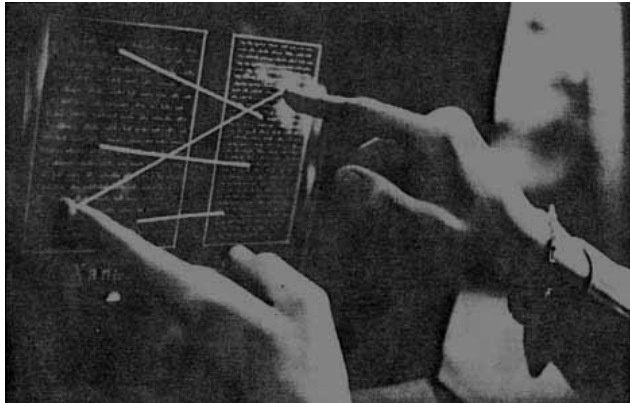


FORMATTING NON-LINEARITY

Typography as a structural context for multi-linear fiction

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Ted Nelson's Xanadu presentation, 1972



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I. SHAPING THE NARRATIVE MATTER

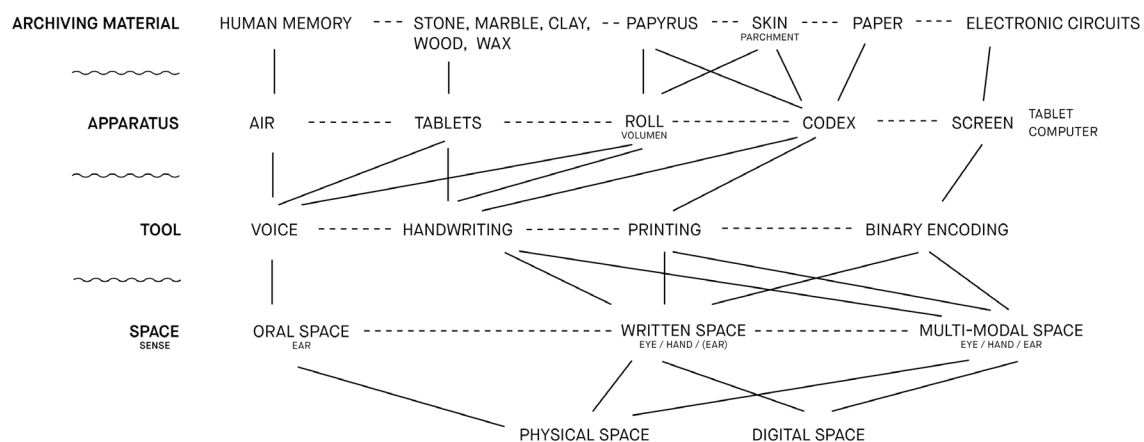
Archiving material, apparatus, tools and spaces of narration.

The history of narrative forms and their modalities of formatting is vast, complex and obviously impossible to be fully circumscribed. What we will try to produce, as an introduction, is a general historical insight of the technical evolution(s) of this shaping, according to four correlative parameters: archiving materials, apparatus, tools and spaces.

As a starting point, we can postulate that all narration, firstly the fruit of someone's mental activity, is primarily shaped through the technology of language, and then, neither organized nor perceptible yet, needs to be physically shaped to be communicated to others (through speech, writing, images...). In the specific case of written narration, it will seem relevant to explore the dichotomy that Emmanuel Souchier describes in his article *Image of the Text*, distinguishing the *first text* and the *second text*.¹ The first text, according to Souchier, being the essential and shapeless text, and the second text being its « editorial enunciation », or in other words, what gives the text a physical existence, what shapes the text for the eyes of the reader.

We will come back to this dichotomy in the third part of this chapter, *The image of the text*.

Diagram n.1⁽²⁾



The *Diagram n.1* is an attempt to describe, according to four basic parameters, the evolving modalities of a very global *editorial enunciation*, of the « molds » in which the narration slipped in in the past centuries. Looking at the diagram, it becomes obvious that the parameters, considered as four aspects of this *editorial enunciation*, have been evolving in a parallel systemic way, but that their relations were neither systematic nor exclusive. This chronology underlines the permanent and various remediations that happened in the very long history of shaping narrative objects, and probably helps us to visualize possible shifts that had the opportunity to occur within this system.

1. *L'image du Texte, pour une théorie de l'énonciation éditoriale* in *Les cahiers de Médiologie*, E. Souchier, 1998, Gallimard

If Souchier borrows the terms of *first* and *second text* to Roland Barthes, he doesn't use them in the exact same paradigm. Roland Barthes uses them in the abstract context of semiotics and language, as Souchier applies them to what he calls the "analogical" context of editorial practices.

2. This diagram is based on the various historical medium remediations Jay Bolter describes in his book *Writing Spaces : Computers, Hypertext and the remediation of print*, (2001) :

« In about the 8th century BC, the Greeks began to refashion the space of oral mythology and heroic legend into the more precise and linear space of the papyrus roll (and stone written inscription), a process that, according to Eric Havelock (1982), lasted hundreds of years. In late antiquity the shift from papyrus roll to codex refashioned the space again, making more effective use of the two-dimensional surface to deploy text. In Western Europe, the shift from handwritten codex to printed book was another such refashioning, and the shift from electronic writing is yet another. [...] Writing on papyrus remediated oral communication by involving the eye as well as the ear and so giving words a different claim to reality. [...] In the Renaissance the printed book remediated the manuscript by appearing to provide the same visual space as the manuscript with the added benefits of mass production. »

The word *remediation* is commonly defined as « the correction of something bad or defective ». From latin *remedio* (cure, medicine), it is habitually used in the context of problem solving.

Although the etymology we are using here — as author Jay Bolter first did — is far different, it seemed interesting to point the double use of this word. In the context of media archaeology, the term remediation is used as a neologism coming from *re-mediate*, as in *re-defining* medias.

« We can call each such shift a "remediation", in the sense that a newer medium takes the place of an older one, borrowing and reorganizing the characteristics of writing in the older medium and reforming its cultural space ».³

Through the evolution of technics and mediums, the modalities of transmitting narration were often and strongly re-defined. These re-definitions (or remediations) therefore redefined the shape of the text, and, a fortiori, the enunciated content itself.

A logical part of the act of remediation (that is not always operated) could be roughly summed up as an action of identification: the identification of what is specific to each medium, and what could be the new logical appropriated use of them. *The Diagram n.1*, as a global overview, settles a context in which we can identify some strange moments in history, when — displacing narration from one apparatus to another, using one tool or another — some unexpected *bugs* happened in this remediation. The word *bug* is not used in a pejorative way here, but more in the perspective of a distorted use of mediums, creating a kind of pleasant uncanny. We can even dare to describe those bugs as a kind of *proto-hacking* of the functional potentialities the medium had.

The aim is to point out the fact that when a new apparatus or tool is invented, — what Marshall McLuhan describes as mediums or environments — it usually takes some time to fully understand their specific potentialities.

Remediating new technologies into older molds, or the other way around: establishing ancient technologies into new molds, are recurrent *bugs* that happened in remediation processes. These *bugs* stand as natural witnesses of the need of continuity that is necessary through the evolution of technics, and yet account of a certain incongruity.

As an example of these distorted remediations, we can point out the interesting case of out-loud reading. For centuries, the distinction between the written space and the space of orality was far from been obvious. The (extremely linear) lay-outings of tables and volumen were in fact reproducing the rhythm of speech, mimicking pure orality:

« For the Greeks, letters usually follow each other without any separation ; and from the 1st century AD, for Romans, scribes just sometimes isolate syllables to make the pronunciation easier. As well, the punctuation often stays elementary and is limited - at least for the Romans - to some points situated on different levels, and to some blanks, in the best case. » ⁴

What we observe here is that the space of orality and the written space, as the voice and the handwriting, cohabited together through many apparatus : tables, volumen and even the early codex.

The full appropriation of this « new » space that was the written space took an extremely long time. It has not been obvious to identify its specific intrinsic potentialities, to eventually separate written space from oral space and discover the new functionalities it could offer. These specificities will emerge with the invention of the codex, allowing autonomous silent reading and an easier navigation through the enunciated content.

Another example of laborious remediation is the amusing propensity Gutenberg had, producing his first printed incunables, to mimic with his machine the familiar handwriting of the monks to ward off the terrified detractors of his invention. He would use the same lay-outing and

3. *Writing Space: Computers, Hypertext, and the Remediation of Print*, Jay Bolter, 2001, p.23

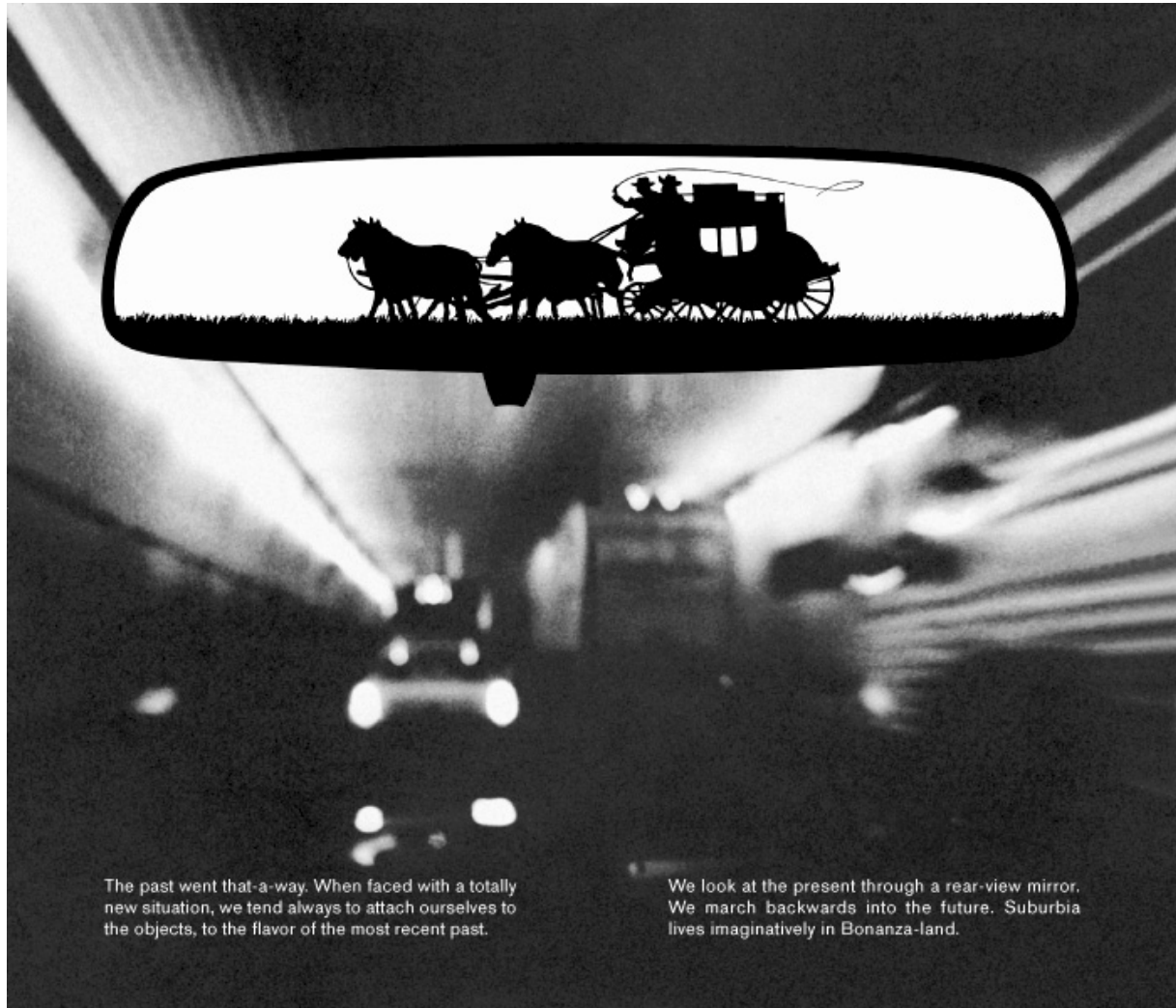
4. Henri-Jean MARTIN, Martine POULAIN, « LECTURE », digital ressources of Encyclopædia Universalis

typefaces — what we can consider a classic remediating imitation of what pre-existed —, but he would even go up to imitate deletions and errors, to make his books seem more familiar to readers.

