the book and the world; the book assures the deterritorialization of the world, but the world effects a reterritorialization of the book, which in turn deterritorializes itself in the world"⁽¹¹⁾ This relationship which Deleuze and Guattari compare to the relationship of the wasp to the orchid, again brings to mind the World Wide Web, which can be seen to be a deterritorialisation of the world: when a text is brought up, when a link is traversed, the territorial nature of the link is completely lost in the Web. The new text is located somewhere near or distant in the world, but this territorialisation is denied by the web which makes no visible differentiation between texts in different places. The World Wide Web is a concrete example of the possibility that we have moved beyond what Deleuze and Guattari characterise as 'arborescent systems' to a more rhizomatic organisation (or lack of organisation) of knowledge: "Arborescent systems are hierarchical systems with centres of significance and subjectification"⁽¹⁶⁾ These

systems, say Deleuze and Guattari, are evident “in current problems in information science and computer science, which still cling to the oldest modes of thought in that they grant all power to a memory or central organ.”(16). The World Wide Web, then which is the model of decentralisation, may be evidence that computer science has moved beyond these problems (Deleuze and Guattari were writing in 1976).

We may choose to see a further image of the World Wide Web in this description of the rhizome: “In contrast to centered (even polycentric) systems with hierarchical modes of communication and preestablished paths, the rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states.”(21) Similarly, as I pointed out above, the World Wide Web has no central automaton because it exists on computers distributed around the world. It has no organising memory because it exists on the Internet, which is disorganised and anarchic. The preestablished paths that are a given for traditional reading do not exist on the Web or in any hypertext, and any hierarchical organisation is a temporary tracing on the map.

Deleuze and Guattari oppose Freudian psychoanalysis to what they call “schizoanalysis” which “treats the unconscious as an acentered system, in other words, as a machinic network of finite automata (a rhizome), and thus arrives at an entirely different state of the unconscious. These same remarks apply to linguistics; Rosenstiehl and Petitiot are right to bring up the possibility of an ‘acentered organization of a society of words.’”(18) They go on to say that “The issue is to *produce the unconscious*, and with it new statements, different desires: the rhizome is precisely this production of the unconscious.”(18) They privilege the idea of production over the idea of signification, and we can see hypertext as a space for production, for producing meaning while mapping the rhizome of the hypertext. Reading of hypertext is characterisable as production

because the reader produces his own text from the rhizome as he or she goes.

Deleuze and Guattari summarise: "the rhizome connects any point to any other point, and its traits are not necessarily linked to traits of the same; it brings into play very different regimes of signs, and even nonsign states." (21) The computer screen, with its mixing of semiotic systems, we may now characterise as the space for a rhizomatic play of signs. The semiotic space of the rhizome is not static, but in motion: "It is composed not of units but of dimensions, or rather *directions in motion*" (21, my italics) The idea of 'directions in motion' is also one we came across in discussing the nature of infinite semiosis which led us to the start of this consideration of the rhizome. Hypertext sets up, not a structure, but a system of movement, a flow. Hypertext is littoral: "Unlike a structure, which is defined by a set of points and positions, with binary relations between the points and biunivocal relationships between the positions, the rhizome is made only of lines: lines of segmentarity and stratification as its dimensions..." (21) Deleuze and Guattari here tread the dangerous ground of proposing a structure that has no structure. Their argument is that lines of motion do not constitute structure. In an anti-structural hypertext, texts do not prop each other up (the way that structuralist concepts of words prop each other up), but flow into one another (like Derrida's supplements). Hyperspace is vector space - characterised by speeds and directions. Each link is a vector, a movement in a certain direction, directing the flow of one text into another.

Deleuze and Guattari state that their book is itself supposed to be read as a rhizome. They recommend to the reader to read the book in whichever order she chooses, much as we might read a hypertext. In a way similar to that in which Landow and other hypertext critics find fiction that anticipates hypertext, Deleuze and Guattari consider a few forerunners to their own book.

Armand Farrachi's *La dislocation* and Andrzejewski's *Les portes de paradis* are two examples of books that, in one way or another, are models of rhizomatic writing. They find, however, that these books "still retain a unity" (24); and ask "How can the book find an adequate outside with which to assemble in heterogeneity, rather than a world to reproduce?" (24) Their answer is to offer advice on how to write nonlinearly: "Make rhizomes, not roots, never plant!..." (24) but their only explanation of how to do this is the example set by their own book. It seems the perfect solution for their riddle that demands "an assemblage that makes thought itself nomadic" (24) is hypertext. They finish their 'introduction' to their 'assemblage' book with another description of the rhizome:

A rhizome has no beginning or end; it is always in the middle, between things, interbeing, intermezzo. The tree is filiation, but the rhizome is alliance, uniquely alliance. The tree imposes the verb "to be", but the fabric of the rhizome is the conjunction "and...and...and..." This conjunction carries enough force to shake and uproot the verb "to be." Where are you going? Where are you coming from? What are you heading for? These are totally useless questions. Making a clean slate, starting or beginning again from ground zero, seeking a beginning or a foundation - all imply a false conception of voyage and movement (a conception that is methodical, pedagogical, initiatory, symbolic...). But Kleist, Lenz, and Büchner have another way of traveling and moving: proceeding from the middle, through the middle, coming and going rather than starting and finishing. American literature, and already English literature, manifest this rhizomatic direction to an even greater extent; they know

how to move between things, establish a logic of AND, overthrow ontology, do away with foundations, nullify endings and beginnings.

The rhizome then as a way of writing is paratactic and anti-linear. Deleuze and Guattari see the movement through such a space, not as the journey or voyage because these imply a beginning and an ending. In the rhizome, as in hypertext, the beginnings and endings are multiple and arbitrary. Every beginning is a middle of sorts. When you read the World Wide Web, you can start anywhere. Every user may define his own starting place - a 'home page' which leads directly into the middle of the Web. Because there is no start or finish to the Web, each spot is necessarily a middle, a temporary centre.

Smooth & Striated, Maps & Tracings, Plateaus, Assemblages

Deleuze and Guattari work by multiplying their metaphors, each metaphor adding to and altering their thesis slightly. The rhizome, 'tracing' vs. 'map', 'smooth' vs. 'striated'⁹², 'plateaus' and 'assemblages'. All these concepts flow together in their book and many of them are suggestive as far as hypertext is concerned.

A 'tracing' is any representation of reality that sets up rules and competences, codification, structures. A map is an instrument of contact with reality, always in perpetual modification, ready for experimentation. For our purposes, the map is hypertext—an 'arm of performance' rather than 'competence', contact rather than rules. A tracing, then, is another structure of texts such as a conventional library with a tracing ('codification') like the Dewey decimal system: "an abstract system of codification with a tendency to establish structures, rules, measures." (Zaera, 41) The concept of hypertext as map corresponds neatly with our often-used metaphor for the writing space of the hypertext - the map,

⁹² For an examination of hypertext as a 'smooth' rather than a 'striated' space, see Moulthrop 1994, 302-4.

rather than the contents page. Contents page or Dewey decimal system as codifications of the print world are tracings. Hypertext provides a map.

This opposition of mapping and tracing can be seen to relate to the relationship between a text and the world: "Unlike the tree, the rhizome is not the object of reproduction: neither external reproduction as image-tree nor internal reproduction as tree-structure." (Deleuze and Guattari, 21) So the old model of literature as mimetic is not supported by a rhizomatic model of literature. Hypertext as a rhizome does not mirror, imitate or trace the real, it maps it, produces it: "Unlike the graphic arts, drawing, or photography, unlike tracings, the rhizome pertains to a map that must be produced, constructed, a map that is always detachable, connectable, reversible, modifiable, and has multiple entryways and exits..." (21) A reading of a hypertext can be likened to the construction, production of this map. What we have called a 'path' through the hypertext (or a reading of a hypertext) can be seen as what Deleuze and Guattari call a map. In constructing this map we find it is 'detachable, connectable, reversible, modifiable, and has multiple entryways and exits'. Indeed a reading of a hypertext is often represented with a maplike diagram, so that the user can see the lines she has produced, and the lines unexplored.

