

# XANADU's textemes

## *Diamond theoretical reflections on hypertextuality*

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### Abstract

Xanadu is still not yet realized. Nevertheless, it is appropriate, not only to understand its principles and its radical difference to established Web hypertext and multimedia, but to try to think and design even more advanced concepts of non-traditional interactions. One interesting extension of identity-oriented thematizations is opened up by polycontextural, kenogrammatic and diamond approaches to text theory; proposed recently as textemes (or textems). Textemes are based on the interplay of anchored semiotic diamonds and are delivering necessary environments for transclusions. Transclusions and transjunctions are modeled additionally in a polycontextural setting. The characteristics of *'electronic'* text in contrast to *'physical'* paper texts are emphasized.

## 1. Xanadu: Nelson's still new principles

### 1.1. Hyper-textuality

Since some decades, everybody knows Xanadu and nearly nobody ever has seen it working. Most people think of it as a special kind of a hypertext project with two-way links and connected with projects like Hypercard. Hence, the focus is on the machinery of links.

Personally I had a similar perception and therefore wasn't specially interested in it. But there is a very crucial distinction at place which makes a profound difference to all kind of linking systems. It is Nelson's insistence on the difference of *'physical'* and *'electronic'* documents. At the first glance this seems to be obvious and trivial too, but it isn't at all.

There is a lot of postmodern writing about the virtuality and simulacrum of electronic media. Nevertheless I couldn't find any conceptually and technically useful elaborations.

With such a change, from the *'physical'* to the *'electronic'*, in the ontological and epistemological status of documents and texts, the whole topic of links (transclusions, deep links, content links, etc.) appears as a 'natural' consequence of the new understanding of text (*'electronic'*, *'digital'*, *'virtual'*). Quite obviously, the term *'electronic'* is historic and utterly metaphoric. Xanalogical concepts are not about electronics, information processing, etc., neither about *'virtuality'*.

A good example for a *conservative* and common understanding of the Web and its hypertext links is demonstrated with Michael Wesch's *"The Machine is us/ing Us"* Youtube entry.  
<http://mediatedcultures.net/ksudigg/?p=78>

*"Digital hypertext is above all... hypertext can link..."*

*"Digital text can do it better. Form and content can be separated."*

*"XML was designed to do just that."*

### 1.1.1. Ted Nelson's Xanadu

*"To Project Xanadu, that means enacting two types of connection: profuse and unbreakable **\*deep links\*** to embody the arbitrary connections that may be made by many authors throughout the world (content links); and **\*a system of visible, principled re-use\***, showing the origins and context of quotations, excerpts and anthologized materials, and content transiting between versions (transclusions).*

*This may be simplified to: connections between things which are **\*different\***, and connections between things which are **\*the same\***. They must be implemented differently and orthogonally, in order that linked materials may be transcluded and vice versa. This double structure of abstracted literary connection -- **\*content links\*** and **\*transclusion\*** -- constitute xanalogical structure."*

#### **Transclusion**

*"Transclusion is what quotation, copying and cross-referencing merely attempt: they are ways that people have had to **\*imitate\*** transclusion, which is the true abstract relationship that paper cannot show. Transclusions are not copies and they are not instances, but **\*the same thing knowably and visibly in more than once place\***. This is a simple point which is remarkably difficult to get across. While copies and cross-reference are workarounds in place of transclusion, aliases and caches are **\*forms\*** of transclusion."*

#### **Text is not simply text**

*"Nelson always meant hypermedia when he said hypertext, it's one of the things that people get wrong about Nelson. They think that they've invented **hypermedia** and he only invented hypertext. He meant 'text' in the sense of corpus, not text in the sense of characters. I know this for a fact because we've talked about it many times (van Dam 1999, interview)."*

Hypertextuality in the sense of the **Web** and its WEB-0.X-mythology, is restricted to a unidirectional exchange of signs as data without environments. Web links are not only uni-directional by definition but they have only two logical states: *broken/unbroken*.

It would be great to enjoy a more dynamic bi-directional Web connectivity in the sense of *transclusions* (Ted Nelson). But Xanadu links are postulated as UNBREAKABLE. Does it matter if they are one- or two-way links if they are not qualified to *perish*?  
<http://www.xanadu.com/xuTheModel/>

#### **What's an 'electronic' text?**

It isn't easy to characterize properly 'electronic' or 'digital' texts and documents in the sense of Nelson's intentions.

A *digital text* in the common sense is easily defined. It is a digitally codified mapping of a text (media) by a binary code into an electronic representation. This is realized for all media (text, sound, picture, graphics, etc.).

One hint to understand the difference to the common understanding of hypertext is given by the distinction of "*same*" and "*different*" instead of '*equal*' and '*unequal*' of textual 'things'.

*"... connections between things which are **\*different\***, and connections between things which are **\*the same\***."*

A further hint to the different epistemological character of 'electronic' texts is given by the necessity of '*orthogonal*' structures. "*They must be implemented differently and orthogonally, in order that linked materials may be transcluded and vice versa.*"

Furthermore, 'electronic' texts are characterized by a complementarity of polar distinctions, i.e. by a double structure of '*content links*' and '*transclusions*'.

*"This double structure of abstracted literary connection -- **\*content links\*** and **\*transclusion\*** -- constitute xanalogical structure."*

#### **Some more distinctions**

Some more distinctions might help to grasp the specific character of 'electronic' texts.

1. The mainstream understanding of text is still dominated by the *sentence*-model. A text is a composition of sentences (phrases, statements, etc.). A sentence is ideally a well-formed statement with a clear meaning.

2. Hypertext in the mainstream understanding is a text of a text. As a meta-level a markup

language is constructed to link textual elements of the primary text.

"In a classical node-link hypertext, a graph can be constructed on the set of nodes where each edge is identified with a link and structure discussions typically take place with respect to this graph." (Neumuller, p.89)

"The Web link is in essence little more than a goto or a jump instruction to the Web browser to retrieve and display a new document." (ibid., p. 149)

3. And to give the whole thing some meaning, a markup language of a markup language of the ordinary text is introduced. This is the concept of a multi-layered text, which still remains syntactically restricted, is introduced in an ontology-based *Semantic Web*.

4. Nelson's *Docuverse*, "deep electronic literature", virtual documents

"...transclusions are hard to formalize in graph theory: are they nodes themselves? If they are, they would transform trees into directed graphs. I have included them in this section, as they seem to mark a breakpoint of graph theory." (ibid., p.90)

The same at different places, without 'physical' representation by copy-and-paste.

"Transclusions are not copies and they are not instances, but 'the same thing knowably and visibly in more than one place'." (Nelson)

**Key Concepts**

- Parallel Documents
- The Big three : Transpointing, Transclusion and Transcopyright.
- Transpublishing.

Hence a further aspect of the epistemology of 'electronic' texts, i.e. xanalogical texts, is the fact that they have to be *placed*, that they have to take *place* in a textual space. There is no such thing in classical text theory as a textual place or *locus*. In other words, classical texts are anchored in uniqueness, hence the unique anchor can be lifted and omitted. A procedure which is producing specific speculations, illusions and phantasm about otherness, void and omnipotence. This observation of a missing localization of classical textuality shouldn't be confused with the triviality that in classical text theory all kinds of topologies, hodologies and super-graphs might be used to explain, model and formalize classical texts as complex objects.

In more recent publications at the University of Southhampton, Nelson introduced further distinctions and broader self-interpretations.

The concept of *anchored* semiotics, diamonds and textemes offers a simple but radical mechanism of epistemic localizations of documents.

**Table of concepts**

|                       |                              |                            |
|-----------------------|------------------------------|----------------------------|
| (linear) text         | sentences                    | first – order logic        |
| hypertext             | marked sentences             | modal logic, graph theory  |
| semantic hypertext    | 2 – level marked texts       | higher – order modal logic |
| xanalogical docuverse | transclusions, transpointing | ???                        |

Nevertheless it seems therefore that, despite the contrary narratives, the idea of Xanadu in itself is strictly different, not only from established hypertext systems but also from Vannevar Bush's Memex.

