Abstract
This paper surveys our design and implementation of a multimedia database and describes a new interface technique, "guides," which simplifies database access by alleviating the need to construct search queries. The paper initially describes the graphical tools and interface provided to the text, graphics and sound database. The design and functionality of alphabetical and topical indexes, multimedia tours, timelines and animated maps are detailed. Future directions for development are presented.

The latter part of the paper describes "guides." The user is given a selection of images of people who embody easily understood points of view. A user can choose a guide as a companion while browsing the database. At each database node, the user is provided with the current guide's next choice and a ranked list of connected items of interest to the particular guide. In this way, the user can follow the interest path of a certain type of individual. Initial results from informal user observation indicates that guides are easy to use and engaging.

The implementation of guides utilizes topical keys supplied by the information provider. The guide's choices arise from the intersection of article topics and those chosen to represent the guide's point of view. The concept of guides can be easily generalized and applied to other databases.

Introduction
The project described in this paper was a joint effort of Apple Computer and Grolier Electronic Publishing. Our primary goal was to create a database which demonstrated delivery of multimedia reference content on an economical personal computer platform. The topic chosen for the demonstration was American History from 1800-1850, with an intended audience of secondary school and junior college students. Grolier was responsible for the specification, collection, indexing and validation of the database contents. The authors were responsible for creation of the user interface and browsing methods, specification of data formats, and loading of the text, graphics, and sound into the delivery system.

Work on the database began in September, 1987 and ultimately involved creative personnel at four companies, as well as data entry at two sites. This paper discusses a prototype version of the database, entitled "The Americana Series CD-ROM Sampler," first demonstrated in March, 1988. It is anticipated that the completed project will form the core of a commercial product.

The delivery system
The chosen delivery system for the project was an Apple Macintosh Plus, SE, or II, with 1 megabyte of memory, combined with a standard CD-ROM drive and running Apple's HyperCard software [1, 3]. The standard Macintosh provides a 9" diagonal black and white screen with 72 dots per inch resolution. The HyperCard display occupies the entirety of this area, and is inset on larger monitors. The Macintosh also incorporates an internal speaker and sound system, with provision for extension speakers.

The CD-ROM is a read-only optical storage device with a standard capacity of 550 megabytes. Its random access speed and data transfer rate is faster than a floppy disk, but slower than a hard disk [4].

Design Goals
Design goals for the database and user interface included:
- Investigating the capability of the delivery system to convey multimedia information.
- Exploiting the capacity of the CD-ROM storage medium to give a depth and richness to the chosen subject.
- Designing navigational tools and visual representations to support cross-media links and browsing.
- Developing and testing methods for converting various types of content from their original medium into the database using HyperCard.
- Exploring the use of linear sound and motion "tours" of a database as a means of motivation and familiarization with its content.

In the course of the project, we found that the HyperCard medium was suited to a more active presentation of the database content than we originally anticipated. Accordingly, we looked for ways to add more active interface elements to the original reference approach. We also felt that there should be some middle ground between free browsing, with the user in full control, and linear tours, providing only simple options for advancing, rewinding or stopping the presentation. "Guides," as described below, were a response to these new requirements.

Database Implementation and Functionality
The following descriptions of the elements of the database and their functionality clarify how the design
goals stated above were implemented. Where appropriate, information is included on the construction of the database to support the interface design.

It is important to note that the implementation utilizes some of the interface techniques and metaphors embodied in HyperCard. The database itself exists as several “stacks” of HyperCard cards. Each card is equivalent to a screen, and only one card can be viewed at a time. Any card can have multiple “hot spots” or buttons. If the mouse is clicked while the cursor is within one of these buttons, a programmed action is taken. The implementation takes advantage of this “point-and-click” style of control throughout.

The Opening Sequence

The first image users encounter after opening the database is shown in Figure 1a. Clicking on this card initiates an introductory sequence of pictures and sounds selected randomly from the database. The series always includes five images, progressively laid over an outline map of the United States (Figures 1b – 1d). This sequence is followed by an item-by-item fade-in of the iconic buttons which represent links to the contents of the database. The sequence concludes when it reaches the Contents card (Figure 2).