It's not the space but the tools which are shifted here, again, witnessing a need of continuity that eventually makes full appropriation of new mediums longer to happen.

What to say today about Ipad's turning pages animation (even mimicking the sound of it), wooden bookshelves in the iBooks application, or leather ornamentation of OS X's calendar ?

Marshall McLuhan, *The medium is the message*, 1967, Penguin books ⁽⁵⁾



The aim here is not to denounce these necessary steps of appropriation, but to refer to ancient practices to better apprehend today's new spaces, apparatuses, materials and tools, in order to identify more recent shiftings and remediation processes in full consciousness of their historical existence.

5. For Marshall McLuhan, the constant re-definition of mediums is a central problematic. According to him, mediums are "invisible environments" which are in fact "active processes" that he suggests should be brought to awareness to be fully apprehended in their present temporality,

The technology of the codex

The most ancient papyrus roll we know, found in Saqqarah, dates back from 2900 BC⁶, and Anne Berthier dates the effective supplant of the roll by the codex in the 4th C AD in the West, and in the 5th C AD in the Byzantine Empire.⁷ For approximately 3500 years, the papyrus roll (volumen) has thus been the nearly hegemonic form of the book.

Nevertheless, antic authors related that in the 2nd century BC, Egyptian emperor Ptolemy decided to forbid papyrus exportation to the city of Pergamon — located in actual Turkey — because its library would compete with Alexandria's grand library. This embargo favored the apparition of an alternative material: skin parchment. Cutting this new material into sheets permitted later, around the 1st C AD, the invention of the codex, that we still use today⁸. Folded and stitched, the sheets were assembled in signatures, creating the idea of the page as a separated, autonomous and discontinuous space; or what Robert Darnton calls a «unit of perception».⁹

The shift from the unwieldy volumen to the smaller and easy-to-handle codex was a major change in our way to organize and perceive written text.

The volumen was heavy, and as a roll, had two bindings. It therefore needed to be handled with two hands. It was linearly written for a linear out-loud reading. On the contrary, the codex, with its single binding side, was light, maniable and portable. The very specific organization of autonomous sheets allowed a simplicity of navigation that was completely new, freed from the arbitrary linearity of the roll. The codex was first massively used by christians, who widely diffused their holy texts through this very accessible form. It is interesting to notice that the first texts that spreaded through the codex were highly hypertextual - religious gospels being fragmentary, multi-authored, multi-linear, admitting versioning and involving persistent occurrences. The case of synoptic gospels, of which comparative reading modality was defined by certain needs^{9,1}, is one of the primary forms of the hypertextual system to come.

The codex not only permitted an easier handling of the text, but with the hand left free by the single binding, it allowed personal annotation and margin comments — that would be used a lot in religious books, with the practice of *marginal glosses*, permitting the fragmentation of the page, allowing several spaces for multiple commentary and authorship. It radically displaced the status of the reader, who was not passively reading anymore, but could interact with the text in a total different manner, presaging the extreme interactivity coming with the emergence of electronic devices in the mid-20th century.

The many navigation systems such as pagination, chapters and indexes also participated in the birth of a non-continuous selective reading. The emergence of this silent and selective reading, also due to the separation of the words in lay-outing, permitted a quicker reading that would have, a «decisive impact on the development of critical thought», as Jocelyne Rouis explains it.¹⁰

She goes on: «Written matter [then] goes beyond its function of preservation and memorization, and is copied in purposes of reading and intellectual work.»

For Colette Sirat, this selective and non continuous reading «contributes to the elaboration of mental structures where the text is separated from the speech and its rhythm».¹¹

6. Fernando Báez, *Los primeros libros de la humanidad*, Forcola, 2013

7. Anne Berthier, *Du volumen au codex*, digital resources of Bibliothèque Nationale de France.

8. Codices made of wooden tablets had in fact existed for a long time, but didn't expand the way parchment codex did.

9. Robert Darnton, "The Library in the New Age" in *The New York Review of Books*, 2008

9.1. "De là, l'adaptation de la forme nouvelle du livre aux besoins textuels propres au christianisme : à savoir, la confrontation des évangiles et la mobilisation, aux fins de la prédication, du culte ou de la prière, de citations de la parole sacrée.", Roger Chartier, *Du codex à l'écran : les trajectoires de l'écrit*, 1994, Presses Universitaires de Rennes.

10. Jocelyne Rouis, *L'Imprimé au XX^e siècle*, 2002

11. Colette Sirat, « Du rouleau au codex », dans *Le Livre au Moyen Age*, sous la dir. de Jean Glénisson, Paris, Presses du CNRS, 1988.

The technology of the codex hence already carried in its formal structure some of the characteristics of the computational hypertext to come, such as a potential non-linear navigation, a (basic) interactivity with the reader and a relative easiness of diffusion.

Despite this malleable apparatus, a linear model of writing largely imposed itself through centuries, in the context of narration. This linear model might be, according to McLuhan, inherent to our alphabet itself :

“The alphabet is construct of fragmented bits and parts which have no semantic meaning in themselves, and which must strung together in a line, bead-like, in a prescribed order. Its use fostered and encouraged the habit of perceiving all environment in visual and spatial terms — particularly in terms of a space and of a time that are uniform, c,o,n,t,i,n,u,o,u,s and c-o-n-n-e-c-t-e-d. The line, the continuum — this sentence is a prime example — became the organizing principle of life[...] “Rationality” and logic came to depend on the presentation of connected and sequential facts or concepts”.

(Marshall McLuhan, *The medium is the message*, p.44-45 1967, Penguin books)

The image of the text

As mentioned earlier, in his essay *The image of the text*¹², Emmanuel Souchier theorizes the existence of a dichotomy between the shapeless text and its way of existing in the world through physical embodiment, what he calls its *editorial enunciation* :

« If I consider analogically the semeiological shift operated by Roland Barthes¹³, I can define editorial enunciation as a “second text”, in which the significant is not built by the words of the language, but by the materiality of the medium and writing, the organization of the text, its formatting, or shortly said, by everything that allows its material existence. »

For Souchier, the *editorial enunciation* involves the whole observable context existing around the text. This context is defined as much on material aspects (cover, format, paper, lay-out...) as in a wider publishing environment (title, collection, traduction, price... or what Gérard Genette calls the *paratext*¹⁴). As Genette before him, Souchier defends the idea that « [...] the reader should not be blinded by the apparent “transparency” of the text, in order to be attentive to its objectality. » The next step for Souchier is to point out how a conscious disturbance of this *editorial enunciation* can reveal a certain traditional transparency of mediums (or « invisible environments », for Marshall McLuhan).

« Editorial enunciation can sometimes be made visible by the author, especially when he decides to make it one of the major problematics of his work. These cases of exhibition allow us to reflect on all the other cases which hide under the obviousness of “infra-ordinary” or under the “false neutrality of classic”. »¹⁵

12. *L'image du Texte, pour une théorie de l'énonciation éditoriale* in *Les cahiers de Médiologie*, E. Souchier, 1998, Gallimard

13. « J'écris : ceci est le premier degré du langage. Puis, j'écris que j'écris : c'en est le second degré. », *Roland Barthes par Roland Barthes*, Roland Barthes, 1975, Seuil.

14. « Il s'agit ici des seuils du texte littéraire, qu'on nommera aussi, d'un terme plus technique, le paratexte : présentation éditoriale, nom de l'auteur, titres, dédicaces, épigraphes, préfaces, notes, interviews et entretiens, confidences plus ou moins calculées, et autres avertissements en quatrième page de couverture. Car les œuvres littéraires, au moins depuis l'invention du livre, ne se présentent jamais en société sous la forme d'un texte nu : elles l'entourent d'un appareil qui le complète et le protège, en imposant au public un mode d'emploi et une interprétation conforme au dessein de l'auteur. », Gérard Genette, *Seuils*, 1987, Ed. Seuil.

15. Ibid¹²

By mentioning a few examples of texts for which a specific material formatting is the *sine qua non* condition of existence¹⁶, Souchier points out the fact that the *editorial enunciation* establishes a certain reading mode, to which the reader is strongly subjected, but that can nevertheless be manipulated, disturbed and brought to awareness.

We will later see in what way, and for what purposes such a disturbance of the codex apparatus has been investigated by many authors of the 20th century. We will focus on authors who re-fashioned the traditional environment of the codex to adapt it to their needs, instead of casting their work in pre-existing molds.

We will identify what modalities of a relatively recent system of organizing information, the hypertextual system, can be found in several literary works yet using the medium of the codex. By studying authors who were clearly influenced by this system, or who happened to foresee this system by producing *proto-hypertexts*, we'll try to identify a particular case of remediation: the hybridization of the codex apparatus with digital-born hypertextual modalities of writing and formatting.¹⁷

In the second part of this study, we will develop further on *remediations* that operated at the end of the 20th century, when narration shifted from physical to digital space, and from written space to multi-modal space.

16. Souchier particularly mentions Raymond Quenau's *Cent mille milliards de poèmes*, lay-outed by Robert Massin, and *Composition n°1*, by Marc Saporta, that we will also study later.

17. We will see that hypertextual systems pre-existed the digital era, but we will notice how the birth of computational environments powerfully favored their development and impact on thinking, writing and reading.

II. WRITING AND READING IN THE HYPERTEXT

Origins and characteristics of hypertext as a system

« At last we can escape from the prison of paper. » ¹⁸

If the word hypertext was firstly suggested by Ted Nelson in 1965 ¹⁹ in the context of informatics, the system had been theorized decades before (by Vannevar Bush, mainly), and had even pre-existed computational era, in the analogical form of Diderot and d'Alembert's encyclopedia, or, as mentioned earlier, in the christians' synoptic use of the codex and in the practice of marginal glosses.

A hypertextual system relies on the use of nodes of information, related to each other by hyperlinks. The multi-linear and associative nature of the navigation implied by such an organizational system strongly refashioned the sequential and circumscribed organization of information that prevailed within the technology of the codex.

« A text is a linear structure, more or less subjected to hierarchy. Textual elements, more or less autonomous, are linked by ORDER relations.