Because elaborated conceptuality is missing, the whole Xanadu projects seems to be lost in metaphors and intentions.

**Founding background**

Behind many of the most important inventions in computer technology, realized or

conceptualized, by Doug Engelhart, Ted Nelson, Heinz von Foerster and Gotthard Gunther, was the enthusiastic help of the assistant of Harold Wooster, Rowena Swanson, of the US Air Force Office of Scientific Research.

*"Long ago we considered on-line documents. One of the first questions we asked was: "How can computers improve on paper documents?" Our principal answer: "By keeping every quotation connected to its source." We still believe this. However, those who created today's computer world didn't get that documents should be different now. They imitated paper. We see this as retrograde, like the buggy-whip sockets on the early horseless carriages." (Ted Nelson) <http://www.xanadu.com.au/transquoter/>*

What exactly does it mean: "keeping quotations connected" to its sources, if there are no sources but only quotations?

### Perishing links and textemes

Perishing links are neither breakable nor unbreakable, they are enabling such differences, uni- and pluri-directional. Hence, a perishing link is not a killed link. And a non-perishing link is not an endless link, like an endless non-terminating process. Because of the polycontextual complexity of the xanalogical link structures, with its chiasm of 'originals' and 'copies', a broken (micro-)link is not breaking the link as such. Redundancy, self-repair and learning is included in the conceptuality of complex links, i.e. interactions.

Textemes with their environments and chiasmic interactions are enabling links to *perish*, to be, as reductions, ordinary links, which might be broken/unbroken or even unbreakable. Nevertheless, actions in textemes and between textemes are not links but *interactions*, able of interactionality, reflectionality and interventionality. Hence, they have their life.

Hypertextuality in the sense of **Xanadu** might find a scientific model by the interplay of *internal* and *external* environments of *textemes*. That is, links refer to the external environment and are connected with the internal *environment* of neighboring textemes, and vice versa.

### Common understanding of links

*"Let us now try to use those notions for analysing the main features of Web pages. Web pages are so-called **hypertexts**, that is, texts with some of their components (words or sentences), possibly linked to other (hyper)texts, and so on and so forth. The reader can navigate through the whole text in a non-linear manner, by activating so-called hot links or anchor points that are linking some piece of text to some other.*

*These links are an obvious example of **indexes**, with a word pointing to (referring to) its definition or to some related piece of information. The WWW merely extends the basic notions of hypertext by making it possible for one index to refer to some physically-distant location on a remote computer somewhere else on the Internet, together, of course, with the ability to link to and therefore communicate images and sound. However in order to act as an index, a **sign** has to be recognized as such, i.e. the index has to exhibit itself as a **reference**. This is done in hypertext by marking the **hot links** in blue ink, in order to make the reader aware that he can jump to another piece of hypertext or image, therefore using a conventional **symbol** in order to "show" the index as such." Philippe Codognet, THE SEMIOTICS OF THE WEB, <http://pauillac.inria.fr/~codognet/web.html>*

## 1.2. Xanadu and XML

Is there any chance to realize the Xanadu document concept in the framework of XML?

I would like to stipulate that this question has to be connected with the problem of *identification*. Identification is basic on all levels of computation (Lambda Calculus) and understanding (naming). XML is strictly restricted to identity; and as a consequence to hierarchy.

It would be an artificial and tedious project to model, formalize and to try to realize the specifics of Xanadu in the framework and language of XML. But there are people who found a foundation for that.

Obviously, Xanadu's link concept, especially the "two-way links" are not part of the Web-link nomenclatura simply because Web links are linking *identifiable* documents together in different modes, e.g. direct, indirect, reciprocal, one-way, multi-way, and even incestuous, over- and under-linking, etc.

### XML simulations of Xanadu

Academic implementations of Xanadu as simulation are presented at some universities. As long as *simulation* is not confused with *realization* nothing is wrong about such achievements and much can be learned. XML is

modeled along the 'physical' concept of documents. Hence, a construction of genuine *xanalogical* concepts with XML methods is not producing more than a *simulation* instead a realization. As much as any simulation of an earthquake isn't the real earthquake, a simulation of Xanadu concepts isn't the real thing. Presupposed, obviously, there exists as such a thing.

*"With the XML Pointer Language (XPointer) fragments of XML documents can be identified and addressed as well. Thus, a combination of XML, XLink and XPointer can be employed."*

Josef Kolbitsch, Hermann Maurer, Transclusions in an HTML-Based Environment

### 1.2.1. Abstractness of documents

The great step of Xanadu seems to not be primarily in the new modes of linkage but in the radically new and more abstract concept of an "electronic document or text", positioned conceptually on a very different *epistemological* level than, say XML-documents which are represented as syntactical trees. And thus, on the base of this new abstraction of textuality from the physical to the 'electronical', a transformation of the ordinary link concepts follows 'naturally'.

*"Like Engelbart, Nelson believes the technical system moves in paradigms, and that the current era is bound to paper as a central metaphor. We need to be forced from our collective tricycles. I deal with new **paradigms**' (Nelson 1999, interview)." (Belinda Barnet)*

[http://www.latrobe.edu.au/screeningthepast/firstrelease/fr\\_18/BBfr18a.html](http://www.latrobe.edu.au/screeningthepast/firstrelease/fr_18/BBfr18a.html)

On the base of the classical 'electronic document' concept, mirroring the main characteristics of physical texts (text, sound, graphics, pictures, odors, haptics, etc.) only a specific kind of links are possible.

*"The term **multi-way** simply refers to the fact that the link exchange is between 3 or more websites, however each link is singular by only pointing to one other website."*

*"A **typed** link in a hypertext system is a link to another document or part of a document that includes information about the character of the link."*

*"Nelson coined the term **transclusion**," as well as "hypertext" and "hypermedia", in his 1982 book, *Literary Machines*. Part of his proposal was the idea that micropayments could be automatically exacted from the reader for all the text, no matter how many snippets of content are taken from various places"*

*"In computer science, transclusion is the inclusion of part of a document into another document by reference. It is a feature of substitution templates." (WiKi, transclusion)*

#### **Different identity relations**

*"Let me talk identic relationships. The term identic you might enjoy looking up in the dictionary. I hope it does not have some mathematical definition. I am just trying use it here to mean some relationship showing the two data structures are the same.*

*The number of different identic relationships in the computer field. A copy is in identic relationship with its original. An instance is in identic relationship with its original. A cached copy is in identic relationship with its original. A counted reference is in identic relationship with the places, the context, that reference it. So these are different identic relationships with different properties. Write-through cache, write-back cache.*

*So now I want to tell you about another identic relationship. I am calling it **transclusion**. Think of it as hypersharing if you like. What it is is this. There is only one copy, one master copy of anything. Let's call it a cosmic original. Every other copy you see is a manifestation of this cosmic original.*

*I use these terms because I don't believe they are currently in use. So when you see the Lord Shiva over the road, is it a copy of Lord Shiva? Of course not, it is the real guy. And so it should be with all text. We should never have to type anything twice.*

*Transclusion: you are simulating and enacting and bringing about a situation in which all instances can be regarded as the master. Naturally there must be many copies and this is a point that many people have missed because of the emphasis on the original."*

*Generalized Links, Micropayment and Transcopyright*

<http://www.almaden.ibm.com/almaden/npuc97/1996/tnelson.htm>

#### **Transclusions in HTML**

*Transclusions are an advanced technique for the inclusion of existing content into new documents without the need to duplicate it.*

*Josef Kolbitsch, Hermann Maurer, Transclusions in an HTML-Based Environment*

<http://cit.zesoi.fer.hr/browseIssue.php?issue=25>

Hence, such nice concepts in Webology, like n-way linking, have absolutely nothing to do with the 'two-way linking' of a "double structure of abstracted literary connection -- \*content links\* and \*transclusion\* -- constitute xanalogical structure." (Nelson) <http://www.kolbitsch.org/research/transclusions/>

### 1.2.2. Locatedness of documents

Again, the same at different places, without 'physical' representation by copy-and-paste.

