Codifications of Ethnography: Linear and Nonlinear

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Introduction

This essay is a commentary on ideas presented in Marcus Banks' work, "Interactive multimedia and anthropology - a sceptical view," published in the World-Wide Web (Banks 1994). I am grateful for Dr. Banks' permission to link our essays together, and I appreciate his active elicitation of comments - which I also extend to readers of this work. [1] Like the journal Current Anthropology, the Web allows original texts, commentaries and rebuttals all to be available in one forum. This nonlinear juxtaposition of ideas is particularly useful for emphasizing points of scholarly agreement and disagreement. Banks' ready willingness to have our articles linked reveals his sympathy to such emphasis, a sympathy that is well demonstrated in his provocative, because "deliberately overstated," critique of new media! [2]

I challenge four of Banks' arguments about the new media that I believe are significantly overstated. In their place, I propose a less skeptical view of hypermedia's educational potential in anthropology.

I first trace the logic of Banks' claim that viable, pedagogical hypermedia cannot be created. Instructional applications with few intellectual options, he writes, are "naive," those with too many options are chaotic, and those with a sufficient number of options and links are impossible to produce. I suggest that the premises of this argument are not all true, and that the critique of hypermedia based on them is overly severe.

Second, this essay contests the claim that a dependence on links in hypermedia causes users to replace logical, linear argument with dilettantism and intellectually-pointless "butterfly collecting." I challenge this contention on three grounds. First, although links may give an impression of nonlinearity by leading the user from one cultural document to another, the associations that links suggest are nontrivial; second, although hypermedia links can be abused by beginners, links are nevertheless necessary tools that assist the responsible pursuit of users' research agendas; third, the potential confusion of links can be reduced if a single hypermedia work is designed to present different interfaces to different users: hypermedia can restrict and thereby focus the research options of beginners, yet permit professionals access to all scholarly tools and options.

In the third section of this essay, I contest Banks' characterization of the relationship between computer-based data analysis and computer-based "teaching packages." I argue that ethnographic hypermedia applications must include both: research and teaching necessarily overlap.

Lastly, this essay presents three challenges to Banks' apparent undervaluation of the pedagogical
importance of ethnographic audiovisuals, both linear and nonlinear. First, audiovisuals are important epistemologically because they open the empirical problematics of fieldwork to unprecedented scholarly inspection; second, they make a significant contribution to anthropology by providing unique opportunities in textual and audiovisual research; third, they play a crucial ethical role in anthropology’s struggles against racism.

The fundamental point of disagreement between my view of hypermedia and that of Banks is epitomized in one of his concluding remarks: "Most - probably all - intellectual analysis proceeds along a linear path, where pieces of data need to be assessed alongside each other in the right arrangement in order for the analysis to work." Banks' choice of the metaphor of linearity implies a conception of intellectual analysis that is tinged with empiricism and restricted horizons. I believe, on the contrary, that hypermedia is particularly valuable because the rearrangement of data and the assessment of pertinent new data improves analysis, often in ways that are unanticipated and nonlinear. One of the many ways to express and explore this emergent vision of scientific process is with hypermedia. Ironically, by advocating linear analysis at the expense of emergent alternatives, Banks’ falls victim to the same error he condemns: “the illusion of boundedness and completion [that] exists in the traditional media of the academy.”

I. Necessary and Sufficient Complexity in Hypermedia

The logic of Banks' critique of hypermedia is conducted at one level by his creation of a false dichotomy: Banks divides all possible hypermedia into the "naive" and the chaotic. At the first extreme is the majority of instructional hypermedia applications that contain, in Banks' words, a "highly limited stock of data" and respond only to "extraordinarily specific and narrowly-focused choices of the human user." At the other extreme, Banks claims, closing his logical noose, are applications that attempt to provide unlimited pathways between data and thereby create only intellectual chaos. No alternative to these extremes is said to be possible. In the following, I criticize both the factual characterization of the extremes and the logical validity of the dichotomy.

