

ELECTRONIC COLLAGE:

THE VIDEODISC AND INTERACTIVE NARRATIVE

by **CAROL STROHECKER**

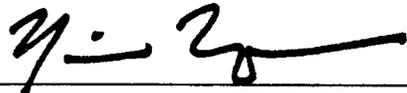
**Submitted to the Department of Architecture
in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE IN VISUAL STUDIES
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ABSTRACT

Interactive narrative is explored as a new, filmic form. One videodisc-based movie, entitled *A Different Train of Thought*, is presented as an example of the form. Through techniques including the stylized intercutting of documentary footage with enactments, this movie attempts to provide a structural context into which scenes can be variably 'embedded' as a result of the "viewer's" interaction. The form, content, and experience of "seeing" the movie are intended to suggest that perceptions of events develop as a function of selective exposure and interpretation.

The meaning of "narrative" is probed: historical and current conceptions are regarded as supporting and/or hindering acceptance of the "viewer's" ability to affect a story. The "viewer's" participatory role is examined from filmic and psychoanalytic perspectives, citing the work of writers such as Wittgenstein, Lacan, and Levi-Strauss, as well as that of Makavejev and other filmmakers. An underlying premise is that technology gives rise to new forms of expression that contribute to the shaping of contemporary thought.

In a series of appendices, details are given about the production of *A Different Train of Thought* and its implementation on "level-III" (computer-controlled) videodisc. A description of modifications made to the VHS signal is included, as are an evaluation of various videodisc "authoring systems", suggestions about developing computer programs based on narrative structure, and illustrations.

Thesis Supervisor: Richard Leacock, Professor of Cinema

STYLISTIC NOTE

This paper is presented in a stylistic manner that is seen as being consistent with the presentation of *A Different Train of Thought*. The result is a 'tapestry' of interwoven voices, represented by varying (but consistently applied) typographic treatments. Bold lettering is used for quoted material.

Quotation marks, in addition to setting off quotations, may call attention to word choices peculiar to a certain context. Double quotes echo a word or phrase commonly used; single quotes indicate my own interpretation and resulting vernacular, which in some cases approximates an idea more so than expresses it literally.

FIGURES

(The figures are grouped together, following the main portion of this paper, in an attempt to preserve their 'integrity' as a set of images capable of 'telling their own story' in addition to supplementing the text.)

- 1 Design from an ancient Greek vase
- 2 Page from a medieval illuminated manuscript
- 3 Scene from the Bayeux Tapestry showing Halley's Comet and King Harold
- 4 Scene from the Bayeux Tapestry showing the fleet's landing at Pevensey
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- 6 Representation of L. Wittgenstein's description of pictures associating a child's activities with times of the day as indicated by locations of the sun
- 7 Diagram after N. Goodman's "plan" of a Japanese painted screen depicting the biography of a prince
- 8 Representation of the screen design for the "tour" of Aspen included on MIT's 1980 videodisc, *Movie Manual*
- 9 The videodisc layout for the Aspen "tour" on *Movie Manual*
- 10 Representations of the screen design for *A Different Train of Thought*, showing the use of a lower border to signal possibilities for interaction
- 11 The 'pulse' of the 'main story' of *A Different Train of Thought*
- 12 The videodisc layout of *A Different Train of Thought*
- 13 The 'story-spheres' of *A Different Train of Thought*
- 14 Storyboards adapted as 'scriptboards' that were used by the actors in *A Different Train of Thought*
- 15 The building of a "plot unit" as described by W. Lehnert *et al.*
- 16 Representation of the relationships between algorithms that control the 'flow' through *A Different Train of Thought*
- 17 The delivery of *A Different Train of Thought*

eye *I*
"I see; therefore, *eye* am."

--Anonymous

"Not simply seeing is believing,
but *seeing and calculating, seeing and translating.*"

--Susan K. Langer, 1978

Philosophy in A New Key, p.20

Cambridge: Harvard University Press

"Since Freud the unconscious has been a chain of signifiers
that somewhere (on another stage, in another scene, he wrote)
is repeated, and insists on interfering in the breaks offered it
by the effective discourse and the cogitation that it informs."

--Jacques Lacan, 1977

Ecrits, p.297

translated by Alan Sheridan

NY: W. W. Norton & Co., Inc.

AN EVOLUTIONARY VIEW OF "STORIES" AND THEIR REPRESENTATIONS

If the interactive videodisc can be considered one of a growing family of visually oriented "new media", perhaps it is no wonder that people working with the medium would introduce storytelling as a beginning application. As S. K. Langer writes,

Just as verbal symbolism has a natural evolution from the mere suggestive word or "word-sentence" of babyhood to the grammatical edifice we call a language, so presentational symbolism has its own characteristic development. It grows from the momentary, single, static image presenting a single concept, to greater and greater units of successive images having reference to each other; changing scenes, even visions of things in motion, by which we conceive the passage of events. That is to say, the first thing we do with images is to envisage a story; just as the first thing we do with words is to tell something, to make a statement.

Image-making is, then, the mode of our untutored thinking, and stories are its earliest product. [Langer, p.145]

Art-Historical Perspectives

In a discussion about the art of ancient Greece, H. W. Janson begins with the earliest records available to us, dating from about the 8th century B.C., a time when trade flourished between the Greeks and nearby cultures. He describes the merging of one representational style into another as the need for more and more 'complicated'--or, at least, a *different kind*--of storytelling developed. **The oldest characteristically Greek style in the fine arts, the so-called Geometric, known to us from painted pottery and small-scale sculpture, began as patterns of geometric shapes, but, gradually:**

...human and animal figures began to appear within the geometric framework, and in the most mature examples these figures could form elaborate scenes. [Janson, p.77]

Janson describes a 'threshold' at which the coexistence of organic and geometric shapes vascillated between decorative and descriptive functions. One example is a scene of a shipwreck, on a Geometric vase (see figure 1): **...if it were not for the fact that the boat is**

upside down and that the biggest fish has seized the head of one of the men, we would read the design simply as pattern, rather than as a disaster at sea. [Janson, p.77]

Janson comments on the 'inadequacy' of the form to represent the stories that Greeks of the time wanted to tell:

The greatest Greek achievement of this era...are the two Homeric epics, the *Iliad* and the *Odyssey*. The scenes on Geometric vases contain barely a hint of the narrative power of these poems....In the shipwreck scene, its [the Geometric style's] rigid order already seems in process of dissolution; representation and narrative demand greater scope than the style can provide. [Janson, pp.77-78]

As exchanges continued with other cultures, a new style emerged in Greek art, called the Orientalizing style and characterized by experiment and transition. Janson describes a vase that is an example of this style:..

Geometric ornament has not disappeared altogether, but it is confined to the peripheral zones....The major areas, however, are given over to narrative, which has become the dominant element. The figures have gained so much in size and descriptive precision that the decorative patterns scattered among them can no longer interfere with their actions... [Janson, p.78]

Janson then explains how, with the further assimilation of the Eastern influences, the Orientalizing style gave way to the Archaic and the capability for portraying narrative expanded. The capability is demonstrated by a change of *form* which demands less and less of a separation between decoration and description: both aspects of the design are used to tell the pictorial story.

In later artforms, the distinction between images' decorative or descriptive functions began to dissolve, as ornament and story-image began to merge. Often in medieval manuscript pages, for example, border images decoratively frame the main image while supplementing its narrative context by representing related events or subjects. Sometimes, border images make direct visual allusions to the main subject, and it becomes difficult to isolate pictures in the border as being 'separate' images (see figure 2).

A well-known example of medieval art, the Bayeux Tapestry, exemplifies such an interrelationship between border and story-image, and, in its portrayal of a specific narrative, goes well beyond the 'static' representation that a single image or group of images could have depicted. A complicated sequence of events is portrayed and supplemented by upper and lower borders, which include decorative motifs, images of events that occur before, after, or *while* the main action is taking place, and even representations of ideas in the characters' imaginations.

C. H. Gibbs-Smith calls the Bayeux Tapestry **the only important monument of secular narrative art that has come down to us from the eleventh century**. Through colorful images, the tapestry relates a story of royal politics, including representations of Halley's Comet and the Battle of Hastings, in which Duke William of Normandy attacked with a mighty force King Harold's England, and in which Harold met his death (see figures 3, 4, and 5).

The Bayeux Tapestry is not really a tapestry but a long stretch of embroidery in wool on linen. The scenes of the long narrative are separated, usually, by trees, and are framed above and below by thin, continuous borders showing...various types of figures and scenes, including fables, naturalistic scenes from country life, studies of animals and birds, and a wonderful selection of fabulous and symbolic beasts of all kinds. [Gibbs-Smith, p.4 and pl.3-5]

Although many of the borders seem to be primarily decorative, border-images often pertain directly to the larger story. D. M. Wilson notes that:

The borders are sometimes ornamental. Sometimes they represent fables. Sometimes they are used to portray a sub-plot and even possibly to foreshadow future events.

Gibbs-Smith elaborates on the cultural climate that produced this lengthy narrative:

C. R. Dodwell has shown the Tapestry to bear the closest parallels with the nature and structure of the *chansons de geste*, those great medieval epics of adventure, battle and heroism which were recited before the lord and his guests after their evening feasting....There were two basic forms of *chanson*, the feudal story and that featuring the crusades. There was something of a set formula for many *chansons* of the first type; they dealt with feudal loyalty and disloyalty....

The Bayeux Tapestry closely follows this formula....[its] plot was 'custom-made' for a *chanson* -type narration, and it fitted perfectly into the feudal pattern of such an epic....

Dodwell also shows that even the border is enlisted in the overall structure of this secular epic, and is meant to be seen in conjunction with it. 'But what is particularly significant about [the borders]', he writes, 'when we read the collection [of scenes] as a whole is that they have all been selected to point to the same kind of moral. It is, indeed, the very moral of the main narrative--the moral of treachery and betrayal. [Gibbs-Smith, p.5]

It is as though the embroiderer had found a way to include story "content" as one of the materials with which to fabricate the tapestry: thematic repetition and emphasis are as important as the colors of the thread and the lengths of the stitches. By providing--literally--several "storylines" at once, the designer of the Bayeux Tapestry has provided an early example of what today's videodisc designers might like to call "polylinear structure"--for narrative. In many instances, the border calls attention to the larger image in such a way that the tapestry as a whole seems to have, at times, the curious property of referring to itself.

A person 'reading' Harold's story by looking at the Bayeux Tapestry would walk alongside the stretch of linen while viewing the rows of embroidered images. Most likely, the viewer would exercise the options of walking back to review images already seen and of looking up or down to take in the entirety of a scene or the supplementary information in the borders. Perhaps the viewer would walk past some of the images, moving to others that have greater appeal because of their color or subject matter. In any case, the viewing experience occurs according to the will of the viewer, and the interpretation of the story becomes a function of the manner in which the person chooses to view the tapestry.

The videodisc enables the telling of a story in a similar way. In this case, though, it is the image that moves, not the viewer. Electronic signals can be "woven" together and interpreted as an image that is framed within the video monitor. Thousands of images can be made accessible within one program. The viewer makes decisions about what to see and when to see it. One of the challenges to the videomaker is to acknowledge the viewer's decision-making power by packing sufficient "meaning" into the signalling of possibilities for interaction, that the viewer can predict what kind of information is likely to result.

What Is a "Story"?

When a group of eight- and nine-year-olds was asked, "What is a story?", the children's discussion reflected a continual hesitancy to depart from what they knew some of the adults present wanted to hear: "A story has a beginning, a middle, and an end".

As the discussion progressed, however, some other ideas were explored. Many children said that a story must have a beginning and a middle, but not necessarily an end. They gave as an example the "story of one's life": it could go on "forever". Different forms were discussed regarding their adherence to 'requirements' for 'story-ness'. Recipes, it was decided, are not stories because even though they describe something that might happen if you "do" the recipe, nothing actually happens, and, furthermore, a recipe has no "characters".

Some of these 'requirements' seemed to dissipate as the discussion continued and an idea emerged that had to do with "state of being". The children decided that "stuff doesn't necessarily have to happen". One story was, simply: "Once upon a time, there was a boy."

Another, perhaps taking the idea to its extreme, was, "Once upon a time, there was nothing."
[M. Strohecker]

The children seemed to be asking for a more open-ended view of "story" structure and content than their acculturation had led them to expect. The particulars of their discussion would seem consistent with others' findings:

Work by story researchers such as Stein and McConoughy suggests that until about the fifth grade, children tend to focus predominantly upon certain physical dimensions of stories, such as major story actions, and less upon aspects such as story settings, or psychological dimensions such as characters' internal responses (e.g., cognitive and affective states, motivation, disposition). As children grow older, they also appear to understand more fully the causal connections among story events rather than perceiving mere temporal links as dictating story event order (Trabasso). [Char and Brienne]

L. Wittgenstein acknowledges just such links in suggesting how a child might be trained in the practice of 'narration of past events'. [Wittgenstein 1960, p.104] He notes that the child would already have been "trained" in asking for things by name and that the adult could phrase

an association of the things with the past possession of them by using the past tense in speech. A next step would be for the adult to prompt the child by beginning the phrase and using facial expression and tone of voice to indicate "expectancy" that the child will complete the phrase. Wittgenstein points out that the success of such prompting depends on the child's interpretation and selection of the "expected" response from any number that might, in the child's mind, be considered.

Two researchers caution that **many...studies rely primarily upon verbal stimuli (written or oral prose passages) and verbal measures, which underestimate aspects of many young children's narrative abilities.** [Char and Brienne] As though responding to their warning, Wittgenstein describes ways in which image-representations can provide a primitive kind of narration of past events that 'precedes' their verbal representation (see figure 6):

We have some characteristic pictures of the sun in different positions in our landscape. Let us call this series of pictures the sun series. We also have some characteristic pictures of the activities of a child, lying in bed, getting up, dressing, lunching, etc. This set I'll call the life pictures. I imagine that the child can frequently see the position of the sun while going about the day's activities. We draw the child's attention to the sun's standing in a certain place while the child is occupied in a particular way. We then let it look both at a picture representing its occupation and at a picture showing the sun in its position at that time. We can thus roughly tell the story of a child's day by laying out a row of the life pictures, and above it what I call the sun series, the two rows in proper correlation. We shall then proceed to let the child supplement such a picture story, which we leave incomplete. And I wish to say at this point that this form of training...is one of the big characteristic features in the use of language, or in thinking. [Wittgenstein 1960, p.105]

In this description, the idea of "story" is open-ended enough to acknowledge the child's contribution. Wittgenstein describes a variation of this "game" in which a clock's hour hand and its corresponding numbers, rather than pictures of the sun, are used to denote the passage of time. Then he describes another variation, which is followed by an examination of the distinction between ideas of time that rely on concepts of measuring or means of measuring, and ideas of time that don't suppose such a reliance. The difference, he points out, is not necessarily reflected in the language used to describe the "game" or its 'idea' of time.

Note that there would have been a similar game in which also, as we might say, time was involved, that of just laying out a series of life pictures. We might play this game with the help of words which would correspond to our "before" and "after". In this sense we might say that...[the game] involves the ideas of before and after, but not the idea of a measurement of time. I needn't say that an easy step would lead us from [such] narrations to narrations in words. [Wittgenstein 1960, p.106]

A similar word/picture approach was used in developing the "narrative" for a movie on interactive videodisc, entitled *A Different Train of Thought* (see Appendix D). The technique used in that "game", however, was more one of 'interchange': an initial short story (see Appendix A) inspired a visual rendering (see Appendix B), the organizing of which required another verbalization (see Appendix F), which in turn fueled refined visualizations and verbalizations as the editing and programming ultimately produced the finished movie.

Wittgenstein's "game" also frees the images from the ordering that is dependent on time of day or time of occurrence. The concepts of "before" and "after" to which Wittgenstein alludes depend on an image's arrangement relative to the other images, rather than to a pre-determined temporal ordering.

Like Wittgenstein, N. Goodman is concerned with the roles of both time-sequence and spatial associations in storytelling, but Goodman explores further the question of ordering. He begins by illustrating how different wordings affect one small story:

Excalibur broke last from the gate, took the lead by the far turn, then dropped back to fourth coming into the stretch, but rallied to win by a nose.

compares with:

Excalibur won by a nose, though he was fourth coming into the stretch after leading at the far turn despite having broken last from the gate. [Goodman 1980]

Goodman remarks:

Nothing strikes us as unusual here even though the order of telling completely reverses the [told]* order of occurrence. Indeed, to have withheld the result of the race to the end

would have been inconsiderate under the circumstances. In other reports the telling may jump back and forth... [Goodman 1980, *1981]

Goodman goes on to show examples that 'mix up' the orders of telling and of occurrence, and asserts that each of the possible versions is admissible, despite the non-inclusion of 'helpful' words like "before" and "then". He points out that literature and cinema share the tolerance, even the need, for such options in ordering, and that the 'audience' succeeds in understanding the story by making adjustments of interpretation as needed, as more and more of the context is revealed.

In sum, flashbacks and foreflashes are commonplace in narrative, and such rearrangements in the telling of a story seem to leave us not only with a story but with very much the same story. [Goodman 1980]

The interactive movie, *A Different Train of Thought*, also explores how the idea of "story" encompasses more than its verbal 'record' can represent. The first scene of the movie is described in a literal representation of the motion-picture cuts that make up the first sequence (see Appendix E):

Lise was in a flower shop. A soldier bought flowers; so did she.