Elaborating their theory of 'plateaus': Deleuze And Guattari say

"A plateau is always in the middle, not at the beginning or the end. A rhizome is made of plateaus. Gregory Bateson uses the word 'plateau' to designate something very special: a continuous, self-vibrating region of intensities whose development avoids any orientation toward a culmination point or external end...For example, a book composed of chapters has culmination and termination points. What takes place in a book composed instead of plateaus that

communicate with one another across microfissures, as in a brain? We call a 'plateau' any multiplicity connected to other multiplicities by superficial underground stems in such a way as to form a rhizome. We are writing this book as a rhizome. It is composed of plateaus. We have given it a circular form, but only for laughs."

(22)

Stuart Moulthrop's *Victory Garden*, (as the text that resists orgasm) may be seen as a text of plateaus. *Victory Garden* may be seen as the book Deleuze and Guattari imagine, where the chapters are plateaus instead of beads on a teleological chain. However, Deleuze and Guattari are not thinking of *Victory Garden*, but of their own book, *A Thousand Plateaus*. To write a rhizomatic book, Deleuze and Guattari recommend avoiding "typographical cleverness, lexical agility,...blending or creation of words,...syntactical boldness," characterising these techniques (which are all too familiar to any reader of *Breakthrough Fictioneers*) as 'technonarcissism'. Instead of employing these techniques to turn their book into a rhizome, Deleuze and Guattari use words that function as plateaus. These words are concepts, rhizomatic lines which run through the book. *A Thousand Plateaus*, then, is a book which explicitly sets out to model the rhizome, anticipating hypertext much more directly than the 'anticipatory' books such as *Finnegans Wake* considered above. Deleuze and Guattari set out to follow their own advice: "Make rhizomes, not roots, never plant! Don't sow, grow offshoots! Don't be one or multiple, be multiplicities! Run lines, never plot a point! Speed turns the point into a line!"(24) In the end, however, Deleuze and Guattari admit here to the same 'circular form' that they say makes Joyce's work, with its 'cyclic unity', unrhizomatic. Luckily, theirs is only circular 'for laughs'.

Deleuze and Guattari imply that if a rhizomatic structure had only been funny, they could have achieved it in print!

The Unwanted Rhizome

On the face of it, then, the rhizome seems an excellent model for hypertext, if only one possible model. In most, if not all of its features, we find reflections of the spirit of the ideal hypertext, if not the details of concrete examples of hypertext. The attractiveness of a theory like this lies in the fact that it comes from outside the field of hypertext criticism. As Moulthrop says, the work of Deleuze and Guattari “sets in motion perhaps the most radical reinterpretation of Western culture attempted in the second half of this century. Geopolitics, psychoanalysis, neurobiology, sexuality, mathematics, linguistics, semiotics and philosophy all fall within the purview of their encyclopedic project.” (Moulthrop 1994, 301) By finding in their theories a possible analogue for hypertext, we can not only find new concepts to describe a new writing space, but we can include the development of hypertext in this ‘radical reinterpretation’.

Suggesting that hypertext is rhizomatic is fixing a theory of hypertext by finding a model for its space. This model can suggest features hitherto unexplored in hypertext, (such as ‘tearing’), but it may be limited by its applicability to concrete examples. We must keep in mind that any hypertext that is rhizomatic is likely to be a theoretical, ideal or ‘pure’ hypertext. In practice, we are likely to find the imposition of certain structures not only desirable, but necessary. Our computer writing space may not be able to provide us with tools for creating a hypertext that has no structure at all, that is completely interlinked. Furthermore the link as a device can be seen as allowing texts to not necessarily to *flow* into each other, but to hold one another apart in a structural way. Moulthrop says, “various theorists have represented hypertextual discourse, not as wholesale embrace of indeterminacy, but rather as the articulation of global variability in

tension against local coherence. In other words, hypertext may not be quite the smooth or rhizomatic structure some have made it out to be.”(Moulthrop 1994, 308) It is doubtful that we could make a hypertext that was a true rhizome. If we could, it is doubtful that we would want it. I set forth the rhizome, therefore, as an apposite model (certainly not the only possible model) for the virtual realty of the theoretical hypertext.

Literary Theory

...hypertext has much in common with some major points of contemporary literary and semiological theory, particularly with Derrida's emphasis on de-centring and with Barthes's conception of the readerly versus the writerly text. In fact, hypertext creates an almost embarrassingly literal embodiment of both concepts...

Landow, 1992, p34

Claims and Prophecies

..... In this section I wish to examine claims that hypertext is the embodiment of certain critical views of literature. The theory of hypertext has largely been shaped by poststructuralist literary theory. I fear that this theory is to some extent artificially forced onto hypertext, like an ill-fitting garment; and I am concerned here to note some of the split seams and baggy parts where current hypertext theory ignores them.

One of the major claims being made today is the assertion that hypertext "creates an almost embarrassingly literal embodiment of such concepts" as decentering, intertextuality, the democratisation of the text, Barthes' readerly and writerly texts, and post-modernism's rejection of sequential narratives and unitary perspectives (Landow 1992, 34). This embodiment, says Bolter, effectively renders deconstruction redundant, as hypertext "takes us beyond the paradox of deconstruction, because it accepts as strengths the very qualities - the play of signs, intertextuality, the lack of closure - that deconstruction poses as the ultimate limitations of literature and language." (Bolter, 166). He later adds: "All this suggests again that the computer takes us beyond deconstruction" (204)

Landow and Bolter identify, in poststructuralist writing, ideas which seem to relate to the concepts of hypertext; and draw from this relation the conclusion that critical theory theorizes hypertext and that hypertext is the embodiment of critical theory. (Landow 1992, 3)

I will briefly summarise the equivalences that Landow, Bolter and other hypertext theorists draw before moving on to question the significance of these equivalences and the motives behind them. Broadly, Landow and Bolter see hypertext as the embodiment of concepts such as intertextuality, multivocality, writerly texts, decentring and the death of the author.

Many structuralist and poststructuralist authors describe the text as some kind of *network*, in the way that we might call hypertext a network. Roland Barthes characterised the 'ideal text' as a system of interacting networks (*réseaux*), a galaxy of signifiers rather than a structure of signifieds. Unlike the conventional view of texts, but like the rhizome, Barthes's ideal text has any number of entrances, none of which can be called the main one. To describe text, Barthes uses terms like *link*, *web*, *network*, *node*, and *path*. (see Landow 1992, 3) Similarly, but in different ways, Foucault, Bakhtin, Derrida and Pagels all describe theories of network in relation to literary texts. Derrida describes the text as an 'assemblage' of 'morceau' or bites⁹³. This assemblage brings these bites together in an interlacing or a web (see Landow 1992, 9). J. Hillis Miller examines a Thomas Hardy novel by describing the passages as 'nodes' which are connected, directly or indirectly to all the other passages in the book. No passage has priority, or is the origin or the end (see Landow 1992, 28).

The poststructuralist concept of intertextuality is remarkably similar to the intertextuality provided by hypertext in its explicit

⁹³ Interestingly, 'assemblage' is one of Deleuze and Guattari's central metaphors, however they make no reference to Derrida (or Barthes or Foucault) in their work.

linking of texts. The text is not single, solid or whole, but is pulled apart, falls apart, along axes which pierce the text, leading to other texts. A text is linked to, is talking about other texts. Derrida emphasises the irrelevance of the distinctions between the inside and the outside of a text, seeing a text as just one 'langue' in a vast intertextual 'parole' (see Bolter, 162,3). Structuralists like Thais Morgan see the text, rather than taking a place in a chain of linear history stretching back into the past, as taking part in a synchronic semiotic. The text is involved in an infinite play of relationships with other texts (see Landow 1992, 10). From either the structuralist or poststructuralist point of view, what is important is that the text does not exist alone, as an island in the sea of literature, but is itself made of water and is therefore inseparable from other texts.