"Transclusions are not copies and they are not instances, but 'the same thing knowably and visibly in more than one place'." (Nelson)

In contrast, "As the nodes need not have a fixed place in a spatial order to form this network of text (and other hypermedia), hypertext structure is commonly analyzed by means of graph theory." (Kolbitsch)

### 1.2.3. Accessibility: Abstractness and locatedness

There is an interesting antagonism between abstractness and locatedness of documents. It could be expected that the abstractness of the text model is covered by a topological space and its graph theoretical representations where places don't matter and documents are represented abstractly and place-free.

Hence the type of abstractness of 'electronic' (xanalogical) documents is of a different kind as the abstractness of a topological space. The difference might be termed as that of "connectivity of links" in contrast to the "deep connectivity" of transclusions.

"As Nelson is fond of saying, all this means is making and maintaining connections between things that are the same (Nelson 1995), or 'deep connectivity' as the Udanax community term it. Remote instances remain part of the same virtual object, wherever they are." (Belinda Barnet)

This might be one of the difficulties to explain properly xanalogical concepts. Their abstractness is concretization, while ordinary abstractness of texts is 'generalization'.

## 1.3. Xanadu and semiotics

A semiotic reconstruction in the framework of the purely syntactic XML wouldn't change much, neither. Semiotics in its triadic-trichotomic form (Peirce, Bense), or even in its tetradic extension by Toth, is still framed, bracket and caged by the decision and necessity of *identification* and *uniqueness*. It seems that semiotic based approaches are missing the point.

### 1.3.1. Xanadu semiotics, citations

"Let us now try to use those notions for analysing the main features of Web pages. Web pages are so-called hypertexts, that is, texts with some of their components (words or sentences), possibly linked to other (hyper)texts, and so on and so forth. The reader can navigate through the whole text in a non-linear manner, by activating so-called hot links or anchor points that are linking some piece of text to some other.

"These links are an obvious example of *indexes*, with a word pointing to (referring to) its definition or to some related piece of information. The WWW merely extends the basic notions of hypertext by making it possible for one index to refer to some physically-distant location on a remote computer somewhere else on the Internet, together, of course, with the ability to link to and therefore communicate images and sound.

**However in order to act as an index, a sign has to be recognized as such, i.e. the index has to exhibit itself as a reference.** This is done in hypertext by marking the *hot links* in *blue ink*, in order to make the reader aware that he can jump to another piece of hypertext or image, therefore using a conventional symbol in order to "show" the index as such. [...]

As in all semiotic systems, we have seen that the web is a *mesh* of icons, indexes and symbols, with each type of the trichotomy indeed depending on the others, even for its own definition."

Philippe Codognet, THE SEMIOTICS OF THE WEB

<http://pauillac.inria.fr/~codognet/web.html>

"*Intertextuality* is a term introduced by Julia Kristeva and widely adopted by literary theorists to designate the complex ways in which a given text is related to other texts.

Just as there is no sign apart from other signs, there are no texts apart from other texts.

In Kristeva's words, "every text is constructed as a mosaic of other texts, every text is an absorption and transformation of other texts."

"Nielsen points out that "the fact that a system is multimedia-based does not make it hypertext. [...] Only when users *interactively* take control of a set of dynamic links among units of information does a system get to be hypertext,"

Moritz Neumüller, Hypertext Semiotics in the Commercialized Internet

[http://sammel punkt.philo.at:8080/23/2/ht\\_semiotics.pdf](http://sammel punkt.philo.at:8080/23/2/ht_semiotics.pdf)

*"Xanadu is a system for registered and owned content with thin document shells, re-usable by reference, connectable and intercomparable sideways over a vast address space (Nelson 1999, interview)."*

### 1.3.2. Identity, copy, original

The main strategy of classical attempts to implement Xanadu concepts in the framework of HTML, XML, XPath and others is quite straightforward but in full denial of the difference of original-based identity texts and Xanadu texts, which, whatever it means, are conceived as origin-free.

*"Transclusion: you are simulating and enacting and bringing about a situation in which all instances can be regarded as the master."*

There are two identity concepts in the game, one, the classical, is an ontological and logical identity concept based on subject-free, i.e. user-free, existence of objects, i.e. texts. Here, there is a strict hierarchy between the original and its copy; and the plagiarist-police is well equipped behind the corner. Originals are first, copies are second.

The Xanadu 'identity' concept is not an onto-logical but a *reflectional* and *cognitive* concept of the pragmatics of *using*, i.e. interaction with texts.

With that, the plagiarist-police gets jobless and confused:

*"Transclusions allow authors to include portions of existing documents into their own articles without duplicating them."*

*"Transclusions are designed as complete replacement for all cut-and-paste mechanisms in use. Nelson argues that **cut-and-paste** is not what people actually want to do but that it is a restriction imposed upon authors by the nature of paper." (Kolbitsch, p. 162)*

The mentioned sentence is a citation, accessible to TurnItIn!-control. I had to copy and paste the text from CIT704.PDF to my text in progress. No transclusion accessible! It is still very difficult to grasp a textuality beyond ontological identity.

But the reasons are simple. Only, it is postulated, if texts have an identity, they can be owned by me, being my possession. Only then, I can get a degree and a patent and sell it and get rich or bankrupt.

Hence, don't promote the real thing!

### Transcopyright and micropayment

This point, textual identity and authorship beyond ontological identity, was well reflected by Nelson's early concept of **transcopyright** and **micropayment** for/in Xanadu.

*"Whenever a reader views a transclusion, a note about the rights associated with the transcluded content is added, and a micropayment is made to the corresponding owner. Nelson names this model **transcopyright**." (Kolbitsch, p.162)*

*"The on-line copyright problem may be resolvable by a simple, sweeping permission method. This proposed system, which anyone may use, allows broad re-use of materials in exchange for automatic tracking of ownership. Payment goes to the original publisher and credit to the original author (Nelson 1995)."*

*"Necessarily, a mechanism must be put in place to permit the system to charge for instances, a micropayment system which provides a bridge to the original from each instance. Critically, this bridge should never break; links should not be outdated. At the same time, the bridge must leave no trace of who bought the pieces, as this would make reading political. As such, Xanadu would require a micropayment system parallel to the docuverse." (Belinda Barnet)*

[http://www.latrobe.edu.au/screeningthepast/firstrelease/fr\\_18/BBfr18a.html](http://www.latrobe.edu.au/screeningthepast/firstrelease/fr_18/BBfr18a.html)

There are educational problems too. Computer scientists and engineers are not trained in humanities, like hermeneutics, rhetorics, comparatistics, etc. and their ambiguous, complex, multi-layered texts. On the other hand, cultural scientists are not trained in computer science and programming. Hence, Ted Nelson's project Xanadu was not only to early in time but trapped into mutual misunderstandings.

### Madonna, neither original nor copy

In cultural history there are a lot of such paradox situations. Take a iconoclastic Madonna! She is the real Madonna! No copy, exclusive singularity. But from time to time she turns into a pictorial object, and has to be refreshed, repaired or exchanged with a more fancier one. During this procedure she surely didn't change her mode of existence into a copy. What had to be restored was the material, which has nothing to do with the Madonna as the real Madonna. Nothing at her body was lifted. In fact, to speak about an original includes a concept of the opposite, the copy. But the Madonna is the Madonna and the Madonna is nothing else than the Madonna in uniqueness. Albeit the neighbor church will claim, without any logical contradictions or ontological conflicts, the same for their own unique Madonna. Hence, uniqueness and multitude, 'original' and 'copies' remain, in this world-view, in harmony.

Similar figure had been at work with the Ancient Egyptian Gods.

### List of changes

Change in identity concept, chiasm of original/copy.

From physical (linguistic) to electronic (virtual, xanalogical) text.

From information to knowledge.

From links to transclusions.

From copyright to transcopyright.

From shopping to micropayment.

## 2. Diamonds, bi-signs and textemes

Up to now, the classical concept of a link didn't produce any serious scientific problems, conceptually and for implementation. Links have a simple logical structure: they are broken (dead) or not-broken (alive).

Nelson's extension of the concept of links is radically abstracting from the physical and linguistic paradigm of documents. His '*transclusions*' and '*content links*' are much more abstract than syntactic links. But their logical status seems to be simple too. They are 'unbreakable' or, and this may become a problem, "breakable".

