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Narrative as Puzzle !? An Interview with Marie-Laure Ryan

By Roberto Simanowski

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Abstract

■ Marie-Laure Ryan is an independent scholar working in the areas of narrative theory and electronic textuality. She has written various articles on Hypertext and Narrative, she has published "Possible Worlds, Artificial Intelligence and Narrative Theory" (Bloomington: Indiana University Press 1991) and edited "Cyberspace Textuality: Computer Technology and Literary Theory" (Bloomington: Indiana University Press 1999). Roberto Simanowski talked with her about her forthcoming book "Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media" (Baltimore: Johns Hopkins University Press, late 2000), about the hypertext condition, and the problem of interactive narrativity.

dd: Your book investigates "new genres made possible by the digital revolution of the last two decades, such as hypertext, art CD ROMs, synchronic role-playing games (MOOs), the largely virtual genre of Interactive Drama and its embryonic implementations in electronic installation art." These are quite different applications of digital media. Could you please give us a short description and an example of each?

MLR: I assume that the concept of hypertext is so familiar to readers of *dichtung-digital* that it does not need a description: anyone who reads these lines has reached them by navigating the links of a giant hypertext, namely the World Wide Web. And the vast majority of these readers, being interested in the literary potential of computer technology, knows of course that the idea of structuring a text as a network of connected nodes, and of making these nodes accessible through the click of a mouse, has been applied to the design of literary texts.


As for art CD ROMs, they are a multi-media application of the idea of hypertextuality, and they typically explore the relationship between text, image, and sound. They rely heavily on kinetic effects, such as visual transformations triggered when the user "mouses over" certain areas of a picture, and they come in many forms: navigable

landscapes containing objects that yield surprises when clicked on by the user; illustrated storybooks with pictures that come to life; animated forms of visual poetry, with words dancing on the screen; digital versions of artist books that dramatize the coming-into-view of images, and so on. (Incidentally, the museum of digital arts in Karlsruhe, ZKM, publishes a periodical, *Artintakt*, that includes in each issue some art on CD ROM.)

MOOs (the abbreviation stand for Multi-user Dungeons, Object Oriented) are a cross between computer games, public chatrooms, improvisational theater and masquerade ball. Users log on to sites that contain the verbal description of a setting, usually a building with many rooms. They design a character by posting its description, and they interact under this mask with other users, who are themselves hidden under their own digital identities. MOOs were a popular pastime in academic circles and among computer professionals—should I say nerds?—in the early days of computer networking, and they received a lot of scholarly attention in the mid nineties, but I have a hunch (though I don't have the numbers to support it) that with the democratization and increasing commercialization of the Internet they are losing in popularity to chatrooms and IRCs (Internet Relay Chats)—in other words to platforms that do not require the creation of a full-fledged fictional persona, though users still can hide under avatars. (In fact, the visual versions of MOOs being developed these days, such as Active Worlds (<http://www.activeworlds.com>) take away the creative dimension of the old textual MOOs by offering a list of ready-made avatars to choose from.)

Genuine role-playing and identity-creating MOOs are to chatrooms and IRCs what creative writing is to conversational gossip. Elizabeth Reid has written of MOOs that they offer a stage but not a script: it is up to the users to create the script in real time, and how good the script is depends on the creativity of the users. Now imagine that the system takes over most of the responsibility for creating the script—that it is endowed with a "narrative intelligence" that enables it to create an interesting dramatic action around the user's often unpredictable actions. This would be interactive drama. In its ultimate implementation Interactive Drama would be something akin to the Holodeck of the Star Trek series: the user would enter a computer-generated world, meet computer-generated agents, impersonate a fictional character, and out of the interaction between the user and the system would arise a dramatic action that would be as pleasurable to enact, as regular drama is pleasurable to watch.

The user would be spectator (as beneficiary of the production), character (as agent in the plot), actor (as impersonator of the character), and author (as creator of the character's part.) Needless to say, interactive drama is a virtual genre that will only be actualized when AI develops advanced story-generating capabilities (I believe we are still far from the required stage), and when VR becomes able to create sensory environments sufficiently rich and diversified to be experienced as physically

present. But embryonic forms of interactive drama exists today in digital installation art, such as the VR project  *Placeholder* by Brenda Laurel and Rachel Strickland,¹ as well as in some theme park rides that make use of VR technology, such as *The Loch Ness Adventure*, designed by Celia Pearce

dd: Is there not a danger that quality will be compromised in favor of interactivity when readers become writers or AI generates the story?