A hypertext need have no centre. It is not necessarily arranged in a fixed structure of any kind; no particular point, no single text, can be identified as the centre. A reader may conceivably choose her own centre, or centres, and move about shifting these at will. In this sense, hypertext is analogous to the Derridean idea of decentring. In "Structure, Sign and Play in the Discourse of the Human Sciences," Derrida describes an "abandonment of all reference to a *center*, to a *subject*, to a privileged *reference*, to an origin, or to an absolute *archia*."⁹⁴

In that a hypertext requires a reader to make certain decisions normally left to the author, hypertext is seen as providing a writing and reading space wherein the reader comes closer to being an author himself than he does in print literature. The hypertext reader controls, in particular, the sequence of the text, deciding which path to follow through an unstructured network of texts. Landow sees this as an 'empowerment' of the reader, the

⁹⁴ Jacques Derrida. "Structure, Sign and Play in the Discourse of the Human Sciences." In Adams and Searle, 65 (emphasis in original). (Henceforward cited as Derrida.)

embodiment of democracy and Barthes's writerly text: where the reader has access to the pleasure of writing; where the divorce between author and reader that is maintained by our literary culture is broken down (Landow 1992, 6). The freedom and the responsibility which hypertext gives the reader is an extension of the same function that reader-response critics assign to readers. For Stanley Fish, the objective physicality of a printed book belies the fact that the site of the text's construction is within the mind of the reader. Hypertext replaces the physicality of the book with a virtuality, thus embodying the reader-response theory of text by un-bodying the book.

To anyone who both understands the basic concepts behind hypertext and has read any literary theory, the above connections will seem obvious. But what do these apparent equivalences mean for hypertext or for literary theory? The consequences and effects of the parallels are variously described:

Firstly, hypertext for all its virtuality, provides a visible incarnation of poststructuralist theories. Bolter says hypertext "permits us to visualise intertextuality" (Bolter, 164); and "The computer therefore makes visible the contest between author and reader" (154). Hypertext is able to make these theories visible, because it provides a "literal embodiment" (Landow 1992, 34) of them; it "*produces* Barthes's readerly text" (6 - my emphasis).

The flip side, if you like, of this embodiment, is the presumption that the structuralist and poststructuralist theorists were carrying out an "instinctive theorizing of hypertext" (Landow 1992, 9); that without knowing it they were describing hypertext; or their own language was demanding to describe hypertext: "Derrida in fact *describes* extant hypertext systems..." (8 - my emphasis); "Derrida continually uses the terms *link (liaison), web (toile), network (réseau), and interwoven (s'y tissent)*, which *cry out* for hypertextuality" (8 - my emphasis). Furthermore, as we saw in the analysis of 'anticipatory' print fiction, this anticipatory

theory “provide[s] a transition to the technology that is replacing print.” (Bolter, 156) and “argue[s] against the future importance of print-based information technology” (Landow 1992, 29).

Finally, then, hypertext takes us “beyond the paradox of deconstruction” (Bolter, 166). Hypertext itself is a deconstructed medium. It leaves nothing for deconstruction to do. If deconstruction can be seen as a set of instructions for *taking apart* a model (that model being print literature) then hypertext is the disassembled print medium, lying already in pieces. The instructions are no longer valid, for the model is taken apart.

**Idealisations and Simplifications:
Questioning the Prophets.**

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ I do not wish to question the fact that similarities can be seen between literary theory and the theory of hypertext; I do want to question the nature of these similarities, and the conclusions being drawn from them: that hypertext embodies poststructuralism, and that hypertext takes us beyond deconstruction. I hope, thereby, to call into question the *inevitability* of the “transition to the technology which is replacing print”. Hypertext does superficially ‘embody’ some of the hidden aspects of print technology. In doing so, the new writing space gives us a fresh look at the old writing space, with a new perspective. In this sense it decentres us from our print-oriented position which, I would argue, is just what the poststructuralists succeeded in doing. When I suggest a ‘superficial’ embodiment I mean to imply that hypertext does not take us beyond deconstruction. There are limits, both practical and theoretical, to the way in which hypertext makes real the poststructuralist dream.

That hypertext is claimed to embody poststructuralism beyond these limits is the result of three causes: (a) a misunderstanding (or a simplified reading) of poststructuralism; (b) an idealisation

of hypertext; and (c) the beguiling effect of a coincidence of terms and metaphors. I will consider (a) and (b) more or less together, and subsequently (c).

Intertextuality

The idea of intertextuality originates from a structuralist view of text as the “product of various cultural discourses on which it relies for its intelligibility”⁹⁵ If hypertext is to embody poststructuralism, a text would have to be imbedded in a network of texts which amount to no less than the sum of all the ‘various cultural discourses’ that surround it. It is hard to imagine a hypertext, no matter how large or distributed, that can perform this feat.

An embodiment is the making physical of a concept, the tangible expression of an idea. In essence the concept and the embodiment are identical, they spring from exactly the same motivation, have the same scale and domain. Thus hypertext might be more aptly called a *model* which is an *approximation*. A model rises from a different source, with foreign materials, and imitates the concept in a different medium or on a different scale. We may sensibly talk of how closely a model approximates the original, gaining by the comparison some knowledge both of the nature of the original and the nature of the model and modelling. On the other hand, ‘embodiment’ is a binary concept: one thing either embodies another or it doesn’t. Similarity (model) is not sameness (embodiment). Hypertext does not embody intertextuality.

According to Barthes, “the text is not a line of words releasing a single ‘theological’ meaning (the ‘message’ of an Author-God) but a multi-dimensional space in which a variety of writings, none of them original, blend and clash. The text is a tissue of quotations

⁹⁵ Jonathan Culler. *On Deconstruction: Theory and Criticism after Structuralism*. Ithaca: Cornell University Press, 1982, 32.

drawn from the innumerable centers of cultures.”⁹⁶ The idea of a drawing together of actual quotations - taking a line here, a word there, etc and linking them together - sounds like hypertext. That is exactly what hypertext can do, since it concerns links joining units such as words and lines. However, if we think Barthes’s ‘quotations’ are metaphoric or that his ‘centers of culture’ cannot be shown on a computer screen, then the hypertext cannot be said to embody his ideas. Indeed, it is hard to take the simplistic view because he states the text is “not a line of words . . . but a multi-dimensional space”⁹⁷. And later “there is one place where this multiplicity is focused and that place is the reader, not, as was hitherto said, the author. The reader is the space on which all the quotations that make up a writing are inscribed . . . A text’s unity lies not in its origin but in its destination”(148). Here Barthes describes a kind of intertextuality where the text is dependent on the convergence of intertextual codes in the reader. The intertextuality exists in the mind of the reader. A hypertext may hope to model the intertextuality by associating the texts as we may theorise they are associated within the mind of the user (hence the link between hypertext and modern associative theories of human cognition). Until we know more about the human mind, this relationship must remain a modelling rather than an embodiment.

To further examine intertextuality, we might turn to Derrida’s concept of ‘grafting’. Derrida’s ‘grafting’ is like Barthes’s ‘drawing together’: texts are grafted into one another and “deconstruction is, among other things, an attempt to identify grafts in the texts it analyzes: what are the points of juncture and stress where one scion or line of argument has been spliced with another?”

⁹⁶ Roland Barthes. *Image, Music, Text*. essays selected and trans. Stephen Heath. London: Fontana, 1977, 146.

⁹⁷ In fact, Barthes’s description of ‘text’ is so infuriatingly vague, it is difficult to see how any concept could be said to embody it.

Supplement in Rousseau is one such point, at which a graft of logocentric and anti-logocentric arguments can be detected . . .”(Culler, 135) We can see hypertext as a physical representation of this system of grafts, an attempt to try and identify these points of graft by placing a text on the crossroad of many possible texts and by placing many links within the text. Derrida’s *Glas* uses an unusual separation of texts within the book into two columns “While reading one column you are reminded that the gist lies elsewhere”(Culler, 136) Similarly in hypertext there is always the same tension in that the link markers remind us that the gist is elsewhere. However a point of graft within a text may not be as simple as a word on the screen that can be marked with a link marker. When Derrida says that “*Supplement* in Rousseau is one such point”, he is talking about the *concept* of supplement within Rousseau’s writing, not just the signifier of that concept. The concept of supplement is distributed through the work, it does not exist at certain positions in the text as a hypertextual links must. Where do we place the links in Rousseau’s text to try to embody the deconstruction of the text? To simply place them on every occurrence of the word ‘supplement’ is, I think, to miss Derrida’s point. When Derrida fastens on a footnote or a recurrent motif or image in a work, he does so because those points are “‘symptomatic’ points, the *aporia*, or impasses of meaning”(Eagleton, 133) They are not the points of graft, but ‘symptomatic’ of them. The real points of graft are along conceptual axes in the text, they are non-locatable. While hypertext can help point out the symptoms, it cannot embody the intertextuality that a text has by virtue of being at a crossroads of a discourse.

