

150 Highgate Road
London NW5 1PD
United Kingdom
Email: cayley@shadoof.demon.co.uk
Visible Language 30:3
John Cayley, 164-183

© *Visible Language*, 1996
Rhode Island School of Design
Providence, Rhode Island 02903

Potentialities of Literary Cybertext

The application of cybertextual technologies to experimental poetics is the context for this brief exposition of my machine modulated literary work. I invoke theoretical issues of cybertext but these are not extensively explored. Instead, I raise issues crucial to the work described here — the role of (literary) text in cyberspace; silent reading in new visible language media; the confusions of computer as medium; the limitations of link-node hypertext; the shifting relationships between writer, reader *and* programmer; multi- and non-linear poetics; and the engagement of contemporary poetics with cybertext. The major part of the exposition then focuses on the work itself and certain of its future potentialities, with occasional reference to the more general, theoretical concerns.

Beyond Codexspace: Potentialities of Literary Cybertext

John Cayley

The use and abuse of visible language — in the broadest sense — is undergoing huge, unprecedented growth at the current time. This growth is taking place in cyberspace, in what many critics might well have considered an environment hostile to cultivated “letters,” hostile, at the very least, to the traditional and still pre-eminent delivery media which have made language visible. The narrow bandwidth of current networks, and the limited capabilities of affordable interfaces has meant that encoded text is the dominant medium of information exchange on computer-based networks. To communicate over these networks, people write and read. That is, they compose (literary) texts and publish them in cyberspace where they are read, usually in silence, by friends, colleagues and the more general, “wired” public. All this has stimulated the emergence of an exuberant mass of new forms and proto-genres of visible language: listserv mailing lists, online conferences or “chat” zones, MOO spaces and so on. The advent of the World Wide Web has extended and articulated networked literary production to include typographic and other design aspects of textuality. However, the vast majority of this visible language is not seen by its writers or readers as belonging to literary or artistic production in the canonical sense. Serious literary hypertext does exist and is practised increasingly in this context.¹ However, it is perhaps more significant, in cultural terms, that the new quasi-ephemeral forms of non-literary visual language are exerting an increasing influence on self-consciously literary production, in what might be characterized as the real-time realization of contemporary criticism’s postmodern intertextual ideals.²

But this is a temporary state of affairs, a momentary window of opportunity for the partisans of visible language. When the bandwidth widens, when the audio-visual takes over from the keyboard and comes to dominate screen, printer, speaker and as yet undreamed of appliances and peripherals, a huge swathe of visible language-use will instantly migrate to non-literate

1 “Serious hypertext” is a rubric of Boston’s Eastgate Systems, one of the major, self-consciously literary publishers in the field, and developers of their own hypertext authoring software, StorySpace. The Voyager Company has also made significant efforts to produce new work in new media as well as transpose appropriate content.

2 Various references: Landow, George P. 1992. *Hypertext: The Convergence of Contemporary Critical Theory and Technology*. Baltimore, Maryland: John Hopkins University Press. Bolter, Jay D. 1991. *Writing Space: The Computer, HyperText, and the History of Writing*. Hillsdale, New Jersey: L. Erlbaum Associates. Landow, G. P. editor. 1994. *Hyper/text/theory*. Baltimore, Maryland: John Hopkins University Press. Joyce, Michael. 1995. *Of two minds: hypertext pedagogy and poetics*. Ann Arbor: University of Michigan Press.

sound and vision. By the time this happens, will visible language have become an understood and established literary medium within the new technosphere? As engaged with cyberspace as it now is with "codexspace," for example? This is an underlying concern of the work I describe, the first of a small number of theoretical issues which I briefly outline as a context for this delineation of my own practice.

My cybertextual compositions are literary. They are designed to be published on computer-controlled systems linked to the now familiar peripherals of screen, keyboard and pointing device. First and foremost, these pieces are intended to be visually scanned on screen, silently read and interacted with through keyboard and pointing device. They subscribe to the notion of written language as a distinct, quasi-independent system of signification and meaning-creation. Its relationship to spoken language is structured but indeterminate as to detail, and is subject to continual contestation, depending on the nature and function of the language being created. When the issue of the survival of textual language-use into the audio-visual age was raised on a hypertext discussion list, I answered for its continuing creative role: "for the very reason that it is silent / because it allows the silent to speak / because it allows the dead to speak / because so many of our thoughts are silent, unspoken."³ Literature which is engaged with the unique potentialities of computer-based networks is uniquely placed to serve as a link between the silent literary culture of the past and that of the future.

However, the new literature will not be "computer literature." There is a recurring popular confusion concerning the nature of the computer. It is not in itself a medium, neither a physical or a delivery medium, nor a content-bearing, artistic or cultural medium. What we idly call computer is always a system of hardware, software and peripherals, and this multiplicity is what may become, potentially, a medium; potentially because it is arguable that there must be agreement between producer/consumers about the use of a new medium before it can be recognized as such. Thus, link-node hypertext, especially as realized on computer networks, is a new, rapidly evolving textual medium, gaining wide acceptance. However, "computer poetry" is not a new medium, it is simply a misnomer. Neither is this a trivial

³ Posting to ht_lit@journal.biology.carleton.ca (server: subscribe@journal.biology.carleton.ca), March 28, 1995.

matter of terminology. It is important to make it clear that literary developments in cybertext are not constrained by hardware technologies themselves; they are constrained only by software, which is an *authored* delivery medium. Apart from these constraints which are surmountable through engineering, there are those produced by, as it were, a false consciousness generated by the ideology surrounding the current use of computer-based systems.