Re-orderings retain the sense of the story even though they no longer represent the order of the pictures that tell it:

Lise and a soldier bought flowers in a flower shop.

A soldier who was in a flower shop bought flowers; so did Lise.

Obviously this exercise could continue in various ways. None of the verbal arrangements, however, could communicate the turns of the body, patterns of color, duration of movement, and other factors that determined the sequencing of the event in the movie. Stories told through paintings or photographs (or video monitors) rely on the *combined considerations* of time-sequencing and spatial presentation. In referring to Jacopo del Sellaio's *The Story of Psyche*, a painting in the Museum of Fine Arts, Boston, Goodman notes:

Here what is explicitly told takes time, and the telling has a definite order. Several incidents, with Psyche appearing in each, are shown strung across a landscape. The impossibility of the same person being in different places at the same time notifies us that difference in spatial position among scenes is to be interpreted as difference in temporal position among the events depicted. And, as with a written tale, although the whole story is presented at once, an order of telling is plainly established. [Goodman 1980]

And, in another painting that Goodman describes, the spatial arrangement of telling departs from the order of occurrence in that an event that does not occur between two others is depicted between them. Thus we have not a foreflash or a flashback but a flashbetween. [Goodman 1980] (See figure 7.)

A contemporary filmmaker has experimented in a similar vein and concluded that the resilience of the "story" itself is what enables it to endure despite such re-orderings:

Legge describes Makavejev as a Yugoslavian filmmaker and former film critic who has been developing a heterogenous cinematic style—intertwining radical political ideology with documentary footage, eroticism, comedy and sheer fantasy. On narrative structure, he comments: I believe I have been fighting narrative for years because narrative structure is prison; it is tradition; it is a lie; it is a formula that is imposed.

Despite his experimentation, Makavejev may remain jailed in a conceptual prison of his own making, in that he insists on temporal sequence as defining story structure and seems unwilling to relinquish any of the telling of the story to the interpretive power of the viewer:

...I discovered that whatever I do, however I scramble my stories, not only do they still have a beginning, a middle, and an end, but they each have their own shape. So I discovered that there is something indestructible in the story because the story is narrative and the story is also part of the form. [Simon]

Goodman is careful to note that the 'meanings' of many pictures cannot survive temporal and spatial rearrangements because they have...not only no direction but no order of telling at all. Rearranging scenes can result merely in different patterns being marked out by the sequence of occurrence... (See, for example, figure 1.) ...although every narrative will survive some reordering, and some narratives will survive any reordering, not every narrative will survive every reordering. Some stories when reordered in certain ways are

no longer stories but studies. [Goodman 1980]

He says that rearrangements of the order of telling can, in some cases, ...cut across and obliterate--or at least blur--the story line. Narrative gives way to exposition. In other cases, when organized on the basis of dynamic and rhythmic properties, into movements like those of a musical work...a story becomes more a symphony than a study. [Goodman 1980]

In all of these definitions, however, Goodman's discussion emphasizes the importance of the story's structure, in which he includes both temporal and spatial arrangements. S. Chatman also emphasizes structure as a characterizing basis for "narrative", but--unlike Goodman--places the reader or viewer in a relatively passive role:

A salient property of narrative is double time structuring. That is, all narratives, in whatever medium, combine the time sequence of plot events, the time of the *histoire* ("story-time") with the time of the presentation of those events in the text, which we call "discourse-time." What is fundamental to narrative, regardless of medium, is that these two time-orders are independent... [Chatman]

That is, the time of events represented is not the same as the time it takes for a particular medium to represent them.

...the internal structures of...non-narrative texts are not temporal but logical, so that their discourse-time is irrelevant, just as the viewing time of a painting is irrelevant. We may spend half an hour in front of a Titian, but the aesthetic effect is as if we were taking in the whole painting at a glance. In narratives, on the other hand, the dual time orders function independently... [Chatman]

Other writers acknowledge that it is the reader, or the viewer, who balances these two structures, thus creating the "narrative". But Chatman insists on the control of the author or filmmaker as being a condition of maintaining narrative structure:

...In theory, at least, any narrative can be actualized by any medium which can communicate the two time orders....Narrative pressure...affects the genre of film...in which the camera moves around close-up details of a single painting. An example of this

genre is Alain Resnais' film on Picasso's *Guernica*....By controlling the viewer's order and duration of perceiving, a film scanning a painting might imply the double time structure of narrative texts. [Chatman]

A recent filmic presentation explores the issue of "control" by enabling the viewer to make choices about "order and duration of perceiving". As with the Bayeux Tapestry, Wittgenstein's "life pictures", or a favorite novel, the receiver of the narrative becomes a participant in its relating. The means of participating is physical, and perhaps provides tangible evidence of the mental processes that respond to text or image and comprise, for each receiver, the "story". The movie is called *A Different Train of Thought*. Presented through a video monitor that allows viewers to interact by touching the monitor, thus affecting changes in the video images, this movie has its recent roots in other applications of the videodisc medium.

A Different Kind of Movie

One of the better known applications is the *Movie Map* of Aspen, Colorado, an MIT project for which single photographs were taken at about every ten feet along each street of the town, and mastered with other information onto a videodisc. As the disc is played, viewer, driver, and "map"-reader are the same person: to "see" the movie is to "drive" through Aspen, as successive still-images simulate smooth motion at variable speeds. The viewer controls the motion by touching symbols shown along the bottom of the screen, which resemble traffic signals (see figure 8).

The spatial arrangements of streets and buildings in the town are 'mapped' on the videodisc in a way that acknowledges both the need for a specific organization of information on the disc and the viewer's interpretation of the information. When the "viewer" "turns" left, the disc plays backward, and when the "viewer" "turns" right, the disc plays forward (see figure 9). Concepts of "before" and "after" are not 'built in' to the "map". If applicable at all, they derive from places that the "viewer" visits and from each "viewer's" interpretation of a highly individualized 'path' through the "map".

In attempting to acknowledge the medium's propensity for individualized viewing and to tell a particular story, *A Different Train of Thought* makes use of both temporal and spatial orientations. The movie 'holds' its audience through a "diachronic", or time-reliant, sequence

of events while maintaining the "synchronic" emphasis that motivated its creation: *relationships* among the images are the key to understanding the movie.

A Different Train of Thought presents the "story" of an American woman who leaves the Eastern European family with whom she has been staying and boards an all-night commuter train. She finds her way out of the crowd and into a cabin, in which she tries alternately to sleep and to field encounters with tired people who come and go during the ride. The people and the woman do not share a spoken language--yet, in trying food and drink, arguing against a black-market exchange of currency, and quelling an attempted rape, she experiences understanding and friendship in ways that would have seemed impossible without conversing.

The movie combines documentary footage, shot in Budapest, with acted scenes that re-create the events of the "story". The two kinds of footage are edited together within a 'main story', and are variably interspersed as a result of the "viewer's" interaction. To see the 'main story' without images that supplement it, is to see a complete 'tale', but only part of the 'story'. Viewers who choose not to interact cannot miss the point entirely, however, as the 'main story' is edited in a manner consistent with the movie's 'meaning' and 'appearance' in an interactive presentation (see Appendix D). The role of time--of the chronology of events in the 'main story'--is continually subverted by images that demand correlation to an overall 'meaning'.

In "viewing" *A Different Train of Thought*, the participant sees a divided image (see figure 10). Along the bottom portion of the screen are stationary pictures of characters in the movie. Most of these pictures are blocked from view at any given time, as only the one/s representing a possibility for interaction are visible for each scene. As the story unfolds, with the upper portion of the screen displaying the moving picture, the viewer can touch one of the pictures showing at the bottom of the screen--say, that of the main character.

Suddenly the moving image is no longer of the scene in the train, but of her thoughts: quickly flashing by are images of the station where she purchased the train ticket, of the family with whom she had been staying in Budapest, and so on. The "viewer" can elect to return to the train--that is, to the 'main story'--or can allow the stream of images to play itself out, after which return to the train is "automatic". Choices are continually available: the "viewer" can then allow the current scene to play, or touch the picture of another character to "see" his or her "thoughts", or even touch the picture of the woman again to see how her thoughts may have

progressed since the last interaction.

The timing and nature of the selections are so individualized that each "viewer" becomes, in a sense, a "character" in the movie. As with the interpersonal dynamics portrayed by the movie, the "viewer's" model of characters and events is a function of exposure and interpretation.

A New Form?

A Different Train of Thought is a kind of 'offering' as a beginning example of what a movie on interactive videodisc might be like. An emerging medium must grapple with problems of making itself understood: through trial and error, content fleshes through form, and ultimately a specific grammar becomes recognizable. S. K. Langer describes the process in terms of metaphor as being a vehicle through which humans 'understand' and through which the evolution of a "grammar" or "semantic" occurs:

Metaphor is the law of growth of every semantic. It is not a development, but a principle. This is strikingly attested by the fact that the lowest, completely unintentional products of the human brain are madly metaphorical fantasies, that often make no literal sense whatever; I mean the riotous symbolism of dreams. [Langer 1957, p. 147]

In *A Different Train of Thought*, the main character's dreams are among the thought-images that can be made visible through interaction. They are accessible when the woman sleeps, between 'events' in the cabin. These interludes are not very long, compared with the scenes that surround them--they consist of only a few quick cuts. The "viewer" may or may not choose to "lengthen" them. Here *A Different Train of Thought* plays with the tension between Chatman's "double time structures" of representation and events represented--the woman may actually have been asleep more than awake on the train, but the 'main story' structures that timing differently. The potential for expanding the timing into another realm altogether, into the dream-realm of variable duration dependent upon the "viewer's" curiosity, echoes Goodman's contention: **...in a narrative neither the telling nor what is explicitly told need take time...** [Goodman 1980]

Like the rest of the 'main story', the sleep-interludes consist of documentary footage alternating with enacted events. The quickness and closely cropped shots of these short sequences,

however, may make the distinction between types of footage even more difficult than in other parts of the movie. The interludes are "distinctive" nevertheless, in their formation of a 'refrain' that helps to shape the overall rhythm of the movie (see figure 11).

There is a sense in which the movie's exploration of the interplay between experience and thinking--in the form of dreams, memory, evaluation, déjà vu, and premonition--evades the question of whether a narrative can be "interactive" and still constitute "narrative". Like *The Wizard of Oz*, whose makers relied on the realm of dreams as the context for the then-new capability of filmic rendering in color, perhaps *A Different Train of Thought* depends on the uncontested nature of 'personal thought' as a 'safe' context for a narrative that allows for relatively unpredictable arrangements of chronology, geography, and visual imagery.

But Langer provides a plausible explanation of the 'need' for such experimentation in conjunction with the emergence of a new medium, particularly one that allows involvement of a sensory repertoire (vision, hearing, and touch) as well as interpretation and decision-making:

Pictures and stories are the mind's stock-in-trade. Those larger, more complex elements that symbolize events may contain more than merely visual ingredients, kinesthetic and aural and perhaps yet other factors, wherefore it is misleading to call them "story-images"; I will refer to them as "fantasies." [Langer, p.146]

Myth begins in fantasy, which may remain tacit for a long time; for the primary form of fantasy is the entirely subjective and private phenomenon of *dream*....The lowest form of story is not much more than a dream-narrative. It has no regard whatever for coherence or even consistency of action, for possibility or common sense....primitive story has some other than literal significance. It is made essentially of dream-material; the images in it are taken from life, they are things and creatures, but their behavior follows some entirely unempirical law; by realistic standards it is simply inappropriate to them. [Langer, p.171]

DIALECTICS OF "INNER" AND "OUTER" WORLDS

There is also a sense in which the inclusion of dreams, the accessing of other 'thought-images', and the incorporation of the viewer's participation may reflect a growing emphasis, exhibited by contemporary trends in both arts and sciences, on psychological or

"epistemological" topics. In literature, theater, and cinema, there are enough examples that some authors have deemed as a genre the "reflexive narrative". The genre may be one eddy of a cultural wave that several writers have described, a wave that marks a turning point in the attitudes that shape people's lives.

The schoolbook history of new technologies concentrates on the practical. In these accounts, the telescope led to the discovery of new stars, the railroad to the opening of new territories. But there is another history whose consequences are deep and far-reaching. A new sense of the earth's place in the solar system made it necessary to rethink our relation to God; the ability to cross a continent within days meant a new notion of distance and communication. Clocks brought more than the ability to measure time precisely; they made time into something "divisible" and abstract. Time was no longer what it took to get a job done. Time was no longer tied to the movement of the sun or the moon or to the changing of a season. Time was what it took for hands to move on a mechanism. With digital timekeeping devices, our notion of time is once more being touched by technical changes. Time is made more abstract still. Time is no longer a process; time is information.

Technology catalyzes changes not only in what we do but how we think. It changes people's awareness of themselves, of one another, of their relationship to the world.

[Turkle 1984, p.13]

Videodisc technologies spring from a framework of scientific thought that has evolved in a way that many writers consider to be no less than drastic.

When physics was as old as psychology is now, it was a definite, systematic body of highly general facts, and the possibilities of its future expansion were clearly visible....Theology, which could not possibly submit to scientific methods, has simply been crowded out of the intellectual arena....As for logic, once the very model and norm of science, its only salvation seemed to lie in repudiating its most precious stock-in-trade, the "clear and distinct ideas"....Yes, the heyday of science has stifled and killed our rather worn-out philosophical interests, born three and a half centuries ago from that great generative idea, the bifurcation of nature into an inner and an outer world. [Langer, pp.16-17]

Langer describes the emergence of a new "generative idea" hallmarked by an awareness of commonality between "inner" and "outer" worlds:

The men in the laboratory have departed so far from the old forms of experimentation—typified by Galileo's weights and Franklin's kite—that they cannot be said to observe the actual objects of their curiosity at all; instead, they are watching index needles, revolving drums, and sensitive plates. No psychology of "association" of sense-experiences can relate these data to the objects they signify, for in most cases the objects have never been experienced. Observation has become almost entirely indirect; and *readings* take the place of genuine witness.

...suddenly, it becomes apparent that the age of science has begotten a new philosophical issue, inestimably more profound than its original empiricism: for in all quietness, along purely rational lines, mathematics has developed just as brilliantly and as vitally as any experimental technique, and, step by step, has kept abreast of discovery and observation; and all at once, the edifice of human knowledge stands before us, not as a vast collection of sense reports, but as a structure of facts that are symbols and laws that are their meanings. A new philosophical theme has been set forth to a coming age: an epistemological theme, the comprehension of science. The power of symbolism is its cue, as the finality of sense-data was the cue of a former epoch.

...There are at least two limited and technical fields, which have suddenly been developed beyond all prediction, by the discovery of the all-importance of symbol-using or symbol-reading. They are widely separate fields, and their problems and procedures do not seem to belong together in any way at all: one is modern psychology, the other modern logic....one stems from medicine and the other from mathematics, and there is nothing whatever on which they would care to compare notes or debate. Yet I believe they embody the same generative idea, which is to preoccupy and inspire our philosophical age: for each in its own fashion has discovered the power of symbolization. [Langer, pp.20-22]

J. Lacan, who has developed what might be described as a mathematical theory of psychoanalysis, makes a similar prediction...

...empiricism cannot constitute the foundations for a science....if the historical birth of science is still a sufficiently burning question for us to be aware that at that frontier a shift took place, it is perhaps there that psychoanalysis is marked out to represent an earthquake yet to come. [Lacan 1977, p.296]

...and S. Papert suggests something like a 'psychoanalytic theory of mathematics':

...the very central idea of abstract mathematics could be seen as condensation: The "abstract" description simultaneously signifies very different "concrete" things. Does this allow us to conjecture that mathematics shares more with jokes, dreams, and hysteria than is commonly recognized?...Taken to its extreme, this line of thinking leads us to see mathematics, even in its detail, as an acting out of something else: The actors may be mathematical objects, but the plot is spelled out in other terms. Even in its less extreme forms this shows how the aesthetic and the functional can enter into a symbiotic relationship of, so to speak, mutual exploitation. The mathematically functional goal is achieved through a play of subgoals formulated in another, non-mathematical discourse, drawing on corresponding mathematical knowledge. Thus the functional exploits the aesthetic. But to the extent we see (here in a very Freudian spirit) the mathematical process itself as acting out premathematical process, the reverse is also true. [Papert 1980, pp.199-200]

Such perspectives reflect a widespread change that is occurring in the way that we regard our world and ourselves. The discourse of "psychoanalysis" is providing material with we can begin to symbolize the change.

...when we reflect on the social impact of psychoanalysis, it makes more sense to speak of the development of a psychoanalytic culture than to talk about the truth of particular psychoanalytic ideas. What fueled the development of a psychoanalytic culture is not the validity of psychoanalysis as a science, but the power of its psychology of everyday life. Freud's theory of dreams, jokes, puns, and slips allows people to take it up as a fascinating plaything. The theory is evocative. It gives people new ways to think about themselves. [Turkle 1984, p.24]

Trains of Thought, Streams of Consciousness

A Different Train of Thought appears at a time when many people associate arcades and next-generation pinball with the computer-controlled interaction with moving images. Certainly this narrative's mode of presentation may seem to have more in common with such games than with the movies we know. But *A Different Train of Thought* has a story to tell, a story that may be relevant in different ways to each person who sees it. It is a story about people on a train, but also about a family, about a city, and about people maintaining their dignity in the midst of a military occupation. And, with or without the viewers' interaction, it

is a story about the spectrum of differences that make up the collective 'mind' of society.

