Scholarly Hypertext: Self-Represented Complexity

David Kolb
Department of Philosophy
Bates College
Lewiston ME 04240 USA
Tel: 207 786 6308
E-mail: dkolb@bates.edu

ABSTRACT
Scholarly hypertexts involve argument and explicit self-questioning, and can be distinguished from both informational and literary hypertexts. After making these distinctions the essay presents general principles about attention, some suggestions for self-representational multi-level structures that would enhance scholarly inquiry, and a wish list of software capabilities to support such structures. The essay concludes with a discussion of possible conflicts between scholarly inquiry and hypertext.

KEYWORDS: Hypertext rhetoric, argument, scholarship, typed nodes, typed links, self-representation

1 SCHOLARLY HYPERTEXTS

If we classified all the hypertexts in use, most would be networks of information that are either in the process of being organized or are being consulted. Tremendous effort has gone into discovering manual and automatic linking strategies to organize information and make it efficiently manipulable.

On the other hand, there are literary hypertexts whose goals differ from the organization and delivery of information. These texts experiment with new modes of writing; they break traditional linearities of narrative and form; they offer adventuresome modes of encounter and ongoing textual re-definition. Theorizing about and production of literary hypertexts offers the most compelling evidence for Landow's suggestion that hypertext bears important relations to views about writing and culture found in recent critical theory [20].

There has been less discussion of what I'll call 'scholarly' or 'inquiry' hypertexts. If talked about at all, these tend to be equated with informational hypertexts, but they are significantly different. The neglect of scholarly inquiry hypertexts may be because literary writers equate them with linear critical essays, while scientific writers presume that scholarly writing will be handled as the Web was originally designed to do: individual lexia will be scientific papers or their equivalents, with links offering cross reference to evidence and to related papers. Also, many interested in electronic writing view hypertext as a possible escape from moribund scholarly writing seen as dedicated to the preservation of hierarchy and rigid trivialization. "Expert language is a prison for knowledge and understanding. A prison for intellectually significant relationships. It is time to move beyond the institutional practices of triviledge" [41].

I want to argue that there should be a mode of hypertext writing that is neither avant-garde literature nor organized information, but more akin to scholarly inquiry in the humanities and philosophy.[1] This has unique formal features of its own that may highlight new possibilities for hypertext in general.[2] Some of these features could be better implemented in hypertext. Doing so might both inspire new hypertext forms and enliven scholarly inquiry.

---

1 We should question the universal applicability of Schneiderman's Golden Rules of hypertext ("(1) A large body of information is organized into numerous fragments, (2) The fragments relate to each other, (3) The user needs only a small fraction at any time" [32]). These presuppose that the hypertext is to make available units of information that can be put into one node each. Neither literary nor scholarly hypertexts fit this model.

2 My threefold division of hypertexts is somewhat tendentious. Stand-alone hypertexts can be classified according to their primary use. But as hypertexts get larger and the environment allows more interconnection, links are likely to be established among large hypertexts so that one may be part of another for a given reading. My distinctions could also be attacked in an imperialistic way, claiming that all text is basically literary [34]. But this turns on an argument "in principle" that does not contest functional differences between different types of text in daily use.

However, 'scholarly' is not always a positive appellation. Scholarly writing is often stigmatized as dead, linear, lacking imagination, protective of boundaries, using rigid methodology to destroy creativity. Nor is there any lack of examples that fit the accusations. But over time inquiry does change. A community of inquirers forms around agreement on methods, a set of questions, and relevant options and methods for answering them. This is akin to what Kuhn called "normal science" [18]. Such normalization accounts for the deadening effect of much scholarly writing, but also for its progress. For, as in science, these normalizations eventually produce revolutions. People come to question their presuppositions, principles, and criteria. A field like philosophy or literary criticism may be more or less permanently in revolution, but in all fields inquiry continues and the revolutions come. In the humanistic studies the revolutions usually cause a divergence from rather than a replacement of the older discussions. So scholarly inquiry writing has never been as linear as people claim, for its real existence is not as the isolated article but as the contentious library. There it is already inter-linked in complex and rival ways through bibliographies, dueling evaluative summaries, competing authorities, and so on.

So let us not conceive the scholar too narrowly. The paradigmatic scholar, the classicist studying Greek and Roman literature or history knew the books, could trace the references, make the connections. What becomes of such a scholar when automatic concordances and automated searches start to replace the scholarly memory and perhaps automated linking makes the connections? Memory was never all of scholarship; there were also those who reflected on what was being said, who changed the templates, asked new questions, saw the texts in new ways, found new relations and made connections across borders. Those skills are still needed and they are not best described as the management of information, because they debate the criteria for what is to count as information. How do we get that debate into hypertext?

While I mean to raise issues concerning hypertext in general, I am speaking as someone who creates neither knowledge bases nor literary texts, but rather argumentative inquiry. In particular, I come from philosophy, which has an uncertain relation to the scholarly essay and a long feud with literature. Philosophy has always been given to self-reflection and self-criticism of its own presuppositions, and this influences how I describe scholarly activity. In philosophy it is very evident that 'inquiry' exists as a multiplicity of contending voices mutually including one another and constantly turning back on themselves in an always incomplete self-reference.