Hypertextuality in the sense of the **Web** and its WEB-0.X-mythology, is restricted to a unidirectional exchange of signs as data between identical addresses without environments. Web links are not only uni-directional by definition but they have only two logical states: *broken/unbroken*.

It would be great to have a more dynamic bi-directional Web connectivity in the sense of *transclusions* (Ted Nelson). But Xanadu links are postulated as UNBREAKABLE. Does it matter if they are one- or two-way links if they are not qualified to *perish*? <http://www.xanadu.com/xuTheModel/>

*"Long ago we considered on-line documents. One of the first questions we asked was: "How can computers improve on paper documents?" Our principal answer: "By keeping every quotation connected to its source." We still believe this. However, those who created today's computer world didn't get that documents should be different now. They imitated paper. We see this as retrograde, like the buggy-whip sockets on the early horseless carriages." (Ted Nelson)*  
<http://www.xanadu.com.au/transquoter/>

Perishing links are neither breakable nor unbreakable, they are enabling such differences, uni- and pluri-directional. textemes with their environments and chiasmic interactions are enabling links to perish, to be, as reductions, ordinary links, which might be broken/unbroken or even unbreakable.

Nevertheless, actions in textemes and between textemes are not links but *interactions* able of interactionality, reflectionality and interventionality. Hence, they have their life.

But all that, endless self-generation of signs and contextuality of signs and texts, is well known and taught endlessly. But does it matter?

"Just as there is no sign apart from other signs, there are no texts apart from other texts.

In Kristeva's words, *"every text is constructed as a mosaic of other texts, every text is an absorption and transformation of other texts."*

As it was said at another place, an endless repetition of a sentence is not a truth-criteria. The truth-value of sentence might not be what is significant for interactions. True sentences without any *relevance* are dead.

Not only that the term "*endless*" and, e.g the metaphor "a *mosaic* of other texts" (Kristeva) is

not scientifically explained at any other semiotic considerations, its insistence runs out of relevance.

Who cares that, after, e.g Peirce and Derrida, endless iterability of signs is constitutive for sign activities. Later studies from Caputo or Gasché about *infinity* are badly hiding their weakness.

## 2.1. Limits of semiosis

How can a sign realize inter-activity, a prerequisite of any hypertextuality, if it is constitutionally deprived of any environment? In other words, the triadic-trichotomic concept of semiosis (sign production) with all its differentiations is not offering a single distinction, concept or mechanism to realize a semiotics for an interplay between different semiotic systems, i.e. trans-semiotic and inter-semiotic .

Textemes, as applications of polycontextural diamonds, are distributed over kenomic loci. Hence, the concept and mechanism of loci gives us a hint to understand textuality in a non-ontological and non-topological sense.

Disseminated semiotics gets their ontological orientation bracketed and neutralized. Classical semiotics is furthermore blind for its ontological anchoring in uniqueness. Textemes are *per se* anchored in different configurations of disseminated anchors. Anchors are not monolithic, they have different functionalities to anchor systems and environments, concurrently or chiasmic.

Textemes are representing whole semiotic systems, i.e. semiotics. Textemes are distributed and mediated, i.e. polycontexturally disseminated over different loci of a kenomic grid. Because there is no privileged beginning for disseminated semiotics, there is no original semiotics as a beginning of all semiotics; all semiotics are 'copies of copies'.

Applied to XML. If contexturally disseminated textemes (semiotics) are intra-structurally interpreted by XML, then XML gets disseminated as well; and there is no original XML left. For a classical understanding, this is utter nonsense. Classical science is conceiving this situation *manorial*: there is one and only one real XML (and its millions of dialects) but uncountable applications of it. XML for everything. Thus, there is, without surprise, a strict hierarchy between the original and the copy of XML.

All those sophisticated studies about semiotic interactivity, reflexivity and intertextuality, in whatever field, Hypertext, Anthropology, Nursery, are permanently confusing *theory* and *application*.

Without doubt, semiotics, as well as logic, can be applied in many ways to model interaction and hypertexts, and more. This is in full harmony with Aristotle and later. But it is not harmonious with Ancient Chinese mathematics. There, 'application' is 'theory'- and *vice versa*.

Semiotics as semiotics has no environments as semiotics.

Therefore, semiotics as such has no possibility of semiotic interaction with semiotics strange, xenomorph, to semiotics.

Hence, Sowa's statement, "*The Internet is a giant semiotic system*", is not the real thing at all. Again, albeit semiotics might produce interesting insights into the character of the Web, Ontologies and Hypertext, it is fundamentally inappropriate for an understanding of the main properties of a Xanadu based Docuvers (texts, documents, semantics) with its aspects of *abstractness*, *situatedness*, *polylogic* and *liveliness* of a new Web.

## 2.2. The idea of textemes

As Alfred Toth, an eminent semiotician, mentioned, the introduction of *diamond category theory* had been opening up unforeseen possibilities for further developments of theoretical semiotics as a purely semiotic discipline. Hence, let's try to apply it!

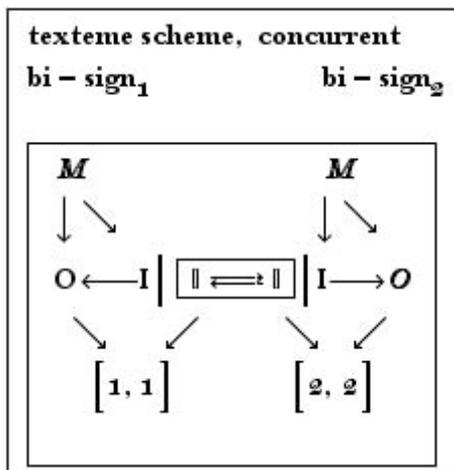
On the base of diamond theory, I introduced, as a very first step or risk, the idea of textemes. This is conceptually straight forward because it is an interpretation of the mechanism of the composition and combination of anchored diamonds.

Recall, diamonds are conceived as systems with inner and outer environments *per se*.

Hence, different diamonds might be combined by their different but interacting external environments. Other modes of combination and interactions might be omitted for now.

*Anchors* had been omitted in recent publications to focus on the new aspects of diamonds.

Anchoring was introduced in the late 90s, following a hint from Cartwell, to concretize *conceptual graphs* of operations and their proemiality.



**texteme :**

*diamond* = (sign + environment)

*bi-sign* = (diamond + 2 - anchor)

*texteme* = (composed bi-signs + chiasm).

## 2.3. Textemes and text theory

Classical and post-structuralistic text theory is, despite all kinds of subversion against its heritage, based on classical sémiologie and linguistics. Hence, textemes, in a post-structuralist sense, are based on the chain of

*grapheme --> phoneme --> morpheme --> signification.*

with its foundation in linguistics, i.e. the theory of *spoken* language and its conflicting concepts of writing.

Textemes for '*electronic*' texts, which are multimedial, virtual and distributed, are not based on a linguistic chain of logocentric abstractions and idealizations. Textemes as proposed in this paper are epistemologically not based on semiotics but on diamond theory. In some sense, textemes can be seen as based on a diamond understanding of *systems* and their specific *environments*. More precisely, textemes are based on an interplay of diamonds mediated by their external environments.

The fact, that on a *micro-analytical* level, links might have a pointer-structure and therefore a semiotic representation as *indexes* of the sign process, is secondary, and based on the structural interplay between diamonds and bi-signs.

## 2.4. Textemes and interactions

If we accept the limited value of sign systems for interactivity, it seems to be interesting to apply the idea, concept and formalism of textemes to study a new concept of links as *interactions*, with all their possible properties of interactionality, reflectionality and interventionality, to mention some important features.

I will not use '*semiotic glue*' to connect different semiotic action systems together but the post-semiotic concept of an environment of *diamonds* as supported by textemes.

The fact of the *dissemination* of textemes is subverting the systemic identity of the involved semiotics.

This change in the 'ontological' status of textemes, semiotics and contextures by dissemination has to be kept in mind if the following thoughts are focusing on environments, interactions and links. Such links, environments and interactions are not thematized in the framework of cybernetic system theory or data processing of Multi-Agent Systems (MAS).