By varying the opening each time, we hoped to keep students’ attention even after several uses of the database. The opening sequence was viewed as a vehicle for introducing users to the various categories of information and hinting at the contents of the database. At any time during the opening sequence, the user can override the introduction and proceed directly to the Contents card by clicking the mouse.

The Contents Card

The Contents card (Figure 2) provides the user with a point of departure from which to enter a variety of information. It is a textual and pictorial menu of the elements in the database, containing a set of buttons for accessing all database components: Articles, Historical Documents, the Timeline, Sounds, Pictures, Maps, Tours and Guides. (Each of these elements is discussed in detail in following sections.) The visual design of the buttons gives each element equal weight and importance. In addition, the look of each button closely relates to the appearance of the cards to which it links. For example, the Article button on the Contents card reappears as the “headline” graphic in the article listings. These visual clues make it easier for the user to quickly recognize their location within the database. At each point within the database, a consistent button links back to this Contents card. If the user becomes disoriented, this provides a quick means of reaching a known location.

Help

The Contents card also contains one button which activates help. At present there is one help card (Figure 3) which provides assistance in using the navigational tools in the database. The Help card visually depicts each of the available navigational buttons, and describes the database element to which it is linked. A more complete, context sensitive help system would be desirable, and may be included in future implementations.

Articles and Historical Documents

The main database text is derived from the 30 volume Encyclopedia Americana. Grolier’s editorial staff selected articles relevant to early 19th century American history and verified the accuracy of text and bibliographies. Long survey articles were rewritten as sequences of shorter pieces. In order to enrich the text database, the full text of original documents of the period were added. These were selected from existing archives by the editorial staff.

Neither the Americana nor the original documents were in electronic form, so data entry of the articles was required. This entry occurred at four separate sites using a variety of hardware and software. Due to schedule requirements, data entry, indexing, and linking were performed in parallel. Therefore, a system of document numbering was designed to uniquely identify each article and original document. These document numbers were also used to specify all interdocument links.

Links among articles were assigned by Grolier’s editorial staff. The database record for each article contains links to other articles cited within the text, as well as back links to articles which make reference to the given article. Link information is also directly associated with portions of the text of each article using a markup system. However, as the current version of HyperCard does not support scrolling text links, this markup will only be used in a later version of the database. In the prototype database, the number of links per article ranges from 0 to 60, with an average of six.

The editors also created a hierarchical topical index list of over two hundred items specifically for this project. Each article was tagged with one or more of the indexing terms. The maximum number of terms per article was 43, the average was around seven. These terms were used to create topical indexes to articles and the guides, as described later in this paper.

When the database was loaded into HyperCard, a master index was created relating the document number for each article to the identifier of the card on which it was stored. Because document number references are independent of HyperCard, different versions of the database may be loaded without invalidating links.

There are currently 476 articles from the Americana and three original documents comprising 2.5 megabytes of text in the prototype. The final version of this database will contain approximately 700 articles and 100 original documents.

Both the Articles and Historical Documents portions of the database can be entered by the user in two ways — through alphabetical and topical indexes. The alphabetical index was created by sorting the list of article titles after the HyperCard database was loaded. The user can quickly view the available articles that start with any letter by clicking on that letter in the alphabet bar present at the bottom of the screen (Figure 4). The topical index was created using the hierarchical
index term list. Each article was associated with at least one of the topmost branches of the hierarchy, based on its specific indexing terms. This resulted in twenty-one topical lists of articles. These lists were then ordered, sorting by the fraction of each article's indexing terms which fell within the particular topic's indexing terms. After selecting the topical index, the user is presented with the 21 available topic names. Clicking on any of these topics branches to a card containing the ranked list of articles within the topic. The user can click on any title to view the article.

The screens containing the actual article and historical document text maintain a standard look (Figure 5). The bottom of each screen is reserved for navigational elements. In the lower left corner, an icon labeled "Path Finder" provides the user with a way to find good branch points from the current article. Clicking on the Path Finder button takes the user to a screen containing the list of text documents linked to the current article (Figure 6). Links to non-textual elements are currently not implemented, but will be provided in the completed database. Within the Path Finder list, the article titles are presented in the order specified by the editors at the time the links were created.