For example, we still expect our systems, our new media, to produce forms which are stable, closed. Hypertext in its most familiar link-node manifestation is limited and sometimes self-limiting. There are developers and authors of hypertext who argue that despite these limitations, the medium has opened up huge spaces of unexplored potential for creative activity. Thus, it is time to recognize a new medium, define and accept its limits, and so proceed to exploit the space it has marked out. Unfortunately for this view, the computer, the underlying hardware on which hypertext systems are realized, does not have fixed functionality and is increasingly easy to reprogram. Thus, for example, as a poetic writer with fairly extensive (but far from professional) programming skills, I can break through the boundaries of link-node hypertext with relative ease. The forms of both delivery and artistic media change under my fingertips and before your eyes, allowing, for example, greater reader-interaction with the work than is typical of most hypertext. This introduces a new element into the critical understanding and assessment of new literary objects. We must begin to make judgments about the composition of their *structure* — to assess, for example, the structural design or composition of the *procedures* which generate literary objects — not only the objects themselves. The poet must come to be judged as a sometime engineer of software, a creator of forms which manipulate the language that is his or her stock-in-trade in new ways. This is crucial to criticism, but it also has immediate practical consequences, because a general problem with hypertext is finding your way through it, or rather doing so in a way which is meaningful and enriching. While the poetics of linear paper-based text has been extensively explored, the multi- or non-linear, generalized poetics of texts composed and structured in cyberspace has a long way to go.⁴

4 A generalized non-linear poetics is one of the central concerns of the hypertext poet, Jim Rosenberg. See his introductory essay in Jim Rosenberg, 1993, *Intergrams*. Boston, Massachusetts: Eastgate Systems, published as part of *The Eastgate Quarterly Review of Hypertext*, 1:1. Recently he has also posted a draft discussion of these issues to ht_lit (note 3 above), March 26, 1995.

Multi- and non-linear poetics is a recurring theme in my work for other, more contingent reasons and is one of the concerns

which originally inspired my move into machine modulated writing. As a trained sinologist who did research on parallelism in Chinese prose and poetry, I was well aware of non-linear rhetorical techniques in writing. The computer's programmable screen offers the possibility of representing such tropes and figures directly, and the development of writing for new hypertextual media should also lead to the development and better understanding of non-linear poetics generally.

Finally, there is a question that is more purely a matter of content: the engagement of writers using these new, potential media with contemporary poetic practice (and with writing practice more generally). Few writers who are established in traditional literary media are engaged with the emergent forms and many new writers who are exploring those forms are insufficiently aware of relevant past experimentation, of the huge corpus of highly sophisticated writing which already exists, and against which any literary production — embracing all media — must be judged. I speak chiefly to the field of poetic literature, to encourage deeper engagement of the world of letters with the ocean of potential literary outlawry.⁵

Scoring the Spelt Air

My own first explorations of machine modulated poetics began in the mid 1970s when personal computers first became widely available. It is clear that the computer's programmable screen provides a way of "scoring" the presentation of literary compositions which are intended to be read silently. Within a relatively simple authoring harness, the writer has the possibility of presenting the words of a text according to the rhythms of his or her inner ear, in terms of the speed at which words appear on the screen, the positions in which they appear, the pauses between them and between phrases or lines, etc. There is also the possibility of exploring dynamically (in real time), non-linear aspects of a poem's rhetorical structures, by scoring its component words and phrases in alternate orders designed to highlight such structures. The most finished result of these investigations is the piece, *wine flying: non-linear explorations of a classical Chinese quatrain* (figure 1).⁶ A collection of techniques for this scoring approach to poetic presentations on programmable machines is a software harness for developing such work, a still uncompleted project, with the general title, *Scoring the Spelt Air*.⁷

5 Potential Literary Outlawry or PoLiOu: potentially, a name for a broad range of experimental literary activities which are engaged with their own representation in cyberspace and with the particular capabilities which this new form of representation may offer. Clearly, the name makes explicit acknowledgment to both the anticipatory plagiarisms and the anticipated antagonisms of the OuLiPo (see note 25).

6 Cayley, John. 1988. *wine flying*. London: Wellsweep. *wine flying* was first programmed on a BBC microcomputer in 1983–84. In 1988, it was ported to the Macintosh and HyperCard, which then became my preferred development environment for this kind of work.

7 The project is uncompleted in the sense that the authoring harness has not been prepared for publication, although I have used it for individual works such as *wine flying*. This points to the question of the cybertextual author's engagement in the creation of forms themselves and how this relates to the completed work. At the present time, most of the software forms I make are intimately related to the corresponding finished works, but I can also see that, particularly in the case of non-generative work such as *Scoring the Spelt Air*, the form could easily be detached from any specific content.

rich scarlet
 deepens
 herb path
 faint turquoise
 fills
 mountain window
 envy you
 butterfly
 through dreams
 under flowers
 wine flying

scarlet

turquoise

butterfly

under flowers

flying

Figure 1 Two screen shots from *wine flying* showing the entire text of the translation of the quatrain by Qian Qi (AD ? 722–80) and a screen showing first fragment of an alternative “path” through the poem. The words in this fragment were displayed in the order: “turquoise butterfly flying under scarlet flowers.”