Figure I models a common style of hypermedia, one that has very limited options. As Banks suggests, this style, like most first-generation applications (Biella 1993b:297, 299-301), lacks complexity: I define complexity with respect to hypermedia to mean the existence of many alternative paths and nodes; complex applications therefore exhibit considerable sensitivity and responsiveness to an individual user's skills and interests. In Figure I, the application's nodes, or cites of information, are indicated by globes. Links or paths, that indicate relationships between nodes and allow the user to travel between them, are represented by pipes. Red arrows represent mandatory paths; blue arrows are forks, interactive options.

In Figure I, the user's exploration is narrowly-focused, first constrained along a mandatory path between the Lesson Content and the Test node. Then, at the Test, two forking paths open: the user's selection of a correct or incorrect answer constitutes the criterion for interactivity in the system. A correct answer rewards the user with a path to the Next Lesson. An incorrect answer leads the user to the Test's alternative fork, first passing through the Remedial Lesson node and advancing to the second point of interactivity, the Remedial Test. As before, a correct answer leads to the Next Lesson.
An incorrect answer loops the user back to the first Lesson.

Figure I. Simple Hypermedia Design with two mandatory paths and two forked paths. Answers provided by the user at the two Test nodes determine pathways taken.

Hypermedia applications in the mold of Figure I are not complex, but neither are they always naive. Certainly, such systems lack complexity, as defined above, and are minimally interactive. They offer users few unique journeys to a final destination. Yet strict limitations do not necessarily indicate bad hypermedia design. Like other forms of rote instructional material, hypermedia based on a simple, stimulus-response methodology is appropriate - and can provide good pedagogic results - given certain instructional goals.

Complexity, then, is not an absolute value that guarantees the usefulness of an application. Interactive simplicity is sometimes appropriate. The instructional goal of an application should always be the ultimate determinant of its form.

Opposite in the spectrum of hypermedia complexity are applications that Banks also condemns because they are strewn with pointless, indiscriminate links and pathways. "If we agree that any path ... is as good as any other path," Banks asserts, "then the main intellectual purpose of our discipline is cast away." Yet one must question whether such applications actually exist or have ever been contemplated. Banks here, I believe, jousts with an imaginary foe. George Landow (1991), a designer of one of the most heavily-linked applications in existence, offers a more realistic and constructive argument about the profusion of links in hypermedia. He makes the simple but telling point that links, like nodes, must only be created for sound educational purposes. Links are not neutral, contentless paths between ideas. Instead, links promise users important insights, and the insights must be delivered, if users are not to be driven off to more responsible forms of communication.

Having condemned both excessive and inadequate linking, Banks concludes that necessary and sufficient linking in hypermedia is an impossibility: "an endlessly recursive project. The user may require footnotes of the footnotes, further paths and diversions, beyond the existing paths and
diversions." Hypermedia, Banks concludes, can therefore never meet critical standards.

Banks' critical standards are unreasonably high. The authors of print-based monographs are not criticized for failing to anticipate and satisfy every requirement of every reader. Works produced in hypermedia should be judged by the same criteria that are applicable elsewhere in the discipline.

Although hypermedia cannot anticipate its users' every need, it is not incapable of being helpful to its users. The goal of serving needs does not commit hypermedia to an impossibility, an "endlessly recursive project." This is true even when many of the users' needs - such as discovering or forging new relationships between ideas - are not anticipated. A moderate contribution of labor on the part of the designer can create a broad range of alternate intellectual pathways that users may follow in pursuit of their unique interests.

High sensitivity and responsiveness to users' interests is achieved by hypermedia in two ways. The first is through the establishment of recursive, multiple paths to the same nodes. The second is through the provision of a keyword-search option.

Systems are said to be recursive when the nodes they contain are accessible through more than one path. Since each recursive path originates from a different source, each serves to emphasize a different facet of the destination-node. Recursion, therefore, is not simple redundancy or repetition, since new information is carried by each different emphasis.

The model of an interactive hypermedia application given in Figure II represents such recursion. It also models hypermedia's sensitivity and responsiveness to users' needs because of its wealth of what I call unique intellectual journeys. [3] Figure II models an instructional program that has eight nodes of information, each linked with three paths along three analytical dimensions. The multiplicity of paths in the model renders it highly recursive. Thus, a journey, beginning at any node, can follow four, six or eight paths and return to the original node without travelling twice along the same path. Remarkably, the recursion in this cube makes possible 370 unique journeys! [4]

Figure II. Interactive Cube offering 370 unique intellectual journeys.