A hypertext is a NETWORKED structure : textual elements are nodes that are linked by non-linear relations, lowly subjected to hierarchy. » ²⁰

The origins of computational hypertextual system as defined today are multiple — from Paul Otlet's *Mundaneum*, to Vannevar Bush's *Memex*, Doug Engelbart's *oN-Line System* (funded by the american government) or Ted Nelson's *Project Xanadu* — but it seems that the different studies led in this domain relied on the same basic motivations. The development of computing sciences permitted the above-mentioned few pioneers to invent a structure that would fit their specific needs, instead of again, casting their work in existing structural molds. We'll specifically study the cases of Vannevar Bush's *Memex* and Ted Nelson's *Xanadu*.

For Vannevar Bush, who theorized the *Memex* (Memory Extender) in his 1945 article *As we may think* ²¹, two major needs can be identified. Firstly, the need which originated the birth of writing itself, and which gave its name to Bush's theoretical system, of an *extended memory*.

« A Memex is a device in which an individual stores all his books, records, and communications [in the form of microfilms], and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory. » ²²

Roger Laufer and Domenico Scavetta point out that « the birth of hypertext is fundamentally linked to a fantasy of absolute and total memorization, a memorization in which informations would pile up on each other, never to disappear. » ²³

Not only Bush imagines the Memex as an extension of memory, but he also thinks of its modal-

18. Ted Nelson demonstrates *XanaduSpace*, 2008, https://www.youtube.com/watch?v=En_2T7KH6RA

19. « Let me introduce the word 'hypertext' to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper », Ted Nelson, 1965, *A File Structure for the Complex, the Changing, and the Indeterminate in Association for Computing Machinery: Proceedings of the 20th National Conference*, ACM Press.

20. Roger Laufer and Domenico Scavetta, *Texte, Hypertexte, Hypermedia*, 1992, Presses Universitaires de France

21. Vannevar Bush, *As we may think*, 1945, The Atlantic

22. Ibid. ²¹

23. Ibid. ²⁰

ities of storing, updating the concept of library in the context of the electrical era, foreseeing what will become the digital era's *databases*.

The second need appearing through Bush's system, linked to the problematic of infinite memory, is the need for a system that would get closer to what he considers being the human way of thinking: a multi-linear path built on associative jumpings.

« The human mind [...] operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain. » ²⁴

Bush's approach is to try to create a storage tool that is more adapted to human needs, instead of staying subjected to inherited storage forms from the paper era (like the traditionally alphabetical organization of books in a physical library).

His idea is that the massive amount of entries in the *Memex* should be linked together by the user (referred to as a *trail blazer*), who then creates his/her own paths of navigation within the system, according to his/her own judgement criterion.

The same need to liberate from ancient modalities operates for Ted Nelson, with *Project Xanadu*, that he started to theorize in 1960. *Xanadu* never succeeded in supplanting its contemporary concurrent system, the *World Wide Web*, and therefore never had the opportunity to be fully developed, but Nelson strongly documented his research and produced a lot of prototype versions of his system. *Xanadu*, as Nelson imagined it, should have been a huge ensemble of servers linked together in a wide system permitting the rhizomatic organization, exchange and concurrent editing of a huge amount of documents. The need to get out of the sequentiality of writing was a major motivation for Nelson, as the possibility to produce widely-accessible and multi-authored documents.

Ted Nelson, as Vannevar Bush, underlines the inadequacy of linear writing models when confronted to human thought's dynamics :

« Writing is not intrinsically sequential. Sequential writing spoils the unity and structure and forces a single inappropriate read sequence. A particular sequential structure might be appropriate for someone and inappropriate for someone else. It would be preferable to easily create different pathways for different readers. [...] The sequential structure has been too much present for thousands of years. It does not correspond to the structure of ideas and thought processes. » ²⁵

Going further, Nelson gives great importance to the links building his system, acting for him as so many indicators of the inner structure of the text.

« Hypertext will lead a better representation of thought, because it can show all interconnections one can think of.[...] On a computer screen, one should see the true structure of the text, of information. » ²⁶

For Nelson, hypertext in a computing environment should provide the powerful possibility of overviewing what could be called the *superstructure* of information, which seems impossible in a physical context. For the last four decades, Nelson has fought against what he considers to be a wrong remediation, denouncing the widespread propensity to imitate the physical paper page in the digital environment, instead of inventing new modalities of showing documents, that would, according to him, be more adapted to the digital apparatus that the screen is.

24. Ibid.²¹

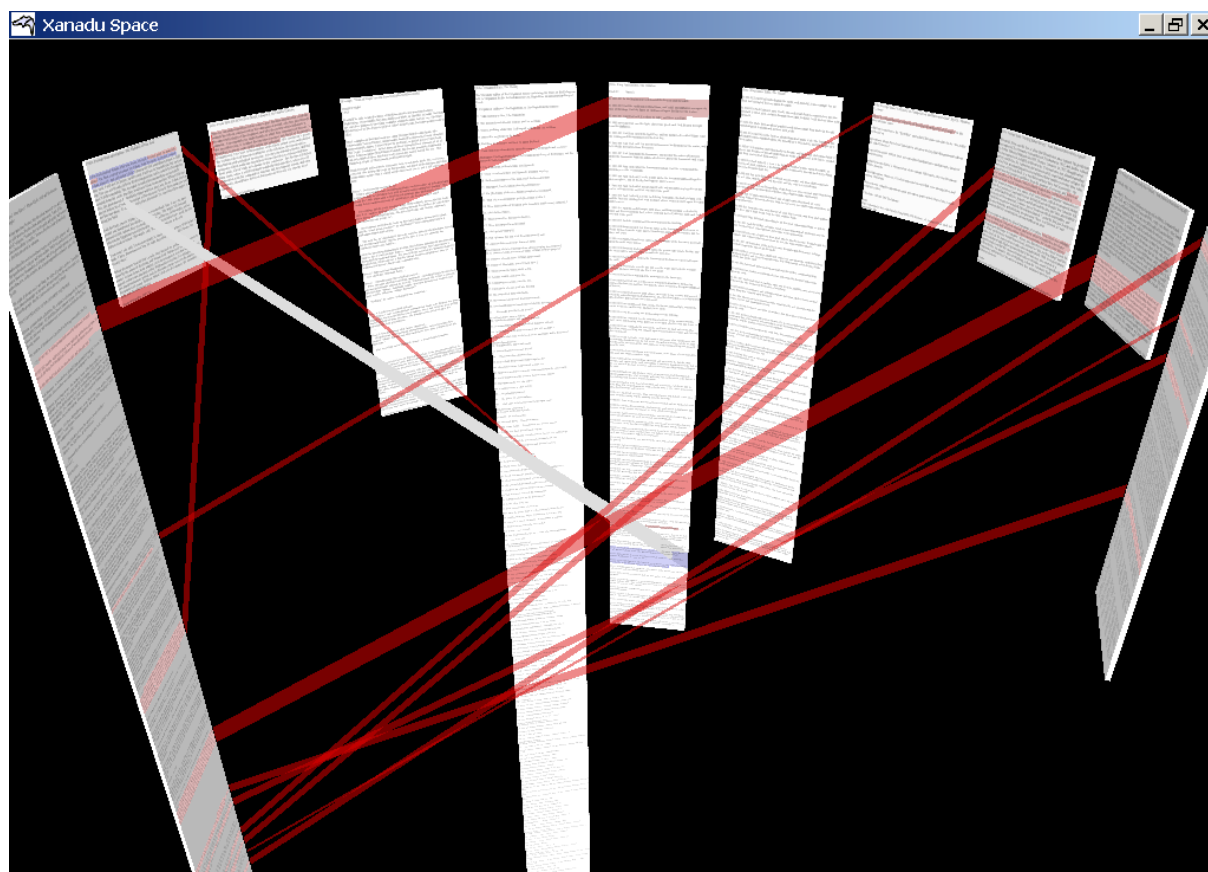
25. Ted Nelson, *Literary Machines*, 1980, Mindful Press

26. Ibid.²⁵

« The purpose of hypertext was always to make up for the deficiencies of paper. Paper cannot easily show connections, has very limited space, and forces an inflexible rectangular arrangement. Hypertext, the generalization of writing, potentially offers many forms of interconnection and presentation beyond what paper allows. But so far the mechanisms, not the users, have been put in control. »²⁷

Nelson's mistrust towards the remediation of paper into the computer is the reason why he developed in 2007 his *XanaduSpace* software, designed to explore correlated documents in a 3D space, showing the hyperlinks existing within the ensemble and permitting side-by-side reading.

Ted Nelson demonstrates XanaduSpace, 2008



It is relevant to notice that in his demonstration video of the software, Nelson uses the Synoptic gospels as an example, showing a possible utility of side-by-side reading.²⁸

The spatialization of information, that is actually inherent to every hypertext system, is made visible in Nelson's software prototype.

The notion of spatiality is central in hypertext.

« The screen should not be considered as a page, but as a three-dimensional space, with its width, height and depth, as if the texts were reaching the surface of the screen from the bottom of the device. Consequently, in the digital space, it is not the object that is folded, like in the case of the printed sheet, but the text itself. The act of reading then consists in 'unfolding' this mobile and infinite textuality. »²⁹

27. Ted Nelson and Robert Adamson Smith, *BACK TO THE FUTURE: Hypertext the Way It Used To Be*, 2007, <http://xanadu.com/XanaduSpace/btf.htm>

28. Ibid. 18

29. Roger Chartier, *De l'écrit sur l'écran. Écriture électronique et ordre du discours*, lecture in the symposium *Les écritures d'écran : histoire, pratiques et espaces sur le Web*, 2005, Maison Méditerranéenne des Sciences de l'Homme.

Roger Laufer and Domenico Scavetta notice that «**the volumen's page is attached by two sides, the codex's by one side, and the hypertext's by none**»³⁰, but we can maybe assert, in the light of Chartier's statement, that the hypertext's page is in fact attached by the *terms* themselves, its hyperlinks working as a form of *internal binding*, structuring the text in a semantic way, instead of the linear sequential way traditionally imposed by paper.

The technology of the codex eventually implied the birth of the *libro unitario*, defined by Armando Petrucci in the 14th century as the idea of the text as a finite object, taking place in a closed apparatus: the book (in opposition to the transversal dimension of text at the volumen era).³¹ Hypertext, with its potential «infinite textuality» seems to challenge this finite aspect of the text.

In his famous short story *The Book of Sand*, Jorge Luis Borgès explores the paradoxal existence of an infinite content inside a closed object.

«The line is made up of an infinite number of points; the plane of an infinite number of lines; the volume of an infinite number of planes; the hypervolume of an infinite number of volumes. [...] It can't be, but it is. The number of pages in this book is no more or less than infinite. None is the first page, none the last. [...] I thought of fire, but I feared that the burning of an infinite book might likewise prove infinite and suffocate the planet with smoke.»³²

In a related paradoxal situation, Laufer and Scavetta identify a certain property of *simultaneity* in the reading modality of the hypertext, describing a facilitated «simultaneous access to datas», mainly encouraged by the screen-related practice of multi-windowing. They although then state that «no more than a hypercube, a hypertext or hypermedia can be directly accessible to our senses as such».³³

The infinity of hypertext cannot co-exist with the full simultaneity it theoretically implies, therefore, a way needs to be chosen to explore the system.