The obvious features of scholarly inquiry are questions, assertions, argumentation, evidence, and a community of inquiry to which the writing is submitted for judgment. This model is familiar to us from science, and the differences between humanistic discussion and science are themselves matters of dispute. At the least, there is more continual self-reflection and more global self-criticism, more divergence and less straightforward addition or subtraction from a knowledge base. And less agreement. Important formal features are on-going self-representation and debate about criteria for argument and organization, without any clear or stable hierarchy within which to locate such debate.

Assertion and argument make inquiry different from literature. Stuart Moulthrop says that "the act of reading in hypertext is constituted as struggle: a chapter of chances, a chain of detours, a series of revealing failures in commitment out of which come the pleasures of the text" [29]. Reading literary hypertexts creates contours of meaning that emerges from the field of the text. This is not enough for assertive inquiry. The pleasure of the text is not the only goal. Literary productions do not relate to one another as assertions do in inquiry. The question whether or not there is a basis for a universalistic ethics is asked for more than the pleasure of the text. As are: Might Quine be right about the analytic/synthetic distinction? Did Van Gogh paint this canvas? And there are other questions where most of the discussion might be about what criteria could ever certify a possible answer: What is the value of art? or What can we learn from the fall of Rome? Writing about such questions involves claims and judgment, as well as ongoing debate about the form and criteria for the discussion as we engage in it. These are different from both the management of information and the pleasure of the text. The landscape this writing creates is complexly self-connected and we seek not only to explore it but to create new dimensions, new stakes.

I want to ask how in hypertext we might allow not just connection but assertion, self-representation, and debate about criteria. How do we perform these in hypertext, and how make them available for discussion and judgment?

Hypertext theorists, if they think of scholarly inquiry, often see hypertext's task as the organization of a new and improved library as a web with live cross-references, links back and forth between articles and their predecessors and successors. But such a hyper-library could just assemble current scholarly forms, which are best suited to a different institutional framework and rhythm than what is now developing. A hyper-library is not yet a hyper-text.[1]

---

1 Producing the hypertext library is surely important, and we understand the difficulties of indexing, of automatic link creation, of classification, issues librarians have studied for years, not to mention the digitalization of unthinkable amounts of past data--which is important since humanistic inquiry does not outpace its

The hyper-library is not what I want to deal with in this essay. I want rather to ask *what else* hypertext might do for communal inquiry. Could it affect not just the linkages among works in the library but the works themselves?

We are here discussing such issues in linear conference essays because it is efficient to do so. But our discussions are beginning to live in a new context that will alter their ecology, and there will be new genres. Can hypertext be one of them? Is there a way to do inquiry in a "native hypertext"[28]?

Or is native hypertext to be restricted to either the management of information or associative modes of writing? There should be other alternatives. We should not leave argument, assertion, critique, self-reflection and self-criticism behind as we move into the new media. We need to find out how to do such actions in new ways.[1]

What interests me most is whether we might create new modes of reflection, new ways to organize inquiry, and new intellectual objects. I wonder about new forms of writing which would be like literary hypertext in that some discursive effects would occur in the landscape and its traversal rather than inside individual lexias or across one-step links.[2] Might new intellectual moves be possible in these freer spaces? Perhaps even a new structure for inquiry that was not just the point-counterpoint of traditional debate.[3]

Hypertext can do *better* some features of scholarly inquiry.[4] Hypertext offers space for ever new dimensions of writing. It could offer new ways for self-representation and self-criticism. And it offers these together with a structural refusal of authoritative meta-positions, through their endless proliferation and mutual inclusion. This one feature alone already fights against the rigidification of inquiry.[5]

In the next two sections I discuss two prerequisites for developing such new intellectual objects and discursive moves: regions and multiple self-representations.

2 ATTENTION AND STRUCTURAL EVENTS

Hypertext theory often talks as if the unlimited dimensions of hypertextual composition could offer endless reading. But our time here is limited. And attention is a scarce resource. Not only does our attention flag, but action and policy cannot be postponed indefinitely. We can create hypertextual structures sprawling as far as we wish, but in reading them we have scarce time and limited attention. James Joyce may have wanted perpetual insomniacs to devote their life to reading *Finnegans Wake* but most of us will find less dedicated readers. We have to think about structural emphasis and movement in hypertext, but print conventions are inadequate to the possibilities of the medium. How do we compose hypertexts that can do inquiry that has no simple limits, that turns on itself, that always has other questions, and yet remains readable?

Every node cannot demand equal attention to itself, or attention will fail. If everything has equal emphasis, nothing has much emphasis.

A hypertext must be more than a sequence of random associative links. If anything at all can follow this node, there will be no play with expectation, so attention will get more difficult to sustain except by ever more extravagant moves.

---

past as does scientific literature, and thus needs references to old texts.

1 For discussion and tentative examples of such moves see [16]. About forty percent of the long hypertext in [16] was published as an essay in [22]. Some of the background assumptions can be found in [15, 17].

2 My interest in such possibilities was sparked by my philosophical work with Hegel and with other thinkers, such as Derrida, for whom philosophy should lead not to the presentation of isolated results but to an understanding embodied in a movement that cannot be confined to one static proposition or argument.