Utilizing previous constructions about reflectional interactivity in general, some diagrams from other papers might elude the mist of primary conceptualizations.

A *sign system* shall be modeled, in general, first abstracting from its semiotic properties, by its contextural subsystems  $S_i$ ,  $i \in \mathbb{N}$  at a structural (kenomic) place  $O_j$ ,  $j \in \mathbb{N}$ .

Each subsystems of a sign system has its own neighbor system.

As a first step, to focus on the *environments*, the anchors shall be omitted.

With a second step, the specific semiotic characterization, i.e. M, I, O, shall be replaced by a general *contextural* scheme.

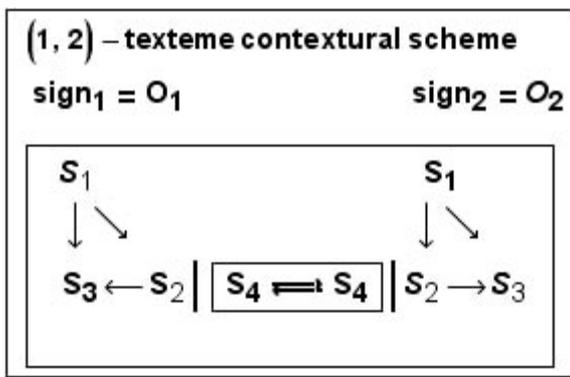
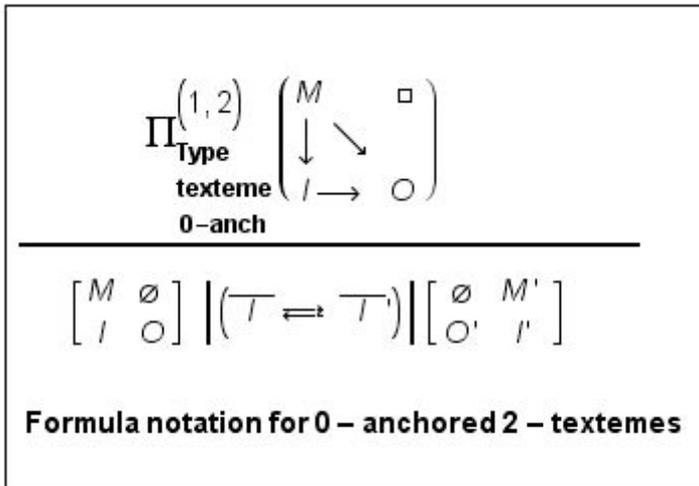
### What's the meaning of anchors anyway?

Anchors don't exist in semiotics. The only classical reason could be found in the "*Satz vom zureichenden Grund*" (Leibniz) or the "*causa (forma) teleologica*" (Aristotle) of ontology and epistemology. But, because there is one and only one metaphysical reason for existence and truth postulated by classical thinking, its notation simply can be omitted.

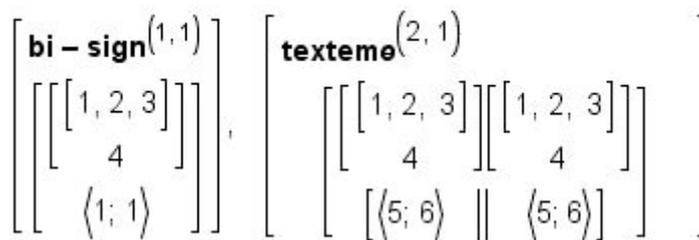
Anchors are getting more interesting if a multitude of autonomous semiotics and their environments, i.e. textemes, are accepted. Textemes might be anchored for themselves or by others. The same for environments, they might be anchored together with their semiotics or by anchors of other semiotics. This could be called the *architectonics* of anchors. But there is also dynamics involved. *Metamorphosis* between textemes might involve anchors. Hence, an anchor of one system might function as a system of another texteme.

For reasons of introduction, such complex metamorphosis of anchors shall be omitted too.

### 2.4.1. Elementary textemes



**Bracket versions:**



$$\text{elementary texteme} = \left[ \left[ \left[ S^1, s^1 \right]; \left[ S^2, s^2 \right] \right]; q \right], \left( s^1 \simeq s^2 \right)$$

$$\text{texteme}^{(2,1)} = \left[ \left[ \left[ \text{Sem}^1 \mid \text{env}^1 \right]; \left[ \text{Sem}^2 \mid \text{env}^2 \right] \right]; \langle \text{anch} \rangle \right],$$

$$\left( \text{env}^1 \simeq \text{env}^2 \right)$$

**elementary texteme**

$$\text{texteme}^{(2,n)} = \left[ \left[ \left[ \text{Sem}^1 \mid \text{env}^1 \right]; \left[ \text{Sem}^2 \mid \text{env}^2 \right]; \dots; \left[ \text{Sem}^n \mid \text{env}^n \right] \right]; \langle \text{anch} \rangle \right],$$

$$\left( \text{env}^i \simeq \text{env}^j, 1 \leq i \neq j \leq n, n \in \mathbb{N} \right)$$

**composition of textemes**

$$\text{texteme}^{(m,1)} = \left[ \left[ \begin{array}{c} \left[ \text{Sem}^1 \mid \text{env}^1 \right] \\ \left[ \text{Sem}^2 \mid \text{env}^2 \right] \\ \dots \\ \left[ \text{Sem}^m \mid \text{env}^m \right] \end{array} \right]; \langle \text{anch} \rangle \right]$$

$$\left( \text{env}^i \simeq \text{env}^j, 1 \leq i \neq j \leq m, m \in \mathbb{N} \right)$$

**mediation of textemes**

**2.4.2. Composed textemes**

$$\frac{\left[ \left( M_\alpha \rightarrow I_\omega \right) \diamond \left( I_\alpha \rightarrow O_\omega \right) \right]^{(1,1)} \circ \left[ \left( M_\alpha \rightarrow I_\omega \right) \diamond \left( I_\alpha \rightarrow O_\omega \right) \right]^{(1,2)}}{\left( M_\alpha \rightarrow O_\omega \right)^{(1,1)} \mid \left( I_\omega \right)^{(2)} \left( I_\alpha \right)^{(1)} \mid \left( M_\alpha \rightarrow O_\omega \right)^{(1,2)}}$$

**Diamond composition rule for homogeneous semiotic texteme**

$$\frac{[(M_\alpha \rightarrow I_\omega) \diamond (I_\alpha \rightarrow O_\omega)]^{(1,1)} \circ [(I_\alpha \rightarrow M_\omega) \diamond (M_\alpha \rightarrow O_\omega)]^{(1,2)}}{(M_\alpha \rightarrow O_\omega)^{(1,1)} \left| \begin{array}{l} I_\omega \leftarrow I_\alpha \quad (1) \\ M_\omega \leftarrow M_\alpha \quad (2) \end{array} \right| (I_\alpha \rightarrow O_\omega)^{(1,2)}}$$

**Diamond composition rule for heterogeneous semiotic texteme**

$$\frac{\Pi_{\text{Type}}^{(1,3)} \left( \begin{array}{ccc} S_1 & & \square \\ \downarrow & \searrow & \\ S_3 & \rightarrow & S_2 \end{array} \right)}{\text{0-anch}}}{\left[ \begin{array}{cc} S_1 & \emptyset \\ S_3 & S_2 \end{array} \right] \left[ \begin{array}{cc} \emptyset & S_1 \\ S_3 & S_2 \end{array} \right] \left[ \begin{array}{cc} \emptyset & S_1 \\ S_2 & S_3 \end{array} \right] \mid S_4^{1.2.3} \rightleftharpoons S_4^{1.2.3} \mid}$$

$$\text{MC} = \{S_1^2 = S_1^3, S_1^1 = S_3^3\}$$

**Formula notation for 0 – anchored (1, 3) – textemes**

**2.4.3. Mediated textemes**  
**4-fold semiotics**

A general scheme for a 4-fold, in contrast to triadic semiotics, might first be introduced as a mediation of 4 triadic semiotics. Such a construct shall then be interpreted as a genuine 4-fold structure with, e.g. the formal distinctions of *our-medium*, *me-interpretant*, *you-interpretant* and *our-object*, all triadic distinctions modified by the whole  $\text{Sem}^{(4,1)}$ -structure of the construction.