MLR: Let me first play the devil's advocate: The computer scientist/futurologist Ray Kurzweil has recently written (in *The Age of Spiritual Machines*) that by 2019 there will be "computer artists" whose reputations will rival that of humans, and that by 2029 computers will pass the Turing test: this means that they will attain a level of language skill equal to that of humans. If Kurzweil is right, we have nothing to fear: there will be Sophocleses and Shakespeares and Prousts in computer-generated literature. And now let me speak my own mind: after having witnessed the rather disappointing development of the AI field of "narrative intelligence" in the past twenty years, I think that we are nowhere close to teaching computers how to generate a brand of literature that will be appreciated for aesthetic reasons, rather than as an experiment in cognitive science. We just know too little about the creative process and about what makes a good story. The only way to make computers rival human authors would be by downloading the brain of a writer into computer memory—a scheme worthy of science-fiction (though there are computer scientists, for instance Hans Moravec, who believe it is feasible).

But it would be wrong to ask of computer-generated drama to provide the same experience as Shakespeare and Sophocles. If drama becomes interactive, the experiencer (or interactor) will look at it from a point of view entirely different from the point of view of the spectator of drama: namely, from the point of view of a participant (call this participant writer if you want, since interactors will improvise their own part). From this point of view, a plot that would not be very interesting for a pure spectator may become fascinating—just as playing a tennis game not worthy of televising may be a richly rewarding experience for the player. We are certainly not as critical of the scenarios that we generate as participants in games of make-believe as we are of the plots of classically staged drama. For me interactive drama should be this: a game of make-believe with tremendously enhanced audio-visual resources.

dd: The purpose of your book is to revisit the new narrative concepts popularized by digital culture and the fate of traditional narrative patterns in digital culture. What role do interactivity and immersion play in this approach?

MLR: The question I am asking is whether or not digital culture, by making the text respond to the user's input, has made possible new forms of narrativity. It all depends, of course, on how narrative is defined. Narratologists traditionally distinguish two dimensions of narrative, story and discourse. Story is "what

happened" in the textual world, and its elements-characters, setting, events- are imagined by the reader as existing independently of language (even though in fiction the reader knows that this is not literally the case; fiction, as Coleridge noted, presupposes a "suspension of disbelief").

Discourse, on the other hand, is the dynamic disclosure of story through language. The first generation of hypertext theorists, such as Landow and Bolter, made the claim that because hypertext is fueled by reader input, it represents a "reconfiguration of narrative." It is hard to deny that interactive digital texts open up a new mode of presentation, which means new discourse strategies, and arguably new types of narrative experience. But does the interactivity of digital texts change narrative on the deep structural level, the level of story, or on the contrary, do they threaten its coherence ? And if interactive texts really threatens the coherence of story, can one still say that they "reconfigure narrative" ? This in turn raises the question of whether a narrative structure is something that varies historically and culturally, or whether it is a cognitive universal.

My personal inclination is to regard it as a universal; it is the cognitive model by which the mind makes sense of human action. Now if we assume that every interactive text is based on a network of textual segments (lexia, textrons) and of paths between these segments, there will be some types of networks that preserve narrative coherence no matter what paths the user chooses, while other types will permit incoherent and therefore non-narrative sequences.

Let's move to the contrast between the aesthetics of immersion and the aesthetics of interactivity. Immersion, one of the goals of VR technology, is a corporeal experience: the sensation of being physically surrounded by an element. If we transpose the idea to reading, or experiencing a narrative, the surrounding element is no longer water but space-the space of the imaginary world created by the text. Immersion means to me: feeling that there is something out there-a world and the individuals who inhabit it-; regarding the characters in a story as flesh-and-blood people motivated by desires who act both rationally and irrationally; imagining that they move in a concrete geography, that they live in time, that their life extends beyond what is shown in the text; and above all: viewing oneself not as a reader but as a member of the textual world, a witness to the narrative action.