However, text manipulation and generation by machine seemed to me, from the outset, to provide richer potentialities. When a friend wrote me a personal letter at about this time, coded into the acrostic letters of twenty-six words, one for each letter of the alphabet, I immediately set out to program such a simple, and potentially poetic encoding technique.⁸ At about the same time, I produced various text randomizers: experimenting with disordered text at different linguistic levels — sentence, clause, phrase, syllable, grapheme, etc. — and comparing the results. Another important theme underlying this and my subsequent work emerged in the process: an interest in the effects of

⁸ The writer of the letter was Humphrey McFall, whom it is a pleasure to acknowledge.

procedural techniques on closely written "given" texts; a testing and re-testing of the hypothesis that such texts seem to retain the tenor of their meaning-creation even after having been subjected to such transformations, so long as readers of the transformed piece are prepared or prompted to involve themselves actively in the reading process.

All of the work which followed involves the use of some form of semi-aleatory text-generation procedure. These rule-governed procedures are applied to a given text when a reader selects its title from a contents page. The selected piece is then "read" or "performed" by the procedure(s) in a series of screens of animated text. Because of the aleatory factor(s) working within the procedural rules every performance is unique; every reading is different and demands the active involvement of the reader.

I use conventional link-node structures only for the explanatory pages/screens of each work. The generational structures at the heart of the work *could* be mapped onto a link-node model having separate lexia for each word of the underlying given text(s) and with links generated 'on the fly' by the object's generational procedures.⁹ This amounts to one potential realization of the "hypertext *within* the sentence and *within* the word" which the hypertext poet, Jim Rosenberg, has repeatedly called for, and realized himself in widely different ways.¹⁰ However, the usefulness of the link-node model is highly questionable when approaching literary objects such as those developed by Rosenberg and myself.

Indra's Net

It was only in the late 1980s that the technology to present the results of such work in an appropriately designed format became widely enough available to qualify as, at least, a potential medium of publication.¹¹ It was at this time that I produced the first published piece in a new medium of my own making, *Indra's Net*, a title which I used for this piece and also for the series of works which have followed from it.¹²

9 "Lexia" is a term adopted by George Landow to indicate the unit of text at either end of a hypertext link.

10 "I am on record as advocating taking hypertext into the fine structure of language, thereby fragmenting the lexia ..." "Notes toward a non-linear prosody of space," Jim Rosenberg, posting to the ht_lit discussion list (note 3), March 26, 1995; or in a later posting elsewhere, "... my own interest [is] in using hypertext to carry the infrastructure of language itself ..." October 28, 1995.

11 I first gained regular access to a Macintosh computer with HyperCard in 1988, as noted above.

12 Cayley, John. 1991-93. *Indra's Net I*. London: Wellsweep. Details of the other publications in the series will be given as they are first mentioned in the text. All are HyperCard 2.x stacks which are published on disk or over the Internet, currently for Macintosh computers only.

Indra's Net was one of two metaphors which guided the inception and development of this cybertextual project. The concept of *Indra's Net* originates in Hinduism. The net was made of jewels and hung in the palace of the god Indra, a generative representation of the structure of the universe. I first encountered it in a history of Chinese Buddhism: "a network of jewels that not only reflect the images in every other jewel, but also the multiple images in the others."¹³ As a metaphor of universal structure, it was used by the Chinese Huayan Buddhists to exemplify the "interpenetration and mutual identification" of underlying substance and specific forms. In my own work it refers to the identification of underlying linguistic structures which are used to restructure given texts recursively, and so to postulate and demonstrate these structures' generative literary potential; or, on a more grandiose scale, to represent some of the underlying principles of meaning-creation within language itself, those which generate new language in the same way that the universe may be seen to be formed by the falling and swerving atoms of Lucretius.¹⁴

13 Ch'en, Kenneth. 1964. *Buddhism in China: A Historical Survey*. Princeton, New Jersey: Princeton University Press, 317.

14 "But the fact that the mind itself has no internal necessity to determine its every act and compel it to suffer in helpless passivity — this is due to the slight swerve of the atoms at no determinate time or place." Lucretius, *The Nature of the Universe*, Book 2, translated by R. E. Latham (Harmondsworth: Penguin, 1951), 68. The swerve or "clinamen" of Lucretius is also a major reference point for the Oulipo (see note 25), even though the workshop is, generally, suspicious of the aleatory.

15 See, especially: Emmett Williams, *A Valentine for Noël: Four Variations on a Scheme* (Barton, Brownington, Berlin: Something Else Press, 1973) and also his 1975. *Selected Shorter Poems (1950-1970)* New York: New Directions. A selection of Jackson Mac Low's Asymmetries is included in his 1986. *Representative Works: 1938-1985*. New York: Roof Books. His "diastic" technique was used in 1985. *The Virginia Woolf Poems*. Providence, Rhode Island: Burning Deck. See also note 24 below. Cage's mesostics include *Roaratorio: An Irish Circus on Finnegans Wake* (first produced in Paris in 1978) and *I-VI*. 1990. Cambridge, Massachusetts: Harvard University Press. For interesting discussion of these works, see Marjorie Perloff. 1991. *Radical Artifice*. Chicago and London: University of Chicago Press, especially chapters 5 and 7.