Just as a badly-conceived written ethnography may be well-indexed, so too a weak ethnography in hypermedia may be given many recursive links. The complexity of an application, as determined by the number of its links and nodes, does not guarantee its excellence. We must also insist, however, that without complexity in an application, high sensitivity and responsiveness to user-needs is not
possible. Therefore, one viable measure of an application's capacity to interact legitimately with needs of individual users is the number of its unique journeys.

An actual ethnographic hypermedia application would be enormously more complex than the model in Figure II. Such an application would have hundreds or thousands of nodes, and many nodes would have more than three links. From such complexity, an astronomical number of unique intellectual journeys could interactively be taken by users in pursuit of their particular interests. A designer need only include enough links and recursive loops so that, in a reasonable period of time, the user may follow a modest number of paths to forge new links or track down related ideas.

Recursive and multiple paths are appropriate in hypermedia when the instructional or research purpose requires internal cross-referencing. Ethnographic hypermedia, with multidimensional nodes of text, audio and video, has such a requirement. A designer's creation of multiple links, describing different analytical dimensions via different paths to the same document-node, is worth the effort because it sensitizes users to the multi-dimensionality of the ethnographic surround.

Considerably less creative effort on the part of the hypermedia designer is required to permit users a second, powerful interactive tool. Hypermedia applications allow users to conduct keyword searches, thereby creating their own unique "soft-links" or paths. Users initiate a Boolean keyword-search and are presented with an itinerary of nodes to explore in which the keyword (or its synonym) is found. Searches are even more sensitive to the users' specific interests than are the permanent links created by a hypermedia designer. Like the number of unique journeys made possible by recursion, the number of keyword searches is effectively infinite, and therefore very responsive to users' needs.

Banks first condemns simple hypermedia designs, with few links, as "naive." I suggest in response that such designs are often useful. Banks next condemns complex designs, with pointless links, as destructive to the "intellectual purpose" of anthropology. I argue that such designs are neither advocated nor produced. Banks concludes that it is impossible to create links in hypermedia that anticipate and serve every need of every user. I counter that existing resources in hypermedia do provide reasonably good alternatives to omniscience and omnipotence.

II. Pedagogical Linearity vs. Scholarly Fluttering

The departure from linearity, made possible in hypermedia, need not lead to an endless labyrinth of links, to intellectual chaos. Banks' fear to the contrary is exaggerated, but links and pathways are indeed seductive: they promise to deliver untold associative insights, if only users renounce the systematic pursuit of the stolid itineraries they have planned. Seen from the perspective of Roland Barthes (1974) [5], links redirect attention from a syntagm to a system. The possibility of such redirection is the motive for Banks' critique: "Abandoning linearity signals a return to Radcliffe-Brownian [or Barthesian?] butterfly collecting: the arbitrary and decontextualized pursuit of comparison and connection for its own sake..." This condemnation of nonlinear pedagogy requires a complex reply.

In the first place, Banks' reference to butterflies suggests an association with the important argument
cited by Gleick (1987:322ff): movements of air no stronger and no closer to home than the fluttering of butterfly wings in Brazil have been shown mathematically to have profound influence on the weather patterns in the United States! What is true in the rarefied atmospheres of meteorology is no less true in the material and symbolic tropics of culture. There, too, the analysis of unlikely associations, the search for system in what might appear to be arbitrary and distant syntagms, often reveals the profound interconnectedness of the human world.

Thus, if hypermedia applications are to be critiqued with the objection that, "Most - probably all - intellectual analysis precedes along a linear path," it must be insisted that links in hypermedia are linear, if by this word is meant coherent and substantive. Of course, links may be unexpected. They may force users to reevaluate basic assumptions, to acknowledge new relationships at different levels of abstraction, but such insights are extremely important. Banks is correct, as far as he goes, that disorientation can effect users who do not follow a plan, a coherent itinerary. A more threatening source of user-disorientation than arbitrary links, however, is exposure to an excess of legitimate links, and to legitimate but divergent contexts. Such exposure may well overwhelm an undisciplined user.