If hypertext is indeed liberated from finitude, it is not necessarily in the concatenation of an endless amount of elements (a hypertext can be circumscribed to a predefined number of elements), but rather through the potential infinite *paths* that the reader can follow.

The hypertext is built by the user himself, who, as a «trail blazer», unfolds the text in a unique way, subjected to his own reading process and choices. More than non-linear, hypertext is rather *multi-linear*: proposing a huge variety of different linearities, more or less multi-spatialized, within a coherent system.

Considering the spatiality of the hypertext, George Landow explains: «**Hypertext, in other words, provides an infinitely re-centerable system whose provisional point of focus depends upon the reader, who becomes a truly active reader in yet another sense.**»³⁴. From this perspective, hypertext could then be considered as a fixed system, on which the reader would have a moving point of view, becoming what Landow calls a *wreader*, so to say a *writer* as much of a *reader*. A moving point of view therefore implies the quasi-simultaneous co-existence of several points of view on one object, reminding the problematics of cubist painting.³⁵

30. Ibid.²⁰

31. Ibid.²⁹

32. Jorge Luis Borgès, *El libro de arena*, 1975, Emecé

33. Ibid. 20

34. George Landow, *Hypertext, The convergence of contemporary critical theory and technology*, 1992, The John Hopkins University Press.

35. Staying in the topic of painting, and concerning simultaneous vision, we can dare to make a link between hypertext and what John Berger declares in his 1972 tv show *Ways of Seeing*: «In a painting all its elements are there to be seen simultaneously. The spectator may need time to examine each element of the painting but whenever he reaches a conclusion, the simultaneity of the whole painting is there to reverse or qualify his conclusion. The painting maintains its own authority.»

Unlike the codex, the hypertext's context, unstable, is constituted by the reading path itself, creating an organic space to explore, an active environment to navigate through (even though the system's architecture is fixed).

Christian Vanderdorpe notices how such a context influences the reader :

« [An hypertext] cannot rely on the work of interpretation that the reader accomplishes in a linear text, from the immediate context and his anterior reading [...] If the book has, from the start, a totalising function and aims to saturate a domain of knowledge, hypertext, on the contrary, invites to multiply hyperlinks in a will to saturate associations of ideas [...]. » ³⁶

Writing and reading in the hypertext is therefore far different from reading in the space of the book. It destroys the safety of continuous reading, disturbs the notions of beginning and end present in the *libro unitario*, and questions the usual hierarchy settled between author and reader. We'll now describe how these different properties of the hypertext have seduced authors who started to experiment electronic literature in the 1990's, and we'll later analyze how such properties have also been explored in the context of the physical codex's apparatus.

The "text" in "hypertext" : electronic hyperfiction

The first hypertext systems, theorized by Vannevar Bush (in the 40's) and later developed by Douglas Engelbart ³⁷ or Ted Nelson ³⁸ (in the 60's), were originally rather inscribed in a scientific context : the common aim was to create organization and communication systems that would allow collaborative work and a facilitated way to share scientific documents. It nevertheless took a while before fiction authors start to show interest for these computational systems, from the very end of the 80's.

afternoon, a story, by Michael Joyce, is considered as one of the first hypertext fictions. It was published in 1987, on floppy disk, by Eastgate Systems.

Jean Clément describes the way Michael Joyce proposes to navigate through the story :

« The text *afternoon, as story*, is composed of 539 screen-pages linked together by 950 hyperlinks. The sequential reading of these 539 pages is not possible. If the reader simply goes from one page to another using the enter button, he can only read a very small part of the story, that is 35 pages. Doing that, he would have travel through a story, but an incomplete and deficient story [...]. To read the other pages, he must intervene in the progress of narration by making choices. The *dispositif* in fact proposes the reader an alternate way to travel through the story. He can answer to questions with yes or no, or click on words that seem interesting to him and that will lead him to new pages. » ³⁹

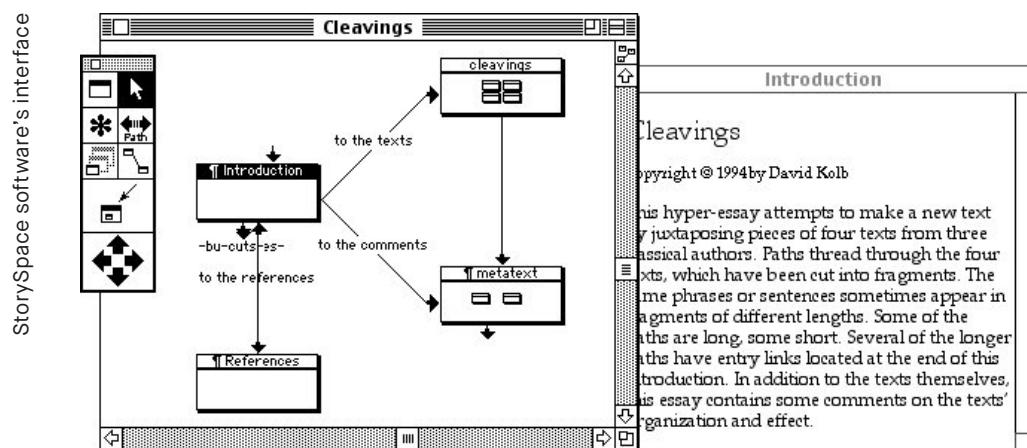
The particularity of this pioneer work is the correlative creation of its environment of writing : *Story Space*. Created by author Michael Joyce himself and literature and computer sciences professor Jay David Bolter, *Story Space* is a software permitting hypertextual writing and reading, in the specific context of fiction. *Story Space*'s interface in editing mode permits the simultaneous editing of text or images fragments and of a spatial and interrelated diagrammatic overview of the multiplicity of fragments that constitutes the work. It also permits the integration of images to the narration.

36. Christian Vanderdorpe, *Du Papyrus à l'Hypertexte*, 1999, La Découverte

37. « Designed by Douglas Engelbart and implemented by researchers at the Augmentation Research Center (ARC) at the Stanford Research Institute (SRI), the NLS system was the first to employ the practical use of hypertext links, the mouse, raster-scan video monitors, information organized by relevance, screen windowing, presentation programs, and other modern computing concepts. » Wikipedia, *NLS (computer system)*

38. Ted Nelson considered his Xanadu in a wide perspective, as a "digital repository scheme for world-wide electronic publishing", but his personal interest would rather go towards philosophy and computational sciences, and Xanadu didn't turn out to be the environment of major fictional work.

39. Jean Clément, *Afternoon, a Story, du narratif au poétique dans l'oeuvre hypertextuelle*, 2000, online ressources of Université Paris 8



The case of *Story Space*, a specific tool designed for specific needs, echoes our further analysis of the way authors distorted the classical use of the codex to reveal it as a malleable and unique environment, adapted to their needs.

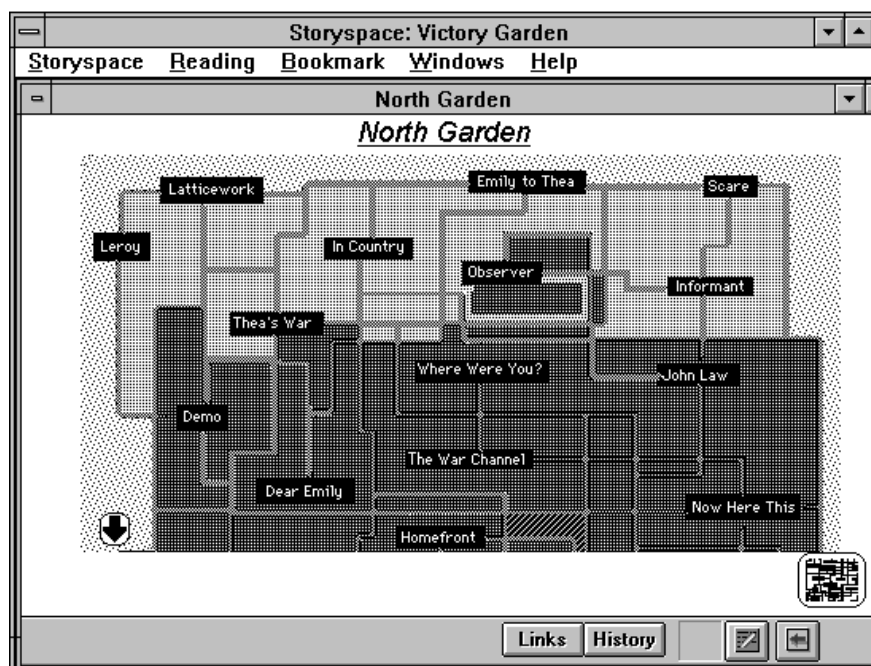
As much as the writing tool itself strongly depended on the author's first will, being designed for certain needs, we can state that the shape of the fiction that is produced is strongly dependent to the tool. The production is specific to the writing environment. The interrelation between first and second text, between the tool/apparatus combo and the content, is central, and more importantly : consciously designed.

afternoon, a story encompasses all the characteristics of the hypertext described earlier, activating them in the domain of fiction : multi-linearity, simultaneity, multiple points of view on one story, shift of temporalities, interrupted narration (« littérature de l'inachèvement »⁴⁰), interactivity (the « wreader » is actively participating to the development of the story), the possibility of wandering, and a complete disturbance of the concept of finitude.

Joyce reminds: « Closure is, as in any fiction, a suspect quality, although here it is made manifest. When the story no longer progresses, or when it cycles, or when you tire of the paths, the experience of reading it ends. »⁴¹

40. Ibid.³⁹

41. Michael Joyce, in one of the lexias of *afternoon, a story*, 1987



Another fiction produced in *Story Space*, a few years after Michael Joyce's, is *Victory Garden*, by Stuart Moulthrop (1992), also released by Eastgate Systems.

If *afternoon*, a story was mainly textual, proposing several ways through textual lexias without showing the full structure of the story, *Victory Garden* inscribes in a spatial dimension.

As a tribute to *The Garden of forking paths*⁴², Moulthrop located his story in a garden, presenting the different elements of the story as places to visit, organized as a visual map (the narration is scattered in 105 spaces, interconnected by almost 500 links).

Another characteristic of hypertext, spatiality, is fully exploited here. The possible paths are revealed, the structuring relations of narration are visible (echoing Ted Nelson's wish to « see the true structure of the text »). Both metonymic (metonymy of time and space) and structuring, the symbol of the garden also invites to wandering⁴³.