In hypertext, the link is the essential device of intertextuality. The link is not sufficient to embody the poststructuralist idea of intertextuality. A link is a definite thing, it has a start and an end. Intertextuality is not a set of lines going from text to text, but a

concept whereby texts are “products of various cultural discourses” some of which do not even exist in textual form, and cannot be represented within a computer. Intertextuality may be seen as rhizomatic, and as I have argued above a hypertext may model this rhizomatic structure, but not embody it. Some examination of the link will be useful.

Does the link hold apart or melt together texts? Does it enforce the structural oppositions between texts, between text and criticism, between source and reference . . . or does it break down these oppositions? A real deconstructionist tool would have links that do both at once, that illustrate a Derridean *différance*. Landow and the other hypertext theorists do not explicitly consider the link as a poststructuralist device (although they constantly maintain that hypertext blurs the boundaries between texts). The expression plane of the hypertext clearly encourages the structuralist view of ‘oppositions’ and ‘boundaries’ between texts. It appears, in this way, to crystallise the structural oppositions between texts. Each text is brought up in a separate window, with clearly delineated boundaries. Each window acts independently and may be manipulated independently of all the other windows. The link marker within the text is the sign of another text. At once, it both includes the other text within this one, and defers the other text - holding it off at some distance.

Similarly, the computer screen can be seen as a tool of *différance*. It holds off all the ‘meanings’ it can take: they are deferred, but can flow to and through the screen. The screen is the site of any possible parole and from these paroles, the whole of the langue at once signified and deferred. The screen, like the mind, is equivocal and can contain any parole. The computer is analogous to Derrida’s Magic Writing Pad, which is a metaphor for writing written on the conscious and unconscious mind. The clear layer is the conscious mind which transmits what it does not retain. This is our computer screen, the medium for the

transmission of signs. The backmost pad is the unconscious mind which retains what it does not perceive. This is the computer memory, or database. Like Derrida's Magic Writing Pad, however, hypertext is only a metaphor for human cognition and for the systems of human discourse. We should no more claim that hypertext embodies these concepts than Derrida claimed the Magic Writing Pad did.

Decentreing

Derrida calls the 'organising principle' of structure the 'centre'. While governing the structure it escapes structurality, because it is non-substitutable, not involved in the structurality of the structure 'around' it. It is thus both inside and outside structure. Because the centre does not belong to the structure, the structure has its centre at a place other than at its centre. Paradoxically, the centre is at once centre and not centre. And because it can be inside or outside, the centre can therefore also indifferently be called the beginning or the end. Decentreing begins when the structurality of structure begins to be thought. Derrida identifies one of these beginnings as the time when ethnology was born, when "European culture...had been *dislocated*, driven from its locus, and forced to stop thinking of itself as the culture of reference." (Derrida, 86) We might see another of these beginnings in the invention of hypertext, which allows the structurality of structure to be thought, and dramatised in electronic form. In a hypertext there is no text that is at the centre, because the structure of a hypertext is such that a centre cannot be located.

Superficially, then, hypertext employs a kind of decentreing. A reader may organise her reading around any theme or locus (given the right tools for filtering); she may change the theme at any time. Any text, or no text, can be given central status, all texts can be seen as equal in the structure. However, the structures that Derrida decentres are not just structures of texts, but structures of

language and thought, *epistemes*, discourses which have “their roots thrust deep into the soil of ordinary language” (Derrida, 83). A centre is an ideological centre. In an ideal Hypertext, no ideological centre would be favoured over any other; texts might deconstruct each other by their differing ideological centres, thus providing an embodiment of the decentring and the deconstruction that Landow et al are anxious to provide. Texts might be directly linked to dissenting texts, so that text and dissension are on the same 'level'; one is not privileged above another because of the democratic nature of the link. In this way, a hypertext might provide a kind of ideological decentring, but it is important to note that we are talking here about an *Ideal* hypertext, fully deserving a capital 'I'. This Ideal hypertext must be compiled completely democratically by everyone with innumerable links and texts covering every discourse in human history, in every culture. It would have to include not only things that can be digitised and represented on a computer, but those that can't - for otherwise, any hypertext has a certain ideological centre that privileges digitalisation. It's not that this imagined version of hypertext differs from those that are available today that causes our problem - today's hypertexts *are* a very limited version of what we can expect. It is that the hypertexts imagined differ from any hypertext we can ever expect to see in fundamental ways. They are ideal hypertexts that can never be realised.

Obviously the embodiment of decentring is impossible. Even a less ambitious modelling of decentring is difficult, as Landow himself suggests when he says “In practice most readers employ the materials developed at Brown University as a text-centred system” (Landow 1992, 13). Landow says this text-centred approach is not dictated by the system, which also allows an author-centred approach, or an approach based on period, or certain critical notions. However, offering five possible organising principles (or fifty) is not to embody decentring, for certain

centres are always implicit, especially in a hypertext like Intermedia which upholds ideological assumptions such as the importance of studying literature. If a hypertext has a purpose, it has a certain kind of centre.

If we consider a hypertext which tends toward the ideal hypertext above (say the World Wide Web) we may be tempted to say that the glimmer of the ideal is there in every hypertext. Conversely we may conclude that by paying lip service to the ideal, hypertext hides its real nature. By having the appearance of multivocality, non-hierarchicality, non-canonality, decentredness, democracy etc, a hypertext hides the fact that it holds a canon, an ideological centre, an implicit hierarchy, etc - being in fact a product of the culture that created it. More correctly, it is not the hypertext itself that does this 'hiding', but the theorists of hypertext who find their notion of the 'ideal' hypertext in the real hypertext, and thus risk missing the real hypertext altogether.

Deconstruction

Bolter states that "The question is whether the deconstruction of an electronic text seems worth the effort" (165) since "it may never make a univocal statement that invites deconstruction" (164); and later that "Deconstruction itself is playful, but its playful attitude requires a fundamental seriousness in its object." (165). Hypertext deconstructs itself, and in this act, "The electronic medium dissolves the distinction between writing and interpreting a text" (165) Bolter is claiming both a victory and a defeat for poststructuralism in that it is the victory that puts the soldiers out of work. The soldiers have secretly deserted and become computer programmers working behind the front line. Bolter's conclusion is that "Electronic writing takes us beyond the paradox of deconstruction, because it accepts as strengths the very qualities - the play of signs, intertextuality, the lack of closure - that deconstruction poses as the ultimate limitations of literature and language." (166) The problem with Bolter's argument is that

it is not only literature but also *language* that deconstruction works upon. Deconstruction exists on a microcosmic scale, the scale of language use, of sentence and paragraph, not just on a textual and intertextual scale.⁹⁸ Hypertext cannot prevent a text from embodying its own contradictions in a way that gives the deconstructionists work within itself. Even intratextual links cannot deconstruct the very language.

We may find a contradiction within Bolter's writing on this subject. He says of the hypertext novel, *Afternoon*, "The margins yield to the reader, and this yielding serves as a safety valve to prevent the text from disintegrating under the force of a deconstructive reading"(163). Now, rather than seeing hypertext as deconstructing the text, Bolter sees it as preventing the text from being deconstructed. In order for Bolter to hold to his argument, rather than saying "prevent from disintegrating" he must say 'recognise the disintegration' - for the yielding margins of the text in hypertext, (if yielding they are) must for Bolter embody the decentring, rather than prevent it in any way. Furthermore, it is not the force of the 'deconstructive reading' which disintegrates the texts, but the force of language, the forces of language, falling away from itself, ever outwards.

The main thrust of my argument has been that hypertext cannot embody poststructuralism because poststructuralism is about the ideologies within texts. Terry Eagleton sums it up thus: "This is not just an empirical observation about certain kinds of writing: it

⁹⁸ In a similar argument to the one Bolter employs, Walter Ong suggests that deconstruction plays on literacy and the literary object while ignoring orality. Orality, he says, recognises that there are no closed systems and never have been. "The illusion that logic is a closed system has been encouraged by writing and even more by print. Oral cultures hardly had this kind of illusion, though they had others. They had no sense of language as 'structure'. They did not conceive of language by analogy with a building or other object in space."(Ong, 169) Despite the similarities between orality and hypertext that I will describe later, Ong's argument can not be smoothly transposed to hypertext as Bolter would have it. Hypertext, comes from a base assumption (inspired by literacy) that language is structured; thus rather than having no concept of unstructuredness, hypertext, like print, is *deconstructed* and the vestiges of structure must remain.