Only with the introduction of a semiotic complexity of at least 4, mechanism of *view-points* and corresponding *as-abstractions* as differences and chiasms between two interpretants or semiotic agents are conceptually and formally realizable. Hence, an interpretation of a text as at once being an original and a copy are conceivable without logical-ontological contradictions.

$$\text{Sem}^{(4,1)} = \left( \begin{array}{ccc} M_{1,3,4} & \Rightarrow & O_{1,3}/M_2 \\ \downarrow & x & \downarrow \\ I_{2,3,4} & \Rightarrow & I_1/O_{2,4} \end{array} \right)$$

with:

$$\text{sem}_i = (M, O, I)_i, \quad i = 1, 2, 3, 4$$

**and the matching conditions :**

$$\begin{array}{l} M_1 \cong M_3 \cong M_4 \\ O_1 \cong M_2 \cong O_3 \\ I_1 \cong O_2 \cong O_4 \\ I_2 \cong I_3 \cong I_4 \end{array}$$

#### **An interpretation of a 4 – contextual semiotics**

$$\text{Sem}^{(4,1)} = \left( \begin{array}{ccc} M_{1,3,4} & \Rightarrow & O_{1,3}/M_2 \\ \downarrow & x & \downarrow \\ I_{2,3,4} & \Rightarrow & I_1/O_{2,4} \end{array} \right),$$

$[M_{1,3,4}]$  as our – *medium* in  $\text{Sem}^{(4,1)}$

$[I_1/O_{2,4}]$  as you – *interpretant* in  $\text{Sem}^{(4,1)}$

$[O_{1,3}/M_2]$  as our – *object* in  $\text{Sem}^{(4,1)}$

$[I_{2,3,4}]$  as me – *interpretant* in  $\text{Sem}^{(4,1)}$

#### **4-fold textemes**

An the base of the shortly sketched 4-fold semiotics, diamonds and textemes are naturally introduced.

**Scheme of a 4 – contextural system**

$$\text{Diam}^{(4,1)} = \left[ \begin{array}{ccc} S_{1,3,7} & \Rightarrow & S_{5,6,7} \\ \downarrow & x & \downarrow \\ S_{1,2,6} & \Rightarrow & S_{2,3,5} \end{array} \right] \parallel [S_{4,9} \rightleftharpoons S_{8,9}]$$

**Scheme of a 4 – contextural texteme**

$\oplus_{\text{Type texteme 0-anch}}^{(4,1)} \left( \begin{array}{ccc} S_1 & \rightarrow & S_4 \\ \downarrow & \searrow & \downarrow \\ S_3 & \rightarrow & S_2 \end{array} \right)$

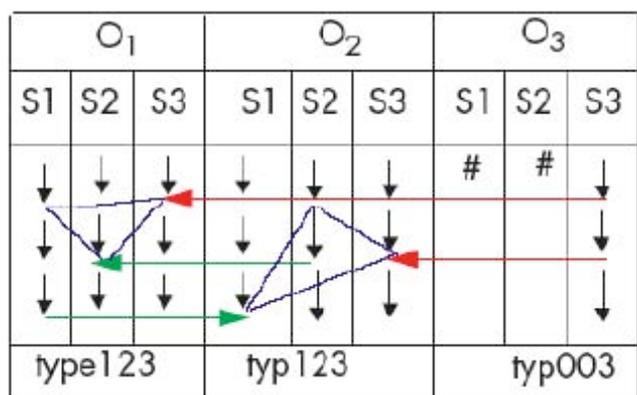
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$\left[ \begin{array}{ccc} S_1 & \rightarrow & S_4 \\ \downarrow & \searrow & \downarrow \\ S_3 & \rightarrow & S_2 \end{array} \right] \parallel \left( \begin{array}{ccc} S_4^{1,2} & \rightleftharpoons & S_4^{1,2} \\ S_4^{3,4} & \rightleftharpoons & S_4^{3,4} \end{array} \right) \parallel \left[ \begin{array}{ccc} S_4 & \leftarrow & S_1 \\ \downarrow & \swarrow & \downarrow \\ S_2 & \leftarrow & S_3 \end{array} \right]$

**MC = {S<sub>1</sub><sup>1</sup> = S<sub>3</sub><sup>3</sup>, S<sub>2</sub><sup>2</sup> = S<sub>□</sub><sup>□</sup>}**

**Formula notation for 0 – anchored  
(4, 1) – textemes**

**2.4.4. Interactions**



| PM             | O <sub>1</sub>   | O <sub>2</sub>   | O <sub>3</sub>   |
|----------------|------------------|------------------|------------------|
| M <sub>1</sub> | sem <sub>1</sub> | env <sub>1</sub> | x                |
| M <sub>2</sub> | env <sub>2</sub> | sem <sub>2</sub> | x                |
| M <sub>3</sub> | env <sub>3</sub> | env <sub>3</sub> | sem <sub>3</sub> |

| PM             | O <sub>1</sub>    | O <sub>2</sub>    | O <sub>3</sub>    |
|----------------|-------------------|-------------------|-------------------|
| M <sub>1</sub> | comm <sub>1</sub> | put <sub>1</sub>  | x                 |
| M <sub>2</sub> | put <sub>2</sub>  | comm <sub>2</sub> | x                 |
| M <sub>3</sub> | get <sub>3</sub>  | get <sub>3</sub>  | comm <sub>3</sub> |

Interaction in this case is properly playing with the difference of *inner-* and *outer-*environments of acting systems. A two-way link is an interaction, i.e. a mutual bi-directional interaction between two autonomous systems in the mode of communication between the operations “put” and “get” in relation to the environments of both systems, and mirrored in a third communicational system.

A bi-directional *link* might be modeled as a *bi-arrow (graph)* between two nodes. Obviously, *interactions* are not adequately modeled by graph theoretical concepts and methods.

### 2.4.5. Links

Links in identity systems are connections between two entities. Even for physical systems it isn't always easy to understand how bi-directional or two-way activity could happen.

Conceptually, a source (domain, initial object) can't function at once as its opposite, a target (codomain, final object). Mathematically, there is no problem involved. Links are arrows between nodes.

The saying, “*there are no texts apart from other texts*”, which is implying some detachments from an origin, or Nelson's “*copy of copies*”, might be a post-modern move against conceptual fundamentalism but this gesture is still caged, by negation and rejection, in the logocentric understanding of negation, iteration, continuity, and origin.

*“Nelson mentions that there is a fundamental difference between links and transclusions yet fails to clarify and elaborate.*

- Links different - Transclusions same
- *Is the memex building trails through transclusions rather than links?*

Xanalogical Structure, Needed Now More than Ever: Parallel Documents, Deep Links to Content, Deep Versioning, and Deep Re-Use. Qasim Hasan, Sandeep Jauhal, Sept. 18, 2004, p. 5

If there is no origin, then everything might function *as* an origin, and this is not another abstract statement but is itself involved in the formalism of chiasms of thematizations of the interplay of origins and copies **as** this and that.

Links in the paradigm of Xanadu, therefore, have to be understood in such an interplay of as-abstractions.

Again:

*"Transclusion: you are simulating and enacting and bringing about a situation in which all instances can be regarded **as** the master."*

*"There is only one copy, one master copy of anything. Let's call it a cosmic original. Every other copy you see is a manifestation of this cosmic original".*

And obviously, there is no cosmic original or Kantian *Ding an sich*. If it would exist, we wouldn't have been chosen to experience it..

Hence, Xanadu's text concept is "*parallel documents*".