Pictures
All period images in the database were converted from original engravings and photographs supplied by the Bettmann Archive. Given the constraint of a small 72 dot per inch display, we found it necessary to be quite selective in image choice. Generally, originals which showed low contrast, complex scenes, or small details were avoided. In many cases, we chose to excerpt a portion of the original.

All digitizing was done with a flat-bed digitizer. The most productive technique was scanning in grey scale, followed by conversion to a black and white halftone using an adaptive filtering technique. We also used line art scanning techniques, as well as scanned images directly into halftones. At times, composites with greater clarity resulted from combining scans created with different techniques. For example, an image was scanned once as a halftone to enhance detail and shading. It was scanned again as high contrast line art to produce solid blacks. These two scans were then combined, as in the duotone printing process, to produce an image with both depth and detail. Heavy retouching of images was often necessary, particularly when contrast was poor on the original. After retouching, the images were manually pasted onto cards.

The current database of pictures is accessed through the "Pictures" button on the Contents card. As with the Articles database, the specific images can be accessed either topically or alphabetically. In addition, a "Slide Show" button is available within each topical listing, providing the user with a quick look at all images within a specific topic.

Maps
All maps in the database were specifically created for this project by R. R. Donnelley Cartographic. Maps are animated series of screen images. This allows depiction of change over time, which is very difficult with static maps. Distributing features over a series of maps also partially alleviated the problem of representing many fine details on the small display area. In the sample database there are 54 separate map images incorporated into six series. The final product will increase the total number of series to twelve.

By choosing the "Map" button on the Contents card, the user is presented with a card containing buttons representing the six currently available map sequences (Figure 7). These sequences include, for example, the trail followed by Lewis and Clark, and depictions of California population expansion. Each button is labeled with the theme of the map it links to, and also graphically indicates the number of images in the map sequence.

By clicking on the button representing the desired map series, the user is presented with the first map in the sequence. The images within the sequence can then be viewed individually or as an animated sequence (Figure 8). In the standard navigational area at the bottom of the card, forward and backward arrow buttons and a "Show Animation" button are provided. The arrow buttons allow the user to step through any amount of the sequence in either direction. The "Show Animation" button presents the entire progression from start to finish.

Timeline
A historical timeline was researched, written and entered specifically for this project. It provides historical facts about the individual years 1800 to 1850, and it serves as another means of accessing information in the Articles portion of the database.

By selecting the "Timeline" button from the Contents card, users are taken to the first timeline card. Events that occurred during any single year may be viewed by selecting a button labeled with the desired decade, and then selecting the specific year (Figure 9). The selected buttons highlight to confirm the user's choice, and a scrolling field displays a listing of the historical events which occurred during that year. If an item in the list is preceded by a bullet, an article in the Articles database refers to it. The user can access that article by clicking on the bulleted item. The links are implemented using the standard document numbering technique.

The current timeline contains 731 entries, of which 317 are linked to articles.

Music
The performances of period music in the database were licensed from Smithsonian / Folkways Records. They were dubbed to cassette tape and digitized on the Macintosh using an Impulse Audio Digitizer. Sampling was performed at 11kHz rate, with one 8-bit channel. The very large music files which resulted were broken into smaller segments which fit into the processor's limited memory. These are reassembled at playback time using a HyperCard script which eliminates audible gaps between the segments. In the current database
there are five pieces of music totalling eight megabytes, or about twelve minutes of sound.

By clicking on the "Sounds" button on the Contents card, users are presented with a card containing a graphical menu of the musical selections available (Figure 10a). The graphical menu consists of a number of buttons, each with an illustration conveying the theme or story of the song. Clicking on one of these buttons takes the user to a card with a full screen illustration of the song, as shown in Figure 10b. The standard navigational buttons to other parts of the database and a "Play" button are available at the bottom of the card. When the "Play" button is clicked, the song starts. Clicking again stops the song.

In the future, we would like to incorporate sound pieces other than music. For example, recordings of actors delivering historically relevant speeches could be included.

**Tours**

A "tour" of the database is a dramatic audio-visual presentation embodying a central theme or slice of life from the period of history supported by the database. The purpose of a tour is to familiarize the user with major themes of the database and motivate further exploration. Within the course of each tour, reference is made to documents in the database. The presentation can be stopped at any time to allow the user to explore the related information. A tour's animation and soundtrack can be restarted at any point, if the user chooses to return to it.

