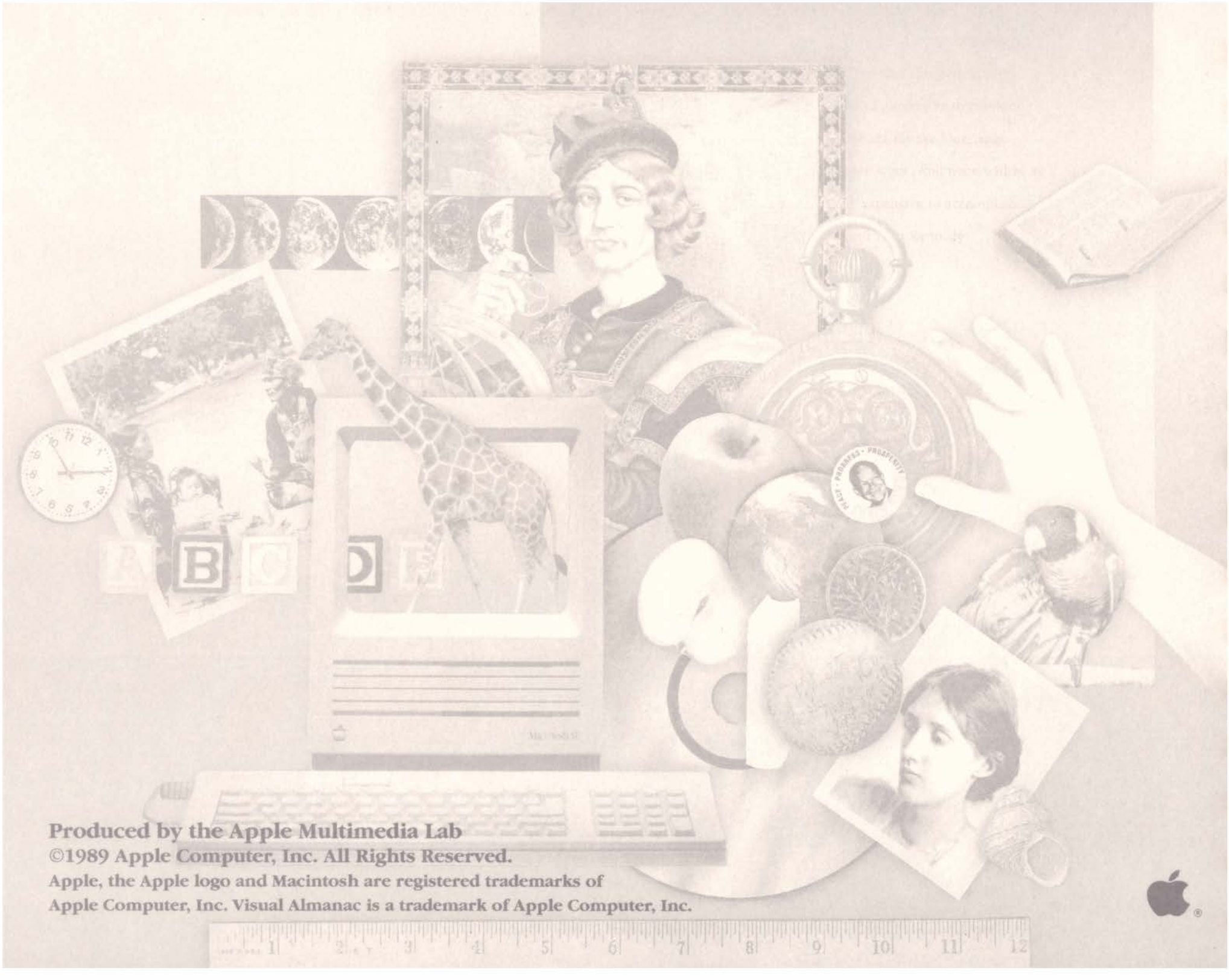
The Visual Almanac™
An Interactive Multimedia Kit

Companion



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THE VISUAL ALMANAC COMPANION

Apple Multimedia Lab

San Francisco

Produced by Apple Multimedia Lab

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All perceiving is

also thinking,

all reasoning is

also intuition,

all observation is

also invention.

–Rudolf Arnheim

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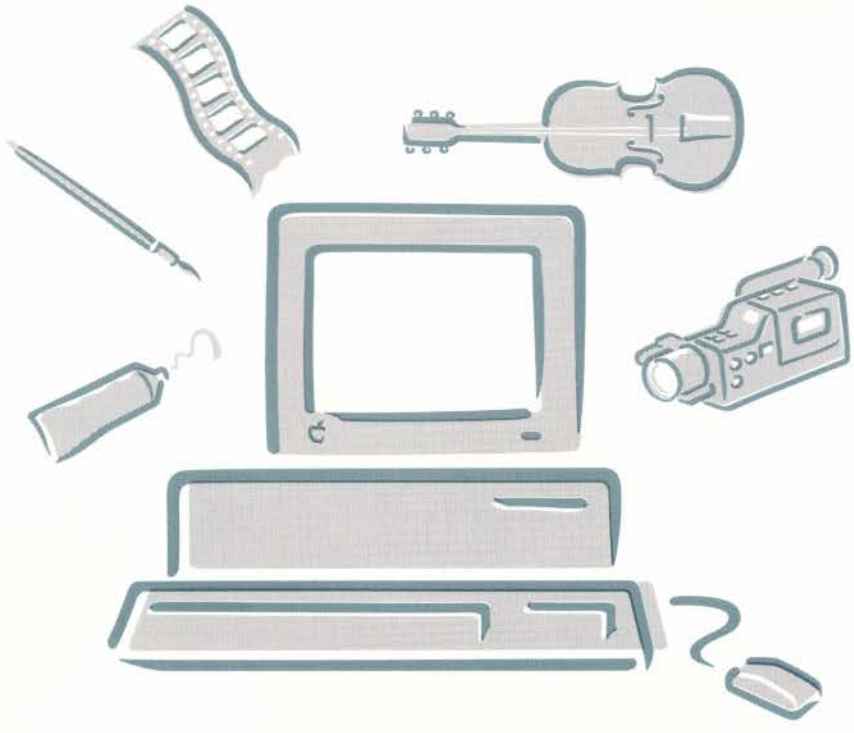
Preface



WELCOME TO *THE VISUAL ALMANAC!*

We designed *The Visual Almanac* to give everyone a glimpse of potential computer-centered futures and have tried to show how current multimedia technologies might be used to do something new. We tried to make something that could be used now, but would also provoke the development of methodologies, technologies and pedagogies for the future. It is an interactive multimedia kit aimed at children and all their teachers—in schools, in homes and in various public environments—as well as business people, researchers and developers who make educational and other materials for our youth.

Essentially, interactive multimedia computing offers pictures, movies and sounds in the computing environment. Just as Apple brought high-quality fonts and graphics to our computing environments with the introduction of the Macintosh computer, we at the Apple Multimedia Lab are now working to make these other multimedia elements available.

A key feature of *The Visual Almanac* is that it is open-ended. There is no one way to use it. It is intended to be a first set of building blocks for people who want to become fluent multimedia composers.

The great thing about toy blocks is that they are so versatile. You can play with them as blocks: "Let's see how high we can stack them!" "What happens when we lay them this way instead of that way?" Or they can be used as a medium for other kinds of play: "Let's build a road and race our cars!" "Let's build a castle…" You can put them away one night and start over in the morning in a completely different way. You can also add to your original set with new blocks or other kinds of objects.

That's how we envision *The Visual Almanac*. Let's throw some blocks on the floor and begin to play. This time the blocks are multimedia objects, and the floor is a Macintosh.

The Visual Almanac consists of three core parts: the videodisc, the software and this book, the Companion. The videodisc provides a wide range

of images to use as raw materials for your own creations. Although we produced a number of these images especially for this project, most were acquired from generous collaborators, for free or at very reasonable prices. You will find a number of references to these image providers in *The Visual Almanac*, including their addresses and other products.

The choice of images is based on our intent to provide materials for you to explore the world around you and your place in it, including relationships to distant people, things and times. Then we gathered them into collections—Earth View, Animals and Plants, History of Daily Life, Historical Portraits, among others.

We have included over 7,000 basic image resources on *The Visual Almanac* videodisc, including movies, image sequences, still images and sounds. (To put it another way, the videodisc has two sides containing about 108,000 frames and one hour of two-channel sound.) Looking at this in terms of production costs, or compared to most accessible image resources, this is a huge resource. But in terms of all the images we would like, it is only a drop in the bucket!

We hope that this product will encourage many image providers to make their images available in a similar way and that we can create an industry where it will be profitable to do so. Then we can all benefit from the image resources stored in so many vaults across the world.

The second piece of *The Visual Almanac*, the software, provides a way to make the images available. The software has three parts, all of them written in HyperCard (for a description of HyperCard, see page 21). First, there are the Collections, the images and data,

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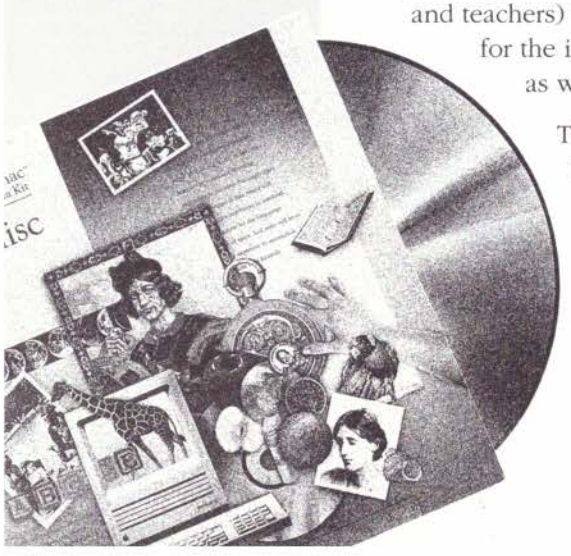
The videodisc provides a wide range of images to use as raw materials for your own creations.

as well as a management system which lets you search through the images according to the descriptions and key words attached to them. Second, the Composition Workspace provides you with tools to select, manipulate and present the images. Third, we have included a set of Activities, to show you the kinds of things you can do with the image resources in the Collections and to provide examples of the kinds of interactions that are possible in multimedia. Finally, we have also included some sample compositions made with the Composition Workspace tools.

We believe we have taken a big step in creating a multimedia database system, and we hope that this software will inspire other developers to improve on our design and build enhanced systems. We also hope that the tools we have provided for image manipulation will be extended by others. Finally, we hope that developers (and students and teachers) will devise new activities for the images on this videodisc, as well as for other videodiscs.



The third major part of *The Visual Almanac* is the book you are now reading, the Companion, which we have put together to accompany you as you work with the videodisc and software. It presents information about the main elements of the *Almanac*, complementing the extensive documentation that is provided in the software. It also includes discussions about the ideas that have driven the design of the *Almanac* and about the principles of the Multimedia Lab.

Feel free to jump around in the Companion as you choose. It is intended for general browsing as well as direct reading. Depending on what you want, you might find certain sections more relevant than others and want to read those first. For example, if general pedagogical or cognitive philosophies interest you, you might start with the section "The Big Idea" on page 25. If you are interested in technical details, you might first peruse the Reference section. If you want to get right into using the system, try the sections at the beginning of the book.

Nancy Hechinger has done a fine job writing this book, keeping it playful as well as informative. Kristee Kreitman coordinated the Art Direction on the entire *Visual Almanac*. The Companion team has been extremely innovative in inventing this new kind of book under production pressures. As you will find out, this Companion is at once a technical manual, a browsable

educational philosophy book, and a description of the software and videodisc components of the *The Visual Almanac*. It is, as its name makes clear, a Companion for you while you are working with the *Almanac* as well as when you are planning or reviewing your *Almanac* activities.

I've been extremely lucky to work with an incredible team—a cast of thousands—on *The Visual Almanac* as a whole. As you will note in the credits on the videodisc it took a wide range of talent to put all of this together. I thank them all.

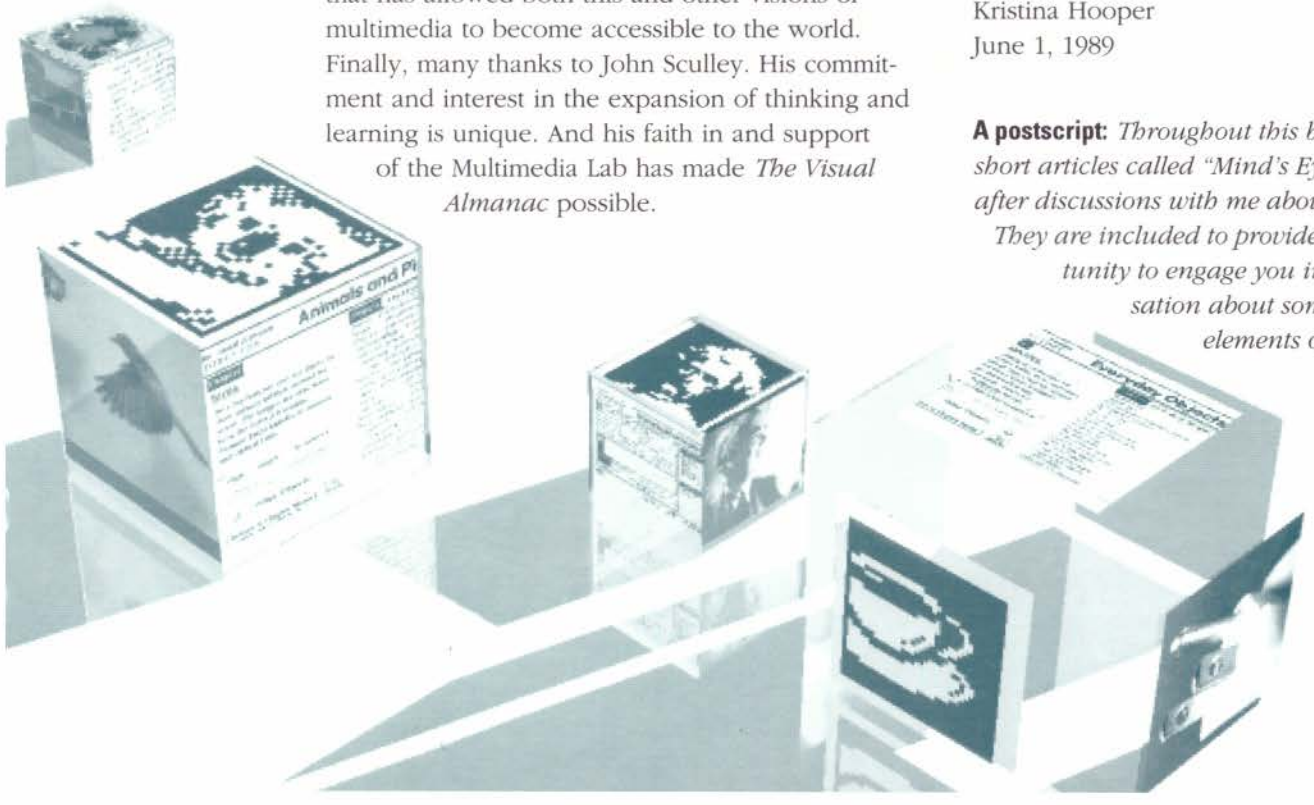
I especially thank Bill Atkinson who had the fortitude and wisdom to create HyperCard, a tool that has allowed both this and other visions of multimedia to become accessible to the world. Finally, many thanks to John Sculley. His commitment and interest in the expansion of thinking and learning is unique. And his faith in and support of the Multimedia Lab has made *The Visual Almanac* possible.

We've enjoyed inventing *The Visual Almanac*. I am particularly pleased to see that so many ideas from the research on temporal and spatial learning I have conducted over the last twenty years fit so well into an accessible and affordable technology. I'm delighted that my children and yours will have these and new classes of resources available for their mental explorations. We hope you enjoy using *The Visual Almanac* and that you make new things that surpass anything we have ever dreamed of. Have fun!

Kristina Hooper

Kristina Hooper
June 1, 1989

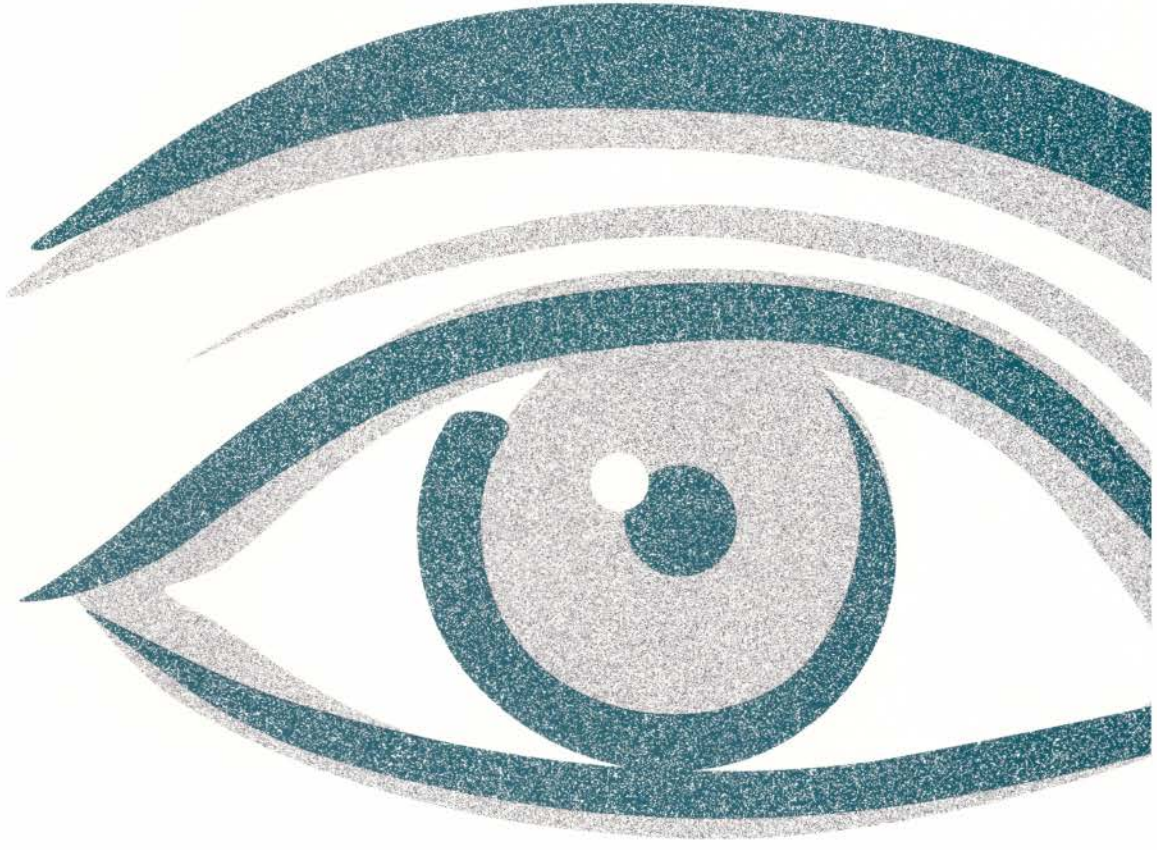
A postscript: *Throughout this book you will note short articles called "Mind's Eye," written by Nancy after discussions with me about particular topics. They are included to provide me with the opportunity to engage you in an ongoing conversation about some of the ideas behind elements of the* Almanac.



This Companion is at once a technical manual, a browsable educational philosophy book, and a description of the software and videodisc components...

CHAPTER 1

The Brief View



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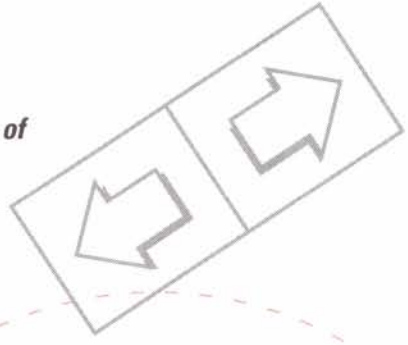
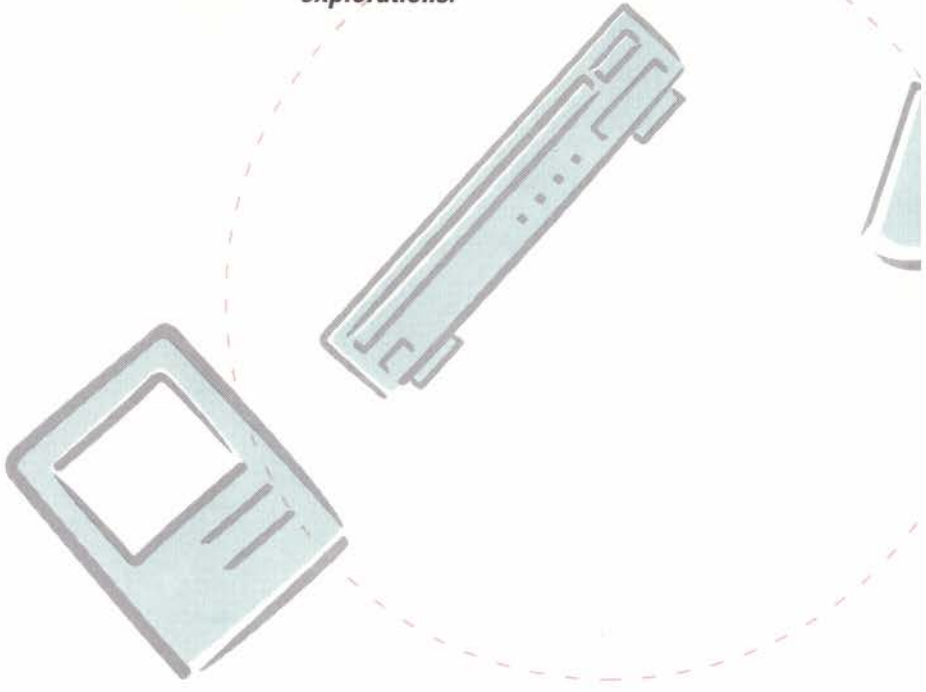
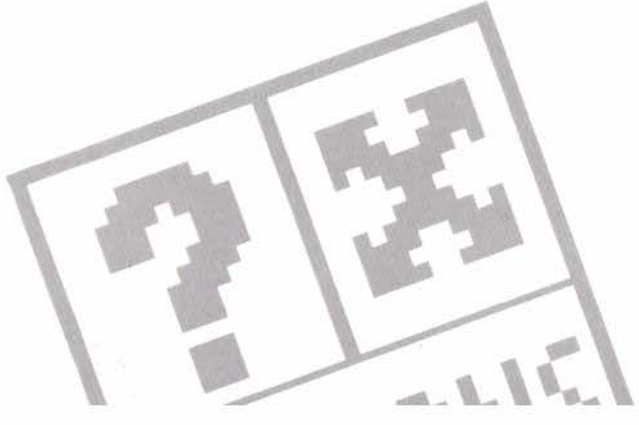
An overview of* The Visual Almanac *and some suggestions for your first explorations.







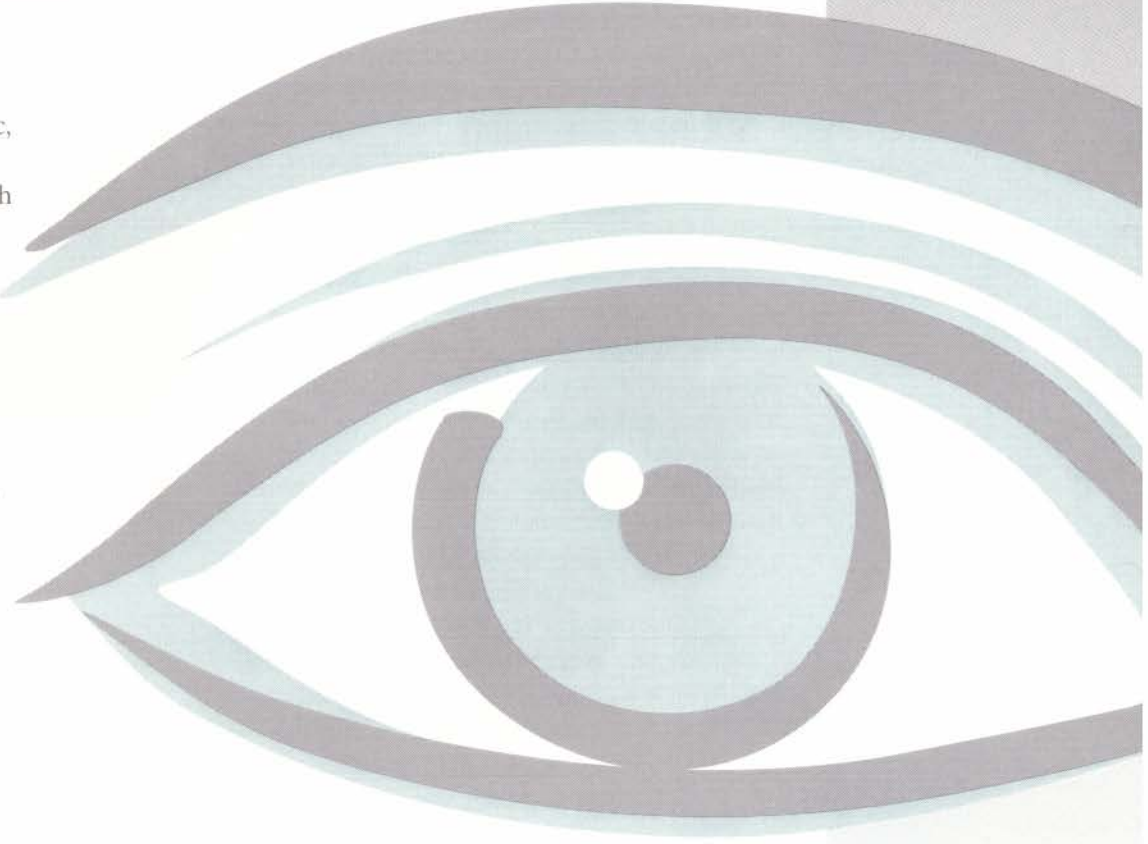
The Brief View

ORIENTATION/ What Is *The Visual Almanac?*

The Visual Almanac is an interactive multimedia kit. It contains a videodisc, software and this book. You can take what is in this package and fiddle with it. You can browse through images, explore and build your own multimedia compositions.

At the heart of this almanac is a library of pictures and sounds, many of which you have seen and heard before. In a sense they constitute the basic audiovisual vernacular of our culture. You have come across many of them on television, in filmstrips and slide shows, in movies and in textbooks.

The pictures and sounds are under your control, courtesy of the technologies of a videodisc player connected to an Apple Macintosh computer. You control which images you see, the pace at which you see them, and the kinds of connections you make. You bring sights, sound and information together. The result need not be a hectic collision of media; it can be quiet, simple and quite flexible.



You can browse through *The Visual Almanac* as if it were a large book of illustrations, or you can peruse it in depth. You can use it for research, as a reference for both images and data. You can also make your own additions to the text information. You can make reports, presentations, explanations, stories and poems. It is an audiovisual resource at your fingertips, covering a wide range of topics, from Mahatma Gandhi to the yearly rotation of the Earth around the Sun.

The Visual Almanac is open-ended. Included here are two basic kinds of building blocks: a group of images and information (the Collections) and the tools to manipulate them (the Composition Workspace). What you do with these blocks is entirely up to you. Any number of connections, explorations and compositions can be made with images and information contained in *The Visual Almanac* Collections and tools provided in the Composition Workspace. There are also two kinds of ready-made examples of the kinds of things you can do with the images in this interactive multimedia kit. The Activities have been made by Multimedia Lab designers using HyperCard. The Compositions were made primarily with the Composition Workspace tools. In the next section we describe each part of *The Visual Almanac,*

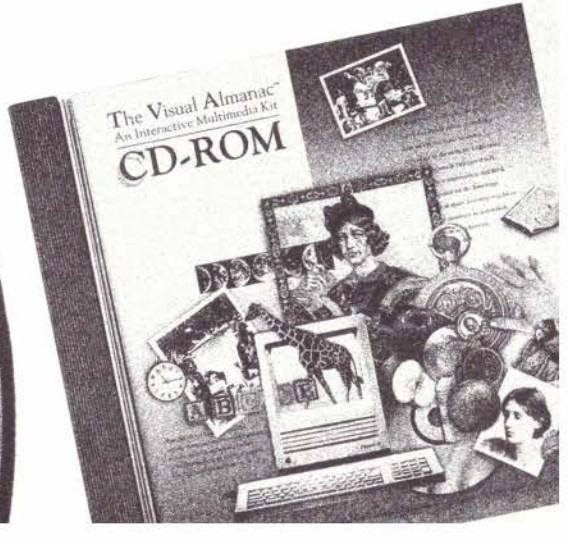
and you will begin to see how the videodisc, the software and this book all work together.

The Visual Almanac is also an experiment. Not much is known about how people learn to think conceptually or visually, but researchers agree that they are fundamental thinking skills. We have a sense of interactive multimedia's potential for conveying major conceptual information through visual explanations. *The Visual Almanac* includes a set of examples which demonstrate some ideas about the visual presentation of ideas. (See "Learning and Teaching with *The Visual Almanac*" on page 28.) It is a model for testing how interactive multimedia works, as well as a product that many people inside and outside of research labs can use. It is a map for developers and educational researchers to use in the near future. And it is a demonstration of an abstract vision of how people might learn and think, a vision which is fast becoming a concrete reality.

The Physical and Functional Maps

When you opened your *Visual Almanac,* you saw these physical objects: a videodisc, a CD-ROM (Compact Disc–Read Only Memory), three floppy disks and a book. Upon investigating you might have discovered that the two-sided videodisc contains two channels of sound and over 7,000 still and moving images on 108,000 frames. *The Visual Almanac* software includes about 22 megabytes of information. The software is provided on CD-ROM and is designed to run either from floppy disks or a hard disk. (The CD-ROM is for distribution convenience only. The software has not been designed to run efficiently from this medium.) And *The Visual Almanac* Companion has a couple of hundred pages.

These numbers may be impressive or frightening, depending on your point of view. But, either way, a list of the physical components of *The Visual Almanac* doesn't really reveal much about what it does. The videodisc and the software disappear into their respective machines, and it is the interaction of these components that creates the *Almanac.* So we also need to talk in terms of the *Almanac's* functions and we do so on the following pages!



The Physical Map

Videodisc: *The Visual Almanac* images are stored on the two sides (A and B) of the videodisc and include still photographs, moving pictures, paintings, photographs, drawings and two channels of sound. The images and sounds were provided by many generous collaborators. (References to these sources can be found in the software. A list of sources and their addresses are also on the videodisc and in the section "The Collections" on page 120.)

The videodisc is designed to be used with a Macintosh computer, but you can also scan through it independently to get a feel for the kinds of images it contains.

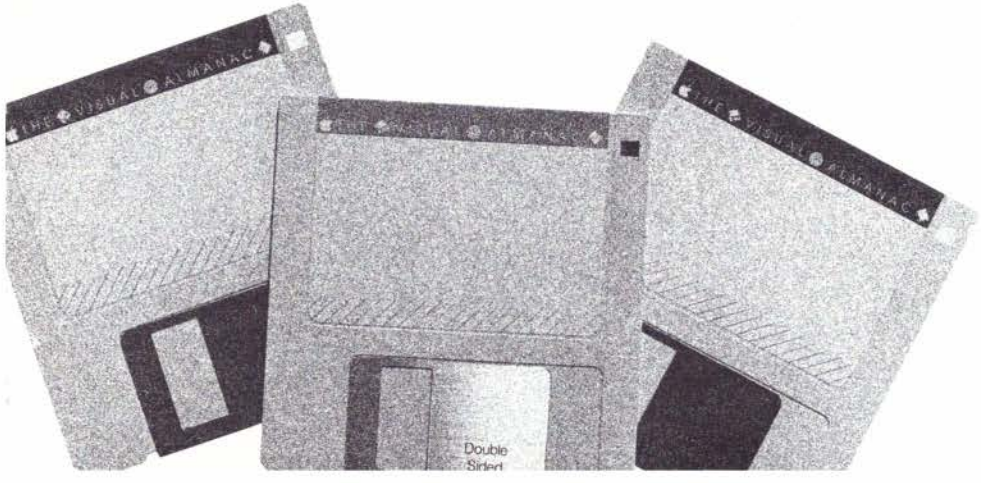
Note: *Throughout the Companion, we assume that you have transferred (downloaded) your software onto a hard disk. If you want to run from floppy disks, check "Managing Your Software" in the Reference section, page 190.*

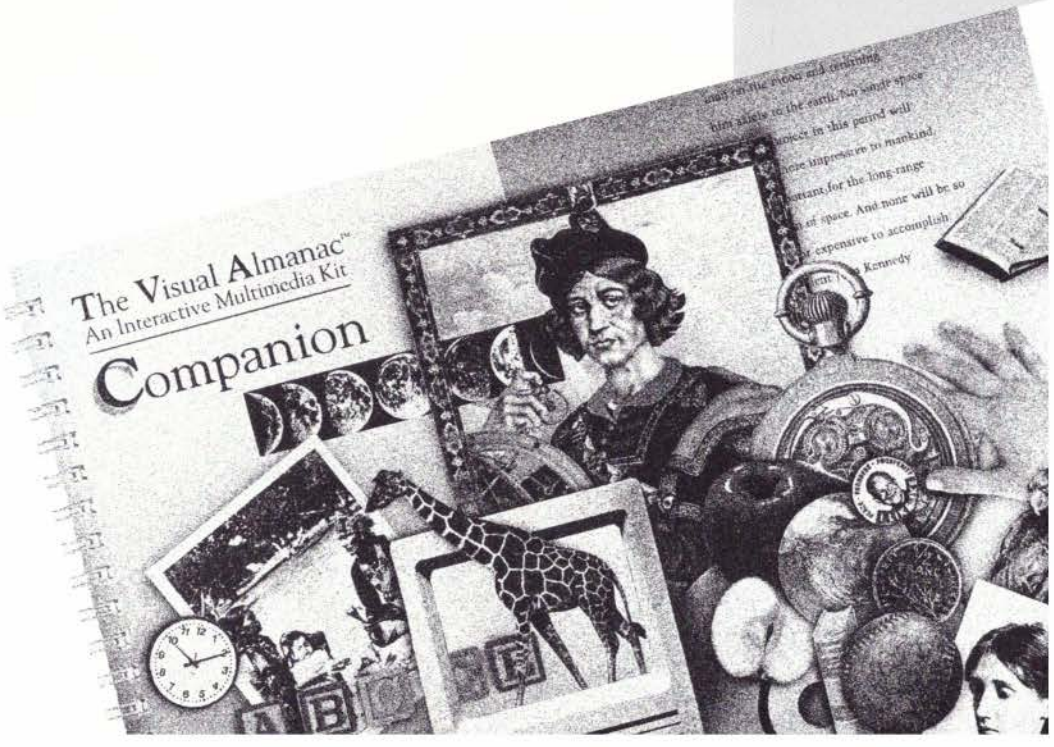
Software: *The Visual Almanac* software is distributed on CD-ROM. The software is divided into three parts: the Collections, the Activities and the Composition Workspace. Below you will find a description of each of these.

There is also some CD-audio on the CD-ROM, which includes the sound from the videodisc. For more instructions on using the CD-Audio Toolkit, call Apple Programmers and Developers Association (800-282-2732). You do not need the toolkit to run *The Visual Almanac*.

Book: *The Visual Almanac* Companion describes *The Visual Almanac* and tells how to use it. It also discusses multimedia and its role in education.

The videodisc and the software disappear into their respective machines...



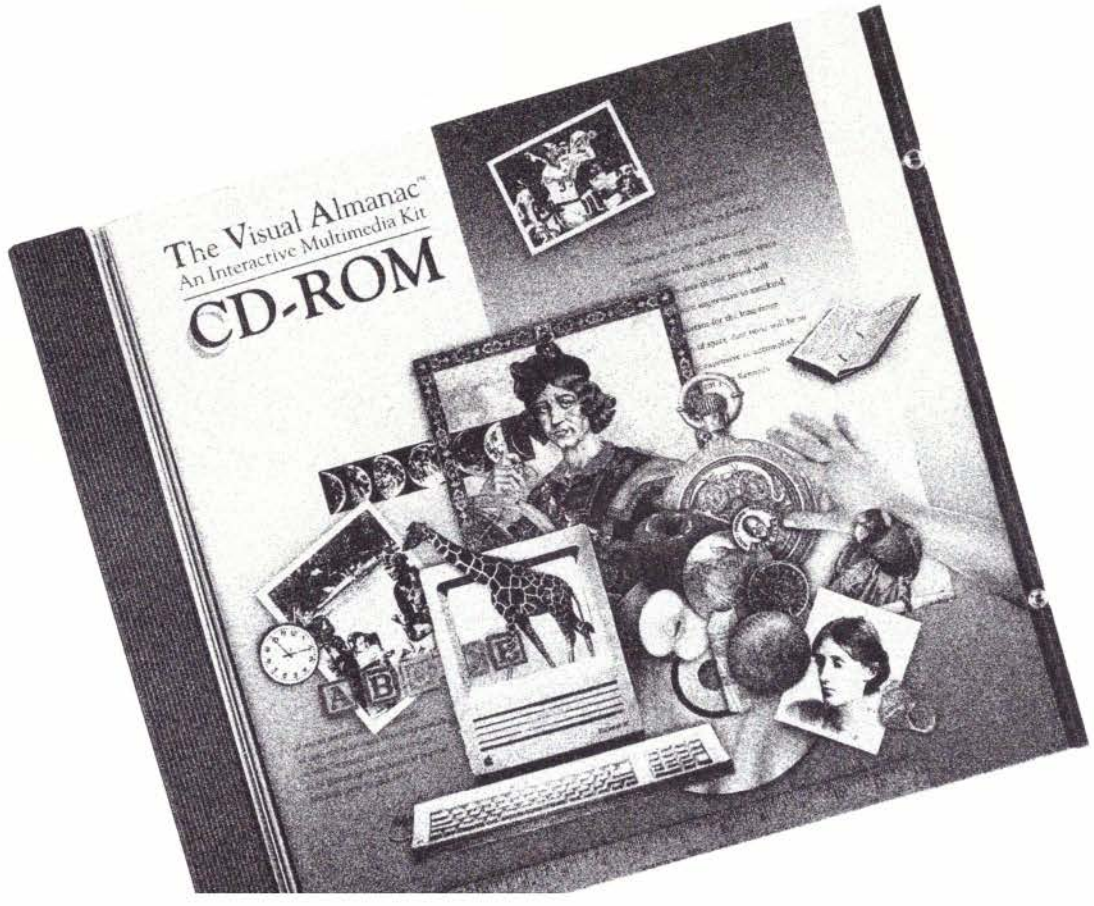


The Functional Map

The Collections: One part of *The Visual Almanac,* called the Collections, is a resource of sights, sounds and information. The images (visual and sound) are on the videodisc; the data for the images are provided in the software. The combination of an image and information about it is called a *multimedia object* (for a full definition see page 98). The Collections contain over 7,000 multimedia objects. The multimedia objects are divided into 12 Collections on a wide range of topics, such as the Solar System, Studies in Time, American History and Sound. Each collection is subdivided into chapters.

Composition Workspace: The Composition Workspace is your personal multimedia lab. You can search for objects in the Collections, choose the ones you want, edit and rearrange them. Then you can build your own compositions. Directions for using the Composition Workspace are in the section called "How to Make a Composition."

Some sample compositions made with the tools are included.



Activities: Fourteen activities on a range of topics (e.g., physics, time, daily life) for a range of ages (pre-school through high school) have been made by Multimedia Lab designers using HyperCard. These activities are examples of multimedia presentations intended to introduce you to *The Visual Almanac* and convey a sense of what is possible in multimedia explanations.

Navigation

In this section is some basic information so that you can begin to explore *The Visual Almanac* right away. Most of the instructions are embedded in the software, and descriptions of the features of *The Visual Almanac* can be found in the Reference section.

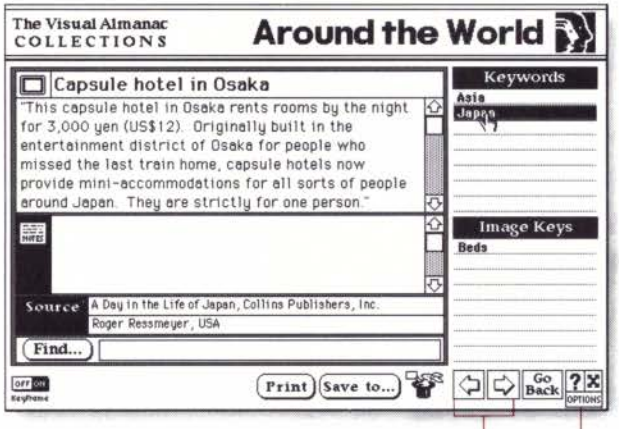
Here is how to get around in *The Visual Almanac.*

Arrows

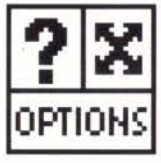
Click on forward arrow to go to the next card.

Click on reverse arrow to go to the previous card.

Go Back — Click on "Go Back" to go back to the last place you were.



The Superbutton



? — Click here for Help. Instructions will pop up telling you what you can do on that screen. Any screen that calls for you to do something has Help. (Screens that don't require any action, other than clicking to go to the next screen, do not.) Click OK, when you're finished with Help and want to go back to the actual screen.

Click here to get to a map. It shows where you are in relation to everything else. Click on any place on the map and you will go there. This is an excellent tool for moving around quickly in the software.

OPTIONS — Click here and you will have a choice of options:

1. Get back to the Main Menu.
2. Get back to the introduction for the stack you are working in.
3. Quit HyperCard.
4. Get to the video controls (in order to turn the videodisc over, browse through the images, turn the sound on and off, etc.).

Terminology

HyperCard Terms

All *The Visual Almanac* software is written in HyperCard. You don't have to know HyperCard to use the software, but there are a few terms with which you should be familiar. The definitions below are not the complete definitions you would need if you were using HyperCard directly, but they should at least ground you while you are using *The Visual Almanac*.

HyperCard. HyperCard is software that was developed for the Macintosh in 1987 by Bill Atkinson. HyperCard links pieces of information and helps the user organize, display and navigate through this information. For further information see the short article on HyperCard in the Reference section "Multimedia Overview," page 193.

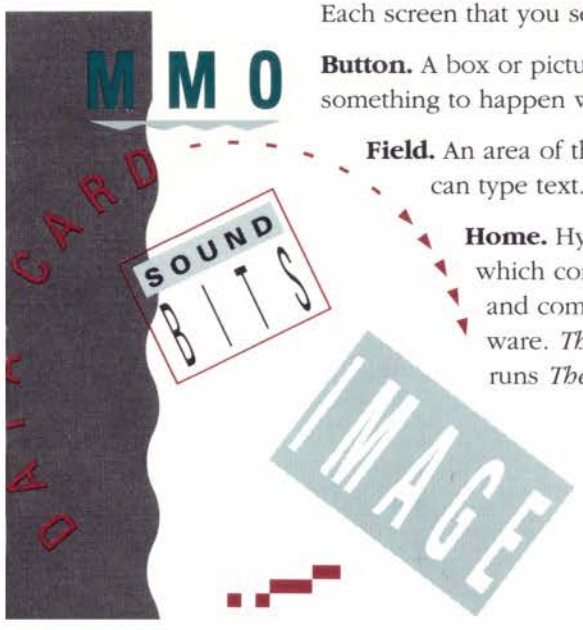
Stack. A HyperCard file, composed of cards.

Card. A HyperCard stack is made up of cards. Each screen that you see is actually a card.

Button. A box or picture on a card which causes something to happen when you click on it.

Field. An area of the screen into which you can type text.

Home. HyperCard's central stack which contains special information and commands for running the software. *The Visual Almanac* Home runs *The Visual Almanac* software.



Visual Almanac Terms

Interactive Multimedia (or **multimedia** for short). A computer-centered medium that combines many media elements—moving and still pictures, sound, music, text, data—in a single computer-controlled environment. For a more detailed definition and discussion, see the section "The Big Idea" on page 25.

Multimedia Object. A new term for a class of things in multimedia. The multimedia object is a unit of meaning, consisting of an image—a still picture, movie (with or without sound), a sequence of related images or a sound—and information about it. It is the basic unit of multimedia production and has embedded in it a range of resources needed for interaction. Physically, a multimedia object in *The Visual Almanac* resides on both the videodisc (images) and the software (data and resources).

Browsable Movie. A normal movie plays straight through from beginning to end at a constant speed. A browsable movie is a term for a sequence of related pictures (still or motion) that you choose how to see. Using a videocontroller, you may be able to step through the pictures frame by frame, go backwards or forwards or change speeds.

Main Menu. This is an important card in *The Visual Almanac* Home stack. It is the hub—from this card you can choose to go anywhere in the *Almanac*: the Collections, Composition Workspace or Activities, etc.

Quick Starts: Some Suggested Ways to Explore

There are several ways to become familiar with *The Visual Almanac*. You can:

- explore the videodisc
  - with the software
  - independent of the software
- explore the Collections Directory
- explore the Collections
- try out an Activity
- look at some sample compositions

Each collection, each activity and the Directory is an independent stack so you do not have to load all the software to see individual pieces of the *Almanac* but we assume here that all software is loaded.

Explore the Videodisc

You can look at the videodisc with or without installing the software.

Browsing the videodisc without the software is limiting, however. You cannot get information about the images or look for specific things you want to see. There are a number of ways to look around the videodisc with the software. You don't have to load all your software, because each one will work as an independent stack.

Look at the Videodisc *With* the Software: Use the video controls in the Superbutton. Click on "Options" in the Superbutton and then click "Video Controls." The video controls work just like a remote control. Click or click-and-drag your mouse to make things happen. You will find a Superbutton on almost every card. See page 178 for a full description.

Look at the Videodisc *Without* the Software: Use a remote or the controls on the machine's front panel.

First Look: Look at the Introduction on the videodisc. Press "Play" on the videodisc player or click "Play Introduction" in the Orientation to see a 45-second introduction.