The game aesthetics, by contrast, regards the text as a construction kit: the text is made of words, of linguistic signs, which, put together in a certain way, yield a certain picture. If you put the signs in a different order, as you can in an interactive text, you get a different picture. There is no language-independent world that the text describes, but only transitory images created by the permutations of the basic repertory of textual segments. The purpose of reading is to play with these segments-to try out all the possible permutations, and to inspect all the different pictures that result from this semiotic play.

dd: With respect to Margaret Wertheim you describe two different concepts of representation as dedicated to "the inner eye of the soul" and to the "physical eye of the body". Could you explain what these concepts are and how they apply to literature?

MLR: Wertheim proposes these concepts in reference to the modes of pictorial representation of the Middle Ages and of the Renaissance. In medieval paintings, objects and characters are represented not as the eye sees them-this would be in perspective-but in their spiritual essence. For instance, Jesus will be depicted as to be larger than the humans who surround him to stress his religious importance. We can say that pre-Renaissance painting signifies objects, rather than re-presents them. The discovery of the laws of perspective in the Renaissance allowed the projection of three-dimensional space onto a two-dimensional surface. The painting could now fool the eye, create the dimension of depth, and the spectator could imagine himself as part of the pictorial space, because this space extends in make-believe beyond the surface of the canvass. The "physical eye of the body" thus stands for a type of representation that creates immersion, such as VR tries to do nowadays.

In the domain of literature, the equivalent of the "inner eye of the soul" would be any kind of allegorical or deeply symbolic representation, while the "physical eye of the body" would translate into a realistic type of representation that transports the reader into an imaginary world, and gives her a sense of its presence. "The inner eye of the soul" could describe lyric poetry, and the "physical eye of the body" the realistic novel. When a poet like Georg Trakl speaks of a "blue deer," we mentally picture a shape, a color, perhaps a ghostlike animal, and the eye of the soul gives it a symbolic meaning, but when a novelist, say a practitioner of magical realism like Gabriel García Márquez, refers to a blue deer, we imagine, with the eye of the body, that there is a blue deer in the fictional world, a deer that exists objectively, and we may imagine ourselves in the presence of that deer.

dd: You note that theorists of hypertext sold "hypertext to the academic community-an audience generally hostile to technology, but also generally open to postmodern theory-by hyping their brainchild as the fulfillment of the ideas of the most influential French theorists of the day". To what extent does the "broken up structure" of hypertext and its "dynamic reconfiguration with every new reading session" fulfill the "postmodern condition," i.e., the replacement of grand narratives by little stories?

MLR: The broken-up structure certainly challenges "grand narratives," if by this term one understands a global narrative structure. I think however that it is perfectly possible to maintain, and hope for global narrative coherence in hypertext, if the text is conceptualized as a jig saw-puzzle. Each of the lexia would present bits and pieces of the story, and the task of the reader would put back this story together.

Hypertext then would be, in a reasonably literal sense, a "game of narration," as Espen Aarseth calls it.

This pattern is possible, but it seems that most hypertext authors reject it in favor of a model that presents hypertext as matrix that contains an infinite number of little stories. In this second model, every reading session yields a different story. So if a reader visits two lexia and then quits, for whatever reason, these two lexia would be the story of the day—a little story. In my view this is wishful thinking: you cannot make narrative sense out of a randomly chosen set of lexia, and you don't start from scratch with every reading session. Rather, you keep in memory what you have read before, and you try to complete the picture that is emerging in your mind. The completion of this picture may or may not be possible depending on the nature of the text. So there may be hypertexts that allow the reconstruction of a grand narrative, some that present only little stories (stories contained in one lexia), and still others that frustrate narrative desire both on the level of grand narrative and of little stories.

dd: To what extent does the third type, that is the non-narrative and conceptual hypertext, become a realm only accessible to those interested in the idea of challenging traditional aesthetics rather than in the pleasure of reading?

MLR: If by pleasure of reading one understands something like the immersion of a reader in a fat novel, the "conceptual art" version of hypertext will never reproduce this experience. This is why I think that it is wrong to conceptualize hypertext as a new type of novel or narrative. Its appeal will reside in its architecture, and to appreciate the complexity of this architecture it will be necessary to read it in small doses, as one reads lyric poetry. Indeed, hypertext could be to the early twenty-first century what hermetic symbolist poetry was to the early twentieth century: an exercise for intellectuals, not a popular form.