The characters, and perhaps the "viewer", are changed within the course of these stories. And the presentation, for all its game-like qualities, is a movie in the most serious sense of the word: to explore the thoughts of various characters is also to explore oneself. By interacting with the characters in *A Different Train of Thought*, the "viewer" weaves a tapestry of interpretations that shape an impression of the characters and the stories. The process is not unlike those which produced the movie. 'Stolen' bits of "reality" (in the form of documentary footage) were combined with selections from a re-created "reality" (enactments of events that actually occurred), to produce a substrate for the "viewer's" exploration of both "outer" and "inner" worlds:

In its old sense the verb 'bricoleur' applied to ball games and billiards, to hunting, shooting, and riding. It was however always used with reference to some extraneous movement: a ball rebounding, a dog straying or a horse swerving from its direct course to avoid an obstacle. And in our own time the 'bricoleur' is still someone who works with his hands and uses devious means compared to those of a craftsman. The characteristic feature of mythical thought is that it expresses itself by means of a heterogeneous repertoire which, even if extensive, is nevertheless limited. It has to use this repertoire, however, whatever the task in hand because it has nothing else at its disposal. Mythical thought is therefore a kind of intellectual 'bricolage'....Like 'bricolage' on the technical plane, mythical reflection can reach brilliant unforeseen results on the intellectual plane. [Levi-Strauss, pp.16-17]

The self-reflection stimulated by 'viewing' *A Different Train of Thought* occurs largely as a function of the interaction. Seeing a character's thoughts in a given situation, the "viewer" might ask, "What do *I* think about this situation? How do my thoughts compare with the character's? Why?" The action of touching the screen focuses attention on one's own asking of such questions. 'Traditional' movies may prompt similar inquiries but cannot provide a comparable vehicle for their formulation.

In a sense, the story becomes most meaningful when it is interrupted, like...the paradox of conceiving that the discourse in an analytic session is valuable only in so far as it stumbles or is interrupted... [Lacan 1977, p.299] The interactive nature of *A Different Train of Thought* constitutes a kind of "stream of consciousness", a flow of image-representations of

characters' thoughts.

Psychoanalytic theorists of different persuasions have employed different interpretive principles or codes—one might say different narrative structures—to develop their ways of doing analysis and telling about it....For the analyst, free associating is a no-fault activity. What is consciously expected or incomprehensible is seen rather as the analysand's having unconsciously introduced more complex rules to govern the narrative being developed... [Schafer]

Algorithms 'control', to an extent, the configuration of each thought-representation, but the accessing of such images and their consequent placement within the story are subject to the "viewer's" control. The representations are comprised of images retrieved from all parts of the videodisc--that is, from settings both on and off the train. Another set of thought-images, the "viewer's" own, is also part of the "story" that the "viewer" constructs, though these 'thoughts' may be apparent to no one except that individual.

We are forever telling stories about ourselves. In telling these self-stories to others we may, for most purposes, be said to be performing straightforward narrative actions. In saying that we tell them to ourselves, however, we are enclosing one story within another. This is the story that there is a self to tell something to, a someone else serving as audience who is oneself or one's self....telling "others" about "ourselves" is doubly narrative. [Schafer]

"Viewer" As Inter-Actor

A Different Train of Thought plays with a curious reversal of this "double narrative". The movie self-consciously introduces itself to the "viewer", as the (admittedly 'primitive') means through which story character and "viewer" intersect (see Appendix F):

Hi! I'm a movie. We're about to have a conversation, in a way.
You'll forgive me if I stutter from time to time...
...it's just a function of my current stage of development.

Here, images are searched and displayed in a simulation that foreshadows both the editing style and the interspersal of 'thought-images' that the "viewer" affects. And, throughout the

introduction, pictures in the lower portion of the monitor flash on and off in association with the voices and video images.

Your communication will be rather limited as well--primitive, really.

(You'll be poking at me a lot.)

But, eventually, we may touch a note of understanding.

In the three voices of the woman, the conductor, and "the movie", the introduction continues, establishing the "viewer" as an 'inter-actor' with and within the movie.

W: This is a story about a woman...

C: ...who meets a man...

M: ...on a train.

W: You're there, too.

C: With all the other passengers.

M: Their thoughts, and your thoughts, tell the story...In many ways.

C: But what's the *real* story?

W: Touch me...I'll tell you.

The tone is slightly ironic, as one of the reasons for the movie's being is to suggest that each interpretation of any "real story" is subjective. Although the 'main story' of events on the train is told from "beginning" to "end", it is 'fleshed out' with supplementary images to such an extent that an important shift of emphasis occurs: in a sense, the story is more 'middle' than anything else. The experience of participating with the movie defines its nature to a greater extent than any temporal sequence of events represented.

Is there a narrative form that is methodologically more adequate to the psychoanalytic occasion? I believe there is. It is a story that begins in the middle, which is the present: the beginning is the beginning of the analysis. Once the analysis is underway, the autobiographical present is found to be no clear point in time at all. One does not even know how properly to conceive that present; more and more it seems to be both a repetitive, crisis-perpetuating misremembering of the past and a way of living defensively with respect to a future which is, in the most disruptive way, imagined fearfully and irrationally on the model of the past....Under the provisional and dubious assumption that past, present, and future are separable, each segment of time is used to set up a series of questions about the others and to answer the questions addressed to it by the others.

And all of these accounts keep changing as the analytic dialogue continues. [Schafer]

The layout of the videodisc could be interpreted as acknowledging the temporal sequence of the 'main story', which--for all its juxtapositions of languages and realities--is the most clearly articulated sequencing of the footage. The woman is shown leaving the family with whom she has been a guest, boarding the train and experiencing its range of events, and disembarking--presumably to continue her journey through the Eastern European city. Like a pair of bookends surrounding this story are groups of 'mini-sequences'. Together with repetitions of events on the train, these 'mini-sequences' are accessed as thought and/or dream images. And, the videodisc's ordering of each set of 'mini-sequences' is consistent with the temporal plan suggested by the 'main story': images of the family precede the train ride, and images of Budapest follow it (see figure 12).

Exactly where these images will be interspersed within the 'main story', and precisely how they will visually "match" the surrounding ones in their new context, is unpredictable. They simply are 'thoughts'--another level of image altogether, but still very much a part of the "story" and of the movie shaped by each "viewer".

...in the case of absolute temporal continuity...the transition between shots might occur at anywhere. A film editor might maintain that in both cases there is only one "right" point at which to make a straight match-cut or abridge the action, but what he really means is that there is only one place where the shot transition will not be consciously noticed by the viewer. This may well be. But if we are seeking a film style that is less "smooth," that actually stresses the structures that it is based upon, a whole range of possibilities remains open. [Burch]

The cutting of *A Different Train of Thought*'s 'main story' provides a rhythmically, visually, and aurally diverse structural context into which the 'thought-images' can be nestled.

Events on the train alternate with intervals during which the main character is "asleep" to create a 'refrain' that can be expanded, if the "viewer" likes, to show images of her dreams. The cutting of the entire movie is often fast-paced, even 'jumpy'--although there are times when the camera's lingering on a slow-moving images remains intact.

The visual richness of scenes shot from life is offset by the sparsity of the enactments. With

the exception of the conductor's uniform, costumes were not used. The "set" was assembled in an *ad hoc* fashion: a piano (which happened to be in the room where the shooting took place) and a bookshelf formed the walls of the train cabin, and some folding chairs covered by blankets formed the seats in the cabin. Lights were used not for dramatic enhancement, but to brighten the space in order to ensure the quality of the recording.

The intent of this "minimalist" approach was to demonstrate that the 'meaning' of the story can be communicated without dependence on props or elaborate 'mood-setting' devices. Additionally, the approach represented an attempt to maintain a perceived 'integrity' in rendering the "story": it is a 'real' story about 'real' people. Whatever could be 'captured' from *lifewas*, and the rest of the footage strove to announce rather than to mask its simulation of 'reality'. (Ironically, the interior of the European train was so dimly lit and sparsely 'decorated' that it is often difficult to distinguish the 'real' footage from the enactments.)

Aural diversity results from the variance of languages spoken by the characters in the movie. In the actual events, the woman sounded as foreign to the people on the train as they did to her. In the movie, this disparity is simulated for the 'viewer'--most likely a speaker of English--by varying the language spoken by any given character. Within the 'main story', the woman speaks English and the other people do not. Within the 'thought-images', however, the character whose thoughts are being shown speaks English. Thus, the woman sometimes speaks English but sometimes does not, and the same is true for each of the other characters. The point is not what language they speak, but whether or not they can understand each other. And, if they do not understand each other verbally, there are other means through which they manage to communicate.

Implementing such considerations of spoken language paralleled the "minimalist" approach to visual aspects of the enactments: the actors did not rely on a formal script (see Appendix B), and when they needed to use a language other than English, they simply spoke "gibberish". The technique underscored the movie's insistence on 'simulating' the experiences represented by the "story". Many different languages were spoken when the events actually occurred. Each was incomprehensible to the woman. Furthermore, the accuracy of any spoken language was not as important to the movie's purpose as the "viewer's" sense--shared with the characters--of being 'outside of' the mainstream code of communication. Often, even without interacting, the "viewer" experiences through the documentary footage the apparent gibberish

of a European who is actually attempting to communicate through the inaudible coherence of his native tongue.

Thus, through the use of rhythmic, visual, and aural diversity, *A Different Train of Thought* anticipates the "viewer's" interaction and incorporates it into an overall style (see Appendix D). The temporal sequencing of events in the 'main movie' is challenged by their "spatial" disparity and by the temporal and spatial 'interruptions' introduced by the "viewer".

Also challenged, in fact, is the very idea that the temporal sequence of events is "interrupted" by interaction. The 'thoughts' may look very different from events on the train, and may be about events that occurred at some time other than during the train ride, but the characters experience the 'thoughts' *while* on the train. Each thought-experience is very much in the "present", and is very real to the particular character.

By 'sharing' in the experiences and interpreting them relative to others seen, each "viewer" goes through a process comparable to that of the characters. Understandings of "reality" are a function of selective exposure and interpretation. By adding to such perceptions his or her own "train of thoughts", each 'viewer' *becomes*, in a sense, a "character" in the movie. Buzzard describes how a similar phenomenon occurs in 'traditional' movies:

...the essence of film language occurs not in the images themselves, but rather in the sequencing of the images, the shots. The junctures which compose the splices in film editing allow for discrete articulations. Even though film viewers share images, and despite the objectivity of the image, it is fair to say that the differences in attention make slim the likelihood that each viewer will attend to exactly the same things. Additionally, the junctures...permit the individual viewers to contribute private details to his/her diegesis... [Buzzard]

Story-Spheres

In the form of interactive narrative made possible by the videodisc medium, the phenomenon of "individual diegesis" suddenly becomes the focus rather than an undercurrent of the movie. The form results from a new frame of reference, one that depends on the *active* participation of the "viewer".

The time has now come to change our attitude toward the function and nature of cinematic articulation, both between individual shots and in the film over all, as well as its relation to narrative structure. We are just beginning to realize that the formal organization of shot transitions and "matches" in the strict sense of the word is the essential cinematic task....It is only through systematic and thorough exploration of the *structural* possibilities inherent in the cinematic parameters...that film will be liberated from the old narrative forms and develop new "open" forms that will have more in common with the formal strategies of post-Debussyian music than with those of the pre-Joycean novel. Film will attain its formal autonomy only when these new "open" forms begin to be used organically. What this principally involves is the creation of a truly consistent relationship between a film's spatial and temporal articulations and its narrative content, formal structure determining narrative structure as much as vice versa. It also implies giving as important a place to the viewer's disorientation as to his orientation. [Burch]

In *A Different Train of Thought*, that "disorientation" has to do with the possibility for interaction and its resulting challenge of temporal and spatial sequence, with the intermingling of documentary footage and enactments, and with the variable use of English. The "viewer's" 'speech' is relegated to gesture, to touch. Yet, these disparate modes are woven together into the fabric of the movie, conspiring through their omnipresence to focus attention, instead, on the "viewer's" "diegesis".

...film form essentially depends on a dialectical opposition between a continuity and a discontinuity....Film form, it would appear, simply cannot exist without some kind of underlying dialectic; the mere linear alternation of disparate images does not suffice to create a film. [Burch]

Burch explains this dialectic in terms of the different mindsets required by the moviemaking functions of shooting and editing. Each demands its own view of the movie's ...essential unfolding in time and space. *Decoupage* as a structural concept involving a synthesis is strictly a French notion....It may never occur to English-speaking film-makers or English-speaking critics that these two operations [shooting and editing] stem from a single underlying concept, simply because they have at their disposal no single word for this concept. [Burch] (See Appendix D.)

By continually providing contrasts in what the "viewer" sees and hears, *A Different Train of Thought* presents, perhaps...an essential structural unity in the form of a continual and

alternating series of divergences and convergences between sound and image, a dialectical rhythm that sometimes joins and sometimes separates what used to be called form and content. [Burch]

The resulting tension is consistent with the overall questioning of the natures of the "real" and "non-real" as posed by *A Different Train of Thought*. The most "unreal" content, the thought and dream imagery, is comprised mainly of "real"--that is, documentary--footage. And the "real" story --of events that actually happened--is re-created through the "unreal" device of enactments. The paradox dramatizes an essential conflict inherent within the "documentary" genre:

...the confusion of actuality with its screen equivalent is the basic fallacy of cinema verite. And the American term, "direct cinema," is a contradiction in itself. The fascination of the cinema and the potential that can make it art is precisely that it is not direct. From here it is only a step, although a decisive one, to surreality. [Amberg]

R. Leacock, who is largely responsible for the origin and development of "direct cinema", acknowledges its bordering on 'theater':

Godard overestimated how much he was finding reality and didn't realize how much he was faking it...To me, the most brilliant aspects of Godard are highly theatrical, which I think he was embarrassed by, because it would admit to making films showing a closed universe. [Leacock 1979]

In elucidating the difference between documentary and acted films, Leacock comments on a recent attempt to re-create a ludicrous event. Originally it had been filmed in documentary fashion, so that its apparent "reality" of politicians seriously discussing financial matters slowly gave way to the "reality" that they were spending a lot of time being confused about who ordered what supper. The re-creation is ...an almost identical re-enactment but it's not nearly so funny as the original because you know in the back of your head they're actors, and at a certain point you think it's ridiculous. [Dorne] The difference between documentary and enacted films, it seems, has to do with *knowing* the difference between recorded and simulated 'realities'.

Ignoring the viewer's savvy by simply combining these 'realities' cannot necessarily obliterate

the perception of their difference. Leacock expresses this skepticism: ...If you were to attempt to make a film which mixed the two forms--if you were to fake parts between the real thing, I don't think it would be convincing--you would destroy the real with the unreal.

[Dorne] Leacock cites Makavejev as having, perhaps, begun this kind of experimentation by creating ...a strange mixture of documentary and totally unnaturalistic footage, which makes no attempt to pass one for the other.

A Different Train of Thought is made in a similar spirit, by deliberately contrasting documentary with enactment and by continually intercutting the two kinds of footage. The surprising result is that viewers of the 'main story' often cannot tell the difference between the two. In this form, attempted in order to provide a suitable context for viewer-interaction, perhaps connections between the images are freed from conventional temporal and spatial constraints.

Within the limits defined by the nature of its "bricolage", *A Different Train of Thought* attempts to enable expansions of its own "universe" by 'nesting' "realities", including those brought to the movie by each "viewer" (see figure 13). The attempt is to materialize, through the use of interactive technology, filmmaking aims that until now may have seemed wildly intangible. We do not yet even have a way of discussing such aims: terms like "surrealism" and "reflexive narrative" may allude to them but do not quite provide a vehicle for working with them and furthering their development.