The other metaphor which helps to structure my work is taken from holography. The neologism, "holography," is based on the definition of "hologram" in the *Shorter Oxford English Dictionary*: "A pattern produced when light (or other radiation) reflected, diffracted, or transmitted by an object placed in a coherent beam (e.g., from a laser) is allowed to interfere with the undiffracted beam; a photographic plate or film containing such a pattern." This is transposed from light into language: "A pattern of language produced when the words or the orders of words in a given text are glossed, paraphrased, etymologized, acrostically or otherwise transformed, and such transformations are allowed to interfere with the given text; a set of rules, a machine or a computer program which defines or displays such a pattern."

The first Indra's nets were acoustic. *Indra's Net: I* is a sampler of this early work and the terminology used to describe it. I should say at the outset that when I first developed this work, I was ignorant of the earlier or coincidental experiments of Emmett Williams and Jackson Mac Low. John Cage's mesostics were also then unknown to me.¹⁵ William's "ultimate poetry," Mac Low's "Asymmetries" and later, his "diastic" techniques are very similar to what I first termed

“head- or internal-acrostic holography.”¹⁶ However, there are non-trivial differences between all this work and my own which arise from its method of publication, or more precisely the digital instantiation of my work, which allows such generative procedures to be experienced by the reader in real time, as the text is generated, and not after the author has produced and recorded the new text. The procedures thus move closer to the reader, and surely a major component of the appreciation of such work is the reader’s potential understanding of what is going on and how it’s being done. Beyond a real-time experience, the programmable screen allows further intimacy with the process, once a composer has developed meaningful ways for the reader to interact with or even alter the procedures themselves. Moreover, any aleatory or “chance operation” aspect of such work is only *fully* realized in a publication medium which actually displays immediate results of the aleatory procedure(s). Such works should, theoretically, never be the same from one reading to the next (except by extraordinary chance). Mac Low has preserved and published the effects of chance operations through a commitment to the performance of his pieces; software allows these effects to be carried over into the world of silent reading.

Indra’s Net I contains examples of several “free internal-acrostic holograms,” one “strict or head-acrostic hologram,” one “26-word-story head-acrostic hologram” and both holographic and non-holographic “etymoglossological Indra’s Nets.” The latter involve semi-automatic transformations of words from a given text into expanded glosses based on etymologies and associations of words. I will not discuss them further here because they have not yet been developed as have the acrostic and collocational pieces.¹⁷ Neither will I detail the “strict” and “26-six-word story or sentence” forms, for similar reasons.¹⁸ Instead I shall outline what I now call the “mesostic hologram.”

The implication of applying the word “hologram” to a text is that it is generated from material which is contained within itself.¹⁹ The given text is seen as a succession of the twenty-six roman letters, ignoring punctuation, etc. The transformation may begin at any point in the given text. Each letter is, in turn, replaced by any word from the given text which con-

16 It would be interesting to make a catalogue of the precise varieties of *generative* acrostic and mesostic procedures, noting their differences; although this is far beyond the scope of this paper.

17 This technique bears certain similarities to those developed by Stefan Themerson and set out in 1975. *On Semantic Poetry*. London: Gaberbocchus Press. Further details of a number of other potential and (in *Indra’s Net*) as yet unrealized forms can be found in the explanatory material in *Indra’s Net I-III*. These include further etymological and glossological holograms; phonemic holograms (which would generate a form of sound poetry) and morphemic holograms (which I will eventually explore since they would provide a way of engaging a language like Chinese). A forthcoming commission will investigate mesostic transformations from original to translation (in another alphabetic script) and back again.

18 This 26-word form is similar to Williams’s “ultimate poetry” except that in my strict form I try to make a 26-word sentence or narrative (in the traditional order of the letters). An aspect of this form which I cannot resist mentioning is that once, like Williams, Mac Low or myself, you have mapped the 26 letters of the alphabet onto 26 words, it is theoretically possible to encode all of literature acrostically or mesostically — translating everything into a “surface language” of 26 meaningful tokens (with no loss of information). Perhaps alphabetization was once perceived like this, as early scribes moved away from morphemic script elements — as if “book” seemed to present itself as: “house + eye + eye + palm-of-the-hand.”

tains the letter being replaced. This kind of hologram is unlikely to produce anything resembling natural English. Its primary transformational rule is based on arbitrary elements of the script (itself already at one remove from language as a whole) and is, on the face of it, unrelated to any significant aspect of grammar or rhetoric. On the other hand, the notion that words which share letters may, by this token, share something more, is perhaps worth poetic attention. Moreover, the given text may

Figure 2 Screen shot from "Under it all." This is the version of the piece as it appears in *Moods & Conjunctions: Indra's Net III*.