To remain readable, these conceptual hypertexts will have to be shorter than the hypertext novels of the first generation. And it will be necessary to give a strong allegorical meaning to the action of moving through the textual network—not an invariant generic message inherent to the medium, but a meaning unique to each particular text, and ideally recreated with every use of the device. Eventually, the device will become dated, as did (to some extent) twelve-tone music, or the automatic writing of the Surrealists, but I think that we are far from having explored all of its possibilities. To me the main question is: will hypertext will remain fashionable long enough for all these possibilities to be explored? As you can see I place literary hypertext in a historical perspective—I see it as a transient phenomenon, like all literary movements—rather than regarding it as THE literary form that will dominate the future.

dd: You note that hypertext "interactivity has been hyped as a panacea for evils ranging from social disempowerment to writer's block". You remind us that readers

have to *follow* links and are limited to the paths designed by the author. This hype of the death of the author and the freedom of the reader seems to belong to the golden age of hypertext, which according to Robert Coover now has given way to the silver age that is "characterized by a retreat from radical visions and a return to major elements of the preceding tradition". One of these elements may be the pleasure of immersion that is often accused by hypertext theorists of promoting a passive attitude in the reader and of providing escapist gratification. By contrast you point out: "At its best, immersion can be an adventurous and invigorating experience comparable to taking a swim in a cool ocean with powerful surf. The environment appears at first hostile, you enter it reluctantly, but once you get wet and trust your body to the waves, you never want to leave. And when you finally do, you feel refreshed and full of energy." How does this translate in the realm of aesthetics?

MLR: Indeed, one of the main points of my book is that immersion need not be the passive stupor of the couch potato addicted to the steady flow of images on the TV screen. (In fact, the couch potato is not immersed in what he sees, he is just lulled away from the real world.) There is no need in my view to combat immersion in language, and to promote interactivity at all costs, because language is by nature an activity-stimulating medium, but not an inherently immersive one, as are moving pictures. Because language does not provide data for the senses (at least not data of the sort that automatically pictures its referents), it takes a great deal of mental activity to imagine textual worlds, and to imagine them in sufficient detail to feel immersed in them. By adding inter-activity to this inevitable activity, hypertext may be straining our cognitive abilities.

To offset the cognitive burden of interactivity, future hypertexts will need to rely more on the intrinsic immersivity of pictures, especially of animated pictures. The next generation of hypertexts will have to be visually pleasurable, and hypertext will be a work of design and orchestration as much as a work of writing. This is why I regard multimedia CD ROM art as the path of the future for interactive texts. Coover deplores this development, calling it a silver age (as opposed to the golden age of the early text-only hypertext novels). He would like to maintain a purely verbal form of literature, and regards multi-media hypertext as a threat to language art, a surrender to the invasion of culture by the visual image. Coover seems to forget however that hypertext is only a small niche of artistic creation, and that the codex book is very much alive. There is ample room in our culture for multi-media hypertext and non-electronic language-only literature.

Now to my comparison of immersion with plunging into a cool but invigorating ocean, as opposed to soaking in a Jacuzzi (a metaphor inspired by the ten years of my life that I spent in Southern California). This was written in reaction to Bolter, who wrote that immersion is an experience characteristic of "genre fiction," such as romance novels, mysteries and thrillers-in other words, the experience of novels whose world is so predictable, so stereotyped, that it comes preassembled to the

imagination. It is easy to get into these worlds, but we do not get much out of our visit since we already know them.

By contrast, some texts are very difficult to construct, because their world is unfamiliar to us, because the writing is challenging, because characters seem to act out of a different logic; but once we overcome our initial reluctance, and actually learned the laws of this world (all learning is somewhat painful), then these worlds become intensely present to us, they haunt our imagination. And I must say that this can happen with a well-written hypertext-I had this oceanic experience with "Twelve Blue" by Michael Joyce. But in order to achieve immersivity, hypertext must fight its medium much more than a printed, linear narrative needs to do, because linear narrativity easily creates the effect that I call "temporal immersion": being caught in suspense, in the forward movement of the plot.

dd: As you mention in the discussion in your introduction of the relation between narrative and hypertext, the paradox of maintaining a reasonably solid semantic structure in a fluid environment has generally been avoided in favor of more discourse-oriented issues. What aesthetic consequences follow when one gives up well-formed narrative content in favor of alternatives or randomness? How can an unforeseen combination of elements interlock into a narratively meaningful picture and what role is the author likely to play in constructing future narratives?