3 This issue is difficult to conceptualize. Must the overall form of inquiry be the confrontational point-counterpoint of standard scholarly dialogue? There are forms hypertext could assume that would not be essays or monographs but would still assert and judge in dialogue. Could there also be forms in hypertext that give the overall inquiry a different structure than point-counterpoint? Could there be other movements that are equally as thoughtful and inquiring as confrontation and commentary? The Socratic and Peircean answer affirming the ultimacy of question-and-answer argument is generally accepted but it has been questioned not only by anti-foundationalists since Nietzsche [33], but also by foundationalists in the dialectical and phenomenological traditions.

4 As Bernstein comments with regard to the opening chapters of Thucydides,"Linearity was never an option for historical writing; hypertextuality can make complex structure concrete, clear and responsive to both the author and reader" [2].

5 "As Kaplan and I have observed in working with students, electronic writing complicates the work of literary criticism. A critical project set up within a hypertextual network becomes an intimate and integral part of the work it tries to anatomize. In its root sense, "criticism" implies a separation of one discourse from another; but in hypertext this primary agenda runs into difficulties" [29, 30]. Versions of this failure to establish a secure meta-discourse are common in philosophical inquiry, though not through direct hypertextual inclusion.

If emphasis cannot fall equally on all nodes, then hypertext rhetoric must be more than a sequence of one-step links. Emphasis should occur on different scales. Besides individual nodes, patterns may extend over many links, and may themselves be the objects of emphasis and self-description.

Investigations in music indicate that sequences of randomly chosen notes do not hold the listener's attention. Sequences ("brown music") where the choice of each note is somewhat constrained by neighboring notes sound better, but still lack the attraction of more composed music where there are complex relations among more distant parts of the piece.[1]

Hypertext suffers this problem when the horizon of reading is too close. Musical compositions go beyond this kind of linkage to create rich and complex temporal and formal and thematic connections to other sections of the piece in many different levels and sizes. Hypertext could do the same with sequences and nodes that are not just influenced by their immediate neighbors. There should be large structures, echoes, returning themes, transformations and recapitulations and variations, but without a fixed linear framework of reading. Literary hypertexts strive for this; scholarly hypertexts must learn how these kind of structures might be appropriate for their inquiries.

Hypertext thus offers possibilities for exciting complexity. Compare this with the movement of entertainment multi-media that emphasize serial intensities and must become more and more 'loud' to keep attention engaged. Such structures are inadequate for inquiry. Replaying a video game brings increased familiarity and skill, but little new insight. Rereading a hypertext should do more for thought and feeling. We should not substitute association for all kinds of questioning and discursive moves.

3 REGIONS AND SELF-REPRESENTATIONS

To manage emphasis and attention in extended thought, then, hypertext needs what music has: different kinds of unities on many levels that interact with each other in complex ways. The single node should not stand alone, nor should a single level of linking. There should be larger structures and discursive moves as well as ways to become aware of them and their relations and links. We are familiar with discursive moves such as making an assertion, giving backing, offering alternatives, contesting a question, expanding a topic. Less familiar are moves might be undermining a duality, raising questions about criteria, ironic parody, showing internal tensions within a set of concepts, and the like. Are there new moves possible in hypertext that might take advantage of more expansive and self-reflective linking?[2]

Linkage and inclusion are not new in inquiry; the library is full of links and quotations. What's new is the density of links, with miscegenational linkage and full-scale mutual inclusion that crosses borders. What's new is the tempo of writing and connection, and the ability to include any number of self-representations and self-commentaries in different dimensions, and yet, despite the distance one may have traveled, to bring these to bear with a single link back.

A complex discursive move could be made by a locality composed of many nodes. There could be a region that is an explorable landscape whose links and transitions are meaningful in themselves but also contribute to the regional effect. Such units of meaning could have complex internal structures and external relationships. There could also be partial localities. Or a region might itself be a node in some larger move or gesture. As in nature, units of meaning would occur on many scales.

Jim Rosenberg has argued for the importance of hypertext "episodes" [37]. When I speak of a "region" I mean something different. Rosenberg's episodes take form in the mind of the reader, and embrace nodes that need not be related "in the text." I am concerned with structure that is not necessarily gathered in one reader's mind but is there in the link or relation patterns. Not the hypertext as read but as readable. On the other hand, Rosenberg's idea of "the episode as a virtual document" suggests regions as units with sub-units, and I agree strongly with his claim that "meaning is not just a function of the lexia, but happens as we move through the links" and his plea for "hypertext as a medium of thought . . . [not] as a medium for organizing . . . linear thoughts which are not themselves hypertexts."[3]

---

1 I remember these results as reported in *Scientific American* but its indices contain only [11], which mentions similar issues but is not the article I recall.

2 What I here call "discursive moves" might be termed in philosophy "speech acts," though there are some difficulties with the individuation of speech acts (see the debate in [5]). Motion is not pure passage; this is one reason why I have sometimes used the word "gesture" for the discursive moves in hypertext.