Browse the videodisc. After you have seen the Introduction, you might want to step through the Collection Highlights.

Press "Play" again to run the videodisc. It will take a half hour from beginning to end. Listen to Channel 1, which gives a narrative overview of the videodisc. (Turn Channel 2 off: it will be confusing to listen to because it contains a sound library and sync sound.)

Explore the Collections Directory

- The Collections Directory fits onto one floppy disk. Insert that disk and click to proceed, or...
- If all your software is loaded, click on Collections on the Main Menu then on Collections Directory. (A videodisc icon on the left side of the screen reminds you which side of the videodisc you are on.)

You then can take a structured walk through all the images in the Collections on that side of the disc.

- Select a Collection, then a chapter and then you will see a list of the multimedia objects in that chapter.
- Click any object on the list to see its image.

You can move around the Collections, see and play images and find the source of the image, but you cannot get information about the images. For that you need to be in the Collection itself.

Explore the Collections

Assuming you have loaded all the Collections, get to the Main Menu and then click on Collections. Then click "Go to Collections Menu." Select a collection from the Collections Menu and you will go right to the cover card for that collection. Click anywhere on the screen to begin.

Try Out an Activity

You can try any of the activities in any order, either from floppy disks or from the hard disk. Click on "Activities" on the Main Menu, and then click on a title on the list to select the activity you want.

Look at Some Sample Compositions

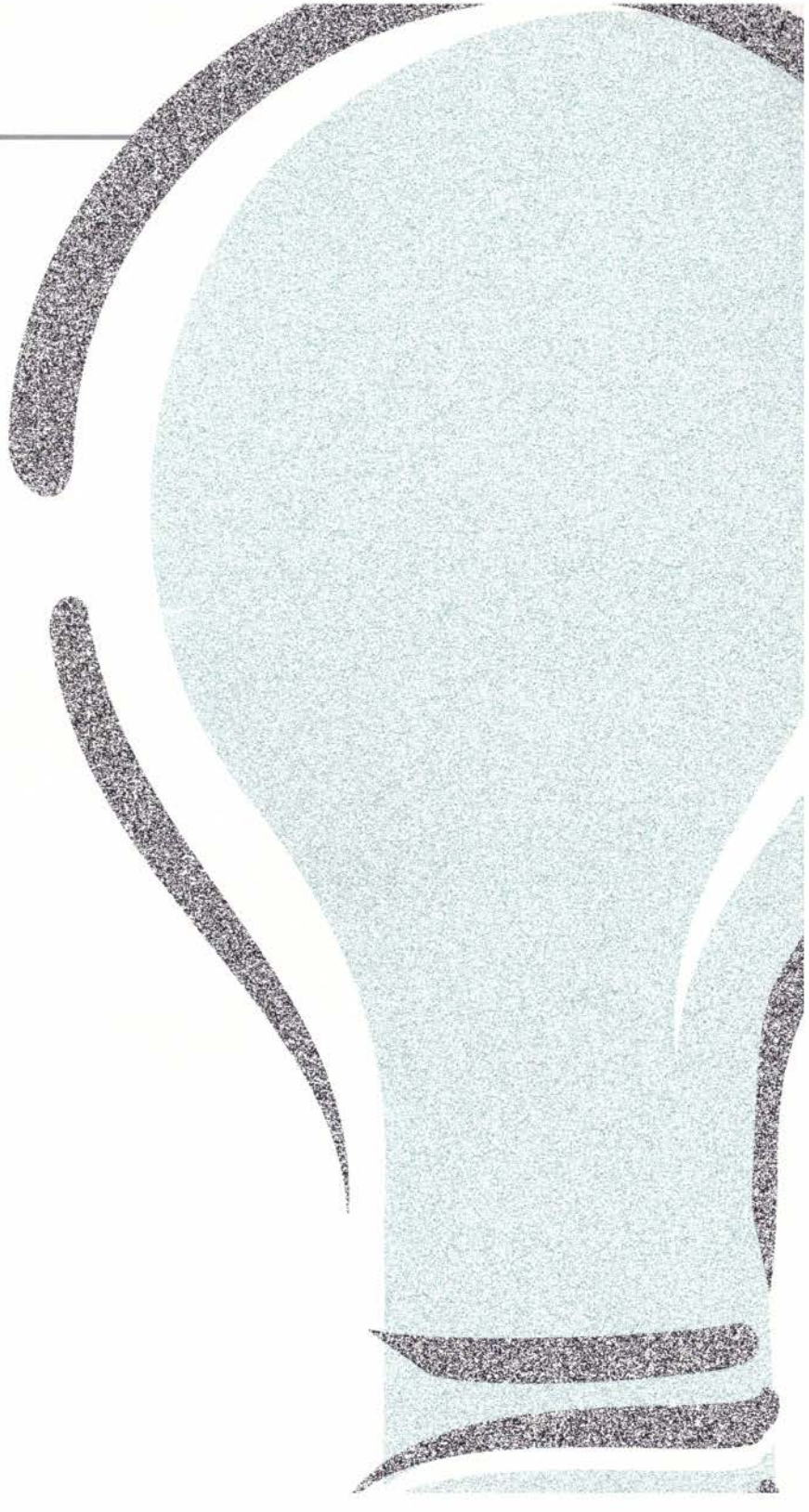
To see some compositions made in the Composition Workspace, click on "Activities" from the Main Menu. Then click on "Go to Sample Compositions Menu" and choose a composition.

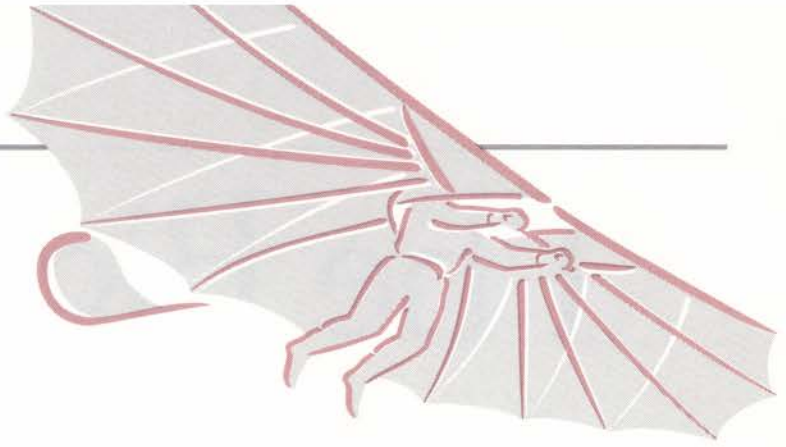
A Word to the Wise

Don't start with the Composition Workspace. It's a wonderful tool once you have become familiar with the images and other parts of the system, but it could be overwhelming as a starting point.

CHAPTER 2

The Big Idea





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Why we made* The Visual Almanac *and the potential of interactive multimedia in the development of important cognitive skills.

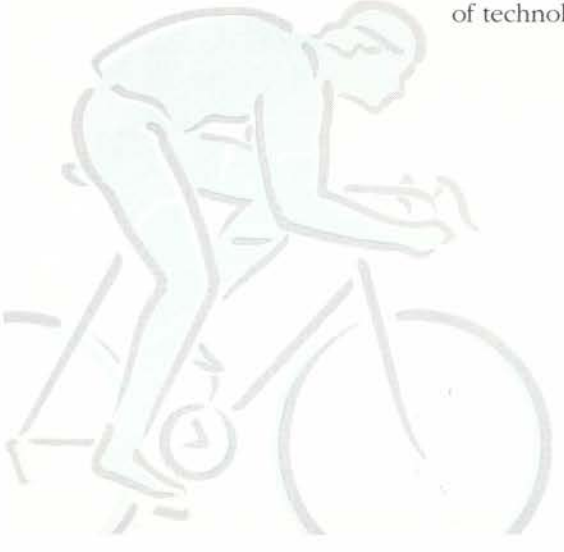
The Big Idea

ORIENTATION

The other parts of the Companion tell you what *The Visual Almanac* is and how to use it. In this section we tell you why we made it. With *The Visual Almanac*, we tried to show how current technologies might be used to do something new. We tried to make something that could be used now but would also provoke the development of technologies and pedagogies for the future.

The Visual Almanac is designed to give everyone a glimpse of possible computer-centered futures. It is aimed at children and all their teachers—in schools, in homes and in various public environments.

In this section we discuss how we think *The Visual Almanac* addresses the issues of technology and pedagogy.



Learning and Teaching with *The Visual Almanac*

By now you have some idea of what *The Visual Almanac* is. But perhaps these questions remain:

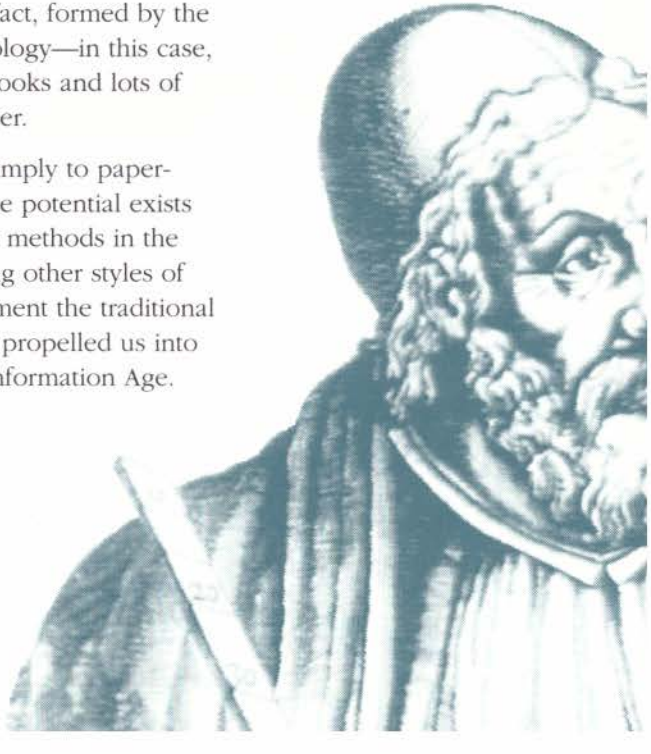
- Why did we create it?
- What is it good for?

Apple Computer, Inc., has a deep commitment to education, which extends beyond its program to put computers into schools. The Multimedia Lab is one of many groups at Apple researching new ways to use technology to improve teaching and learning and to broaden the scope of education. The primary purpose of *The Visual Almanac* is educational—more specifically, to show how multimedia can enhance thinking skills.

It is hard to explain multimedia in words because multimedia is a nonlinear experiential medium. Many things are like that—they must be experienced to be fully understood. Even the greatest writer in the world cannot transmit to another person the actual experience of listening to a symphony. And you cannot learn to ride a bike by reading about it. Nor can you truly grasp the size of the solar system just by learning that it is 3.6 billion miles across. That's why most teachers labor hard to think of examples, metaphors and comparisons to convey abstract concepts and realities to their students.

Our society traditionally places great value on those things that can be expressed in words or linear, rational expressions (like mathematical formulas). Why is that? One, because reason and its fruits are worthy of esteem. And two, because the technology that has been available to us, at least since the proliferation of writing and printing, is mainly linear. We are taught, and, in fact, formed by the available technology—in this case, desks and textbooks and lots of pencils and paper.

But we are no longer restricted simply to paper-and-pencil technology. And so the potential exists for an explosion of new teaching methods in the classroom, methods encompassing other styles of thinking and teaching to complement the traditional technology. New technology has propelled us into a new age of knowledge... the Information Age.



Today's children will be living most of their lives in the twenty-first century, and they will need very different skills to thrive there. Less than a decade ago, if a computer was in a classroom, it was usually to teach computer science. Getting used to the computer itself was as important as the programs that were used. Software consisted mainly of electronic workbooks. Today the computer is not such a novelty; it can disappear into the background and let the content come to the fore.

Recent research shows that although American students are testing better on basic skills, they don't know how to apply them. Their conceptual skills are weak. The two major U.S. college testing services, apparently in response to this trend, announced the first significant changes in their college tests in thirty years. According to the *New York Times*, January 3, 1989, the tests will be "redesigned to emphasize a wider range of mathematical knowledge and more abstract reading skills," and changes "could lead to a new essay examination and open-ended, rather than multiple-choice mathematical questions." What is important about this news is that the tests are trying to catch up with what teachers already know.

The Visual Almanac is only a first-generation example of what multimedia will be, but let's take a look at the specific nonlinear areas it addresses. As examples, we will refer to some of the sample activities in *The Visual Almanac*.

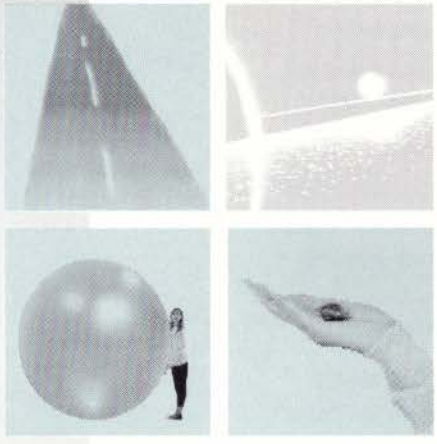
We are convinced that multimedia will be a powerful tool for teaching the skills needed for the twenty-first century, because its strengths lie precisely in those areas where linear media's are weak.

- *Cognitive skills*. Much of what students learn in school today will be obsolete by the time they grow up. Instead of simply absorbing information, students need to learn to be perpetual learners—able to find information, use it and communicate it.
- *Pedagogy*. Teachers need tools and methods to help turn abstract concepts into concrete experience and back again. To do this they need to involve as much of the student as possible—eyes, ears, kinesthetic sense, emotions.
- *Exploration*. Because of movies, television (especially "Sesame Street" and MTV) and other current media, children are used to taking in information in a nonlinear way—but passively, as spectators. Schools have to wake kids up and get them involved. When students can explore material on their own, they will become active participants in their education.

Teachers need tools and methods to help turn abstract concepts into concrete experience.

Developing Cognitive Skills

The development of intuition. Intuition is arguably the least "linear" mental ability we have. It has been assumed that it's just there, not educable. We disagree. Multimedia can help students develop intuition about things that don't come alive naturally in a textbook. In the Planetary Highway activity, for example, students can get a concrete experience of the size and location of the planets in relation to the Sun. The activity is a drive down a 6.5-mile stretch of desert highway, which represents the entire solar system. The Sun is a weather balloon eight feet in diameter. Pluto is a peanut. By the time you get from the Sun to Pluto you have a felt understanding of the distances between planets and of their sizes as well. If you have to sit down sometime later and learn the precise numbers and facts, you will already have an intuitive sense of the solar system to hang those facts on.



Multiple representation. The more ways you can think of something—picture it or represent it to yourself—the more "embedded" and useful that information will be. Let's say you want to teach a class about the conservation of angular momentum. You can teach the formula and definition out of the book and draw a diagram. But if you use the Playground Physics activity sample in the *Almanac*, you bring a playground into the classroom. Your class sees the conservation of angular momentum in action, from different points of view. In fact, they can see in ways that would be impossible if they were riding a playground merry-go-round themselves. They can also learn to represent what they see in standard notation, using a graphing activity. Chances are, as we've discovered in the classroom, students will chomp at the bit to go down to a playground and have the experience firsthand. So multimedia can lead to concrete experiences as well as to abstractions of experiences!

Application of the real world to the world of abstractions (a corollary to multiple representation). There is usually such a split between what students learn in class and what they know about the world that they have to be shown that what they already know may be

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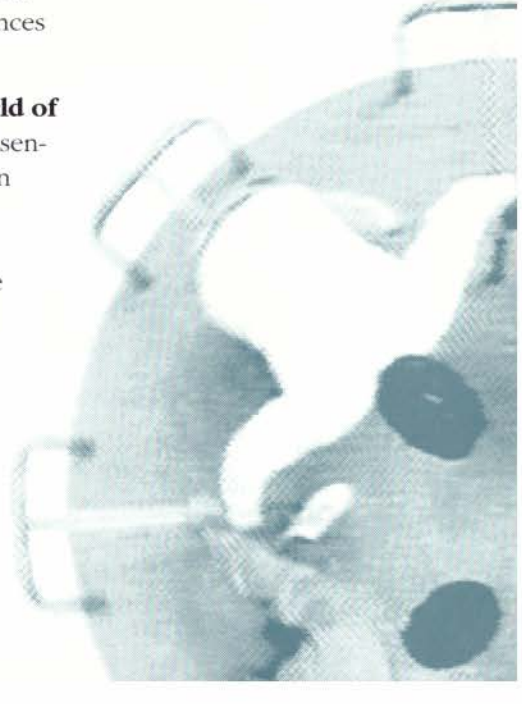
Your class sees the conservation of angular momentum in action, from different points of view.

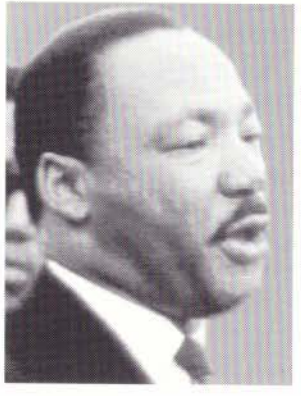


a good starting-off place for what they need to learn. The Playground Physics activity builds on intuitions students already have and relates them to abstract concepts, such as the conservation of angular momentum. In this way, students make conceptual leaps from playground events to planetary orbits.

Reexperience history. History comes alive when you actually hear the voices of the past and see the world's leaders at significant moments. *The Visual Almanac* contains many images of the leaders and events of the twentieth century: for example, Hitler speaking at a rally, FDR at Yalta, the Civil Rights protests of the 1960s. In the Twentieth Century Highlighter, students can take a quick time-trip through the century—decade by decade and/or by theme (history, transportation, daily life, arts). We think students are more apt to notice things for themselves and remember them by using multimedia tools than by just reading a textbook.

Commonality and diversity in human culture (a corollary to reexperience history). There is at once extraordinary diversity in world cultures and a startling similarity. And hardly any lesson is more important to learn than the appreciation of people for their differences from ourselves as well as for their similarities. The two collections in *The Visual Almanac* that most clearly demonstrate that point are History of Daily Life and People from around the World. The first collection uses a historical perspective to show people in different cultures doing ordinary, everyday things. The second shows various cultures today. It features pictures from the book series *A Day in the Life of...* These photos are the basis for an activity called A Day in the Life, a structured way to travel through three very different modern-day cultures: the United States, Japan and the Soviet Union.

The management of information. We are witnessing the dawning of the Information Age, and there's more data available than any one of us could assimilate in twenty lifetimes. But data is not information—information is something you can use. You need to be able to sort through all that data, make sense of it, filter out what you don't want and organize what you do. This sorting has usually been done for most of us old-timers (anyone over twenty-one!), but our kids need to learn how to manage information for themselves.



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History comes alive when you actually hear and see the world's leaders at significant moments.

The Animals and Plants collection in *The Visual Almanac* is an example of raw data—about 1,000 still pictures and short movies of animals and plants. That's a fair-sized database for students to wade through. (A database is information organized for computer retrieval.) In very sophisticated cases, you may never be aware of a database's organizing principles, but we have designed an exploration activity—Animal Habitats—that should familiarize students with how a database works. In Animal Habitats, we make the organizing dimensions of the information explicit so that students can:

- learn to *navigate* through the information
- see how the information is *categorized* (in this case, it is identical to standard classification in biology texts)
- understand that *defining the variables* determines what you see

So one aspect of managing information is using a database to look at large groups of facts. Just as important is knowing what to make of the facts once you have them. Development of the ability to perceive the overarching concept that ties information together is as essential as the information itself; for example, Animal Habitats conveys important information about biomes, the major environmental areas of the world. Which animals live where depends on the climate and vegetation of a region. To grasp this concept is to translate the data into an understanding of how the natural world is organized—a global concept with extremely important ramifications.

A multidisciplinary approach. The borders between disciplines are fading fast. How can we understand psychology without biology? History without geography? Literature without history and psychology? In life we are all multidisciplinary. Schools are the last bastion of hard-and-fast departments. Part of the reason is logistic: the physics rooms are far away from the English rooms. But in *The Visual Almanac*, images on many different subjects are all in one place, so it is easier to cross over from one discipline to another. For example, a class studying the physics behind nuclear power would have easy access to images of the bomb and pictures of the people who made it as well as to relevant political statements. Students interested in space could learn about the history of aeronautics and space flight and also how politics affect research into space technology.




Critical thinking: observation and analysis. If students are to grow into thinking adults, they must learn to observe the world around them and analyze what they see. Used to looking in a book for answers, students are often uncomfortable when asked just to look around in the world. They try to guess the right answer, instead of investigating for themselves. In the real world, right answers are seldom in books, and people make judgments and decisions that are as good or bad as their observational and analytical skills. We want to produce critical thinkers—people who can look and listen and then independently decide what they think. *The Visual Almanac* provides original material and leaves the interpretation up to you and your students. The Phases of the Moon activity is a good example. Most educated people can offer up, with varying degrees of self-confidence, only a vague explanation of why the Moon seems to change shape over the course of a month. Phases of the Moon zooms you to a location in outer space where you have an excellent vantage point for watching the Moon's orbit around the Earth. If you then imagine yourself back on Earth, you can figure out what part of the Moon you would be seeing. This is not an easy exercise—it strains the imagination. But if you stick with it, you will understand the concept as you may never have before. The Earth Cycles activity provides a similar experience. Most of us can say why a day is a day, a month is a month, a year is a year—but none of us has ever traveled to outer space and watched the Earth's time cycles in progress. (These animations, by the way, were created especially for *The Visual Almanac* because we couldn't find existing representations of these concepts. The lack of this archetypal representation makes clear that the field of visual representation of concepts is in its infancy.)

TA

IMAGE

The development of intuition, the application of the real world to abstract ideas, the management of information… these are some of the specific nonlinear areas we think interactive multimedia will be exceptionally good at addressing. We provided you with some examples of how it could work in the Activities. (Note the chart on page 42 of "The Activities" section of the Companion; it tells you which issues we think each activity addresses.) These are just a few samples; the best ones are waiting to be created by you and your colleagues. We bet that you, the first users, will do amazing things that we haven't thought of with the visual resources and tools in this package.

We want to produce critical thinkers–people who can look and listen and then independently decide what they think.

Pedagogy

Besides enhancing the development of important cognitive skills, what else can multimedia do? Here we get down to general pedagogy.

© Scott Kim

First, let's smudge the line between teaching and learning. Teachers who just deliver information to passive students are not the teachers that students remember. In the best situations, teacher and learner recognize that they are both in the same business. Schools are moving more and more toward "student-centered classrooms," which does not mean that kids are taking over the class and that teachers are not needed. It simply means that the model of a teacher standing in front of a room dispensing information is becoming obsolete. Instead, the new teacher will be a guide/scout/mentor who helps students along the way in their quest for knowledge and understanding. The terms "teach" and "learn" are often set up as opposites, when in fact they are a bonded pair.

In addition to changing the teacher/student model, we have to broaden the scope of education. Education is not complete after you put in your time in educational institutions. A clear message of the Information Age is that you have to be in the learning game your whole life. Once out of school and concerned with making a living, however, most of us will not have the luxury of devoting ourselves again to a full-time school routine. So education has to come into our everyday world—the office and the home. Interactive multimedia has a big role to play, not only in training but in ongoing education, remedial education, entertainment, family interactions and life enrichment.

We are convinced that multimedia can:

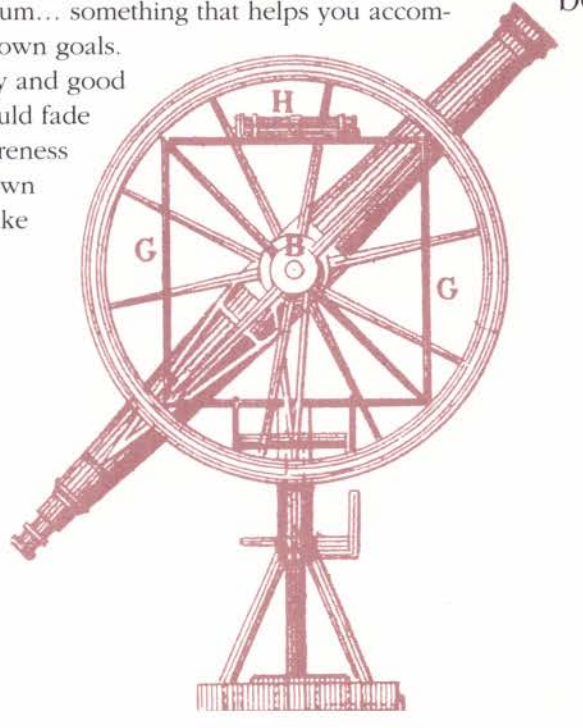
- help students be active participants in their education, not just passive consumers
- encourage students to become creators and manipulators of information, not just memorizers
- teach students how to do research
- allow both teachers and students to become more creative in their presentations
- help teachers create learning experiences that are more nonlinear and more visual
- help students turn abstractions into concrete experiences, and vice versa

Finally, interactive multimedia allows teachers, for the first time really, to incorporate the computer into the classroom. Most of the time computers are a separate classroom activity. A few students may go to work on the machines, while the teacher stays with the rest of the class. But *The Visual Almanac,* and any other interactive multimedia, is a resource that can be used by an individual, a small group or the entire class.

Exploration

Interactive multimedia promotes exploration. It is true that with *The Visual Almanac* you can make presentations and have something physical to show for your labors. But you will get as much out of simply exploring and experiencing. The technology is fairly easy to learn and simple to use, but it is not effortless. It will take a while to get familiar with the images on the disc and to get the hang of how everything works together.

When we first took *The Visual Almanac* to a classroom something very interesting happened. After five minutes the students completely ignored the technology and were interested only in the content. That was success! Even if it's "multimedia"—something new and perhaps a little dazzling—it is still just a medium... something that helps you accomplish your own goals. Technology and good design should fade out of awareness and your own thoughts take over.



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The terms "teach" and "learn" are often set up as opposites, when in fact they are a bonded pair.

CHAPTER 3

The Activities

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Why we made the 14 ready-to-use activities, how to use them and small articles on each activity.

The Activities

ORIENTATION

The Visual Almanac comes with 14 activities. Each one is a HyperCard stack which uses images based on the *Almanac* Collections. Each one is ready to use and independent. You do not need any knowledge of HyperCard or any other part of *The Visual Almanac* to use an activity. The activities represent a good range of subjects and are directed at different age and skill levels.

Most activities are good for any age level. For example, the Earth Cycles activity shows how a day, a month and a year are determined—as if you were sitting out in space and could see the Sun and the movements of the Earth as it revolves around it. It is as appropriate to show this to a second-grade class as to a class of high school seniors. Obviously the discussions in a second-grade classroom would differ greatly from those in a high school classroom, but in both cases the activity will help a teacher to explain a difficult concept.

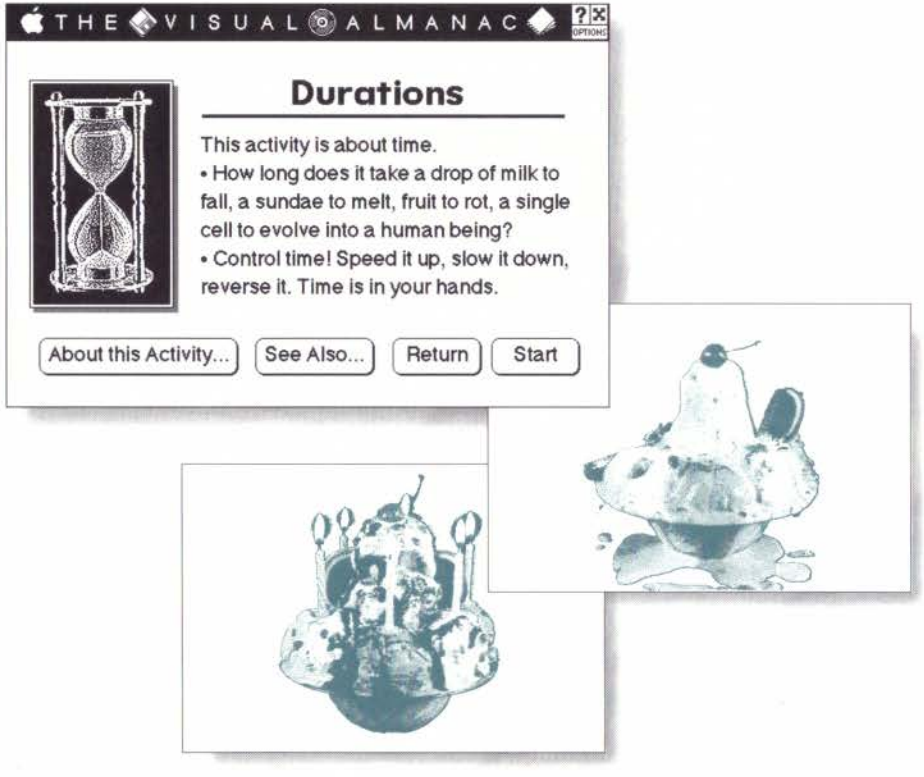
A couple of activities could well be used in almost any subject area. For example, the Durations activity shows the relative times it takes for various things to happen: a sunset, the evolution of human beings, a market day, a melting sundae. This activity could be used in math, science, history and English classes. One teacher thought she might use it in a creative writing class.

Why Did We Create the Activities?

We prepared the Activities to provide you with a quick and relatively easy way to become familiar with interactive multimedia and *The Visual Almanac*. The range of topics is wide enough to give you a sense of the scope of the images on the videodisc.

We also had some important pedagogical reasons for creating the Activities. Interactive multimedia has the potential to be very significant in education (in schools, ongoing business training and lifelong education) because it is a powerful tool for explaining abstract concepts. The activities we selected for this package demonstrate several such concepts. In the chart on page 42 we describe the idea behind each activity, and the articles that follow in this section (pages 52–91) provide fuller discussions.

We also created the Activities with software developers in mind. Because this is a new industry, the conventions of interactive multimedia are just being invented and worked out. At the Lab we grappled with several important design and interface issues involved in multimedia compositions, and what we learned is incorporated in the Activities (and in the Composition Workspace as well). We hope that our resolution of these issues will prove useful as a model for software developers.



How to Use an Activity

The activities are designed to be fairly self-explanatory. To make them work, you need to do the following:

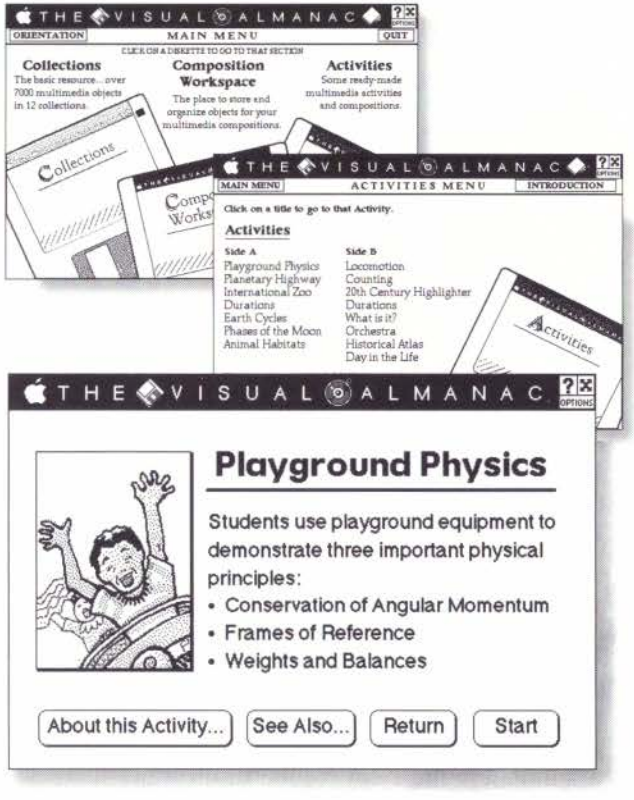
Assuming all your software is loaded on a hard disk:

- Click on "Activities" from the Main Menu.
- Select the Activity you want.
- Follow the instructions on the screen.

The activities have a standard look. When you click on an activity title you get to an Intro card. The Intro card gives a brief description of the activity. There are four buttons on the bottom of the card:

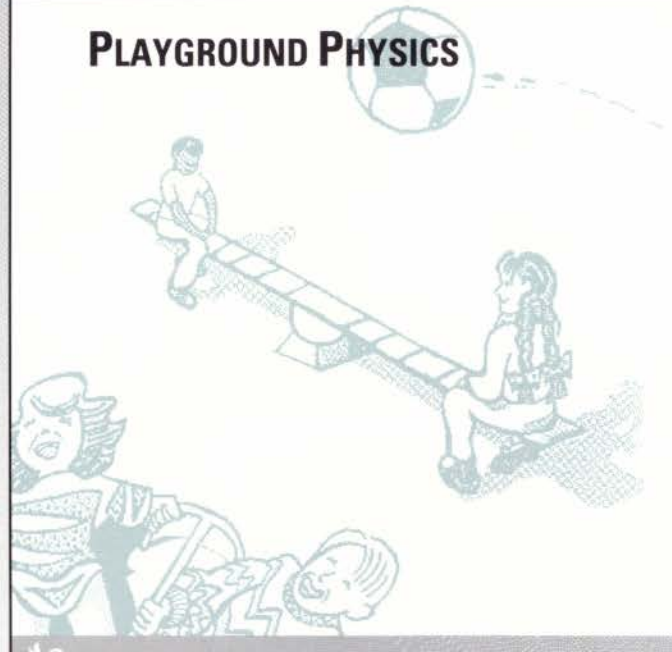
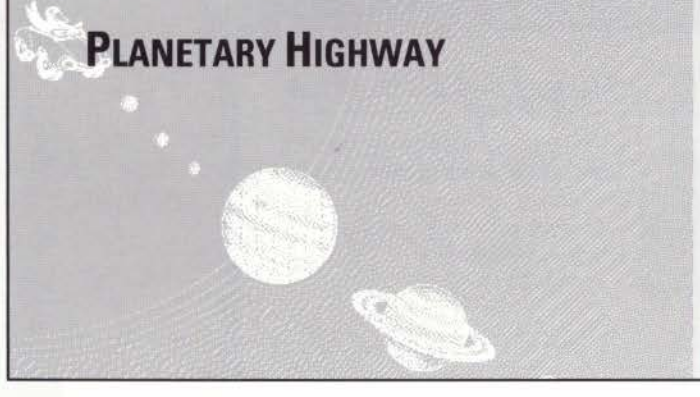
- "About this Activity"–Click here to find out a little more about what you may expect to find in this activity.
- "See Also"–Click here for some suggestions of other material related to the subject of the activity (other collections and activities, books, movies, etc.)
- "Return"–Click here to go back to the Main Menu.
- "Start"–Click here to begin the activity.

There is a separate article in the Companion on each activity; each is at least two pages and includes some additional information we thought might be of interest... lab notes, rationale for creating the activity, students' reactions, discussions, etc. These are the stories we would tell you if we were giving you a demonstration in the Lab. (Note: Earth Cycles and Phases of the Moon are treated in one article; Playground Physics is a very large article because it is a very large activity... really four in one.)



You will see as you get more familiar with *The Visual Almanac* that you can make countless activities with the images in it. We selected the activities presented here because they meet four basic criteria. They had to:

1. **Convey a big idea.** We wanted to demonstrate how multimedia environments can be used to enhance teaching. For example, conveying abstract concepts that are important to understand and often difficult to explain and to learn.
2. **Be rich in content.** We wanted the content to be relevant to a range of subject areas and age levels to show diversity.

ACTIVITY	SUBJECT	BIG IDEA
PLAYGROUND PHYSICS 	Physics High School	Extend intuitive knowledge about the world into formal, structured representations
	Moving In and Out/Graph	Develop an abstract concept from observation of an experience
	Rolling Ball	Develop ability to see from more than one point of view (frames of reference)
	Teeter-Totter	Create an approachable simulation of experience
PLANETARY HIGHWAY 	Physics Junior High and High School	To develop an intuition about the size of the universe

3. **Lead to the development of key cognitive skills.** We wanted to show how interactive multimedia might address such important pedagogical challenges as the development of intuition, representational and fluency skills in observation and analysis, and opportunities for re-experiencing history.

4. **Pose some challenging design issues.** We wanted to explore different frontiers of this new field and make our results generally available to future designers.

The following chart gives an overview of all the *Almanac's* activities in terms of their major aspects.

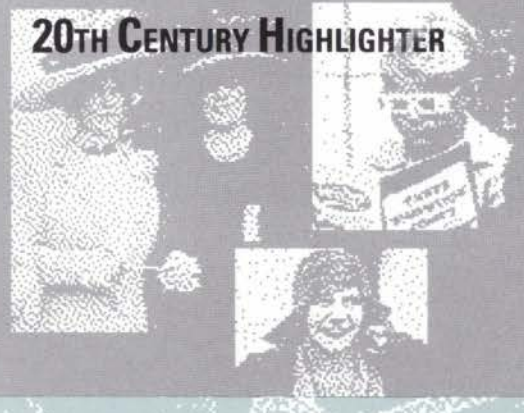
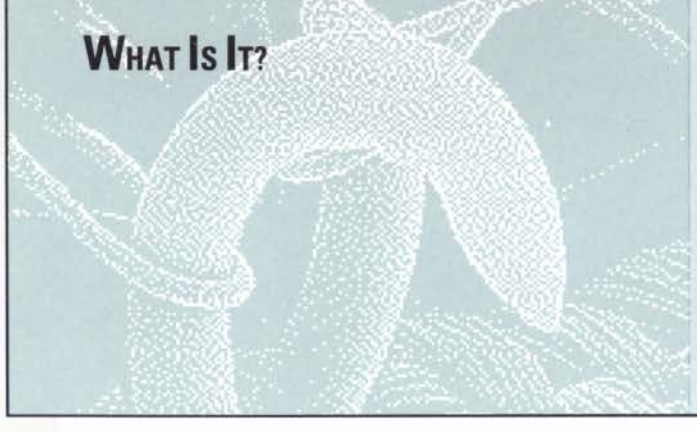
CONTENT	SKILLS	DESIGN ISSUES
Physics	Abstraction, representational fluency	Original video production
Conservation of angular momentum	Observation and analysis, representation (quantification) of observations	Link concrete video images to an abstract representation
Relative motion	Observation and analysis	Exploit the two-screen format. The interaction of Macintosh and video makes it possible to see two points of view at the same time.
Weights and balances ($d_1w_1 = d_2w_2 + d_3w_3$)	Hypothesis testing	Video designed for interaction
Size of the solar system, the order of the planets and their relative sizes and distances from the sun	Use of a model to understand an abstract concept Observation and analysis Specifically, understanding the relationship of speed, distance and time	Production: How to create a model, customize stock highway footage in "Paint Box" Software: Development of a simple interface, determination of time issues

ACTIVITY	SUBJECT	BIG IDEA
INTERNATIONAL ZOO	Language Pre-kindergarten through second grade	To develop consciousness of cultural diversity through language
DURATIONS	Any subject All levels	To use our innate sense of time passing as a way to understand time-based phenomena such as evolution Perception of time
EARTH CYCLES	Astronomy All levels	To show your place in the universe and the relationship between time and space

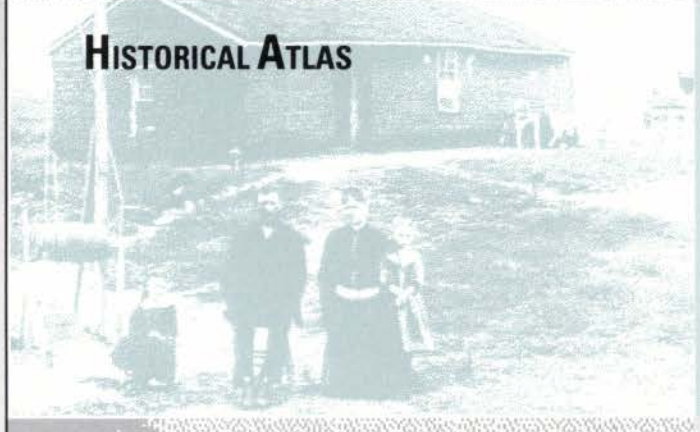
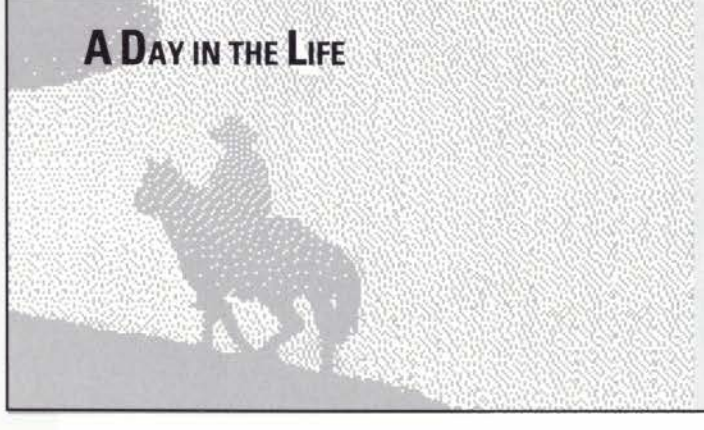
CONTENT	SKILLS	DESIGN ISSUES
Animal sounds Voices of people from seven different countries imitating animals	Ability to listen Identification of animals from their sounds Noticing similarities and differences among people	Use of sound Development of material for young children
The dimension of time and its effects Change over time in a range of areas (evolution, biology, geology, astronomy and things in everyday life)	Observation and analysis Multiple representation Understanding the dynamic of time Math skills	Development of a multidisciplinary activity Play with variable sampling rates and playback rates
How the position of the Sun, Earth and Moon determine the cycles of day, month, seasons and year	Observation and analysis Ability to see things from multiple points of view Spatial reasoning	Original production: Animation

ACTIVITY	SUBJECT	BIG IDEA
PHASES OF THE MOON	Astronomy All levels	To show your place in the universe and the relationship between time and space
ANIMAL HABITATS	Biology (classification) Junior high school	To demonstrate why animals live where they do and how the natural world is organized
LOCOMOTION	Biology All levels	To introduce the study of motion To bring famous original source material to students in new format

CONTENT	SKILLS	DESIGN ISSUES
To show how the position of the Moon in the sky determines the shape of Moon that we see on Earth.	Observation and analysis Ability to see things from different points of views Internal representation Spatial reasoning	Original production: Animation
Biomes (the major environmental regions of the Earth) Which animals live where, and why	Observation and analysis Information management, including learning how a database is organized and how to use one	Development of an effective interface to a large database of images Finding out how long it takes to find information and write text for images
A selection from Muybridge's animal motion studies	Observation and analysis Comparative reasoning Use of an aspect of the scientific method: the manipulation of things in the world for scientific experimentation Hypothesis testing	Incorporate variable speed options into Muybridge photos to allow different views of his experiments

ACTIVITY	SUBJECT	BIG IDEA
COUNTING 	Math (estimating and counting) Elementary school	To convey the abstract notion of counting and estimating To enable manipulation of objects on a computer as if they were real
20TH CENTURY HIGHLIGHTER 	History All levels	To present an experience of history To provide a tool to compare different periods of history according to four major themes
WHAT IS IT? 	Any subject Pre-kindergarten through sixth grade	To understand multiple points of view To see the normally unseen To recognize a whole object from seeing its parts

CONTENT	SKILLS	DESIGN ISSUES
Count and estimate numbers of objects	Estimating and modular counting Ability to make one-to-one correspondence of objects and numbers Abstraction from object to symbol Number recognition	Try to use images in a way not foreseen Creation of an activity for different age and skill levels
Art, politics, transportation and daily life in the twentieth century	Observation and analysis Information management Comparative reasoning	Development of a general format for historical browsing
Animals and everyday objects in detail and in full view, sometimes magnified	Visual skills Fluency in determining part/whole relationships	Creation of a simple game format

ACTIVITY	SUBJECT	BIG IDEA
 ORCHESTRA	Music Pre-kindergarten through sixth grade	To introduce musical instruments through their sounds
 HISTORICAL ATLAS	U.S. history and geography All levels	To provide a historical overview in an experiential way
 A DAY IN THE LIFE	Social studies All levels	To provide a global overview of commonality and diversity in human culture

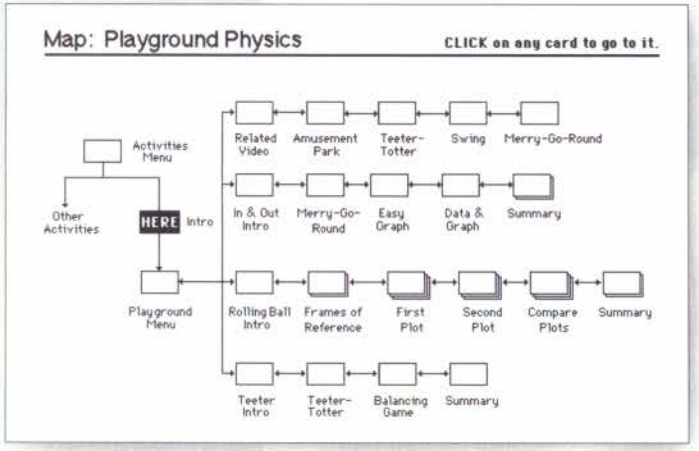
CONTENT	SKILLS	DESIGN ISSUES
Sounds of different musical instruments	Ability to listen Recognition of instruments by sound	Use of sound Development of material for young children
European settlement of North America History and geography	Observation and analysis Research Writing	Original Macintosh II production
Everyday events in America, the Soviet Union and Japan Thematic tours (photographs taken from the book series *A Day in the Life*)	Information management Comparative analysis	A general format for browsing through a large thematic database

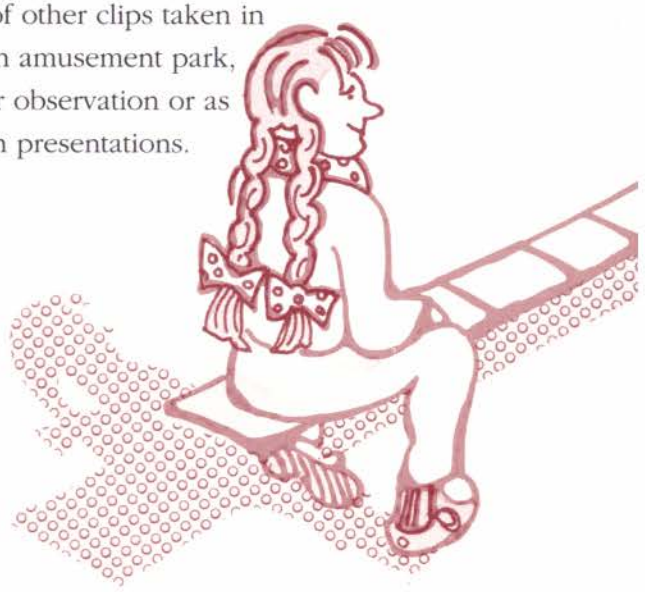
Playground Physics

Playground Physics was developed to help teachers bring physics back down to earth and make it once again a hands-on and "mind-on" experience. The activities were designed:

- to give meaning to physical principles that students generally learn in school and to provide a framework that encourages them to derive the equations for the formulas themselves
- to help students visualize the phenomena they are learning about
- to demonstrate that science is not just a body of formulas and rules about things already known, but an organized process of discovery involving observation, analysis, experimentation and prediction, and based on wonder and imagination

The background for Playground Physics is an ordinary playground. Three pieces of equipment are used in these activities—the merry-go-round, the teeter-totter and the swing—in order to illustrate basic principles of physics, such as conservation of angular momentum, frames of reference and balance. We have also included a small video library of other clips taken in the playground and an amusement park, which you can use for observation or as the basis for your own presentations.