MLR: To see what is lost when "solid" structures, which can be planned discourse strategies as well as well-formed plots, are sacrificed to "fluid" randomness, let me return to the question of narrative suspense. The creation of suspense is highly dependent on the order of presentation of narrative information. Therefore, if the author loses control of this order, as is the case when the reader can follow a variety of branches, it becomes very difficult to create expectations (a precondition for suspense effects), or to build up and relieve dramatic tension. When the order of presentation is randomized, one reader may reach a certain segment after having acquired the necessary information to understand it, while another reader, having taken a different path, may be totally unable to situate it in a context. All this other reader can do, at least during the first visit, is read the segment as a self-standing text.

Randomizing the sequence is not necessarily deprived of aesthetic interest; but the effect that results from the chance encounter of two lexia is more of a metaphorical / lyrical than of a causal / narrative type. Dadaist and Surrealist aesthetics relied heavily on this type of effect-think of the famous line by Breton: beauty is the encounter of a sewing machine and an umbrella on a operation table. At best, the random sequencing of two lexia challenges the reader to find, should I say to create, semantic relations between them; at worst, the reader may think: since the sequence is created by my blind clicking, it is hopeless to look for sense.

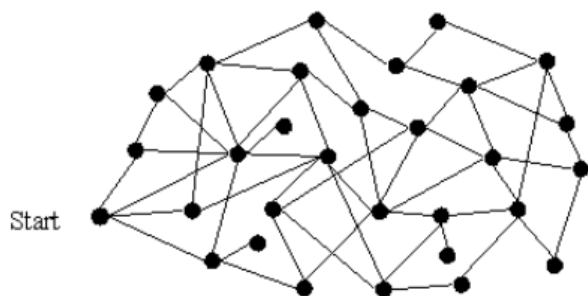
To return to the question of interlocking the lexia of hypertext into many different pictures, it all depends on what we mean by "picture." If we expect logical coherence and meaningful sequentiality in a picture, in short, a well-formed plot, it takes a top-down, author-controlled design to guarantee that the pieces will interlock properly. And it would take an almost god-like intelligence to design a set of elements that combine narratively in whatever order they are visited. Similarly, it would be a tour de force to design a jig-saw puzzle that yields different recognizable shapes when put together in different ways.

But if we regard interactivity as a device that affects discourse, not story, then all paths through the network could be seen as disclosing the same story-in a different order. This means that the pieces interlock into only one pattern, and this pattern has nothing to do with the order in which the reader visits lexia. In this model, sequence loses logical and temporal meaning-reading lexia "a" before lexia "b" does not mean that "a" precedes "b" in narrative time --, and as I mentioned above, reading becomes a game similar to solving a jig-saw puzzle: the picture to be reconstituted is the story itself. This mental model of hypertext could be exploited in a mystery-story structure, in which the reader would be driven by the desire to see the entire picture.

dd: What do the designs "that provide feasible solutions to the problem of interactive narrativity" look like?

MLR: They will be designs that retain some authorial control over the paths taken by the user. This control can be exercised by giving a memory to the system, so that it will be only possible for the user to reach a certain segment after another one has been visited. Joyce uses this idea in *Afternoon*, but it will need to be applied much more extensively to ensure narrative coherence. (*Afternoon* is more preoccupied with frustrating than with satisfying narrative desire.) Another way to retain integrity on the story level is to minimize the number of links-but this is tantamount to saying that narrativity is incompatible with choice.