The idea of deploying a story in the form of a cartography is also fundamental in Chris Marker's *Immemory* CD-ROM, as Annick Rivoire explains it: « Chris Marker a donc entrepris une cartographie de la mémoire, la sienne, la nôtre, organisée en "zones" géographiques: "guerre", "poésie", "cinéma", "voyage", "photographie", "musée" et "mémoire". »⁴⁴

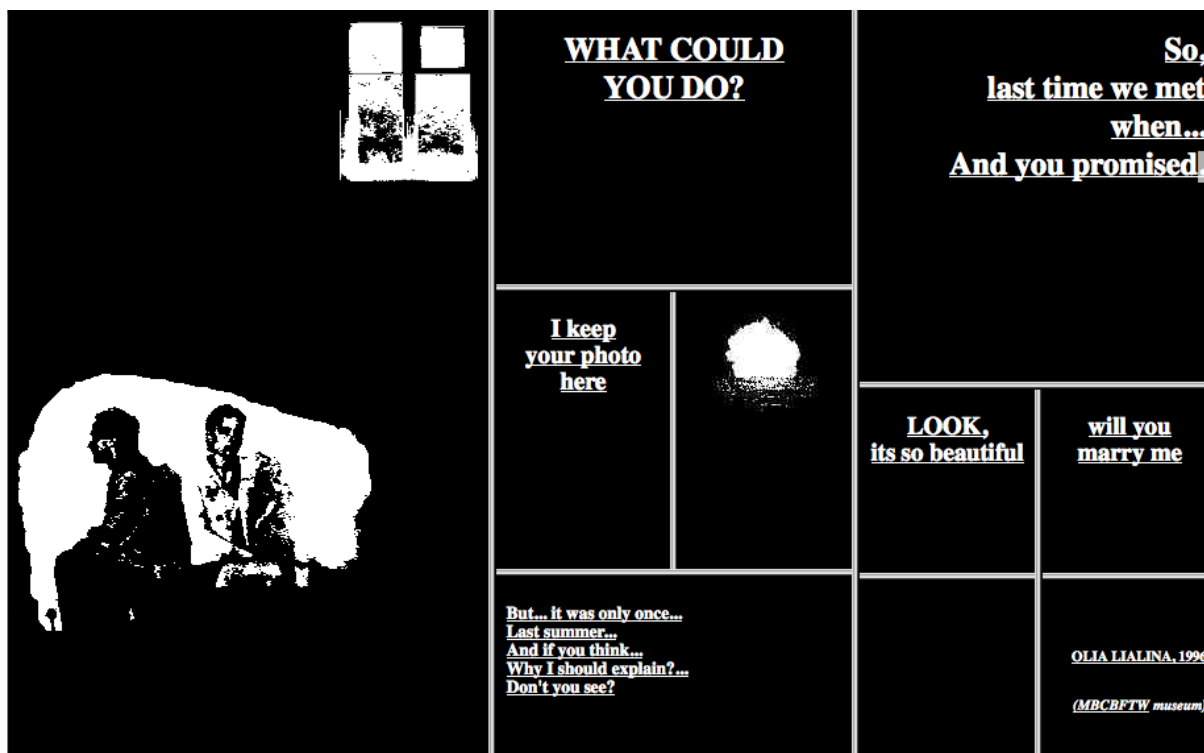
Immemory, built with HyperStudio, leads us to identify another interesting aspect of hypertextual forms applied to fiction: a structural imitation of memory. Hypertext reading, being forkable, non-linear, incomplete, endless, interrupted and associative has a lot to do with the experience we have of our own memory and of collective memory. The need to imitate human thought that was one of the basis of the birth of hypertext seems to inhabit fiction authors also.

Chris Marker sums up: « Je vais maintenant construire un modèle mécanique de représentation sensible de la Mémoire. »

42. The short story *El jardín de senderos que se bifurcan*, by Jorge Luis Borgès, is often considered a theoretical foreseeing of the hypertext, deconstructing the idea of a linear conception of time, proposing simultaneous infinities and « forking paths »: « The explanation is obvious: *The Garden of Forking Paths* is an incomplete, but not false, image of the universe as Ts'ui Pên conceived it. In contrast to Newton and Schopenhauer, your ancestor did not believe in a uniform, absolute time. He believed in an infinite series of times, in a growing, dizzying net of divergent, convergent and parallel times. This network of times which approached one another, forked, broke off, or were unaware of one another for centuries, embraces all possibilities of time. » Jorge Luis Borgès, 1941, Editorial Sur.

43. Comparing video game decors to the art of gardens: « Le jardin est un modèle réduit, clôturé et idéalisé de la nature [...] Un monde clôt qui donne l'illusion de l'infini. », Marie-Line Nicol, *Typologie du jeu vidéo*, 2012-2013, Académie de Rennes.

44. Annick Rivoire, *Libération* (8 janvier 1999)



A last example of electronic fiction will lead us to another platform used to build non-linear fictions, the World Wide Web itself. Olia Lialina released her most famous net.art work, *My Boyfriend came back from the war*, in 1996.^{44.1} The tale deploys in a single internet window that sub-divides as the reader goes along through the story, by clicking on the elements he/she chooses. The spatiality is suggested by a clipart animated element representing a window, setting the action in a house. The left half of the screen remains still (the decorum), as the other half, the «space of the conversation», as we perceive it, is clickable, subdividing several times as the reader clicks, displaying various fragments of text. The subdividing blocks in the conversation space, producing smaller and smaller spaces at each click, (like if physical space was actually shrinking) act like dozens of simultaneous contradictory discussions, that all eventually evolve towards the same ending: a black block, silence.

This experience shows us how the spatiality, multi-linearity and simultaneity that are inherent to the hypertext can become the powerful structuring factors of the narration. The story is actually ending at some point, proving that hyperfiction doesn't have to rhyme with infinite wandering.

In the last part of this essay, we will focus on authors who, instead of using computing specifically adapted tools, foresaw or consciously applied hypertextual structures to the ancient form of the codex, distorting its classic use and revealing its hypertextual qualities.

44.1. <http://www.teleportacia.org/war/wara.htm>

III. DISTORTING THE USE OF THE CODEX

The codex as a place for art, the codex as a study object

Contemporary to the firsts multi-linear fictions, the practice of the artist book started in the 60's. If the transposition of artistic problematics into this cheap medium was firstly justified by a certain contemporary ideal to democratize art, it eventually happened to strongly reshape the medium of the codex itself. By activating their artistic practice⁴⁵ in the context of this medium usually dedicated to critical thought, science or literature, many artists radically disturbed the inherited linearity that used to prevail within the *libro unitario*.

By becoming a *place* for art to exist in, the codex is consciously reshaped as a space. This re-spatialization partially relies on the multi-modal formatting operated by artists, but it is mainly a consequence of the very nature of art, implying transversality, arrangement, repetition, simultaneity, space, objects, seriality... So to say, all kinds of models that are quite far from a linear model of storytelling.

It is true to say that many artists were in fact seduced by the sequentiality of the codex, and used it as such, but a lot of them mixed the concept of sequentiality with forms that were specific to their practice.

In his very famous book *A Few Palm Trees*⁴⁶, Ed Ruscha presents a collection of photographs of trees of which the location is soberly indicated on the left page.

The interest of this typology relies as much in its particular elements as in its existence as a whole. The seriality of lay-outing suggests sequential reading, but the very existence of the ensemble invites to transversal reading. This paradox questions the object of the codex, as neither causality nor linearity are structuring the book, although the items are, indeed, organized sequentially.

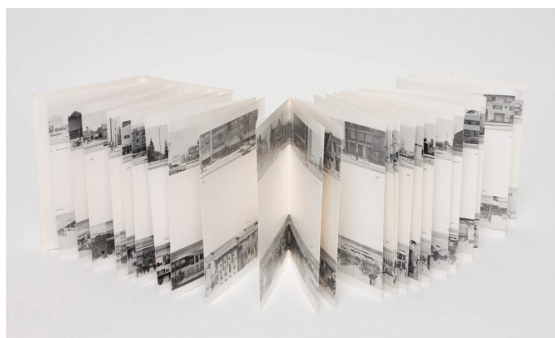
(46)



45 . The practice being considered in a wide meaning : including collage, concrete poetry, conceptual art, photography... but excluding illustrated books, that don't rely in the same shifting, often staying in the domain of linear narration.

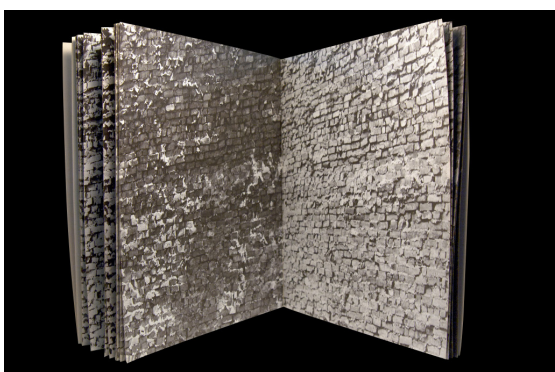
46. Ed Ruscha, *A Few Palm Trees*, 1971

(47)



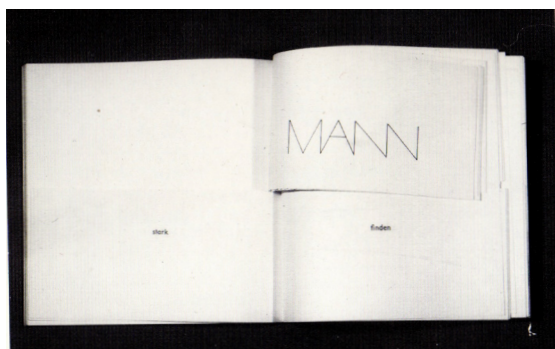
Another book by Ed Ruscha, *Every Building on the Sunset Strip*⁴⁷, completely refashions the space of the book itself. A huge panorama of Sunset Boulevard (Los Angeles) spreads horizontally through a 297 inches accordion book. Again, the work is paradoxical. Technically speaking, the book is not really a codex, as it is a long unique sheet that is folded to look like a codex. But it is yet presented as a book, and its folded form proposes sequential reading. The space of the book is double, it exists in the same time as an entire panorama and as a sequential concatenation of incomplete pieces of this panorama. The page as a single *unit of perception* is consequently deeply questioned.

(48)



Sol Lewitt raises this same question of the spatiality of the book in his publication *Brick Wall*⁴⁸. The approach is more illustrative, the pages of the book presenting full-pages photographs of a brick wall. The pages become portions of space, organized in a sequential, but non-linear typology.

(49)



Gerhard Rühm, in his work *Mann und Frau*⁴⁹, acts on the space of the book itself. By cutting the sheets of the book in two, he disturbs the unit of perception. The such divided pages imply a simultaneous and variable reading, proposing infinite arrangements, and questioning the very objectality of the book.

(50)



Focusing on lay-out, Anne and Patrick Poirier also investigate the idea of simultaneous reading in their book *Les Paysages Révolus*⁵⁰. The work inscribes as a form of imaginary archaeology.

"On every left page : the photograph of a famous archaeological site, invaded by tourists ; on every right page : two parallel and contradictory stories,[...] one relating an actual trip the Poirier had in Sicily, and the other one relating an archaeological tale involving mythological characters like Ulysses and The Sphinx..."⁵¹

Two temporalities co-exist in the side-by-side columns that structure the right page.

47. Ed Ruscha, *Every Building on the Sunset Strip*, 1966, Heavy Ind. Pub.

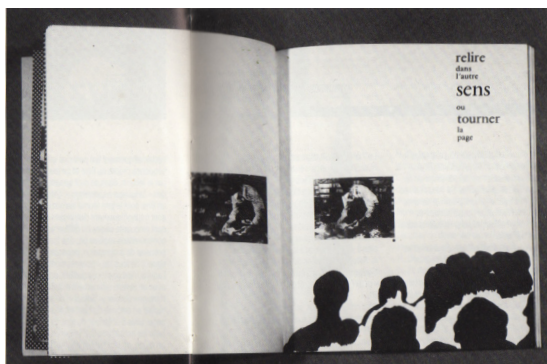
48. Sol Lewitt, *Brick Wall*, 1977, Tanglewood Press Inc.