Each tour consists of a combination of images, animation, narration, sound effects and music. Images and sound were digitized using the methods described above. Animated effects similar to video transitions are provided as a basic capability of HyperCard. Using a technique developed by one of the authors [5], we were able to synchronize display of HyperCard images with continuous digitized sound played by the processor. Both image and sound data are transferred from the CD-ROM as the tour is played.

Each tour was created and designed in much the same way as creating a film. First, image storyboards with corresponding music and narration annotation were generated on paper. The tour images were scanned from original engravings, or taken from the Donnelley maps and simplified for faster recognition. All images were reviewed for their composition, level of detail, style consistency and contrast between subsequent images. Often, the images were substantially edited to enhance a certain effect. For example, backgrounds were removed to highlight other parts of the images. Occasionally, several scans were combined into a single image to create the desired composition.

Simple VCR-like navigational controls are provided with each tour (see Figure 11). The set of controls includes buttons for playing, stopping, rewinding and scanning forward and backward. In addition, a button with a document icon labeled "Related Document" appears whenever the images present on the screen correspond to associated information in an article. Users can stop a tour and use this button to immediately branch to the associated article. Once again, these links are implemented with the standard document numbering technique.

The current prototype contains one completed tour, "Gold Rush," of about three minutes duration. The completed database will contain five tours of three to seven minutes duration.

**Guides**

Guides offer perhaps the most engaging navigational aid in the database. They were included in the interface as a way to provide a perspective or point of view. They were also created to facilitate browsing within a potentially large amount of intricately linked information.

In the current implementation, guides represent prototypical characters from the period of American history covered by the database. The set of guides provided includes an Indian, a settler, a miner, a sea captain, an author, a diplomat, an itinerant preacher, an inventor, a slave and a scout. A user can select one of these ten guides from the screen which depicts them (Figure 12). Once a guide is selected, a smaller iconic representation of that guide appears in a box at the top of the screen, confirming the user's choice. Additionally, the guide's recommended first move is shown. The user can take this suggested article as a point of entry into the database. Alternatively, the user can re-enter the database anywhere with the chosen guide in tow. As the user moves through the information, the guide appears at the bottom of the screen whenever he or she can suggest a relevant next move (Figure 13).

Choosing a guide within the Grolier database is similar to choosing a travel tour with a particular tour guide. The traveler doesn't need a detailed description of the tour guide's personality to know what type of tour will result. For example, a tour of Fiji led by a botanist would certainly differ substantially from a tour of the same area given by a textile artist. In the same way, guides within the Grolier database act to bias the user's moves within the database. They prefer certain themes and motifs and provide the user with a simple way to use their expertise to find items of interest.

Guides offer an easy-to-use interface for the person who does not need the precision of a word search. The user is not required to learn how to use a complex filter description language to compose a precise query. By selecting one of the available guides, the user conveys his or her general interests. This choice is easily made, because the guides provided personify readily understood themes. Ultimately, guides facilitate the user in locating a subset of the total database that fulfills a fuzzy criterion. This can be a very useful and powerful browsing tool, which is intuitively understood.

**Implementation Details.** Each of these ten guides is graphically portrayed with distinguishable and unique features. At the same time, each guide is not representative of any particular author or Indian. An attempt was made to strike a balance between creating overly generic guides and guides that reflect the
idiosyncrasies of a particular person's life and interests.

The software implementation of guides involved specification of the character types and a computation step during the authoring phase. A run-time computation completes the process. In the current implementation, guides only provide assistance with text articles. However, when keyword lists are generated for the audio and visual information in the database, the implementation of guides will trivially expand to provide assistance in selecting the next piece of data, regardless of its type. Future work will include this extension.