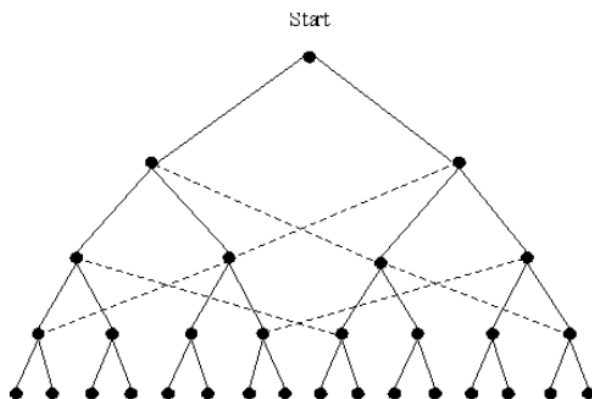
Hierarchical tree structures allow a very strict control of the path of the reader from the root node to the tip of the branches, since there is only one way to reach a given tip, but because distinct paths cannot share any nodes, the tree creates a combinatorial explosion that places far too great a burden on the author if the system is to offer a reasonable number of choices.



Paths can be uni or bidirectional

Unrestricted network
Allows loops and random sequences

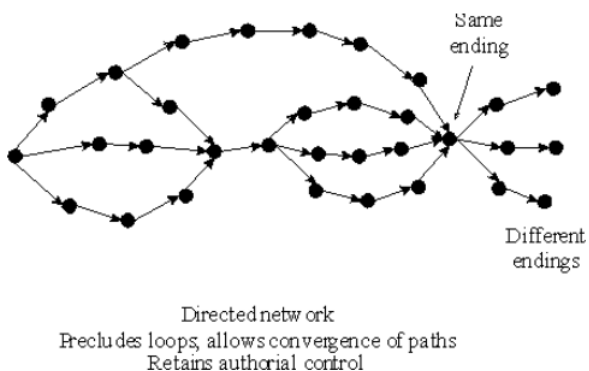
hypertext structure: The Network



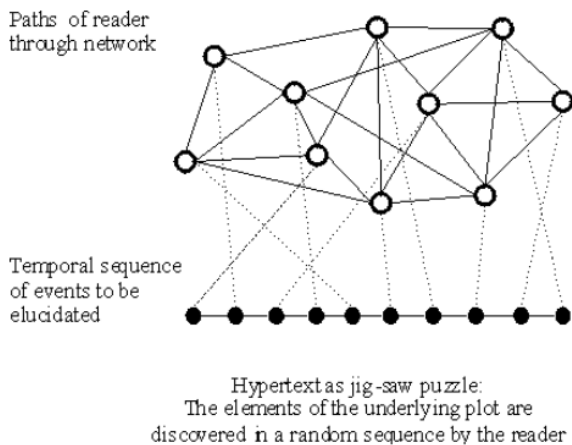
Paths are unidirectional (from top to bottom)
Every traversal produces a well-formed plot

Tree structure
Allows maximal authorial control

hypertext structure: The Tree



hypertext structure: The Flowchart



hypertext structure: The Hidden Story

The most efficient structure is a network that allows the convergence of paths, so that different branches can share certain elements, and precludes loops, so the reader will not be lost in a labyrinth.

This is not to say that labyrinthine texts cannot be artistically valuable; quite the contrary; but how many of them do we need? When they visit the carnival of literature, readers may enjoy one trip in the funhouse, where they will be lost for a while, but they want a variety of rides! The anti-narrative and self-reflexive stance of

postmodern texts is an interesting moment in the development of literature, but in the long run, immersive narrativity is much more viable, pleasurable, and diversified than anti-narrativity.

dd: In your discussion of interactivity you intend to concentrate "on the expressive properties of the feature, its potential and limitations, its control of the reader, and its problematic relation to immersion." What are the potential and limitations of these expressive properties, and what is problematic about immersion?

MLR: I will skip the question of the literary potential of interactivity because I make an attempt to address it in the enclosed extract ("The future of hypertext"). Let me therefore focus on what I see as the main problem with interactive texts: their deficiency, compared to traditional narrative in the area of immersivity.

The main thesis of my book is that the reconciliation of interactivity and immersion requires a type of interactivity based on a corporeal involvement in a virtual world, not on a mere play with signs. One of the goals of VR developers is to enable the user of virtual systems to interact with the computer-generated environment in the same way we interact with the real world: not only through the use of symbolic, arbitrary language, but also through the use of gestures. Because the active user is connected through her body to the VR environment, which she apprehends and shapes from within, her experience is one of both creative interaction and immersion.