• MIND'S • EYE •

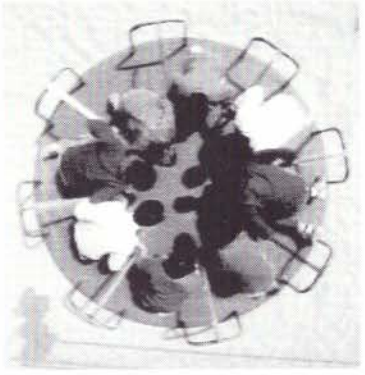
A Conversation with Kristina Hooper on Conveying Abstract Concepts

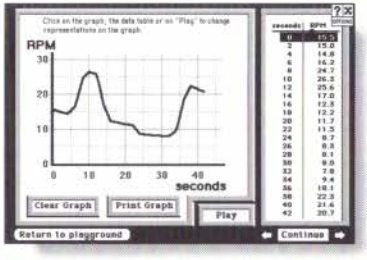
Learning theory tells us that the more associations you have with something, the more likely you are to remember and use it. I'd take that a step further. Associations with the most sensory and experiential components are the ones most likely to foster a deep understanding of the information. And once you understand what something means, you don't have to memorize it—you just know it.

When you went to the playground as a kid, you knew how to make the merry-go-round go faster and how to balance with a friend on a teeter-totter. You already knew how to walk, and you probably learned to ride a bicycle. You can't exist in this world without some deep intuitive sense about physical things. But understanding the principles that explain what you already know is quite a different issue.

What we tried to do with Playground Physics was to explore how interactive multimedia could be used to explain abstract concepts. Physics is chock-full of abstract concepts that often leave students cold (or out in it). Research shows that students are capable of studying physics and learning formulas (about angular momentum, for example) by rote without ever associating those bits of abstract knowledge with the related experiential and intuitive knowledge they already possess.

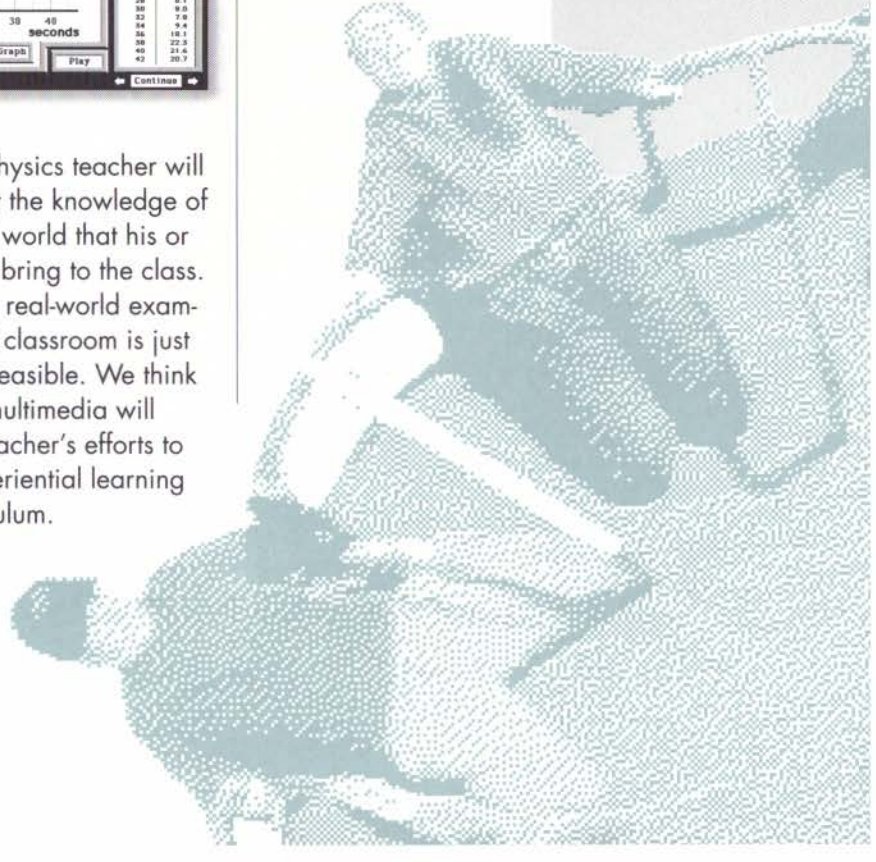
We thought we'd try a different tack. We begin with concrete realities and then build up to abstractions, introducing standard scientific techniques, such as graphing and observation, along the way.





A clever physics teacher will try to exploit the knowledge of the physical world that his or her students bring to the class. But bringing real-world examples into the classroom is just not always feasible. We think interactive multimedia will support a teacher's efforts to include experiential learning in the curriculum.

We begin with concrete realities and then build up to abstractions...

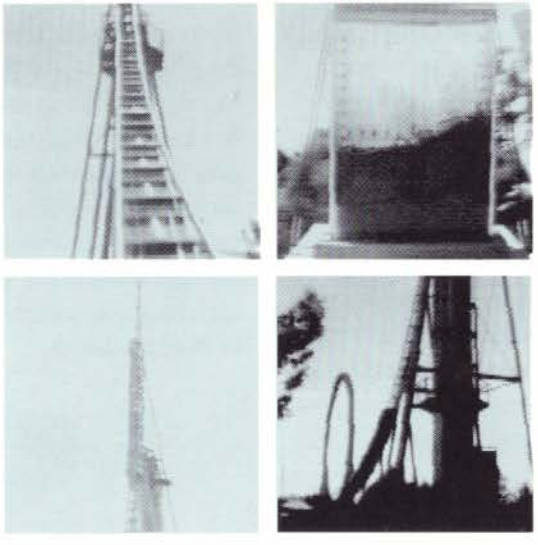


So Playground Physics is the result of our saying, "Okay, let's address three basic issues:

1. Let's find ways to help kids connect things they have learned in life to things they learn in class or from a textbook.
2. Let's give kids a way to talk about concrete things in abstract language.
3. Let's create activities that a teacher could not otherwise provide in a classroom.

Playground Physics is basically an exercise in bringing a student's experience in the playground into the classroom for analysis. For example, it reminds students how they used to make the merry-go-round go faster: they would move toward the center. This reminder of their own real-world experience is a starting point for understanding the law of the conservation of angular momentum.

We hope you see here the creative tension between the concrete and the abstract. It's most obvious to me in the teeter-totter example. Here you go from a very clear pictorial experience, observing what happens when people switch positions on the teeter-totter, to an extremely abstract insight, understanding the relationships of distance and weight and balance. The big point here is how powerful a simulation of an abstract idea can be. Although a mathematical formula gives all the possibilities, students most often just learn the formula, and the formula is empty unless they understand the issues behind it. The intent behind this particular teeter-totter exercise is to make explicit how simulations can work, by demonstrating in a specific instance how general principles might be derived from concrete examples. We want to provide tools and experiences to enable students to enter the abstract world with secure underpinnings, and we believe interactive multimedia presentations can help. We hope that, after experiencing this set of exercises, you will agree.



David got sick on the merry-go-round. Why? Why do certain kinds of motion make us sick? If you want to see what the inside of your stomach looks like when you go on an amusement park ride, see the clip in the Amusement Park Physics in the Video Collection.

Language and measurement with instruments to check the accuracy and extend the range of the senses are the two crucial developments which distinguish man from all other animals. They have allowed us to take the extraordinary step of developing accounts of the world quite different from the way we see it.

–Richard Gregory

Why Physics Gets a Bad Rap

▼▼▼

"As long as they teach physics and give tests on Fridays, there will be prayer in schools."
–seen on a bumper sticker

Children are natural-born physicists.

All over the world, children discover basic physical principles for themselves. Playing with friends on a teeter-totter, children learn how to balance (and not balance), that things fall down and if you use a lever you can lift things heavier than yourself. On the swings, children discover how to pump themselves up way high and how to get themselves down again. They can make a playground merry-go-round go really fast, and, when they get too dizzy they can make it stop. Kids go out to play and they reinvent the wheel! They notice that the size of the moon changes depending on where it is in the sky, that sometimes the Sun and the Moon are out together, that the sky is blue. And they wonder why almost all the time.

Physics is a science that was born out of wonder. People have always marveled at the universe and pondered its workings. Why do the stars twinkle? Why do things slow down? How can we predict when the warm weather will come? These wonderings led to some marvelous discoveries and inventions, as concrete as the lever and as abstract as time. Science was born when people began to notice patterns, keep records, experiment and make predictions about the future based on their observations of the past.

Why, then, it is fair to wonder, does the very word "physics" send a bolt of fear up the spines of most students if physics simply explains all this neat stuff that we are naturally curious about? Why does physics, and most science, seem so *unnatural* in school?

Answer:

$d_1w_1 = d_2w_2 + d_3w_3$

$f = ma$

angular momentum = mvr (?)

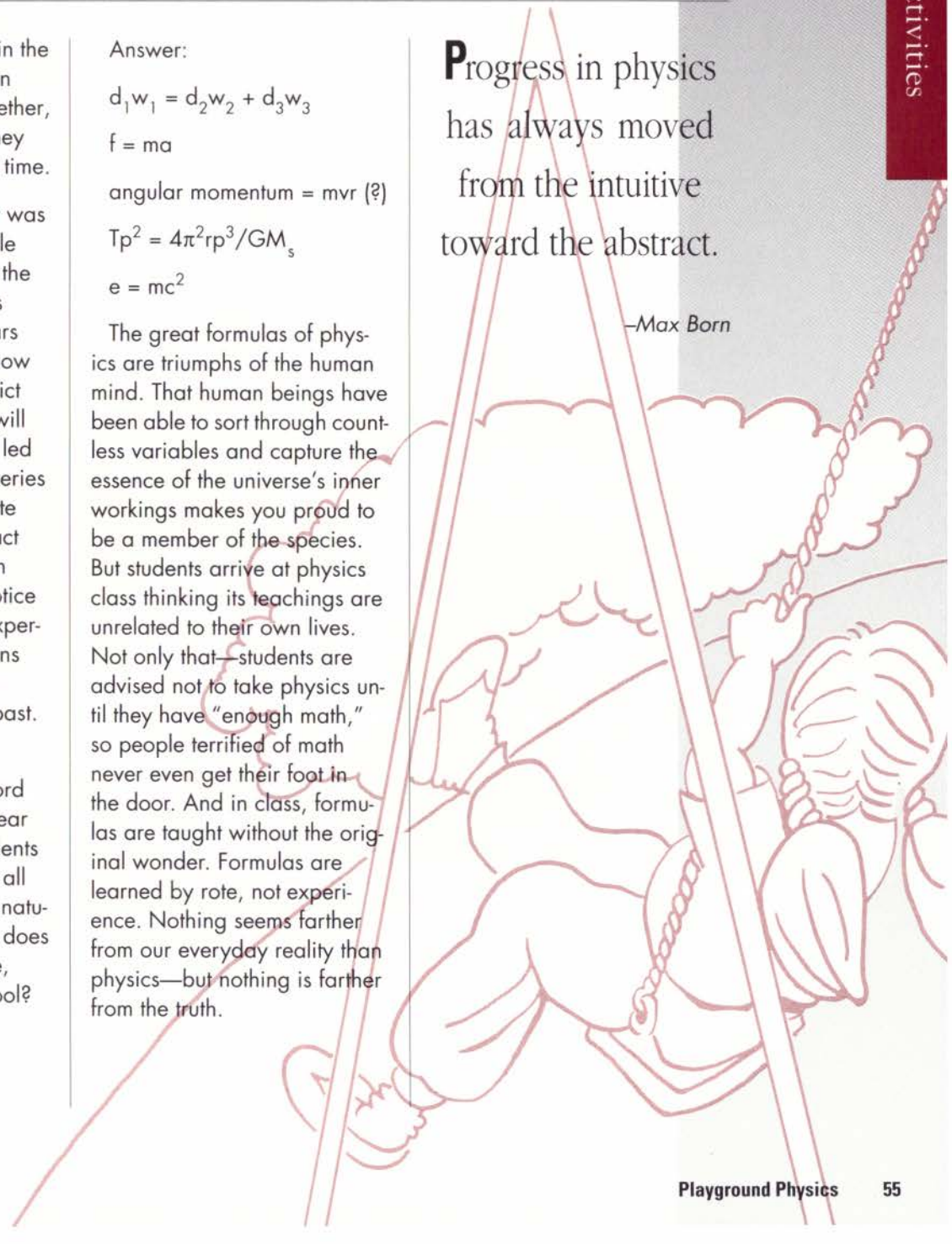
$Tp^2 = 4\pi^2rp^3/GM_s$

$e = mc^2$

The great formulas of physics are triumphs of the human mind. That human beings have been able to sort through countless variables and capture the essence of the universe's inner workings makes you proud to be a member of the species. But students arrive at physics class thinking its teachings are unrelated to their own lives. Not only that—students are advised not to take physics until they have "enough math," so people terrified of math never even get their foot in the door. And in class, formulas are taught without the original wonder. Formulas are learned by rote, not experience. Nothing seems farther from our everyday reality than physics—but nothing is farther from the truth.

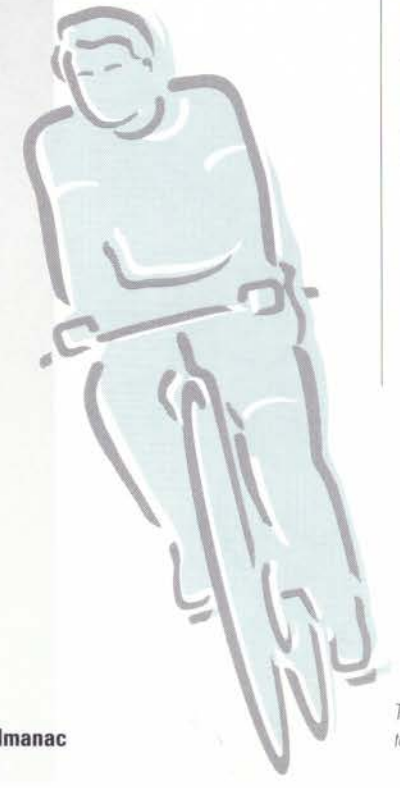
Progress in physics has always moved from the intuitive toward the abstract.

–Max Born



Refresh Your Memory: Angular Momentum

A body moving in a straight line has momentum (or, more formally, translational momentum). You can determine the momentum of a body by multiplying its mass by its velocity: *momentum = mv*.



Angular momentum is the measure of an object's rotation around an axis. To figure it out, you multiply the radius of the object's rotation, its mass and its velocity: *angular momentum = mvr*.

The law of conservation of angular momentum holds that as long as there is no external torque (which is the rotational equivalent of a force) on an object, there will be no change of angular momentum. "Conservation" here means it will not change.

In our example when the kids move in towards the center of the merry-go-round, there is no external torque and so the angular momentum does not change. But when they moved in, the kids made the radius (r) smaller. The mass (m) didn't change, so velocity (v) had to increase because of the law of conservation of angular momentum.

• LAB • NOTES •

The Shadow Knows

by Mike Naimark

This was our most professional shoot on the whole videodisc. We hired a crew, and we put the camera on a crane. We scouted playgrounds for days to find just the right one. We even carpeted the merry-go-round! The camera only holds four minutes of film, and then you have to take it down and reload. It's a big deal. In production the meter's always running; every minute is expensive. You try to make as many decisions as possible before you rent equipment and hire crews.

We picked a playground right below Twin Peaks in San Francisco. Shooting outside is difficult because you can get weird shadows. So you want a day without bright sun, without strong shadows. Anyone who lives in Twin Peaks will tell you that it's always foggy or cloudy—always, that is, except for the day we were shooting. There were some clouds, the thin feathery kind (what are they called?—I'm the artistic production guy, not the scientist) and we waited for the sun to go behind them. The crew was waiting. The kids were waiting. The sun was getting stronger. This was costing money, minute by minute. So it was a hard call. We had to go ahead and shoot anyway.

I knew the shadow was there, but there was nothing I could do about it. I figured I could cut it out in the edit.

But then someone—I think it was Alex—noticed that the shadow actually acts as a frame of reference when you are doing the rolling ball activity, and everyone thought that was really neat and that we should leave the shadow in. Everyone, that is, except me.

I don't like it.

The hardest part about riding a bike is going very slowly. The faster you go, the easier it is to balance. How does the conservation of angular momentum help you understand this?

Ham and Cheese on Rye, with Juice and *The Visual Almanac*

One lunch period in autumn, a group of teachers wandered into the science room at Marin Academy. They unwrapped their sandwiches and crunched on their apples, while Margo and Karla unwrapped some of the pieces developed for *The Visual Almanac*. Karla teaches science at the school and has been working with the Multimedia Lab for the past year. Margo is a designer in the Multimedia Lab.

Margo said, "Our goal is to make tools for teachers and students to help make their presentations more visual. First, we'll show you some of the stuff on the videodisc..."

"How did you decide what to put on the disc?" one of the teachers asked.

"Did you have any particular disciplines in mind?"

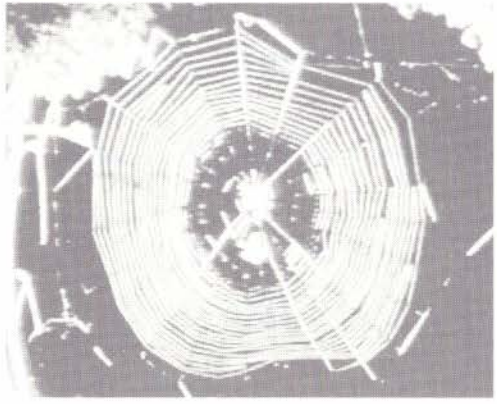
"Hmm, I wonder if I could use this... I love the fruit. I could teach the names of fruit in French."

"How do you get the images on the videodisc?"

People started moving up, tentatively, to get closer to the screen.

"I'm touching my first videodisc... I can see myself!"

"I'm drooling at this!"



"I teach African studies. Do you have any pictures on Africa?"

Margo was thrilled with this question. "Let's see!" She set up a search, and we waited for it to finish. It went on and on. To fill in the waiting time, she talked about how to get students to help. The bell rang. Lunch was over. The teachers left. The computer was still searching.

A couple of hours later, some students came in. This was a free time when kids can go to their teachers to ask for help. Karla had alerted some students about what was happening in the science room that day. The ones who showed up were all boys.

"Where are the girls?"

"They're not into computers."

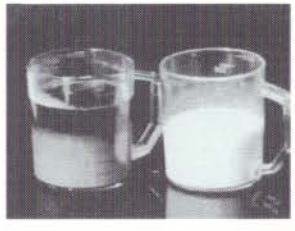
"Too bad. You know, a lot of women worked on this project. Oh well, next time."

Karla and Margo started the same way, scanning through images, this time on Side A.

The kids started moving closer to the screen. One boy wandered in from a teacher conference. He sat way in the back but moved up one seat at a time, every five minutes or so, until he was part of the group.

"Neat!"

"Rad!"



There was the clip of a coffee cup emptying itself of coffee. How'd they do that?

"Oh, man, they had a tube under the table."

"No way, it's stop-action."

"It's magic."

The sequence of the man getting a fork out from the middle of the balloon:

"The fork is dulled, I know it."

"The fork isn't in it, you know. The balloon is around it."

"Hey, you should get some Three Stooges' stuff to go with this."

"You know what this disc is?"

"This is something you could send into space, and they'd say this is a really wigged-out planet."

The series of Landsat pictures of Earth cities:

"Wow, that looks like fractals."

Life imitates technology!

The teeter-totter came on, and they saw all the combinations. "Cool, it's kind of like balance."

Margo stopped the disc. "Want to try something?" She clicked on the teeter-totter activity. "Can you make it balance?"

"Sure, move the kids toward the middle."

"No, wait, pull the little guy back."

"Move Alex back."

"What if you put Todd and Matt on the same seat?"

They started using the names of the players right away. That felt friendly.

"Do you think you could figure out a way to get them to balance every time, with just one try?"

"Probably there's some mathematical way."

"Yeah, you could average their weights."

"No, man, that's lame."

"Wait a minute. Try this. Put Alex on seat 4. Okay. Now put Todd on 5 on the other side, and Matt on 1. I betcha that works."

"It does! Josh, how'd you do that?"

"It's so obvious," he said, with a slightly condescending tone. "Can't you see it? Let's say you call Alex 3 and put her on seat 4. Then you gotta place Matt (who you call 1) and Todd (who's 2)—"

"Why is Alex 3?"

"See, like Matt is 40 pounds, and Todd is twice that amount and Alex is three times. Right? So if you put Alex on seat 4, you multiply her weight, which is 3 times 4 and that's 12. So you've got to get 12 on the other side."

"How'd you know that, Josh?"

"I don't know. It's just the only thing that makes sense."

"Yeah, you figure there's got to be a way to figure it out with all the information here."

"That's neat."

"Could you express that in a formula?" Karla asked.

Almost every kid responded. "You multiply the guy's weight times how far he is from the middle."

Then Margo showed them the merry-go-round. They were jazzed.

"Hey, let's go to a playground, right now."

"Yeah. They'll say, hey, this is for little kids only. And we'll say, like, we're doing a physics project."

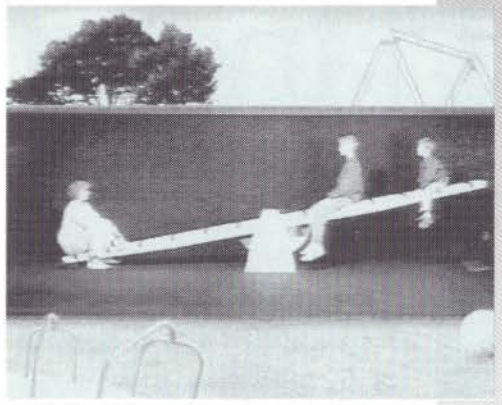
"I don't want to seem overexcited, but I am in awe."

The bell rang.

"Do I have to go to soccer?"

"Amazing. Can I do something with it by myself? I'm no computer wizard."

"But you're enthralled."



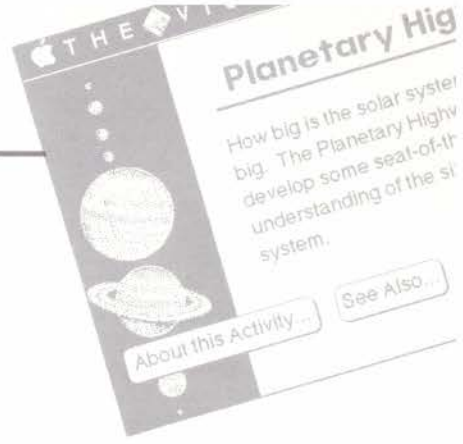
The African studies teacher came in to see the 200 pictures the computer had found. He shook his head at the students' enthusiasm. "If we let them in on this stuff, I'll never get to use it."

Karla suggested that teachers ask kids to do projects for them. Kids and teachers were both enthusiastic and supportive.

There was a difference in the response of students and teachers. The teachers were interested in the technology: How do you get this to do that? But the kids, after a minute or so, ignored the machines and became immersed in the content.

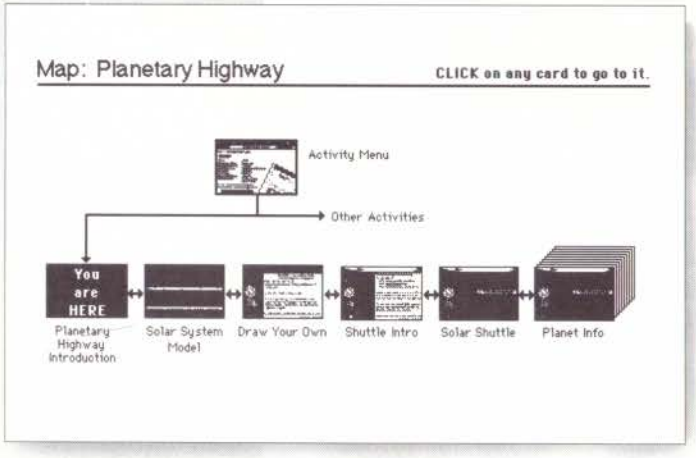
And they weren't just spectators; they experienced what was happening on the screen as if they were right there.

Planetary Highway

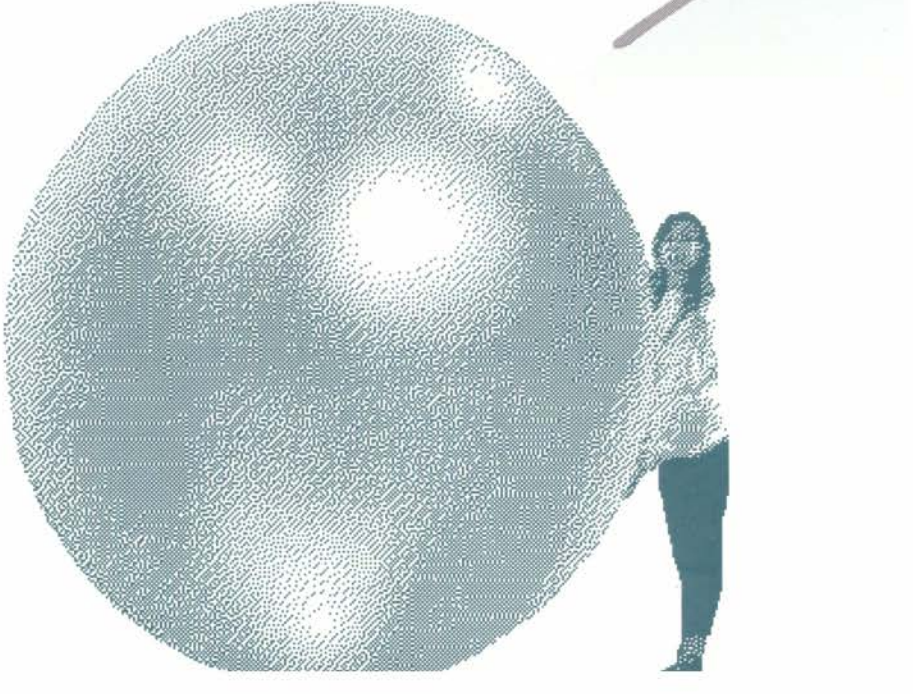


Is the Earth much closer to the Sun than Saturn? How far away is Pluto? Planetary Highway was created as a tool to develop intuition about the size of the Solar System and to bring the facts to life in an experiential way.

To make our model of the Solar System we chose a 6.5-mile stretch of desert highway to represent the entire 3.6 billion miles from the Sun to Pluto. We used fruit and vegetables of varying sizes to represent the planets. At this scale the Sun would be the size of an 8-foot weather balloon, and Pluto would be the size of a peanut. In this activity you choose a destination and a speed and then take a simulated drive down the road. "Planets" pass by on your way, and you get a feel for the distances between them.



We seem to have an intuitive understanding of the relationship between time and distance. Although your ride from the Sun to Pluto actually may take only 16 seconds, it is impossible not to appreciate the vastness of space just by sensing the difference in the time it takes to get to Mercury and Venus, and then from there to Neptune and finally Pluto. At the end of the ride you realize that the inner planets are much closer to each other than are the outer planets. It makes you appreciate how much more complex explorations of Neptune are than those of Mars—just because of the distance.



• MIND'S • EYE •

A Conversation with Kristina Hooper on Developing Intuition

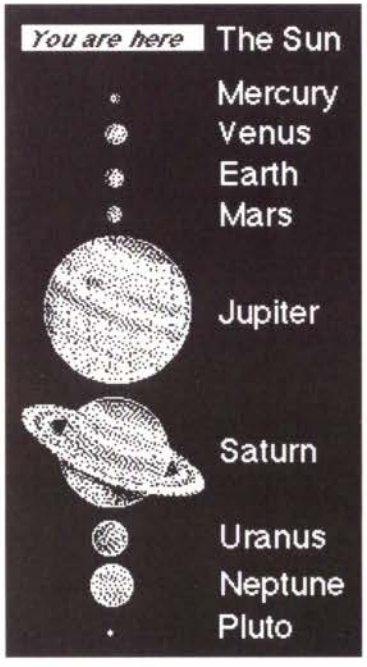
When we talk about intuition, we use emotional words: "My gut feeling is..." "I feel strongly that..." "I know in my heart..." And though we often don't know or can't explain why we know something to be true, that kind of intuitive knowing is often the very bedrock of our reasoning and analysis.

We believe strongly (our intuition tells us) that intuition is an educable skill. It is not something you either have or don't have. It's not an instinct or some kind of reflexive reaction. Rather it is an immediate knowing, a deep understanding, which we are either born with or which we develop from experience.

Most great innovative thinkers—scientists and artists alike—say they rely more on intuition for the source of their critical insights than on logical reasoning. Young children already have a set of intuitions "on board" as they navigate through their primitive worlds. What baffles me is that we expend so little effort in schools to develop and build on our natural capacity for intuiting. Intuition can, does—and should—interact with the whole range of other ways of knowing. In combination they augment and drive each other to wonderful heights. Wouldn't it be wonderful if we addressed the development of intuition directly, at home and in our schools! We think that one of the things interactive multimedia can do very well is to help in the development of intuition.

Time Is Distance

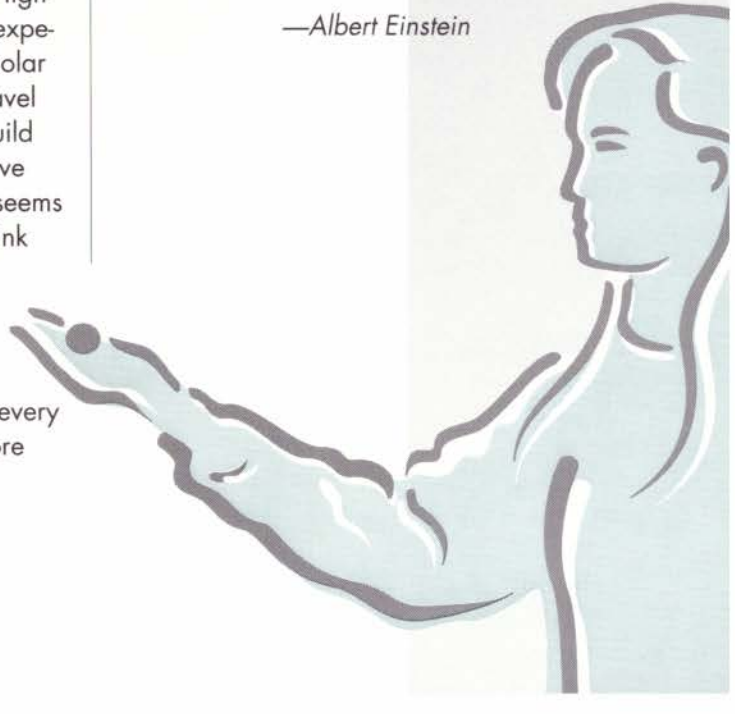
We think it would help students to develop an intuitive sense of the scale of the universe. The numbers that describe the vastness of space are so large as to be practically meaningless.



We designed Planetary Highway to give students an experience of the size of the solar system. We made it a travel experience in order to build on some intuitions we have already. For example, it seems quite natural to make a link between time and distance. We infer distance from our experience of time. This is something we do every day of our lives. I am more

Pure logical thinking cannot yield us any knowledge of the empirical world; all knowledge of reality starts from experience and ends in it.

—*Albert Einstein*



likely to tell people that I am 20 minutes away than 20 miles away. Scientists make this time-into-distance conversion when they talk about "light years."

It would be hard to imagine anything less human in size than the solar system. So the challenge here was to somehow bring it down to a human scale. Space travel is not a direct experience for most of us, but riding in a car is. We felt that the familiar relationships of time and space involved in driving down a road—in this case, a very straight road in the middle of a sparsely vegetated desert—would give students a good benchmark for judging distances between planets. We were afraid that "Star Wars" or videogame-style travel might be tossed off as fictional, so we chose to create a very realistic scenario.

At no matter what speed you travel the Planetary Highway ride conveys a sense of how the planets relate to each other in terms of distance. By the way, we invented a few speeds so that a trip could be accomplished in a class period—and surpassed the speed limit of the universe several times over.

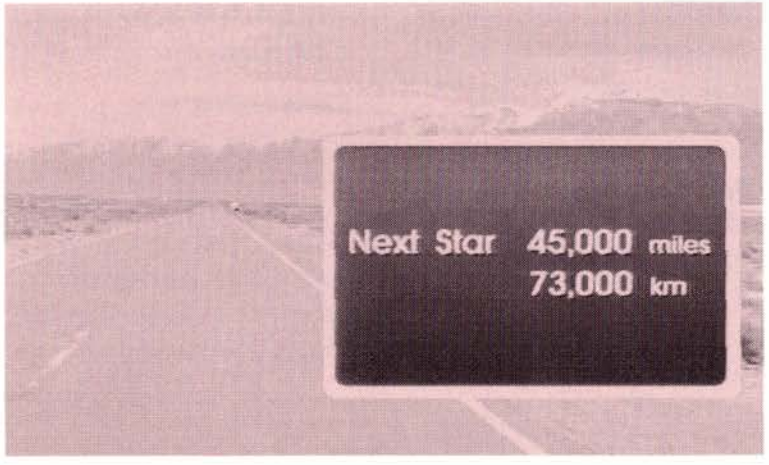
An Aside on Composition

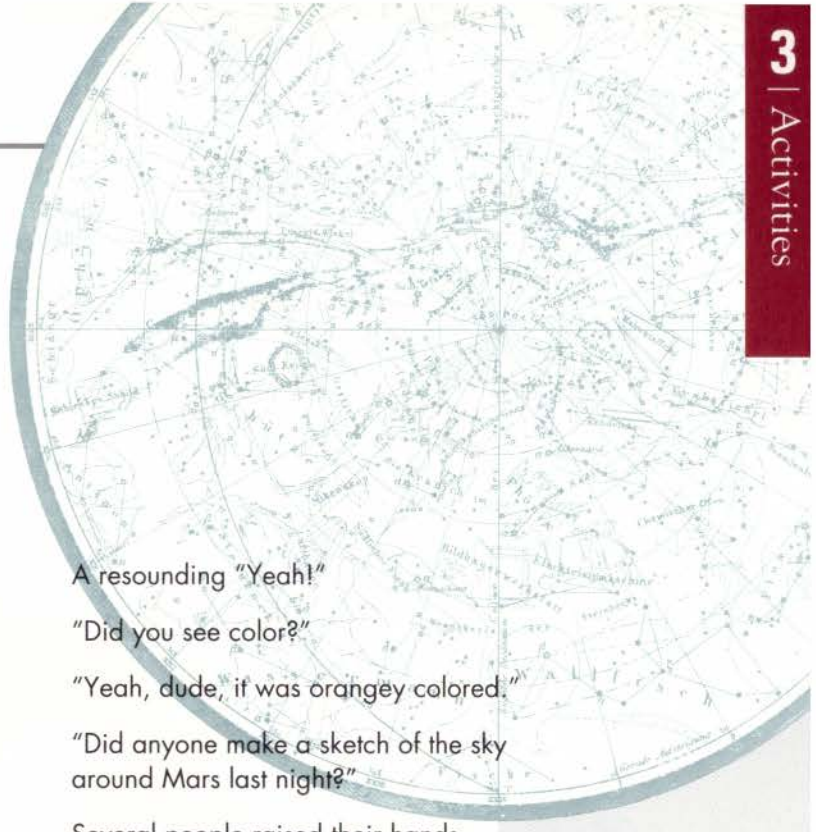
We have tested this activity with students and teachers, and it seems to work well. Yet of all the activities we worked on, this one took the most time. We struggled for months, and wondered why.

I think the reason this activity gave us such a hard time is that there is so much to say about space. We could talk about the size of the universe, its origin, the implications of limits to the speed of light and so on. Planetary Highway is about only one aspect of the Solar System: the relative distance between planets. That's a lot—but that's all. We kept muddying up our basic clear concept with ancillary ones. They'd creep in, because the whole subject is so interesting, and slyly affect our interface, or our language or the kind of data we presented. So we had to pare away at these extraneous ideas. We also had to pare away at some elements of reality. For example, you can't go faster than the speed of light, and the planets aren't laid out in a straight line. Once we allowed ourselves artistic license and kept focused on the central concept, the activity began to fall in place.

Erika (age 4, climbing onto her mother's lap): "Mommy, I love you more than the whole world."

Matthew (brother, age 5): "That's not very much. The world is only a speck in the whole universe."





Debut at Berkeley High

On Wednesday, September 21, 1988, Mars was going to shine in the sky over San Francisco's Bay Area more brightly than it had since 1958 and more brightly than it would again, until the year 2003. Peter Saxby, a physics teacher at Berkeley High School, gave his students an assignment that physics teachers all over the area were probably giving that night: "Go look at Mars."

The next morning, Mr. Saxby's freshman class in Conceptual Physics dragged themselves into the classroom: an interesting assortment of kids probably typical of most urban American high schools. Every race was represented. Slightly more boys than girls. A group of girls talking and laughing. A tall, "buff dude" looking in a hand mirror while talking to two admirers. A few boys gazing at their textbooks as if they were down pillows, straining to keep their eyes open. One girl was etching a boy's name into the cover of her book. Two boys wanted to sit in the same seat and got into a fist fight. There *were* a few kids who looked as though learning had at least a place on their agenda for the day. Today, Conceptual Physics was a two-period class.

Other classes all over the Bay Area were assembling, but Mr. Saxby's class had something that no other class had: *The Visual Almanac*.

Many physics teachers showed audio-visuals that day. After all, Voyager took some marvelous pictures of Mars. Overhead projectors were wheeled into classrooms. Maybe a filmstrip on Mars, maybe even a film. Teachers turned out the lights and covered the windows, and everyone sat back to look and listen.

But what the students saw when they came to Mr. Saxby's class was a TV, a Macintosh computer and a laser disc player, facing them from the teacher's desk.

"Did you see Mars last night?"

A resounding "Yeah!"

"Did you see color?"

"Yeah, dude, it was orangey colored."

"Did anyone make a sketch of the sky around Mars last night?"

Several people raised their hands.

"Good, what did you see?"

They found the square of Pegasus, a group of stars near Mars. Tonight they would see the Andromeda galaxy with their naked eye if the fog didn't come in.

"How could you tell it was a planet and not a star?"

The stars are always a blur of light, the planet has texture, you can see things.

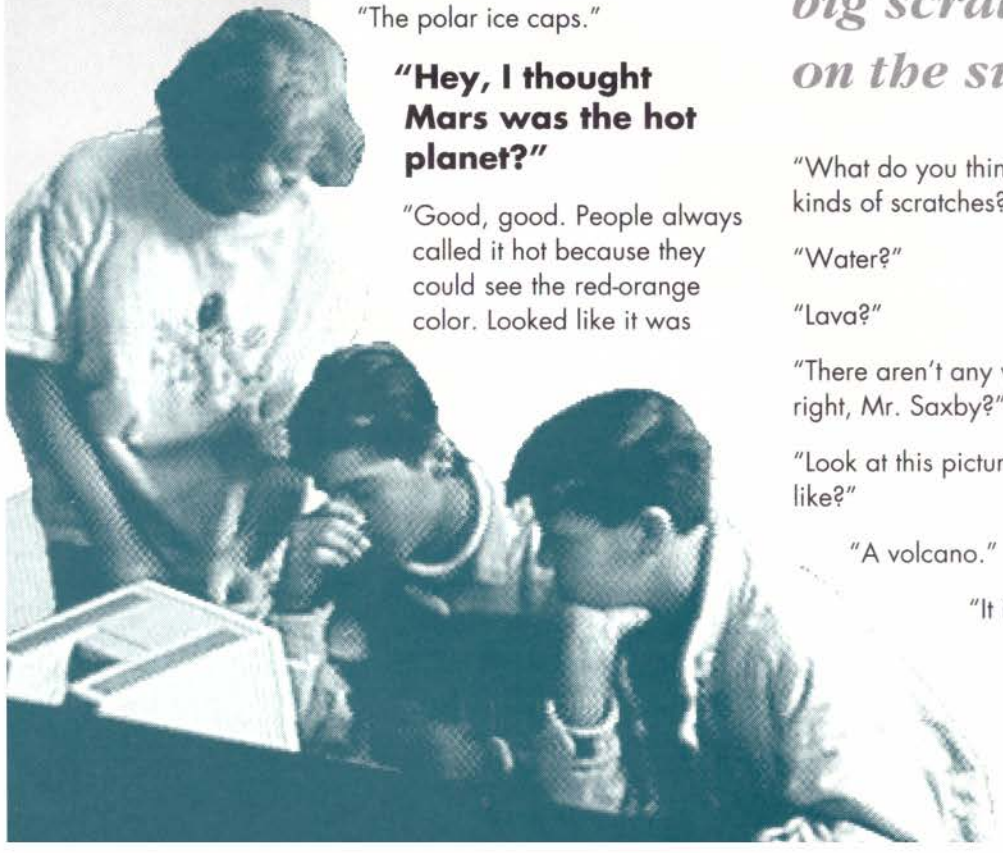
"Why are the stars always a blur?"

No answer.

"Let's look at some pictures." Peter Saxby turned on the TV. "Last summer while you were goofing off at the beach, I was working with Apple on a project called *The Visual Almanac*. We chose a lot of images to put on a videodisc, and we figured out ways to organize them and present them with the Macintosh. So let's see what we can see today." He clicked the mouse, and a picture of Mars, taken by Voyager, came on the TV screen. On the Macintosh screen a list appeared of all the Mars-related pictures on the videodisc.

"What's that white spot you see?"

"The polar ice caps."



"Hey, I thought Mars was the hot planet?"

"Good, good. People always called it hot because they could see the red-orange color. Looked like it was on fire. But no, it's not particularly hot. I tell you what... let me show you this other picture next, a close-up of the polar ice caps." He clicked on the mouse, and a new image appeared. Not the one he had planned to show but one that fit better into the discussion. The discussion now turned to the geography of Mars, because students were asking about things they saw on the pictures.

"Mr. Saxby, what are those big scratches on the surface?"

"What do you think could make those kinds of scratches?"

"Water?"

"Lava?"

"There aren't any volcanos on Mars—right, Mr. Saxby?"

"Look at this picture. What does it look like?"

"A volcano."

"It is. This is Olympus Mons, one of Mars's largest volcanos."

"Is it bigger than the Grand Canyon?"

"How big is Mars compared to Earth?"

"How long does it take Mars to rotate around the Sun?"

"If Mars is smaller than the Earth, wouldn't the day be shorter?"

"Does Mars have the same gravity as Earth?"

"What would happen if we tried to breathe on Mars?"

"Your first breath would be your last."

"How long did it take Voyager to get there? How long would it take us? Could we bring enough food?"

"Why do you think they put the American flag emblem on the outside of the spaceship? Were they just being patriotic, or is there some other reason?"

"How big is that canyon?"

"If you lost your balance and fell off a cliff on the side of the canyon—it's five miles high—how long would it take you to fall?"

"Figure it out. Gravity is one-third what it is on Earth. How would that affect your acceleration?"

"Hey, if there are polar ice caps... ice... doesn't that mean there must be water?"

The kids in this class—who 20 minutes earlier had arrived ready to listen or doze or talk or fight or daydream—were *involved*. Some came up to the screen to point. Everyone asked questions. They climbed on their desks straining to get their questions asked. They didn't ask if anything was going to be on the exam or if they were getting graded. They didn't take many notes. They just wanted to know more. They were curious and unabashed by it.

Katie asked, "Mr. Saxby, what is that up in the corner?"

"What's it look like?"

Damato said, "Looks like a big hole, except it's got a lump in the middle."

"A crater?"

"Yes, I would say it looks like an impact crater. That means a crater that was made because something hit the planet with an incredible force. You know what happens when you drop water in the bathtub—how when it hits, there's a kind of double motion. There's a big depression in the water, and then some water comes up the sides, and then in the middle there's a kind of lump?"

Blank faces.

"Wait a minute. Just a minute. I just remembered something. We've got something on the disc—I can show you." He went to the Collections Directory and found what he was looking for. "Okay, guys, this is slow-motion footage of a drop of milk splashing. Watch carefully." He clicked his mouse, and the TV showed a slow-motion film sequence of a milk drop dropping, which illustrated how the crater on Mars might have been made.

The bell rang for break. They could go to the bathroom, get some water, talk, eat for five minutes. No one left the room. They wanted to find out about the technology Mr. Saxby was using, and they wanted to know more about Mars.

"Are there any good tunes on the laser disc?"