3 The discursive moves and gestures I have in mind mostly involve relations among already syntactically complete propositions. I am concerned with expanding and making explicit the types available for discursive moves. The "simultaneities" that Rosenberg discusses and creates in [35, 36, 38] attempt a related expansion in another way, through an open juxtaposition that refuses to type the relations among groups of words as it refuses syntax within the groups.

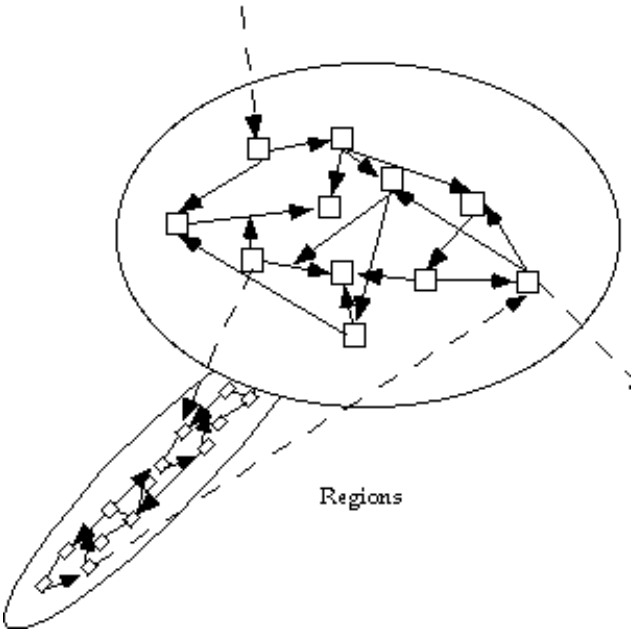

Figure 1: Regions. These could show Aquanet layouts instead of node-and-link structures.

Regions come closer, perhaps, to Michael Joyce's notion of "contour" [13, 14, 2]. For contours are in the landscape as well as assembled by my eye. The experience of reading a hypertext with complexly related regions would involve a sense of changing contour, of inquiry altering its horizons as in the shift of ground that happens when new language is deployed, or a question is discredited, a presupposition challenged or a duality shown not to be exclusive, or criteria changed. A region would not necessarily offer a single contour but perhaps occasion for a family of contours whose mutual transitions might be a discursive move.

Emphasizing the importance of regions does not mean, however, that every node must belong to some unique locality. A single node might be ingredient in several localities, and there could be nodes or sequences of nodes that remain alone or compose lines of flight outside of any larger unity.

There are no closed forms in hypertext, just as there can be no truly isolated or finished works. (There are no truly isolated works in print, either. Connectivity is a condition of meaning even without explicit links.) A whole set of nodes in one region might also appear in another but linked quite differently. Even if it had a relatively closed form a region would contains nodes that led outside or intersected different regions, and there should be other ways to move than by explicit links.

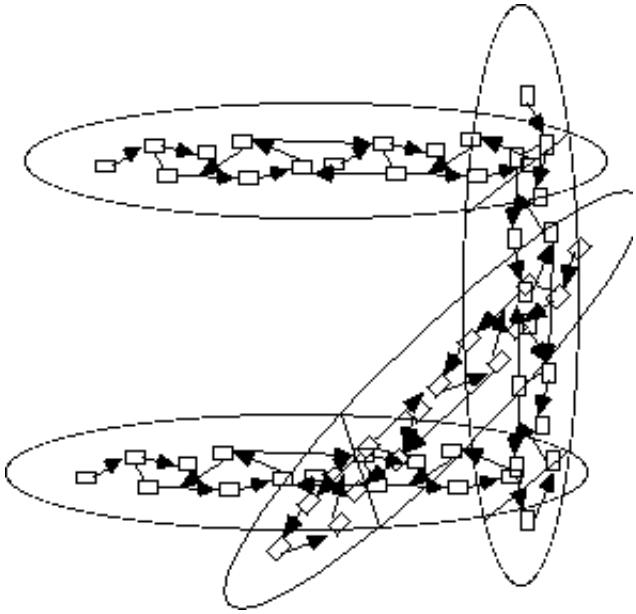

Figure 2: Intersecting Regions

Intersecting regions need not be hierarchically nested nor need the text make a hierarchical whole. Since hypertext always provides the possibility of more dimensions of movement and connection, authoritative metapositions can be undone by mutual inclusions, interactions among levels, and multiple and conflicting totalizations.

An ability to perform complex linking across multiple levels of description and abstraction would provide the possibility for creating new intellectual objects and discursive moves.

Besides these kinds of units in hypertext, we could have many kinds of relations among the units. A complex hypertext must be more than a sequence of self-enclosed localities, as are many video games. Hypertext can take advantage of the possibilities for links that move from a member to its region as a whole, or from a region to another region, or from a region to abstract representations of the forms and relations of itself or other regions.

Such self-representations provide more than a rhetoric of departure and arrival [19]. If hypertexts are to serve inquiry, they need to question and comment on their own and others' form and relations, so they must be able to represent their own form and movement.[1]

---

1 Having available more means to construct different self-representations and so to question one's criteria and schemes of organization would help avoid the situation Joyce fears where hypertext becomes an endless commentary on authoritatively pre-given structures and categories [14].