The second component of a reply to the condemnation of nonlinear links, therefore, is the reminder that a user's pursuit of links is optional. Links incline: they do not impel. Disciplined users must resist tantalizing distractions if only to pursue with greater fervor those links that reward their research passions all the more. Self-discipline is essential for any scholarship. If scholars had no self-control, they would not be able to work in libraries: unopened books on nearby shelves would offer far too much distraction!

The third element of a reply to the argument for linearity at-any-cost requires a return to the concepts of user-skill and instructional purpose. A great advantage of hypermedia packages is the fact that access to the audiovisual resources they contain may be tailored to serve users with different degrees of sophistication. Users with little practice in scholarship and little knowledge of anthropology are not likely to make good use of powerful interactive tools. Beginning students require guidance: they should be protected to some extent from distraction, frustration and failure. Novices will benefit from hypermedia that "precedes along a linear path," that restricts their link-options, for example, to the exploration only of nodes that fall along a single associative dimension. Designers may create a travel-itinerary of document-nodes for beginning users to visit, and append to each node on the tour a lecture that provides basic contextualization. When the application's instructional purpose is to provide an introductory lesson in ethnography, then the users' journeys should be shaped to resemble the unambiguous (if also simplistic) teaching model suggested by Figure I.

Professionals and advanced students, on the other hand, require access to all of an application's interactive tools. Such users are sufficiently knowledgeable of the field that they can afford to ignore parts of the designer's recommended, linear itinerary. As I argue elsewhere:

"Non-linear navigational facility is essential [in books as in hypermedia] because readers bring needs, questions and criteria to scholarly works which were not the principle concern of the author....
Random-access navigation is often attributed exclusively to electronic media, but it is clearly a property which facilitated scholarship in books long before the computer revolution" (Biella 1993a:144).

Advanced users substitute, for the linear path of the designer's tour, the internal linearities of their own research agendas and their own educated, nonlinear intuitions.

**III. The Complementarity of Teaching and Research**

Although Banks argues that hypermedia is not an appropriate medium for "teaching packages," he does suggest that other capabilities of the computer, such as the power to analyze large databases, should be employed by anthropologists in their original research. In addition, Banks argues that ethnographic databases and the applications that analyze them should be made available to other professional anthropologists who wish to retest their originators' research hypotheses.

The distinction - between teaching packages and hypothesis-testing packages - is a reification that distracts attention from a deeper unity. At the pedagogical level, teaching and research are inseparable.

Print-based ethnographies, anthropology's principle teaching packages, have a relatively modest data-storage capacity in comparison to that of computer-based hypermedia. Despite their limitations, however, written ethnographies are expected to include *enough* quantitative and qualitative information to make cultural reinterpretations possible. Such reinterpretations are frequently published. From them, students and professionals may learn a great deal as the sparks of reinterpretation fly.

For the same reasons that data should be available and integrated into print-based cultural interpretations, so too should data be placed in pedagogical materials that take advantage of computer resources. Professionals and students continue to require access to data files, despite the larger size. Without such access, reinterpretations by professionals will be less capable of achieving plausibility. Without it, too, students will lack the tools they need to conduct exercises in critique. Students train to become professionals: their education ultimately requires exposure to all professional resources.

Increasingly, ethnographers and other social scientists commit major resources of time and money to the digital conversion of video and to the authorship of corresponding analytical software. These new resources are among the bases of the quantitative and qualitative breakthroughs that have become familiar features of the computer revolution. It is highly desirable that these resources should be included as part of research reports and publications. The inclusion of such materials increases the preparation time of authorship substantially. Yet in addition to the arguments given above, another important resource, now to be discussed, also justifies the additional time of hypermedia authorship.

**IV. The Importance of Ethnographic Audiovisuals, Linear and Nonlinear**
Unless images and sounds collected in fieldwork are assumed to have value, their inclusion in anthropological hypermedia would certainly be pointless. It is unfortunate that Banks' essay is almost entirely silent regarding the anthropological value of ethnographic audiovisual material. Any critique is destined to remain skeptical as long as it ignores one of hypermedia's greatest resources. Banks' most positive statement about ethnographic film damns it with faint praise. Film, Banks writes, is typically "seen as a relatively painless way to introduce students to basic ethnography."