The two new elements that appear in surrealism are the fortuitous and the irrational. And they are disturbing because they criticize and contradict our conventions....Now surrealism does not merely transcend or transform reality. All art, of course, does precisely that. It combines one reality with another reality, and hence we get those strange juxtapositions....Certainly it combines reality with reference to another realm....The other realm, I suggest, is the unconscious....Now, in an oversimplified way, we can say that figuratively speaking a surrealist work of art is the creative equivalent of psychoanalysis. It makes conscious or, in certain works of art visible or articulate, what is repressed in the unconscious. And that's why I think that Paul Eluard's statement, "Surrealism is a state of mind" is a very useful hint. [Amberg]

S. Buzzard describes how existing films in the genre of "reflexive narrative" have foreshadowed the possibility of physically interacting with a movie, by beginning to shift the

frame of reference from emphasis on the film itself--and the filmmaker's 'world'--to emphasis on what the "viewer" makes of it:

The reflexive film presents viewers with...another kind of gap. They may be shown the mechanics of how a movie is made, but they may also respond to other textual signals which allow them to 'unrealize' the narrative and to discount all they know of their illusion's workings. The gap here is between what Iser calls the 'object text' and the 'virtual text'. A film like *The French Lieutenant's Woman*, for example, foregrounds the actress Anna who plays Sarah, continually reminding viewers that Sarah is fictional. Nonetheless, viewers still make of Sarah a person whose problems with the French Lieutenant seem as real as do Anna's. The reflexive narrative in many ways seems, in fact, to foreground not simply object text and virtual text, but the gap itself. Viewers are thereby asked to experience (if not understand) their very participation in creating their virtual text. Viewers of the reflexive film are invited to study their own imaginative leap into the world of the film narrative. [Buzzard]

Accepting such an invitation is inevitable in "viewing" *A Different Train of Thought* --as, perhaps, is appreciating one's own "imaginative leap" as both sampling and contributing to a broader domain. About another example of reflexive narrative, Buzzard comments:

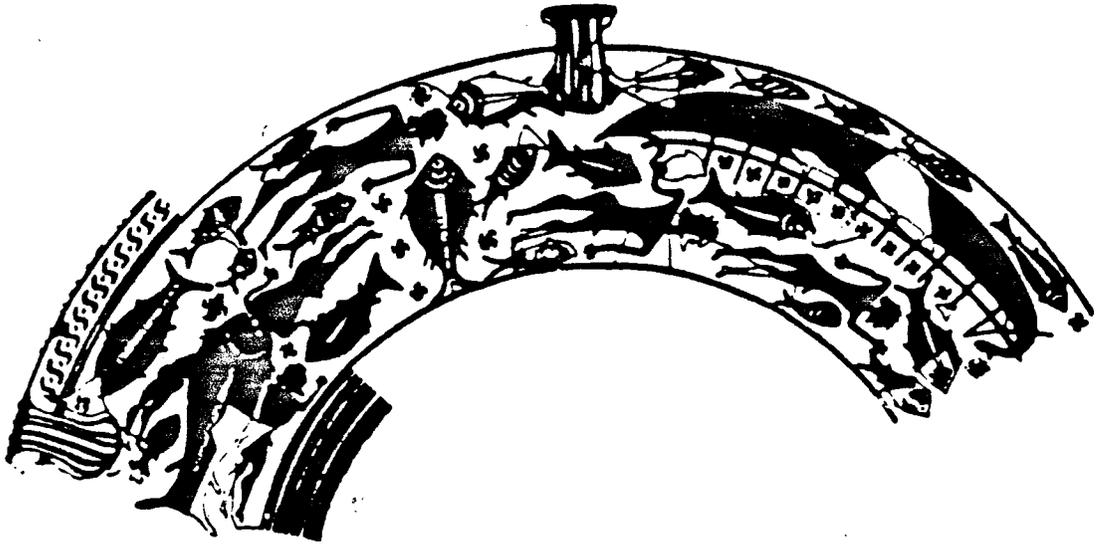
Apprised of cinematic trickery and of movie making in general, a viewer enjoys a pleasant sense of distance from the crises in this text and his/her position as a mere spectator is affirmed. At the same time, however, the narrative structure has been at work on him/her, encouraging the making of a virtual text. To do so involves a suspension of the self-conscious act of watching a movie. The experience of these two roles--one in and one out of the film--indicates the viewer has been able to enjoy the figure-ground perceptual phenomenon....Up until the final shot, however, he/she has not been asked to experience the moment when figure *becomes* ground, when object and virtual text meet. [Buzzard]

A Different Train of Thought does not wait until the "final shot". It is, perhaps, situated at the convergence of "object" and "virtual" text. The convergence is not momentary; it does not represent merely the dipping of one's toes into an experimental pool of figure/ground reversal. *A Different Train of Thought* marks an initial dive into a realm of moviemaking that demands a new frame of reference for moviemaker and "viewer" alike.

As more examples in this movie's form of interactive narrative emerge, we will continue to face challenges of existing structures, concepts of "story" and "movie", emphasis on message-maker moreso than receiver, and the very ways in which we think about ourselves.

Perhaps we will also improve our ways of talking and thinking about how we implement such challenges. Terms like "interaction", "*decoupage*", "story-spheres", and "*bricolage*", may become more commonly used as we develop a new 'language' that enables the clear description and further exploration of both medium and genre.

- 1 A design from an ancient Greek Vase in the Geometric style shows the characteristic intermingling of organic and geometric shapes. A distinction between decoration and description is not clearly made.



[Janson, pl.115: A Shipwreck, drawing after a Geometric vase in the museum at Ischia. 8th century B.C.]

- 2 In this page from a Romanesque-style illuminated manuscript, it is the precisely controlled dynamics of every contour, both in the main figure and in the frame, that unite the varied elements of the composition into a coherent whole....The unity of the entire page, however, is conveyed not only by the forms but by the content as well. The Evangelist "inhabits" the frame in such a way that we could not remove him from it without cutting off his ink supply,...his source of inspiration (the dove of the Holy Spirit in the hand of God), or his identifying symbol, the eagle. The other medallions, less directly linked with the main figure, show scenes from the life of St. John.



[Janson, 227 and colorpl.21: *St. John the Evangelist*, from the *Gospel Book of Abbot Wedricus*. Shortly before 1147. Societe Archeologique, Avesnes, France]

The Bayeux Tapestry



- 3 Halley's Comet...appears and terrifies both the people and the King. On the left the crowd points upward to the comet (in the border).... Harold is then told of the bad omen; and beneath (in the lower border) are the ghostly invasion ships which he sees in his imagination as punishment for accepting the throne after his oath to support William's claim. This is another occasion when the main story invades the upper borders, as it does frequently in the later portions. [Gibbs-Smith, pl.127] In another border design, tiny nude figures of a man and a woman suggest a scandalous relationship between one of the main characters and a woman whose role is tangential to the main story but very much part of the overall "feudal drama".

The Bayeux Tapestry



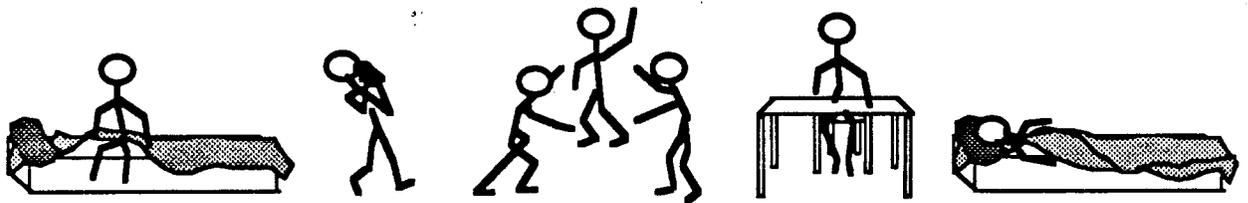
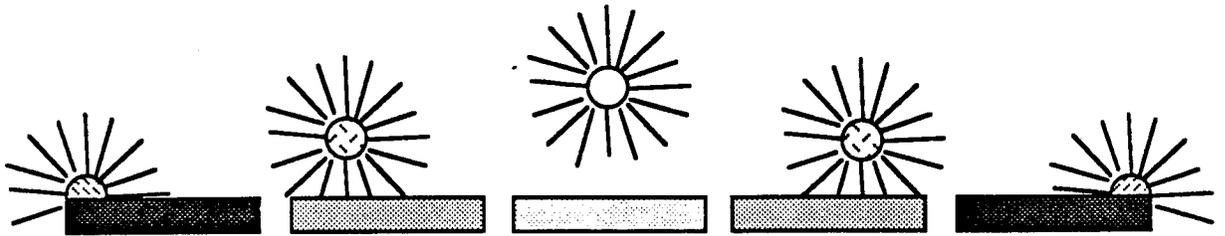
- 4 The fleet lands at Pevensey....Seamen unstep the mast of a ship and the horses are jumped over by low gunwales. Then horsemen are soon in the saddle, and they gallop off unopposed by any English army, and make for Hastings. [Gibbs-Smith, pl.31]



- 5 ...after the rout of the Bretons, a rumour spread that William had been killed; whereupon the Duke thrust up his helmet to show his face. The inscription states, "Here Bishop Odo, holding a mace, cheers on the young men" and then, a few inches farther on, "Here is Duke William"....Just ahead of the Duke rides Eustace of Boulogne, pointing to his master for all to see. But more important, he carries aloft the Papal Gonfanon Banner, which waves bravely in the upper border....The charge then continues....Meanwhile the lower border has exchanged the dead for the living, and we now see a continuous row of archers there: most have quivers. This array of bowmen may have some vague relation to the combined forces attack which won the day. [Gibbs-Smith, pl.39]

6 The story of a child's day is 'told' in this pictorial representation described by L. Wittgenstein.

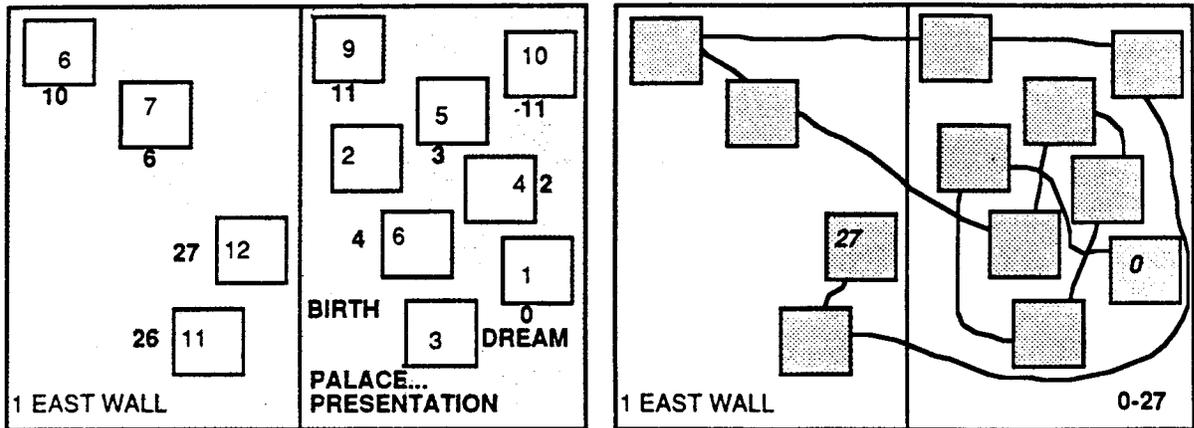
SUN SERIES



LIFE PICTURES

A time-sequence, shown by the "sun series", structures the 'narration' of events in the "life pictures". The 'meaning' of the story depends partially on the spatial association of the two rows of images. [Wittgenstein 1960, p.105]

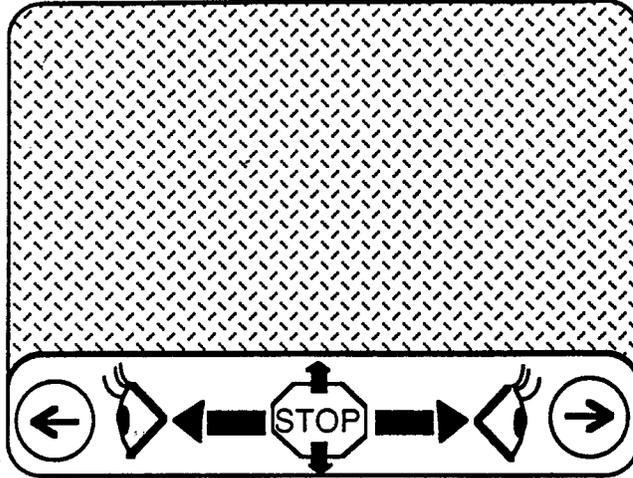
7 In these diagrams after N. Goodman's "plan" of a Japanese painted screen, the biography of a prince is shown without reliance on any spatial convention as dictating the pictorial arrangement of temporal events.



In the diagram at the left, numbers in dark type indicate the prince's age at the time of the incident depicted. The numbers in light type indicate the chronological position of the incident relative to the others depicted on this same screen. [Goodman 1980]

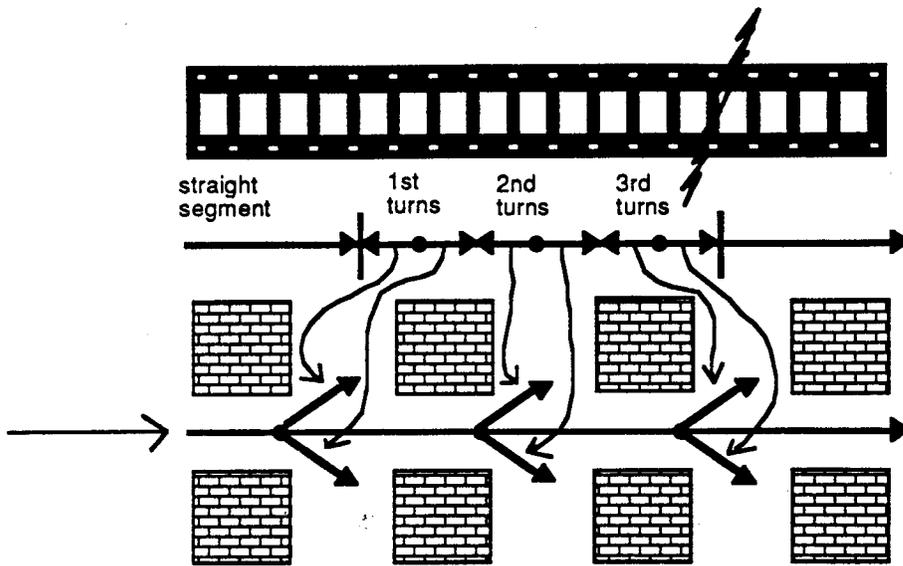
The diagram at the right shows the 'path' that a viewer would follow to track the temporal sequence of events. In many cases, what is represented is ...not a foreflash or a flashback but a flashbetween. [Goodman 1980] (Goodman could have continued this "game" linguistically by calling the phenomenon a 'beflashtween' or, even more appropriately, a 'flabetweensh'.)

8 Representation of the screen design for the "tour" of Aspen included on MIT's 1980 videodisc, *Movie Manual*



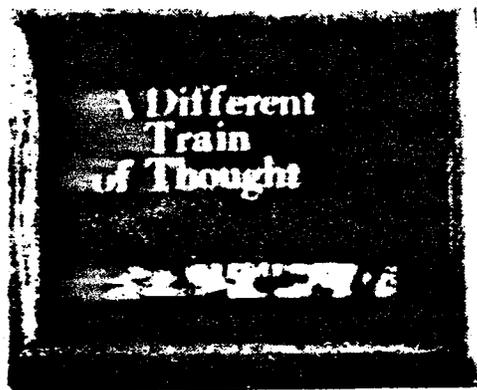
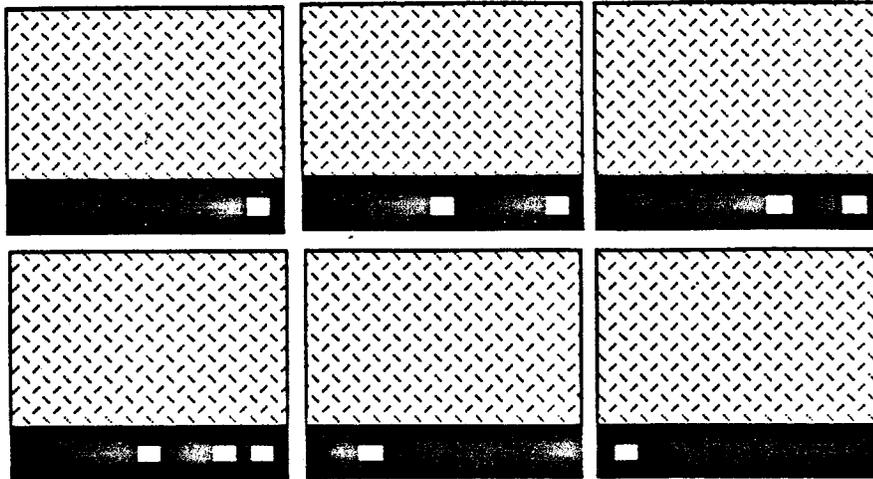
By touching any of the pictures at the bottom of the video screen, 'viewers' of the "Movie Map" of Aspen, Colorado, direct their own tours through the town.

9 The "Movie Map" of Aspen, Colorado



Disc layout. A straight segment is followed by all of the turns from that street, in order. From a single point on the disc, playing forward will show a right turn; playing backward will show the corresponding left turn. [Lippman 1980]

10 Representations of the screen design for *A Different Train of Thought*, showing the use of a lower border to signal possibilities for interaction



Digitized images in the lower border of the screen signal possibilities for interaction. Touching one of the pictures changes the moving image in the upper portion of the screen. Touching a picture of one of the characters results in that character's 'thoughts' being shown. Touching the picture of the train returns the "viewer" to the 'main story'. And, touching the picture of the sleeping woman brings to the screen images of her dreams.