But in hypertext, interactivity consists of the possibility to select one of many predefined branches at specific decision points (no fluidity as to where they are situated!), and this selectivity uproots the reader from the world that was beginning to take shape in her imagination. Every time the reader is asked to make a choice, the flow of narration is interrupted, and she must weigh the various possibilities. Even when the choice is blind, she must decide on which button to click, and as she reads on, she may keep thinking of what she missed by not taking the other branches. When this occurs, she is neither "here" -in the selected world- nor "there".

I also think that the activity of selecting one of many possible worlds entails a point of view external to any of these worlds. Hypertext may not turn its readers into productive writers, as its early promoters suggested, but by asking readers to detach themselves from any particular world it does bring them indeed closer to the authorial perspective- for authors, like the God of Leibniz, have the luxury of contemplating many possible worlds before deciding which one (hopefully the best) should be actualized. Neither authors, Leibnizian gods, or hypertext readers are tied to the destiny of one particular world. They dwell in outer space- or is it hyperspace ?- , and they move freely in the universe of the possible.

This is why the authorial perspective is not an immersive experience. We can only reconcile immersion and interactivity if the interactor exists as a body (or at least,

as an imaginary body) in the virtual world. For models of immersive interactivity, we must look at art or entertainment forms such as interactive drama, computer games, and MOOs-where the user manipulates a character in the virtual world. And in the non-electronic domain, at ritual, street theater, carnivals, or children's games of make-believe.

dd: Your book begins with some impassioned remark about Virtual Reality as technology: "some day VR will replace reality; VR will never replace reality; VR challenges the concept of reality; VR will enable us to rediscover and explore reality; VR is a safe substitute for drugs and sex; VR is pleasure without risk and therefore immoral; VR will enhance the mind, leading mankind to new powers; VR is addictive and will enslave us; VR is a radically new experience; VR is as old as Paleolithic art; VR is basically a computer technology; all forms of representation create a VR experience; VR undermines the distinction fiction-reality; VR is the triumph of fiction over reality; VR is the art of the twenty first century (as cinema was for the twentieth); VR is pure hype and ten years from now will be no more than a foot-note in the history of culture and technology." Short question after a long quote: What do you think?

MLR: I have very strong opinions on some of these alternatives, while on others I prefer to take an attitude of wait and see. Six or seven years ago, when I first heard of VR technology, I sincerely thought that it would be the art of the twenty-first century, but in the meantime the technology has developed and penetrated daily life at such a slow pace, compared to the pace of development of the Internet, that I have my second thoughts about this. Maybe VR will remain an idea, a virtuality. Since I use the concept of VR largely as a metaphor of total art in my book, the points I am trying to make about literature are fortunately not tied to its actualization. The cost of VR installations seems so prohibitive, at least right now, and the throughput so limited (virtual worlds are meant for one or two users at a time) that I don't see them developing into the cinema of this new century-at least not for the first decade or two, and I don't have the necessary clairvoyance to venture further into the future.

Incidentally, when I use the term VR, I mean digital simulation technologies, and not what is commonly called "cyberspace." Unlike many people, I do not regard the Internet as virtual at all, unless "virtual" simply means digital. (This seems to be the popular evolution of the term, but in my book I stick to optical and philosophical interpretations.) My own realist inclination (by this I mean my sense of the uniqueness of the real world and of its resistance to both mind and body) prevents me from thinking that our embryonic simulation technologies "challenge the concept of reality," though they would certainly do so if they fulfilled Jaron Lanier's dream of the "Reality Engine" : a machine that enables us to freely create virtual worlds and to live in them until we become hungry, and perhaps even longer than that, since cyberprophets tell us that some day nanotechnology will enable us to do without bodies. Since I am rather skeptical of cyberprophets, I prefer the view that

VR technology can be the instrument of an exploration, scientific as well as philosophical and phenomenological, of reality.

And finally to the dichotomy "VR is a radically new experience"-"VR is as old as Paleolithic art," I say yes to both alternatives: VR can be new medium for continuing a project that began with Paleolithic art and inspires all forms of fiction: the exploration of the world-creating power of the imagination.

dd: Thank you very much for this interview.

Notes

1. For a detailed print description of the project see: Brenda Laurel, Rachel Strickland and Rob Tow, "Placeholder: Landscape and Narrative in Virtual Environments." *Computer Graphics* 28.2 (1994): 118-126.