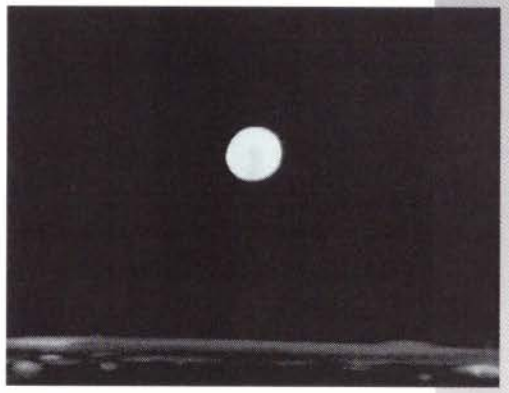
"Is it the same as a compact disc?"

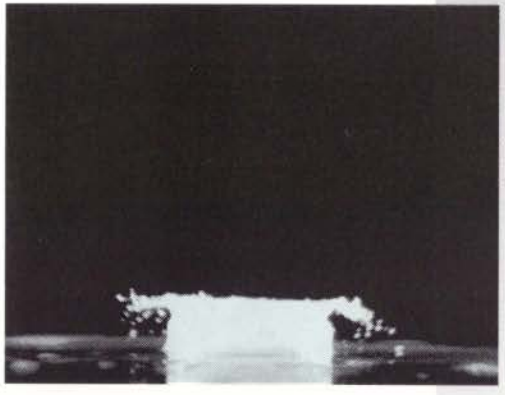
"Can we make one?"

"How does it work?"

The session continued like this until the second bell rang. Lunch.

The *Almanac* couldn't compete with lunch.





International Zoo

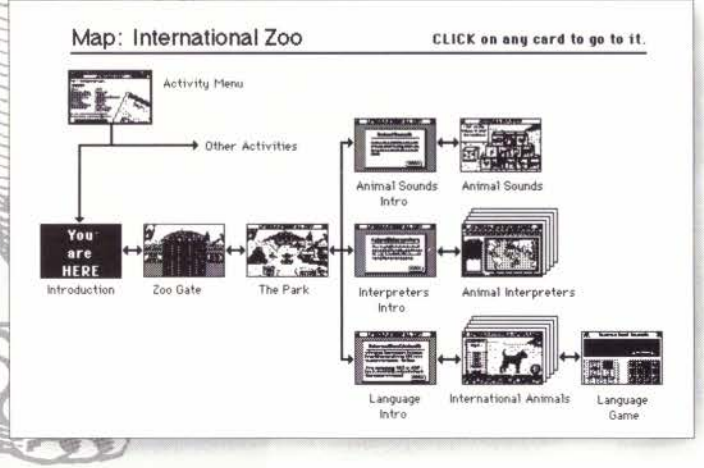
International Zoo is an auditory activity for very young children. Although most obviously an introduction to animal sounds, it is also an elementary introduction to two primary multicultural concepts: language and geography.

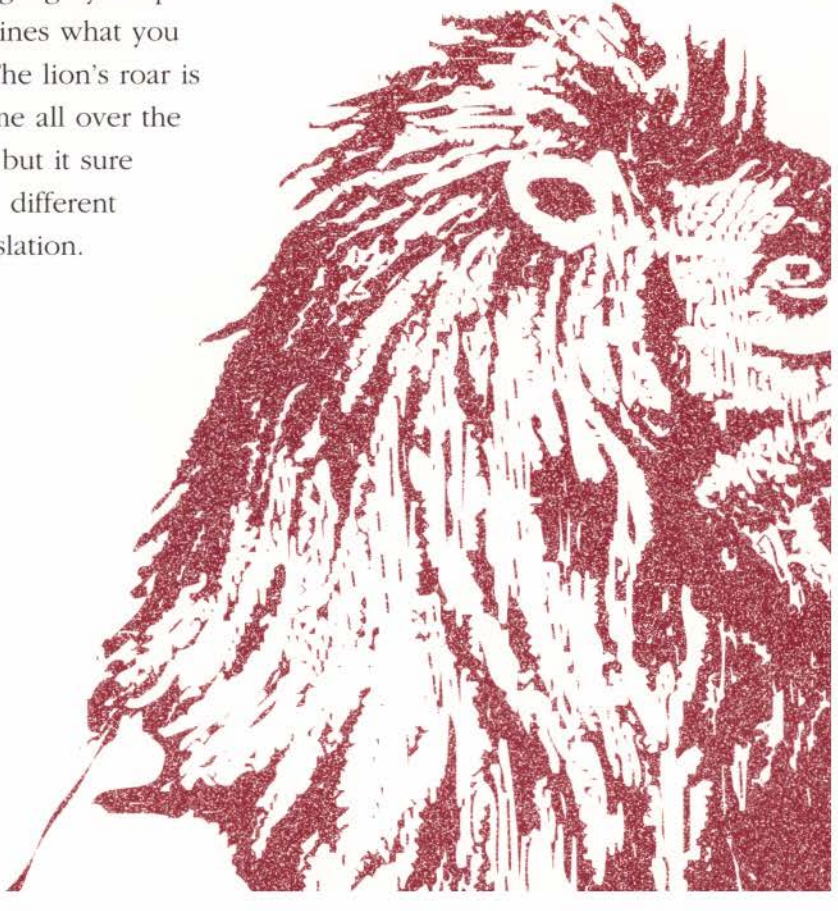
It seems that the earlier you introduce multicultural concepts to children, the better. Young children are not threatened by the idea of different cultures; in fact, they love to learn about them. They are not scared at the thought of learning new languages, but usually delight in knowing a new way to say something.

And grown-ups can have fun with this activity, too. When you listen to people introduce themselves and make animal sounds in their own language, you get a sense of the characteristic sound of that particular language.

It is clear that to some extent the language you speak determines what you hear. The lion's roar is the same all over the world, but it sure sounds different in translation.

Does our language determine what we can hear or say?





Does a baby chick from China chirp a different chirp than one from Chicago?

• LAB • NOTES •

To: Everybody

From: Jeff

Date: Sept. 12, 1988

It was so neat. Yesterday we had some Japanese visitors in the lab. Toward the end of the day, after showing them a whole bunch of stuff, we showed them one of our current demos, International Zoo. Do you know it? Have you tried it?

Well, the point is that there are lots of pictures of animals, and we have the sounds they make. We also have the sounds people make to imitate the animal sounds, in seven languages. You know, like we say "moo" for a cow, "meow" for a cat. So we've developed a guessing game. It's not quite finished (still needs some tweaking to hook it up correctly to the video, and the design of the cards needs work), but the sound is working great.

In the guessing game, you click on "Guess Which Animal," and the machine randomly selects an animal sound. You don't know which animal it will select or in which language it will speak. We clicked.

A weird sound came out—something like "piu, piu." Nick and I sat there dumbfounded. It was such a short sound, almost like a record skipping. Nick raised his eyebrow at me... had the sound screwed up again? Just when you're trying to look good in front of visitors.

The Japanese man to my left said, "Baby chick."

"Yes," said the woman, "piu piu, baby chick." They were right!

We clicked again, for another random selection. Unbelievably, the sound came on, "cheep cheep." Now it was our guests' turn to look bewildered. They thought it might be a sparrow.

The weird thing was that Japanese is not one of the languages we recorded. We checked—and it turned out that "piu piu" is the noise that a baby chick makes in Mandarin. Many of the Mandarin sounds turned out to be the same in Japanese, but not all. The rest of the afternoon we sat squawking, chirping, meowing and cawing in our respective languages. The detail in the Japanese language was interesting. It has four different sounds for sparrows. And cicadas—three or four different sounds for different cicadas—which is amazing because you only get to hear them once in seventeen years. I'd never even heard of them!

It was a fun way to end the day. We'd been very serious about showing what we're doing and finding out what they're doing back in Japan. We had been totally techy all day and ended up pretty silly—like a nursery school class.

Isn't that great? The software that can make you foolish and friendly...

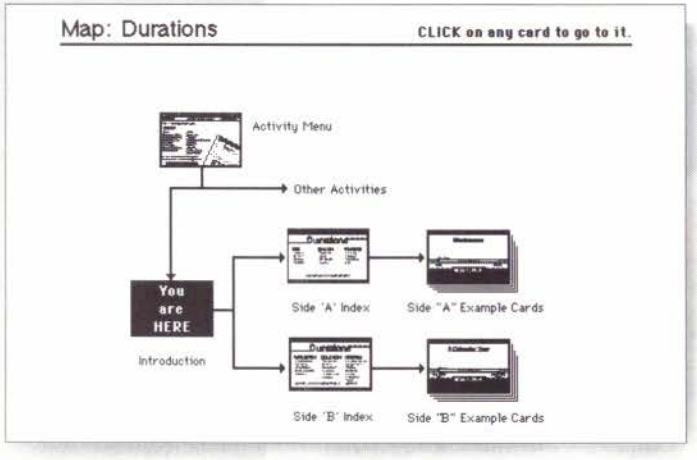
"Let's all sing like the birdies sing... piu piu piu piu."

Do we actually hear sounds differently in different languages?

Durations

Things change over time, but often we don't have the patience, the time or the sensory acuity to observe the process. How can we observe changes that take place so fast that we can't see them? Or changes that happen over vast intervals of time? Or over extremely short intervals?

Durations is an activity that allows you to control the pace of time. You can slow it down, speed it up or even reverse its direction. In this way, you can observe changes that you would not be able to ordinarily, and get an intuitive sense of how long these changes take.



Select "Starfish" and you will notice things you could never see with your naked eye. A starfish seems to be a sluggish creature. In this activity, 24 hours is compressed into seconds. The starfish look hyperactive! They move with purpose. By altering the time frame—in this case, speeding it up—we can make observations of the natural world typically unavailable to us.

It is impossible for us to observe things that happen too fast or slowly for our eyes to see. We also cannot observe—or even imagine—that which takes place over very long periods of time. How can we, who live only 70 or 80 years, imagine 500,000 years? The "Evolution" piece is a good example of how we can build on our intuitive sense of time and intervals to understand things that happen on a grand scale: the evolution of humans from a single-celled organism, for instance, or the changing of North America's landforms over the last 100 million years.

Technology is a way of extending our senses and capabilities. Certainly the invention of certain film techniques, such as time-lapse, compression and expansion, have made it possible to move through time in a different way and thus see the world around us from a new perspective.

• LAB • NOTES •

To: Everybody

From: Bob Mohl

Random Thoughts on Time

Durations is about time, and it is also about perception, observation and analysis. We are pretty good at observing events that unfold over the course of a few seconds—tracking a fly ball in the outfield or watching a baby smile. But until recent advances in photographic technology, we could not easily see phenomena that happened at faster or slower rates.

Seeing the Unseen

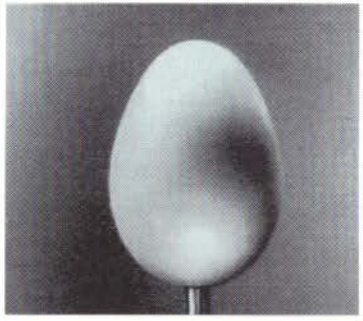
How does the chameleon's tongue actually retract? High-speed photography (time compression) and slow-motion playback break down a process into discrete units and analyze them in minute detail, frame by frame.

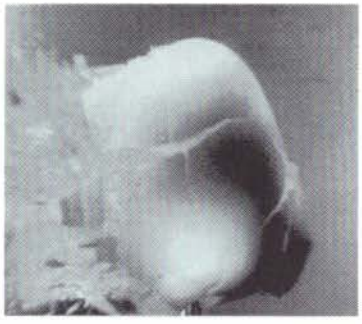
Time-lapse photography allows us to see patterns and continuity that take place outside of our normal span of attention. None of us had ever seen a flower open from bud to bloom until time-lapse captured several hours on film and played it back in a few seconds. Similarly, with time-lapse photography, we could see that traffic patterns in cities and the patterns of the blood vessels in our bodies had something in common.

Both kinds of photography (high-speed and time-lapse) allow you to pick out a single feature or relationship and study how it changes over time—for example, a crack in the wall of a collapsing building or an individual vendor at a marketplace.

Playing with Time

Time is an abstract concept, often poorly understood by kids, who can't read clocks. Sometimes it seems to crawl, sometimes it flies. Actually it always moves at a constant rate. It also always moves in the same direction: we and everything around us are constantly getting older, and the past is getting longer.



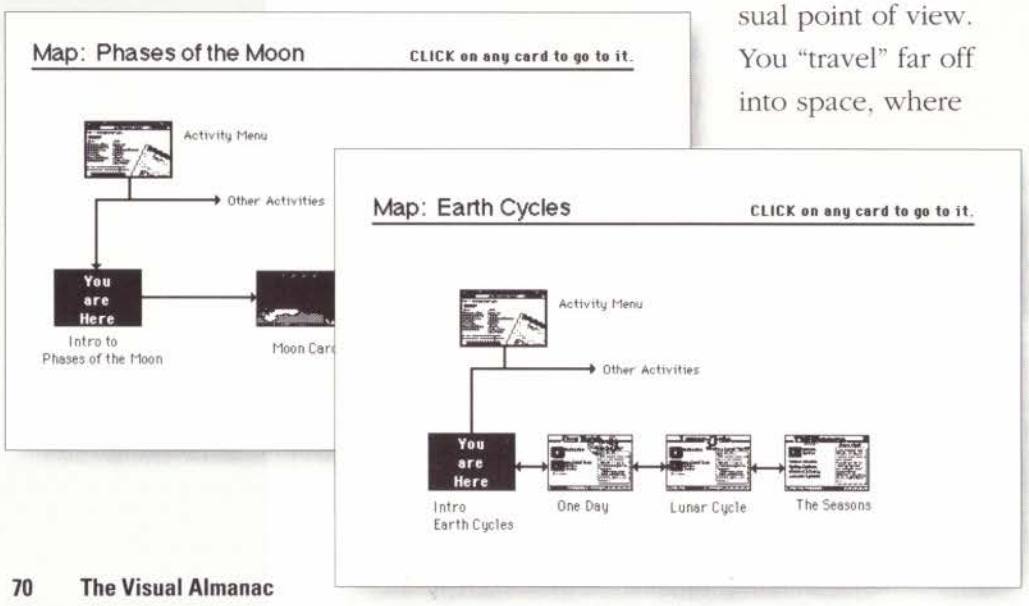


In Durations, you can reverse time and entropy by playing the sequences backward! They often seem funny in reverse, partly because they are unfamiliar and because they are impossible: Events cannot happen backward; time cannot be reversed. It's the law! (A puddle of melted ice cream cannot suddenly cool and build itself back up into a ball.)

How smooth a clip will be depends on three things: the rate at which the film was shot, the rate at which it is played back and the relation of those two rates. If something is shot and played back at 30 fps, motion will be smooth. In the examples in Durations, you can change the rate of playback with the controller. This will change the overall elapsed time. There is some nice math here: The rate is inversely proportional to the elapsed time; if you double one you halve the other. It will also change your perception of the phenomenon. At a different rate your attention may be drawn to other features that flow more smoothly. You cannot change the rate at which the film was shot, but still that rate also affects perception.

Earth Cycles and Phases of the Moon

Both of these activities, Earth Cycles and Phases of the Moon, deal with natural cycles of time: days, months, seasons, years and the phases of the Moon. Although our very lives are dependent on these regular cycles, most of us don't have a clear understanding of them. We may have studied them in a science class at some time, but it still remains a leap of faith for us to believe that the Earth is spinning and at the same time revolving around the Sun, because all the concrete evidence that surrounds us is so stable. In these activities, we provide an unusual point of view. You "travel" far off into space, where you have a fine vantage for watching the Moon orbit the Earth and the Earth orbit the Sun. By seeing these celestial bodies in action, you can clarify and amplify your intellectual grasp.



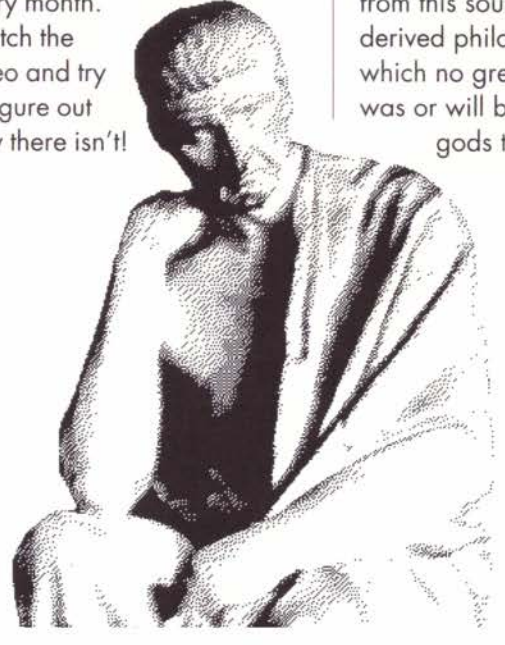
Science teachers always look for metaphors to explain these cycles. They hold up oranges and balls under lamps to simulate the orbits of the Earth and Moon. We wanted, however, to show an animated version of these basic phenomena. We couldn't find one—so we created one ourselves. In this activity, you can see the position of the Moon at specific intervals, or you can play out an entire lunar month—one orbit around the Earth. You can also play out the Earth's yearly orbit around the Sun.

In the Lab, we found that the views we had created made us all question what we had learned and what we were now seeing. These are not simple activities. Suddenly, faced with the visualizations, we found ourselves struggling and straining to understand! It's hard to translate what you see on the video screen to what you see at night. This activity challenges the mind to encompass the new perspective.

The Questions of Scale

When we decided to make our own examples we encountered a major problem: scale. The distance from the Earth to the Moon (approximately 240,000 miles) is much greater than the diameter of the Earth (approximately 8,000 miles). If we had drawn the Earth and Moon to scale, the Moon would have been one pixel. (A pixel is the smallest point of light on a screen, too small to be useful for our example.) The distance of the Sun from the Earth makes it impossible to make examples that would be absolutely correct in scale and also fit onto a monitor

and be perceptible. We chose to make our examples relatively correct. That is to say, we tried above all to convey the true *concept,* but to do this we had to take some license with absolute facts. So these animations are not drawn to scale, and that may occasionally cause some confusion. The most obvious one is that the animation might lead you to think there is a lunar eclipse every month. Watch the video and try to figure out why there isn't!



The Nature of the Universe

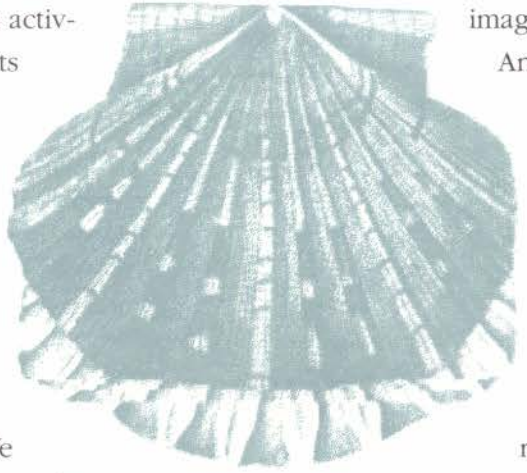
"Had we never seen the stars, and the sun and the heaven, none of the words which we have spoken about the universe would ever have been uttered. But now the sight of day and night, and the months and the revolutions of the years, have created numbers, and have given us a conception of time, and the power of enquiring about the nature of the universe; and from this source we have derived philosophy, than which no greater good ever was or will be given by the gods to mortal man."

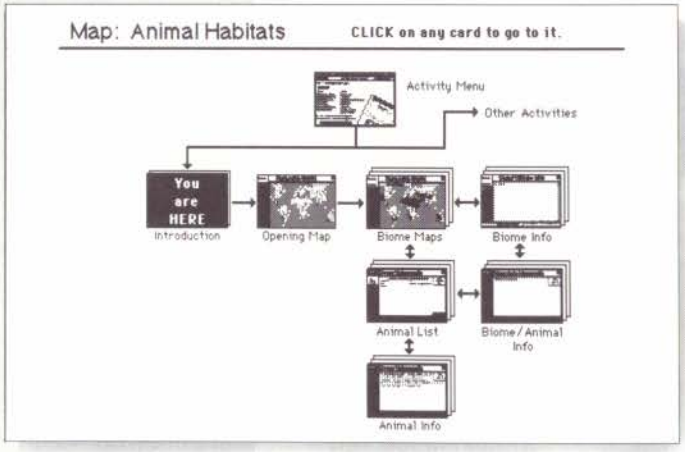
–Plato

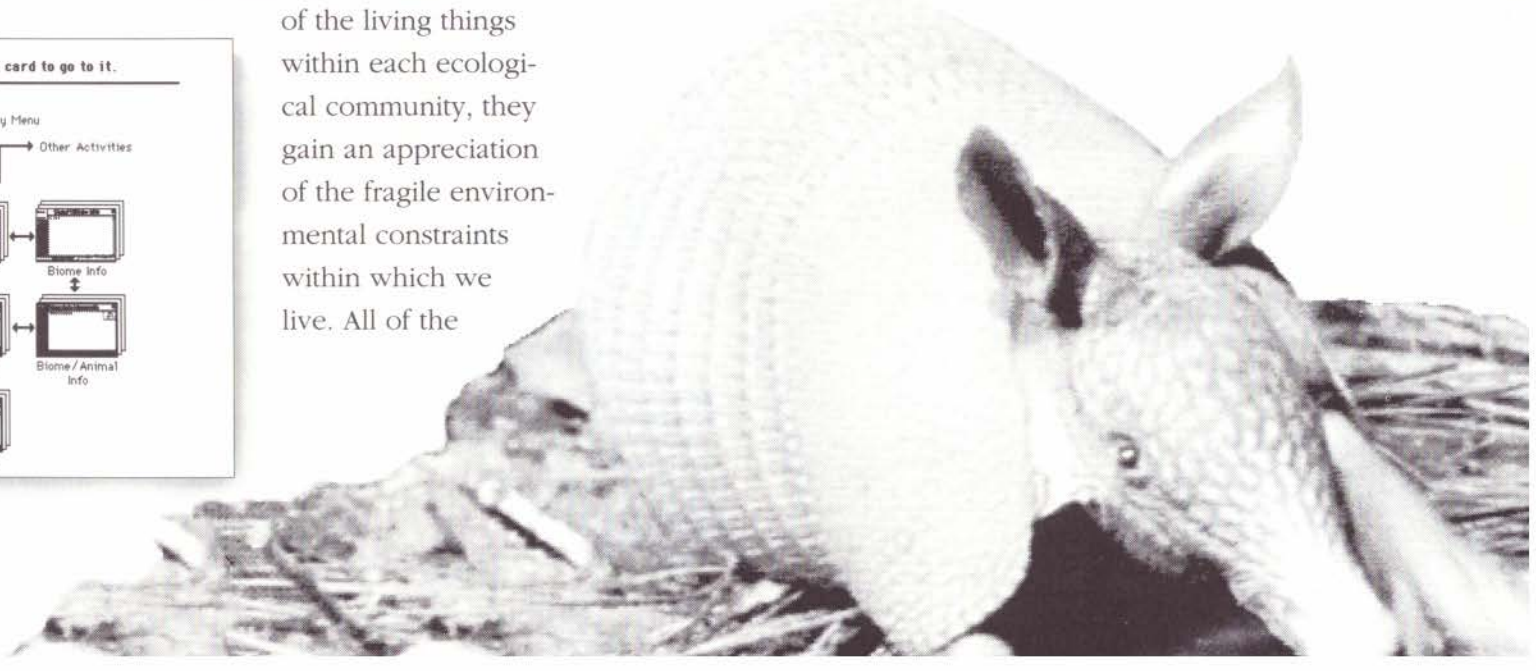
In this activity, you can see the position of the Moon at specific intervals, or you can play out an entire lunar month—one orbit around the Earth.

Animal Habitats

Animal Habitats is an exploration activity. It is designed to give students an understanding of *biomes*, our planet's major environments. A biome is defined by its climate and geography and by the plant and animal life that thrive in that region. In this activity students can examine and read descriptions of a wide range of animals and plants in each of the eight major biomes. We hope that as students see the interdependence of the living things within each ecological community, they gain an appreciation of the fragile environmental constraints within which we live. All of the images in this activity are drawn from the Animals and Plants Collection, which contains over 1,000 images. Our design challenge was to make this impressive number of animal pictures easy to handle. The main screen is a map of the world divided into biomes. Each animal is seen only within the context of its biome, as is the case in the real world.





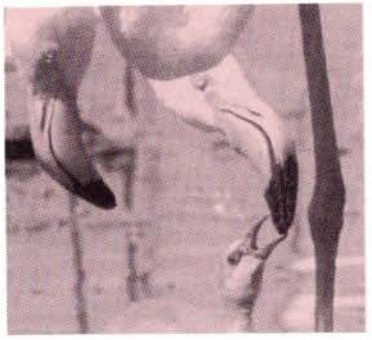


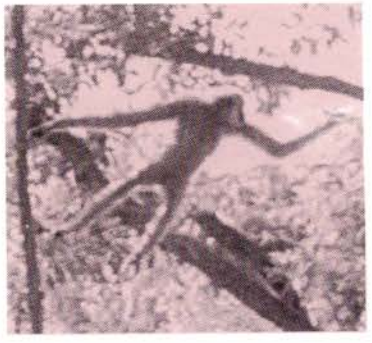
Refresh Your Memory

How Fragile We Are

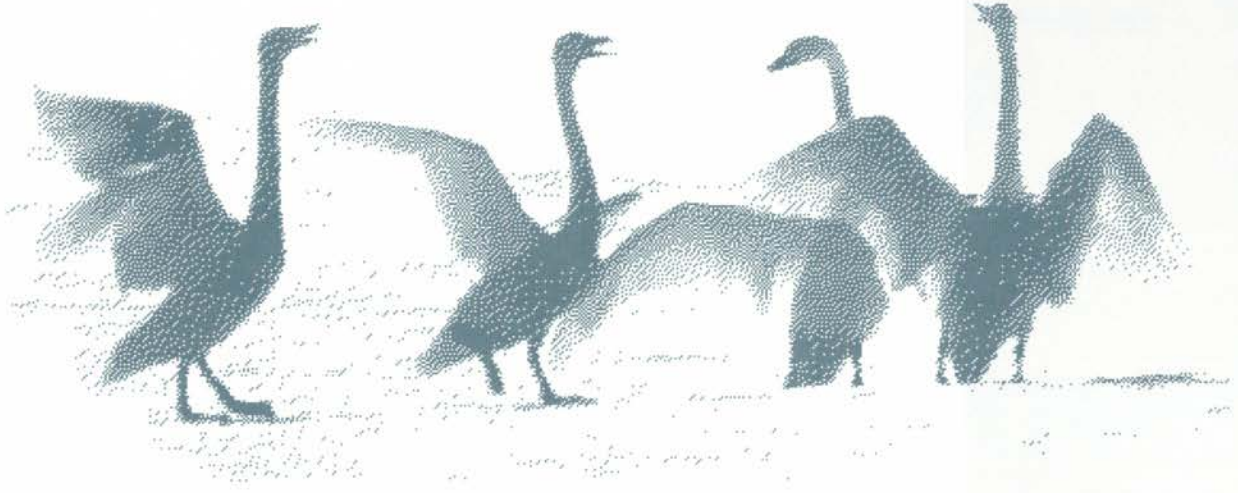
The normal body temperature for human beings is 98.6° F. If our temperature varies only 10 degrees in either direction, we die. That's a pretty small window for life.

Just as an individual survives and thrives only within specific constraints and given certain conditions, so also does life on our planet. The term "biosphere" describes that small part of the solar system that can support life: the Earth, with its atmosphere, water and land. You can picture the biosphere as a special bubble, like a giant terrarium orbiting in space. But the terrarium is not a uniform place; many factors interact to create different environments within it. Climate—a product of rainfall, temperature and wind—is the dominant factor determining the kinds of vegetation that grow in a particular area. Climate and vegetation in turn determine the kind of animal life an area will support, giving rise to a specific type of ecological community, a biome. Thus, each of the major biomes—for example, grassland or desert—has its own characteristic plant and animal life.

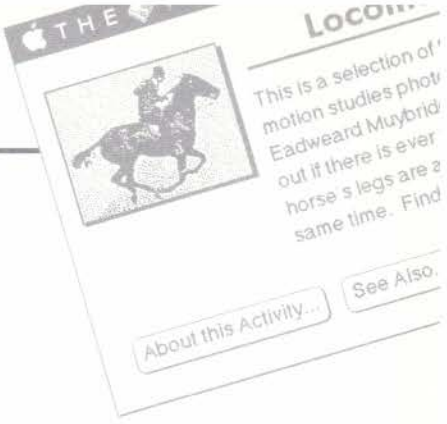




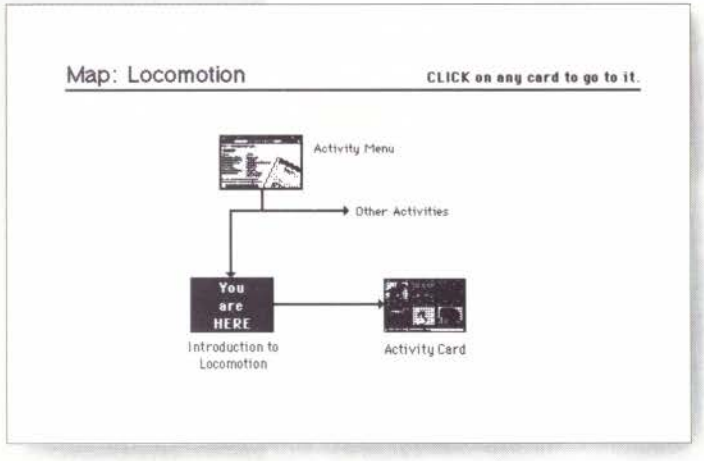
The term "biosphere" describes that small part of the solar system that can support life...



Locomotion



This activity is based on a famous series of photographs taken to study animal locomotion in the 1870s by Eadweard Muybridge (pronounced Edward Moybridge). Muybridge rigged up an elaborate system whereby cameras were set up at intervals. As an animal moved, it tripped a wire attached to a camera's shutter, and a picture was taken. In this way, Muybridge was able to isolate parts of a movement; in essence, he reduced motion to a series of still photographs. Thus he was able to see for himself and enable other people to see something that could not actually be seen by the naked eye in real time.



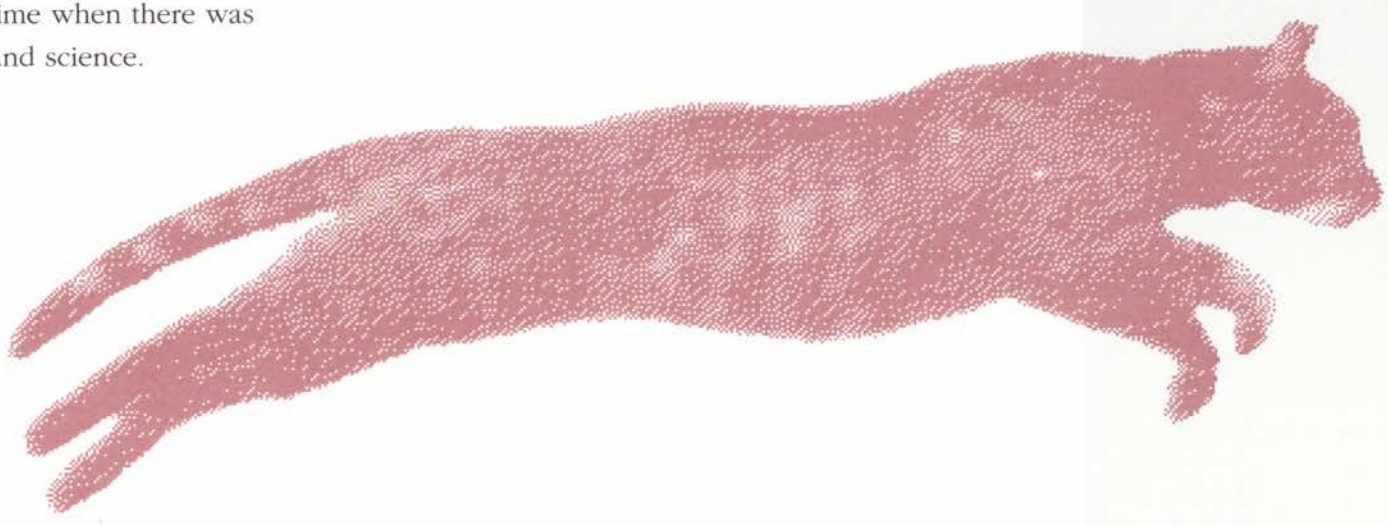
We think Muybridge would have appreciated this activity. When he first published his results, many people could not understand them. They saw the separate images, and they certainly had seen animals in motion. But they found it hard to map one onto the other. One problem was that most scientific journals did not publish photographs, and so he had submitted line drawings of his photos! If only he had had a videodisc and a Macintosh—how easily he could have demonstrated the truth of his findings! He could have shown, as we do in this activity, the photographs one frame at a time and then played them in series in real time.

Instead he had to go to great extremes to prove his point. He invented something called the "zoopraxiscope." Images were projected onto a rotating glass disc, and people could look into it and see a rough equivalent to a moving picture. Little more than a decade or so later, Thomas Edison invented the motion picture camera. If you look at movie film, you can see that it is indeed a series of still pictures. We see motion because of the speed with which it goes through the projector.

In multimedia terms, what Muybridge did was make the first browsable movie. A "browsable movie" is one in which you can vary the speed and direction at which you see a moving image. You may choose to see images one frame at a time, or 5 frames per second, or backward, etc. This way of viewing often provides insights that would not be otherwise possible. This is one way in which technology extends human senses. Photography (especially the kinds of photography that expand or compress time) and browsable movies augment our visual capabilities and give us a new view on our world.

Muybridge lived in a time much like our own... an age of inventions and technology, a time when there was much collaboration between art and science.

We include here Muybridge's preface to the original edition of *Animals in Motion* because first-hand sources are the most direct way to reexperience history. This piece was written before the invention of the phonograph or the movie camera, and yet you can see that he predicts "talkies." He describes a visit to Edison's laboratory, where he saw an early prototype of the phonograph—and is intrigued with the possibility of combining "visible actions and audible words."



Excerpts from the Preface to the Original Edition of *Animals in Motion*

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In the spring of the year 1872, while the author was directing the photographic surveys of the United States Government on the Pacific Coast, there was revived in the city of San Francisco a controversy in regard to animal locomotion, which we may infer, on the authority of Plato, was warmly argued by the ancient Egyptians, and which probably had its origin in the studio of the primitive artist when he submitted to a group of critical friends his first etching of a mammoth crushing through the forest, or of a reindeer grazing on the plains.

In this modern instance, the principal subject of dispute was the possibility of a horse, while trotting—even at the height of his speed—having all four of his feet, at any portion of his stride, simultaneously free from contact with the ground.

The attention of the author was directed to this controversy, and he immediately resolved to attempt its settlement.

The problem before him was, to obtain a sufficiently well-developed and contrasted image on a wet collodion plate, after an exposure of so brief a duration that a horse's foot, moving with a velocity of more than thirty yards in a second of time, should be photographed with its outlines practically sharp.

In those days the rapid dry process—by the use of which such an operation is now easily accomplished—had not been discovered. Every photographer was, in a great measure, his own chemist; he prepared his own dipping baths, made his own collodion, coated and developed his own plates, and frequently manufactured the chemicals necessary for his work. All this involved a vast amount of tedious and careful manipulation from which the present generation is, happily, relieved.

Having constructed some special exposing apparatus, and bestowed more than usual care in the preparation of the materials he was accustomed to use for ordinarily quick work, the author commenced his investigation on the racetrack at Sacramento, California, in May, 1872, where he in a few days made several negatives of a celebrated horse named Occident, while trotting, laterally, in front of his camera, at rates of speed varying from two minutes and twenty-five seconds, to two minutes and eighteen seconds per mile.

The photographs resulting from this experiment were sufficiently sharp to give a recognizable silhouette portrait of the driver, and some of them exhibited the horse with all four of his feet clearly lifted, at the same time, above the surface of the ground.

So far as the immediate point at issue was concerned, the object of the experiment was accomplished, and the question settled for once and for all time in favour of those who argued for a period of unsupported transit.

... It then occurred to him that a series of photographic images made in rapid succession at properly regulated intervals of time, or of distance, would definitely set at rest the many existing theories and conflicting opinions upon animal movements generally.

Having submitted his plans to Mr. Leland Stanford, who owned a number of thoroughbreds, and first-class trotting horses, the author secured that gentleman's cooperation for a continuance of the researches at his stockfarm—now the site of the University—at Palo Alto.

His official and other duties, requiring absences from the city on expeditions sometimes extending over several months at a time, prevented continuous attention to the investigation, but in the meanwhile he devised a system for obtaining a succession of automatic exposures at intervals of time, which could be regulated at discretion.

The apparatus used for this initiatory work included a motor-clock for making and breaking electric circuits.

To this instrument the author gave the name of zoopraxiscope; it is the first apparatus ever used, or constructed, for synthetically demonstrating movements analytically photographed from life, and in its resulting effects is the prototype of all the various instruments which, under a variety of names, are used for a similar purpose at the present day...

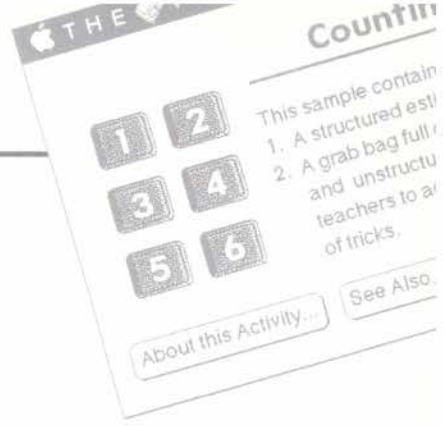
It may here be parenthetically remarked that on the 27th of February, 1888, the author, having contemplated some improvements of the zoopraxiscope, consulted with Mr. Thomas A. Edison as to the practicability of using that instrument in association with the phonograph, so as to combine, and reproduce simultaneously, in the presence of an audience, visible actions and audible words. At that time the phonograph had not been adapted to reach the ears of a large audience, so the scheme was temporarily abandoned...

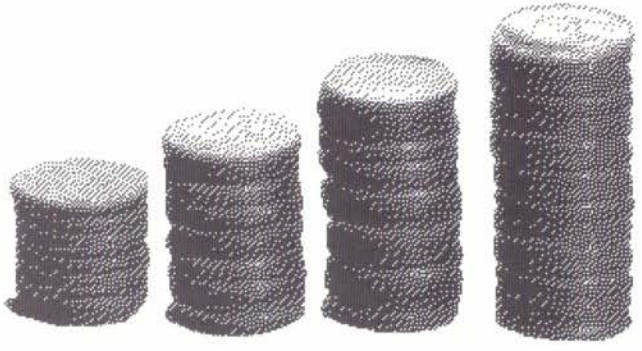
The combination of such an instrument with the phonograph has not, at the time of writing, been satisfactorily accomplished; there can, however, be but little doubt that in the—perhaps not far distant—future, instruments will be constructed that will not only reproduce visible actions simultaneously with audible words, but an entire opera, with the gestures, facial expressions, and songs of the performers, with all the accompanying music, will be recorded and reproduced by an apparatus, combining the principles of the zoopraxiscope and the phonograph, for the instruction or entertainment of an audience long after the original participants shall have passed away; and if the photographs should have been made stereoscopically, and projections from each series be independently and synchronously projected on a screen, a perfectly realistic imitation of the original performance will be seen, in the apparent "round," by the use of properly constructed binocular glasses...

–E.M.
Kingston-on-Thames
December, 1898

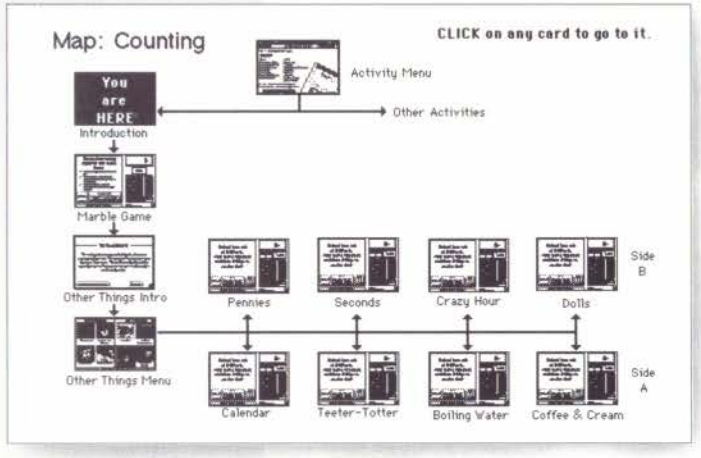
To this instrument the author gave the name of zoopraxiscope; it is the first apparatus ever used, or constructed, for synthetically demonstrating movements analytically photographed from life...

Counting





For the past several years many math teachers (especially those who teach at the elementary levels) have been advocating the use of manipulatives. Manipulatives are tangible objects that can be touched, turned, counted, grouped, etc. The idea is that real objects help make abstract concepts, such as place value, more understandable to elementary school students. This activity, Counting, is a kind of halfway point between the concrete and the abstract. Here students see and play with "objects" in the electronic domain in order to understand principles of counting.



This activity is divided into two parts. The first is an estimation game in which you try to guess the number of marbles in a jar. The second part is more open-ended.

We have selected a number of different objects (pennies, nesting dolls, a clock) and have some suggestions for games and other activities to play with them. But, generally, you can use these electronic objects as you would any manipulative.

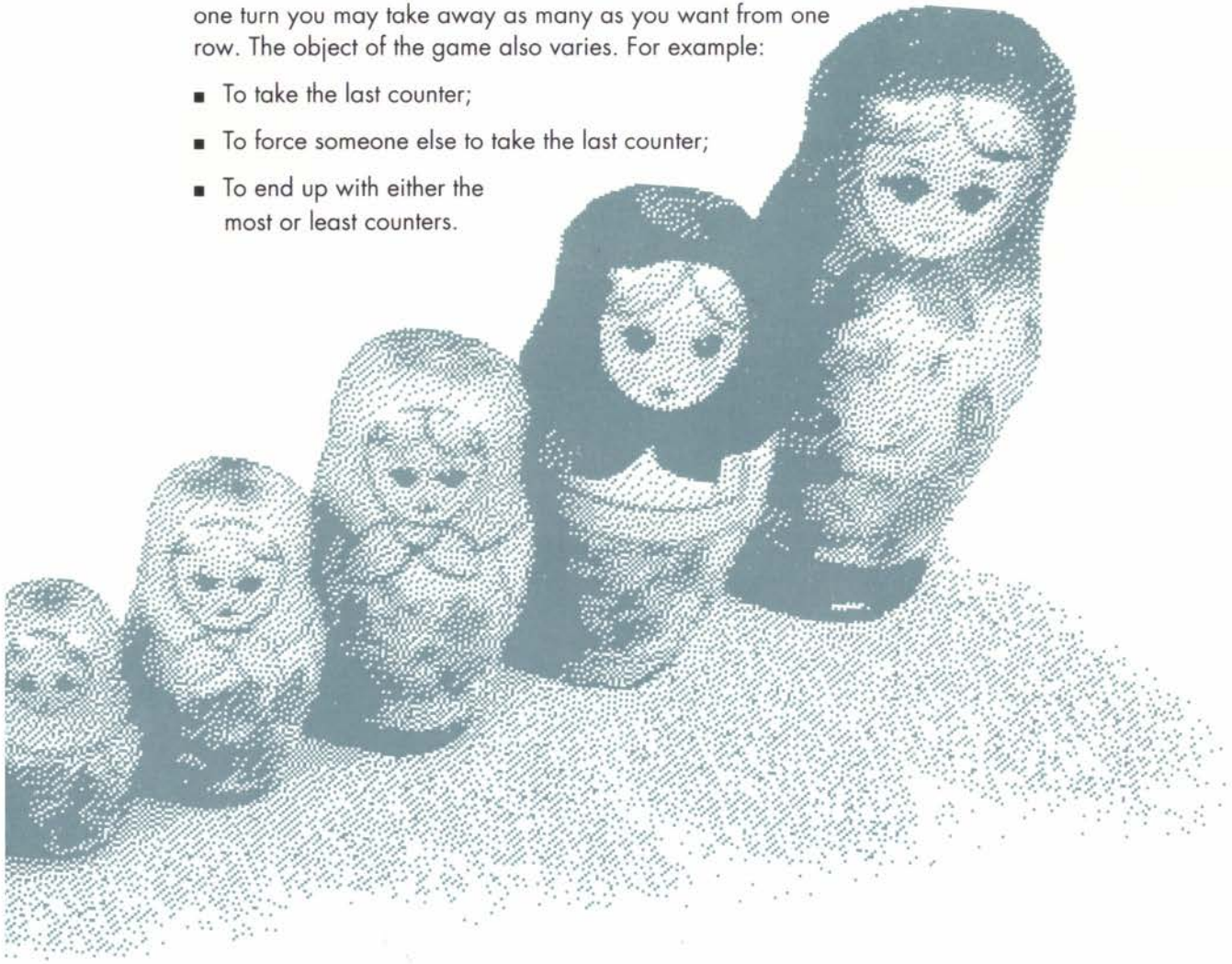
Some manipulatives are especially suited for multimedia. One activity, for example, asks you to guess how much cream you can put in a cup of coffee before it spills over the top. If your guess is too high, you can watch the coffee overflow, but you don't have to clean it up!

You don't have to stop with this activity. There are many countable things on the videodisc. The Everyday Objects Collection (on Side B) is a particularly rich source. If you are interested in looking at patterns in nature, you might check out the chapter called Fruit Slices in that collection.

The Game of NIM

For many of the objects in Counting, we have suggested that you play a game of NIM. NIM is a generic name for a variety of mathematical strategy games in which counters are arranged in groups (e.g., piles or rows). Each player takes a turn removing one or more of the counters in some specified way. For example, when counters are arranged in rows, on one turn you may take away as many as you want from one row. The object of the game also varies. For example:

- To take the last counter;
- To force someone else to take the last counter;
- To end up with either the most or least counters.



For example—use toothpicks or stones. Lay them out in rows like this:

On your turn, take away as many objects from any single row as you want:

Your opponent then takes away as many as he or she wants from a row:

Continue until there is only one object left. The person who has to pick up the last one loses.