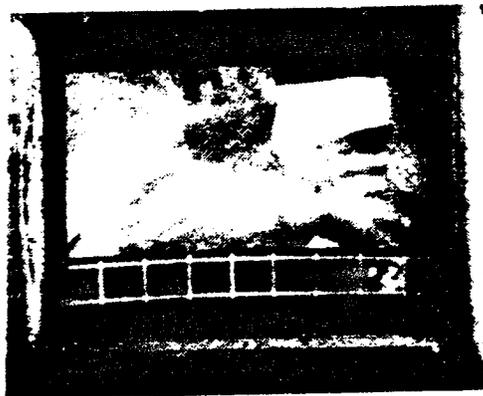
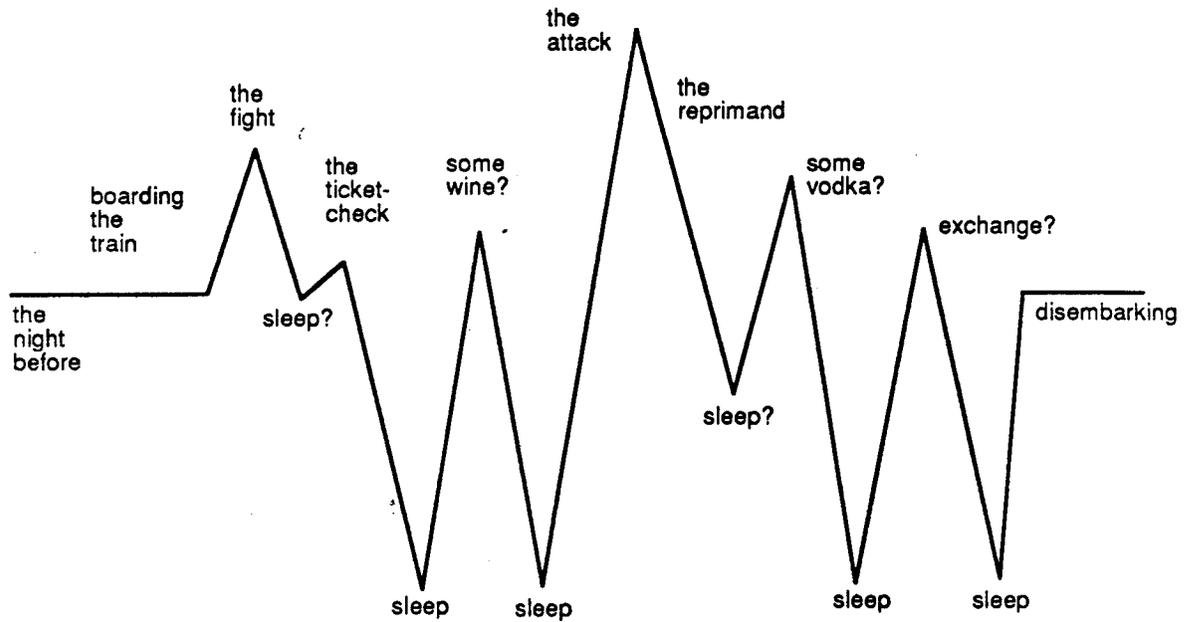


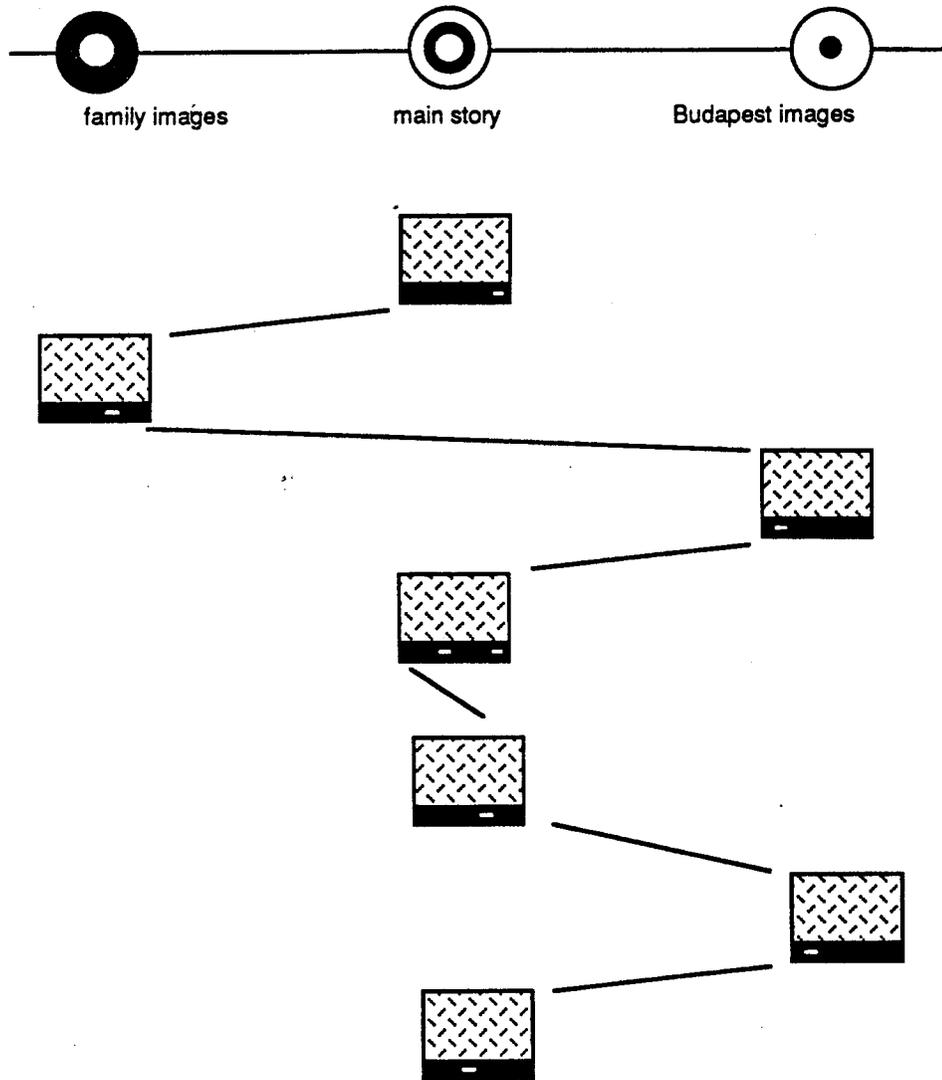
Figure 10

11 The 'pulse' of *A Different Train of Thought*



The quick pace, close cropping, and dim lighting of shots in the 'sleep-interludes' may make the distinction between documentary and enactment less distinguishable than in other parts of the movie. The "viewer" can 'lengthen' these short interludes by deciding to 'see' the main character's dreams.

12 Videodisc "Layout" : A Different Train of Thought



The viewer touches a picture in the lower border, to signal a change in the moving image. Touching the picture of a character requests 'thoughts'; when viewing 'thought-images', touching the picture of the train returns the 'viewer' to the 'main story'. The primary set of 'triggering' images is located at the center of the videodisc to minimize search times.

Figure 12

13 'Story-spheres' of
A Different Train of Thought

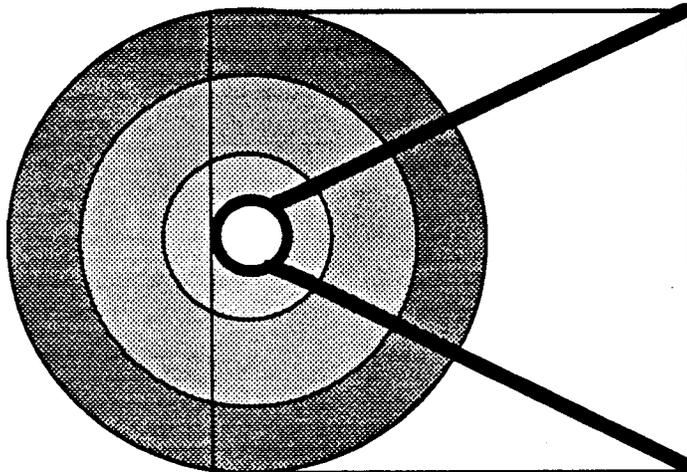
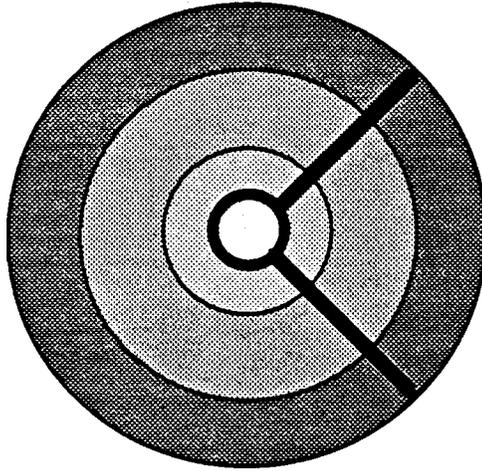
A Different Train of Thought

is many stories. Only one of them has a "beginning, middle, and end" in the 'traditional' sense: the story of events on a train.

Other stories are revealed during the course of the movie. Based on selective exposure and interpretation, the 'viewer' constructs understandings of the stories of military presence, travel in Budapest, and a family with their guest.

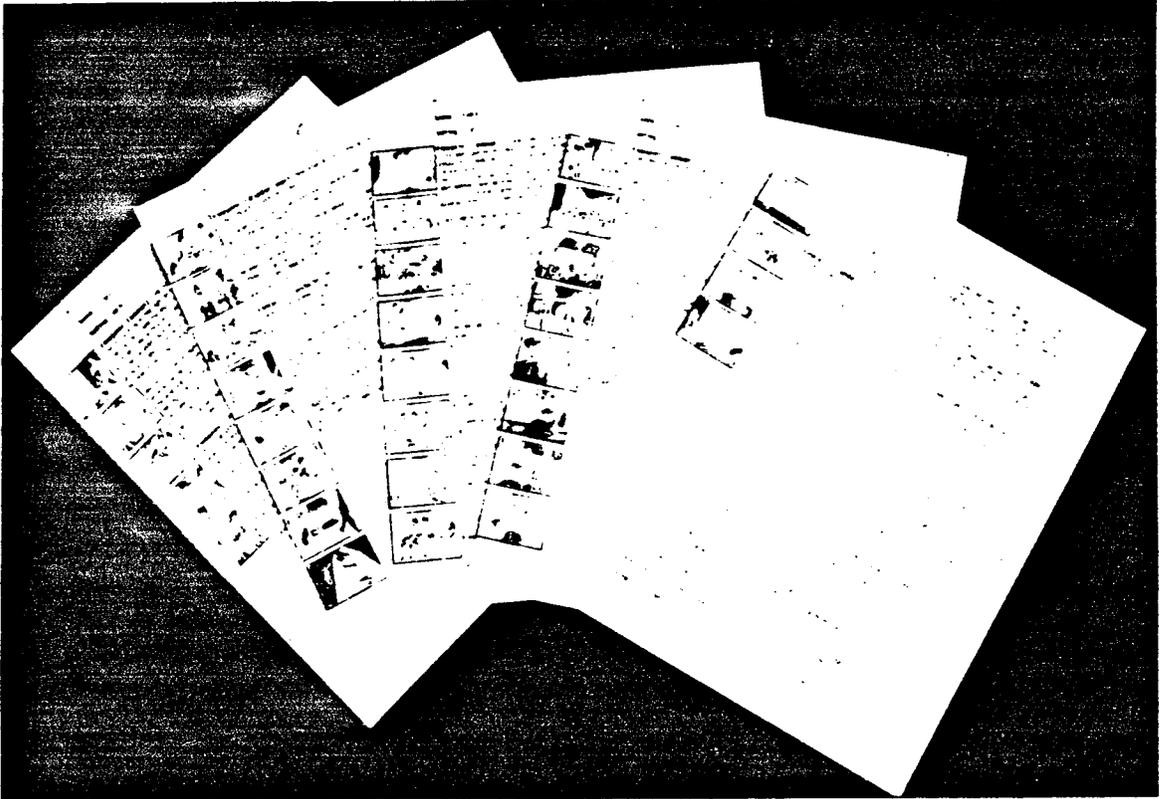
Although the 'main story' is presented more "linearly", it also is subjectively constructed by each viewer. Its form, of documentary footage intercut with enactments, symbolizes the 'viewer's' process of 'overcoming' spatial and temporal juxtapositions in the constructing of each of the movie's stories.

Through the use of flashbacks and other cinematic devices, conventional movie structures could provide the means for telling these stories together. But *A Different Train of Thought* demands a different kind of structure, one that incorporates a shift of emphasis to the 'viewer's' understanding of and contribution to the movie.



In a literal sense, each person who "sees" the movie 'sees' a different movie. The differences in what is actually shown underscore the differences of interpretation that would exist with or without interaction.

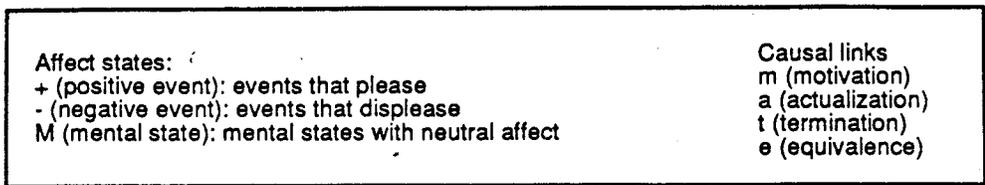
14 The 'scriptboards' used for *A Different Train of Thought*



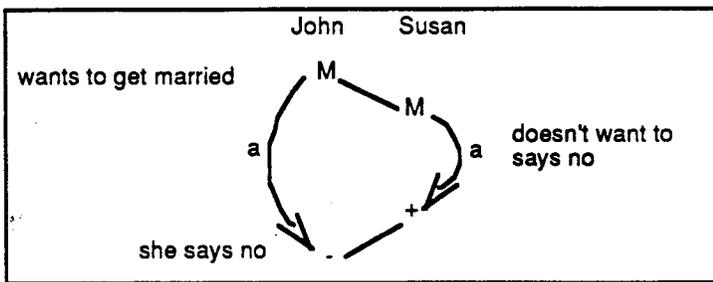
Sketches from the "storyboards" for *A Different Train of Thought* were incorporated into modifications of the original short story to produce 'scriptboards' that the actors used to prepare for each scene's enactment. They memorized no lines, but acted based on impressions gleaned from the 'scriptboards'.

15 W. Lehnert and associates have developed a way of sorting through narrative complexity using "summarization algorithms". The algorithms are based on graphs of the story's structure, built from "plot units". A simple example is shown here. [Lehnert 1984]

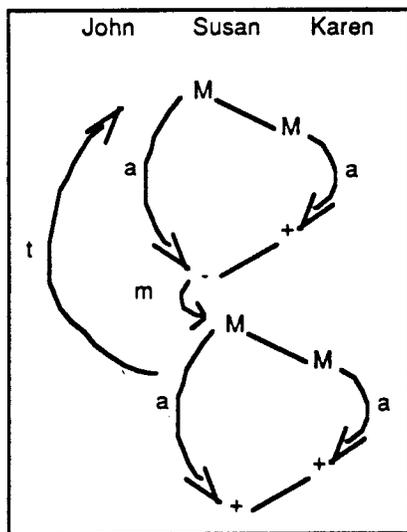
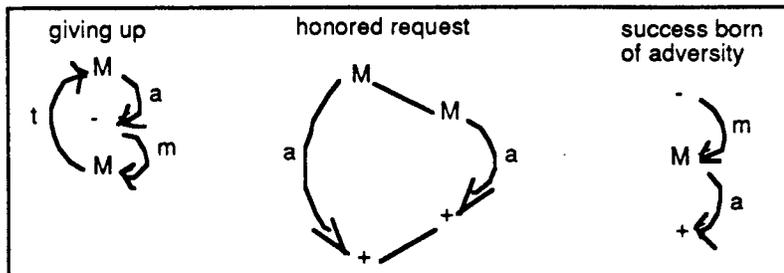
Affect states are linked in various ways:



In this example, John asks Susan to marry him and she says no. The episode is represented by the "denied request" plot unit.



Now, John asks Karen to marry him and she says yes. Three "plot units" are involved.