49. Gerhard Rühm, *Mann und Frau*, 1972, Darmstadt und Newied

50. Anne and Patrick Poirier, *Les Paysages Révolus*, 1975, Sonnabend

51. Anne Moeglin-Delcroix, *Livres d'artistes*, 1985, BPI Georges Pompidou

(52)

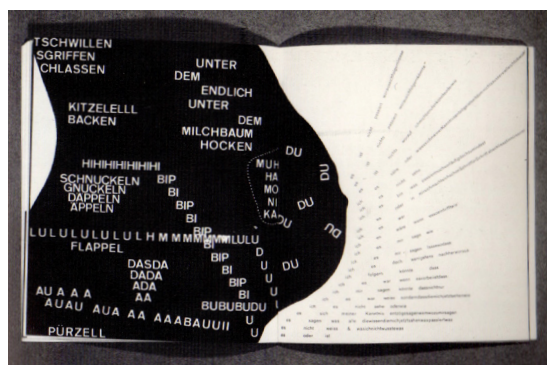


"Re-read the other way, or turn the page"

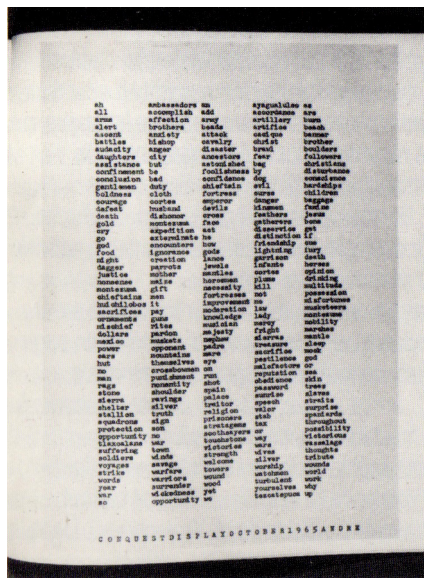
Another artist, Julien Blaine, straightly suggests that his collage book *Processus de déculturation (un itinéraire...)*⁵² should be read in all possible senses. By proposing, in the book itself, the violation of the usual processus of navigation, he makes the reader a conscious user of his book, an active *wreader* with whom he partly shares authorship, letting him organizing his own sequential reading through the work.

The field of concrete poetry investigated a thousand possibilities of adapting the significant to the signified, by re-considering the use of typography (with particular arrangements of letters and typographic blocks, deconstructed grids, ...) ^{53, 54, 55, 56, 57}

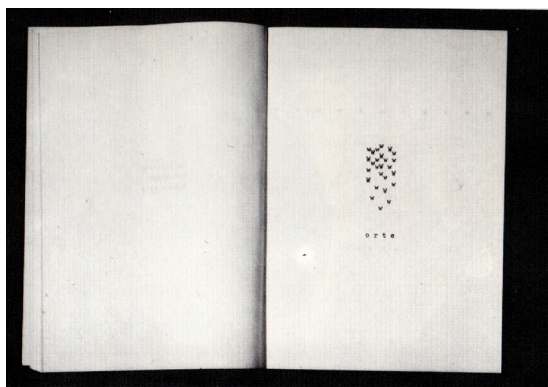
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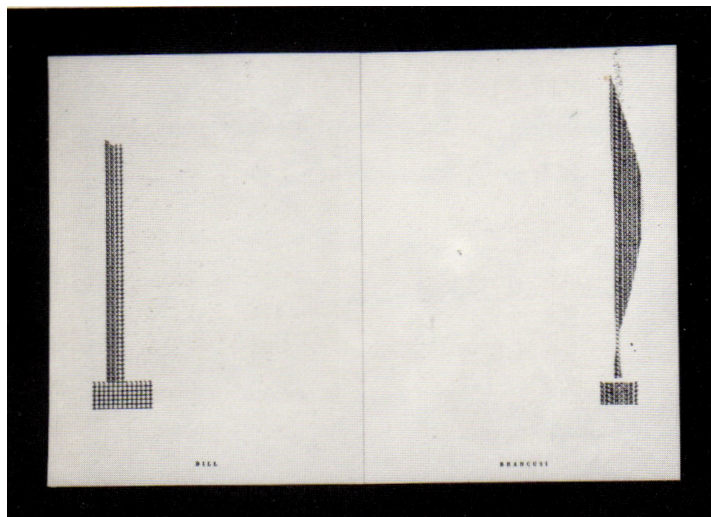
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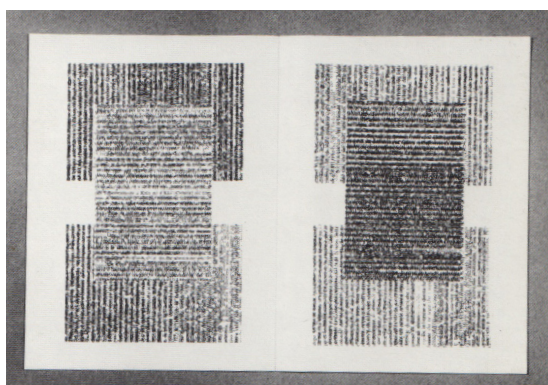
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52. Julien Blaine, *Processus de déculturation (un itinéraire...)*, 1972, Editions de la Tête de Feuilles

53. Jochen Gerz, *Footing*, 1968

54. Huberth Kretschmer, *Konkrete, visuelle und konzeptionelle Gedichte und anderes und ähnliches. 71 arbeiten*, 1978

55. Luciano Caruso, *Piccola teoria della citazione*, Tau/ma 5, 1974

56. Carl Andre, *Eleven Poems*, 1974

57. Jiri Kolar, *Gersaints Aushängeschild*, Tau/ma 2, 1976

(58)

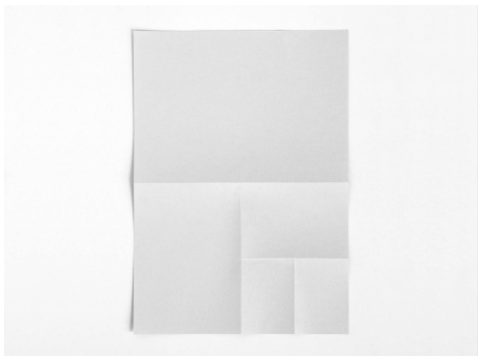


A more contemporary practice relies on a self-reflective production, proposing the codex itself as an object of study.

A lot of artists and designer worked on these matters, but we can quickly mention the works of Geoffrey Brusatto, Louis Lüthi and Hyunho Choi.

In his currently running PhD *Ways of Folding, Reconstructing the printed book*, designer Geoffrey Brusatto questions the future of the printed book in today's digital context.

(58)



« By means of a unique methodology, he de- and reconstructs the paper book to develop new visual and content structures. The fold plays an important role. Brusatto developed folding schemes that shape new book structures and page combinations. »⁵⁸

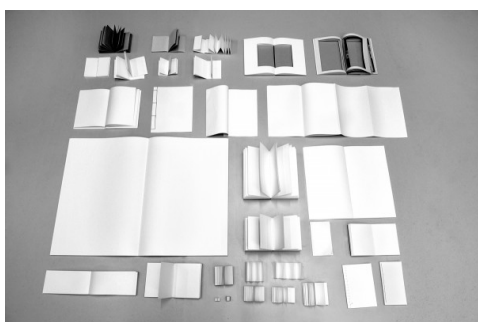
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In his 2010 book *The Self-Reflexive Page*⁵⁹, Louis Lüthi typologically explores the various possible forms and functions of the page.

« The subject of this book is the page, and the pages reproduced in it are taken from works of literature (or, in some cases, art books that derive specifically from literature). Luethi presents them thematically, resulting in a typology of self-reflexive pages: Black Pages, Blank Pages, Drawing Pages, Photography Pages, Text Pages, Number Pages, and Punctuation Pages. In literature, such devices are often used as a counterpoint to what has preceded or what will follow in the narrative. »

(60)



In his project *Empty Books*⁶⁰, designer Hyunho Choi, as for him, investigates the question of the format. Again, by producing a typology that explores various potential shapes of the book.

Even if these examples may sometimes involve certain properties of fiction, they still rely in the specific fields of art and design research. We'll know try to understand how fiction authors explored the distortion of the codex, and how they specifically integrated hypertext properties in their objects and writing.

58. <http://www.z33.be/en/projects/geoffrey-brusatto-ways-folding-reconstructing-printed-book>

59. Louis Lüthi, *The Self-Reflexive Page*, 2010, Roma Publications

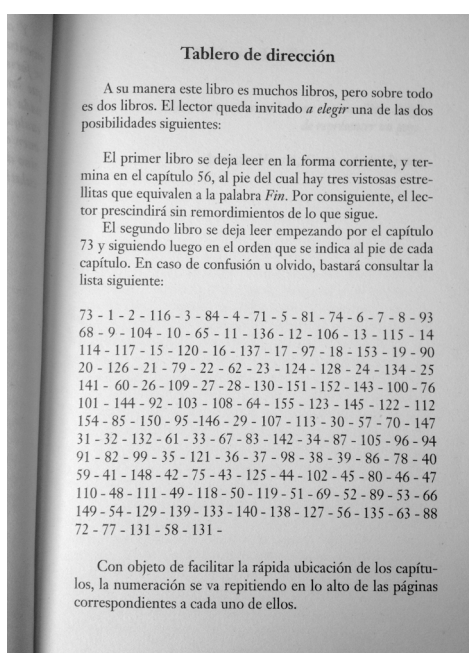
60. Hyunho Choi, *Empty books: Understanding the form of books*, 2012

When the object shapes the story : a structural approach of narrative matter

The case studies that follow present a corpus of physical books that encompass unconventional design or writing process, producing non-linear narration. In each case, we'll try to precisely identify the dispositif and its consequent effects on reading. We'll see how these authors managed to reshape the space of the book, how they consciously distorted it to adapt it to their needs, remediating, willingly or not, various above-mentioned characteristics of the hypertext.

The invisible disruption

Julio Cortazar's novel from 1963, *Rayuela*⁶¹, takes shape in a very classical lay-out. It is presented as an approximately 600 pages book. The text fits in the most conventional centered full justified column, the only apparent peculiarity being a certain shortness of the chapters. The multi-linearity of the story relies on the instructions given by Cortazar at the beginning of the novel, proposing two different ways to read the book. The first suggested way is a linear but incomplete reading, starting at the beginning of the book and ending at chapter 56, eliminating approximately half of the whole story. The second suggested way is a full but non-linear back and forth reading, following the indications given by the author at the end of each chapter, specifying the next chapter to read (155 chapters in whole). The tabulation element that chaptering is, habitually used in a linear, logical and indicative way, becomes, in this case, the main and almighty tool of navigation, acting as a disrupting travelling guide. The book is subject to a double pagination: one indicating the actual current page, and another indicating the current chapter, thus facilitating quick displacement. Without even disturbing classical typography, the particular system of navigation proposed by Cortazar only relies on the very basic possibility — inherent to the codex — to easily manipulate the book through pagination and tabular elements. Cortazar yet writes a complex non-linear book, by two distinct aspects: firstly by proposing two different books in one object, and secondly by offering an authentic non-linear way to progress through the object. As in Vannevar Bush's *Mex*, Cortazar sets himself as a *trail blazer*, digging a possible path through the story for the reader, but without categorically imposing it. Moreover, many of the « annex » chapters encompassed in the second reading can actually be considered as very digressive from the main story, and even sometimes as kinds of « external links », reproducing quotations from other books or newspaper articles, projecting the story outside of the book itself.