How inquiry even in well-defined tasks can turn back upon its own schemes and organization can be seen in the adventures of Aquanet from the optimism of its announcement [23] through the unexpected observations about informal and implicit patterning [24] that lead to creation of VIKI [25, 26, 40]. In the flow of scholarly literature, writers must be necessarily reluctant to commit themselves to fixed types and patterns in advance. Thus we find a multiplication of overviews and tentative patternings. Some means of amplifying and representing this multiplicity and debate about form and criteria would be necessary for scholarly hypertext. My suggestion is to allow the construction of and discussion about self-representations of many types on many levels, none of them final or authoritative.

4 A WISH LIST

Constructing such hypertexts demands strong representational and linking capabilities. A complex hypertext needs some way to modulate and focus emphasis on different levels of organization. For inquiry, everything in the text needs to be open to question and discussion: content, form, progression, criteria, and so on. In native hypertext inquiry the software should enable discursive moves that happen within a landscape or region rather than in a single node or link, and have ways to refer to regions that are related without hierarchy and in many dimensions.

In using the node-and-link conception of hypertext in framing these suggestions I do not mean to ignore the criticisms of "the tyranny of the link" [10]. Indeed I would add a criticism of my own, that the model encourages the notion that a hypertext must consist of linked facts or bits of information.

However, explicit author-made links are important in scholarly inquiry. For one thing, given the state of AI today it is unlikely that structures and connections computed on the fly could handle the kinds of relations needed in inquiries where what is at stake may be the very criteria of relevance and connection presumed by the search. For instance, automatic link creation would have limited success in arguments over the worth of a new metaphor, or over alternate translations, or over whether thinker X really influenced thinker Y who uses a totally different vocabulary. Similar difficulties would arise with mechanisms for automatically calculating link inheritance and simplification [4, 1, 39]. Even author guided content search would be of limited value in such cases.

Scholarly hypertexts would need multiply typed nodes that can be collected or referenced as having various kinds of content, belonging to various regions, or standing in various relations.

Regions could perhaps be implemented as saved composites in the Dexter-based framework outlined by Grønbaek [8]. These would be structured collections of unrestricted types of components. Since the same component could belong to more than one region, a composite would probably reference rather than include its components. However a two-way relation is needed, despite the computational overhead, so that components could be aware of their region(s) and discuss or dispute their membership.

Scholarly hypertexts also need links that are first class objects which can themselves be linked to and discussed.

Given the need to refer to and to gather links, there should be an open-ended capability for multiply typing links (for instance, something like the keyword system that allows users to give multiple types to Storyspace nodes). Non-dyadic links, or Aquanet relations offer the possibility of more complex moves, especially if objects of any kind or level can enter into the relations.

Link types pose problems since pre-defined types would not likely be used consistently, while user-defined types would proliferate beyond easy usefulness. But such proliferation would be preferable to a lack of types. If we let types proliferate but make them objects that can be referred to and discussed, then the discussion of link types and rival collections of links into new types would be one way to embody disagreement over criteria and appropriate moves.

Scholarly hypertexts would need to create (and link to and comment on) patterns of links or patterns of regions in one's own text or in texts referenced or included, emphasizing different sorts of connectivities on different levels of abstraction. This would allow reference to larger-scale features. The familiar planar or nested map of boxes and arrows (as in Intermedia or Storyspace) could be enriched with colors and labels and styles of nodes. It could have capabilities for displaying only certain chosen link patterns or types, or the relations of larger regions. This would involve bringing items from what could be widely distanced areas on the full view into various abstracted views that create new localities. There could be many types of overview and filtered lists, with the author specifying parameters such as the type of objects or links being mapped. In a complex multi-authored hypertext there might be competing overviews, and discussions about their adequacy; deciding the criteria for an abstract mapping is not a neutral act. A planar map has difficulty representing the many levels of abstraction and cross-reference that might be involved, so perhaps the map would be a three-dimensional space in which regions occupied planes that were allowed to intersect or overlap.

Such views would be temporary updatable maps, but also be able to be made into permanent discussible nodes in the system, with added labels and comments. In that case automatic updating would be user-specifiable.

There might be a combination of author-created and system-generated views, as with VIKI's algorithms for locating implicit structures. The problems here are similar to those mentioned above for automatic content search, but one could imagine that as users produced maps or diagrams with spatial arrangement of tokens for regions or discursive moves, the system compared rival maps for similarities and differences, or noted common formal structures in maps of different areas.

Such self-representations could, like regions, be implemented as composites in the Dexter-based framework, much as Grønbaek speaks of browsers and table tops as objects. They would be structured collections referring to their components rather than including them, and available either globally or within the one object. These representations could be either temporary or saved. They would be either computed or created by hand, but they would need more kinds of structure than the hierarchical structuring discussed in [8], and more kinds of editing operations, so that they could receive comments or visual annotations that might propose connections, indicate divergencies, and the like.