The overlapping "plot units" in this little story are graphed to show that the four units involve five arcs:

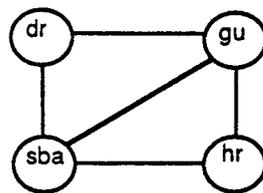
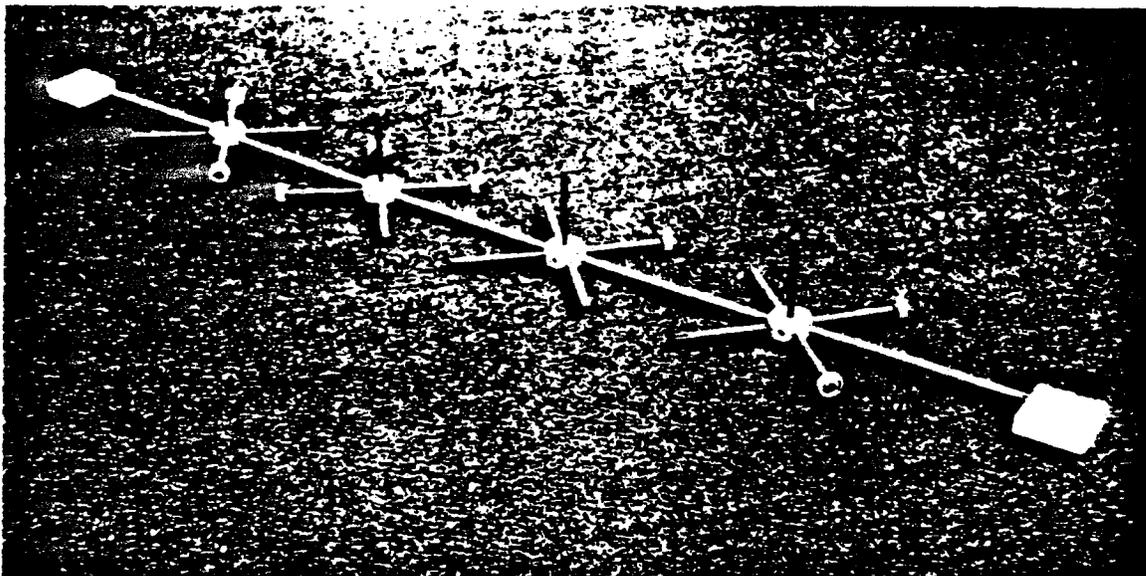
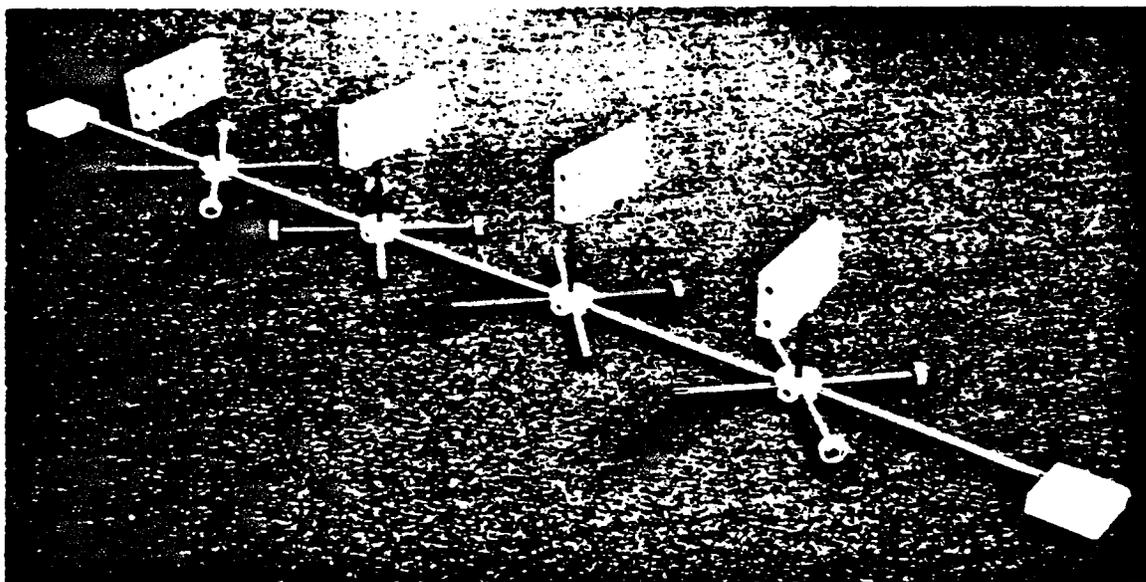


Figure 15

16 A model of the flow through *A Different Train of Thought*

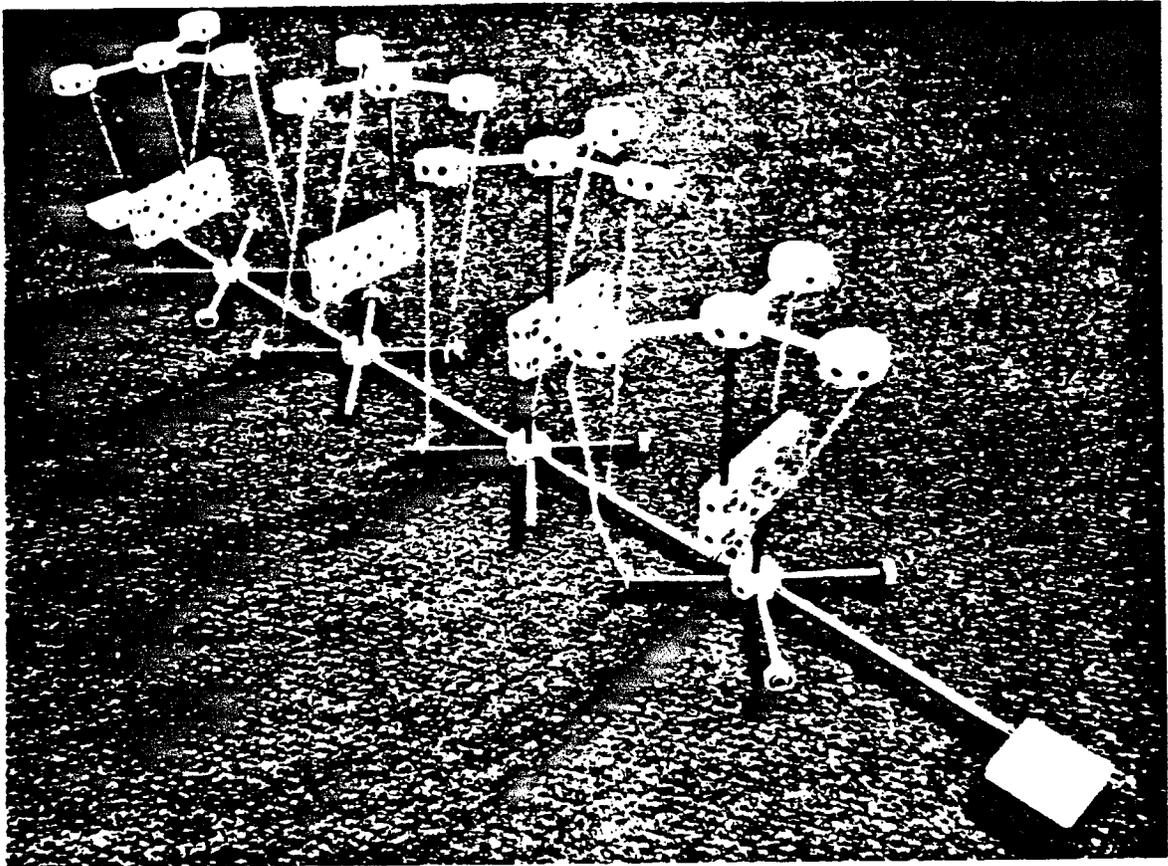


Introductory and ending sequences frame the 'main story' of events on the train and explain how to interact with it. At any point within the 'main story', the "viewer" can interact by selecting a character whose thoughts will be shown. A 'direct connection', pre-established in the computer program guiding the movie, effects a search of the associated sequence. That sequence is shown, temporarily 'interrupting' the 'main story'. Usually a very short sequence, the 'thought-image' plays out and then the "viewer" is returned to the 'main story'--unless the "viewer" chooses to 'interrupt' that sequence also, by selecting either another character's thoughts or to return sooner to the 'main story'.



In most cases, interacting with the movie accesses an 'image selector' rather than affecting a 'direct branch' to a previously associated segment or segments. Random selection and history of the "viewer's" interactions are among the 'considerations' of the algorithmic 'image selectors' (see Appendix H).

Figure 16A



The 'image selectors' use the result of various calculations to select 'response' segments from associated 'pools' of images. Usually these response images are from completely different parts of the videodisc, but sometimes they include repetitions of scenes in the 'main story'. The strings in this model are meant to signify the 'fluidity' of the program: from any 'response' image, it can 'flow' back to the point of departure from the 'main story' or to other images, associated to affect a fuller representation of a character's 'thoughts' at any given time.

On this level of representing the structure of *A Different Train of Thought*, the model shown here becomes, perhaps, too 'literal'. The straight line at the base no longer represents the 'main movie', but the path guiding the "viewer's" "train of thought" as the movie progresses. The model could be lifted from the ground, and the 'image selector'/response image' extensions could be positioned at every 'branch', ultimately creating a kind of spiral that would more effectively represent the complexities of possibilities for interaction and associations of images throughout the movie.

17 The delivery of *A Different Train of Thought*



A Different Train of Thought was programmed using both touch-screen and keyboard interfaces. Delivery of the movie is completely by touch-screen. The nature of the delivery system--and of the movie itself--are such that individual "viewers" or groups of only two or three people are the ideal 'audiences'. Large-group viewing of the movie is not desirable, but individual "viewers" comparisons of impressions most definitely are.

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Appendix A

PRODUCING A DIFFERENT TRAIN OF THOUGHT : THE STORYBOARDING

"A Different Train of Thought" began as a short story recording a remarkable personal experience.

On an all-night commuter train from one seaport to another in northern Poland, I was separated from my traveling companions. Through a series of events, I found myself in the conductors' cabin, trying alternately to sleep and to field encounters with tired people who entered and exited the compartment during the ride. We did not share a spoken language--yet, in trying food and drink, arguing against a black-market exchange of currency, and quelling an attempted rape, I experienced an intensity of understanding and friendship that would have seemed impossible without conversing.

One of the concerns in 'translating' this story for the videodisc presentation was in maintaining some of the subtleties that characterized the experience: the finality of the sound as the conductor locked the door from the outside, the sensory refrain of hearing the bolt unlock while the lights went on, the constant sense of being 'outside of' the communications code, and the occasional raw fear that accompanied an overriding concern that something unknown and possibly undesirable was about to happen--contrasted with the warmth and genuine understanding that managed to evolve among some of the passengers.

The choice of videodisc, even--especially--in its early stage of development, as the medium for presenting the story had much to do with attempting to preserve such subtleties. The viewer's [currently] "primitive" way of interacting with the movie simulates the occasionally effective but often awkward communication among the passengers; the potential for repetition with slight variations echoes the experiential refrains of waking and sleeping, understanding and feeling confused; the momentary blacking of the screen when the player searches for the next videodisc frame is reminiscent of the continual alternation between light and dark, waking and sleeping that happened in the train compartment; and the assurance that each interactor would produce, ultimately, a "different" movie manifests each person's individual nature of perceiving and interpreting the experience.

Another hope was that the "reality" of the experience--the fact that it actually happened--be preserved. The sense was that the events themselves were so extraordinary that they needed no embellishment in the re-creation--in fact, that even a highly controlled re-creation would not be likely to match the appropriate sense of the "extraordinary". The modus operandi that developed, therefore, was to shoot from life as much as possible and to enact whatever aspects of the story could not be obtained directly. Artificial light, costumes, props, etc., would be used minimally, if at all.

One of the beginning steps was to 'map' the movie by developing a "storyboard"--a series of rectangular pictures that showed little people doing or feeling what was described in the story. The exercise became important in guiding the shooting in Eastern Europe: certain images emerged as being key in the visual description of the events. Later, the pictures were incorporated into an edited version of the written story. This illustrated version was divided into "scenes", each of which was an event that happened between "naps" in the train compartment. This version, honed further by a professional "scriptwriter", became the material from which the actors gleaned their impressions of the story.

Originally dubbed the "non-script", but perhaps more appropriately called the "scriptboard", this version was used with the actors in an attempt to maintain the closeness to the actual events, by using my (nearly) original verbal and visual record, and to ensure the "freshness" of the actors' interpretation: they memorized no lines, but "reacted" to the story as I videotaped.

Appendix B

PRODUCING A DIFFERENT TRAIN OF THOUGHT: THE SHOOTING

The Equipment

I used a consumer-format camera (JVC GZ-S5) with its separate, compact video cassette recorder (JVC HR-C3 VHS-C). The deck records on 1/2" VHS "mini-cassettes" (TC-20 VHS C).

Features that determined the camera as being well suited for the project were its ease of handling, automatic focus, and capability of recording in very low-light situations, as were encountered on the train. I blocked the lower portion of the viewfinder with a piece of paper sized proportionally to the "interaction strip" anticipated for the videodisc; this precaution determined a wider image area than is normally used in video and guaranteed that no crucial part of an image would be omitted in pre-mastering for the videodisc. The resulting aspect ratio approximates that used in 16mm film.

While traveling, batteries for the deck were recharged each night using an adaptor for current from wall outlets. The recording of the signal was much cleaner when operating from battery power than when attempting to use the modified alternating current in Europe. Both batteries and cables were used in shooting the acted scenes (in the United States).

The small size and portability of the deck and the camera positively affected my ability to obtain some of the images. I kept the deck in a shoulderbag at all times; along with the rest of my traveling paraphernalia, the bag was hardly noticeable. In general, the rig did not call too much attention to itself and my mobility was not significantly hindered. For the kind of movie I was making, the trade-off of signal quality for portability would seem to have been worthwhile.

The "Documentary" Footage

Camera work in Budapest preceded the shooting of the acted scenes. The story had been well defined prior to traveling, and the intent was to capture as much of the story as possible from

life; whatever was not recorded that way could be reconstructed through acting. Requirements for the location were the prevalence of a spoken language unintelligible to most of the prospective audience, and a military presence that was visible yet not overly threatening to freedom with the camera. Of the different places considered, Budapest seemed to have the best combination of these requirements. Much to my delight, the footage includes Magyar, Greek, Turkish, and Polish--as well as English.

The camera was so unobtrusive that many people didn't even seem curious about it. Some dismissed my surveillance as typical tourist behavior (or as an only occasionally irritating idiosyncrasy); others demonstrated curiosity about the equipment through excitement over its "advanced engineering" or through confusion over its likeness to Super-8.

In a few instances, the concealment of the deck coupled with the size of the camera allowed the recording of situations that otherwise would have been impossible: customs officials didn't even notice the subtle movement and whir of the automatic focus as the camera, on the seat next to me or at my hip as I stood, recorded their routines. Likewise, many people in the movie seem so natural simply because they didn't realize that the camera had found them.

In one instance, I may have relied too strongly on the general lack of attention paid to my shooting. As I recorded a stream of passengers disembarking a train one night in the downtown station, two soldiers within the viewfinder waved at me to stop looking at them and later insisted that I accompany them to a room where some more senior officers questioned my motivations in recording events in the train station. A sometimes humorous but more often frightening scene followed; ultimately, we were not detained for very long and managed to keep all of the footage and equipment.

The Acted Scenes

The actors had no rehearsals, but worked spontaneously with each other and from copies of the "scriptboards" (see figure 14). We did a scene at a time; the characters involved read the story and looked at the pictures for each scene description, and often I read the story aloud before they enacted the events. We shot each scene two or three times--not so that several "takes" would be available for editing, but with the idea that each event should be capable of being told from the point of view of each character involved.

The "point of view" approach may have been an over-extension of a main idea of the movie. If each person's experience of events is a function of exposure and interpretation (the premise of the movie), then the rendering of events would somehow have to vary from character to character. Attempts to show this variance turned out to be both appropriate and inappropriate.

Rendering the characters' *viewpoints* by varying the camera angle is an obvious and appropriate way of hinting at subjectivity, one which I used in the shooting. Additionally, we varied the language spoken: when the scene was being rendered from a given character's "point of view", that character spoke English, whether or not the character was an English-speaking one in the story. This technique acknowledged both the fact that the ultimate viewers of the movie would most likely be English-speaking, and the idea that interaction with the movie would yield a glimpse of what a selected character was "thinking about", regardless of the events currently going on. In order for viewers really to be "privy" to a character's thoughts, that character would have to be thinking "in English" (if verbally at all). Characters of a nationality other than the one whose thoughts were being shown, furthermore, would have to speak something other than English in order to maintain the sense of a "foreign" language. This way of using spoken language seemed to work in the shooting, and did find its way into the final movie.

Where the "point of view" idea seemed inappropriate was in its implications about the *events* that occurred in the story. Different characters' perceiving the events differently does not necessarily mean that different things happened, although this was often the misleading association with the idea of varying "point of view". Portrayals of certain events may vary in specific details of the occurrence, as well as in language and camera angle, but only one scene is actually shown as occurring in different ways: that of the attempted rape. The woman is so rattled that her ability to reconstruct the scene is unreliable; the man is so drunk that he imagines something much more pleasant happening; and the conductor, who is absent from the scene, constructs a mild scenario that has little to do with what actually happened.

Advanced sync from the TBC was used as a reference input to the VHS deck, offsetting the TBC's delay of the video signal's arrival at the 1" deck. The 3/4" deck was included in order to take advantage of its color circuitry, which more accurately interprets chroma than the circuitry in the VHS deck. VHS video therefore went through the 3/4" deck, the video corrector, the TBC, and finally to the 1" deck.

Color bars controlled by hard-wiring of the TBC were first adjusted using the waveform monitor and controls on the TBC for video level, chroma phase, and black level; the monitor was adjusted as needed. By flipping the "operate/bypass" switch on the video corrector, it was possible to compare the "control" color bars to those coming from the corrector; adjustments to the signal were made as needed, modifying the video, color, noise, enhancement, and black characteristics so that the two sets of bars matched. The black portion of the signal coming through the video corrector was turned all the way down, and stayed that way throughout the transferring.

For each dub, specific modifications were made as needed, generally through the video corrector rather than the TBC. Audio levels (controlled through the mixer) and tracking of the video signal (controlled at the VHS deck) were checked in each case. The most frequently adjusted portions of the video signal were the video level and the chroma phase, both of which were generally boosted, through the video corrector. Occasionally, for extremely dark images, the TBC was used in addition to the video corrector, to raise the pedestal of the video signal. Other exceptional images, very bright ones, had been recorded with the video level wildly surpassing 100 I.R.E.; these were brought within an acceptable range.