“The general importance of non-linear or antilinear thought appears in the frequency and centrality with which Barthes and other critics employ the terms *link*, *network*, *web*, and *path*. More than almost any other contemporary theorist, Derrida uses the terms *link*, *web*, *network*, *matrix*, and *interweaving*, associated with hypertextuality; and Bakhtin similarly employs *links* (*Problems*, 9, 25), *linkage* (9), *interconnectedness* (19), and *interwoven* (72).” (25)

Landow Quotes Pagels: “The representation of knowledge, according to connectionists, is distributed among the strengths of the connections [links!] between the units” (26 - Landow’s “[links!]”)

“...even the most radical theorists...speak a language that is strikingly appropriate to electronic writing.” (Bolter, 161)

“Derrida’s characterization of a text again *sounds* very much like text in the electronic writing space.” (162 - my italics)

“In conversation with me, Ulmer mentioned that since Derrida’s gram equals link, grammatology is the art and science of linking - the art and science, therefore, of hypertext.” (Landow 1992, 30)

I do not say that an equivalence of terms does not imply a relationship of similarity between the two areas; just that it cannot be the basis of a claim of sameness. To reason from the fact that Derrida uses the term ‘gram’ to the conclusion that grammatology is the art and science of hypertext is clearly not logically justifiable.

Furthermore, employing the terminology of another area may be misrepresenting some of the essential connotations of that terminology. Landow uses Barthes’s term ‘lexia’ to describe hypertext nodes. However, quite unlike Landow’s vision of a

node, Barthes's lexias have an "emphasis on seriality (*fragments contigu*)" and the destructive process of its separation (*découpé*) from the text. For Barthes, lexies are not the building blocks of textuality but a violent and powerful demonstration of 'reading.' In sharp contrast to the playful combinatorics of textual nonlinearity, Barthes's motto is clearly *divide et impera*." (Aarseth, 61) Landow's use of Barthes's terminology here seems to work against his theory of hypertext, rather than to support it. Because of an effect similar to this, the hypertext critic Martin Rosenberg sees the potential of hypertext as a new kind of writing space to be stymied by the very tropes used to describe it.¹⁰⁰

My argument brings me back to the quote with which I began this section:

...hypertext has much in common with some major points of contemporary literary and semiological theory, particularly with Derrida's emphasis on de-centring and with Barthes's conception of the readerly versus the writerly text. In fact, hypertext creates an almost embarrassingly literal embodiment of both concepts...

Landow, 1992, 34

We may now see that the "embarrassingly literal embodiment" may be just that - embarrassingly *literal*, an embodiment only in terms (it is hard to see how else an embodiment could be embarrassing!) If I may resort to a play on words myself, it may be because the poststructuralist concepts are so *littoral* that

¹⁰⁰ In his paper "Physics and Hypertext: Liberation and Complicity in Art and Pedagogy." In Landow 1994, Rosenberg concludes, "In any case, whether employed for art or for pedagogy, the properties of nonlinearity that we have identified demonstrate that the "writing space" of hypertext cannot be considered a zone of liberation, because of its epistemological and ideological link with the geometric perspective in physics and with the stasis of logocentrism." (293)

hypertext must fail to embody them. Littoral means 'on or of the shore'; and the poststructuralists see texts like tides and river mouths flowing through other contexts. The static nature of the hypertext link can embody only the divisive nature of the shore - the separation of sea and land; it does not embody the flowing, tidal nature (the free play of semiosis) that poststructuralists emphasise.

To look at this yet another way, the term 'embody' itself may work against what Landow and Bolter try to achieve. 'Embody' means to 'give concrete form to'. It is just this giving of a form which poststructuralism resists. Thus to embody poststructuralism is to fail to embody it.

My intention in this section has not been to pointlessly oppose what Bolter and Landow say about hypertext, but to usefully qualify it. To say that hypertext embodies poststructuralism and takes us beyond deconstruction, leads to claims (I will quote them once more) that hypertext "provide[s] a transition to the technology that is replacing print." (Bolter, 156) and "argue[s] against the future importance of print-based information technology" (Landow 1992, 29). I will say more in the next section about this kind of prophecy. It may be more productive for us to see hypertext as a tool that *models* ("permits us to visualize" (Bolter, 164)), or even that *dramatises* poststructuralist views of text. This leaves us free to learn more about both theories by a comparison which admits both difference and similarity.



X Hypertext and Orality

Will 'IT' revolutionize current forms of organization and democratic participation, or will it merely reinforce existing power divisions? Are we entering a new age with new modes of thinking, new concepts of the self, new notions of what it is to be a 'human being'? Do the changes in communication technology determine our future or do we have any choice?¹⁰¹

According to Kernan, not until about 1700 did print technology 'transform the more advanced countries of Europe from oral into print societies, reordering the entire social world, and restructuring rather than merely modifying letters'(9). How long, then, will it take computing, specifically, computer hypertext to effect similar changes?

Landow 1992, 31

Hypertext and the Printing Press as Historical Analogues

..... Landow's consideration of changes in writing technologies presupposes that hypertext will be the fourth great medium. Finnegan treads more carefully. In her book *Orality and Literacy*, Finnegan advocates careful study before we begin to predict what changes may be caused by new technologies of communication. For Landow, the changes are almost given, it is only a question of 'when?'. In this chapter I will examine changes in communication technology, not only to see what we may expect of the 'electronic revolution' - but also to examine the motives behind predictions of revolution. I will begin by briefly examining the change to print technology that

¹⁰¹ Ruth Finnegan. *Literacy and Orality*. Oxford: Basil Blackwell, 1988, 1.

Elizabeth Eisenstein documents in her book *The Printing Press as an Agent of Change*.

Eisenstein examines the writings of an Abbot in charge of a fifteenth-century scriptorium: "His arguments show his concern about preserving a form of manual labor which seemed especially suitable for monks...But his activities show clearly that as an author he did not favor handwork over presswork. He had his *Praise of Scribes* promptly printed, as he did his weightier works." (Eisenstein, 15) The abbot's concern about the new medium was belied by his use of it; whereas today, critics' *praise* of the new medium (hypertext) is to a certain extent belied by their lack of use of it¹⁰². There are three possible explanations for this. First: it could be too early. Eisenstein's Abbot found print technology irresistible a good fifty years after it's introduction. We have not even left the first decade of useable hypertext. Considering, however, the relative rate of change of technology, ten years of change in the twentieth century could be worth at least fifty in the fifteenth. Second: the medium of hypertext might be overrated by critics. It may never come to be used widely. I don't believe this to be true. Some current forms of writing may not make the shift to hypertext, but I believe it is such a strong medium that some others must. Third: that the medium that hypertext provides is so different to the medium of print that more time is needed for writers and critics to construct the right texts (indeed the right *kinds* of texts) for publication in hypertext, and for

¹⁰² Some may object to my suggestion that hypertext lacks use; and they would be justified, for hypertext is being widely used in many areas (such as education, encyclopedias and instruction manuals) and some distributed hypermedia like the World Wide Web have shown particular growth and popularity. However, it is hard to imagine a situation today analogous to that of the Abbot of Sponheim, where a critic argued against hypertext but found it impossible not to publish in hypertext anyway. Walter Ong says, "One weakness in Plato's [anti-writing] position was that, to make his objections effective, he put them into writing, just as one weakness in anti-print positions is that their proponents, to make their objections more effective, put the objections into print. The same weakness in anti-computer positions is that, to make them effective, their proponents articulate them in articles or books printed from tapes composed on computer terminals." (Ong, 80) Hypertext critics have by no means found themselves in Plato's position.

society to demand those kinds of texts. If the third explanation turns out to be the correct one, then the changes in our world could be even more far-reaching than those associated with the change from writing to print that occurred after the invention of the printing press because the coming change in medium could catalyse a change also in the *kinds* of texts we use.