Special self-representations of structure and content could be created to meet particular needs. These might be cross-roads documents such as the overviews found in George Landow's work [21]. Or the author-created representations might involve special tools such as the structural views in SEPIA [9, 32] or the Aquanet type editor and display [23]. Such systems provide facilities for representing a structure of argument or data that is the object of discussion and development, but they do not provide a easy medium for recording the stages in such discussion, the proposed alternative organizations, or the issues that are disputed in various suggested formalisms or spatial organizations. For instance, Aquanet offers different views of the same knowledge structure but not multiple structures. However, imagine a three-dimensional space in which different Aquanet arrangements appeared as floating planes that could be compared and linked to, and this map was itself something that could be referred to and discussed. Something like this could be arranged with the flat Aquanet or VIKI plane if the objects were duplicated and arrayed in rival arrangements on different regions of the plane, and some selective overview provided to compare the regions.

Although spatial arrangement allows structure to remain implicit and to grow while being discussed, the syntax of spatial arrangement, even complemented with visual typing by color and shape and font, seems too limited to represent the many kinds of discursive moves in inquiry and argument. Aquanet relations with their recursive capabilities seem to offer more possibilities in this regard.[1]

Scholarly hypertexts would need to be able to make links in all directions among types and levels of nodes, refusing any hierarchical separation of text from representations of the text.

Since regions and their discursive moves are important it might be a helpful option for a backtrack capability to move by larger regions in reverse order, but within a region to repeat the nodes in the order in which they were visited or in some other way that would preserve the moves made by linking and choices.

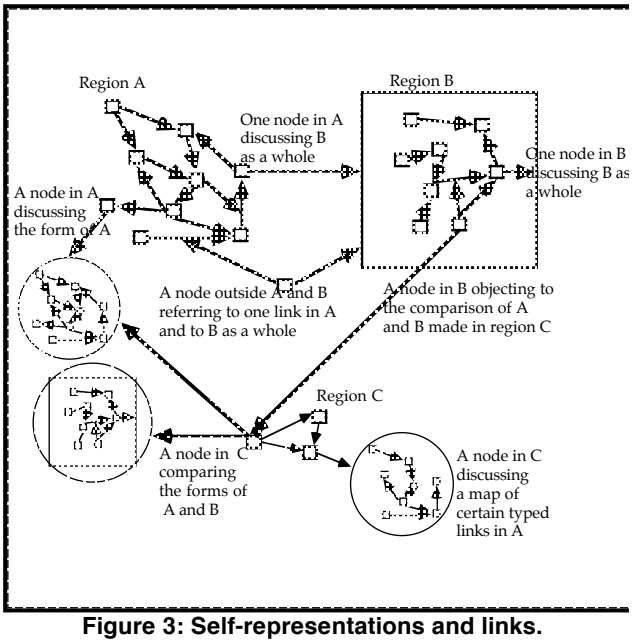

Figure 3: Self-representations and links.

5 POSSIBLE CONFLICTS

Whatever one may think about this wish list, there are further questions about the possibility of scholarly hypertext.[2]

---

1 Given the reluctance users showed for the machinery of relation-creation in Aquanet [24], it is a legitimate question whether the elaborate typing and self-representing facilities I am suggesting would actually be used. But scholarly inquiry already trains people to value overviews of options and self-critical analysis, so that if the facilities were relatively easy to use and returned value because they allowed the raising of new questions, there would be an impetus to use them.

2 One could object that there is no point in discussing hypertext form "in advance." Should we try to legislate the form of future poetry? Or even of scholarship? Of course we should let forms evolve as needed (or as unneeded!), but this essay discusses capabilities in the underlying technology that would bring the possibility for new kinds of form

We could start by asking whether modes of scholarly presentation really could be adapted to the presentation of scholarly structures of argument, evidence, and inquiry. Perhaps long prose passages of such inquiry could be linked in the hypertext library, but the inquiry itself still demand a more linear mode of presentation inside each unit. "If strict control of information is paramount [or if argument, assertion and self-questioning are paramount], why trade print for hypertext in the first place?" [31].

It is true that when things must be presented in a single unvarying fixed order network linking is not appropriate, though hypertext can mimic an article or book by using large nodes and linear linking. However, very little writing needs to be presented in a single fixed order, considering the varying ways in which scholarly moves have been presented in prose and how readers skip around in linear books and essays.[1] There should be advantages to presenting ideas and assertions in regions that are multiply explorable landscapes located in complex relations to others. Imagine even as small a text as this present essay presented in several regions with multiple links on different levels of detail instead of the paragraphs plus digressive footnotes. Other links could lead to self-reflective remarks such as this.

On the other hand, the issue could be reversed, asking whether my emphasis on complexity and self-representation creates self-totalizing texts that present and control their own form, and so deflect the natural tendency of hypertext to associative and borderless thinking. Taylor and Saarinen say that we must move "from edifice to improvization" [41].

We are not caught between linear and associative-interstitial writing. Nor is there one essentialist way to use hypertext; it is a technology, not a literary genre. However what I have been urging does involve more unity than theories of literary hypertext might recommend. The unity stems from the focus on inquiry and the need for self-representation. In Joyce's terms, scholarly hypertexts would be more exploratory than constructive [13]. However the overall inquiry would be a constructive endeavor that kept adding and changing regions and dimensions of relations, and so altering the older contours. As a result the whole complex would not be a totalized unity, though it would contain competing self-representations.