19 Oscar Pastior in his *Poempoesms* (first published in German in 1973) has a more poetic and less formalist approach to such a self-referentiality: "... holography ... to make a text as far as possible such that every part contains the whole. That is an image I hold in front of me." Oscar Pastior. 1991. *Poempoesms*. London: Atlas Press; first publication of Pastior's work in English, as part of *The Printed Head* series, 1:5. Eduardo Kac is another early explorer of the application of holography to literature and vice versa. See his first holopoem (with Fernando Catta-Preta), Holo/Olho (1983), and his remarks in "Holopoeetry and Fractal Holopoeetry." *Leonardo*, 22: 3/ 4, "Holo/Olho (Holo/Eye) ... is a combination of anagrams in which the word holo mirrors olho and vice-versa. The mirroring effect, however, was conceived so that fragments of the poem would contain enough letters to form the entire meaning: both holo and eye. The arrangement of letters in space was holographed five times; each hologram was fragmented and the five holograms were reassembled in a new visual unit. This holopoem was an attempt to recreate, in its own syntax, a structure that would correspond to the holographic model, according to which the information of the whole is contained in the part and vice-versa (399) ."

white absences
particularly notice
imperative awake
delicate intimate
designs sleeping

intimacies

be adapted or composed with an eye to the transformation which is to be imposed upon it. This was undertaken in the case of "Under it All II," the central piece of *Indra's Net I* (figure 2). As far as possible all of its nouns are plurals and all verbs agree with the third person plural. This means that new, derived phrases are more likely to be natural collocations.

An advantage of using software to produce this kind of work is the relative speed at which texts can be generated, allowing an experimental phase in the process of composition, with the results of earlier experiments fed back into the finished publication. The development of the Indra's Net project generally, has been just such a process.

Indra's Net and visual poetry

Mesostic work is inherently visual, in the sense that textual choices are based on the identity of graphs in the written form of the language. Moreover, early on, it became apparent that this type of text generation implied a structure that could be represented in three (or more) dimensions. The flexibility of typography on the computer screen allows the instantaneous production of typographical effects which would be very difficult to reproduce on paper. A simple example is the use of emboldening to highlight the letters of the word(s) of the *underlying* given text after a mesostic transformation has been applied. From the collection, *Collocations: Indra's Net II* this emboldening is applied to letters on the screens, as they are generated (*figure 2*).²⁰ A special rendition of *Golden Lion* was also published in paper form in what is a piece of visual poetry in fine printing, as well as a snapshot of cybertext.²¹

It is possible to conceive of more than one implicit three-dimensional space defined by (twenty-six) planes of words which share the same letter. One of these is represented on the cover of a paper publication which accompanies *Collocations*.²² Later I produced a poster

poem of the entire text of "Under it All" in which tone was used to imply this three-dimensional arrangement of words (*figure 3*). Each letter of the alphabet is assigned a particular weight of tone — a the lightest, z the darkest — placing it, visually, on a separate plane at a particular distance from the viewer. Each word from the text is printed in the tone which

20 Cayley, John. 1993. *Collocations: Indra's Net II*. London: Wellsweep.

21 Cayley, John. 1995. *An Essay on the GOLDEN LION: Han-Shan in Indra's Net*. Edinburgh: Morning Star Publications. See the discussion of *Golden Lion* below.

22 Cayley, John. 1993. *Under it All: texts, holography, afterword*. London: Many Press. This little book was published in an edition of 221 copies, each of which was unique. Four separately prepared pages bound into each copy consist of unique samples from two holographic transformations.

winds rains waking how many petals must have fallen silent sleeping forms points on blank white canvases all possible curves problems far beyond our artists capacities to resolve consider these our small children who awake see their sleeping parents doors ajar enter their rooms bright warm summers mornings all coverings abandoned except these sheets which trail their sculpted folds over partially concealed limbs and lie beneath white sheets whose pure brilliancies children particularly notice their parents barely sleep enjoy still teasing promises of deeper slumbers return our children know their parents now are dimly conscious of days approach notice underlying sheets once more plain white completely silent tender relations of bodies lying which children believe they fully understand they long to express perfectly follow lines linking these bodies then draw their parents intimacies towards themselves but see sheets infuriating pure white absences feel everything so still our children forget ignore lines points on linen canvases know nothing of bodies curves intimate designs sleeping forms are painfully aware even were they able to hold in mind draw these forms towards their hearts eyes hands still too young too inexperienced to follow lines of intimacies they pursue children artists with their own unique imperative visions committed to their most perfect realizations what can our children do they need methods processes techniques children jump into beds between upon their parents pummel with shrill words tiny fists limbs twist flail make demands hairs pulled tangled gentle bruises taunts scratches endless demands somewhere scant traces delicate structures remain dreams slip away their parents attempt to smooth refashion frayed crumpled forms lines so many so delicate once so finely drawn these alone remain white sheets beneath above affections storms break threads split lines shear successive gales all these which slip away with dreams gather lines forms show through within against their tender tempests tattered destroyed returned to days lights winds rains waking how many petals must have fallen

Figure 3 Scaled-down, monochrome version of the "three dimensional" poster poem of "Under it All."

23 An animated version for HyperCard is in the works, and there is a plan for an installation to project words onto mesostic planes, realized as a set of 26 transparent screens hung to suggest a large cubic word space. Read from its front through the 26 layers, fragments of a given text would be legible as the text was generated and projected words onto the planes. But moving around the cube, other mesostically-deter-mined orders of words would present themselves.

corresponds with that assigned to one of its constituent letters, according to simple rules intended to distribute and use up all of the twenty-six tones. Such representations could be animated and translated for the computer screen or a computer-controlled installation.²³

Collocations

Results of the experimentation with the collection of pieces in *Indra's Net I* indicated two principles for further development: (re)composition of given texts in preparation for procedural transformation, and composition, through software engineering, of the procedures themselves.