Appendix D

**PRODUCING A DIFFERENT TRAIN OF THOUGHT :
THE EDITING****Defining the Structure**

Editing the 280 minutes of footage may have been the most difficult part of the project, mainly because it brought to the surface an essential conflict between my conception of the movie and the means of formulating it.

I envisioned the portrayal of different characters' 'thoughts' as comprising a visual exploration and rendering of modes of association that describe people's thinking. When seeing a soldier drop a cigarette from the train window, for example, the main character may have thought of something as "simple" as other experiences in which a cigarette was present or played a significant role in the iconography: the man who was the family's guest smoking while the father sang, for example, and/or the man in the dimly lit restaurant sitting casually in an authoritative pose, surrounded by the bluish swirls of smoke generated by his cigar. (Such associations have been seen as illustrating the phenomenon of "transduction" as described by Piaget. [Piaget 1977] A common portion or element of the images is the connection between them, rather than some logical interpretation of the content or context of the "triggering" image. In other cases--other portrayals of characters' "thoughts"--however, other bases for the "connections" could have applied.)

Such associations may very well develop a character in the story or simulate transduction or accomplish any number of other filmic aims, but the problem I encountered in editing was that of determining what the set of "triggering" images would be. I may have been satisfied with a mosaic-like collection of images on the videodisc, awaiting "connections" through subsequent programming, in an acknowledgment of my view of the movie as manifesting a truly "elastic", collage-like, even "non-linear" form--but I was influenced by people who were not satisfied with such an approach.

Their view of "sequencing" seemed counter to my vision of the movie. The technique

produced too "fixed" a statement of what happened; my movie attempted to challenge such a temporal approach to storytelling and, furthermore, the point of my movie was that one view of events could not be trusted. Additionally, I had in mind other advice that referred to "granularity" as being a prime consideration in producing a movie for videodisc. That idea seemed to refer to individual images rather than grouped ones, and thus seemed counter to the idea of "sequencing". N. Burch describes a phenomenon that may have been the reason for my dilemma--as well as the source of its solution:

In everyday practice, *decoupage* refers to the final form of a script, incorporating whatever technical information the director feels it necessary....By extension...*decoupage* also refers to the more or less precise breakdown of a narrative action into separate shots and sequences before filming. A third French meaning of *decoupage*, however, has no English equivalent. Although obviously derived from the second meaning of a shot breakdown, it is quite distinct from it, no longer referring to a process taking place before filming or to a particular technical operation, but, rather, to the underlying structure of the *finished* film. Formally, a film consists of a succession of fragments excerpted from a spatial and temporal continuum. *Decoupage* in its third French meaning refers to what results when the spatial fragments, or, more accurately, the succession of spatial fragments excerpted in the shooting process, converge with the temporal fragments whose duration may be roughly determined during the shooting, but whose final duration is established only on the editing table. The dialectical notion inherent in the term *decoupage* enables us to determine, and therefore to analyze, the specific form of the film, its essential unfolding in time and space. *Decoupage* as a structural concept involving a synthesis is strictly a French notion....It may never occur to English-speaking film-makers or English-speaking critics that these two operations stem from a single underlying concept, simply because they have at their disposal no single word for this concept. [Burch]

As I worked with the material I gradually found, though, that the 'filtering' of the footage demanded a firmer premise than simply aiming to provide a base for characters' non-articulated associations of 'thought-images'. The idea of "sequencing" provided such a premise, so I made what seemed a compromise at the time: I settled on "sequencing" as being the guiding principle in the editing and "granularity" as guiding the programming.

The result was a materialization of what my view of the movie's structure had "resembled" all

along: a 'main storyline' consists of the set of 'triggering images', from which the viewer departs upon interaction and to which s/he returns. Images from that set can themselves be re-arranged and shown as 'accessed' images.

This structure is reflected in the arrangement of time-coded images on the pre-mastered tape and on the videodisc: the central portion consists of the 'main movie'; preceding and following this story are the images that can be accessed through interaction. (Images with the family precede the train story, and images of Budapest follow it.) Presumably, this arrangement reduces search time as the computer-controlled videodisc player responds to interactions.

The Sequences

Images of the family and of Budapest almost "sequenced" themselves. Particular conversations at the dining room table or events at a certain location in the city were generally short and self-contained, and simply needed to be condensed and "cleaned up". The resulting little 'chunks' of images I placed one after another on the pre-mastered tape, often without regard for connections between them that could justify them as a larger "sequence"--it is the 'chunks' that are accessed, not their context in terms of the "real estate" on the disc.

Sometimes, the "sequences" of Budapest-images are themselves more "granular" than "sequence"-like in that they combine images from a variety of city locations, often without a character consistently present or some other obvious connecting motif. In such cases, the visual quality of the images is generally what brings them together, and such "sequences" are accessed as the main character's dreams. In the programming, comparable "sequences" were developed as dreams, drawing from those already on the disc as well as recombining images from non-dream "sequences".

Settling on the layout of the videodisc and the structure for the interaction reduced the editing problem to the subset of cutting the 'main movie'. This, the story of events on the train, is a kind of "default" movie: should the viewer choose not to interact, this sequence, uninterrupted, is what s/he would see. Even when supplemented by images accessed through interaction, this story is the common thread in each viewer's experience of the movie. It seemed important, therefore, for this 'main movie' to reflect the principles guiding the development of the entire

project: documentary footage is intercut with the acted scenes, and the "tempo" varies between images cut very quickly together and images on which the camera lingers without interruption.

Deciding how to order such a variety of footage in the telling of the story came through *writing* descriptions of each scene as a link within a temporal chain of events. Scenes of Budapest and of the family are introduced at the very beginning of the story so that their later inclusion through interaction has a meaningful context. These introductory scenes lead up to the train ride; when the train reaches its destination, the passengers disembark and are seen in the train station. This ordering of events is fairly consistent within the larger context ('invisible' to the viewer) of the entire videodisc: the implication of both the story and the disc layout is that the woman stays for a while with a family, then takes a train ride somewhere, and then tours more of Budapest. The verbal 'map' that guided the editing was modified as needed, as specific cuts were made (see Appendix F).

"Train sounds" were mixed and recorded on the second audio track throughout the 'main movie', in an attempt to blend the disparate images and to signify, ultimately, when the viewer is "on the train" vs. exploring characters' thoughts or dreams. Some "gibberish" was recorded separately and dubbed over the acted images for which there was no sync sound or for which the original sound didn't correspond well to the way in which the story came together.

Provision for Signalling Interaction

After the three sections were entirely cut, selected images were digitized, reduced, and positioned as one of the seven touch-targets that were recorded, as a "wipe" through a mixer, at the bottom of each video frame. The images show the woman who is the main character (both awake and asleep), the conductor, the husband and wife with whom the woman visits, a man who is also their guest, the "crowd" of passengers on the train, and the train itself--which the viewer can touch in order to return to the main story after having touched one of the other targets as the way of accessing thought or dream images (see figure 10).

Appendix E

PRODUCING A DIFFERENT TRAIN OF THOUGHT :
THE "MASTERING"

The final 1" videotape was prepared for mastering a "level 3", "constant angular velocity" videodisc, in order to allow interaction through computer control. For financial reasons, a set of "DRAW" (direct read after write) discs were pressed, rather than a metal master. Specifications of the pre-mastered tape are as follows:

Field 2 is dominant.
Sound is recorded a a level of 4 dbm.
Video level ranges from 0 to 100 I.R.E.

Continuous time code is recorded from 00:56:45 to 01:30:10.

The tape contains the following information:

00:56:40	time code and black begin
58:44:28	bars and tone begin
59:44:28	black begins
01:00:00	program begins (with black)
00:20	program images begin
01:20	critical program images begin ("family" images)
04:03:18	program black
04:04:08	introductory narration
04:50	program black
04:51	main story
16:46	credits
17:02	"dream" images
26:33:25	critical program images end
26:39:00	program images end
26:39:01	black
01:30:10	end time code

Appendix F

PRODUCING A DIFFERENT TRAIN OF THOUGHT :
A 'MAP' OF THE VIDEO DISC

The written "script" guided the editing and was continually modified as "sequencing" decisions were made. The final version, presented here, became useful as a verbal record of images on the videodisc. Time code corresponding to certain images is included in this record.

Scenes with the family come first. Then, within the solid lines, is the narration that precedes the 'main story' and introduces "viewers" to the movie. This narration explains the means of interaction by associating soundtrack, motion video, and programmed searches of images at different parts of the disc.

Passages describing documentary footage are printed in regular-weight type, and cuts from acted scenes are described using darker type.

00:01:20

Lise and "Mama" were at the dining room table; "Papa" asked for Lise's passport.

"Papa" sang a song to the man and then took a cookie from the table.

The man pulled some hair from Lise's sweater.

The man got Lise's attention. The conversation that followed seemed primitive: "I, you, him; in, tay, ur", they said.

They opened beer, poured wine, and made a toast.

The man drank; Lise and he read. "Papa" yawned. The man looked at Lise's paper; they were getting to be buddies. "Papa" said, "Eni ini". The man asked for Lise's paper and "Papa" gestured as he said something to "Mama". The man dropped the paper and looked at "Papa" yawning and scratching his nose. Lise and the man laughed nervously.

"Papa" seemed passive as Lise asked where the man worked. "Mama" and "Papa" looked at a calendar while the man told Lise he worked at the post office.

The man and Lise made eating gestures. "Papa" sang a "blessing". Lise offered the man a cookie; he looked at her in an odd way.

"Papa" sang a Turkish song.

01:04:20

Hi! I'm a movie. We're about to have a conversation, in a way.

You'll forgive me if I stutter from time to time...

...it's just a function of my current stage of development.

Your communication will be rather limited as well--primitive, really. (You'll be poking at me a lot.)

But, eventually, we may touch a note of understanding.

This is a story about a woman...

...who meets a man...

...on a train.

You're there, too.

With all the other passengers.

Their thoughts, and your thoughts, tell the story...in many ways.

But what's the *real* story?

Touch me...I'll tell you.

00:04:51

Lise was in a flower shop. A soldier bought flowers; so did she.

A bus pulled away from the split-level subway station as a neon sign spelled out its message.

Lise checked the pot on the stove. "Mama" spoke no English, but she loved the flowers.

Outside, Budapest seemed threatening by night. Two soldiers walked near a bridge.

"Papa" entered the kitchen with the flowers. As he arranged them, Lise asked "Mama" if she wanted help. "Mama" finished juicing a lemon and took some things out of the room. "Papa", holding the flowers, called her by name.

A bus slowed down near the two soldiers. A policecar with full siren zoomed through the night.

At the dining room table, Lise and "Mama" showed each other parts of their respective alphabets. Their hands cast shadows as they gesticulated and wrote.

A woman swept, next to a standing train. The station's chime-sound preceded an announcement, as usual.

At the dining room table, "Papa" dunked a cookie and Lise proposed a toast. They all said "cia" and clicked glasses.

As she prepared to board the train, a soldier dropped a cigarette from the train window. She lifted her suitcase onto the train and looked at a couple saying goodbye. Then she climbed on board, and (through the skylight reflection in the window) made her way down the aisle.

The train was crowded.

She pushed through the crowd and the conductor checked her ticket on the daytime train.

A fight broke out in the aisle. The conductors broke it up.

The train moved by other trains as it departed from the yard.

Lise struggled through the crowd.

The train barrelled along; a couple wriggled; two soldiers walked down the aisle.

Lise found an aisle seat.

Scenery flew by the couple's window; two soldiers stood by a window; someone walked down the aisle; a soldier stamped a passport.

Lise read her book with the help of a lightstick. Exhausted, she leaned back her head and dozed; then she looked down the aisle.

The conductor came down the aisle checking tickets. He lingered over Lise's, but she couldn't understand his gibberish.

Some guys in a cabin chattered about Budapest. A lady sneezed as she looked at her train ticket.

Lise followed a conductor down the aisle; he looked back to see her.

A conductor in a cabin set aside his paperwork to greet her. A man in the aisle watched. The conductor found his key and put it in the lock.

Uniformed men argued at a table in the dining car. Lise reached for the luggage rack. A little girl slept; scenery rolled by.

She awoke with a start as the conductor entered the cabin with a bottle of wine. He offered her some; Lise made it clear that she didn't want any.

Two women read. Lise was asleep. Two other women shared some vodka.

Two men looked through their luggage; Lise yawned. One of them found some vodka. He covered it, but Lise said it was OK. Then she said "nostrowia".

The men laughed and offered her some. She didn't want any. One man attempted to pour some vodka in the cap, but his buddy stopped him and he downed some from the bottle. It was stronger than he expected.

A man finished his beer and put the bottle on the floor. Lise was sleeping soundly. The man and his two friends shared a meal.

The light went on and she gasped. The crowd jostled and the roof of the train hovered over all of them. A triangular danger sign appeared.

Lise was terrified; a man was on top of her. Smoke emanated from under the train. The corridor seemed endless.

The man wrestled with Lise as she screamed for him to get away. The corridor kept moving.

Lise punched the man away. Railroad tracks whirred by and the end of the corridor approached.

She sat up while the man made excuses. She screamed at him to stay away. A woman who was dozing looked up. A man folded his hands.

Lise and the strange man were sitting on the bench. She was angry. The conductor entered the cabin as Lise scolded the man. The conductor pulled a citation from his notebook and the man searched his pockets for a ticket. The conductor reprimanded the man, who had the nerve to offer Lise some vodka. She refused. The conductor wrote as he spoke to the man, who again offered Lise some booze. She screamed "nem" and the conductor ordered him out. The two men left the cabin.

Trees chugged through the train window and a lady put a sandwich in her bag. Lise slept as the lady folded her napkin.

Lise and the other people awoke as two conductors entered the cabin. The one how had offered her wine wanted money from her; she had zloty's but said she didn't have any dollars. The people seemed turned off but warmed up again when she accepted some food from the conductor.

A person slept bundled up like a mummy. Lise and the people in the cabin all fell asleep. A man in a train bunk was sleeping.

The passengers got their things and prepared to leave.

In the station, a luggage cart went by. Lise watched as passengers disembarked; two soldiers waved and a black marketeer hurried away. Lise walked down the platform into the distance while the *Keleti Pu* chimes sounded.

01:16:46

Well, that's one way of looking at it.

Are there more?

Infinitely, yes.

01:17:02

In a dream, a little girl climbed some steps that could be seen through an archway. The river and Budapest capitol building could be seen through a curved window. Below, a car rounded a curve in the road. There was a sunlit archway through which a car could be seen turning around. Three women approached.

Checkerboard roofs of typically Budapest buildings provided a backdrop for some birds in flight. Some people walked through an elaborate arch. Two men walked up an ornate staircase.

Lise watched as a boat glided along the river. A father and daughter played with their dog. They all walked up the steps to the street; Lise followed them and stopped at the top of the staircase.

A woman who was sewing looked out at Lise photographing some rooftops that made an abstract-kind of design.

Lise bought a ticket outside. She took an escalator down and held her book as she sat on a train. She was next to a man who looked at her book. She showed him the Magyar and the English; they began talking. A woman looked on with disapproval. They showed each other their ages, with their hands. A conductor refused Lise's ticket, and she heard the refusal even as she rode up an escalator.

The concert hall was brilliantly lit. Lise looked all around; Beethovenesque sounds filled the room as the concert ended. The violinist bowed to the audience's applause.

A little girl rode a down escalator. Lise bought a ticket at *Keleti Pu*. In the *Keleti Pu* cafeteria, Lise sat under a poster showing a conductor helping a woman from a train. The poster came into focus, large.

Some Polish women at Lise's table attempted a black-market exchange of currency. Two policemen escorted a man to an exit.

A conductor talked with a man near a time table. Another conductor walked over and shook hands. Then she walked away and picked up a sign. A conductor walked by a couple kissing on the platform next to a train.

A woman outside waved as a woman inside gesticulated. The train slowly departed and Lise was reflected in the window.

The drunken man imagined that he was kissing Lise.

Lise was sleeping when the light went on and she jumped up. The drunken man couldn't understand why Lise was so upset. He'd only come in to sit

down and escape from the crowd.... He complained about the people on the train. She showed him the phrase book but he said the language was too hard.

The conductor prepared to write a citation. The drunken man protested and then told the conductor that he'd seen him on TV.

The drunken man came in and pointed at Lise. She waved and he swigged some vodka. She regarded him hesitantly as he drank some more; then she stood up. He stood with his vodka and heard distant voices.

Lise was on a daytime train. A woman looked up as Lise talked with a man who wrote something for her. She asked about a good place to eat; he nodded.

A barmaid listened as the door opened. A man sat near the window, smoking calmly. Another man watched the activity through the open door.

01:26:39

Appendix G

**PRODUCING A DIFFERENT TRAIN OF THOUGHT:
THE SYSTEMS HUNT****Comparison of Videodisc-Interface and Authoring Systems**

These descriptions were accumulated with an eye toward evaluating how the various systems might be applied to implementing the interactive presentation of *A Different Train of Thought*, and/or of videodisc-based narratives in general. The descriptions are somewhat piecemeal in that the extent of my exposure to each system and/or its literature varies.