Even this minimally-positive evaluation is contested by Banks in another essay. There, his purpose is to argue against the essentialist reduction of ethnography to film. Banks writes, "Post-screening [in-the-classroom] discussion is the locus of ethnographicness" (1992:126). Although Banks is correct that it is an error to reduce ethnography to any one medium or quality (Biella 1993a:134-138), he commits the same error by reifying the undeniable achievements of flesh-and-blood, classroom interaction. [6] A non-essentialist definition of ethnography can benefit from classroom discussion, but there is also every reason to believe that texts - print, film, and hypermedia - can make useful contributions as well. Intentionality, active historical consciousness, shapes definitions by reflecting on interactions of many kinds, those that involve other people and those that involve texts. [7]

In final response to the conclusion that the new media are not appropriate in anthropology, I offer the following three arguments for the importance and continuing inclusion of audiovisual resources in ethnographic hypermedia.

The first argument is philosophical: because of the emergence of hypermedia, anthropologists may now publish a large recorded sample of the audio and visual perceptions to which they were exposed in the field and on which they have, in part, based their research conclusions. The fidelity of the recordings that can be stored on CD-ROM or the World-Wide Web permit anthropologists unprecedented strategies to address some of the most persistent epistemological and theoretical difficulties in the discipline.

In the sciences, anthropology is among those that are most dependent on solitary fieldworkers. The discipline has always been obliged to rely on the accuracy of fieldworkers' memories, linguistic competence and perceptual acuity. Almost no way existed to correct or even recognize mistranslations or misperceptions. Empirical components of field events on which ethnographers' theories were born were not subject to recall for a second viewing. The absence of extensive empirical and contextual detail hindered the retroactive ability of fieldworkers to expand their paradigmatic and perceptual limitations. As a consequence, the relationship between fieldworkers' micro-level, empirically-based perceptions and their macro-level, theoretical conclusions has remained under-theorized and often unchallengeable.

The development of video and hypermedia will render the empirical half of this dichotomy more vulnerable to scrutiny by scholars (although sampling problems will never be overcome). Ethnographers' field diaries will no longer remain as private as before, but this development should bring more moments of insight than embarrassment. Researchable, nonlinear audiovisual materials from the field will permit other scholars to refine an original fieldworker's perceptions and interpretations. Paradigmatically-disparate interpretations of the same field events will begin to be
developed with increasing plausibility.

No one can anticipate the epistemological rapprochements to which hypermedia will ultimately lead, but it may safely be said that the eminent researchability of audiovisual recordings in hypermedia will add an insistently empirical tone to future theory. Ethnographic film will thus begin to play a more central role in the major theoretical struggles of the discipline.

A second argument for the production of hypermedia, with a strong component of audiovisuals, concerns the fact that ethnographic hypermedia is able to provide professional anthropologists and students with valuable and unprecedented opportunities for research into printed texts and other media. Hypermedia can provide controlled exercises in the experience and analysis of apparently chaotic field situations, and can slowly provide guidance toward achieving the clarity of concepts. Students can explore links between relatively raw field recordings and tailor-made or classic anthropological texts. In this way, they can better appreciate the genius of interpretive tools. They can also come to recognize the inadequacies of theory in the face of complex overdeterminations of an event, made visible by extensive ethnographic, audiovisual material. Hypermedia of the future, too, may be produced to document the creation of ideas in the early days of fieldwork, the development months later of ideas into full hypotheses, and the ultimate expression of ideas as grounded theory in published form.

Film viewing, once restricted to one-pass fine-cuts, blossoms with hypermedia to include access to all original footage. Shots can be arranged by scholars in any order and can be viewed as often as is needed for a research goal. Assigned viewings of material in the database, along with independent research, will at least partly prepare students for future field surprises and will make a powerful contribution to students' acquisition of scholarly research techniques.