For many regions or sets of regions within hypertexts of the sort I am imagining there would likely be some complex abstract armature "behind" the text, perhaps a set of ideas and arguments, a conflict of points of view, or rival interpretations of evidence. If that is so, why not just present the abstract structure straight out? First, because it is not evident that complex argument is always best presented in step-by-step fashion, since it is frequently presented otherwise even in linear books or essays. Second, there may be abstract structures that are better presented in hypertext than in linear prose. Third, there may be discursive moves and gestures that are not the exemplification of static structures and cannot be performed in linear sequences of argument or proof.[2] Fourth, to say that there is some abstract structure does not mean that comprehending that structure is the only goal of reading.

Finally, we might ask why we should care about such complex scholarly hypertexts? Why might they be important? The main reason is that they could enrich inquiry and scholarship. But there is another reason. Many current worries about the social and intellectual impact of new technologies in the wired world depend on an image of the net as delivering seductive serial intensities, as in a series of video games or music videos. These are conceived as destroying literacy and thoughtful reflection. But the opposite could be the case if hypertext could help create a new literacy by using in more complex and self-referential ways those very features of the new technologies that are most feared. Linkage and transitions, moving attention, transgressing borders, and non-linear reading could be complexly structured and encourage increased attention and reflection.[3] Could hypertext then lead to a renewed literacy of inquiry and discussion? Could it broaden participation in such pursuits?

That depends on whether such complex texts could ever be written and read. An anonymous reviewer of an earlier version of this essay put the question sharply: "We still don't know what motivates changes in scholarly forms. What would motivate a turn to hypertext? What is the

---

1 Would exploration be compromised by the self-representational capabilities I am suggesting? Not if they are used in multiple ways. We should distinguish psychological motivations to explore, because we don't know what is coming next, from the structural gradients within the text. The latter remain when we reread a novel or a poem. Jane Yellowlees Douglas 'explored' Michael Joyce's story 'afternoon' uncounted times [6, 12, 7].

2 This touches some of the philosophical issues that divide "analytic" and "continental" thought: what is the relation of thinking to formal structures and is there a thinking that is not the creation or analysis of structure?

3 "In answer to McLuhan's second question--what does hypertext render obsolete?--the best answer is not 'literacy' but rather 'post-literacy'. As Nelson foresees, the development of hypertext systems implies a revival of typographic culture (albeit it in a dynamic, truly paperless environment). That forecast may seem recklessly naive or emptily prophetic, but it is quite likely valid. Hypertext means the end of the death of literature" [27].

scholarly value-added (to be rather crass about it) to writing and publishing in hypertext?"

What does hypertext have to offer, besides the efficiencies of the hypertext library that need not contain native hypertexts? What about more complex structures? New discursive moves that occur in non-linear sequences? New forms of self-representation and ways to bring them to bear on issues. More access to others work and easier inclusion of others' texts. Attempts to assert one dominant scheme of categorization both facilitated and resisted. Elimination of the fiction of the final metaposition. A realistic sense of not controlling the dialogue, combined with new possibilities of surveying relevant regions. More access to the context of discussion. Hypertext may be truer to the real context and process of discourse and thought than are tidy books.

The last time that major changes occurred in the media of humanistic and historical inquiry was during the nineteenth century when universities secured a near monopoly on scholarly journals, which had previously been published by private or royal associations. This multiplied the number and influence of the journals. Their hold on scholarly communication is now breaking down. As self-publication becomes a genuine possibility, quality control may take a new form as surveyors and pointers rather than gatekeepers to the media. Then the way would be open for more hypertextual forms. Perhaps the Web could be the bridge: imagine web items written less like papers to be linked and more in native and interpenetrating hypertext, developing into regions of regions, new lands for us to explore and build.

REFERENCES

1. Allan, J. Automatic Hypertext Link Typing. Proceedings of Hypertext 1996. ACM, New York, 1996.

2. Bernstein, M., Joyce, M., and Levine, D. Contours of Constructive Hypertexts. ECHT '92 Proceeding of the ACM Conference on Hypertext. ACM, New York, 1992.

3. Bernstein, M. Hypertext and the Linearity of History. Hypertext Now. January, 1996. http://www.eastgate.com /HypertextNow/archives/History.html

4. Cleary, C., and Bareis, R. Practical Methods for Automating Linking in Structured Hypermedia Systems. Proceedings of Hypertext 1996. ACM, New York, 1996.

5. Derrida, J. Limited Inc. Evanston: Northwestern University Press, 1988.

6. Douglas, J. Y. Understanding the Act of Reading: the WOE Beginner's Guide to Dissection.Writing on the Edge, Volume 2, Number 2 (1991).

7. Douglas, J. Y. "How Do I Stop This Thing?": Closure and Indeterminacy in Interactive Narratives. In [22].

8. Grønbaek, K. Composites in a Dexter-Based Hypermedia Framework. ECHT '94 Proceedings. New York: ACM, 1994: p. 59-69.

9. Haake, J. M., and Wilson. B. Supporting collaboratiave writing of hyperdocuments in SEPIA. Proceedings of the ACM CSCW '92. ACM, New York, 1992.