Collocations: Indra's Net II contains the first publication of a collocational procedure which is simple, extensible and rich in generative potential.²⁴ It was originally devised as a way of enhancing the syntactic naturalism of the mesostic pieces

by restricting, where possible, the collocations (syntactic linking of words, here in simple pairs) generated by mesostic pieces to collocations which occur in natural English, specifically the given text(s). Thus, once the primary mesostic rule is satisfied, if it is possible to find a word from the given text which collocates with (follows) the last word chosen by the transformation, then this is always selected. The version of "Under it All" included in the *Collocations* suite exemplifies this double procedure (*figure 2*).

However, *Collocations* also includes the first collocational procedure applied to a text without prior mesostic transformation, the piece, "Critical Theory" (*figure 4*). This tranformation can

proceed beginning with any word in the given text, which we then may call “the word last chosen.” Any other word — occurring at any point in the base text — which follows (collocates with) the word last chosen may then follow it and so become in turn the word last chosen.

Clearly, in this type of transformation, at the very least, each pair of successive words are two-word segments of natural English. However, the text will wander within itself, branching at any point where a word that is repeated in the base text is chosen, and this will most often occur when common, grammatical words are encountered.

dim minimal abstraction
they welcome the eye a
tableau but insist on a
temptation to make

Collocations also includes a sampler of earlier work and one essay in another transformational algorithm, which is based on suggestions of Harry Mathews.²⁵ In one of these accompanying pieces, a mesostic abecedarian sentence of twenty-six words — containing the letters a to z in turn — is extracted from the given text of “Under it All.” The sentence is difficult to construe. It is used to transform, mesostically, first itself, and then the text of “Under it All” and then “all literature.”²⁶ Mathew’s advice is indicated to attempt to construe the sentence. Synonyms are gathered for all its words and then the system is allowed to follow the syntax of the sentence, picking the gathered synonyms in place of the original words. This transformation could be developed much further.

Figure 4 Screen shot from “Critical Theory” in *Collocations: Indra’s Net II*.

24 Here, a line of similar and in some respects, parallel work (which did not directly influence my own until recently) runs from the text-scrambling program “Travesty” by Joseph O’Rourke and Hugh Kenner, intersecting with Mac Low at the point of his *Mertzgedichte: in memoriam Kurt Schwitters, February 1987–September 1989*. (Barrytown, New York: Station Hill, n.d. [1994]). During the composition of his *Mertzgedichte* in mid-1989 Charles O. Hartman sent Mac Low several computer programs including “Diatext” and “Diatex4.” He also started to make use of Hugh Kenner and Joseph O’Rourke’s “pseudo-text-generating” program “Travesty” at about this time, to create some of the poems. However, “All out-puts were subject to rule-guided editing.” (Sleeve notes for the audio CD, *Open Secrets* (New York: XI, Experimental Intermedia Foundation, n.d. [1994]).

25 Mathews, a member of the OuLiPo, outlines his version of the procedure in 1988. *20 Lines a Day*. Elmwood Park: Dalkey Archive Press, 90. The OuLiPo, or Ouvroir de Littérature Potential, is clearly a basic reference point for cybertextual developments given the workshop’s profound and ludic investigations of the relationship between mathematics and literature, constrictive form, combinatory literature etc. See, as an introduction: Warren F. Motte Jr. editor 1986. *OuLiPo: A Primer of Potential Literature*. Lincoln and London: University of Nebraska Press. However, the OuLiPo has, at best, an ambiguous attitude to the aleatory as an aspect of generational, constrictive or combinatory procedure.

26 See note 18 above.

Moods and conjunctions

The following three works in the Indra's Net series, *Moods & Conjunctions*, *Golden Lion* and *Leaving the City*, do not introduce significant innovations in the technology of the form, that is, in the delivery medium itself. Instead they fill examples of existing forms with content. Content is offered up to the generative algorithms in a slightly different way in all three works, however, since they all set out from *multiple* given texts. The texts may be blended together in the generational process, or one given text may be transformed in terms of another. Although the content of these works is composed and selected as appropriate to the new potential medium, their significance, in so far as this is conceded by their readers, lies in that *formed content*. This is an important point to recall. In the world of new media there is constantly the necessity to remind ourselves that novel literary technologies are not, ultimately, developed for their own sake. The works they generate or simply frame must be judged in the context of literature as a whole, as works inscribed as content-in-form.

"Moods & Conjunctions" is the title piece of *Indra's Net III*.²⁷ "Moods" consists of two texts about sex and one about language. One of the two pieces on sex is simply composed of fragmentary clauses made from 1) the pronouns I, you and we, 2) the modal auxiliaries and 3) selected adverbial and interrogative conjunctions ("then" has also been allowed). The collocational procedure is applied to all three pieces, such that phrases from one text continue with words from the others. The piece will vary its style and tone considerably. In particular the modal given text has a completely different tone which disrupts the expository prose of the other two given texts as the piece progresses.