For the first time, too, in hypermedia, students and professionals can scrutinize recorded audiovisuals with the critical tools available to the textual scholar. To show why this is true, I present the following summary of arguments I make in Biella (1993a). Through hypermedia, time-based audiovisuals can conveniently be linked to text-based annotations. Such material can now be subject to the standards that are appropriate to other scholarly publications in the discipline. Like printed scholarly works, ethnographic audiovisuals of the future will be expected to be contextualized, with annotations, in a way that conforms to the demands of established intellectual paradigms, to conduct arguments in accordance with canons of responsibility, to establish credentials through appropriate citations and footnotes, and to exhibit the kind of cross-references and calibrated redundancies that speed the work of professionals and allow novices to acquire expertise. Because hypermedia permits rapid, nonlinear access to all of its audiovisual resources, scholars can now conduct research with the comparative leisure and systematicity that are necessary for the mastery of difficult texts. For the first time, too, scholars can take notes, from audiovisual materials, that have all of the fidelity of the originals. The capacity to create audiovisual notes will lead to superior compilations and to more accurate infra- and cross-cultural comparisons. With the transience of linear film and video now held at bay, time-based media will come to acquire the vulnerability and credibility of scholarly text.
A third argument for the importance of ethnographic audiovisuals involves the ethical role that anthropology can play in the struggle against racism and prejudice. Ethnographic hypermedia offers its users a fresh sense of intimacy with people who are radically different from themselves. As such, it continues the best tradition of ethnographic film, contesting racism and chauvinism with eminently plausible and engaging alternatives. Perhaps even more powerfully than film, annotated hypermedia can contextualize intimate portraits with critiques of racial stereotypes and the assumptions that inform the viewing of dominant media.

Through immersion in television and feature films, Western viewers have discovered that a preference for stereotypes and an insensitivity to cultural nuance are often interpretively appropriate. For the anti-racist goals of media designers to be realized, therefore, audiovisuals must include strategies that anticipate and interrupt existing viewer-prejudices and assumptions. Further, anthropological films often contain information that causes anxiety, defensive reactions, and repression in viewers. Techniques must therefore also be found to help viewers work through repressed fears, so that they can more dispassionately accept and interpret the ethnographic information (Devereux 1967:49-80).

Audience-response research can inform the design of such strategies. Murphy (1973) and Messaris and Pallenik (1977), who present early research on the subject, interpret their results to mean that viewers attempt to conform their understandings of media to the communicative-intentions of the makers, whenever intentions are recognized as such. A later study by Martinez (1990) indicates that this argument is probably incorrect. More plausible is the explanation that viewers are inclined to impose their preexistent, stereotypic interpretations onto ethnographic film images, and that they often ignore evidence of alternative interpretations that filmmakers intend to convey. Viewers' sensitivity to alternative evidence will be particularly weak when the images provoke anxiety.

One may glean from the work by Murphy, Messaris and Pallenik that viewers of documentary and ethnographic films, in contrast to viewers of fiction films, are less confident that their stereotypic interpretations are appropriate. As Ruby (1994) argues, this relative uncertainty makes viewers particularly subject to reflexive viewing-instructions included in ethnographic films. Because reflexive films, and, to an even greater extent, annotated ethnographic hypermedia, conscientiously anticipate, interrupt and critique viewer stereotypes, they are more likely to communicate compelling, non-stereotypic interpretations (Biella in press). Annotations help viewers to acknowledge the repressed cause of their anxiety and to reformulate it consciously. Viewers are thereby made more free to apply their intersubjective skills to the development of cross-cultural understanding and empathy.

Establishing a sense of intimacy with the subjects of ethnographic media is one of anthropology's most powerful weapons against stereotypes and racism. The interjection of nonlinear critique into time-based, linear media adds an important new element to the educational struggle. Nonlinear interruptions guide viewers to rewind and reflect not only on the ethnographic material they have seen, but also on the assumptions, prejudices and anxieties that they bring to their interpretation.

In conclusion, this essay responds to Banks' "deliberately overstated" skepticism with the arguments
that ethnographic hypermedia is pedagogically viable and important for the development of new theory in the discipline. Hypermedia offers new tools for the advancement of audiovisual scholarship and it makes a necessary contribution to the ethical goals of anthropology, to what Banks aptly names "the larger script of enlightenment and maturity."