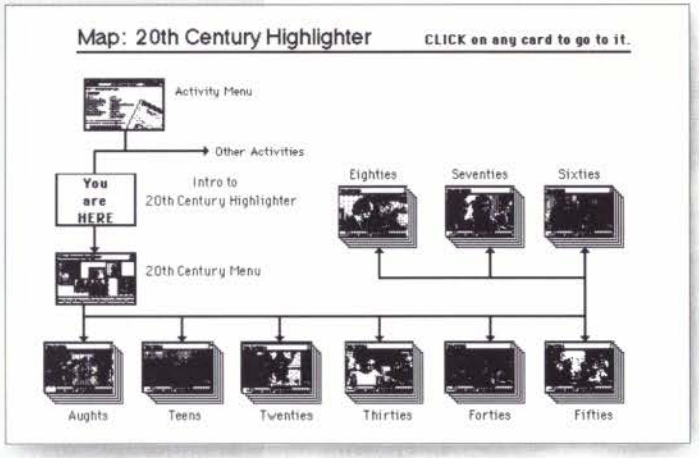
20th Century Highlighter

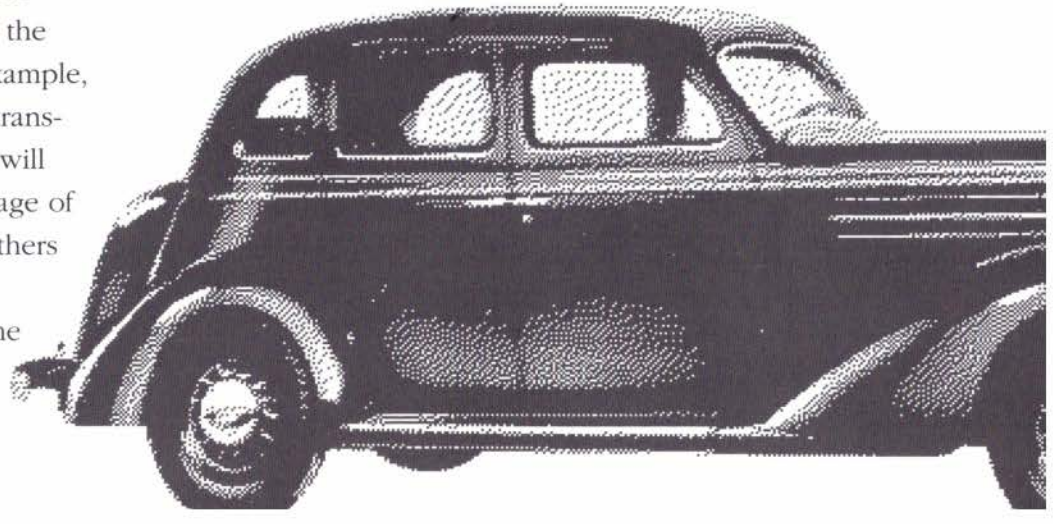
Today's students will live most of their lives in the twenty-first century. Much of what we—their parents and teachers—have experienced, they will have to learn in school. The 20th Century Highlighter activity offers a glimpse of the kind of "time travel" that will be possible in the classrooms and homes of tomorrow. It takes students back through the twentieth century, decade by decade.

You can select a decade and see images from that time, in four thematic areas: transportation, history, daily life and the arts. Or you can choose to follow the thread of one theme through the century. For example, if you choose transportation, you will see actual footage of the Wright brothers at Kitty Hawk, Lindbergh in the "Spirit of St. Louis," Neil Armstrong landing on the moon and the space shuttle.

We also have included lyrics from songs that symbolize the spirit of each decade. A teacher might use this activity as a springboard for other history assignments that encourage students not only to learn dates and facts but also to get a feel for the experience of living at a certain time.

This has been a century of enormous change. Look at pictures of the 1920s and 1930s... those days seem so distant. If the rate of change keeps up, it is mind-boggling to imagine what life will be like fifty or sixty years from now.





• MIND'S • EYE •

A Conversation with Kristina Hooper on Reexperiencing History

The study of history has probably been more influenced by the development of the film and sound media than any other school subject. No longer are we totally dependent on the intermediary step of an historian, who brings with him or her a whole range of personal perspectives and biases on the events in question. (An historian, by definition, presents his or her point of view.) And we are no longer dependent solely on the written word. Even if you read the full text of a speech, you miss the inflections of the speaker's voice, the look in his eyes. Now we can see and hear historical events as they happened (although there is always some selection by the film editor and mediation by the teachers). Original source material will be accessible not just to professional scholars but to ordinary students. With events preserved forever in the present through film, the teaching and analysis of history will change significantly.

In the future, history students will become historians. They won't simply read some version of events out of a book; instead, they will be able to piece them together for themselves by exploring original sources, such as video footage. Imagine the possibilities! Students with different points of view—conservative, liberal, capitalist, communist—from different parts of the world—France, Nigeria, China—would make their own compositions (history "texts"?) of the same world events. But just think how vastly different these accounts might be!

Just as communication with (or even awareness of) people in other cultures helps us to see the similarities within the great diversity of human life, making us more tolerant people, so understanding life in times past may make us proud of our connections to the past,

humble about our own achievements and more conscientious as we work toward building a future.

We offer this small activity now, with the belief that interactive multimedia has an important role to play in the teaching of history. What's needed is for passionate teachers to have access to this medium. A wonderful abundance of raw material already exists. One such source is the CEL Video Encyclopedia of the 20th Century, a 77-hour, 39-disc history of this century. We used it for *The Visual Almanac* videodisc: we selected two major events from each decade—a small sampling, to say the least.

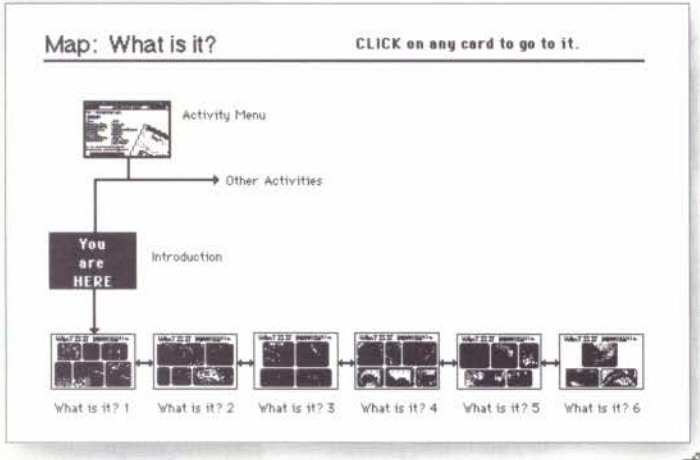
We also tapped other wonderful and generous sources. The Bettmann Archive has images from every age in history. The History of Daily Life collection comes from the Bettmann Archive. The National Archives and the Library of Congress also have extensive photo collections. My guess is that in the next few years most archives will begin to put their collections into electronic form. Not only are media like videodiscs efficient for storage (one videodisc, for example, can replace many drawers of photos and shelves of film) and an effective retrieval medium (with tools such as *The Visual Almanac* search tools, it is easy to find what you want), they also provide an important way to preserve documents. You can have access to materials without threatening the original. Once stored electronically, on videodiscs and even newer technologies, images (film, photo, art, sound) will not fade or tear or deteriorate in any way. So this new-fangled medium of the future will help us preserve our past. Then we're left with just the fun job—trying to understand it.

What Is It?

This playful activity is designed particularly for little children, but it makes some very big points. Common objects are pictured in uncommon ways. Some objects are magnified; others are shown in part, and you have to guess what the whole object is. The goal of this activity is to show that things look different from different points of view, that familiar things may seem unfamiliar when approached in an unusual way.

The activity is set up as a guessing game. If you cannot tell what the object is by looking, you have a second chance to guess after reading about it or listening to the hint. This is not a win or lose game. Many of the objects are almost unguessable. the fun is in seeing the ordinary in an extraordinary way.

Many of the pictures are taken from a book called *The Secret House,* by David Bodanis, published by Simon and Schuster, Inc., 1986.



Mysteries in the West

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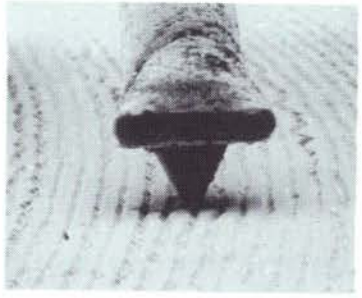
It is the night of Saturday, especially consecrated to a ritual which is awesome to us, faithfully followed by the devotees of a certain cult.

Two groups of twelve, dressed in colorful costumes, carry out complicated movements within an enclosed space. They at times respond to musical stimuli applied through a primitive instrument of a man of seeming authority who, with a few assistants, supervises their activity. Entirely surrounding the area devoted to the ritual, a congregation gives its responses. At times the people sing, sometimes they shout, sometimes they are silent. Some wield an instrument which gives forth a strange sound.

Much care has evidently gone into the planning of the geometrically designed arena. Around it are colorful insignia, flags, banners, decorations probably designed to raise the emotional pitch of the individual and the group. The atmosphere is eerie partly because of the abrupt changes in emotion. The people's reaction to the ecstatogenic processes being enacted in their midst is so explosive at times that one wonders why they do not spill over into the sacred enclosure. Both joy and sorrow are manifested among the votaries.

We are observers at a floodlit association football game (English soccer). What is missing from the observer's account is a knowledge of what is actually happening, and why. If we have this knowledge, we can identify the players, crowd, referee, the used of the chalked lines. If we do not, we continue: Here a man writhes on the ground, another grimaces, sweat pouring from his face. One of the audience strikes himself, another his neighbor. The totem rises into the air, and is hailed by an awesome roar from the assembly...

–Idries Shah,
The Sufis (London:
Jonathan Cape, Ltd., 1971)

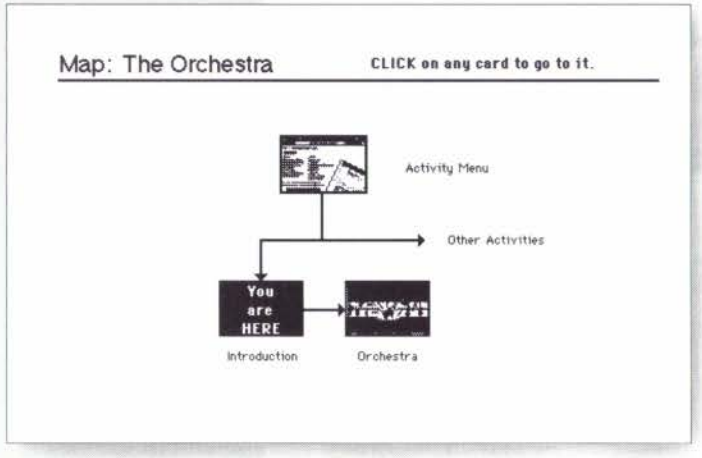


When things are familiar we rarely experience them as a stranger might. Familiar things just seem normal to us. But if we try looking at things as if for the first time, we might see them in a new way.

Two groups of twelve, dressed in colorful costumes, carry out complicated movements within an enclosed space.

The Orchestra

The Orchestra is an elementary introduction to the sounds of 14 musical instruments. It is an audio sample with no pictures. This activity is meant for very young children and is quite simple. There is one main screen, and you click on an instrument to hear its sound. The purpose is to help children develop listening skills and learn to identify the sounds of the instruments in an orchestra.



Note: *The sounds you hear are either digitized or synthesized—not the sounds of real musical instruments.*

• LAB • NOTES •

To: Everybody

From: Nancy

We're all expecting people to create wonderful new compositions and do things with *The Visual Almanac* that we never dreamed of. Well, here's one before the *Almanac* is even out the door!

I was working at home this weekend on the Activities. When I went to make dinner, Molly, who is five, started playing with the Orchestra. After 15 minutes or so, she called Peter and me to come watch a play. Then she began to tell and act out a story (I've attached it verbatim below), clicking on the instruments in the orchestra activity for character identification and emotional emphasis. She must have gotten the idea from *Peter and the Wolf*, which we went to see a few months ago. I showed this to Jim McKee from Earwax Productions, and he said that this is how Wagner wrote his operas. Each character has his signature musical icon, so to speak. Luckily, Molly's story is slightly shorter than the *Ring Cycle*.

The Little Boy and Little Girl and Their Father Who Cut Wood

by Molly Lowe, age 5

Once upon a time there was a little boy and a little girl. (Piano)

They were happy. (Flute)

The wind was going woosh. (Drums)

And they were going to cut wood, because they could never play with their father because he was always cutting wood. (Clarinet)

And the kids feel down without their father playing with them. (Bass)

Then a magical fairy came (Harp) and said, "Your one wish will come true."

They loved toys, yes. But mostly they liked to play with their dad.

The stepmother was terrible. She only wanted to make pancakes. And they didn't like pancakes. They like warm cereal. (Bass)

"What a drag with our stepmother." (Drum)

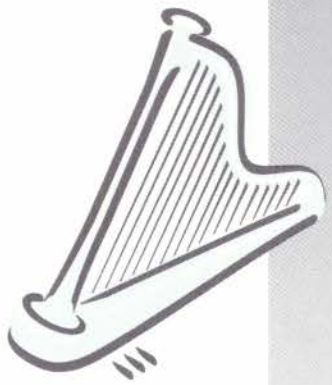
There was a big wind and the father came out. (Drum)

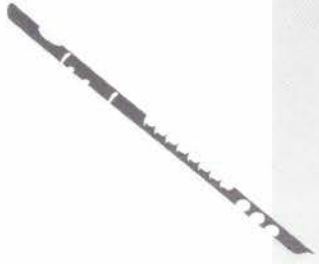
And their father came out very sad, looking for trees he should cut. (Clarinet)

With a bathrobe on. (Clarinet)

The stepmother came out for a tiny bit. (Bass clarinet)

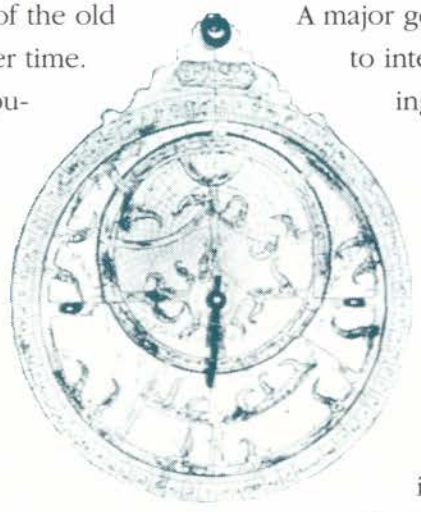
"Don't go out there, come inside!" She was bossy.

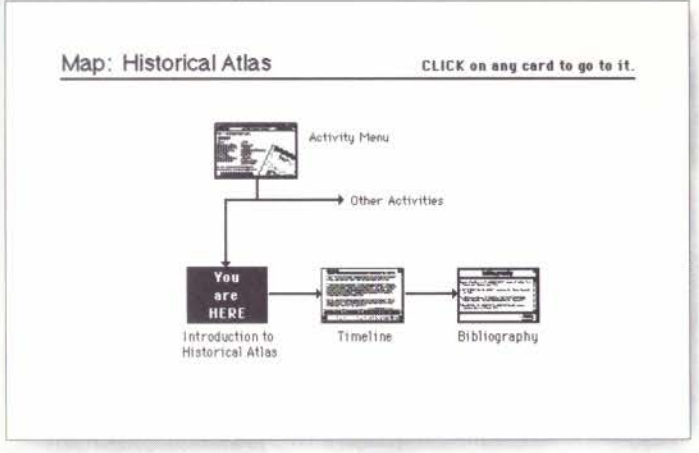




Historical Atlas

The Historical Atlas shows the truth of the old saying that history is geography over time. The map shows the changes in population and settlement in North America from 1606 to 1900. When the animation begins, the map is gray and there are just a few settlements, but soon the colors (settlers) spread, like wet paint, across the continent. The map tells a story of change, bringing alive historical events, and is a great tool for representing historical facts visually.

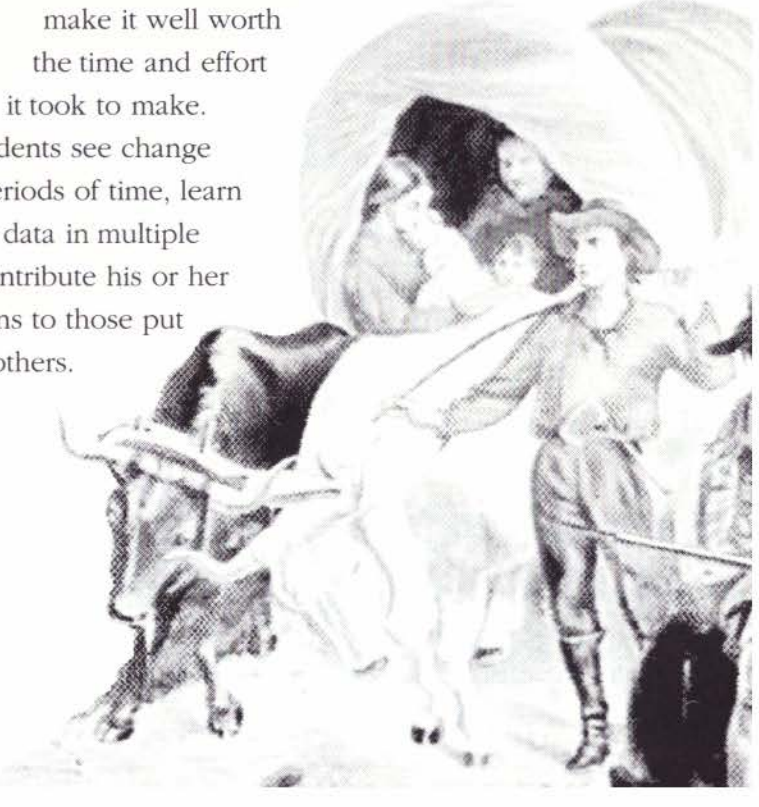




The text that is included with the visuals was written by a cartographer and historian who looked at the facts and wrote her interpretation. That's what a historian is supposed to do: interpret events.

A major goal of this activity is to help students learn to interpret material—not just be on the receiving end of others' interpretations—so this activity includes a feature that allows students to write in their own text to go along with the visuals. As far as we're concerned, the Historical Atlas activity accomplishes three important educational goals which make it well worth the time and effort it took to make.

Students see change over long periods of time, learn to represent data in multiple ways and contribute his or her interpretations to those put forward by others.



Making the Map

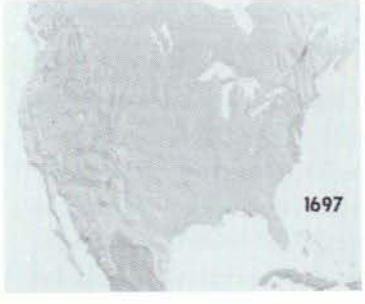
by Steve Gano

We wanted to make an animated map for *The Visual Almanac* like the one Charles and Rae Eames did showing the rise and fall of the Roman Empire. This notion of combining a graphic representation of change, multiple perspectives and multiple representations seemed like it was right up our alley. We also wanted to experiment with some technical design issues and figured a good challenge would be to see if we could make a relief map in color on the Mac II. Also, we wanted the map to be less abstract than the Eames's map. (It's a great film that is not widely seen, distributed by Pyramid Films.) This was about February 1988.

We decided to show the settlement of the Western hemisphere, both North and South America but had to drop this idea pretty quickly, because of the aspect ratio of a television monitor. It's so horizontal! To get both continents on the screen would have meant making the countries so small you wouldn't have been able to see much detail.

We had to get as much detailed information as possible. The beauty of the map would depend on the details. If you included only major events, changes would seem to happen in discrete chunks. Details would provide the flow. We began by talking to content experts and showed a demo to the geography department at Berkeley, hoping to enlist some help with the project. That worked! Two undergraduates, Dorothy Hoover and Anneka Vonk, began doing research in the map room at Berkeley, pulling out maps, copying down settlement lines from historical maps. I made a base map for them to work with on the Mac II, using Mapmaker, which makes outline maps for you if you feed it all the data.

Then some real low-tech work began. Dorothy and Anneka recorded all the different kinds of data by hand. We defined "settlement" as a certain population density at a certain time. And the density threshold we used was two people per square mile. When you see the map on the screen, one pixel represents fifty miles. We examined lots of maps



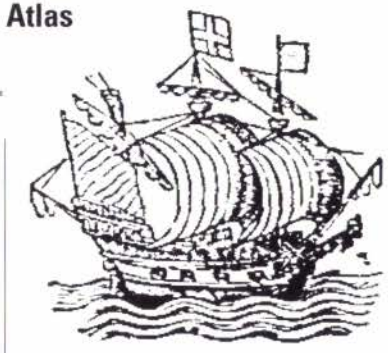
The beauty of the map would depend on the details. If you included only major events, changes would seem to happen in discrete chunks. Details would provide the flow.

and sometimes found contradictory data, usually because the various cartographers were mapping different information and so they showed different lines. There was no standard. So, by hand, we had to create the standards we wanted and had to make our own interpretations to resolve the contradictions.

Finding the right information in the right form was the biggest roadblock. Eventually we had to limit our scope, because the data before Columbus was so scarce. In fact, we realized that we didn't have adequate data for before 1600. We let the data dictate which dates to mark frames. When enough happened around a certain date to warrant a frame, we would use that date.

I needed a map that showed the same relief as the base map we had used for data collection—in other words, the same map without physical features. John Borden, a filmmaker (Peace River Films), who had done a similar map for a NOVA project, suggested a technique. We bought a raised relief map, then painted it gray and scanned it with a Pro-Viz videodigitizer. That plain map is on the first frame of the Historical Atlas.

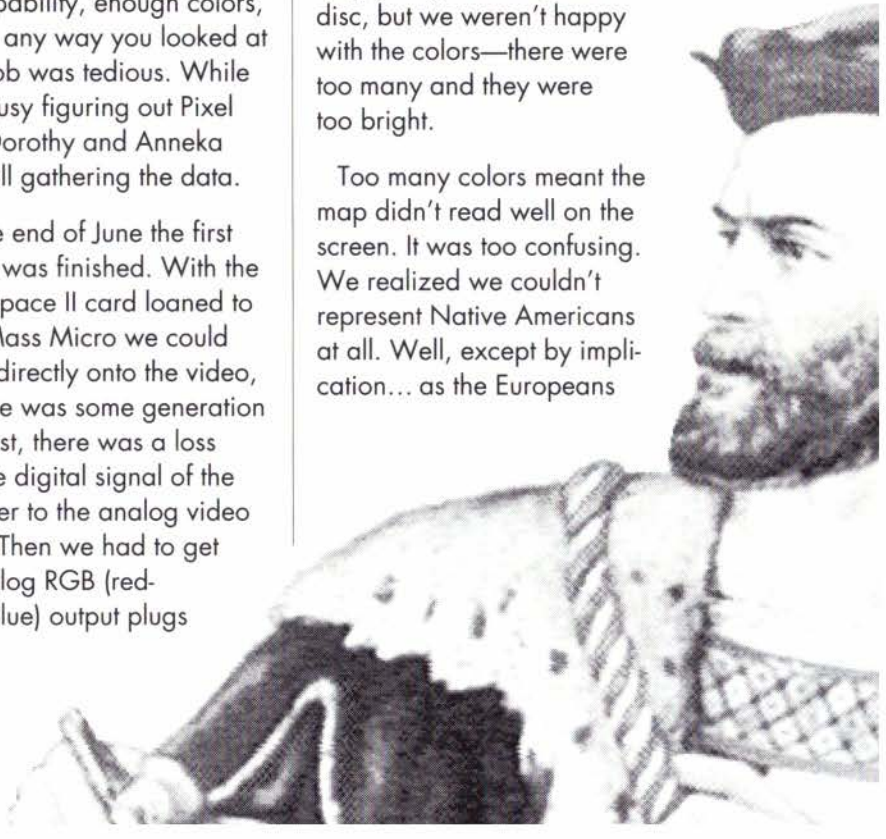
Now we're up to about June 1988, and this is where the technological fun starts. We used the programs Pixel Paint and Pixel Paint Tricks to transfer storyboard maps onto *the* map. We used a tablet and stylus, because it is easier to draw fine details with a stylus

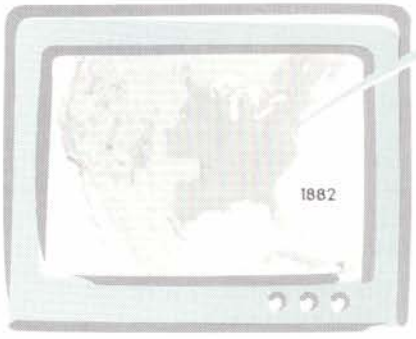


(which is like a pencil) than a mouse. It was tricky rendering the areas of different population groups so that, even though color was added, the gray scale (or tonal range) was preserved. We needed 16 tones for each color we used. This was a job that Pixel Paint could do; it has enough raw capability, enough colors, etc. But any way you looked at it, the job was tedious. While I was busy figuring out Pixel Paint, Dorothy and Anneka were still gathering the data.

By the end of June the first version was finished. With the Color Space II card loaned to us by Mass Micro we could record directly onto the video, but there was some generation loss. First, there was a loss from the digital signal of the computer to the analog video signal. Then we had to get the analog RGB (red-green-blue) output plugs into an encoder—a video device that combines the signal into the NTSC signal. (NTSC stands for National Television Standard for Color, although it is also unaffectionately known as "Never The Same Color.") That signal is then transferred to one-inch videotape (a Sony 2500) that lets you record one frame at a time. We did this at Lucasfilm, where a machine was on loan. So we took that one-inch tape with 35 frames and put it on our first disc. We were happy to get the map on the disc, but we weren't happy with the colors—there were too many and they were too bright.

Too many colors meant the map didn't read well on the screen. It was too confusing. We realized we couldn't represent Native Americans at all. Well, except by implication... as the Europeans





take over, the Native Americans lose out. So, we limited our scope again. It is very ironic, that it turned out that there was no direct way we could make the point we set out to make: that is, the impact of European settlement on Native Americans. We couldn't find enough data to tell the story. So, someone should find a way to tell that story. Unfortunately, this isn't it.

We also brought in James Vance, a U.C. Berkeley history professor, who helped us identify some problem areas on the map. Our meeting with him was very encouraging because he could identify events just by watching what was happening on the map.

We created the next version of the map between September and December. Anneka did the rendering with new colors and made some data changes based on our conversations with Professor Vance. This time we did more color testing to see how the colors would work on video. The NTSC is designed to be particularly sensitive to flesh tones, so colors at the extremes of the scale don't do very well (e.g., certain yellows or vivid reds). Meanwhile, Dorothy worked on the text we wanted to include with the activity.

Amazingly, in the time between our first and second versions, there was an upgrade in video technology!

We were able to record digitally. This new service was provided by Illusion Software in Santa Monica. We sent them map frames as Pixel Paint, and they sent back D1 digital component videotape, the highest quality videotape. It preserved the actual pixels from the Mac II to the final master tape, the color quality and the spatial resolution. It looks as close to Macintosh graphics as possible.

So there you are. It took about a year to do the map. It was a much bigger job than we had originally thought but one well worth doing. We achieved our goals. The map looks simple; it is straightforward to use. It tells an important content story. It also shows off the power of multimedia to convey difficult abstract ideas. We created it on the computer, and its design was definitely a challenge. I'd do it again!

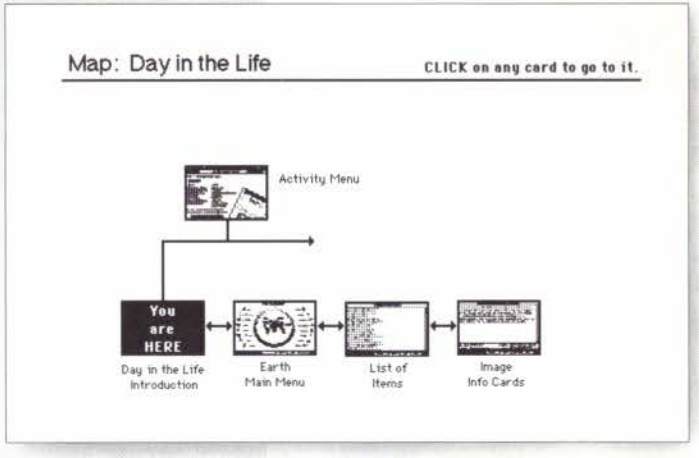
Just reconciling the data was a big task. For example, population estimates for North America in the late fifteenth century range from 500,000 to 10 million!

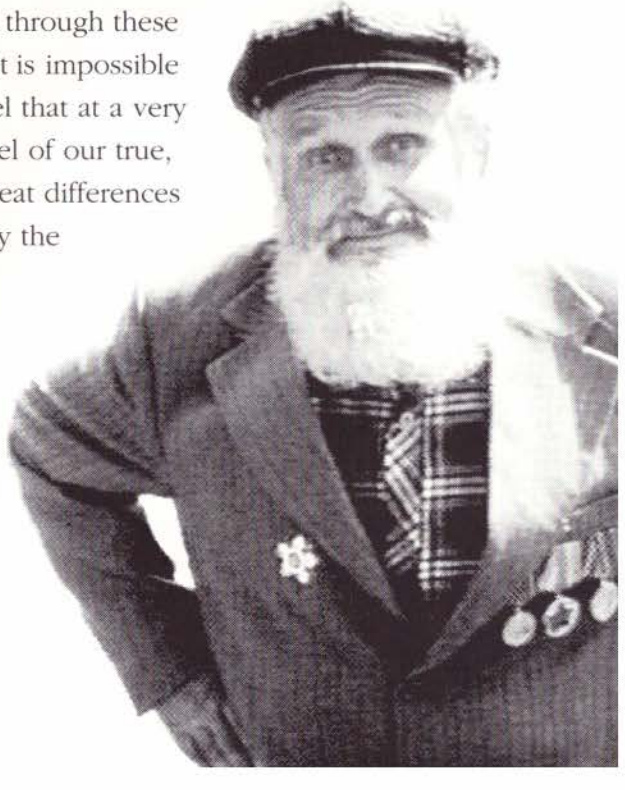
A Day in the Life

Every day all over the world people get up, eat breakfast and go off to school or work. They fall in love; they play sports; they laugh and cry. In this activity, you see ordinary people doing ordinary things in three different countries.

The pictures for this activity were provided by Collins Publishers from three remarkable photography books: *A Day in the Life of Japan, A Day in the Life of the Soviet Union* and *A Day in the Life of the United States*. For each book, 100 photojournalists were invited to visit the country and take pictures throughout a single day. Their assignment was, essentially, to make a family scrapbook of the nation—"to make extraordinary photographs of ordinary, everyday events." What we have done in this activity is to give the books an extra dimension. We created a database of the pictures, so you can flip through them by country and by theme.

The Soviet Union, the United States and Japan are enormously different—culturally and socially, economically and politically. And yet, when you look through these pictures it is impossible not to feel that at a very profound level—the level of our true, everyday selves—the great differences are far overshadowed by the similarities.

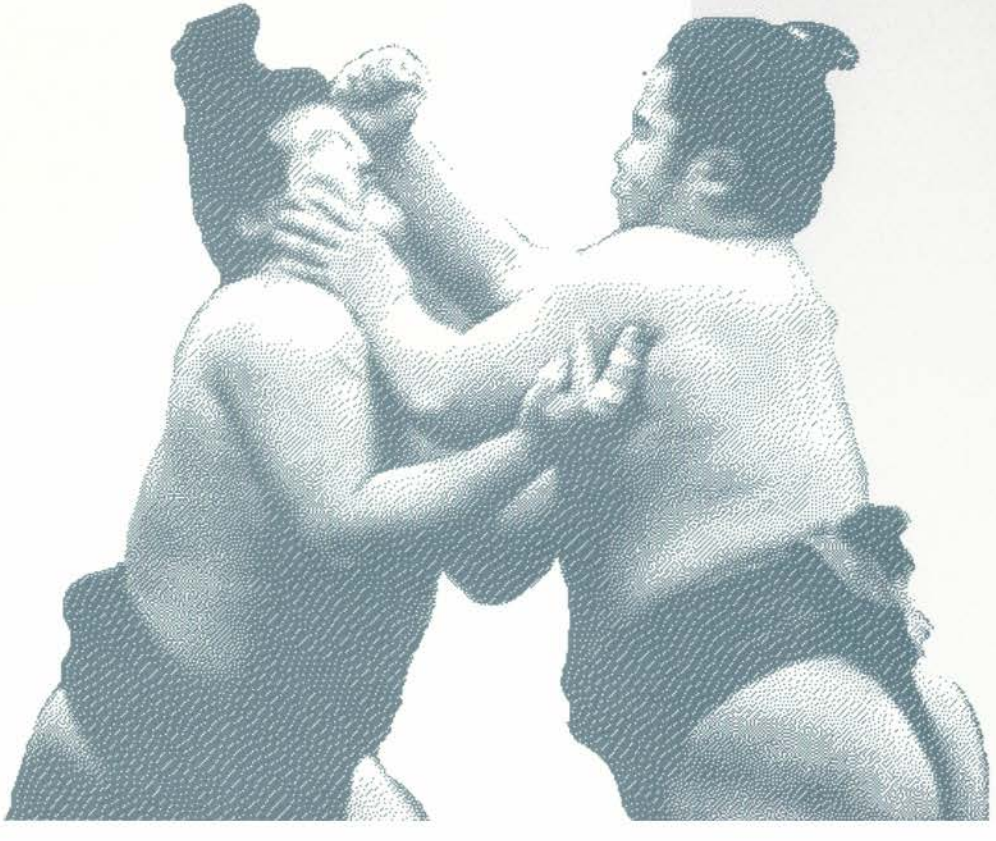




Images, Images and More Images

This collection of photos was taken by the world's best photographers, and it is an act of great generosity and commitment on the part of Collins Publishers to let us use these images. The project directors of the *Day in the Life of...* series shared our interest in multimedia's capacity to extend the power of the books through electronic means and our desire to make them more available to students and teachers. We're hoping that other excellent publishers will be as generous—and that this generosity will lead to ready access to images by individuals, as well as to profitable businesses.

Note: *The photo captions are taken directly from the books. Every info card provides the name of the photojournalist who took the picture.*



"See Also" Bibliography

▼▼▼

For Playground Physics

Frames of Reference
(a videodisc)
Physical Science Study Committee
1960 EDC, Inc.
Central Scientific Co.
(Franklin Park, Illinois &
Mississauga, Ontario)

The Physics of Sport
Dean Zollman
Kansas State University
Department of Physics
Cardwell Hall
Manhattan, KS 66506

For Animal Habitats and International Zoo

Pioneer LDC
Encyclopedia of Animals
A series of eight videodiscs containing still, film, and video images of the animal kingdom. It is available for purchase through regular retail outlets. Or write:

Pioneer LDC
4-1 Meguro 1-Chrome
Meguro-Ku, Tokyo, 153, Japan

For Planetary Highway

Powers of Ten
A film by Charles Eames,
distributed by Pyramid Films
P.O. Box 1048
Santa Monica, CA 90406

For What Is It?

The Secret House
By David Bodanis
A Touchstone Book,
published by Simon & Shuster, Inc.
New York, London, Toronto, Sydney,
Tokyo, 1986

For Historical Atlas

Rise and Fall
of the Roman Empire
A film by Charles and Rae Eames,
distributed by Pyramid Films
P.O. Box 1048
Santa Monica, CA 90406

For Locomotion

Animals in Motion
By Eadweard Muybridge
Dover Publications, Inc.
180 Varick St.
New York, NY 10014

For A Day in the Life

A Day in the Life of America

A Day in the Life
of the Soviet Union

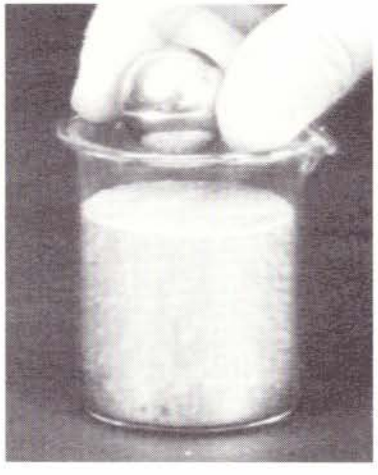
A Day in the Life of Japan
All three books published by
Collins Publishers, Inc.
50 Osgood Place
San Francisco, CA 94115

• MIND'S • EYE •

A Conversation with Kristina Hooper: A Message to Developers

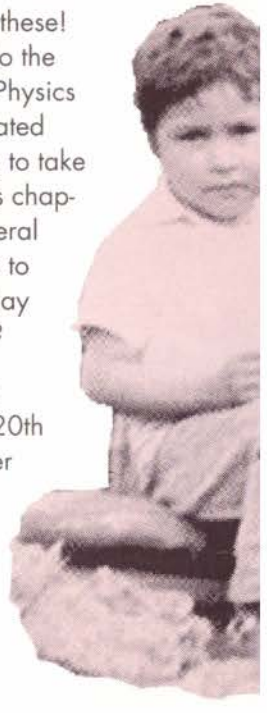
▼▼▼

We have put together these activities to demonstrate a range of possibilities, which we hope a number of you will follow up. New software remains to be written (in HyperCard, Macromind Director, Authorware Course of Action, etc.) for *The Visual Almanac* videodisc, and new videodiscs remain to be made, extending the short "teases" we have included here.



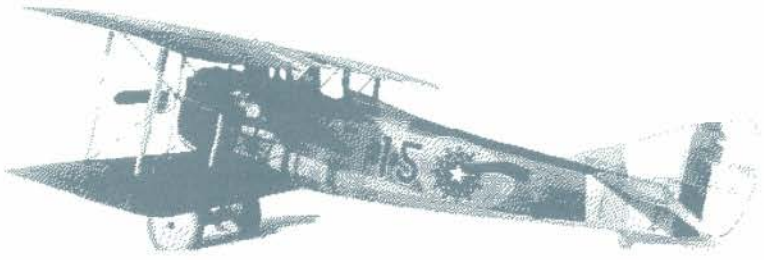
For example, the entire notion of measurement from an image is awaiting expansion. In the Rolling Ball and Moving In-and-Out activities in Playground Physics, we showed how data can be taken from visual scenes and then portrayed in graphic form. We also showed how a crude screen-measurement tool can be used to display directly an analysis of a phenomenon. It would be wonderful to have a broader range of phenomena to measure, as well as more adaptable and powerful measurement tools. Someone should create these! Who is going to do the great Playground Physics follow-up? In a related vein, who is going to take the Kitchen Physics chapter and apply general measurement tools to examine and display these phenomena?

Similarly, who is going to give the 20th Century Highlighter the depth that it calls for?



Videodiscs with extensive related imagery are on the market now (notably those of CEL in their *Video Encyclopedia of the 20th Century*). Who is going to build the tools that will enable ordinary teachers and students to use these invaluable materials? Who is going to add to the visual resource bank in a complementary way?

Another example: the Orchestra. This simple activity begs for an entire course on music appreciation. If we could bypass the audiocassette players and records, this course would immediately be more approachable by kids. A Macintosh-CD product would be perfect.

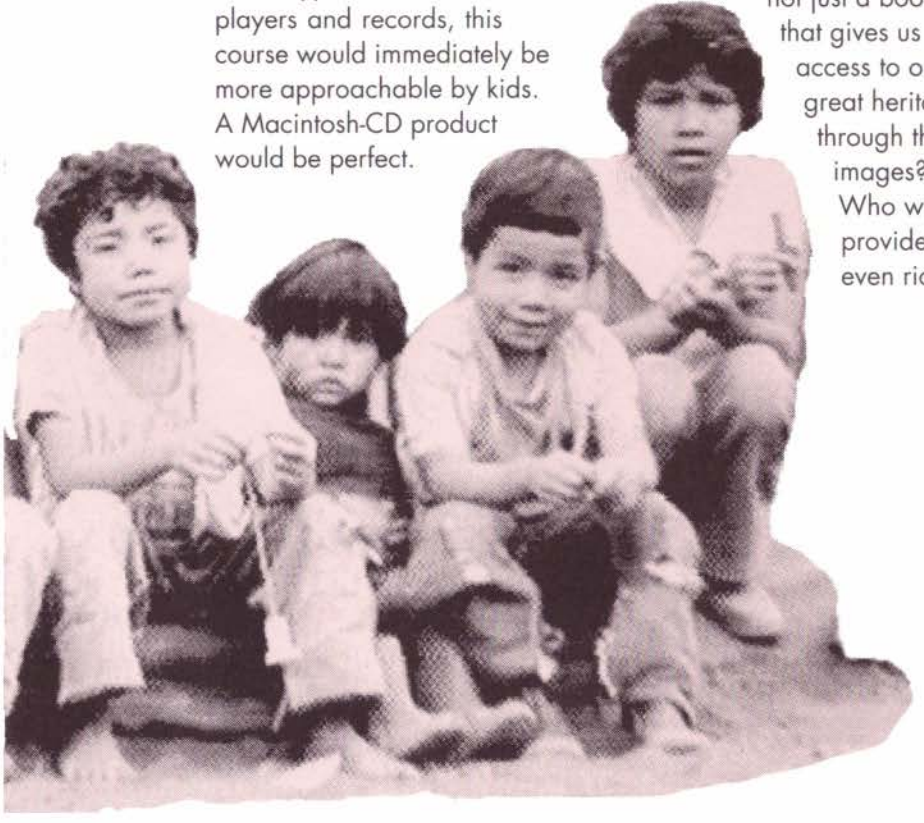


And what about the Historical Portraits and the American History collections on the videodisc, which are not currently accessible via an activity? Who is going to create the "textbook" (and what will we call it, if it is not just a book?) that gives us access to our great heritage through these images? Who will provide an even richer image database that would extend our understanding to a global scale?

Then there are the pictures in the collection called People around the World. The faces of these people represent important stories waiting to be told. Who's going to gather the data and audio materials so that these individuals can tell their own stories? And who—with some software authoring—will use the already existing images to show us the importance of a universal mind-set? And who will take the sound library and demonstrate how the emotional force of music and sound effects can enhance the learning experience?

Et cetera. Et cetera. Et cetera.

I look forward to seeing how this all works out. Good luck!



Who is going to build the tools that will enable ordinary teachers and students to use these invaluable materials?

CHAPTER 4

The Collections

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What Is a Multimedia Object? 98

Quick Start: Exploring the Collections Directory and the Collections 100

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Kristina Hooper on Cultural Literacy 102

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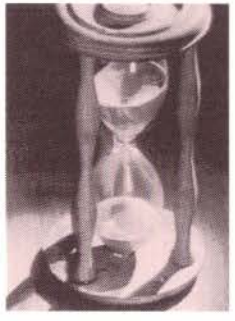


All about multimedia objects, the collections they are divided into and the sources of the images.

The Collections

ORIENTATION

The Collections contain over 7,000 multimedia objects. These are divided into 12 sections: 10 collections of visual images and 2 collections of sound images. These collections are stored on two sides of the videodisc, Side A and Side B.

We wanted to provide users with an abundant resource of images and information—a visual almanac—but deciding which images to include was difficult. What would constitute a basic visual vocabulary? What did we want to show about multimedia with this almanac? And what images should we choose to show it? In this section we will talk about the images. To find out what we wanted to show about multimedia, see the article "Learning and Teaching with *The Visual Almanac*" in the section "The Big Idea" on page 28.

What Is a Multimedia Object?

Although a multimedia object was briefly defined in the Brief View, it bears repeating here, to make clear that the Collections are not just a large group of videodisc images organized by topic. They are multimedia objects.

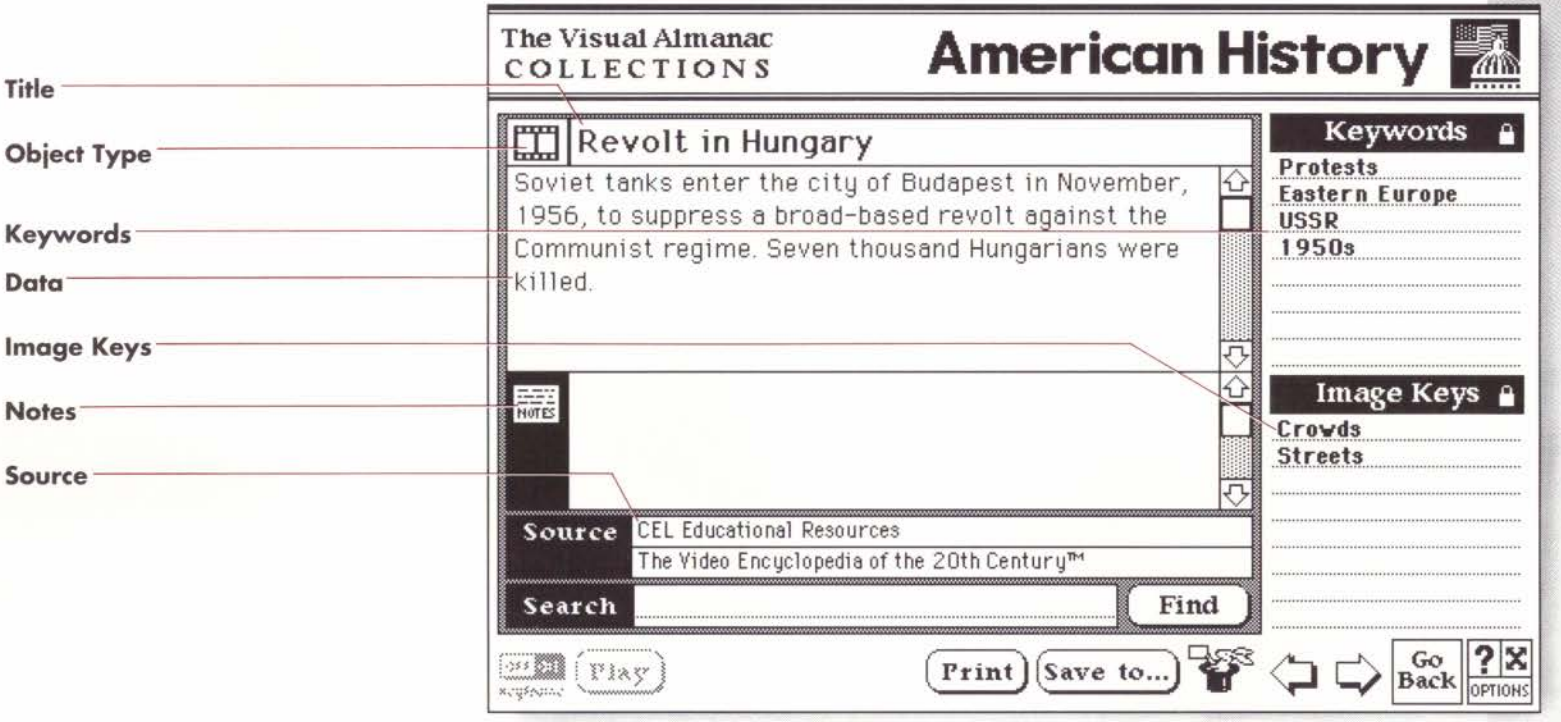
"Multimedia object" is a new term for a class of things in interactive multimedia. They are elements of content, basic units of meaning. In a multimedia object is embedded everything needed for interaction. It is multifaceted. Imagine any three-dimensional object. You may only see one or two faces at a time, but the others are always there. Similarly, you may be using or manipulating only one aspect of the multimedia object, but its full range of capabilities are always there. Physically, the multimedia object resides on both the videodisc and the software (on the data cards). It is by nature extendable. Different interactive multimedia products may require additional information.