In its own way, this book consists of many books, but two books above all.

The first can be read in a normal fashion and it ends with Chapter 56, at the close of which there are three garish little stars which stand for the words *The End*. Consequently, the reader may ignore what follows with a clean conscience.

The second should be read by beginning with Chapter 73 and then following the sequence indicated at the end of each chapter. In case of confusion or forgetfulness, one need only consult the following list:

73-1-2-116-3-84-4-71-5-81-74-6-7-8-93-68-9-104-10-65-11-136-12-106-13-115-14-114-117-15-120-16-137-17-97-18-153-19-90-20-126-21-79-22-62-23-124-128-24-134-25-141-60-26-109-27-28-130-151-152-143-100-76-101-144-92-103-108-64-155-123-145-122-112-154-85-150-95-146-29-107-113-30-57-70-147-31-32-132-61-33-67-83-142-34-87-105-96-94-91-82-99-35-121-36-37-98-38-39-86-78-40-59-41-148-42-75-43-125-44-102-45-80-46-47-110-48-111-49-118-50-119-51-69-52-89-53-66-149-54-129-139-133-140-138-127-56-135-63-88-72-77-131-58-131-

Each chapter has its number at the top of every right-hand page to facilitate the search.

61. Julio Cortazar, *Rayuela*, 1963, Editorial Sudamericana

Honoré	SMAUT	SUTTON	ORLOW- SKA	ALBIN	Morellet	Simpson	Trojan	Troquet
HUTTING						PLASSAERT		
		GRATIOLET	CRESPI	NIETO & ROGERS	Jérôme	Frensd	BREIDEL	VALÈNE
Brodus-Gratiolet								
CINOC		Docteur DENTEVILLE						
Honneurade		Gratide						
RÉOL								
Spota		BOBSCHASH						
BERGER		Grifidoni						
		Danglars						
BARTLEBOOTH								
		Appenzell						
ALTAMONT								
MOREAU								
ENTRÉE DE SERVICE	MARCIA	ANTIQUITÉS	Charmes LOGE NOCHÈRE		HALL D'ENTRÉE			
CAVES	CAVES	CHAUFFÈRIE	CAVES		MACHINERIE DE L'ASCENSEUR	CAVES	CAVES	CAVES

Plan de l'immeuble
les noms en italique sont ceux des anciens occupants.

follows the paths that were arranged for it in the work. Again, Georges Perec perfectly inscribes in the dynamic described by Vannevar Bush with his *trail blazers*, organizing a path for the reader within this vast fictional and inter-connected space.

As the different spaces of the building can expand on several squares of the original grid, the reader will visit the different places and characters several times, at different moments of the book. The book is built, again, on a back and forth dynamic, proposing a disrupted narration encompassing a multiplicity of characters.

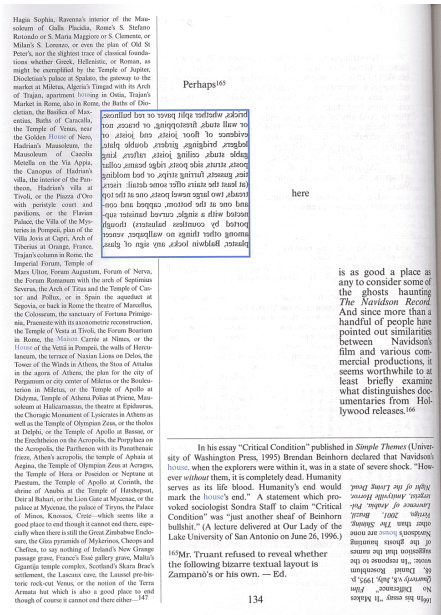
At the end of the book, Perec proposes an Index of occurrences, reminding the hypertextual encyclopedic way to navigate through content, and a chronology summarizing the life of the inhabitants of the building, like to insufflate an ultimate linear breathe to the scattered story. At the very end of the book, Perec eventually shows a slice plan of the building, as a final map for his story. It is interesting that this slice plan comes at the end, and not at the beginning of the book. The whole process of writing is revealed after the reading. The space is showed to the reader in its ensemble after he has discovered each items from the inside.

If the spatiality in *La vie mode d'emploi* is rather mental (and yet deeply structuring), in *House of Leaves* ⁶⁷, Mark Z. Danielevski wipes out the habitual use of typography to create a unique and physically disturbed object.

The spatiality operating in *House of Leaves* is fundamental, and stated from the very beginning, in the title of the book itself. The disturbance of space is directly and physically experimented by the reader. The main narration of the book depicts the exploration journalist Navidson runs in his own new house, which he discovers is (far) bigger in the inside than in the outside, and of which hidden extensions are subject to constant transformation. As Navidson, the reader finds himself overwhelmed by the constant modification of lay-out, endless footnotes, links, digressions, and divisions of the space of the page that occur in the book ; and will try to re-constitute the story through arduous exploration. The title *House of Leaves* is therefore double: it stands as much as a description of the book itself, which is a paper embodiment of the house in which the reader will definitely loose himself ; and it stands as a description of Navidson's house, of which inner structure is as malleable and uncertain as paper sheets.

Two main tales alternate in the book, identified by the use of two main different typefaces. Navidson's exploration is related through the manuscript report of a movie, *The Navidson's Record*, that he shot in his house while exploring it. The report of the movie is written by an old and recently deceased man, Zampano. The second tale is the journal of Johnny Errand, who discovered Zampano's manuscript, of which he effectuates a commented reading, including a huge amount of digressions

67. Mark Z. Danielevski, *House of Leaves*, 2000, Pantheon Books



and annexes relating his own life tale. The central story reaches the reader through multiple layers, in a deeply embedded structure. *The Navidson's Record* is the very center of it, manuscriptly reported and commented by Zampano, and eventually re-reported and re-commented by Johnny Errand. Every layer of narration adds a multiplicity of elements to get lost in.

The space dedicated to Johnny Errand's voice is casted in a commonly used form of paratext : footnotes. The book starts with a short introduction by Johnny Errand explaining how he found the manuscript. After this introduction, Zampano's report starts, and Johnny's interventions are relegated to the footnotes, as commentaries. But the reader rapidly understands that Johnny Errand's story won't stay circumscribed to a discreet space at the bottom of the page, as the footnotes start to invade the all book and become an actual alternative tale.

Considering the grid itself, the division of space operated in the page of the book reaches paroxysm from pages 121 to 150, where until twelve different spaces displaying different texts can be simultaneously identified, in the form of various columns (sometimes upside down, 90° inclined or even in reversed writing), footnotes, boxes, and with the use of three different typefaces. The lay out then strongly reminds old marginal glosses, but transferred from religious to fictional context.

On the contrary, several pages of the book are merely empty, displaying one sentence, one word, or even nothing but the pagination. The grid is constantly varying, and Danielevski also settles a multi-modal space, including a lot of images to the annexes of the book.

A conscious remediation of computer

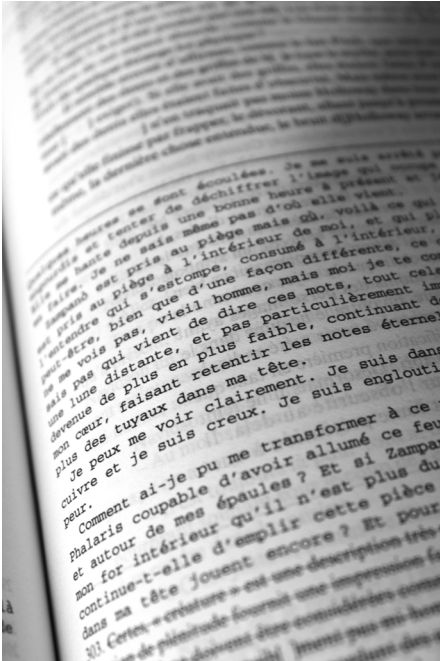
More than a metonymy of the space of a house (or of the self), *House of Leaves* is also a conscious and powerful paper remediation of the hypertextual space of the internet. Danielevski started to write his book in the early 90's and finished it in 2000, so to say at the very moment when personal computers started to allow internet connection.

Danielevski's book describes, as in the fiction as in the object itself, a space that is bigger in the inside than it looks from the outside. He fantasizes an infinity of spaces inside an enclosed object ⁶⁸, as the internet provides a supposedly infinite content inside the tool of the navigation browser. If the fiction allows him to do so, the object is subject to finitude, even though it is made arduous to completely experiment this finitude.

Another aspect of the book situating it in an internet context is the intensive use of internal and external links, by the means of notes referring to other notes or annexes, and notes referring to existing and non-existing outside material. Again, the



68. As Jorge Luis Borgès did it in his *Book of Sand*.



story is scattered over 700 pages, and projected outside of the book by the means of quotations and references, and Danielevski (partly) uses the classic referential tabulation element that footnote is to disturb linearity.

In the color versions of the book, the word «[house](#)» systematically appears in blue, suggesting an internet clickable hyperlink.

«As such, the words appearing in blue are given as privileged entries of the text, under which more informations and significations hide. In the complete edition, called «full color», we also find one occurrence of text appearing in purple. Purple is the color, on the internet, of an already visited hyperlink: «[I'm sorry I have nothing left. Except this story, what I'm remembering now, too long for the surface of any dawn\(...\)](#)». From a thematic point of view, the fact that the extract alludes to memory corroborates the interpretations of these few purple words as an already visited hyperlink».⁶⁹

Also worth noticing, the font used for Errand's tale, Courier, is one of the standard fonts that was massively used in computer environments in the 90's.

As a paper version of Perec's doll house, the multiple divisions of grid above-mentioned and their simultaneous perception are to be related to the computational practice of multi-windowing.

A final 27 pages index working as a tagging system proposes an alternative entrance to the book, based on occurrences instead of the more or less linear path drawn by Danielevski through the story.

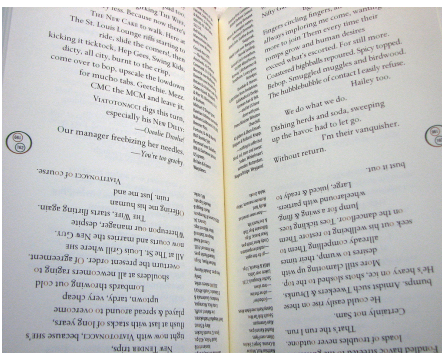
By transposing supposedly incompatible computational dynamics into the physical codex, Danielevski stretches the limits of paper, and yet provides a remarkable example of a possible conscious «new to old» *remediation*.

Synoptic reading

A later book by Mark Z. Danielevski, *Only Revolutions*⁷⁰, takes shape in a synoptic and highly symmetrical lay-out, presenting two stories in one, related by two narrators, Sam and Hailey. It somehow also reminds of marginal glosses.