It is interesting to compare the incunabula of the printing age to what we might call the 'hypertext incunabula'. Hypertext incunabula are indeed 'printed' in a new technology. And this provides the same anomalies of change in technology. We are not yet taking full advantage of the new medium - we no doubt perform the hypertext equivalent of script-like typefaces, run-together words, etc. But unlike print in the fifteenth century, hypertext is not just a new medium for the same texts, it is new medium for new kinds of texts. Printing provided not a space for new kinds of texts, but a new process of creation of the same texts. For this reason, any comparison of the change from writing to printing and that from print to hypertext must be taken with a grain of salt. The shift from print to electronically published texts *in general* (including hypertexts, but also simply print texts written, stored and read on the computer) seems more analogous to the Gutenberg revolution.

How strong is the analogy between the shift to printing and the shift to electronic publication? In many ways the new shift is an amplification, an extrapolation of the older one. Texts can be copied faster and more numerous, can become more available. However the institutions that were set up and the ones that were changed (such as the university, the publishing industry, the middle class, religion...) are arguably unlikely to be further changed by further efficiency of copy of the same kinds of texts. Those changes may be seen as already wrought by the print revolution. Having said this, the near-instant transmission of texts, along with the drastic reduction in cost of producing an electronic copy of an electronic text allowable by electronic publishing may have far-reaching effects on the way we

episodes, which may be associated with certain of the formulaic phrases and lines.¹⁰³

The consequence of this method of oral composition is that the poet "is able to carry on the simultaneous performance and composition essential in his art."¹⁰⁴ Landow sees hypertext reading as essentially similar to the performance of oral poetry: "Although the reader of hypertext fiction shares some experiences, one supposes, with the audience of listeners who heard oral poetry, this active reader-author inevitably has more in common with the bard, who constructed meaning and narrative from fragments provided by someone else, by another author or by many other authors" (Landow 1992, 117) Hypertext, then is seen as a return to an oral-like space in which the reader may 'perform' the text from the pre-composed pieces according to the occasion and context. In this comparison, Landow ignores the fact that the oral poet has at his fingertips (or 'neurotips') the whole stock of his literature - every formulaic line, plot, event, and sequence. Although the fragments may be provided by others, the bard knows them all beforehand, and can choose each one in order to direct the narrative. The hypertext reader, on the other hand, is feeling his way through an unknown space of texts; constructing a haphazard sequence of elements with no guarantees of narrative or suitable rhythm, rhyme etc.

Virtuality of Texts

Another consequence of oral poetry's composition in performance is the lack of a fixed text. Finnegan quotes Lord: "in a sense, each performance is 'an' original if not 'the' original. The truth of the matter is that our concept of 'the original' of 'the song', simply makes no sense in oral tradition" (Lord. Cited in Finnegan 1977, 65) In the study of hypertext too (as we have seen above), the concept of a fixed text loses meaning. Every reading of a hypertext is potentially

¹⁰³ For a full description of Parry and Lord's work, see Ong, 17-30.

¹⁰⁴ Ruth Finnegan. *Oral Poetry*. Cambridge: Cambridge University Press, 1977, 65.

unique. The hypertext as a whole does not correspond to any one of the huge number of possible readings of it, just as the formulaic stock as a whole is not the same as any given poem created from it. Both kinds of texts are easily mutable as they are passed on. A hypertext can be added to by its users, as can an oral one. This equivalence means that problems of textual scholarship and criticism found in the study of oral poetry are likely to again be found in the study of hypertext; and suggests that critics of hypertext might learn from the techniques of scholarship used in the study of oral poetry. So the similarities between hypertext and its distant precursor, rather than just adding to the evidence that hypertext will be the fourth great medium, could be used to provide a fuller understanding of the writing space that it provides.

Oral texts and hypertexts also share their essentially virtual quality. Finnegan says of oral works: "...though they also appear in written form, they surely achieve their main impact and active circulation through ever-renewed oral means." (Finnegan 1977, 5) Similarly a hypertext achieves its impact and circulation through ever-renewed electronic means. The virtual space of hypertext is in the memory of a computer, produced for perception on the cathode ray or lcd screen; while the virtual space of oral literature is in the biological circuits of the human brain, produced for perception by vocal chords on sound waves in the air. Neither kind of 'text' need ever be fixed in print. Both kinds of text can be simultaneously given away and kept; with no limit on the number of 'copies' made. This virtuality of oral and electronic texts is at least partly responsible for the problems of location of text considered in the previous paragraph.

Lawyers and governments have only just begun to try to solve difficulties of copyright enforcement caused by the ease of copying and transmission of electronic texts. We may learn something from the way concepts of copyright are regarded in oral traditions where the text has a status more similar to electronic texts than the print texts upon which our present copyright laws are based. Having said

that, it is not as simple as we might at first imagine. Despite the widely held romantic view of oral tradition as communal and democratic, attitudes towards 'ownership' of oral poetry are as diverse as the cultures in which the poetry arises (Finnegan 1977, 203). In Malaysia, any idea of ownership of oral literature is laughable, while in other cultures poems are considered to be owned by their composers (see Finnegan 1977, 202). To own a piece of oral literature means that the owner is the only person (or family, tribe etc) allowed to sing or recite the piece. Poems may be given to others as gifts, or passed down through families like heirlooms. Finnegan identifies ownership in oral tradition as an area in need of further research (203) and it may be that lessons learned here could be applied to the problem of the copyright of electronic texts.

Definition of the Communication Technology

The "scriptist bias" (Finnegan 1988, 179) of our scholarly tradition means that both the study of oral literature, and now that of electronic literature suffer from problems in definition, not only of what the 'texts' are, but of what the genres are. With these problems come the difficulty of definition. Finnegan finds difficulty identifying the essence that separates oral from print literature, much as I struggle to separate hypertext neatly from print text and other kinds of electronic text. In the end, Finnegan admits, "The basic point then, is the continuity of 'oral' and 'written' literature...The idea of pure and uncontaminated 'oral culture' as the primary reference point for the discussion of oral poetry is a myth." (Finnegan 1977, 24) Rather than acquitting her of the responsibility to try and define 'oral', this definition breaks down the boundaries between 'oral' and 'written' which she shows are erected to serve certain political ends. At the end of this section I will show how similar motives may be forcing a definition and description onto the study of hypertext.

Performance in Hypertext and Orality

We may draw another comparison between oral and hypertext literature in the aspect of performance. Finnegan stresses the importance of performance in study of oral literature:

“‘Performance’ in oral literature has till recently received less attention than the element which oral poetry more closely shares with *written* poetry - the text. But performance can play a crucial part in the actual realisation of this poetry as *literature*: for its full form is more than meaningful words on a piece of paper or in the poet’s mind.” (Finnegan 1977, 122) In hypertext, too, it is obvious that the full form of the work is more than just the words on the screen. To study oral literature we must take into account the performance. We need a new rhetoric (or a reversion to the original idea of ‘rhetoric’). Not only the verbal aspects require study, but also the performance that actualises the texts that exist in the minds of the performers (see Finnegan 1977, 28). In hypertext, the texts are actualised by the links and the computer interface which animate the words. To what extent may we draw further analogy between performance in hypertext and oral literature?

In the transmission of oral poetry, many of the qualities of the performance come from the feeling of immediacy, and the passion and power of the performer. It is not just the words that we may see on the page, but the visual, audio and emotional spectacle which the ‘reader’ takes part in. This ‘multimedia’ aspect of oral poetry is reproduced in the multimedia capabilities of hypertext (hypermedia). Finnegan quotes Paredes in saying that “It is when literature gets farther and farther away from the spoken word that we must invent devices to hold the reader’s attention, to excite his emotions and his imagination, all with those little black marks upon a piece of paper. In fiction we move toward new narrative techniques, seeking to gain the sense of immediacy that was lost when the written word took the place of the living narrator...” (Paredes, cited in Finnegan 1977, 126) This idea is extremely suggestive for hypertext and hyperfiction in

particular. If hypertext can recapture some of the elements of performance with its inclusion of movement (video as well as animation of words and pictures) then perhaps it will not be so reliant on the narrative devices that Paredes asserts are substitutes for performance and immediacy. Some of the difficulties I outlined with hyperfiction may be compensated for by the return to performance of narrative that hypertext (and hypermedia) offers.