Interacting with Multimedia Objects

Each card contains a multimedia object management system. We have highlighted here the areas on the card that let you look for new objects, play motion or sound sequences and save objects for making compositions. To find out more about these features, check the Reference section.

The facets of a *Visual Almanac* multimedia object include:

An image:
Image is defined as a still picture, movie, browsable movie and sound.



Title: Each data card has a different title. The title serves to identify the card, and is especially important whenever there is a search.

Object Type: The kind of image is noted on the icon next to the title. The object types are still picture, motion without sound, motion with sound, browsable movie, sound.

Keywords: Subject-related words that enable the computer to search for images within a broad category.

Data: The information for a specific image is written in the description field.

Image Keys: Keywords based on features of the image rather than content.

Notes: A field in which you can add to the information on the data card by typing in your own notes.

Source: The name of the source of the image.

Quick Start

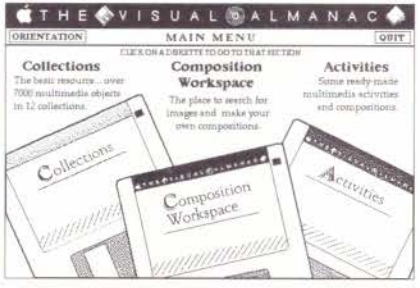
There are two ways to explore the Collections: the Collections Directory and the Collections themselves.

The Collections Directory is a one-disk catalogue of all the Collections. It is a handy way to begin your explorations because you can get a broad overview of the whole videodisc—see how the Collections are organized, what is in them and how to move around in them. It is a single stack, which takes you right up to the border of the Collections. You travel down the levels from collection to chapter to multimedia object. In the Directory you can see the object's image, but you cannot get all its associated information, which is contained on the data cards. The data cards are in the Collection stacks, and to get to them you have to cross the border into the Collections. Each collection is an independent stack.

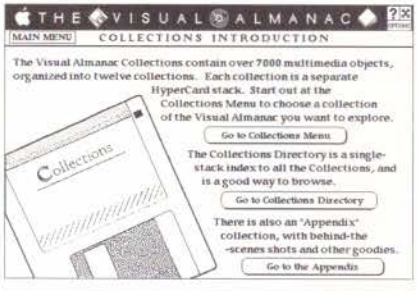
To browse the Collections Directory or Collections, follow the quick start instructions. Step-by-step instructions for the Collections Directory can be found in the Reference section on page 156. You can also follow the directions in the software. You may also explore directly in the Collections, as they are designed for easy browsing.

These quick start instructions assume all your software is loaded on a hard disk. For information about running the software from floppies, see "Managing Your Software," page 190.

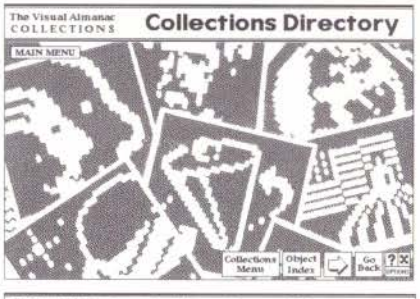
Collections Directory Quick Start



- Get to "Main Menu"
- Click "Collections"



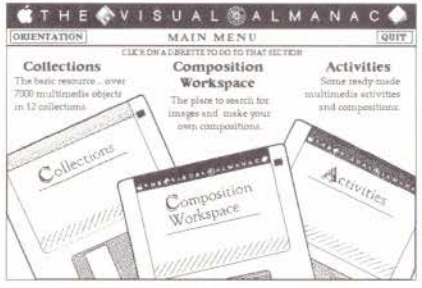
- Click on "Go to Collections Directory"



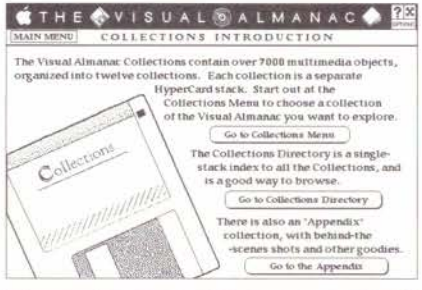
- Click on "Collections Menu"

- Click on an icon to choose a collection, then browse the chapters and objects in the collection

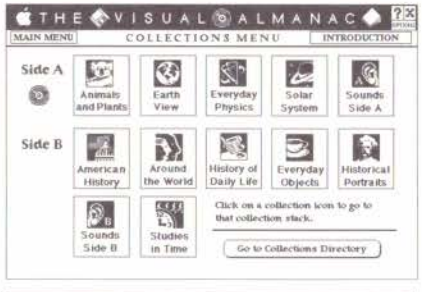
Collections Quick Start



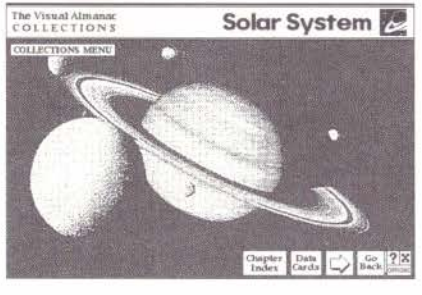
- Get to Main Menu
- Click "Collections"



- Click on "Go to Collections Menu"



- Click an icon to choose a collection and go to the cover card for that stack
  Note: *A videodisc icon on the left side of the screen tells you which side of the videodisc you are on.*



- Click on "Chapter Index" to see the listing of chapters for that collection
- Click on "Data Cards" to go directly to the first data card in that collection

• MIND'S • EYE •

A Conversation with Kristina Hooper on Cultural Literacy

A few years ago when a book called *The Dictionary of Cultural Literacy* was published by E. D. Hirsch, Jr., it caused quite a stir in educational circles. The premise of the book is that every literate person has a specific body of knowledge. I have a fundamental disagreement with Dr. Hirsch, which I will get to later, but I want to talk for a moment about the concept of a specific body of knowledge. It is true that in order to operate successfully in life today, you need to have certain things—facts, ideas, names and dates—at your beck and call. To understand what's going on in the newspapers, to participate in conversations, to get jokes, you need to be in on the common culture of your society—its principles, ideals, references and allusions. It's a shared body of knowledge that allows a society to talk, in a kind of shorthand, to itself.

I realized, to my surprise, when I was looking through *The Dictionary of Cultural Literacy* (by E. D. Hirsch, Jr., Joseph F. Kett and James Trefil), subtitled *What Every American Needs to Know*, that we have a very similar list in *The Visual Almanac* Collections, based on images. Look through the Collections and you will see familiar faces, hear familiar speeches. These are the images that clue us in to our world and our place in it.

Although our list of important elements overlap in several areas, I find that I disagree with Dr. Hirsch in the area of how we acquire this great corpus of information. He doesn't elaborate much on the process but seems to assume that reading is the primary way. He is more concerned with "what" we know and with the general issue of assessment. I am more concerned with the process.

How have you learned what you know? What have your learning experiences been like? How have you learned to associate what you know? How do you use what you know? And how might we all learn new things?

Reading is indeed a key skill, but by no means the only one. Today's children will need to develop many kinds

What have your learning experiences been like? How have you learned to associate what you know?

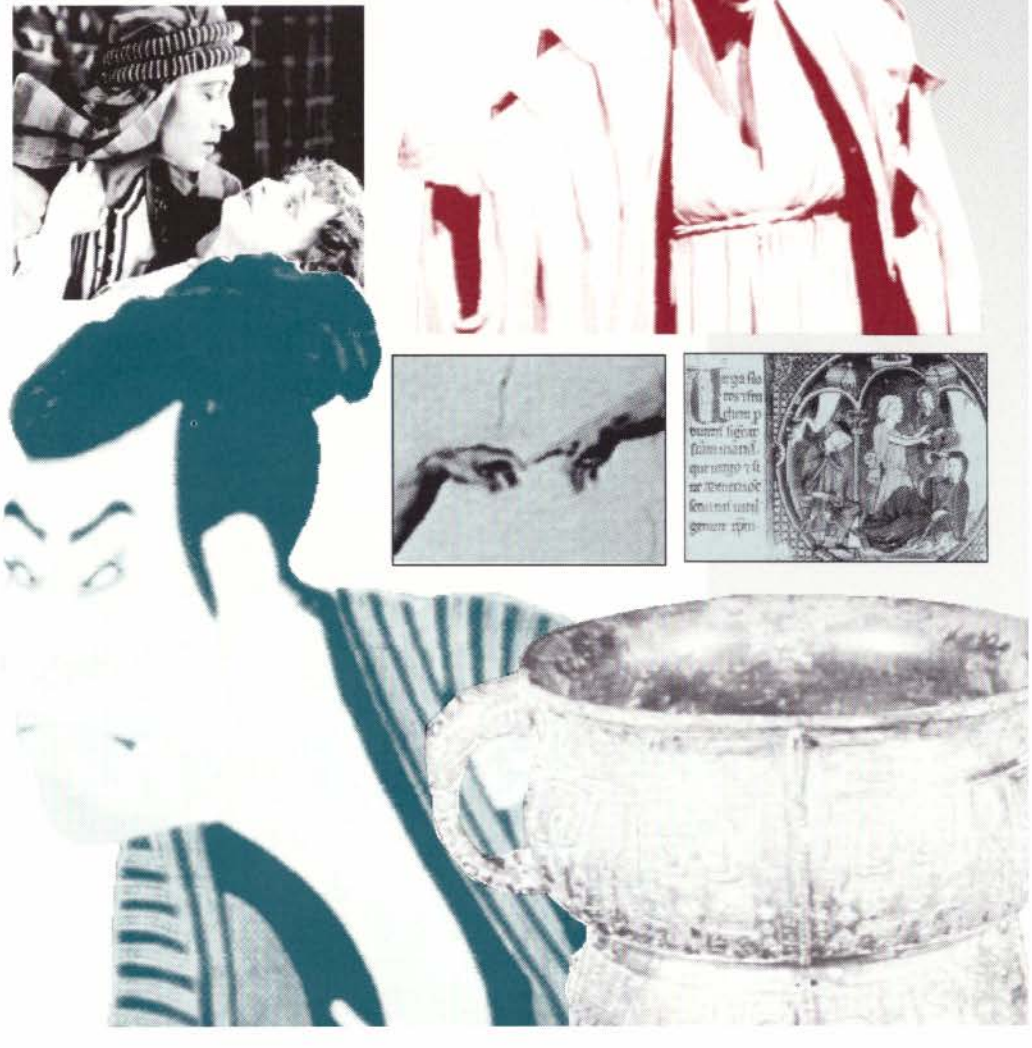
of literacy, not just reading. They need number literacy ("numeracy"), visual literacy, media fluency and highly developed intuition and conceptual skills. Why? Because they must learn how to learn, how to distinguish fact from opinion, and how to interpret science and technology to find out what is good for them in this quickly paced world of ever-increasing choices.

Luckily, we're busy inventing new technology and new ways to use existing technologies so that we can begin teaching these skills more effectively.

The Visual Almanac is one example of a new way to present information. On one hand it is like a first reading book. It teaches you to interact with this kind of visual media on your own terms. And, on the other hand, it is a very sophisticated compendium of our society's collective visual heritage. It will be interesting to follow, systematically, how well people learn from this kind of visual resource.

Many scientific concepts, for example, are hard to understand via textbooks. People who are otherwise "culturally literate" may have a hard time with scientific concepts, not because they are genetically inclined to the humanities but because science hasn't been presented in a way that makes sense to them. I use the word "sense" advisedly. With the kind of direct sense experiences provided by tools such as *The Visual Almanac,* students may have more success grasping difficult concepts. It would be fun, at some point, to provide visual representations of the specific body of knowledge cited by Dr. Hirsch, those terms with which culturally literate people are or should be familiar, and then deal with the issue of acquisition. My guess is that because new technologies afford new possibilities in the representation of ideas, these terms and concepts will be more accessible to more people in more meaningful ways.

I would also like to confront another aspect of Hirsch's proposition... the content. Are these really the things a literate person needs to know? Hirsch's list is thin in science and in multicultural areas. Ah—but that's another conversation.



Collections Index

Numbers refer to chapters on the videodisc.
Descriptions of Collections and chapters follow the index.

SIDE A

Index to the Collection Side A 1

Solar System Collection

Earth's Orbit 2
Moon's Orbit 3
Humans In Space 4
Planets 5
Solar System Model 6

Everyday Physics Collection

Playground Physics 7
Amusement Park Physics 8
Kitchen Physics 9
Objects in Motion 10
Science Grab Bag 11

Earth View Collection

Weather 12
Calendar 13
Aerial Views 14
Geology and the Elements 15

Animal and Plant Collection

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Fish 18
Reptiles and Amphibians 19
Birds 20
Mammals 21
Evolution 22
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An artifact of videodisc production: The first frame of a disc must have a chapter stop. 25

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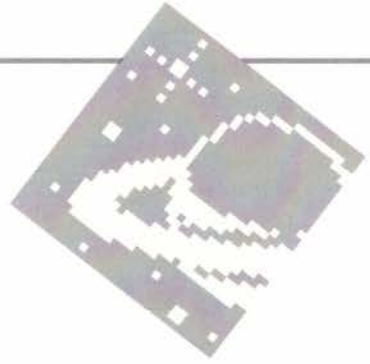
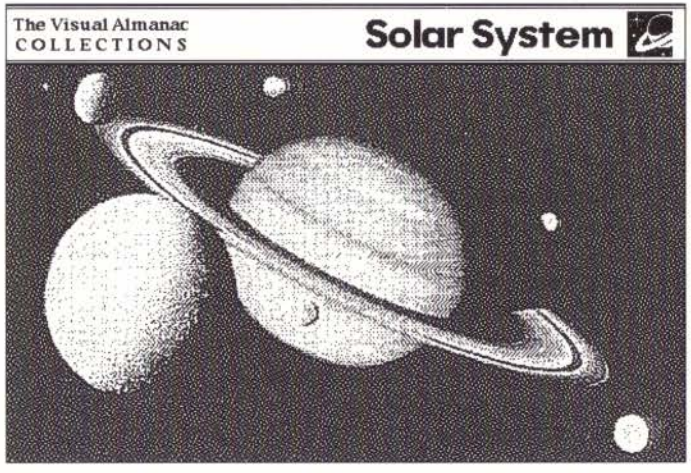
Sound Collection Side B

Channel 1
Channel 2

Solar System Collection



In this collection you can hitchhike through the Solar System. See the Moon orbiting the Earth, and the Earth orbiting the Sun! Cruise the Planetary Highway from the Sun to Pluto!



Earth's Orbit 2
Watch the Earth orbit the Sun in its yearly cycle.

Moon's Orbit 3
Watch the Moon as it orbits the Earth in its monthly cycle.

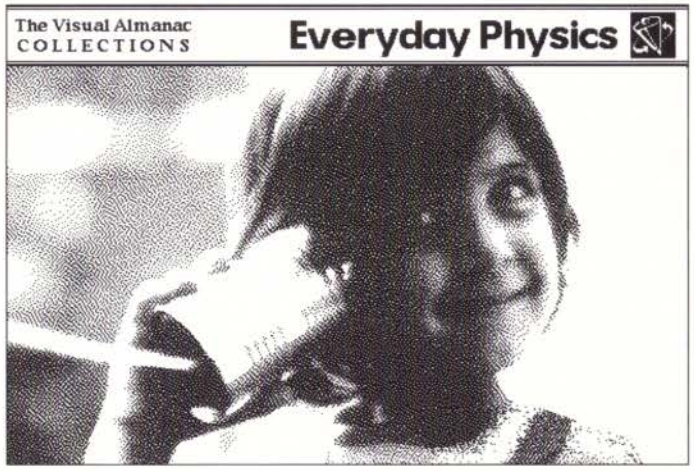
Humans in Space 4
Here are the astronauts and cosmonauts of the first quarter-century of space exploration. Ride with them as they work, eat, even play in space.

Planets 5
The Earth has one moon, Jupiter has a dozen! Take a look at each of the planets and their satellites. This chapter has photographs, film clips, and artists' renderings.

Solar System Model 6
This footage takes you on a metaphoric trip through the Solar System. It is used for the Planetary Highway, an activity designed to illustrate relative distances between planets.

Everyday Physics Collection

In this collection you will find that physics doesn't just take place in the laboratory. Here's everyday physics: in the toy box, the playground, the kitchen and the amusement park.



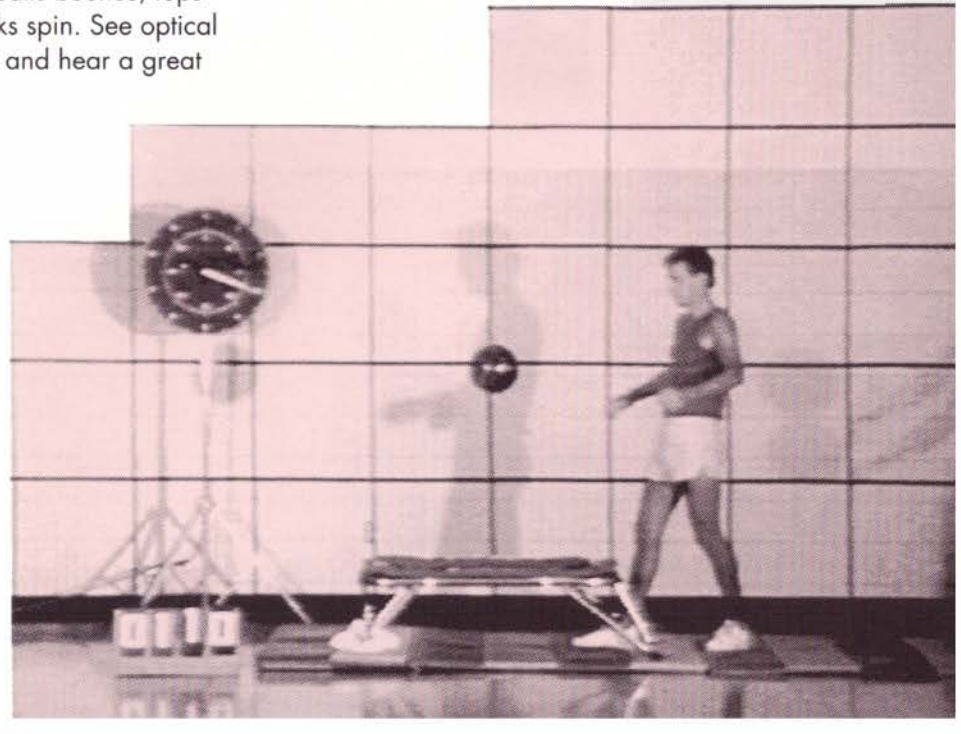
Playground Physics 7
The physics lab moves to the playground. Students play on a merry-go-round and teeter-totter to demonstrate a range of physical principles, including the conservation of angular momentum, frames of reference and balancing weight.

Amusement Park Physics 8
See what happens to your stomach on an amusement park ride! This chapter uses movies taken at the Great America Theme Park in Santa Clara, California, to illustrate the principles of acceleration and force.

Kitchen Physics 9
This chapter turns an ordinary kitchen into a physics lab. Everyday kitchen items demonstrate physical principles such as temperature changes and the Bernoulli effect.

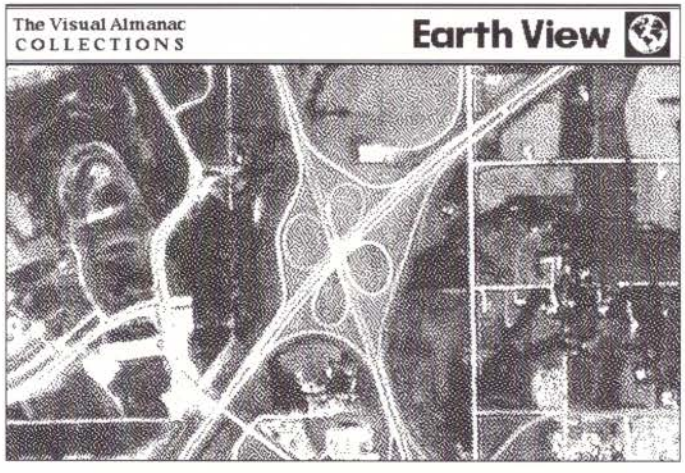
Objects in Motion 10
Watch balls bounce, tops and jacks spin. See optical illusions and hear a great laugh!

Science Grab Bag 11
This chapter contains some basic scientific phenomena: the density of objects, the electromagnetic spectrum, elements of light and color.



Earth View

Take a new look at the Earth. Look at geological changes over time, at satellite views of major U.S. cities and at our weather for a full year, as well as the periodic table and other basics of physical science.

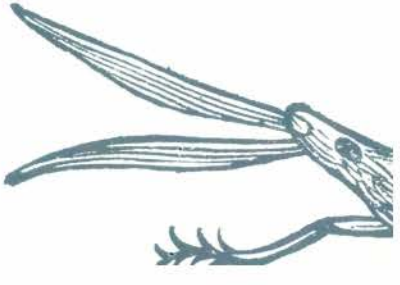


Weather 12
Here's North America's weather for a full year, as well as an assortment of cloud formations and dramatic images of tornados and hurricanes.

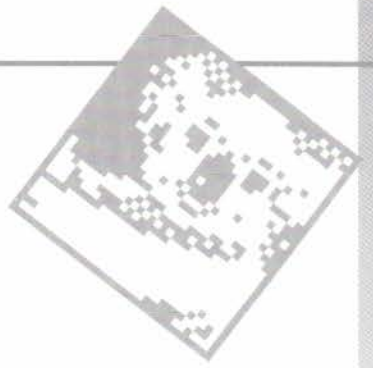
Calendar 13
The seasons change, the Moon waxes and wanes, the holidays come and go, all on the Apple Multimedia Lab's 1990 calendar.

Aerial Views 14
View some major U.S. cities from a Landsat satellite 23,000 miles above the Earth.

Geology and the Elements 15
This chapter features elements from the Periodic Table and a computer-generated animated film that lets you travel in time to see the geologic changes in North America over the past 100 million years. Images courtesy of Optical Data Corporation.



Animals and Plants



In this collection, look at plants and animals—past, present and future. See animals from all over the world in their natural habitats; in hiding, in motion and close-up.

Plants 16
Trees with roots that grow from its branches, a flower with a bird's name, and a plant that "eats" flies—all seen in this colorful chapter.

Invertebrates 17
See spineless creatures that inhabit the seas and then take a bug's-eye view of the insect world... watch insects in their habitats.

Fish 18
Explore the underwater world of fish.

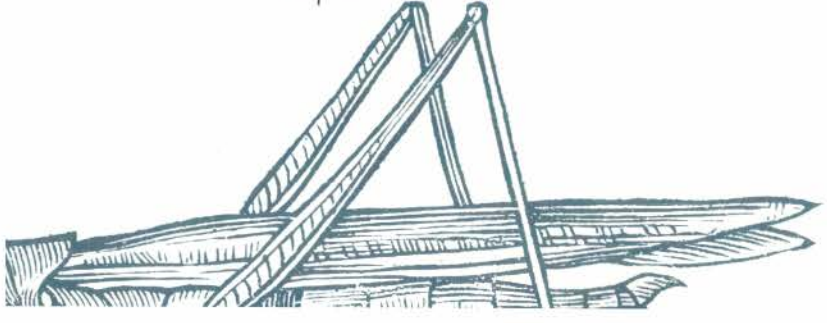
Reptiles and Amphibians 19
Take a safe, close-up look at the world of reptiles and amphibians in their natural habitats.

Birds 20
Be a birdwatcher and see birds in their natural habitats around the world.

Mammals 21
Go on a photo safari for pictures of mammals of all kinds and sizes.

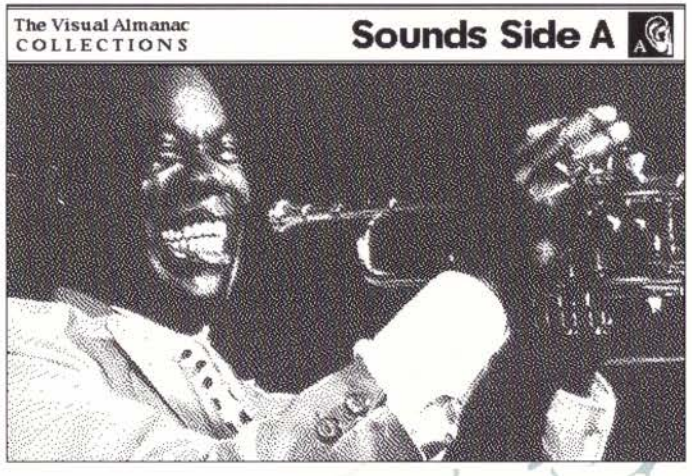
Evolution 22
The varied selections in this chapter include: an animation of evolution from a single-celled organism to humans; animals in camouflage; a mammal mural from The Peabody Museum at Yale University; and drawings that propose how animals might evolve "After Man."

Dinosaurs 23
Learn to tell your tyrannosaurus rex from your stegosaurus. This chapter includes the famous "Age of Reptiles" mural from The Peabody Museum at Yale University and animated dinosaur models.



Sounds Side A

This collection contains over 300 multimedia objects that are sound only and have no video image. Although you will not see anything, you will hear many strange and wonderful sounds: music playing, a dog barking, bacon frying, a nightingale singing and more. Listen to Channel 1 for a narrative overview of the Collections. On Channel 2 there is a library of sounds you can use in your compositions.



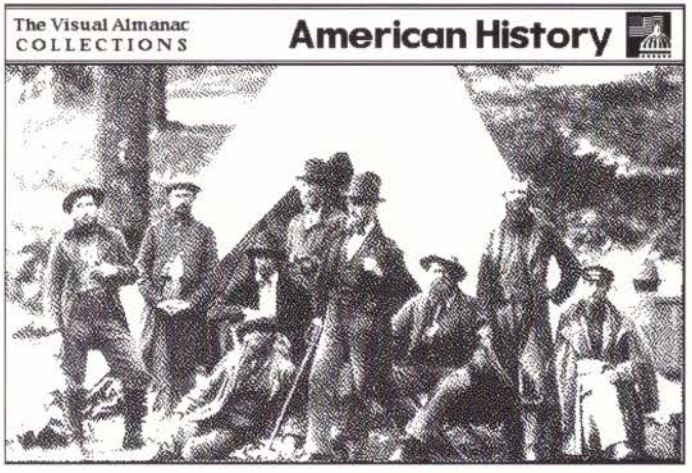
Channel 1
Channel 1 includes a narrative overview of the images on the videodisc, some music and other miscellaneous sounds that are used as dividers between collections.

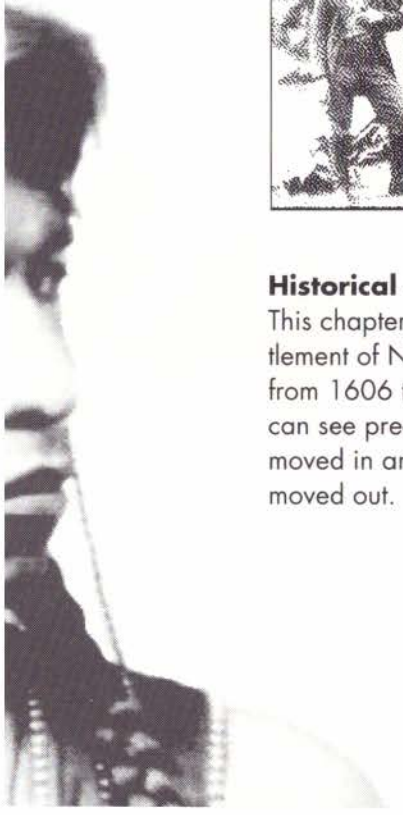
Channel 2
Channel 2 includes sound effects, musical instrument samples of musical instruments, animals and different languages, and sounds that are synchronized with images.

Credits Side A **24**
This chapter is a list of the credits and sources for all the images on Side A.

American History

In this collection, you'll experience some high points of America's history—from Native Americans to California missions, the Civil War and the Cold War and much more. See newsreels of the big events of this century. Major contributors include the Bettmann Archive, the CEL Video Encyclopedia of the 20th Century, the California Historical Society and the National Archives.





Historical Atlas **27**
This chapter shows the settlement of North America from 1606 to 1900. You can see precisely who moved in and who was moved out.

California Missions **28**
Spanish priests and explorers, led by Father Junipero Serra, established 21 missions in California stretching from San Diego to Sonoma. You can take a tour of them all in this chapter.

Native Americans **28**
This chapter includes paintings and photographs of Native Americans. These are the people displaced by the dramatic events portrayed in the Historical Atlas.

Civil War **30**
Some of the earliest photographs were taken during the American Civil War. This chapter contains many of these photographs.

American West **31**
Here are some images of the old American West—settlers in sod houses, prospectors and a few cowboys, too. The Historical Atlas shows where people settled, this chapter shows some of those people. Images from The National Archives.

20th Century at a Glance **32**
Newsreel highlights of the twentieth century: the Wright Brothers' flight, the moon landing, Hitler's Reich, Gandhi's funeral, Queen Elizabeth II's coronation, Nixon's visit to China and more.

Cold War **33**
This is a collection of newsreel movies highlighting the major leaders and events of the Cold War—from FDR at Yalta in 1945 to Krushchev at the Paris Summit in 1960.

Historical Portraits Collection

This collection is a portrait gallery. Over 550 historical figures—from Homer to Mark Twain, with Sara Bernhardt, John Wayne, Sojourner Truth, Mother Teresa, Attila the Hun, Chiang Kai-Shek and others. What a species we are! Major contributors include the Bettmann Archive and the CEL Video Encyclopedia of the 20th Century.

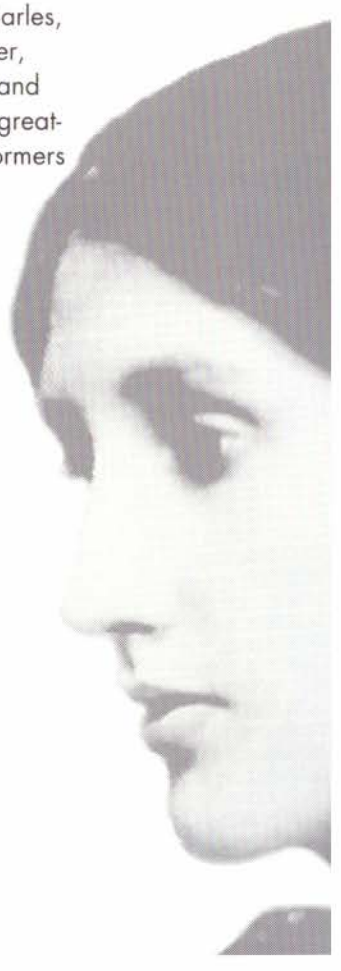
Pioneers **34**
This chapter contains images of pioneers through history. There are scientists and inventors like Euclid and Darwin, Mead and Mendel; explorers like Marco Polo, Charles Lindbergh and Sally Ride.

U.S. Presidents **35**
From George Washington to George Bush—here are portraits of all the presidents of the United States. There's also an assortment of presidential campaign buttons. Most of the portraits are from the Bettmann Archive.

Political Leaders **36**
Here are the great political leaders and social reformers of history: Julius Caesar, Anwar Sadat, Winston Churchill, Sojourner Truth, Susan B. Anthony, Malcolm X and many more.

Thinkers **37**
This chapter contains images of great thinkers throughout history—including philosophers, such as Socrates and Plato, Machiavelli and Locke; and spiritual leaders, such as Jesus, Mohammed, Confucius and Joan of Arc.

Artists **38**
Artists, authors and musicians, featuring the likes of Shakespeare, Ray Charles, Monet, Mozart, Homer, Sinatra, Baryshnikov and Cassatt. Some of the greatest creators and performers ever assembled!



Miscellaneous **39**
In this chapter, meet famous people in an assortment of fields: Helen Keller, O.J. Simpson, Frank Lloyd Wright and others.

Profile: Thomas A. Edison **40**
This chapter profiles the quintessential American inventor, Thomas Alva Edison. He patented over 1,000 inventions, including the electric light bulb and the phonograph.

Profile: Marie Curie **41**
This chapter profiles the Nobel-Prize-winning physical chemist, Marie Curie. She is known for her pioneering work in radioactivity.

Profile: Albert Einstein **42**
This chapter profiles the most famous scientist of the twentieth century, Albert Einstein. His theories of general and special relativity changed forever the science of physics and our view of the universe.

Profile: Franklin D. Roosevelt **43**
Relive the first half of the twentieth century through photos and movies of the life of Franklin D. Roosevelt.

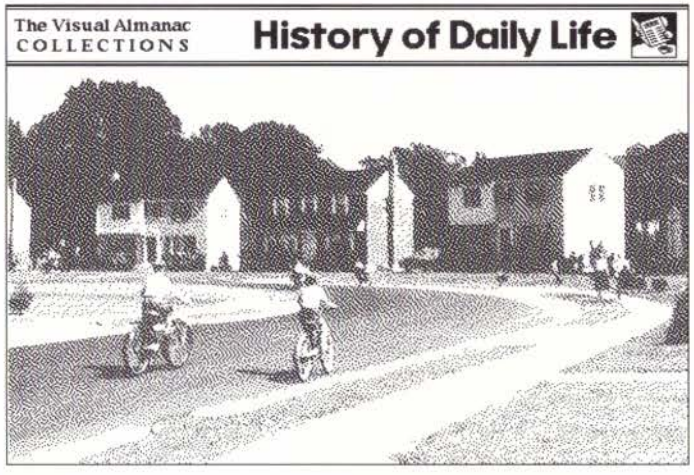
Profile: Mahatma Gandhi **44**
This chapter profiles Mahatma Gandhi, the Indian leader who advocated passive resistance to authority as a means to social change and led India to independence from Britain.

Profile: John F. Kennedy **45**
This chapter is a film portrait of JFK as a young man, a U.S. senator, a father and a president. Highlights of some of the major speeches of his administration are included.

Profile: Martin Luther King, Jr. **46**
This profile, of Martin Luther King, Jr., shows highlights of his illustrious career, including the marches and speeches that helped shape the U.S. Civil Rights movement.

History of Daily Life

This collection points up the similarities and differences in people's lives all over the world, from ancient times to our own. Images of work and play, art and science, politics and religion, communication and transportation and more.



Food 47
The focus is on food... farming it, hunting it, cooking it, eating it and even washing the dishes, from a historical and cross-cultural perspective.

Clothing 48
A fashion show illustrating some of the history of clothing.

Shelter 49
The built world: rural and urban architecture from the Egyptian pyramids to the Empire State Building, grass huts to apartment buildings.

Work 50
What do people do all day? Here's a look at that question from a historical and multicultural point of view.

Transport 51
A quick trip through the history of transportation—from stone wheels to the Concorde. Plus a special section on the history of flight, including mythology and early attempts, Kitty Hawk and beyond.

Trade 52
Follow the development of trade from Egyptian merchants to modern advertising. These images take us through fruit, meat, slave and stock markets. Here also are the tools of trade: money, scales and signs.

Media 53
A look at how humans have communicated with each other throughout the ages: from smoke signals and the Rosetta Stone to telegraphs, telephones and television.

Science 54
This brief survey of the history of science, includes inventions and inventors ancient and modern, as well as early models of the Universe.

Health 55
Images of health and medicine through the ages and across cultures include a Chinese herbalist, old insane asylums, doctors and medicine men and early surgical methods.

Leisure 56
Photographs, prints and paintings show people at leisure through the centuries: at the circus and the theater, on picnics, playing games.

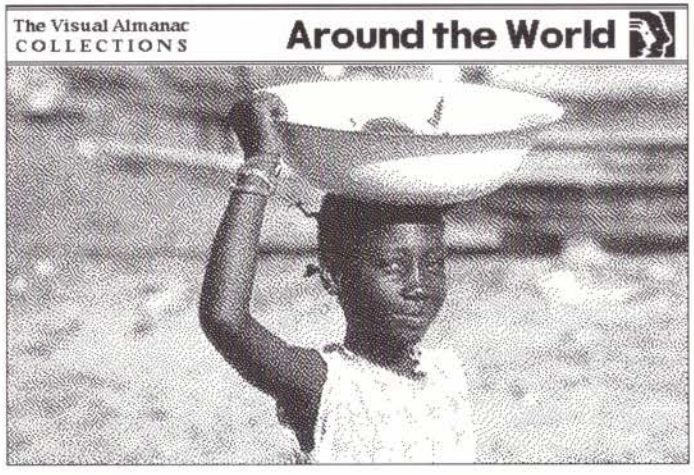
Arts 57
This is the fine arts corner, an eclectic collection of images of art, dance, film and literature—from Joan Crawford and W.B. Yeats, it's a varied and lively group!

Religion 58
This chapter illustrates worship in many of the world's major religions from ancient to modern times: icons, churches, mythological gods and heroes.

Politics 59
Politics is a part of everyday life all over the world, although it has been practiced differently through the ages. Look at some political animals from the past and compare them with those of today.

Around the World

Around the world in 1,000 pictures! See United Nations photos of people everywhere. Live "A Day in the Life" of America, Japan and the Soviet Union. Discover the origins of things you use every day. Explore marketplaces in Brazil and Bolivia. Major contributors include Collins Publishers and UNESCO.



A Day in the Life of Japan 60
"Make extraordinary pictures of ordinary events" were the instructions given to some of the world's leading photojournalists as they captured "A Day in the Life of Japan" on June 7, 1985.

Day in the Life of America 61
"Make extraordinary pictures of ordinary events" were the instructions given to some of the world's leading photojournalists as they captured "A Day in the Life of America" on May 2, 1986.

A Day in the Life of the Soviet Union 62
"Make extraordinary pictures of ordinary events" were the instructions given to some of the world's leading photojournalists as they captured "A Day in the Life of the Soviet Union" on May 15, 1987.

People around the World 63
This chapter features the human family... the faces, costumes and cultures of the people of the world.

A Day in Rio 64
Wander not quite aimlessly through a marketplace in Rio de Janeiro. Shop at the open marketplace and then spend a quick day at the beach!

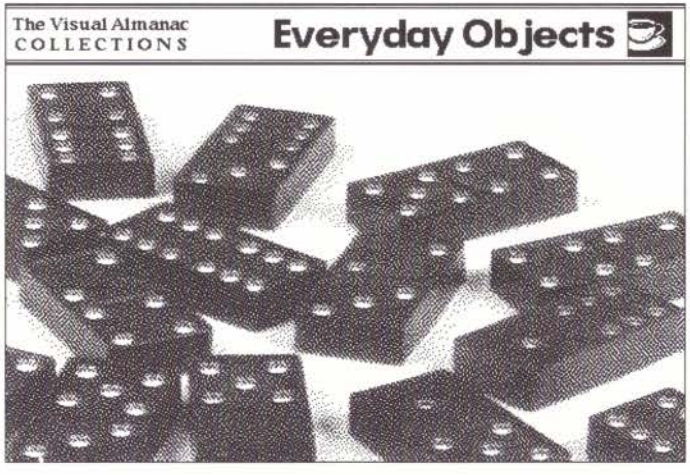
Weaving in Bolivia 65
Here is the story of Bolivian woven rugs. See rugs being woven on the loom and hanging in the market stall. You will see close-ups of the patterns and fibers and trace the dyes and wools back to their origins.

China 66
Qin Shi Huang Di, China's first emperor, built a wall, united a continent and formed a new civilization. Here is a small collection from "The First Emperor of China" videodisc of Project Emperor-I, provided by Ching-Chih Chen of Simmons College.

Paths of Things 67
Where does your breakfast come from? Or a baseball bat? This chapter traces the paths of things as they are transformed from one state to another.

Everyday Objects

In this collection, you will find a variety of objects from around the house, from mascara to Swiss Army knives, fasteners of all kinds, tools, coins, slices of fruits, blocks, connectors and some mystery things, too! The major contributor to this collection was the Apple Multimedia Lab.



Coins **68**
Images of coins from around the world. Use them to count, to teach place value, to flip for heads or tails and more.

Odds and Ends **69**
Going into this chapter is like delving into a generic purse or odds-and-ends drawer. Find keys, Swiss Army knives, makeup, paper clips. Count them, say them in other languages, see how many you have in your own home.

Connectors **70**
This catalogue of connectors for computers, audio, video and other equipment shows how we connect our machines that transport and display information and entertainment.

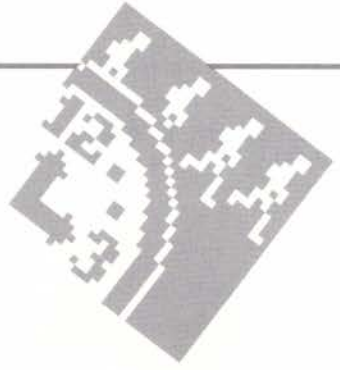
Blocks **71**
A set of video building blocks you can use to create your own number and word patterns and games.

Games **72**
Fifty-two pick-up! Still frames of every card in the deck. Stack them, shuffle them, count them, design card tricks. Dominoes, chess pieces and dice are also shown.

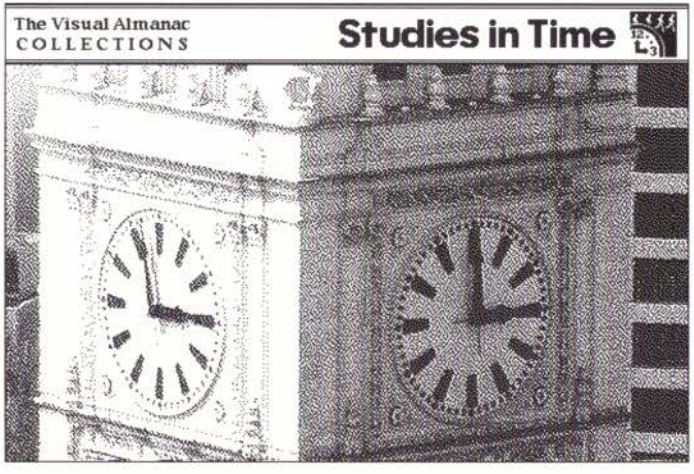
Fruit Slices **73**
No matter how you slice it, this chapter is about fruit (and vegetables)... looked at from every possible point of view. Produced by the Apple Multimedia Lab.

What Is It? **74**
Here are some mysterious images! Take an uncommon look at common things.

Studies in Time



In this collection, time is of the essence. See things change over time: a street in California, fresh fruit and a sundae. Fiddle with a clock and a calendar. Examine the time-and-motion studies of Muybridge and Edgerton. Major contributors include the Stanford Library and the Apple Multimedia Lab.



Time Compression 75
Things change—from ripe to rotten, from sunrise to sunset. This chapter shows time-lapse footage of these natural cycles.

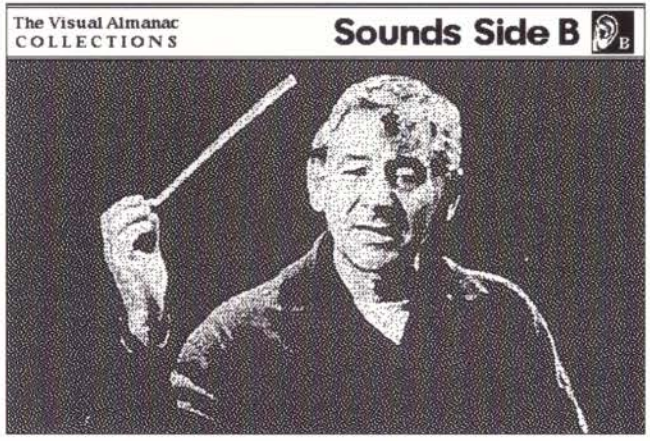
Time Expansion 76
This chapter focuses on photographic motion studies—for example, Muybridge's classic motion studies of animals and people and Edgerton's slow-motion films of popcorn popping, a Coke bottle breaking.

Timekeeping 77
This chapter is about time—measuring it, that is. There's a clock, a stop watch, an hourglass and a calendar (which is also on Side A). They can be used in countless ways from teaching time to multiplication.

Main Streets: Then and Now 78
How much do things change in a decade? We have matched one mile of a California street in 1975 with the same stretch of road in 1987. Also included is a comic strip on the subject of a changing America by R. Crumb.