*"Parallel documents are everywhere, but are not generally acknowledged.*

*There are relatively few explicitly parallel documents (like Tom Stoppard's play "Rosencrantz and Guildenstern Are Dead", which is explicitly parallel to "Hamlet" -- showing events that occur offstage in "Hamlet", and vice versa).*

*But implicitly parallel documents are everywhere -- the parallelism of commentaries, the parallelism of long and short versions of reports, the parallelism of translations, the parallelism of holy books [Nelson 1998].*

*It is vital that we be able to see this parallelism of documents and to intercompare and work with their side-by-side connection."*

The same lack of conceptual clarity or functionality is produced by the property "*parallel documents*" of Xanadu. It can be postulated that *parallelism* of texts needs an operative concept of environments of texts and neighbor texts which is able to explain and implement the interplay between *parallel* and *orthogonal* documents. Otherwise, such parallelism is easily reduced to linearity and hierarchy.

#### **Methods of visualizations and implementations**

*"transpointing windows"*

<http://xanadu.com.au/ted/TN/PARALUNE/paraviz.html>

*"All documents are parallel."*

<http://xanadu.com.au/ted/TN/PARALUNE/paradoxx.html>

<http://xanadu.com.au/ted/tedpage.html>

*zigzag*

<http://xanadu.com.au/ted/zigzag/xybrap.html>

#### **2.4.6. Logic of content links (clicks)**

##### **Web**

Links in identity systems are connections between two entities, realizing the two states of a binary situation: realized/not-realized or broken/unbroken.

##### **Textemes**

Complexions of textemes are realizing corresponding complexions of logical states. Such complexions of disseminated, i.e. distributed and mediated logical states are demanding a corresponding polycontextural logic to their adequate logical modeling and implementation.

##### **Xanadu**

In a world without original, each of the many simultaneous relations between texts is entitled to its own logical status of being an original and a copy.

This might be modeled by the distinction positive (pos) as original and negative (neg) as copy (mirror) of diamond logic. The following examples proposed are restricted to diamonds. It shouldn't be a big deal to apply the results to textemes as textemes are based on an interplay of two diamonds.

##### **Hypermedia and Unified Data Structure**

Xanadu's text and document concept is multi-medial from the beginning.

Again, what does it mean and how does it work? The new paradigm is declared as "*The Age of the Unified Data Structure*". But as with all unified and type-free declarations, circularity

and endless regress is programmed.

What kind of data structure is meant if everything is unified into a general data type?

Another point is obvious, if the distinction original/copy collapses, all is one. This is the common, post-modern understanding of the rejection of origins with the result of nil operativity.

As developed at other places and sketched in this paper, there is another understanding too. If there is no origin, there might be many origins. That is, everything might function as an origin or as a copy. In other words, the operation of negation in “no this-and-that” is based on distinction, and if there is no distinction left then negation is not applicable. Hence, what we need is not a logic of *universal* everything but a logic of the *mechanism of specific change*. The change from origin to copy and from copy to origin in a specific situation, distributed over all kinds of media and media data.

The Xanadu paradigm is not answering any of those questions.

Therefore, there are at least *two* interpretations legitimately possible for a further understanding and modeling of xanalogical concepts.

One is what's going on: a hidden *type-free universalism* best modeled by a tupe-free logic. The other is what I prefer to reflect on: a transparent and explicit *polycontextural logic* for the interactions of textemes based on diamonds and their environments.

## ALL MATERIAL IS ONE

*"Transclusion is a way to include, to quote, parts of a document without losing its current (or any subsequent) contexts, and without it becoming a physical part of the new text (which could be a movie, hyperfiction document, you name it). In this fashion one might see all newly formulated or recorded texts, data, sounds, pictures as future 'boilerplate paragraphs' or fragments, available for viewing, digesting, and transclusion in new works."* (Ian Feldman)  
<http://xanadu.com.au/media/nelson90.html>

*"All the contents on all of the Xanadu storage servers act as a **single pool**. You can send for any part of any document or link to or quote any part of any document."*  
<http://www.aus.xanadu.com/xanadu/future.html>

*"5 Every document can consist of **any** number of parts each of which may be of any data type.*

*6 Every document can contain links of any type including virtual copies ("transclusions") to any other document in the system accessible to its owner.*

*7 Links are visible and can be followed from all endpoints."*

*"Transliterary structure is meant to be the fullest **generalization** of documents. This means being able to represent **all** possible document structures, and to deal with the vicissitudes of change, versioning and copyright.*

***Transliterary** structure is the latest version of the Xanadu project.*

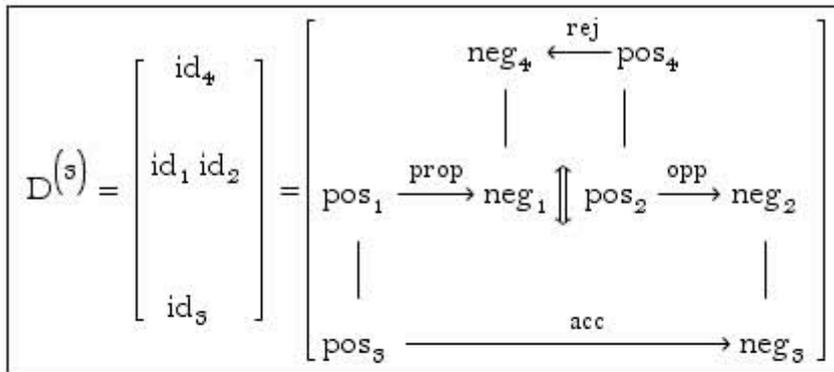
*"Documents" are packages of content constructed by authors from new and old text, audio and video, in any arrangement and pieces and desired appearance."*

<http://xanadu.com/XanaduSpace/btf.htm>

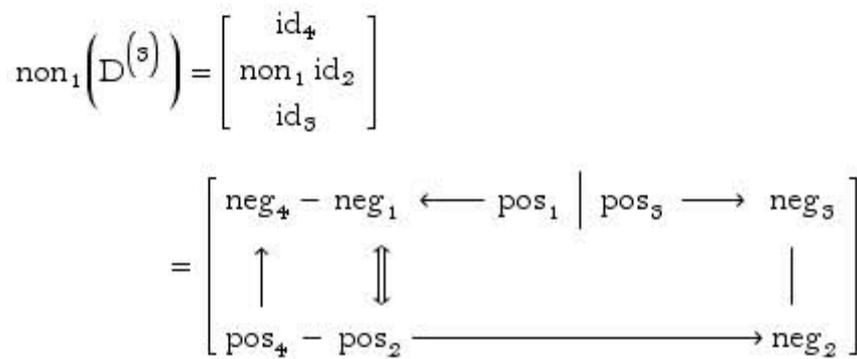
### 2.4.7. Negations for logical diamonds

**Logified diamond**<sup>(3)</sup>

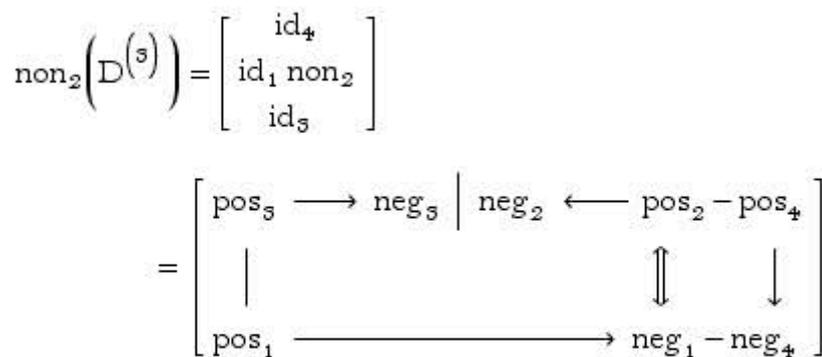
**Logified elementary diamond**



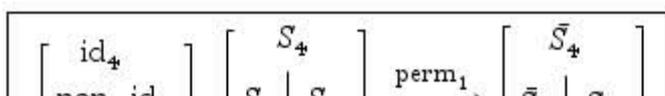
**Negation  $non_1$**



**Negation  $non_2$**



**System notation for negations  $non_i$ ,  $i = 1, 2, 3, 4$**



$$\text{neg}_1\left(\text{neg}_2\left(\text{neg}_1\left(D^{(3)}\right)\right)\right) = \text{neg}_2\left(\text{neg}_1\left(\text{neg}_2\left(D^{(3)}\right)\right)\right)$$