10. Halasz, F. G. "Seven Issues" Revisited. Proceedings of Hypertext '91. ACM, New York, 1991.

11. Hillier, L. A., Jr. Computer Music. Scientific American, December 1959: p. 109-120.

12. Joyce, M. Afternoon, a story. Watertown: Eastgate Systems, 1992.

13. Joyce, M. Of Two Minds: Hypertext Pedagogy and Poetics. Ann Arbor: The University of Michigan Press, 1995.

14. Joyce, M. (1995a) A Feel for Prose: Interstitial Links and the Contours of Hypertext. In [13].

15. Kolb, D. Postmodern Sophistications. Chicago: University of Chicago Press, 1990.

16. Kolb, D. Socrates in the Labyrinth. Watertown: Eastgate Systems, 1994.

17. Kolb, D. Communicating Across Links. In Ess, C., ed. Philosophical Perspectives on Computer Mediated Communication. Albany: SUNY Press, 1996.

18. Kuhn, T. The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1970.

19. Landow, G. P. The Rhetoric of Hypermedia: Some Rules for Authors. In Hypermedia and Literary Studies, ed. Paul Delany and George Landow. Cambridge, MA: MIT Press, 1991.

20. Landow, G. P. Hypertext: The Convergence of Contemporary Critical Theory and Technology. Baltimore: Johns Hopkins University Press, 1992.

21. Landow, G. P. The Dickens Web. Watertown: Eastgate Systems, 1993.

22. Landow, G P., ed. Hyper/Text/Theory. Baltimore: Johns Hopkins University Press, 1994.

23. Marshall, C. C., Halasz, F. G., Rogers, R. A., and Jansen, W. C. Aquanet: a hypertext tool to hold your knowledge in place. Proceedings of Hypertext 91, San Antonio, Texas, (Dec. 16-18, 1991): p. 261-275.

24. Marshall, C. C. and Rogers, R. A. Two Years before the Mist: Experiences with Aquanet. Proceedings of the 1992 European Conference on Hypertext (ECHT '92), Milan, Italy, (Dec. 1-4,1992): p. 53-62.

25. Marshall, C. C. and Shipman, F. M. Searching for the Missing Link: Discovering Implicit Structure in Spatial Hypertext. Proceedings of Hypertext 93, Seattle, Washington, (Nov. 14-18, 1993): p. 217-230.

26. Marshall, C. C., Shipman, F. M., and Coombs, J. VIKI: Spatial Hypertext Supporting Emergent Structure. Proceedings of 1994 European Conference on Hypermedia Technology (ECHT '94), 1994: p. 13-23.

27. Moulthrop, S. You Say You Want A Revolution? Hypertext And The Laws Of Media. Postmodern Culture v.1, n.3 (1991).

28. Moulthrop, S. Toward a Rhetoric of Informating Texts. ECHT '92 Proceedings of the ACM Conference on Hypertext. Milan, Italy: p. 71-180.

29. Moulthrop, S. Traveling in the Breakdown Lane A Principle of Resistance for Hypertext. Mosaic 28/4, December, 1995: p. 55-77.

30. Moulthrop, S., and Kaplan, N. They Became What They Beheld: The Futility of Resistance in the Space of Electronic Writing. In Selfe, C. and Hilligoss, S., edd. Literacy and Computers. New York: Modern Language Association, 1994.

31. Moulthrop, S., and Kaplan, N. Citescapes: Supporting Knowledge Construction on the Web. http://raven.ubalt. edu/staff/moulthrop/essays/citescapes/citescapes.html

32. Nielsen, J. Multimedia and Hypertext: the Internet and Beyond. New York: Harcourt Brace, 1995.

33. Nietzsche, F. The Gay Science. New York: Vintage, 1974.

34. Rorty, R. Contingency, Irony, Solidarity. Cambridge: Cambridge University Press, 1989.

35. Rosenberg, J. Navigating Nowhere / Hypertext Infrawhere, SIGLINK Newsletter 3, 3, December 1994.

36. Rosenberg, J. A Conversation with Jim Rosenberg on the Interactive Art Conference on Arts Wire, January 1996. http://www.artswire.org/Artswire/interactive /www/jim.html

37. Rosenberg, J. The Structure of Hypertext Activity. Proceedings of Hypertext 1996. ACM, New York.

38. Rosenberg, J. Foldings, to the Chord Trellis Relate-Shape Draw, The Barrier Frames, Diffractions Through. Eastgate Quarterly Review of Hypertext, vol 2, no. 3 (Summer 1996).

39. Salton, G., Singhal, A., Buckley, C., and Mandar, M.. Automatic Text Decomposition Using Text Segments and Text Themes. Proceedings of Hypertext 1996. ACM, New York: p. 53-65.

40. Shipman, F. M., Marshall, C. C., and Moran, T. P. Finding and Using Implicit Structure in Human-Organized Spatial Layouts of Information. Proceedings of CHI `95 (May 7-11, Denver, Colorado). ACM, New York, 1995.

41. Taylor, M., and Saarinen, E. Imagologies. New York: Routledge, 1994.