Before *Moods & Conjunctions*, reader interaction with procedures and pieces was restricted to exploring explanatory - pages, selecting pieces to be generated and the ability to interrupt a piece and set it going at a new point in a particular reading. From "Moods," new ways of interacting were introduced, allowing greater reader involvement with the generation of text. Pieces in *Moods* allow the reader to increase or decrease the likelihood of a collocational jump taking place (e.g., from one occurrence of the word "and" in a text to

27 Cayley, John. 1993-94. *Moods & Conjunctions: Indra's Net III*. London: Wellsweep.

another). By moving a pointing device attached to the computer as text is being generated, the aleatory weighting is changed. The further to the left the pointer is moved, the more likely the scripts are to force a collocational jump. As the pointer is moved to the right such jumps become less likely. If it is moved to the extreme right, no jumps are allowed, effectively reading through the given text(s) in a normal linear fashion.

Golden Lion, is based on two given texts.²⁸ "Han-Shan in Indra's Net" is a short original poem. The second text, "An Essay on the Golden Lion," is the translation and adaptation of a prose work by the Chinese Buddhist monk, Fazang (AD 643-712). "Golden Lion" is a mesostic transformation with collocational constraints (as described above), but here the letters of the poems are transformed, one by one, into words of the essay. In the display, a half line of the poem is shown on the bottom of the screen, with words from the essay above, showing the poem's letters emboldened (*figure 5*). The effect is to produce a commentary on the poem in the words of the essay, where the commentary has the poem itself embedded within.

Figure 5 Screen shot from *Golden Lion: Indra's Net IV*.

multiplying everything casting
everything existence in from one
moment to another infinitude and
so produces greater perfection
everything is substance endlessly
multiplying with content integral
lion the

Leave me the space between

Leaving the City takes two distinct given texts and blends them using the collocational transformation.²⁹ One text is a long translation from a talk on poetry and language given by the Chinese poet, Gu Cheng (1956–1993), at the School of Oriental and African Studies, University of London, in 1992. The other text is a shorter piece which attempts to come to terms with the brutal events which ended the lives of both Gu Cheng and his wife, Xie Ye on 8 October 1993.

While developing these three works, it became clear that it would be possible to do two new things with the texts as they were generated, allowing much greater reader interaction. Each time these pieces are read on screen, they are different because of the chance operations. However, it is relatively easy to allow the reader to collect phrases or lines of generated text. This allows them to produce a third kind of text, (similar to the edited cut-ups of earlier writers like Burroughs and Gysin), not composed by anyone, but selected and arranged.³⁰ However, the cybertextual system also allows the selected phrases to be *added* to the given text, thus augmenting the possible collocations that may be picked by the procedure in subsequent text generation. The procedure “learns” new collocations and alters itself. The reader’s copy of the work becomes unique, different from every other copy. These potentialities

were realized and published in the next
Indra’s Net, Book Unbound.

Book unbound

When you open *Book Unbound*, you change it.³¹ New collocations of words and phrases are generated from its given text according to the collocational procedure. After the screen fills, the reader is invited to select a phrase from the generated text by clicking on the first

I each shaped breath tells real time is concealed
 beneath the cyclical ET behaviour of clock and time
 piece lost warmth EE true cold spelt out
 and no breath like this last
 even as E... T II the last breath
 speaks forever the no moment
 like any other wind demon previous or
 subsequent R A moment and yet
 the clock applies time entropy the same name
 to many destroyed under a different
 instance L N of control
 III she destroyed L clock time bigben
 mother of parliament speaks a simple
 language unfraternal S I at cathedral transept
 on church tower O face tolling everywhere
 the speaking clock so unlikely to repeat itself

IV each moment appears to be given a unique name
 the city ran on local ET not mean time
 town hall clock EE E with a second
 minute hand ahead east of its capital
 V what if E... T every clock
 was like unique moment the speaking clock
 she’d never would become known
 this season here R A wild flower
 briefly given with painted trillium
 high bush the awareness cranberry
 each bird N each animal
 indignant L at this presence
 VI day lengthens under sun
 if it was impossible S I to apply a single name
 from a finite set O to a moment
 which seems to recur in an acknowledged cycle of time

29 Cayley, John. 1995a. *Leaving the City: Indra’s Net V*. London: Wellsweep.

30 William Burroughs and Brion Gysin. 1960. *The Exterminator*. San Francisco: Auerhahn Press. Sinclair Beiles, William Burroughs, Gregory Corso and Brion Gysin. 1960. *Minutes to Go*. Paris: Two Cities Editions.

31 Cayley, John. 1995b. *Book Unbound: Indra’s Net VI*. London: Wellsweep. *Book Unbound* was also included in the CD ROM issue, number 3, of the arts magazine, *Engaged*. London, 1995.

and the last of a string of words. These selections are collected on the page of the book named "leaf," where they are accessible to copying or editing. They also become a part of the store of potential collocations from which the book goes on to generate new text. The selections feed back into the process and change it *irreversibly*. If the reader continues to read and select over many sessions, the preferred collocations may eventually dominate the process. The work may then reach a state of chaotic stability, strangely attracted to one particular modulated reading of its original seed text.