The specification of individual guides was achieved by using the topical keys created by the editors for classifying the articles within the database. Each guide was assigned specific subsets of the full set of these topical keys. In other words, a particular guide's viewpoint was described through a selection of relevant keywords from the complete editorial set. These subsets were subjectively chosen. After some experimentation, we found that including both idiosyncratic and general terms resulted in the creation of more useful guides. For example, the scout guide was assigned the terms:

- exploration, wagon trains, maps and mapping, trapping and fur trade, scouts, frontiersmen, Indians, explorers and exploration

After assigning terms to each guide, a ranked list of preferred articles for each guide was generated. This computation estimated the "relevance" of each article to a particular guide. Relevance was calculated by using a measure of co-occurrence of topical indexing terms in the guide and article indexing lists. Specifically,

\[ R = \frac{c^2}{(g^*a)} \]

where \( R \) is the computed relevance factor, \( c \) is the number of co-occurring terms in the guide and article topic lists, \( g \) is the number of terms in the guide's topic list, and \( a \) is the number of terms in the article's topic list.

If the relevance term exceeded the cutoff value of .005, the article was included in a list of articles for the specific guide. The article list for each guide was then sorted by relevance value and stored within the database.

The database user can select any one guide to lend his or her opinion about which article to read next. At the time the guide is selected, the article shown to the user as the guide's first choice is the title of the first article in that particular guide's list of preferred articles. When the user moves to an article within the database, the list of linked articles (as normally shown in the Path Finder) is intersected with the current guide's list. This results in a comparison of the editor's suggested branch points and the current guide's preferred articles. If matches result, the icon representing the current guide is displayed.

Additionally, the title of the "guide's next choice," i.e. the first item in the guide's ordered list that was in the intersection set, is displayed. If the user clicks on the guide icon, the guide's version of the Path Finder is shown. This consists of the list of the articles in the intersection set, shown in the same relevance order in which they appear in the precomputed guide's list.

Guides in the future. There are several ways in which the current database should be restructured to facilitate the use of guides. As mentioned above, while creating the current set of guides we observed that the more detailed terms within the topical keys produced more useful guides. In fact, some guide types were quickly eliminated because of the lack of a significant number of specific description terms. Since the concept of guides was devised after the creation of the topical keys, we were unable to easily add the desirable precision to the set of keywords. Future topical keys should be constructed with this use in mind.

In addition, breaking up the article text into smaller, discrete chunks would also facilitate guides. Presently, the large survey articles in the database are difficult for guides to act upon, because no single focus dominates. These articles could each be broken into several small, topically focussed pieces. By segmenting these articles, guides could play a stronger role in presenting this material.

In the future, it would certainly be desirable to allow the user to employ the services of multiple guides. This raises several important questions, such as how one guide is given stronger presence, and how competing viewpoints should be presented. New computational methodologies, as well as interface elements, will need to be designed to support a multi-guide environment.

Currently, guides' viewpoints are easily understood because the characters portrayed fall into simple, somewhat stereotypical categories. Employing guides with less obvious biases would require additional interface support. The user should be able to interview the guides and learn about their points of view, prior to actually navigating through the interface with them. These interviews could consist of stored paths through the data. The user could then learn about the guide by watching movement through a predetermined sequence of database information. In this way, the user would be able to develop an understanding of the guide's particular biases, as well as receive a sampling of some of the available material.

An attractive aspect of guides is that the metaphor presented to the user can remain intact while the actual software implementation is changed. We have already manually added and deleted articles from the guides' interest list, achieving finer control over the personality presented, without changing the user's perception of how guides work. In the future, the simple term co-occurrence model currently used to create the guides' lists could be replaced by more intelligent analysis of the articles' text and of the user's browsing patterns.

Using Guides in Other Contexts: The use of guides as an interface element and navigational aid is certainly not limited to historical databases. The concept is malleable and could easily be adapted for use as an interface tool within other bodies of information. For example, a science encyclopedia could provide straightforward guides, such as a chemist and physicist, as well as somewhat less obvious guides, such as a farmer and race
car driver.

The current implementation makes use of guides as content agents. They primarily represent a point of view over the stored information. However, guides could equally well serve as form agents. That is, guides could point out relevant information based on the type of data within a database. For example, a poet guide could indicate related poetry and a biographer guide could suggest relevant biographies within a literature database. Likewise, within a mathematics database, an engineer guide could lead the way to equations and calculation methodologies, while a logician guide could point out theoretical proofs.

Preliminary User Reaction

An informal demonstration of the prototype was given to Minnesota elementary and high school students, as well as teachers and administrators. After hands-on access to the database, these potential users provided some interesting feedback on the current implementation[2]. Their reactions point out several issues that warrant formal evaluation and testing.