Authority

Interactive Training Systems, Inc., Cambridge, MA

System characteristics:

Components include a single RGB monitor, an IBM-PC/AT/XT, an ITS video controller card, a color graphics card, and a videodisc player. Text & graphics overlays are possible.

Keyboard authoring precedes touch-screen delivery. The author builds a "lesson" by selecting an option from an edit-menu and responding to associated series of questions in English. The presentation structure is fixed and has various space/storage limitations. The end-user runs a separate program in order to see and interact with the presentation.

Video segment definition:

Video segments are defined with beginning and ending frame numbers, and include standard variable-speed, etc., functions. "Video" is among four categories of "scenes" in the edit ("Author") program. The other categories are "Text", "Graphics", and "Other". "Text" includes a "Prompt Box Area", an "Action Box Area", and a "Text Area". Function keys allow selections of text position, color, overlay, touch-sensitivity, and various formats for interaction, most of which involve evaluation of and/or branching based on user input. "Graphics" includes standard shape and color selections. "Other" includes additional branching and evaluation strategies.

Branching strategies:

Several involve "list-juggling" approaches: selecting, sorting, swapping, multiple-choice, etc., and branching based on degree of "correctness". Scenes assigned for random selection and scenes "stacked" for later review are among the options.

Programming capabilities:

The authoring language does not provide mathematical operators or the use of variables. A "chain" feature allows exchanges of information with external programs that can accomplish such calculations, although additional programming is required in order to achieve compatibility.

"Instructional design" features:

Three established formats ("Inquiry", "Recognition", and "Action") underlie most of the presentation and branching strategies. In general, the system relies heavily on scoring, "performance analysis", and determinations of "competency" for branching through the "maze"/lesson.

Director

Videologic, Inc., Fairfield, CT; for Digital Equipment Corporation's IVIS system

System characteristics:

IVIS "backpack"/system unit, color monitor, videodisc player, keyboard and remote power switch.

Video segment definition:

Pull-down menus. Scenes are within scripts. The "author" program allows editing of text or graphics files, modify scripts or menus. The "window management" program allows construction of displays within specific parameters, such as window size, color, and position; and expectation of typed end-user response. Similar parameters exist for graphics and text display and for video commands, which reflect the standard player functions as well as possibilities for superimposing computer-generated images over video images. User input is anticipated, signalled, and controlled through the "Coordinator" program. Speed of operation can make the system frustrating to work with.

Branching strategies:

Branching is affected through the "Coordinator". "Chain" or "GoTo" commands link scenes to create continuous scenes, which expect menu or keyboard input from the end-user. Scenes from various parts of the presentation can be called as internal subroutines, and marks can be included as return points for "loops".

Programming capabilities:

A library of external subroutines exists, to which outside programs must be linked. Usage of a variety of variables and of conditional tests and math operations are commonplace within the internal authoring environment. A group of commands addresses another possible system component, the "DECtalk voice synthesis unit".

"Instructional design" features:

The author would design scoring and evaluation methods, decide whether or not what kinds of feedback might be appropriate, etc. This system is more general than authoring languages designed for "computer-assisted instruction" both in terms of its lack of emphasis on end-user evaluation and in terms of its lower-level authoring interface. The author has a significant amount of flexibility but acts more like a programmer than authors using other systems might have to.

IVAN & TNT

Jurgen Leschner's undergraduate thesis, MIT 1986; with Digital Techniques' Touchcom system. (*A Different Train of Thought* was implemented using this system.)

System characteristics:

Touchcom system unit, including touchscreen-covered monitor, Pioneer LDP 6000 (or Sony 1000A for IVAN). Text overlays and digitizing of images are possible.

Video segment definition:

Using the "code-generating" mode of the IVAN "control panel", segments are defined and saved along with associated play-speeds, subroutines, and touch-targets. Segments are defined by searching a beginning frame number and, rather than also specifying an ending frame number, stating how many frames to play after the first number. This

"frame/direction-dependent" approach is based on regarding each effect as being relative to another; its resulting generality suggests the possibility for easily creating patterns of images that could be used, for example, in character development for *A Different Train of Thought*: "image-thoughts", which are responses to user-interaction, can be shown according to patterns of timing and repetition that are different for each character. The temporal nature of the "main story", though, makes specifying ending frame numbers as well as beginning frame numbers desirable, which can be accomplished through the underlying "TNT" software.

Branching strategies:

IVAN's CALL command gets the next frame/s or segment/s to be viewed; then returns the program to the point at which the CALL command was executed. This subroutine-approach encourages a modular structure for the overall program and acknowledges the designer's ability to define specific solutions within any given presentation.

Programming capabilities:

The CALL command is also used to access subroutines written in Touchcom's Pascal-like system language, "TNT". Accessing a program is therefore no more difficult than branching. TNT's extensibility, mathematical operators, and test and looping routines make it flexible and powerful.

"Instructional design" features:

No emphasis on scoring or channeling the viewer through a presentation based on evaluation of "performance". In IVAN, the emphasis is on exploration, learning by doing rather than by being "taught". Most often, the end-user is also the presentation designer. In TNT, any evaluations are built in as desired by the programmer/presentation designer.

Mentor/MacVideo

Edu disc, Nashville, TN

System characteristics:

Apple Macintosh computer with external drive, Sony/Pioneer/Panasonic videodisc player, NTSC color monitor. Videodisc recording is possible with a specified Panasonic recorder.

Video segment definition:

Mentor allows the insertion of information into pre-programmed "teaching formats".

MacVideo enables definition of video "clips" and "groups" that play alongside the computer presentation. (RGB overlays are not possible, but computer text and high-res graphics are.)

Branching strategies:

Among ten available "formats", the "branching" mechanisms include variations of subroutines and user-input through the keyboard and/or mouse. Branching can be "linear" (one element feeding directly to another) or "relational" (more open-ended; as many as three elements can be associated with any given element).

Programming capabilities:

Ability to access other Macintosh applications and incorporate information from them into a lesson.

"Instructional design" features:

Individual or group performance can be evaluated. Reference, browse, and review features are among the ten available formats.

QUEST

Allen Communication, Salt Lake City, UT

System characteristics:

IBM or Apple computer, videodisc controller card, graphics overlay and interface, monitor. Specific options within the authoring system (for printing screen images, user-input, and scoring-kinds of information) suggest that a printer should be part of the system.

Video segment definition:

As with text, graphics, and other options, "video" is chosen from a series of flip-menus, and the author supplies necessary information by replying to prompts associated with the menus. The text editor includes unusual capabilities for foreign-language applications: multi-directional screen-printing and a character editor, results of which can be associated with alternate keyboard settings to produce different alphabets. Shape and graphics editors are also present.

Higher-level object orientation is reflected in the use of "windows" that can be easily moved, brought to the foreground, etc.

Branching strategies:

"Objects" (text, graphics, etc.) make up "frames" which make up "lessons" which make up a "course". Branching is from frame to frame. Main ideas are: conditional (either/or) or unconditional (move directly to an associated frame), random calls, or call another section or lesson or external program as a kind of subroutine. Some ideas that would be considered "branching" in other systems are built into the "creation" process here: "question/answer" design groups together the screen image-building, form of user-response (true/false, fill-in, multiple choice, etc.), and feedback--so separate entities need not be created and strung together in order to achieve this kind of module.

Programming capabilities:

Supports a specific and compatible version of Pascal, which can be debugged separately from the authoring and "learn" (run) programs, to develop routines that can be accessed as external programs. Most, if not all, calculations must be done as external programs. Such programs are called as subroutines and are treated in the same manner as a "branching strategy".

"Instructional design" features:

Strong emphasis on weighted answers, scoring, timing, methods of analysis, accumulating "stats" about progress in a "lesson", and using the information to determine levels among user-groups and access to different parts of lessons. Includes a variety of ways of analyzing student responses (phonetic spelling, numeric tolerances, etc.).

SAM (System for Authoring Microtraining)

Learncom Division of Sandy Corporation , Cambridge, MA

System characteristics:

IBM-PC/XT/AT with at least 512K memory and Learncom/MIC system boards and software, RGB monitor, videodisc player. Text overlays, font modification, exhaustive graphics, and text or graphics animations are possible. Keyboard interface (but mouse or tablet are possible).

Video segment definition:

Although the system is being modified (at my recommendation!) to include an initial authoring phase of naming and storing segments defined by beginning and ending frame numbers, the current method is to cite these numbers each time a segment is called. The result is a lot of re-typing, bugs, and tedious confusion in dealing with so many five-digit numbers. Other standard videodisc player-control commands are grouped with the segment definitions. (Unlike the menu-driven way of inputting other kinds of information, such as text overlays and branching, many of the video commands are typed according to the author's own style of describing different video events.

Branching strategies:

"Pages" are branched together in different ways, often based on the form of user-interaction (i.e., multiple choice, yes/no questions, select part of the video or computer-generated image, etc.). The video commands are included with the information for overlays, interaction, etc., as part of each "page". The result is workable but takes "getting used to"; video "branching" can occur within a single page or as a function of "page" branching, which is more what the authoring system is designed to handle. Separating out the many events that can occur within a single "page" can sometimes be confusing.

Programming capabilities:

The inclusion of variables greatly facilitates calculations and generality in approaches to authoring strategies; often, the logic used in different kinds of page-branching can be "tricked" into accepting variables so that the author can create unique branching patterns or modules particular to a given presentation. The possibility for accessing external programs exists, but the process is slightly painful. Random branch-patterns, if/then-style tests, and other similarly useful options are already available in this very complete system.

"Instructional design" features:

The usual user-evaluation/scoring tools are available, but the author is not required to implement them.

Appendix H

**PRODUCING A DIFFERENT TRAIN OF THOUGHT :
THE PROGRAMMING**

Programming for Narrative Summation

The temporal ordering of events is an organizing factor in models developed by a set of researchers who use "plot units" to describe the 'essence' of a particular story. The approach involves **organizing the textual structure of a narrative in such a way that the topological structure of the representation directly indicates which events are central to the story and which are peripheral.** [Cook, Lehnert, and McDonald]

These researchers acknowledge the reader's participation in the 'construction' of a narrative, through the peculiar selection of events to remember as well as the interpretation of those events:

...people who are remembering a story some time after they have heard it typically fail to distinguish between events that were explicitly stated in the story and those that they only inferred while reading it... [Cook, Lehnert, and McDonald]

Such inferences, the researchers find, can be quite consistent with other readers'. Inference is seen as being not only part of the 'fabric' of a particular story, but often so much a part of it that the model need not even 'state' certain components of the story in order for them to be clearly understood. More important is representing the events that provide the necessary framework of the narrative, within which appropriate inferences about the story can be made.

Developing the representation begins with a textual version of the story that is 'distilled' into "plot units", describing characters' "affect states" and showing how these phenomena are "linked" in time. These representations are then "graphed" to show their relationships within the story. As though by changing objectives on a microscope, the importance of details comprising "plot units" gives way to a 'map' of the overall story which illustrates its essential events (see figure 15).

...one key "tactical" problem in narrative summation...we refer to as conceptual ellipsis ,

omitting those events from a summary that we expect an audience to be able to infer on their own, and reinforcing that inference through a judicious choice of textual form. [Cook, Lehnert, and McDonald]

The resulting 'map' of the story emphasizes its structure as being the key to sorting through complexities of the narrative while attempting to maintain subtleties of meaning. Tracking a character's 'states of mind' provides the 'path' through the story's representation.

Story grammars, plan and goal hierarchies, and causal chain representation all provide a sense of structure... [Lehnert 1984]

The graph of "plot units" is considered a "memory representation" which enables the computer-based description of the story. "Summarization algorithms" interpret the structure by charting the central concepts in the story's plot. Another set of algorithms, called "Precis", uses this "conceptual representation" in order to generate a textual summary of the story.

Strategies Used in Planning *A Different Train of Thought*

Thus, these researchers have provided a foundation for modelling narrative structure, as well as acknowledging the receiver's role in interpreting a story. Programming *A Different Train of Thought* was also guided by structural considerations, but was more concerned with guiding the 'flow' through the movie. Additionally, the premises of the projects may differ in that the first one assumes similarities of story-interpretation among its receivers, whereas *A Different Train of Thought* focuses on differences of interpretation.

Descriptions of some useful functions are as follows:

Depart / Return: At any time within a designated range of video, the point at which the viewer interacts becomes the point of departure from the segment, which later becomes the point of return.

Image Selectors: Departure from a segment is filtered through any of various "image selectors", which are means of associating different images. A selector can be assigned by the videomaker to specific ranges for "departure", or chosen "randomly". Among possible "image selectors" are:

- : a 'direct branch' of one image to another, as decided by the videomaker.
- : a calculation that chooses from among several possibilities designated by the videomaker. Such calculations might include random selection, or selection based on the result of formulas seen as somehow expressive of attributes of images made available to the calculation.

Image Availability: Selected images are assigned a probability for later re-selection, depending on the point within the movie at which they have been shown. Availability considerations are:

- : assign lesser probability of selection with each subsequent showing.
- : mark the image for later non-selection (probability 0).
- : excerpt frames within a selected segment for later re-showing while omitting other frames within the segment.

History of Interactions: Considerations of which 'pools' of images from which a given selection might be made, include:

- : how many interactions have occurred up to this point.
- : how many times the same target has been touched
- : which scenes have been shown before
- : rate of interactions (expressed as the average interval between them)

Collage: This function is more whimsical (and not a part of *A Different Train of Thought*) but could conceivably be implemented on certain systems. A "collage area" is created for the viewer within a portion of the screen. As the programmed video is viewed (partially blocked by the "collage area"), the user interacts to indicate not "edits", but images to be saved. Images selected in this manner are digitized, scaled down, and shown within the "collage area". The viewer later can arrange and re-arrange the tiny pictures, making different "collages". Ultimately, the re-arranging might be associated with "play" commands so that each arrangement affects a re-sequencing of video images, played in the order designated by the viewer.

Appendix I

PRODUCING A DIFFERENT TRAIN OF THOUGHT:
ACKNOWLEDGEMENTS

There cannot possibly be such a thing as an "independent filmmaker". Each step in producing *A Different Train of Thought* was supported by countless conversations in working through ideas and by donations of time, equipment, skill, and funds. Without the help of the people mentioned here, the movie simply would not exist; I'd like to thank everyone who was involved.

Lise Motherwell invested time and energy into a project that, in the beginning, must have seemed nebulous at best. Her participation and continued intellectual and emotional support contributed substantially.

Richard Leacock, in the proper spirit of an experimenter, risked exposure as a perpetuator of confusion in movie-making. If the project avoids that extreme, it is largely because of his talent and advice. (If not, well--he tried.)

Glorianna Davenport is a part of the movie. Her technical skills, imagination, and elucidations of problems are invisibly present in every aspect of the project.

The project was funded, in part, by a grant from the MIT Council for the Arts.

Digital Techniques, Inc., loaned a Touchcom system for the programming and delivery of the movie. Brian Raila was helpful in negotiating the loan, making recommendations about the pressing of the videodisc, and providing encouragement. Jurgen Leschner, as an undergraduate at MIT, wrote the IVAN interface that supported much of the programming, and contributed valuable ideas about the programming approach.

Technidisc, Inc., agreed that certain applications of videodisc should be regarded as experimental but necessary research, and developed an arrangement that made the pressing feasible.

Helene Anderson arranged for the use of portable video equipment belonging to Crimson Video (Cambridge) during the course of the project. Gary Smith was particularly tolerant of my many returns to borrow the camera and video corrector.

The Taljanidisz family were themselves. Their hospitality, willingness to communicate, and acceptance of the camera that was, for me, like an appendage, are the very spirit of the movie.

The officers in Budapest's *Keleti Pu* train station let us keep the footage.

Audrey Shulman recorded sound and helped to coordinate the shooting session with the actors.

Pennebaker Studios allowed itself to be transformed, for a day, into the inside of a moving train.

Bruce Anderson collected the group in New York who became or did not become characters in the movie: Barbara Chang, Elf Fairservis, Irving Gregory, Michael Gutkin, Catherine Jones, Lewis Klahr, Elion Sacker, Stewart Sherman, Sally Silvers, and David Weinstein.

Steven Kuetell and Russell Sasnett of the MIT Film/Video Section provided valuable technical support; Vanessa Boris and Diane Bohl were endlessly patient. Mark Anderson contributed to programming ideas.

Computer graphics were developed through SYS at the MIT Visible Language Workshop.

Various faculty or staff members at MIT took an interest in the project and/or in my work as a student; their thoughts and encouragement kept my enthusiasm going. Among them are, again, Richard Leacock and Glorianna Davenport, as well as Seymour Papert, Edith Ackerman, Patrick Purcell, Edith Waldstein, Wolfram Jarisch, Rus Gant, Michael Geisler, Sylvia Weir, Mary Rowe, Sherry Turkle, and Ron MacNeil.

Noam Chomsky recommended Andrez Tymowski as a scriptwriter, whose evaluations and modifications of the 'scriptboards' clarified the roles of some of the characters and strove to maintain something of the "freedom-fighting" Polish tradition that prompted the very beginning of the project.

The Media Lab provided a fertile base for work and ideas.

I'd like to thank Robert Pula, Betsy Cohn, Margie Strohecker, Vicki Porter, Bernice Misiara, and my parents for their interest and encouragement.