The speaking clock

The recently completed *Speaking Clock*, is a mesostic piece which tells the time. It acknowledges Emmett Williams's "Poetry Clock" and the mechanical "Word Clocks" of John Christie, but this digital clock tells the 'real time' in language, by performing a mesostic transformation on a 365 word given text. The words are arranged around the clock face on four screens. The digits 1 to 9 are mapped to the most common letters in the given text as "etanioslr." The date in the form "mm/dd" is shown with time in the form "hh/mm," by choosing words from the given text which contain the "digit letters" and embold- ening these letters on the screen. The

VII or lies time affects to stand still
 what if it was impossible ET to apply the word dawn
 to more than EE one single instant
 at the beginning of particular day E... some one
 of recurrence time changes T VIII would the cycle
 to distinguish nameless demon become less easy
 the awareness R A of decay would it sharpen
 until it was concealed beneath unbearable
 present the end the cyclical of her time here
 on this island L N IX would she
 become more conscious
 of mortality if she were denied
 the sense that S I she constantly returns
 to a previous state O of existence
 with the same name in the cycle

X no time for her self would life as time
 be bearable time changes ET nameless demon
 to be destroyed EE E in the dream of a place
 she has left forever the wind flows
 XI into each cabin E... T of memory falls
 the unique name left forever for the unique
 moment the unique would become
 impossibly R A infinitely complex
 elaborate and moment the ironic
 a futile and last destroyed the inscription of
 struggle against L N XII or plucked
 entropy a procedural system
 from chance like this speaking clock S I gives the illusion
 of real time passing O flake of snow
 white noise and riverflow inscribed on a piece of time

digit letters are arranged around the clock face to indicate the simple mapping of letters to numbers and one of the clock face positions will be emboldened to show (roughly) the seconds after each minute. Zero is represented by a word with no bold letter. A ludic piece, with at least one serious point to make about the language of time, it has shown itself to produce some richly evocative phrases (figure 6 a–d).³²

Figure 6 Four seasonal screen shots from *The Speaking Clock* show the times: a) 12:11, b) 12:14, c) 12:20 and d) 12:26, all on 1 November, 1995.

32 Cayley, John. 1995c. *The Speaking Clock: Indra's Net VII*. London: Wellsweep. "Real time is concealed beneath the cyclical behaviour of clock and time piece. No moment is like any other ... and yet the [traditional] clock applies the same 'name' to many a different instance." *The Speaking Clock* affects to give a unique name to every moment.

(Plastic) literary objects

While, in terms of reader interactivity and constructive, automatic generation of text and intertext, *The Speaking Clock* might seem a retrograde step, in terms of its presentation as a self-explanatory work, I feel it takes a step forward towards current work in progress. The poem as a form, despite the wide range of potentialities on offer in the world of contemporary poetics, is recognizable as such. It is framed by various conventions of publication but, even outside these conventions, it requires little explanation before it is recognized for what it is, leaving aside the question of its readability. On the other hand, in the current state of development, the cyber-textual object pretends to require a great deal of supporting explanatory text. This is perhaps inevitable, in the same way that we might have been overly fascinated by the technicalities of cameras and projection devices during the early history of the cinema, and since there is no escaping the requirement to write sets of instructions for using relatively unfamiliar machines.

However, hypertext systems are now, arguably, familiar enough to allow for the creation of cybertextual objects designed to subsist and operate without extensive explanatory framing. Hence the *(Plastic) Literary Objects*, which will be a series of literary applications, run on a computer in the way other applications and programs are run. They will generate text if left to their own devices and also respond to any of the recognized events produced by the standard peripherals of today's computer systems, chiefly keyboards and pointing devices. They will shift their textual modulation from one type of transformation to another. They will learn — selectively — altering their content and also the processes of textual modulation in response to reader interaction. They will be designed as forms which can be easily filled with new textual content which may be composed or selected by their readers, who will thus become co-authors, in the form, of new (Plastic) Literary Objects.

There is no obvious way to conclude such a presentation of a body of work. The question of the work's value has been bracketed in order that its formal engagement with experimental poetics and technological innovation remains the focus of attention, and because it is somewhat easier for a

writer to discuss the formal aspects of his or her work — without prejudice. However, the narrow formal attention that is a function of the exploration of new media must ultimately broaden and engage with wider critical perspectives. Programming is intimate with composition in all of this work. Its content-as-form is inherently protean, in a way that corresponds with the shape-shifting, multi-functional qualities of computer-based systems generally. It points to an area of potential literature which is radically indeterminate (not simply the product of chance operations); which has some of the qualities of performance (without departing from the silence of reading); and in which readers can extend the usual interpretative relationship with a text by exploring, configuring and even permanently adding to the literary objects of their attention.³³ This not only takes us beyond the bounds of the codex, but subverts the links and lexia of hypertext, leaving us to explore the indeterminate, unbounded literary potential of cybertext.

33 I owe this characterization in part to Espen Aarseth, who in "Text, Hypertext or Cybertext: a typology of textual modes using correspondence analysis" (forthcoming in *Research in Humanities Computing*, 6, edited by Susan Hockey, Nancy Ide and Giorgio Perissinotto, Oxford: Oxford University Press), has developed a (media independent) "generalized model with a few broad categories that can describe the main differences of textual phenomena." He argues convincingly for a distinction between cybertext and hypertext, putting forward the former as an inclusive term embracing, for example, indeterminate or reader-constructed texts, and reserving hypertext for (passively) linked structures of static lexia (textual nodes).