Users in this audience said they found guides to be intriguing and engaging as interface elements. Furthermore, they tried to understand why certain articles were seen as related by certain guides and why one particular article would be suggested as the next item of interest. Presumably, this type of engagement facilitates the learning process. We plan to further explore possibilities for guides in the near future.

Users prefered the topical index over the alphabetical index, implying that guides embodying a certain theme may be an appropriate and attractive way to present this information.

The Gold Rush tour was not as favorably received as anticipated. Many commented that it reminded them of "film strips" or "slide shows." We realize now that our concern for the level of technological sophistication required by the tour may have detracted from our ability to objectively judge its value as an interface element. While users recognized the similarity to movies and film strips, this recognition caused some unfavorable comparison with the visual quality of these existing media. It may have also resulted in an unwillingness to stop and branch from the tour, because of the user's natural inclination to become passive. In the future, we may experiment with restructuring the tours into smaller, modular segments which require greater interaction.

On the other hand, users indicated that they liked the animated maps very much. Some students seemed "mesmerized" by the animation, possibly because it was a novel presentation of the information.

Users seemed ambivalent towards the picture segment of the database. We feel providing substantially more images might increase interest in them. The small song database was observed to be "not of great interest." This is understandable, since the screen display remains static throughout the duration of the song; few people find the source of a sound interesting to look at if no visible change is occurring. However, the audio reproduction did appear acceptable to users, particularly given the age and technical quality of the original recordings from which we worked. Incorporating both the sound and picture databases into the Path Finder and providing guide support for these data types might also increase interest in them.

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Bibliography

Figure 1. The user is first presented with the title card shown in (a). Clicking on this card initiates an opening sequence of pictures and sounds selected randomly from the database. The pictures, like those shown in (b) through (d), consist of a fixed U.S. map, overlaid with appropriate images.

Figure 2. The Contents card appears at the end of the opening sequence and provides several entry points into the database, through HyperCard buttons, which textually and pictorially represent available items. The user can return to the Contents card from any point in the database.

Figure 3. The Help card describes what actions will result from clicking on the iconic buttons present in the database. Information is given for each type of button the user will encounter.
HOUSTON, Sam

HOUSTON, Sam (1793-1863). American frontier hero, who was the first president of the Republic of Texas. Samuel Houston was born in Rockbridge county, Va., on March 2, 1793. In 1807, his father having died, his mother took him and her eight other children to Tennessee. Sam went to school for a year or more and lived for three years with the Cherokee Indians, who called him "the Raven." At 19 he opened a private school.

Early Career. In 1813, Houston joined the Army, distinguishing himself at the price of three severe wounds in the Battle of Horsehoe Bend against the Creek Indians, and entered a powerful friendship with his commanding general, Andrew Jackson. He was a first lieutenant when he resigned after five years of army life. During part of this time he had served as a subagent to the Cherokee Indians, antagonizing white predators upon them and drawing a reprimand from Secretary of War John C. Calhoun for appearing in Indian dress.

Figure 4. Articles in the database can be accessed through both alphabetical (shown above) and topical indexes. All indexes reflect a standard graphical look and include consistent placement of information and buttons. As shown above, clicking on the "H" button brings up a listing of all article titles beginning with "H." Clicking on any listing takes the user to the corresponding article.

Figure 5. A typical article card, as shown here, consists of the title of the article, a scrolling field containing the text, and a bar at the bottom displaying navigational iconic buttons. The Path Finder button links to the PathFinder card shown in Figure 6. The return arrow links to the previous location visited by the user. The reduced image of the Contents card links to that card. The other buttons, which are reduced versions of the images used on the Contents card, link to the corresponding parts of the database.

Figure 6. The PathFinder card contains a list of documents linked to the article last viewed, in an order selected by the editors. The user can click on any title to view that article. As shown, the Path Finder currently only provides information about related text articles. In the future, it will contain information about, and provide links to, all related materials.

Figure 7. Clicking the "maps" button on the Contents card takes the user to the card shown above. Users can choose to view a sequence of animated maps on one of several themes by clicking on the corresponding button. The buttons also provide information about the length of each sequence by graphically depicting the number of cards included.
Figure 8. Each map card provides forward, backward and "Show Animation" buttons. These allow the user to either step through the map sequence at their own pace, or watch the animation in its entirety.