Just as hypertext and oral literature share a problematic notion of 'text', they also share a problematic notion of 'author'. I have discussed above the dissolution of the roles of reader and writer that are well documented in the study of hypertext. Finnegan identifies two main modes of composition in oral poetry: prior composition and composition-in-performance. Who is the author of a piece that is composed in performance? Obviously, the performer is the first candidate. He or she assembles the formulaic parts to form a poetic whole. However, as I have noted above, the audience also takes a part in directing the composition. And who is responsible, in this mode of composition, for composing the stock of formulae the performer uses to create his narrative? Surely no less an entity than the entire oral tradition preceding any particular performance. This indeed seems a case of collaborative composition in some ways resembling the group participation which results in the Intermedia hypertexts, or the international 'collaboration' that produces the distributed World Wide Web. Even when the oral piece is composed prior to performance, no two performances are ever quite the same, and due to elements of dramatisation and flexibility in performance, the performer shares the responsibility and credit for composition. Again quoting from Paredes: "In the end, it is the performer who is the poet - for the brief moment that he performs." (Paredes. Cited in Finnegan 1977, 126) Obviously these questions of authority have their parallel in postmodern concepts of the 'death of the author' in print fiction; but the problem is certainly more salient in oral and electronic narrative.

Finnegan writes: "It needs to be borne in mind that the recognised style of delivery may include formal or informal participation by the audience." (Finnegan 1977, 122) The audience may join in on a chorus, they may voice objections or opinions on the recital, they may dance and sing. In Chinese oral literature, particularly, the audience often has a direct influence on the shape of the story told (see 231). So while we find our traditional definition of author is inappropriate in the study of oral literature, our notion of reader is also in jeopardy. Performance becomes a kind of dialogue between audience and poet; where in hypertext, the 'performance' of the hypertext becomes a dialogue between reader and writer. The actions of a hypertext reader may parallel those of the oral audience in influencing the direction, duration and content of the story (not so much in the dancing and singing though!) Like hypertext, "oral literature is more open than written literature to direct group influence on what might otherwise be considered the individual creative genius of the poet." (232)

Ong enumerates several characteristics that offset oral thought and expression from what he calls "chirographically and typographically based thought and expression." (Ong, 36) In the first of these points, Ong characterises oral expression as additive rather than subordinate. Where chirographic cultures organise texts syntactically, oral expression is paratactic. While I have previously noted that hypertexts, too, are paratactic in structure, the reasons for this additive nature are different. Oral 'texts' are additive because it is easier to compose on-the-fly this way. Pieces may be substituted for one another, or reordered without damaging the structure. The audience have visual clues to make up for the lack of structure of the poem. In contrast to this, the additive nature of hypertext is seen by critics, not as being at the convenience of the writer (though it surely does remove the burden of structuring a work) but for the freedom of the reader.

tellingly called 'folklore' a link to the savage, unfettered, natural past. This Romantic view of folklore coloured the study of oral literature, affecting what they recognised as oral literature, and how they viewed it: "This attitude to the 'natural' products of 'primitive' and 'unlettered' people, and to the 'folk', the 'peasants', and 'the common people' generally, often involved a sentimental and glamorising admiration." (Finnegan 1977, 33)

It is easy to see a similar 'glamorising admiration' in criticism of hypertext. Where the Romantics were "reaching out to a supposed lost world in the past"(33); critics of hypertext reach out to a future - a democratic, centreless, non-linear, non-authoritarian future. We are the New Romantics of Hyperspace. This new romanticism colours our view of hypertext (what is emphasised in hypertext, and what is played down) in a pervasive way.

The Romantic theory of oral literature sees folklore as a polished gem handed down from ancestors: complete, whole, traditional, stretching back to the origins of human communication and consciousness. Hypertexts are seen by the New Romantics as unfinished, never ending, never written, stretching forward into the future of human communication. Both theories to a certain extent idealise their subjects. Both see the 'communal' and 'democratic' as central. New Romantic hypertext theory is like Romantic folklore theory on an inverted time-scale of 'tradition'.

Finnegan quotes an unnamed folklore expert as saying that "'Oral tradition' ...can help us fight the 'waves of mechanization and depersonalization that threaten our life and thinking today'"(39) From one point of view, hypertext embodies this 'mechanisation' that threatens us; but the New Romantic view of hypertext dissolves this threat, casting quite a different (freeing, empowering) light on hypertext.

Finnegan says "It is illuminating...to set the assumptions involved against the historical background and intellectual movement in which they were formulated. This brings home that these are indeed

assumptions, related to particular historic currents, and do not necessarily rise from solid empirical evidence” The main point I am making is that it is not the features or nature of hypertext which cause such assumptions about it, but the New Romanticism from within which it is being viewed. Current political rhetoric of a ‘New World Order’, along with recent literary theory (as we saw in the previous section) can both be seen as contributing to the assumptions about hypertext that I am concerned with. Finnegan identifies the Romantic view of folklore as being closely tied to nineteenth century nationalism, which saw in *local* oral literature the defining essence of the ethnic group or race. Now that nationalism is out of vogue, the idea of a ‘folk’ literature in hypertext extends the concept of ‘folk’ to encompass the whole world in such a literary ‘tradition’ as the World Wide Web. Interestingly, though, a kind of nationalism still creeps in. Hypertext cannot be completely democratising and equalising. Divisions of ‘us’ and ‘them’ inevitably creep in where we seek to dissolve them. Most conspicuously these divisions form ethnic groups based on access to technology. The World Wide Web reaches only that ‘world’ that has access to the computer network. The new ‘folk’ (perhaps living in McLuhan’s ‘global village’) are those that are computer literate and ‘wired to the net’.

Finnegan cautions against acceptance of the Romantic theory of oral literature, pointing out that many of the assumptions it makes about oral literature are, if not completely wrong, at least not universally applicable. The apparent democracy of the oral writing space hides complex systems of privilege and social control; oral literature exists in urban and contemporary settings as well as rural and historical ones, etc (see Finnegan 1977, 40). This caution should extend to theories of hypertext. Assumptions such as those about the democratic nature of hypertext should be treated with care.

Furthermore, the effects of these early assumptions have been detrimental to the field of oral literature “These attempts to reconcile

romantic with empirical approaches actually have held back scientific research in the field and are partially responsible for the fact that, while other disciplines that emerged during the nineteenth century have made headway, folklore is still suffering growing pains" (Ben-Amos, cited in Finnegan 1977, 40). This effect could be doubly felt in the study of hypertext; for hypertext theory does not only study a body of existing literature, an existing writing space, but also is helping to shape and create both the new writing space and the literature that will rise from it. In this sense the 'New Romantics of Hyperspace' are about the performance of a self-fulfilling prophecy. The extent of this self fulfilment (luckily) will be limited by the fact that developments in hypertext and other electronic writing spaces are to a large extent technology driven. Still, the question must be posed: how much of the new writing space is real, and how much is idealistic prophecy designed to fulfil itself?

The Prophecy Determines the Candidates

The Romantic view of oral literature determined what could be considered oral literature and what could not, artificially ruling out genres and traditions that have since been recognised as part of what we might know as 'oral'. Perhaps as a similar effect, hypertext can be seen not, as Landow claims, as the inevitable fulfilment of a deconstructionist vision—the convergence of theory and technology, but as simply one of a number of possible new writing spaces. We may see hypertext as the one that is privileged by the New Romantics as being the great new medium because it seems to fulfil their expectations of what this medium will be like. In other words, hypertext is not the great new medium which fits its rightful place, but just another medium, touted as a kind of literary new Messiah because it seems in some ways to 'embody' current critical thought. Now, if current critical thought is the end result of an evolution of thought that began in prehistory and brought about the Gutenberg revolution then perhaps it *can* demand a new writing space. But if critical thought is a cyclical, whimsical creature then its analogies to

hypertext may be no more than coincidence and the fourth great medium, if it comes, may be in a very different form.

Deconstructing Cause and Effect

Technology is often seen as primary, as being the cause of change in human society and consciousness (see Finnegan 1988, 9). In this view "the technology is viewed as autonomous, that is as itself self-standing and independent of social shaping and as more or less inescapably determining social forms and relationships." (10) This view, as an attitude of "it's coming anyway, we'd better conform to it," is a self-fulfilling prophecy. Finnegan contests this view, saying that "human development is more complex than can be subsumed under the one simple key of the form of communication. The implications of print, for example, have been found to work out differently in different historical circumstances, and to be shaped as much by the power relations in a particular society or by the particular groups which use and control it as by the technology itself" (11). Espen Aarseth also disagrees with the view that sees hypertext as the sole force of political change: "The balance of power between readers and writers is not changed by hypertext alone, nor by its enhancements, but by the political and economic logic of society..." (Aarseth, 70) Social factors drive technology as much as technology drives social factors.