The 360 pages book⁷¹ proposes two sides of reading, two paginations (converging at the very center of the book, p. 180), two bookmarks, two font colors (green and brown), two covers, etc... Each narrator's tale starts at one side of the book, upside down from the other. The grid defines 4 different spaces on each page: the outside column displays the two narrator's tales, upside down from each other, and evolving symmetri-

nia, Praeneste with its axonometric record of the Temple of Vesta at Tivoli, the Forum in Rome, the [Maison Carrée](#) at Nîmes, the [House](#) of the Vettii in Pompeii, the walls of the forum, the terrace of Naxian Lions on the Acropolis, the Tower of the Winds in Athens, the Stoa in the agora of Athens, the plan for the city of Pergamum or city center of Miletus or the Temple of Didyma, Temple of Athena Polias at Priene.



69. *House of Leaves et l'hypertexte*, 2007, Anaïs Guilet, quoting Mark Z. Danielewski, *House of Leaves*, 2000

70. Mark Z. Danielewski, *Only Revolutions*, 2006, Pantheon Books

71. If the reading is operated via two sides, the cover, title and number of pages suggest the figure of the circle, which is, with the line, the only one-sided geometrical figure. This tells us about Danielewski willingly disturbing linearity by creating two sides out of one, two points of view on one story.

When starting to read, the space that the chosen narrator's tale takes in the page is strongly predominant over the other, and gradually shrinks to be perfectly equal in the middle of the book (where the texts of both narrator are completely identical) ; it then continues to shrink towards its almost full domination by the other narrator.

The two columns suggest two spaces, two different contexts for narration (one personal, and one collective), yet linkable in a glance.

Chris Ware's famous *Building Stories*⁷² is a pertinent case for us, as it deals as much with non-linearity, simultaneity, spatialization and memory.

A collection of various children's books, including board books, picture books, and a large pop-up book, displayed on a white surface. The books are arranged in a fan-like pattern, showing different covers and illustrations. Some books are open, revealing colorful pages with text and illustrations. The books are of different sizes and formats, including board books with thick pages and a large pop-up book with a complex, multi-layered design. The covers feature various themes, including animals, landscapes, and everyday objects. The illustrations are colorful and detailed, typical of children's literature. The books are arranged in a way that highlights their diverse formats and content.

72. Chris Ware, *Building Stories*, 2012, Pantheon Books



It seems relevant to notice that the model of the slice-plan is visually very close to the comic strip board. The comic strip board implies both a linear reading of the sequential content, and a simultaneous and global overview of several squares. Chris Ware is fully aware of this dichotomy, as he constantly disturbs the navigation within his boards, alternating between sequential development and ensemble drawings where simultaneous actions take place in several squares of the strip.

If the 14 inside books themselves are globally linear, the reader has full power to decide the order in which he'll make his way through the stories, by literally, *building stories*.

The multiplicity of supports permits a de-centralized, non-hierarchical progress through the story. Even though some of the books are more intense, settling major events of the narration, nothing suggests the hierarchy to the reader. By destroying the chronology, that the reader must re-construct himself during his reading process, Chris Ware inscribes his work in a dynamic that's imitating memory. The non-linearity provides a scattered rhythm of reading, which, by mixing major and minor events, by jumping through them without considering chronology, is a very efficient structural way to report the mechanics of an unstable memory.

We can also notice that the object of the box itself is commonly used by many to store cherished souvenirs, giving them a particular emotional status and preserving them. The object of the box is therefore in its essence strongly linked to the idea of archive, and a potential space to fictionalize the past.

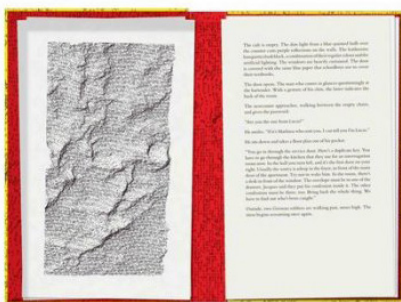
Another famous fictional work taking place in the space of a box is Marc Saporta's *Composition n°1*⁷³. The work is composed of 150 loose sheets randomly gathered in a box, without any pagination indication. The book relates the collateral stories of several characters during German occupation of France. Again, the box serves the purpose of imitating the unpredictability of memory by scattering the tales in a non-chronological way.

No-binding

It is important to notice that Saporta's *Composition n°1* is not a codex, as the sheets are not binded together. Yet, its existence inside the box makes it an enclosed and finite object, a *libro unitario*.

Quoting Laufer and Scavetta again: «**the volumen's page is attached by two sides, the codex's by one side, and the hypertext's by none**»⁷⁴.

What Saporta proposes is a non-hierarchised stack, an inefficient hypertext where the invisible links structuring the story are to be discovered in a randomatic way by the reader (as nothing indicates any path through the content).



73. Marc Saporta, *Composition n°1*, 1963

74. Roger Laufer and Domenica Scavetta, *Texte, Hypertexte, Hypermedia*, 1992, Presses Universitaires de France

The page is reduced to its single unit of perception, physically detached from the ensemble, and only the action of reading can inscribe it in its wider context. The *action of reading* is, in fact, the binding technic proposed by Saporta.

Chance & Game



As a rule to organize sequentiality, Saporta proposes the reader to shuffle the sheets like he would shuffle a deck of cards, introducing both the concept of game and the concept of chance as the structuring tools of navigation, imitating, according to him, what everyone experiences through his own life.

“Car le temps et l’ordre des événements règlent la vie plus que la nature de ces événements”, Saporta says, highlighting the power of causality over the events themselves.

Each page is centered on one of the characters and can be read in either order. According to Saporta, the story is to be perceived differently depending on the reading path. The work potentially offers 149¹⁴⁹ possible ways to go through the story, as the last page is a conclusion including all characters and is predetermined by Saporta. Even if the conclusion is common to all the possible stories, Saporta explains:

« De l’enchaînement des circonstances, dépend que l’histoire finisse bien ou mal. Une vie se compose d’éléments multiples. Mais le nombre des compositions possibles est infini. »



The british publishing house *Visual Editions*, released in 2011 a new edition of Saporta’s box, augmented with a digital version available on Ipad, where the navigation is completely randomized, controlled by the machine.

« *Composition No.1* was published ahead of its time: raising questions we ask ourselves today about user-centric, non-linear screen driven ways of reading [...] So it made sense to develop a screen version too: *Composition No.1* as an iPad app. While the printed book asks readers to shuffle pages, the screen version leave readers no choice, automatically shuffling pages, forcing readers to hold the page down on the screen. » ⁷⁵

This publication is one of the rare e-books, as far as we know, that fully experiment the possibility of non-linearity offered by digital reading apparatuses.

75. <http://visual-editions.com/composition-no-1-by-marc-saporta>

Another work involving chance and multiple possibilities of reading is the famous book by Raymond Queneau, *Cent mille milliards de poèmes*.⁷⁶

Disturbing the integrity of the page



Designed by typographer Robert Massin, *Cent mille milliards de poèmes* is a codex made of 10 binded sheets. Each sheet is horizontally cut in 14 parts, each part encompassing one of the 14 verses of a sonnet. Each of the 14 sub-pages can be independently turned according to the will of the reader, to create a half chosen and half random sonnets. Queneau, by the simple action of cutting in the unit of the page, manages to create a transitional space, the illusion of a page, that can in fact be subject to endless variations at any time, when the reader decides it. The page, in *Mille milliards de poèmes* is a temporary unit of perception, shifting sands for poetry. The interactivity produced within such a system is really innovative from a 60's point of view, and again, the possibility for the reader to build his own path through the content is a central interest.

Infinity



The form of the book allows the existence of 10^{14} possible sonnets.

Queneau explains :

« En comptant 45s pour lire un sonnet et 15s pour changer les volets à 8 heures par jour, 200 jours par an, on a pour plus d'un million de siècles de lecture, et en lisant toute la journée 365 jours par an, pour 190 258 751 années plus quelques plombs et broquilles (sans tenir compte des années bissextiles et autres détails). »

Using combinatory writing, Queneau manages to produce an actual infinity of different contents within a closed object (considering that like the internet, Queneau's book isn't mathematically infinite, but yet feels like infinity). By operating a simple distortion of its use, he consequently completely reshapes the medium of the codex. Escaping the *libro unitario*, he transforms the codex into an environment that is able to produce and encompass an infinity of stories.

76. Raymond Queneau, *Cent mille milliards de poèmes*, 1961

CONCLUSION

A twisted remediation

If from the beginning, the codex encompassed properties of non-linearity, the development of computational hypertext seems to have permitted the re-discovery of these potentialities. A twisted remediation occurred for the authors we studied, who, by transposing newer technology characteristics into an ancient apparatus, paradoxically revealed its original potential.⁷⁷

The temperature of typography

Media theorist Alessandro Ludovico reminds that Marshall McLuhan's «famous division of 'cold' and 'hot' media⁷⁸ assigned to print a very low potential for audience participation: "typography as a hot medium involves the reader much less than did manuscript"⁷⁹, while on the other hand "TV as cool media involve(s) the user, as maker and participant, a great deal." He regarded the book as no longer adequate in this new age of speed and electricity, and thus ultimately doomed: "[...] The slow movement of the eye along lines of type, the slow procession of items organized by the mind to fit into these endless horizontal columns – these procedures can't stand up to the pressures of instantaneous coverage of the earth."⁸⁰ »⁸¹

McLuhan describes a dichotomy opposing typography (and thus the book) as a static medium, to the new dynamics operating at the electricity era. He prophesies the near obsolescence of the former in the context of the second. The various remediations of computational dynamics into the environment of the book that we just studied seem to stand as so many ways to turn typography into a colder medium. Transformed into environments that involve the reader in a deeper and more active way, these typographic structures tend to resist the obsolescence of print augured by McLuhan. These authors prove that the «updating» of an apparatus into a new context can be effectuated without losing the apparatus, but through the modification of its deep and usually invisible structure. The modalities of reading settled in the above-mentioned works of fiction are closer to the cold form of the dialogue. They remediate the physical book into the contemporary paradigms of interactivity and connectivity inherent to electrical era. This colder use of typography may represent a possible future for the physical book, providing it a hybrid and specific way of survivance in the digital era.

77. It is important to remind that not all of the authors we studied clearly situated their work as a conscious remediation of computational hypertext, but all of them being contemporary or coming after the development of informatics, we can assume that they all, at least indirectly, have been influenced by these new modalities.

78. For Marshall McLuhan, the *temperature* of a media is defined according to the degree of participation required from the user when he receives the mediated message. « Hot media usually, but not always, provide complete involvement without considerable stimulus. [...] They favour analytical precision, quantitative analysis and sequential ordering, as they are usually sequential, linear and logical. [...] Cold medias require more active participation on the part of the user, including the perception of abstract patterning and simultaneous comprehension of all parts. » *Understanding Media*, Wikipedia

"Any hot medium allows of less participation than a cool one, as a lecture makes for less participation than a seminar, and a book for less than a dialogue." Marshall McLuhan, *Understanding Media*, 1964, McGraw-Hill, p.25

79. Marshall McLuhan, *Understanding Media*, 1964, McGraw-Hill, p.400

80. Ibid ⁷⁹

81. Alessandro Ludovico, *Post-Digital Print*, 2012, Onomatopée 77, p. 23

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