$$\text{neg}_1\left(\text{neg}_2\left(\text{neg}_1 D^{(3)}\right)\right) =$$

$$\left[ \begin{array}{c|c} S_4 & \\ \hline S_1 & S_2 \\ \hline S_3 & \end{array} \right] \xrightarrow{\text{perm}_1} \left[ \begin{array}{c|c} \bar{S}_4 & \\ \hline \bar{S}_1 & S_3 \\ \hline S_2 & \end{array} \right] \xrightarrow{\text{perm}_2} \left[ \begin{array}{c|c} \bar{S}_4 & \\ \hline \bar{S}_3 & S_1 \\ \hline \bar{S}_2 & \end{array} \right] \xrightarrow{\text{perm}_1} \left[ \begin{array}{c|c} \bar{S}_4 & \\ \hline \bar{S}_2 & \bar{S}_1 \\ \hline \bar{S}_3 & \end{array} \right] \cdot$$

$$\text{neg}_2\left(\text{neg}_1\left(\text{neg}_2 D^{(3)}\right)\right) =$$

$$\left[ \begin{array}{c|c} S_4 & \\ \hline S_1 & S_2 \\ \hline S_3 & \end{array} \right] \xrightarrow{\text{perm}_2} \left[ \begin{array}{c|c} S_4 & \\ \hline S_3 & \bar{S}_2 \\ \hline S_1 & \end{array} \right] \xrightarrow{\text{perm}_1} \left[ \begin{array}{c|c} \bar{S}_4 & \\ \hline S_2 & \bar{S}_3 \\ \hline \bar{S}_1 & \end{array} \right] \xrightarrow{\text{perm}_2} \left[ \begin{array}{c|c} \bar{S}_4 & \\ \hline \bar{S}_2 & \bar{S}_1 \\ \hline \bar{S}_3 & \end{array} \right] \cdot$$

*Logified diamond*<sup>(4)</sup>



**Distribution tables for (trans, conj, conj) in Logic<sup>(3)</sup>**

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <i>PM</i>             | <i>O</i> <sub>1</sub> | <i>O</i> <sub>2</sub> | <i>O</i> <sub>3</sub> | <i>PM</i>             | <i>O</i> <sub>1</sub> | <i>O</i> <sub>2</sub> | <i>O</i> <sub>3</sub> |
| <i>M</i> <sub>1</sub> | log <sub>1</sub>      | log <sub>1</sub>      | log <sub>1</sub>      | <i>M</i> <sub>1</sub> | trans                 | trans                 | trans                 |
| <i>M</i> <sub>2</sub> | ∅                     | log <sub>2</sub>      | ∅                     | <i>M</i> <sub>2</sub> | ∅                     | and                   | ∅                     |
| <i>M</i> <sub>3</sub> | ∅                     | ∅                     | log <sub>3</sub>      | <i>M</i> <sub>3</sub> | ∅                     | ∅                     | and                   |

**Logical function for (trans, conj, conj)**

$$(\oplus \wedge \wedge) : L^{(3)} * L^{(3)} \xrightarrow{(\oplus \wedge \wedge)} L^{(3)} : [L_1, (L_2 \parallel L_1), (L_3 \parallel L_1)]$$

$$\left[ \begin{array}{l} \text{Log}_1 : L_1 * L_1 \xrightarrow{\text{transjunct } \oplus} L_1 : \begin{cases} f_1 * t_1, t_1 * f_1 \longrightarrow f_2, f_3 \\ t_1 * t_1 \longrightarrow t_1, t_3 \\ f_1 * f_1 \longrightarrow f_1, t_2 \end{cases} \\ \text{Log}_2 : L_2 * L_2 \xrightarrow{\text{conjunction } \wedge} L_2 \parallel L_1 \\ \text{Log}_3 : L_3 * L_3 \xrightarrow{\text{conjunction } \wedge} L_3 \parallel L_1 \end{array} \right.$$

**Tableaux rules for transjunction with conjunctions**

|  |   |
|--|---|
| $\frac{f_1 X \oplus \wedge \wedge Y}{f_1 X \quad f_1 Y}$                                 | $\frac{f_1 X \oplus \wedge \wedge Y}{f_1 X \quad f_1 Y}$  |
| $\frac{t_2 X \oplus \wedge \wedge Y}{t_2 X \mid f_1 X \quad t_2 Y \mid f_1 Y}$           | $\frac{f_2 X \oplus \wedge \wedge Y}{f_2 X \mid f_2 Y \parallel f_1 X \mid t_1 X \quad t_1 Y \mid f_1 Y}$ |
| $\frac{t_3 X \oplus \wedge \wedge Y}{t_3 X \parallel t_1 X \quad t_3 Y \parallel t_1 Y}$ | $\frac{f_3 X \oplus \wedge \wedge Y}{f_3 X \mid f_3 Y \parallel f_1 X \mid t_1 X \quad t_1 Y \mid f_1 Y}$ |

**2.4.9. Transjunctions in textemes**

Transjunction are naturally modeled in semiotics and textemes following the strategy

sketched above. The conditions for transjunctions and transclusions in general are distributed and mediated systems, like logics, semiotics, diamonds and textemes. Textemes are taking place, occupying a structural locus, this enables interactions, transclusions and transjunctions, between autonomous systems.

| transjunction in Semiotics <sup>(3)</sup> |             |             |             |
|---|-------------|-------------|-------------|
| $PM$                                      | $\circ 1$   | $\circ 2$   | $\circ 3$   |
| $M1$                                      | sem1        | sem1        | sem1        |
| $M2$                                      | $\emptyset$ | sem2        | $\emptyset$ |
| $M3$                                      | $\emptyset$ | $\emptyset$ | sem3        |

## 2.5. Structure of environments for transclusions in textemes

The structural possibilities of environments are now offering different realizations of interactions, concretized as links, transclusions and other interactions.

Depending on the complexity of interplaying textemes, different structural possibilities for interaction for interactionality, reflexivity to interventionality are accessible for implementation.

Depending on the structure of the common environments, actions like reflection, interaction and intervention are available and supported for interplaying textemes.

*Reflection:* Bidirectional environments are offering minimal requisites for mutual reflection .

*Interaction:* Mutual autonomy of different environments are enabling interaction.

*Intervention:* Different antidromic environments offer the possibility of intervention between the different environmental systems.

The bilateral interaction between the two isomorphic environments is a new topic added to the unilateral environment of diamonds.

$$(1): \boxed{l_{\omega} \longleftrightarrow l_{\alpha}}$$

In this case (1), both actors are agreeing to accept a common environment.

$$(2): \boxed{l_{\omega} \rightleftarrows l_{\alpha}}$$

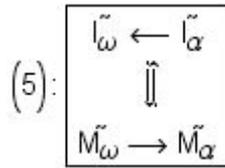
In this case (2), both actors agree in the autonomy and simultaneity of their environments, which are accepted as their common environment.

$$(3): \boxed{\begin{array}{l} l_{\omega} \leftarrow l_{\alpha} \\ M_{\omega} \leftarrow M_{\alpha} \end{array}}$$

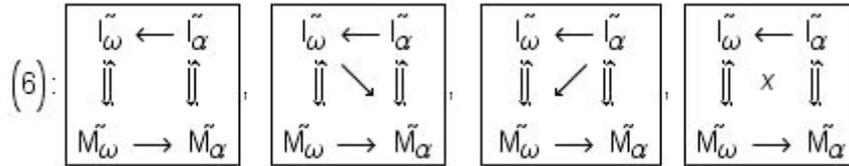
In this case (3), two different environments are accepted as the common environment. A further task would be to analyze their intra-environmental structure of cooperation.

$$(4): \boxed{\begin{array}{l} l_{\omega} \leftarrow l_{\alpha} \\ M_{\omega} \rightarrow M_{\alpha} \end{array}}$$

In this case (4), two different, antidromic autonomous environments are accepted as the common environment of the texteme.



In this case (5), two different and antidromic environments are accepted as the common environment of the texteme and *interventional* activities between both environments are possible.



In this cases (6), new combinations of textemes are required to realize parallel and orthogonal interactions. Further combinations might be introduced as applications of different patterns.