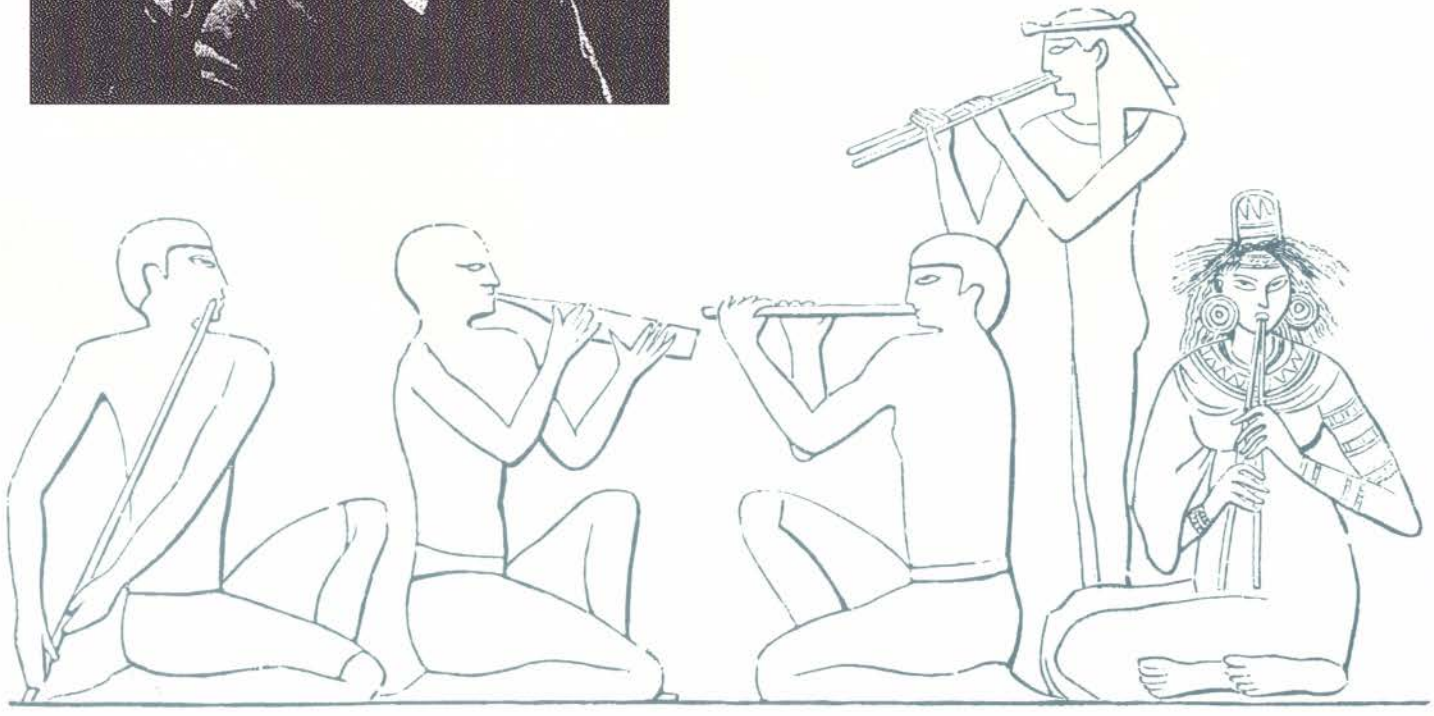
Sounds Side B

This collection contains over 150 sounds. The multimedia objects are audio and have no video image. Although you will not see anything, you will hear many strange and wonderful sounds: sound effects, musical interludes, environmental sounds and some of the sound that is synchronized with images.



Channel 1
Channel 1 includes a narrative overview of the images on the videodisc, some music and other miscellaneous sounds that are used as dividers between collections.

Channel 2
Channel 2 includes sound effects, samples of musical instruments, animals and different languages, and sounds that are synchronized with images.



Sources and Credits

The Visual Almanac videodisc was made possible because many organizations and private individuals contributed their images. Using images that are owned by others involve very thorny legal issues. There are traditional ways to handle these issues in book publishing, but videodiscs and multimedia open up entirely new issues: it is a whole new ball game. The people who allowed us to use their images are also pioneers. They too are interested in the potential of this new medium. Their participation in *The Visual Almanac* was, of course, vital.

The images in *The Visual Almanac* can be used for any compositions you make, as long as they are shown in educational and noncommercial settings.

There are several ways to find out the source and credit of a specific image on-line:

- The source and credit for each image is on its data card. If you want to find out the address of the source, click on the word "Source."
- Click on the "Source Credit" button in the Collections Directory. You will find all the source information, including the address.

For your convenience a list of all sources (redundant with on-line services) follows.

American Museum of Natural History
Images from the Museum appear in the following collections: Solar System, Earth View, Animals and Plants, American History. The museum has a large collection of natural history photographs, which are available through the Department of Library Services, Photographic Collection. Contact the museum library for more information.

American Museum of Natural History
Department of Library Services
Photographic Collection
New York, NY 10024
(212) 769-5418

The Astronomical Society of the Pacific
Images appear in the Solar System collection. 35mm slide presentations and additional information on all aspects of astronomy and space exploration are available from the Society. Special thanks: Sherwood Harrington, Andrew Fraknoi

The Astronomical Society of the Pacific
390 Ashton Avenue
San Francisco, CA 94112

The Bettmann Archive
Images appear in the following collections: Solar System, Everyday Physics, American History, Historical Portraits, History of Daily Life. The Bettmann Archive contains millions of still images on a wide variety of subjects, including history, art, news and science. Special thanks: David Greenstein, Linda Gutierrez, Fernando Ortiz, Larry Schwartz

The Bettmann Archive
902 Broadway
New York, NY 10010

California Historical Society
Images appear in the American History collection, California Missions chapter.The California Historical Society has a large collection of books and images on the history of California. Special thanks: Robert MacKimmie

California Historical Society
2090 Jackson Street
San Francisco, CA 94109

California Raisin Advisory Board
Images of raisin production appear in the Around the World collection, Paths of Things chapter.

California Raisin Advisory Board
3445 North First, Suite 101
P.O. Box 5335
Fresno, CA 93755

CEL Educational Resources
Images appear in the following collections: American History, Historical Portraits, History of Daily Life. "The Video Encyclopedia of the 20th Century"™ is a 79-hour video primary resource set on 40 videodiscs, featuring the significant events of the twentieth century. For more information, call CEL Educational Resources, (800) 235-3339. Footage for the Historical Portraits collection, John F. Kennedy chapter is from "John Fitzgerald Kennedy—A Celebration of His Life and Times." Special thanks: Charles Grinker, Monica Digilio, Lauren E. Snyder, Martin L. Waldman

CEL Educational Resources
515 Madison Avenue
New York, NY 10022
(800) 235-3339

Collins Publishers, Inc.
Images appear in the Around the World collection. *A Day in the Life of America:* Book made possible by Kodak, Merrill Lynch, United Airlines, Nikon, Apple Computer, Inc. and Hertz. *A Day in the Life of the Soviet Union:* Book made possible by Kodak, Pan Am, Nikon, Sony and Intourist. *A Day in the Life of Japan:* Book made possible by American Express International, Inc., Kodak Japan, Japan Airlines, Tokyo Hilton International, Apple Computer, Inc. and Olympus cameras. These books are available in most bookstores. Special thanks: Rick Smolan, David Cohen, Cathy Quealy

Collins Publishers, Inc.
50 Osgood Place
San Francisco, CA 94115

Dinamation International
Images from "After Man, a Zoology of the Future" appear in the Animals and Plants collection, Evolution chapter. The images of speculative evolution by Dougal Dixon are a part of an exhibition titled "After Man, a Zoology of the Future," available for schools and museums. For information about this exhibit, or about another on dinosaurs, contact the Dinamation offices. Specal thanks: Michael Converse, Tom Stifter

Dinamation International
27362 Calle Arroyo
San Juan Capistrano, CA 92675
(714) 493-7440

Earwax Productions
Music and sound effects appear in the Sounds collections, Sides A and B. Special thanks: Jim McKee, Bob Davis, Barney Jones, Andy Newell

Earwax Productions
245 Hyde Street
San Francisco, CA 94102

Energy Productions
Time-lapse clips appear in the Studies in Time collection, Time Compression chapter. Special thanks: Robert Zuckerman

Energy Productions
2690 Beachwood Drive
Los Angeles, CA 90068

Florida Sugar Cane League, Inc.
Images of sugar production appear in the Around the World collection, Paths of Things chapter.

Florida Sugar Cane League, Inc.
P.O. Box 1148
Clewiston, FL 33440

Games Magazine
"Eyeball Benders" appear in the Everyday Objects collection, What Is It? chapter. "Eyeball Benders" reprinted from *Games* Magazine, copyright 1988 PSC Games Ltd. Partnership. "Eyeball Benders" is a feature of *Games* Magazine. For subscription information contact Games, P.O. Box 10147, Des Moines, IA 50347-0147. Special thanks: Peter Gordon

Games Magazine
810 Seventh Avenue
New York, NY 10019

Great America Amusement Park
Images appear in the Everyday Physics collection, Amusement Park Physics chapter. Special thanks: Lisa Shannon

Great America
2401 Agnew Road
P.O. Box 1776
Santa Clara, CA 95054

Hillerich and Bradsby Co.
Images of the manufacturing of baseball bats appear in the Around the World collection, Paths of Things chapter. Hillerich and Bradsby Co. manufactures the world-famous "Louisville Slugger" baseball bats. Special thanks: Bill Williams

Hillerich and Bradsby Co.
P.O. Box 35700
Louisville, KY 40232

Jet Propulsion Laboratory
Computer animated images appear in the Solar System and Animals and Plants collections. Special thanks: Jim Blinn, Sylvie Rueff

Jet Propulsion Laboratory
Computer Graphics Lab
JPL-4800 Oak Grove Drive
Pasadena, CA 91109

Kansas State University Department of Physics
Clips from "The Physics of Sports" appear in the Everyday Physics collection, Objects in Motion chapter. Special thanks: Dean Zollman

Kansas State University, Department of Physics
Cardwell Hall
Manhattan, KS 66506

KARE TV-11
Footage of the Minneapolis tornado appears in the Earth View collection, Weather chapter. Extended footage of the Minneapolis tornado is available from Optical Data Corporation. See the Optical Data source card for more information.
Special thanks: Tom Scott

KARE TV
8811 Olsen Memorial Highway
Minneapolis, MN 55427

Kitchen Sink Press
R. Crumb's "A Short History of America" appears in the Studies in Time collection, Main Streets Then and Now chapter. The series of drawings "A Short History of America" by Robert Crumb is available as a full-color poster. Contact Kitchen Sink Press for ordering information. Special thanks: Denis Kitchen

Kitchen Sink Press
2 Swamp Road
Princeton, WI 54968
(414) 295-6922

M.I.T. Lincoln Labs
Doc Edgerton film clips appear in the Studies in Time collection, Time Expansion chapter. Special thanks: John McCook

M.I.T. Lincoln Labs
244 Wood Street
Lexington, MA 02173

The Mechanical Universe
Computer animation sequences appear in the Solar System collection. "The Mechanical Universe" physics series is available on videotape and videodisc. For information contact:

The Annenberg/CPB Project
c/o Intellimation
2040 Alameda Padre Serra
Santa Barbara, CA 93103
Telephone: (800) LEARNER (532-7637)

Special thanks: Don Delson, Hyman H. Field
The Mechanical Universe
Caltech 1-70
Pasadena, CA 91125

Mount Mansfield Television, Inc.
Time-lapse weather satellite photos appear in the Earth View collection, Weather chapter. The satellite images in this animated sequence were originally available from Environmental Satellite Data, Inc., Beltsville, MD. Special thanks: Stuart Martin, WCAX–TV

Mount Mansfield Television, Inc.
WCAX–TV
Joy Drive
Burlington, VT 05403

NASA–Ames Research Center
Images appear in the Solar System and Earth View collections. NASA has a large selection of slides and videotapes on all aspects of space exploration. Contact the Educational Programs Office for more information. Special thanks: Dick Grover

NASA–Ames Research Center
Educational Programs Office TO25
Moffett Field, CA 94035

National Air and Space Museum
Clips from the film *On the Wing* appear in the Animals and Plants collection, Dinosaurs chapter. The film *On the Wing* is copyright The Smithsonian Institution and Johnson's Wax. Special thanks: Brian Duff, Paul MacCready, California Institute of Technology

National Air and Space Museum
Smithsonian Institution
Washington, DC 20560

National Archives
Images of Native Americans, the American West and the Civil War appear in the American History collection. The National Archives has slide sets available on many aspects of American History. Contact the Still Pictures Branch for information.

National Archives
Still Pictures Branch
General Services Administration
Washington, DC 20408

National Weather Service, NOAA
Images appear in the Earth View collection, Time Compression chapter.

National Weather Service
11400 Rockville Pike
Rm. 207, Rockville 1
Rockville, MD 20852

New Era Video, Inc.
Images appear in the Around the World collection, Weaving in Bolivia chapter. These images come from: The Bolivia Hypermedia Expedition™ copyright 1986, 1987, 1988 by Michael Greenberg, courtesy of New Era Video, Inc. Bolivian Archival Photographs, courtesy of Peabody Museum, Harvard University. Bolivian Aymara Ceremony, courtesy of MUSEF—José Augusto Plaza Martinez. Special thanks: Sherman Sall

New Era Video, Inc.
5894 S.W. 42nd Street
Miami, FL 33155

Optical Data Corporation
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Peabody Museum Associates
Dept. A, P.O. Box 6666
170 Whitney Avenue
New Haven, CT 06511

Peabody Museum of Natural History
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P.O. Box 6666
New Haven, CT 06511

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Science Photo Library electron microscope images appear in the Everyday Objects collection, What Is It? chapter. Special thanks: Karen Salzman

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Pioneer LDC (formerly Laserdisc Corporation of Japan)
Images appear in the Animals and Plants collection. Images are from "The Encyclopedia of Animals," which is a series of eight videodiscs containing still, film and video images of the animal kingdom. It is available for purchase through regular retail outlets. Special thanks: Masaaki Hagino, Junko Kamata, Mark Sakai, Daihei Shiohama

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Dr. Ching-Chih Chen
Simmons College
300 The Fenway
Boston, MA 02115

Sea Studios, Inc.
Images appear in the Animals and Plants collection. Special thanks: Mark Shelley, Natasha Fraley

Sea Studios, Inc.
886 Cannery Row
Monterey, CA 93940

Sky Guide
Images of clouds appear in the Earth View collection, Weather chapter. A collection of cloud Photos is available as a full-color poster. For information contact Sky Guide. Special thanks: Art Rango

Sky Guide
P.O. Box 30027
Greenwood Station
Seattle, WA 98103

Stanford University Libraries
Muybridge photographs appear in the Studies in Time collection, Time Expansion chapter. Special thanks: Linda Long

Department of Special Collections and University Archives
Stanford University Libraries
Stanford, CA 94305-6004

Sunkist Growers
Images of orange juice production appear in the Around the World collection, Paths of Things chapter. Special thanks: Claire Peters

Sunkist Growers
14130 Riverside
Sherman Oaks, CA 91423

United Nations
Images appear in the Around the World collection. Special thanks: Martin Bunnel, Georges Leclere, Tom Prendergast, Dewi Williams

United Nations
D.P.I. Photo Library
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New York, NY 10017

United States Department of Agriculture
Images of milk production appear in the Around the World collection, Paths of Things chapter.

U.S.D.A.
Photography Division
Room 4407, South Building
Washington, DC 20250

WVIZ–TV
Clips from "The Kinetic Karnival of Jearl Walker" appear in the Everyday Physics collection, Kitchen Physics chapter. "The Kinetic Karnival of Jearl Walker," a series of six physics programs, is available on videotape. Titles include: "Forces and Collisions," "Rotation," "Fluid Flow and Friction," "Viscosity," "The Leidenfrost Effect" and "The Science of Cooking." For more information contact WVIZ–TV. Special thanks: Jearl Walker WVIZ–Cleveland

Kinetic Karnival
WVIZ–TV Channel 25
4300 Brookpark Road
Cleveland, OH 44134

Xenon Productions
Time-lapse footage appears in the Studies in Time collection, Time Compression chapter. Special thanks: Sam Nicholson

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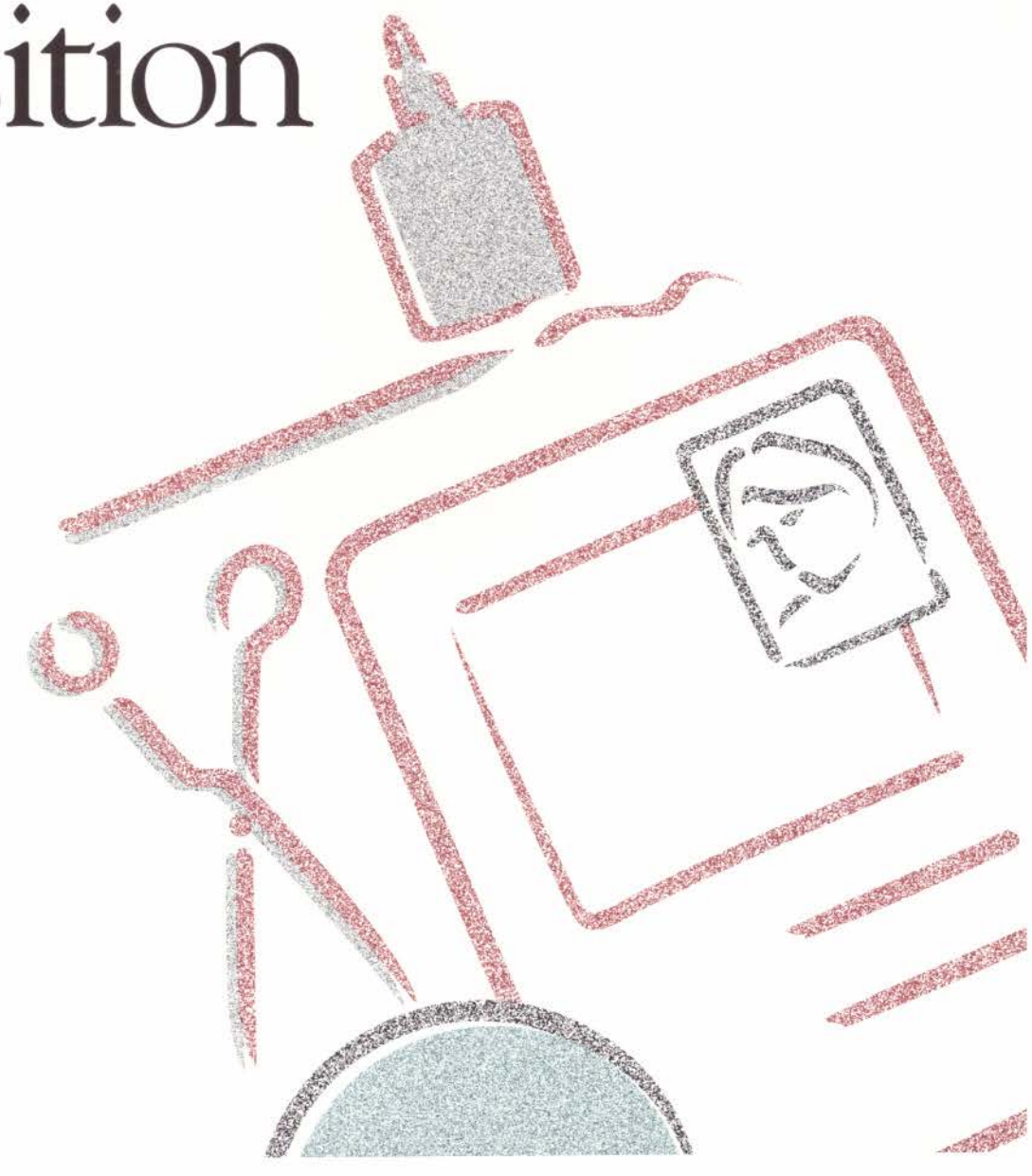
CHAPTER 5

How to Make a Composition



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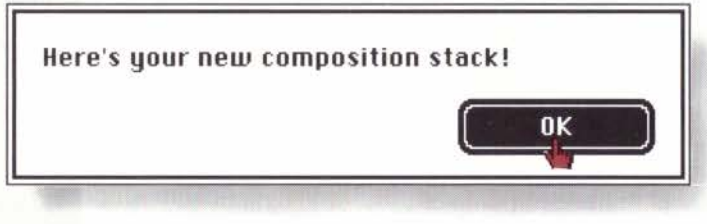


How to Make a Composition

ORIENTATION

The first multimedia report you ever made was in elementary school, probably in the third or fourth grade. What was it about? Montana? Sea mammals? California missions? It may have turned into a family project with your parents helping you glue together a sugar-cube Parthenon or running down to the stationery store for more poster board and glue.

Think back on the things you had to do.

1. Pick a topic.
2. Figure out where to find information.
3. Go get it.
4. Find what's useful. Mark what you might want to keep for the report.
5. Spread out all the stuff you found on the table or floor and make a final selection of what you want to use.

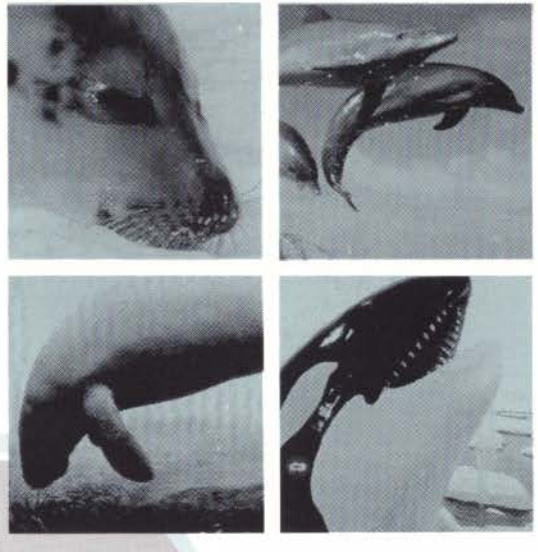
6. Fill in all the information you're required to have in neat handwriting.

7. Get all the pieces together and begin assembling the pages of your report.

Now what you do with the Composition Workspace is essentially the same thing. The differences are mostly technological. Instead of taking pictures out of magazines and books, you take them off of a videodisc. Real scissors and paste are replaced by electronic tools which do the same thing. It is useful to recognize what a familiar activity making multimedia is because it always takes a while to get the hang of new tools. The Composition Workspace is conceptually simple, based on the steps for every report or presentation you have ever made from the third grade on. And it is fairly simple to use. In fact, the instructions make it look more complicated than it is. It is easier to use it than it is to read about it.

A couple of words of advice before plowing ahead. This is not whiz-bang-push-a-button-and-it's-all-done-for-you technology. The most active part of this whole interactive process is your mind. The Composition Workspace is a set of tools for you to use. The computer will do the physical searching of images for you, for example, but you still have to think about what you want to search for. The more you work with *The Visual Almanac* the easier it will be because you will become increasingly familiar with the images. Knowing where to find things is always the most valuable research tool.

One other thing—*The Visual Almanac* is a resource for you but it's not the only one. You can't and shouldn't rely on just one source for everything. You may want to supplement your compositions with other nonelectronic "multimedia objects." The Collections have over 7,000 objects on 12 different subjects. It's a rich resource but not an endless one. You should still go to a public library and museum and write to Chambers of Commerce for information. The more things you bring into your presentation the more multi your media!

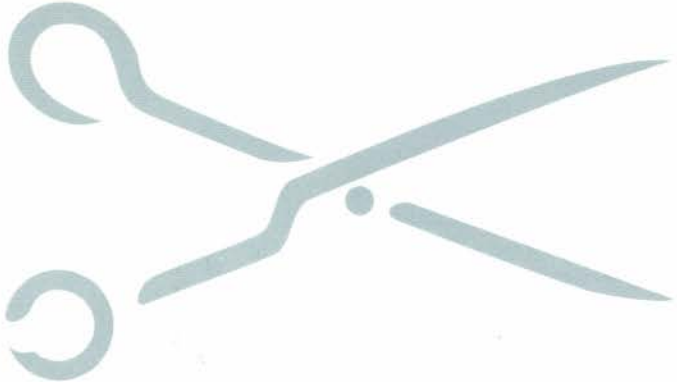


Sample Compositions

To give you an idea of the kinds of things you can make using the Composition Workspace, we have included a set of compositions made by a group of the first users of *The Visual Almanac:* some from inside the Multimedia Lab, some from outside.

These sample compositions were made using the Composition Workspace to manage the multimedia objects. Many have used the templates provided in this workspace for making compositions. Some have gone into HyperCard to add a bit of fancifulness using basic HyperCard paint tools and adding scripts. We have noted where this is the case, so that you can think of doing the same thing yourself. If you have not used HyperCard before, perhaps making compositions with *The Visual Almanac* will be your entry into HyperCard.

The Visual Almanac is built on HyperCard, but you do not need to know how to use it to make good solid compositions and presentations. Because the more tools you have at your disposal, the greater your own personal power, we encourage you to learn a bit about it.



Making Compositions

You don't have to make a composition to make a presentation. If you are making an oral report or leading a class discussion, you might just want to show objects from a "Select List." If you want to get fancier—add words or text, to your report—then you'll want to make a composition, using one of the templates provided in the Template Master. If you plan to have people see your composition when you're not there, you would probably want to include more text to explain your ideas more fully. And if you are like most of the people who made these sample compositions, you will also want to make your composition appealing. This is where you begin to design. Organize your buttons and text messages carefully on the card. Include some sound objects on the cards so that people can listen to music while they read the text. Get into the HyperCard paint tools and put in some graphics to add excitement. If you have access to a scanner, you can scan in images. Have fun.

There are no rules about the structure of a composition. You can see in the ones we've included that a few are straightforward presentations as for a speech or class report. There are stories, visual puns, games and more. What follows are descriptions of the sample compositions written by the authors.

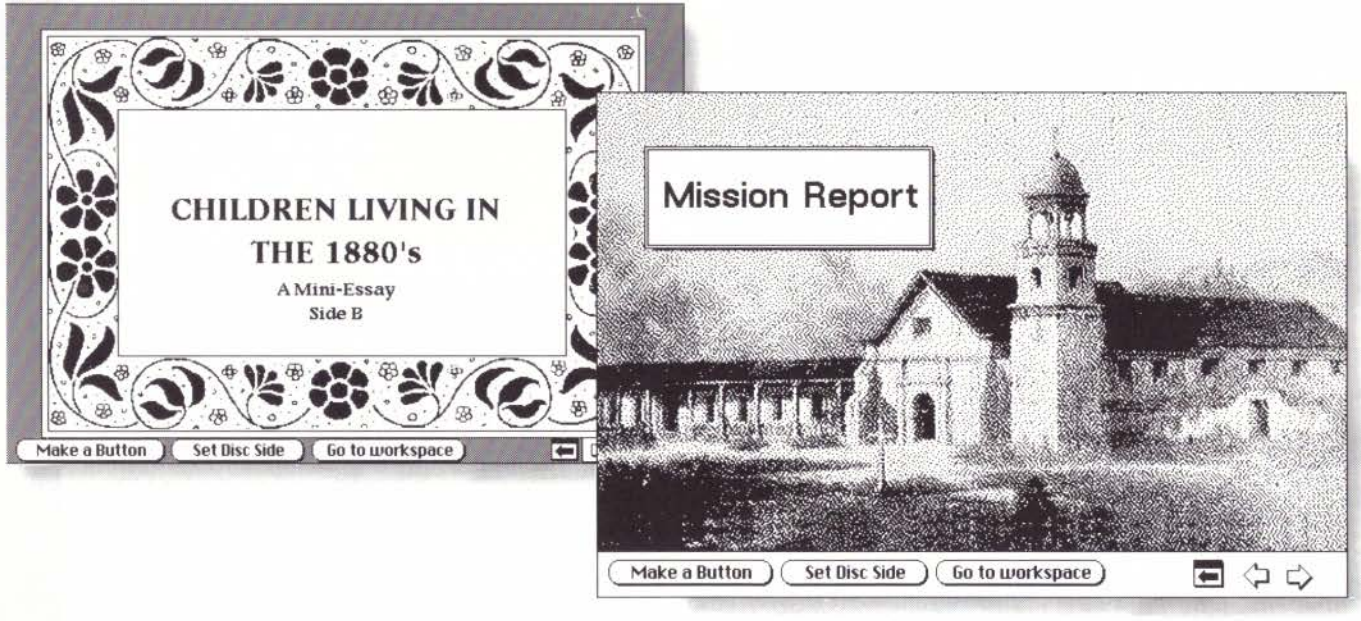
Compositions by Some of the First *Almanac* Users

Children of the 1800s (Side B)
by Amanda Ropa and Marsha Williams
This is a short essay which shows how children looked and what they did a hundred years ago. It is just one card... a pretty simple multimedia report, which we think our students could easily make. The border is from HyperCard Stack Ideas.

Making Change (Side B)
by Pat Blevins
Young children often have trouble learning the value of our currency. This composition will help them to understand the relationship between various U.S. coins.

Mission Report (Side B)
by Nancy Lund and Jack Wall
Every fourth grader in California learns about missions. We made this composition so that they would not only read facts and stories, but see pictures and hear music as well. This is just a springboard. The next step is for them to do their own research and make their own multimedia reports!

What Is That? A Board Game (Side B)
by Bob Bayless
This is a simple board game. You click to spin a number, move that number of spaces. Click. Look at the video and guess what you see. I used HyperCard to make the spinner. You can copy that button to make your own game.



Choose an Adventure (Side A)
by Keith Yocam and Jacqui Giddings
Here is a "choose your own adventure" story. You can travel to Saturn and beyond and come home to Earth again. Once you have finished your journey, you can start over and go to different destinations.

A Presidential Puzzle (Side B)
by Bob Bayless
Here is a new way to learn about the presidents and a new kind of crossword puzzle. Crossword-and-picture is more like it. The clues are the presidents' portraits you see on the video screen when you click on the numbers. I drew the grid and then used the HyperCard button tool to hide the buttons behind the numbers.

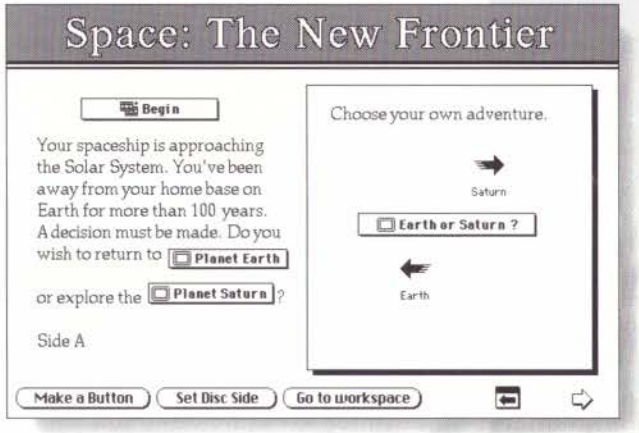
Improvisations (Side A and B)
by Jacqui Giddings, Rafael Gracia, Keith Yocam and Bob Bayless
Here are some multimedia puns and jokes. We juxtaposed the images by using the Splicer in Composition Options. Add your own.

International Dress (Side B)
by Amanda Ropa
What we wear reflects who we are, where and when we live. This composition is a multimedia fashion show that looks at clothes from five different points of view: weather, religion, fabric, style, time.

International Dress

Fun with Sorting (Side A)
by Bob Bayless, Pat Blevin and Mary Patterson
Here are some sorting games that take advantage of the fact that you can move buttons around. Look at or listen to the buttons and then move them into the most appropriate category.

Cuban Missile Crisis (Side B)
by Mary Patterson
I designed this composition to encourage discussion on the 1962 Cuban Missile Crisis and the events leading up to it. History comes alive as you see and hear the people who made history in the recent past and shaped and changed our lives today.

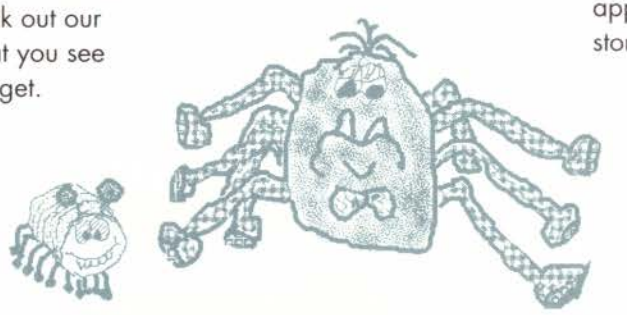


Choose an Adventure

A FAMILY PRODUCTION

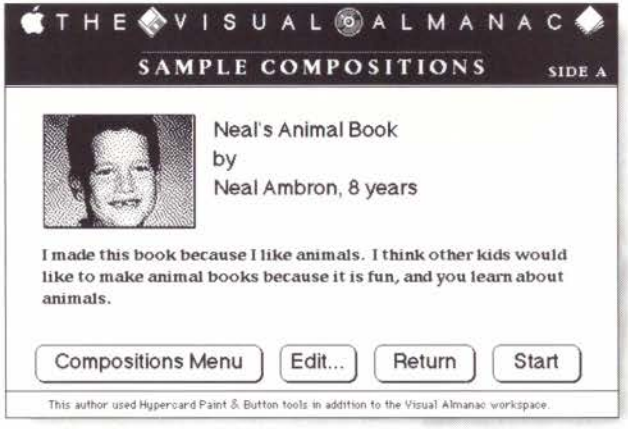
Chez Michelle (Side B)
by Meghan Ambron (age 16) and Sueann Ambron (over 16!)
Welcome to our restaurant. We searched far and wide through the Collections to bring you the best food available in multimedia today. Check out our menu... what you see is what you get.

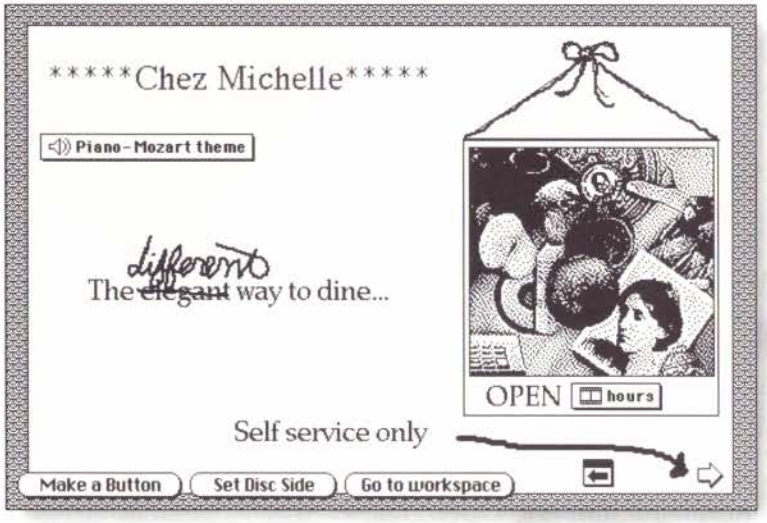
Neal's Animal Book
by Neal Ambron (age 8)
I made this book because I like animals. I think other kids would like to make animal books because it is fun, and you learn about animals.



The Sowbug and the Spider
by Brian and Sueann Ambron
A fable wherein a lowly sowbug learns to appreciate who he is. And we learned to appreciate multimedia as a new approach to children's storybook illustration.

Harry T. Spider's Tea Party
by Maura Ambron (age 12)
Sally Sowbug is sad because she wasn't invited to the trapdoor spider's tea party. She crashes the party and learns, in the nick of time, that a spider's hospitality can be deadly. To make this story, I used many of the buttons from my parents' story *The Sowbug and the Spider*. You can, too.

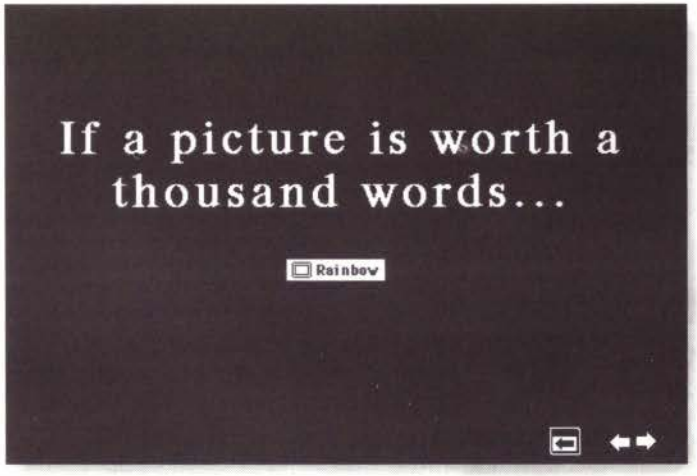


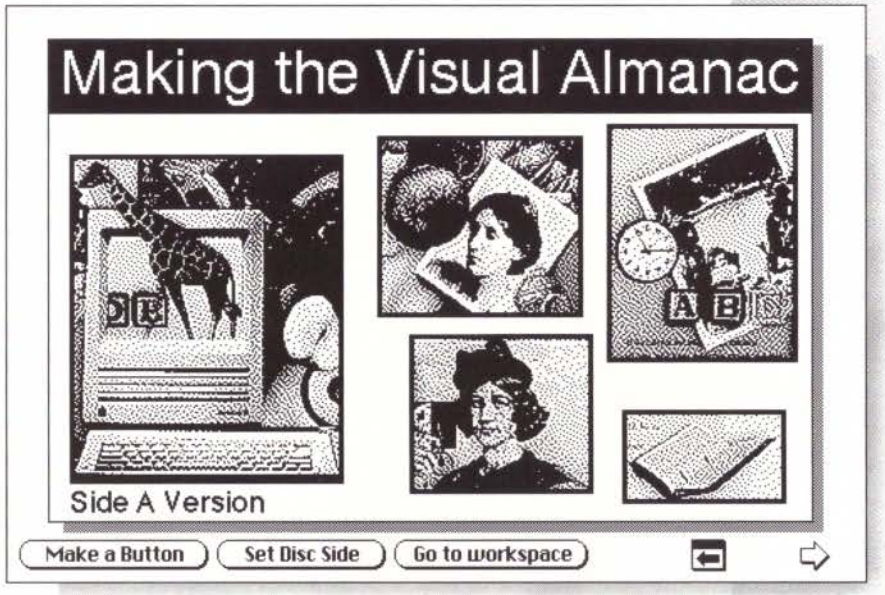


Two from the Multimedia Lab

Visual Explanations: The Use of Images
by Margo Nanny
Why is a picture worth a thousand words? What is the value of interactive images? This composition gives you some ideas on what visuals can offer to explanations.

Making *The Visual Almanac*
by Margo Nanny and Peter Maresca
This composition shows and tells you the background of *The Visual Almanac:* why we made it, how we made it and who "we" are. If it looks like a lot of work and a lot of fun, then it's pretty accurate.





Our hope is that the set of compositions we have included will give you some ideas for compositions of your own, so that you invent wholly new ways of using the *Almanac* images. You are coming in on the ground floor of a new mode of expression. These are some of the first multimedia composition tools designed for and made available to a general public outside of research labs. Soon there will be more images available and more tools to connect and manipulate them. What you create and what you want to create will help designers and developers keep pushing the limits of technology to bring more sophisticated and easier to use tools to a growing universe of multimedia creators-composers-choreographers.

A Tutorial: Making a New Composition

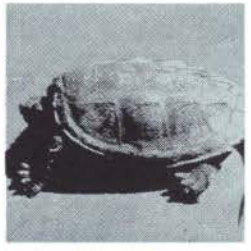
This section is a tutorial that guides you through the process of making a new composition from beginning to end. We'll start with making a new workspace and end with a finished composition.

The reason to take this guided walk through the process is to learn all the names and see how everything works together. Once you make a composition or two, it should make sense and feel natural.

Sometimes you may decide to start a composition while you are in the Collections. You can do that simply by clicking "Save to..." In this tutorial, we take the route from the Main Menu. Once you learn this way, you'll be comfortable any way you choose to begin.

Reminder: The Superbutton provides on-screen help, a map of where you are, and a way to get back to the Main Menu. So don't hesitate to explore.

Let's make a composition about "turtles."

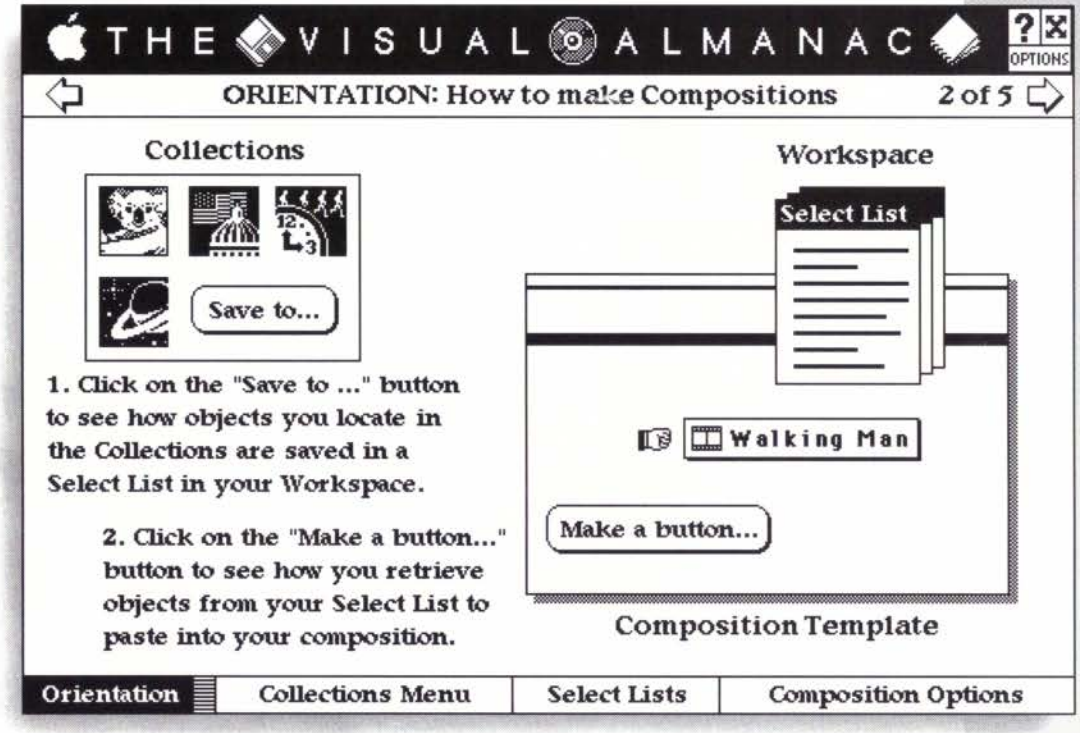


An Overview of the Process

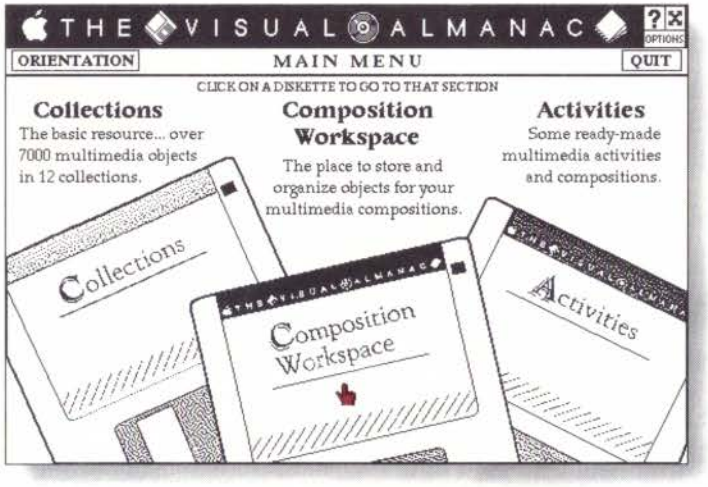
Making a composition is a three-step process.

1. Search the Collections for images.
2. Save the ones you may want on a Select List. There you can rearrange them, search for more and delete ones you do not want.
3. Get objects from a Select List, make them into buttons, and place them on a composition template.

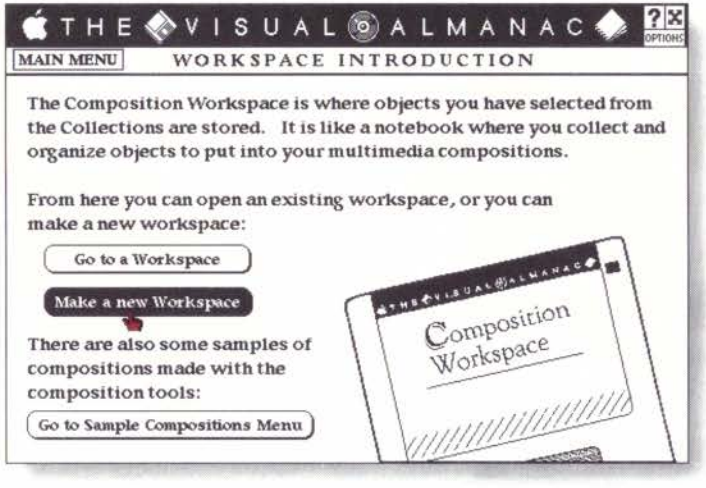
Check out the Orientation in the Composition Workspace. It is a graphic illustration of the composition making process.



1. Make a new Composition Workspace

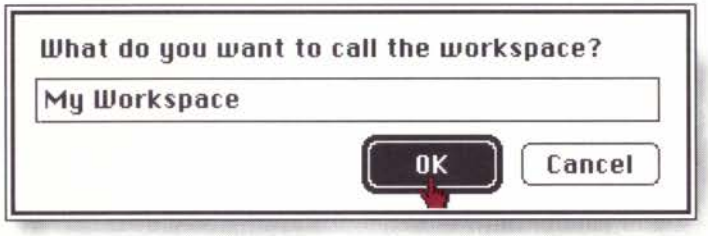


- At the Main Menu, click on the picture of the Composition Workspace diskette to go to the workspace introduction.



- Click on "Make a new Workspace." A dialog box appears.