Finnegan says the "approach of looking not just at the technical element but also at people's ideas and choices, power relations, institutional arrangements, and actual usage in specific contexts, has now to be painfully rediscovered for the case of more recent information technology." (Finnegan 1988, 12) If hypertext is not completely technology-driven, then what is driving its development? The view that commercial users demand the technology to enable them to enhance their private control over, not merely information technology, but our economy and society as a whole may be a cynical one, but there is certainly something in it. Why are the apocalyptic prophecies I criticised above being made? A cynical view, again, says

that the computer industry (Microsoft, Apple, IBM) provides money (or equipment, or both) for academic research. The research then identifies and confirms the need for a new writing space based on computers. So we must mix the theory that technology drives social change, with the equally valid theory that social (economic and commercial) forces cause a (possibly artificial) demand for technology through a system of prophecy and fulfilment.



Conclusion

Political Motives for Prophecy

Landow says, "Considerations of hypertext, critical theory, and literature have to take into account what Jameson calls the basic 'recognition that there is nothing that is not social and historical—indeed, that everything is, 'in the last analysis' political'" (Landow 1992, 32). Much of my discussion has been about the separation of the claims made for hypertext from their ideological backgrounds. Though I realise that this is unavoidably an ideological pursuit in itself, I have aimed to combine an 'empirical approach' with a kind of meta-theory of hypertext in order to gain a greater perspective than I feel is being held currently.

Aarseth identifies theories such as the blurring of boundaries between reader and author as "political conjectures about the benevolent effects on the structures of power between writers and readers, teachers and students, government and the public, in which the good guys seem to be winning, at least in theory." (Aarseth, 68) We may just as easily see the good guys as losing. As a reader, I may not feel 'freedom' but instead a sense of *burden*, at the requirement that I take over some of the author's responsibility for writing. The choice to privilege the first of those two options is a political choice made by the new Romantics of hypertext. I have already noted some of the motivations behind such a choice. It is interesting to note that the radicalism of the new Romantics is tempered with a conservatism which is manifested in their apparent desire to champion hypertext (and in so doing sequester and control it) from within the bounds of conventional academia; and conventional academic publishing. If hypertext is as powerful a tool for academic discourse as Landow

claims it is, there may come a time when the new Romantics' self-fulfilling prophecy may unsettle their conservatism by altering the academic discourse in which it is based.

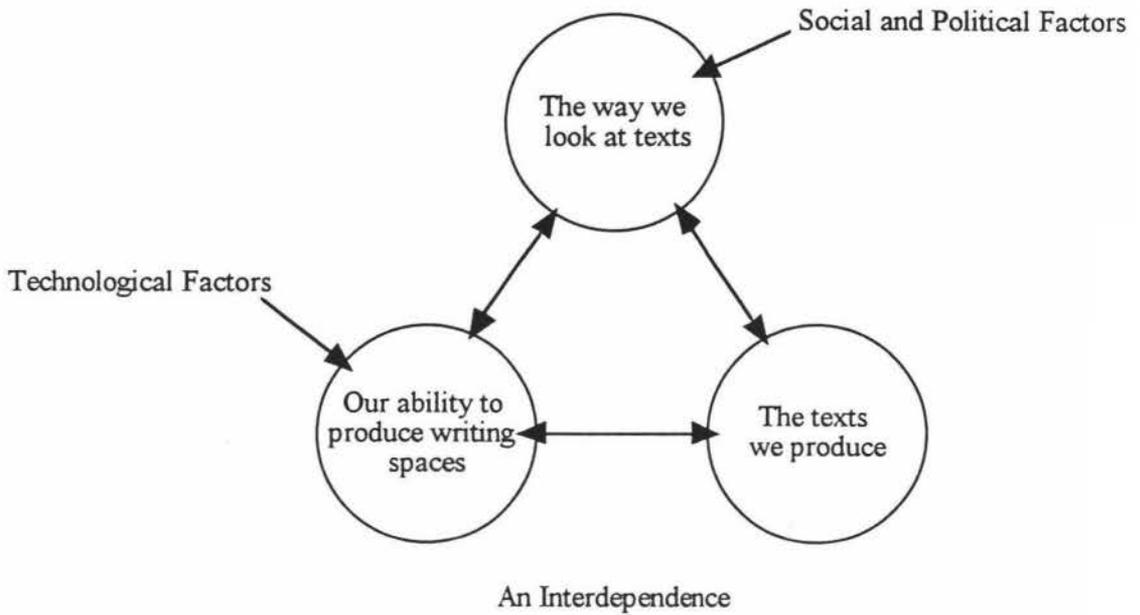
Success Without Succession

▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ ▪ The claim that hypertext is the next great technology of writing implies a succession of mutually exclusive writing technologies.

However, it seems more likely that writing technologies will exist alongside one another. Already, many different kinds of electronic writing spaces exist alongside print. The computer offers more writing spaces than just hypertext, and there are more kinds of 'virtual reality' yet to come, no doubt. The database and spreadsheet are examples of complex and specialised writing spaces which already exist in the electronic writing space.

In the final chapter of her book *Orality and Literacy* Finnegan warns against the view which "sees human history as punctuated by vast historic discontinuities, shaped ultimately by changes in the technology of communication," saying that "the repeated cycles of how knowledge and artistry are valued, interpreted and manifested in human action may be more important and more recurrent than the particular medium chosen from time to time over history to represent this." (Finnegan 1988, 177-8) She compares prophecy of the "great new future to result from electronic media" to the "pursuit of the millennium among the medieval mystical anarchists or modern cargo cults - the millennium that never comes but still goes on being heralded." (178) She takes particular pains to deconstruct the dichotomy of 'orality' and 'literacy', showing how they exist contemporaneously and cannot finally be shown to exist independently of one another. The figure I have included below is a graphical representation of the interdependence of writing space, literary theory and literature which suggests a view close to the one Finnegan advocates: an interdependence rather than a technology-

lead series of divides. Human communication as a whole is not helped by absolute divisions between orality and literacy, or between literacy and hypertext.



Hypertext the New Writing Space

..... The focus of my thesis has evolved subtly since the introduction. I began defending the idea that hypertext provided a new space for literature. In the beginning the emphasis was very much on the word 'literature'. I was concerned to examine hypertext's relationship to the reading, writing and critical demands of literature. Over the intervening chapters the emphasis rested more and more upon hypertext as a *new* space for literature. Newness not embodied only in recency but in a difference of form. I have seen this difference in form, not only as creating the benefits we may derive from hypertext, but as creating difficulties for readers, writers and critics who approach hypertext from a print-centred viewpoint.

At least some of the incunabula of hypertext fiction may be characterised as having a traditional content in a radical structure. The strictly traditional conception of narrative has no place in

hyperfiction, yet readers bring expectations from print fiction to the new medium, resulting in a feeling of dissatisfaction. The print-centred viewpoint of hypertext critics is shown most saliently in their reluctance to publish in hypertext.

Despite the prophecies of the new Romantics of hyperspace, it is too early to tell whether or not hypertext will be a successful new medium for the reading, writing and criticism of literature, let alone the *next* medium. However, the limited success of hypertext fiction, and the lack of criticism in hypertext form is balanced by the growing number of successful hypertexts, both distributed (the World Wide Web, Intermedia) and stand-alone. Hypertext is a medium for new texts, and indeed new kinds of texts.

The complementary question, of course is whether literature can provide successful tools for studying hypertext. In that my thesis has rested on the study of hypertext using the tools of literature, I must answer this question in the affirmative. Although the newness of the texts provides criticism with new problems of definition, genre, reader, author and indeed critic; tools such as semiotics and models like the rhizome will help literature to come to grips with hypertext. Indeed, we are in the unique position of not only describing a new writing space, but helping to prescribe one. Meanwhile hypertext as a new place for reading, writing, criticising and teaching literature, can help literary theory to step to one side of its scriptist bias.



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