Figure 9. The timeline cards provide the user with information about events that occurred during each year, from 1800 to 1850. To select a year, the user clicks on a particular decade button and then on a specific year button. If bullets precede the text of an item in the timeline, a related article exists in the database. The user can view this article by clicking on the bulleted item.

Figure 10. By clicking on the Sounds icon on the Contents card, the user is presented with the card shown in (a). Clicking on the area depicting "My Darling Clementine" in (a) takes the user to the card shown in (b). The user can then play the recording of the song by clicking on the "Play" button. Clicking elsewhere on the card stops the playback.
Takesynu to the timeline of important events. Taku pu to the information about the current article. Taku pu to a list of articles, pictures and sounds related to the current article. Taku pu to a list of pictures. Taku pu to a list of articles. Takesynu to the Table of Contents for the entire CD-ROM Sampler. Takesynu to the available maps. Takesynu to the available illustrations. Takesynu to the available buttons. Takesynu to the available article, picture and sound related to the current article. Takesynu to the available article, picture and sound related by the current guide. Takesynu to the available article, picture and sound provided by the current guide. Takesynu to the available article, picture and sound suggested by the current guide. Takesynu to the available article, picture and sound selected by the current guide. Takesynu to a list of articles, picture and sound suggested by the current guide. Takesynu to the available button, picture and sound selected by the current guide. Takesynu to the available button, picture and sound suggested by the current guide. Takesynu to the available button, picture and sound provided by the current guide. Takesynu to the available button, picture and sound selected by the current guide.

Figure 11. The card shown above is taken from the "Gold Rush" tour. Each tour card provides a navigational icon panel which contains standard VCR-type controls. Additionally, the panel includes a "related article" button whenever an article in the database corresponds to the image. The user can use this button to branch directly to the related article.

Figure 12. The Guides card, as shown, can be accessed from the Contents card or any article card. By clicking on the Indian guide button, the user has selected the Indian as a companion. An iconic representation of the Indian appears in the "current guide" slot at the top of the card to acknowledge this choice. Additionally, the title of the article the Indian is most interested in, "Osceola", is presented. The user can click on this title to immediately go to the article. If the user does not wish to have any guide, he can click on the "Dismiss Guide" button.

Figure 13. After the Indian is selected as the active guide, he appears whenever he can recommend a good article to branch to based on his interests. As shown here, the Indian suggests the Cherokee Indians article as a follow-up to the current article on Sam Houston. The user can simply click on the title in the "Guide's Next Choice" box to view the Cherokee Indians article. By clicking on the Indian icon, the user receives a ranked list of all the articles the Indian might branch to from the current article. This list is presented in the familiar Path Finder format. The user can jump to any of these articles by clicking on their title.

HOUSTON, Sam

HOUSTON, Sam (1793-1863), American frontier hero, who was the first president of the Republic of Texas. Samuel Houston was born in Rutherford county, Va., on March 2, 1793. In 1807, his father having died, his mother took him and her eight other children to Tennessee. Sam went to school for a year or more and lived for three years with the Cherokee Indians, who called him "the Raven." At 19 he opened a private school.

Early Career. In 1813, Houston joined the Army, distinguished himself at the price of three severe wounds in the Battle of Horseshoe Bend against the Creek Indians, and entered a powerful friendship with his commanding general, Andrew Jackson. He was a 1st lieutenant when he resigned after five years of army life. During part of this time he had served as a subagent to the Cherokee Indians, antagonizing white predators upon them and drawing a rebuke from Secretary of War John C. Calhoun for appearing in Indian dress.

Figure 14. After the Indian is selected as the active guide, he appears whenever he can recommend a good article to branch to based on his interests. As shown here, the Indian suggests the Cherokee Indians article as a follow-up to the current article on Sam Houston. The user can simply click on the title in the "Guide's Next Choice" box to view the Cherokee Indians article. By clicking on the Indian icon, the user receives a ranked list of all the articles the Indian might branch to from the current article. This list is presented in the familiar Path Finder format. The user can jump to any of these articles by clicking on their title.