**FOOTNOTES**

1. I want to thank Karen Harris (kharris@netcom.com) of Gang of Art, Santa Monica, for producing this essay's Figures I and II. The software that she used in their production is *Vista Topas* and *Vista TIPS*. Special thanks are also due to Gillian Goslinga for her very helpful comments on an earlier draft of this paper. I am grateful to Karen Orr Vered for reminding me of the pertinence to hypermedia of the quotation from Roland Barthes (1974:5) given in Footnote 5, and for drawing my attention to the review by Jay Ruby (1994), cited in the main text. My thanks also go to Nick Rothenberg, who generously helped me with the HTML coding of this document.

2. Because essays published in the World-Wide Web offer no page numbers, I do not know a way to provide fully-adequate citations for the quotations reproduced here. Unless otherwise indicated, all quotations from Banks are taken from his 1994 essay, cited in the Bibliography.

3. I define a *journey* as a bounded exploration that may begin and terminate at one node, or may involve travel along paths between several nodes. Journeys are defined as *unique* if they differ from one another but do not involve travel along the same path more than once.

4. I calculate the number of unique journeys along the edges of a cube as 370 based on the definitions given in Footnote 3. Many of the 370 unique journeys involve two visits to the same node, accessed through different paths. Such journeys may be said to offer distinct intellectual experiences because new relational information about the revisited node is gained from the different access-paths. As argued in the text, paths add information.

   . . . Under the definitions given in the previous Footnote, the edges of a four-faced pyramid offer only 34 unique journeys. Whereas such a pyramid has four nodes, cubes have eight. Merely doubling the number of nodes, then, while holding constant the number of links to each node, increases the total unique journeys more than ten-fold.

   . . . Contrast 370 unique journeys along the edges of a cube with the number permitted by the model in Figure I. There, three of the five nodes limit travel to a single direction. Only two nodes have forked links. These designer-defined limitations restrict the number of unique journeys in Figure I to six.

5. Writing in a pre-hypermedia era, Barthes nevertheless aptly summarizes those of its properties that come under most heavy criticism by Banks. Barthes argues, under his description of the "writerly" text:

"the networks are many and interact, without any one of them being able to surpass the rest; this text is a galaxy of signifiers, not a structure of signifieds; it has no beginning; it is reversible; we gain
access to it by several entrances, none of which can be authoritatively declared to be the main one" (1974:5).

Although I am an admirer of Barthes' work, I am in partial disagreement with the (pre)vision of hypertext he expresses here. As I argue above, links between nodes of text facilitate users in their analytical progress, assisting them to move beyond the awe-struck admiration of individual stars and galaxies to a more centered cognizance of structures.

6. Banks' (1992) plea for the centrality of the human element in education is powerfully echoed in his present essay (1994). I thank Gillian Goslinga for encouraging me to affirm here that no computer or book can replace the motivating force, the intellectual precision or the pleasure of a good classroom situation.

7. In a 1990 essay, Banks again offers little in praise of the medium's pedagogical value. Yet he acknowledges that ethnographic film can lead one to feel an "intensity of experience" that cannot be gained from written texts. Banks does not recognize that, under the right conditions, intense cross-cultural experience through film can be eye-opening and salutary. To dismiss this intensity as "pseudo-phenomenological" (Banks 1990:20) is to miss the point.

In the same essay, Banks also acknowledges a sense in which ethnographic films "show us reality and hence a kind of truth" (1990:21; c.f., p. 17). For Banks, however, film's truth is treated only as worthy of attention in its capacity as a purveyor of stylistic enigmas, the artifices of realism. Banks does not consider the equally-important and much more obvious view of truth in film - its power, despite representational artifice, to provide compelling evidence of cultural realities. Banks merely says that such a view is unaware of theory (1990:16, 18). If so, the view is at least not unaware that film and video present rigorously analogical records of empirical light and sound. For discussion of related but stronger tendencies in idealist film theory to dismiss the empirical grounding of ethnographic film, see Biella (1988).

BIBLIOGRAPHY

Banks, Marcus


. . . 1992 Which films are the ethnographic films? In Film as Ethnography, Peter Ian Crawford and David Turton, eds. Manchester and New York: Manchester University Press.


Barthes, Roland


Biella, Peter


Devereux, George


Gleick, James


Landow, George P.


Martinez, Wilton

. . . 1990 Critical studies and visual anthropology: aberrant vs. anticipated readings of ethnographic film. CVA Review Spring: 34-47.

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