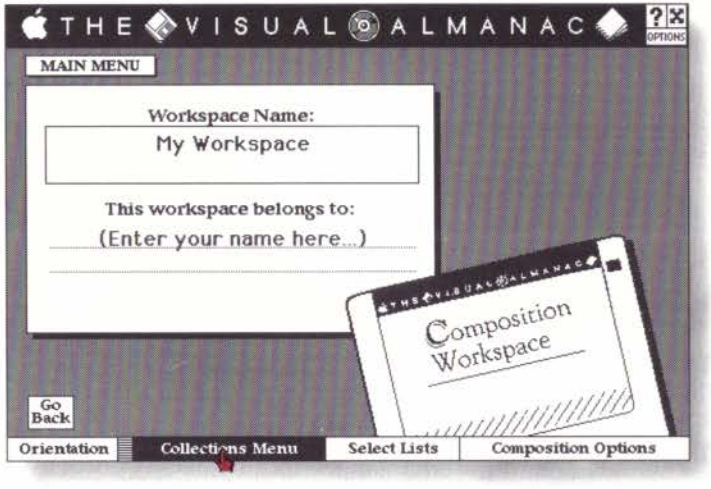
NOTE: *You don't need to make a new workspace every time you make a composition. You can use one workspace to make many different compositions.*



- Name the workspace "My Workspace" and click "OK." It takes 10 to 20 seconds to make a new workspace.

This dialog box appears when the workspace is ready.

- Click "Go there" to go to the cover card of your new workspace.

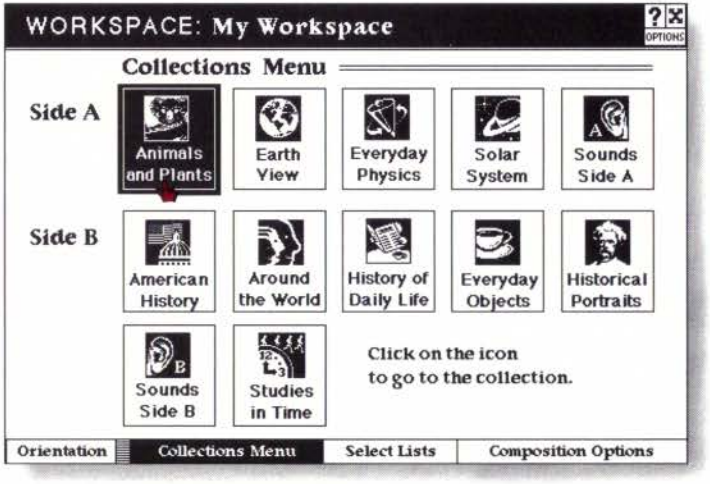


- Select the text in the "Enter your name here" field and type in your name.

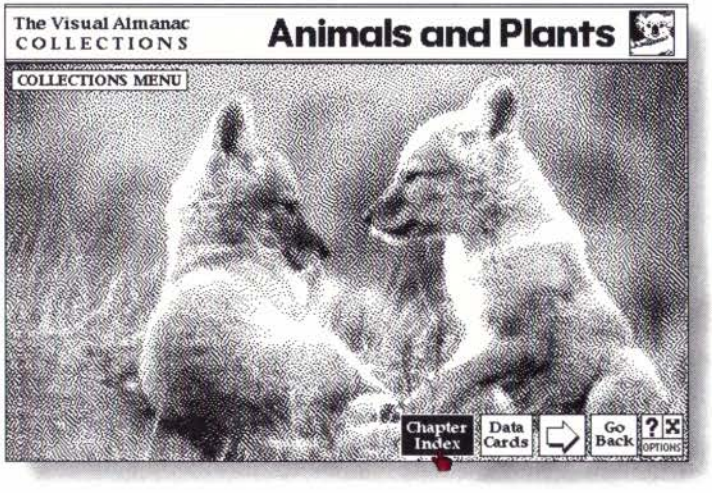
Your workspace is now ready, named and personalized. Your next step is to browse around in the Collections for objects you want to save about "Turtles" for your composition.

- Click on the "Collections Menu" tab at the bottom of the card to view available collections.

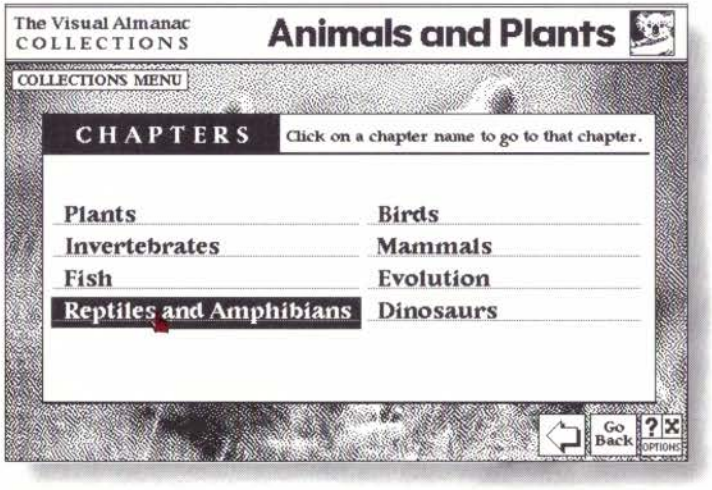
2. Look for Multimedia Objects



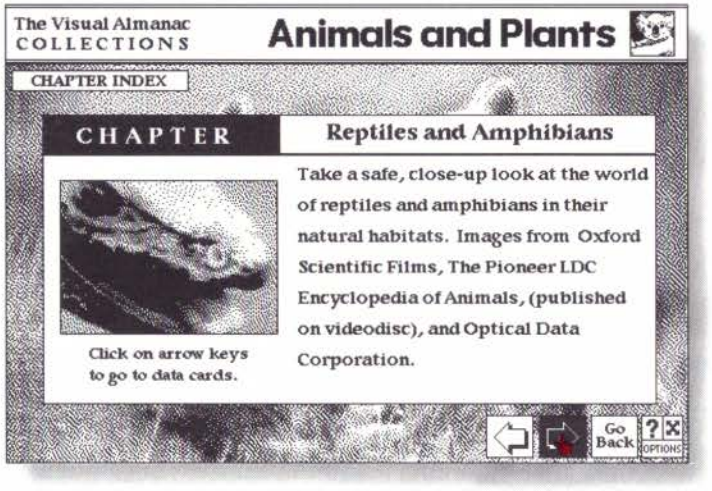
- We're looking for turtles, so click on the "Animals and Plants" collection in the Collections Menu to get to that collections' cover card.



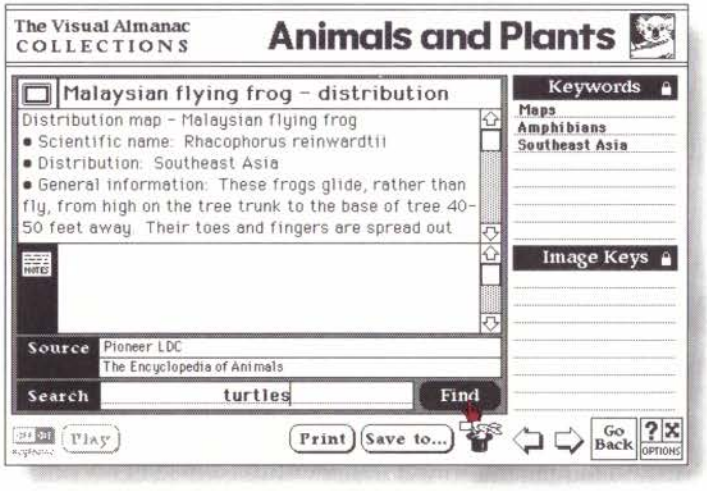
- Click on "Chapter Index" to see a listing of all the chapters in this collection.



- Click on the chapter "Reptiles and Amphibians" to go to the chapter's description card.

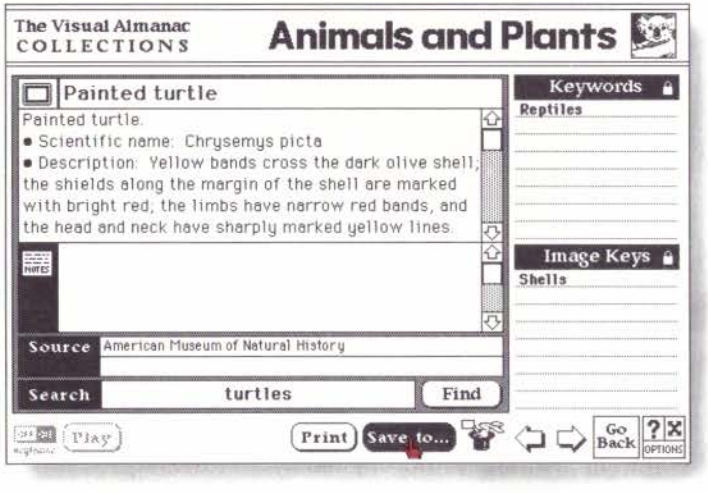


- Click on the right arrow button to go to the first data card in the "Reptiles and Amphibians" chapter.

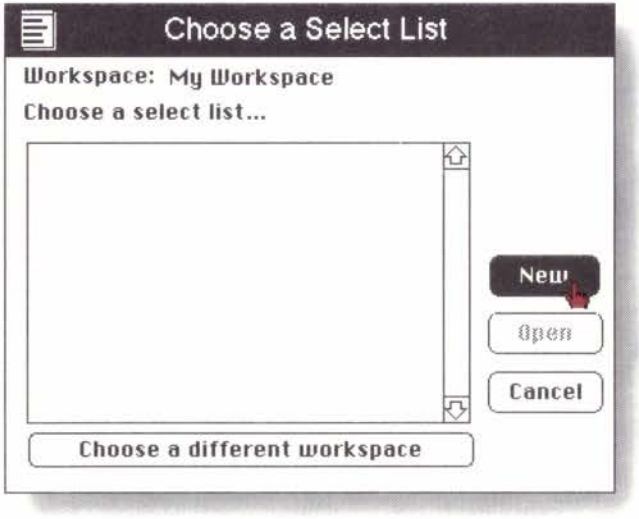


- For this example, you want to look for data cards that contain information about turtles. The simplest way to do this is to use the "Find" button. Click in the field next to the Find button. Type in the word "turtles" and click the Find button.
- Continue to click "Find" until you get a card titled "Painted Turtle."

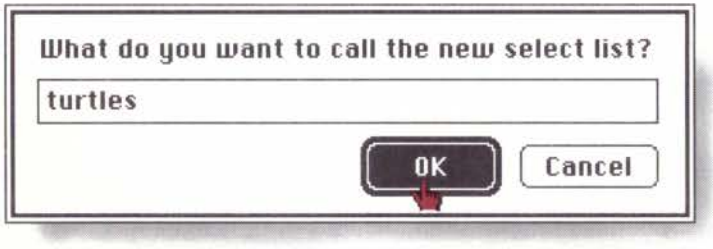
3. Save a Multimedia object



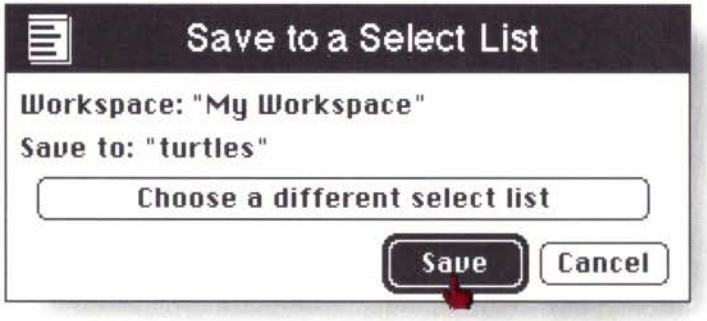
- This is one you might want to use. Let's save it in our workspace. Click on the "Save to..." button at the bottom of the data card. This saves the object into a "Select List."



- A dialog box appears which asks you which "Select List" you want to save this object to. This new workspace doesn't have any select lists yet, so we'll have to make a new one. Click on "New" and a dialog appears.

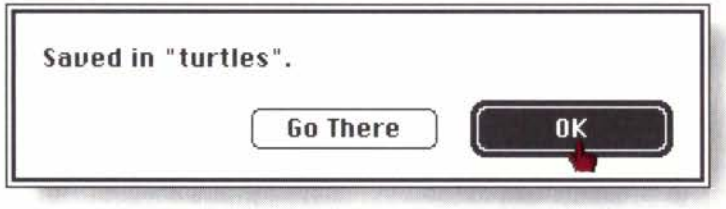


- A dialog box asks you to name the new Select List. Type in "turtles" and click "OK."



Now that you have a Select List to save to, the regular "Save to a Select List" dialog box appears.

- Click "Save" and after a couple of seconds, you will see another dialog box.

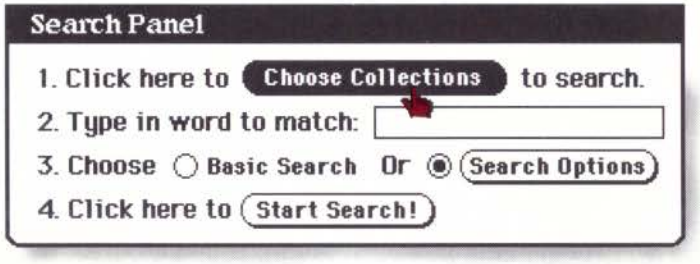


- Click "OK" to continue browsing.

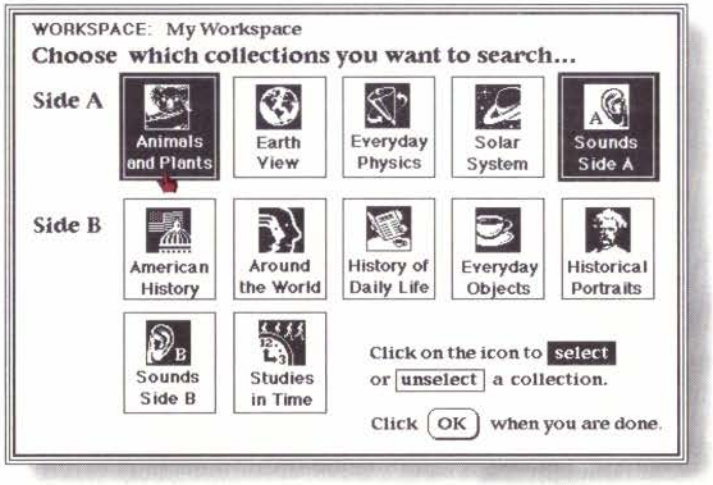
- Continue to use the Find button to locate three more objects about turtles and save them to the Select List. As you are saving the last object, click "Go There" to go to the Select List to see all the objects you've saved so far.

4. Locate and save many objects at once using the Search Panel

- In this example, we want to search for additional objects. Click "Open search panel." The Search Panel lets you perform more sophisticated searches, to locate and add many objects from one or more collections.

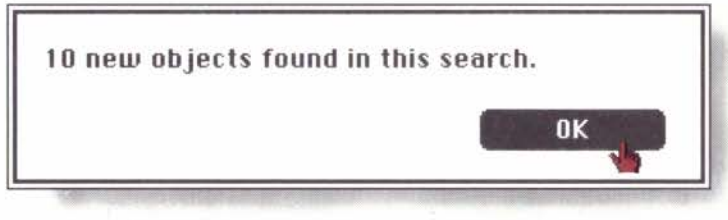


- Click on "Choose Collections" to go to a Collections Menu.



- Click the collections you want to search. Choose "Animals and Plants" and "Sounds Side A" for this example (to see if there might also be some turtle sounds).
- Click "OK" to return to the Search Panel.

- Next to "Type in word to match" in the Search Panel, type in the word or words which you want to find. For this example, type in the word "turtles." Next, click on "Basic Search." Then click on "Start Search." All objects in the selected collections will be automatically added to your Select List as they are found.



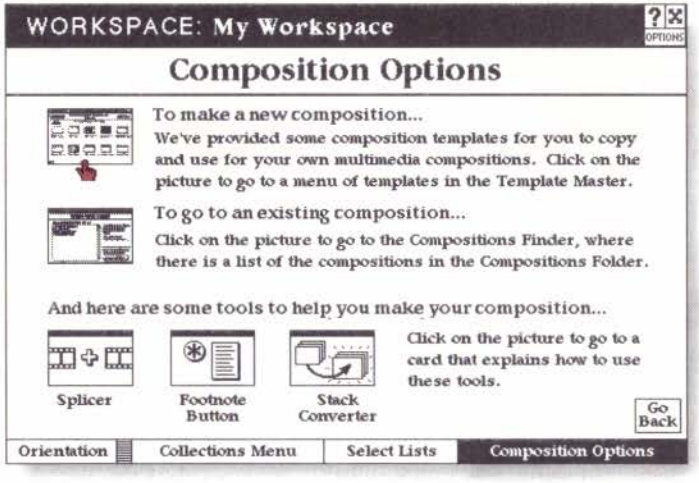
- When the search is complete you'll see this dialog box telling you how many objects were gathered. Click "OK."

- Click "Close search panel" so you can see more of the Select List.
- You can review all the objects found in the Select List. Click on a title to highlight it. The image will appear on the video screen. You can play motion or sound objects by clicking the "Play" button.

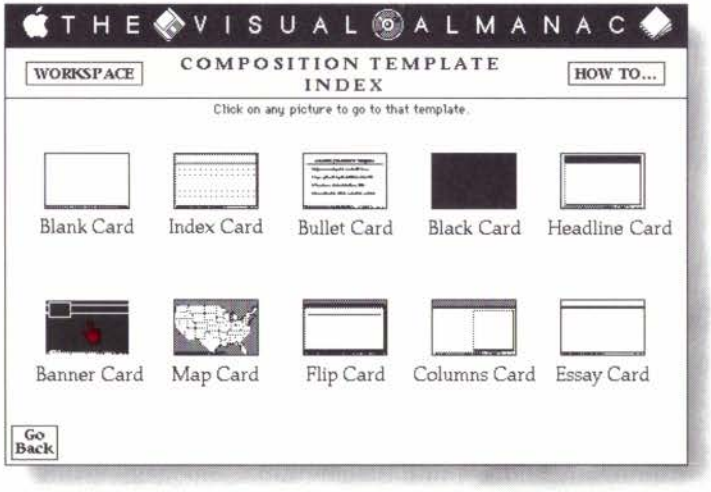
Now that we have some objects, let's start our composition.

- Click on the "Composition Options" tab at the bottom to go to a listing of options and tools for making compositions.

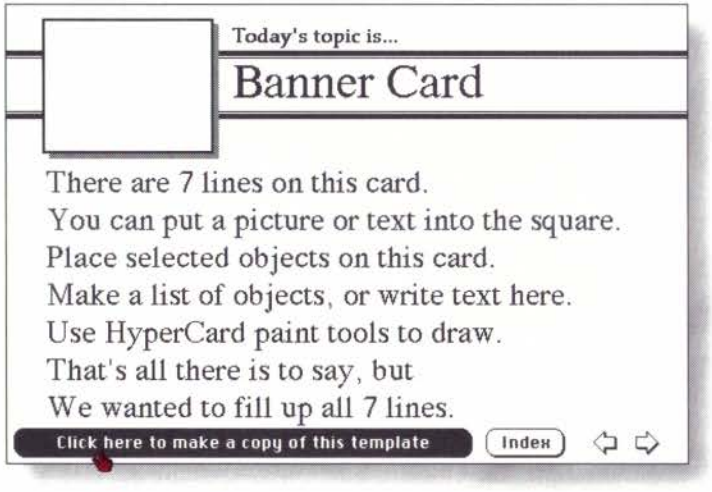
5. Make a new composition stack



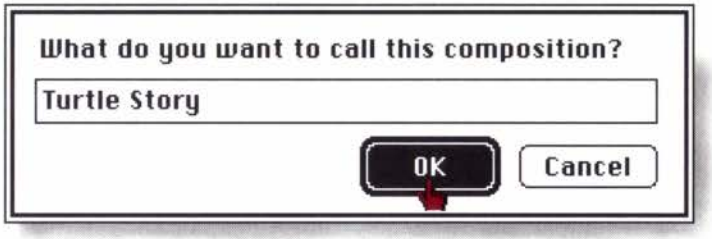
- Click on the picture next to "To make a new composition..." to go to the Template Master where you can make a new composition stack.



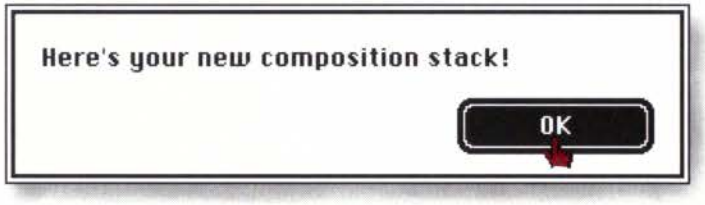
- Click on the "Banner Card" to go to that card template. These templates serve as backgrounds for your composition and allow you to add text and graphics.



- Click on "Click here to make a copy of this template" to make a new composition stack with this banner card format.



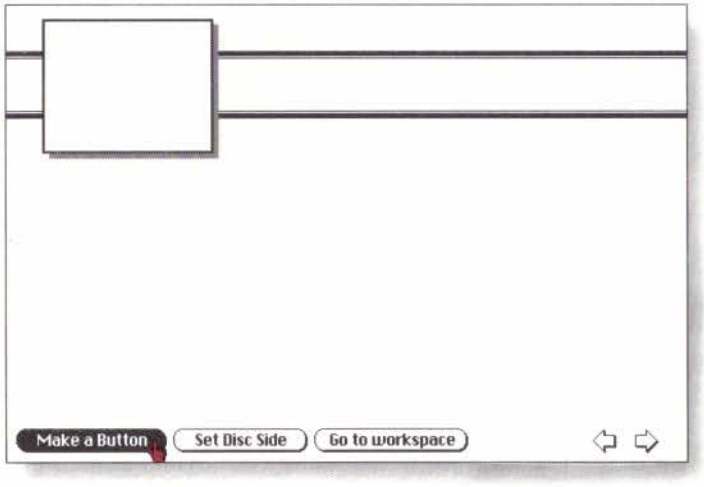
- Type in the name of the composition, in this case "Turtle Story," into the dialog box. Then click "OK." This process takes about 20 seconds to complete.



- Click "OK" to start working on your stack.

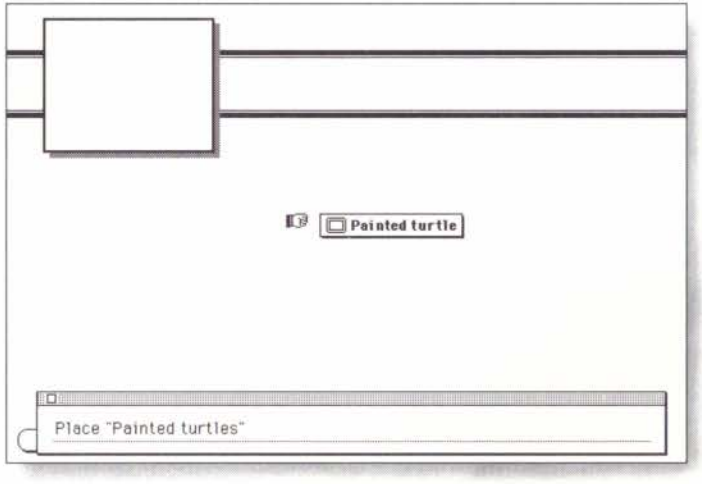
- In this case, click on "Side A" because all the objects we've chosen are on that side.

6. Place objects in your composition



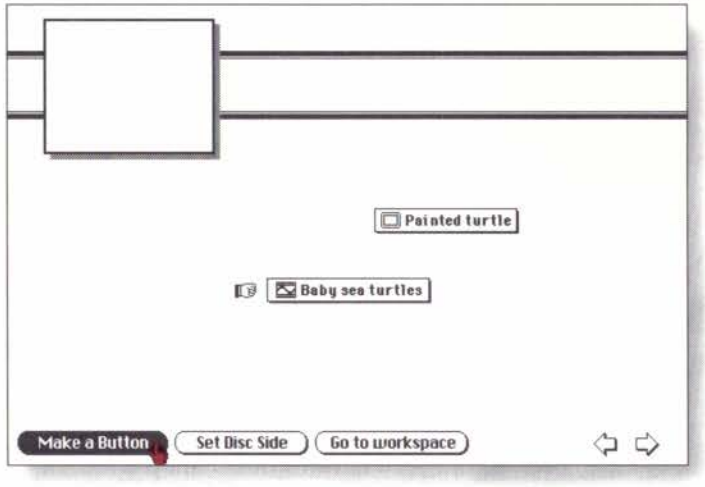
- Your composition is now ready for you to add object buttons. Click on "Make a Button" to get objects from your Select List.

- Click on "Painted turtle" to choose this object to add to the composition. Then click "Get" to retrieve that object.

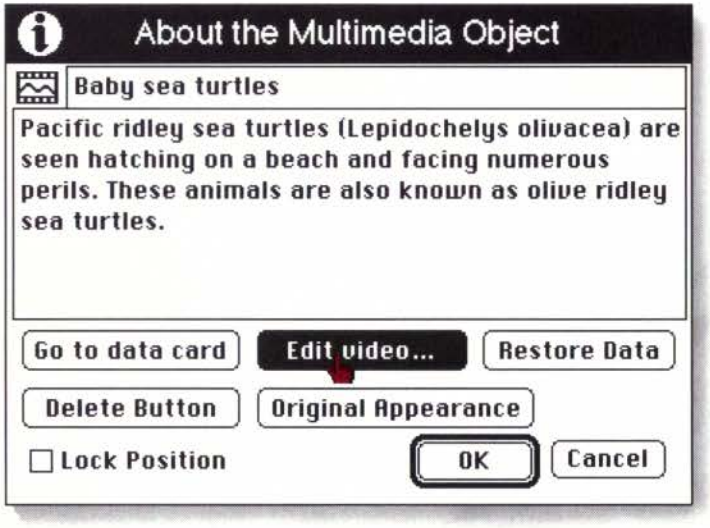


- The dialog box disappears, and the cursor appears as a closed hand because it is "carrying" a multimedia object. Move the hand to where you want the button, and click to place it.
- Once the button is in place, click on it. The object's image is displayed from the videodisc (in this case, a still frame).

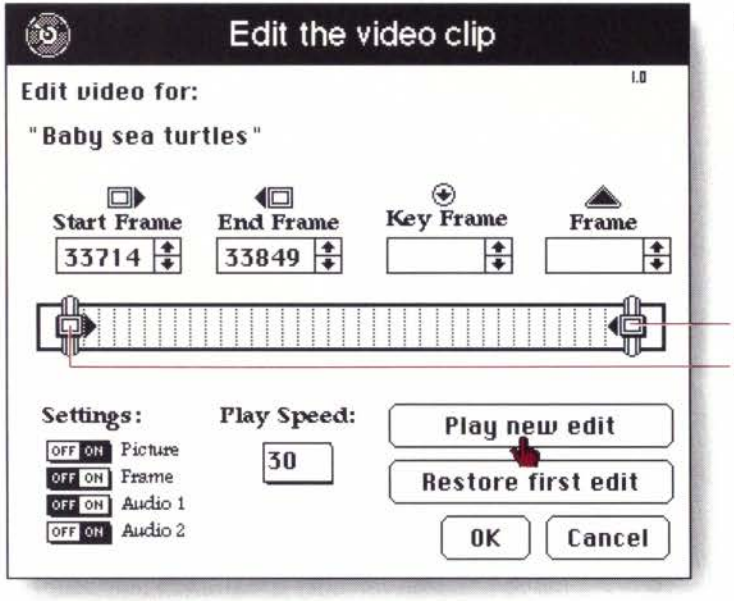
7. Edit the button



- Click on "Make a Button" again and choose "Baby sea turtles." Click to place this button in your composition. Notice that the button has a "sound movie" icon. Click on the button to play the movie.
- To edit this button, hold the Option key down while clicking on the button again. Notice that the cursor changes to an ❶. A dialog box appears with the description of the object.



- Click on "Edit video..." to bring up the "Edit the video clip" dialog box.

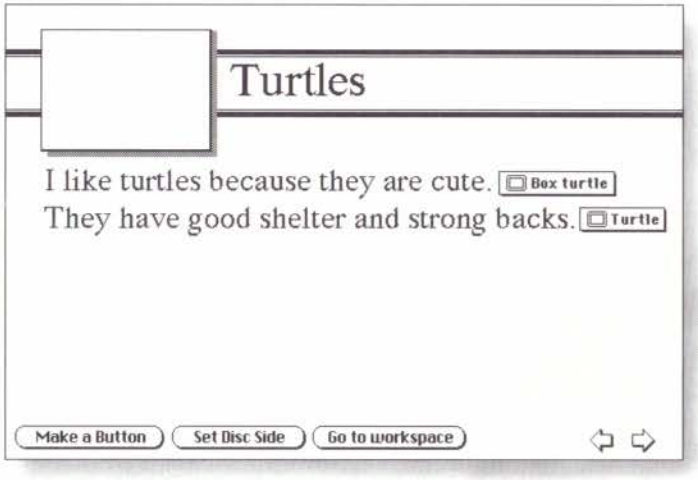


- To edit the length of this video sequence, move the Start and End Frame markers along the bar. Click "Play new edit" to see the changed version. Click "OK" when you're done making changes to this sequence.

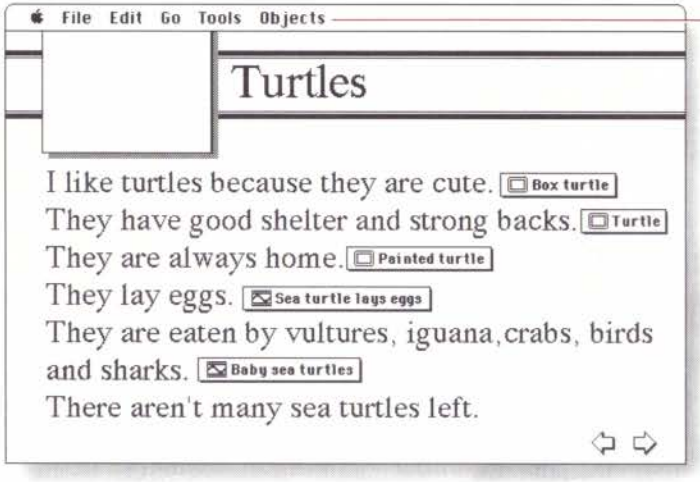
end frame marker

start frame marker

8. Develop the composition



- To add text, click in the text fields on the card and type.



HyperCard menu bar

You can use the HyperCard tools to add cards to the composition, and to add graphics or other types of buttons. The HyperCard tools are available from the HyperCard menu bar. To see the HyperCard menu bar, hold down the Command key and press the space bar.

- To add a new card to the composition, select "New Card" in the Edit menu.
- See the HyperCard Users Manual for instructions on adding graphics, text fields and buttons to your composition.

That's it!

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Reference

ORIENTATION

You may have noticed that the Companion is not a manual in any traditional sense. *The Visual Almanac* is one of the first examples of multimedia put out of a research lab into the public. It's an experiment and a work in progress. That makes you a pioneer and part of the progress, so the bulk of the Companion is designed to let you in behind the scenes to understand the philosophies that propelled the project. Because the nature of both HyperCard and *The Visual Almanac* is nonlinear, it would have been impossible to do a step-by-step guide if we had wanted to. There are many possible routes to get almost anywhere. So we worked hard to make the navigation consistent, clear and easy to use.

For the Activities, you will notice that there are general instructions in the Activities section, but no tutorial. The overall rule is: when in doubt, click on something that seems reasonable and see where it takes you. You can't get too lost because the Superbutton can always get you wherever you want to be.

We decided to provide a bit more guidance for the open-ended part of the *Almanac*—the Collections, Collections Directory and Composition Workspace. This reference section is designed to help you with operational questions. It is divided into three sections.

- **How to...** is a guide to all the features in the Collections and Composition Workspace, organized according to questions you may have about what you can do with the software.
- **The Dialog Box Reference** shows the important dialogs in *The Visual Almanac* and describes the features on each dialog. If you come to a dialog box and you can't figure out what to do, then flip through this section until you find it. Many of the dialogs are multi-functional, and this reference should help you understand how they work.
- **Multimedia Overview** gives you information about which you may be curious: what is a videodisc, multimedia, HyperCard, the Multimedia Lab, etc.

How to...

Here are answers to questions you may have when using the Collections and Composition Workspace.

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What does it mean to "Choose videodisc player"?

The Choose Videodisc Player dialog box appears when you start up *The Visual Almanac* Home. If you aren't using a videodisc player, click "None." Otherwise, you'll need to click on the brand and model number of the videodisc player you are using. When this information is highlighted, click "OK." This step is very important, because it will enable the computer to communicate with your particular videodisc player.

Make sure that you consult the manual for the videodisc player before you try to use *The Visual Almanac* software. You will need to make certain adjustments on any player—setting DIP switches, for instance—before you hook it up to your Macintosh computer. Results may vary with each type of videodisc player. *The Visual Almanac* was developed and thoroughly tested on the Pioneer LD-V4200.

How do I get back to the Main Menu?

If there's a Superbutton nearby, the Main Menu is two clicks away.

- Click on the Superbutton "Options."
- Click on Main Menu in the Options dialog box.

If you don't see a Superbutton (e.g. in the Compositions):

- Display the HyperCard menu bar (see page 173).
- Choose "Home" from the "Go" menu.
- Then click anywhere on the Home cover card, and you'll go to the Main Menu.

How do I make a new workspace?

You have several ways to do this. Instructions are also in "How to Make a Composition" on page 127. Here are two of the simplest:

1. On the Main Menu in *The Visual Almanac* Home: click on the Composition Workspace diskette to go to the Workspace Introduction card.

   Click on "Make a new Workspace." You'll be asked to give it a name, and 10–20 seconds later a dialog box will tell you that your new workspace is ready and open. To go to it immediately, click "Go there."

2. Another way to make a new workspace is to click on the "New" button in the "Choose a Workspace" dialog box. You'll see this dialog box if you save an object in the Collections before you have opened a workspace.

NOTE:

Option-click means hold down the option key while you click with the mouse.

Shift-click means hold down the shift key while you click with the mouse.

Click and drag means click the mouse down and hold it, then pull whatever you've "clicked on" to another location before you release the mouse.

How do I open an existing workspace?

On the Main Menu, click on the Composition Workspace diskette to go to the Workspace Introduction card.

Click "Go to a Workspace," and you'll see the "Choose a Workspace" dialog box which lists all of the workspaces in your Workspaces folder.

Click on a name to choose a workspace, then click "Open."

How do I go to a collection?

1. From the Main Menu: Click on the Collections diskette to go to the Collections menu in *The Visual Almanac* Home. Then click on a collection icon to go to that collection.
2. From a Workspace: Click on the Collections Menu tab at the bottom of any workspace card to go to the Collections Menu within the workspace.
3. From anywhere else:

- Click on the Superbutton "Options," and then click on "Main Menu" in the Options dialog box.
- Click the Collections diskette.
- Click on one of the collection icons to go to that collection.

4. From any place you see a "Go to Data Card" button, click it and it takes you to a data card. For example:

- From a Select List: Select an object by clicking on its name, and then click "Go to Data Card." You'll be taken to that object's data card in the Collection.
- From a Composition: Option-click on an object button to see the "About the Multimedia Object" dialog box, and then click "Go to Data Card" to go to the collection data card for that object.

How do I browse around in the Collections?

We've provided quite a few ways to travel around in the Collections. It will be easier to browse through the Collections once you have looked through a few of them and you become more familiar with the basic structure of a collection.

Here are all of the ways you can go from one multimedia object to another in the Collections:

1. From the cover card of any collection, click "Data Cards" to go directly to the first object in the collection.
2. Click on the arrow keys at the bottom of a data card to step through the objects.
3. Jump to a random object in a collection by clicking on the rabbit-in-the-hat icon. This is a nice way to see the range of things in different chapters of a collection.
4. Retrace your steps by clicking on "Go Back."
5. Use the Collection Browser on the Collection Map. Click on the navigation arrow in the Superbutton to get to the map, where you'll see a slider bar. Drag the slider back and forth quickly to see titles and keyframes of objects in the collection.

- The object titles for each card are displayed to give you an idea about the content of the data card. Click on "Go to this Data Card" to jump to the data card for the displayed title.

6. You can also travel around the data cards by searching for particular words in the text; the next few sections tell you more about this.

NOTE:
Once you are in a collection, to get to the Introduction card of the next or current chapter, hold down the option key and click on the forward or reverse arrow.

How can I use Keywords and Image Keys to browse data cards

Move the cursor into the Keywords or Image Key field. Notice that the cursor changes to a ☞. Now you can click on a Keyword to jump to the next data card with the same Keyword.

This is a good way to see all the objects in a particular category in a collection. For example, click on the Keywords "Map" in American History to see all of the map images in that collection.

To narrow your search, you can use multiple Keywords. Shift-click on a Keyword and wait until a plus sign (+) appears next to it. Shift-click on all of the Keywords you want (shift-click again on a Keyword to remove it from the group). Then click on any one of the words you chose to jump to the next card that has all of those Keywords. Keep in mind that the more Keywords you group together, the less likely it is that there will be another object with all of the Keywords you selected.

You cannot make a group that includes both Keywords and Image Keys.

Can I add my own Keywords to data cards?

Yes! Notice the 🔒 icon in the labels above the Keywords and Image Keys fields. Click on it to unlock the field (the icon will change to an unlocked padlock). Then you can type in new Keywords.

Keywords that you add will stay on the fields until you delete them.

If you want to delete the Keywords you've added, be careful that you don't delete other Keywords or Image Keys that were already on the fields.

Be sure to lock the Keyword field!

Unlocking a Keywords field on any card unlocks the fields of all the data cards in the Collections. Be sure to click on the padlock icon again to lock the field, because you can't use any of the Keywords fields for searching when they are unlocked.

How do I find objects of a particular type?

The icon in the upper left corner of the data card indicates what type of object it is: still frame, silent movie, sound movie, sound only or "browsable" image.

Notice that when you move the cursor over this icon, it changes to a ☞. Click on the icon, and you will jump to the next object of the same type in the collection.

You can also option-click to jump to an object of a different type. For example, if you are on a still-frame object and option-click on the still-frame icon, you will jump to the first silent movie object that follows.

How do I save an object to a Select List?

If you find an object that you want to save—either to use in a composition, or just to keep with similar objects—click "Save to..." at the bottom of the data card.

The "Save to a Select List" dialog box appears. It tells you the name of the workspace and Select List that the object will be saved in. Click "Save" to save it there, and in a few seconds another dialog box pops up to tell you that the object has been saved. On that dialog box, you may click "Go There" to go to the Select List, or you may click "OK" to remain in the collection.

If you want to save the object to a different Select List, click "Choose a different Select List" in the "Save to a Select List" dialog box. You will then see the "Choose a Select List" dialog box, showing you all of the Select Lists in the open workspace. Choose one of those, or click "Choose a different workspace" to save to a different workspace altogether.

If no workspace is open when you click on "Save to..." you will see the "Choose a Workspace" dialog box so that you can open one.

SHORTCUT:
If you want to save directly to the Select List you used last, hold down the option key while you click "Save to..." on the data card.

How do I get back to my workspace?

1. From the Main Menu: On the Main Menu, click on the Composition Workspace diskette to go to the Workspace Introduction card, then click on "Go there" in the bottom right corner of the screen to go to the open workspace.
2. From a Collection: Click on the navigation arrow on the Superbutton to go to the Map. If a workspace is open, you will see three miniature icons for it in the top right-hand corner of the Map under the title of your workspace. If there is no workspace open, the map will say "Click here to open a workspace" instead; clicking there will give you the "Choose a Workspace" dialog box.
3. From a Composition: Click "Go to workspace." That will take you to the last place you visited in your workspace; or, if you haven't yet been to a workspace, it will give you the chance to open one with the "Choose a Workspace" dialog box.

What's the best way to gather a lot of objects from several collections?

You can search for and gather large numbers of objects from one or more collections by using the Select List Search Panel. On any Select List in your workspace, click on "Open search panel" to reveal the search controls.

There are four steps to searching the Collections, and these are outlined on the search panel:

1. *Choose Collections:* Click this button to go to a menu of the Collections. Click on a collection to include it in a search (and click again to exclude it). When you have selected the collections you want to search, click "OK," and you'll return to the Select List Search Panel.

NOTE:
Nothing will prevent you from saving objects that use different sides of the videodisc in one Select List. If you do mix Side A and B in the same Select List, you will get a warning dialog box each time you try to play a video that is on the side of the disc that is not available.

2. *Type in a word to match:* Type in a word or phrase that the objects you want might contain. For example, if you wanted to find all of the objects related to medicine, type in "medicine."
3. *Choose Basic Search or Custom Search:* "Basic Search" will satisfy most of your searching needs. Read the next section on "Search Options" for more detailed information on how you can use "Custom Search."
4. Click "Start Search!" to begin the search.

When the Basic Search begins, a search status window appears over the Search Panel, and a large "Interrupt Search" button appears next to it on the right. The search status display tells you which fields in which collection are being searched, and how many objects have been found. As objects are found, they are added to the Select List (you'll also see their video keyframe).

You can interrupt the search by clicking on "Interrupt Search." The search may take a couple of seconds to notice your interruption, so hold down the mouse until you see the "Search Interrupted" dialog box. You'll have the option of resuming the search, pausing or quitting the search.

If you quit the search, all of the objects already found remain in the Select List, and you can resume the search where you left off by clicking "Resume Search" (where "Start Search" was on the Search Panel). You may also change your search options and restart the search.

If you let the search run to the end, a dialog box will appear telling you how many new objects were found in the search.

What are my "Search Options"?

If you choose "Custom Search" in the Search Panel, you can change certain characteristics of the search. A "Search Options" button appears. Click on it to go to the "Custom Search Options" cards. There are three of these cards, and you can go from one card to another by clicking on the larger buttons along the left side of each card.

1. *Select Data Card Fields:* On this card you will see a diagram of the data card showing you in which fields to search for the Search Key. The Basic Search looks in all of the fields, but you can narrow the search to only one field if you like. Click on a field to select it, or click again to de-select it. For example, you might want to search in only the Image Keys field for "clouds" to find images of clouds.
2. *Match Partial or Whole Words:* On this card you can choose one of four ways to match your search key with text in the data card. It's easier to explain these by example, and there are examples on this option card. The Basic Search does a "whole word" search.
3. *Display Options:* On this card, you can specify how the search results will be reported to you. There are three options:

   a. Do you want to pause to accept or reject each object as it is found? The Basic Search automatically accepts all objects as they are found, but you might want to look at each object as it is found to decide whether or not to keep it.

   b. How much data do you want to see? The system can either display the entire data card, show the title (Basic Search does this) or show nothing.

   c. Do you want to see the video keyframe for each object that is found? The Basic Search shows you the keyframe, but the search will go slightly faster if you turn off the video.

What is usually the fastest search?

- searching all fields
- "whole word" match
- "no pause"
- "display nothing"
- with "no video"

When do I search, and when do I browse the Collections?

When you are just starting out with *The Visual Almanac,* or are just starting to develop a composition topic, browse through the Collections to get a sense of what's available. You do this by traveling around using the navigation buttons, the Find function or through a Keyword search. This helps you get familiar with the language we've used in descriptions and Keywords, and also gives you an idea of the depth of a collection in particular areas.

If you know pretty well what you want, and to what extent the Collections have what you want, it's good to do a search from the Search Panel on a Select List in the Composition Workspace.

What can I do with objects in the Select List?

The Select List is primarily for storing your own collections of objects, for browsing, or for use in compositions. However, there are quite a few things you can do with objects in a Select List.

To select an object, click on its title. It will highlight, and you will see the object's image or keyframe. Also, some buttons to the right of the list will be enabled:

Play – This button lets you play the movie or sound associated with the highlighted object. When you click "Play," the cursor turns in to a spinning ball as the video plays. Click again to interrupt the video.

Show Description – Click here to pop up the object description field. This field obscures some of the buttons on the Select List, so you may click and drag it to another location if you like. When the description field is displayed, "Show Description" becomes "Hide Description." Click there to hide the field.

Go to Data Card – Clicking here will take you out of the workspace to the object's data card in its collection. On the data card, you can see the object's full description, Keywords, etc. To return to the Select List, click "Go Back" on the data card.

Copy to... – You may copy objects to another Select List in the open workspace, or even to another workspace. This is described in more detail in the following section.

Delete – Click here to delete the selected object.

Can I rearrange the order of objects on the Select List?

Yes. Option-click and drag the object title to its new location. Notice that you can scroll the list while you are moving, so that you can move an object from the bottom of a very long list to the top.

How do I select multiple objects to play, copy or delete?

Shift-click on the titles to select them.

With a multiple selection, the Play button will play all of the selections in sequence.

"Copy to..." will copy all of the selected objects to another Select List.

"Delete" will delete all of the selected objects (after first confirming that that is what you want to do).

To play, copy or delete ALL of the objects in a Select List, option-click on one of those buttons. If you option-click on "Delete," for example, it will delete every object in the Select List.

How do I go to a composition?

To get to the Sample Compositions included with *The Visual Almanac:*

1. Start at the "Main Menu."
2. Click either "Compositions Workspace" or "Activities."
3. Click "Go to Sample Compositions."

To find a composition you made yourself:

1. Go to the "Composition Finder" in your workspace.
2. Click on the Composition Options tab at the bottom of any workspace card to go to a menu of Composition Options.
3. Then click on the icon next to "To go to an existing composition..." to get to the Compositions Finder.
4. Click on the composition name to go to it.

NOTE:
If for some reason the composition is no longer available (e.g., it has been deleted, or it was on a floppy disk that you had last week but don't have now), a dialog box pops up to say "Composition is not available." You will have the option to remove the title from the composition index.

What if I can't find my composition? I know it's there!

If there's a composition that you know exists, but that isn't showing up in the index (e.g., if it's not in the compositions folder, but is on, say, a floppy disk), click on "Look in any folder..." You will see a standard file dialog box which asks you to select the composition you want to include in the index.

If you get a dialog box that says "Can't find the Compositions folder" when you arrive at the Composition Finder card, that means that the compositions folder isn't in the expected place. (This might happen if, for example, the workspace you are using is not in a *Visual Almanac* Workspaces folder.) You will have the option to "Look for it"; you'll get a file dialog box asking you to select a file in a folder, and that will be used as the compositions folder.

How do I make a new composition?

(See the chapter called "How to Make a Composition," page 127, for a step-by-step tutorial on how to make a composition.)

In a workspace, click on the Composition Options tab at the bottom of any workspace card to go to the Composition Options menu. There, click on the icon next to "To make a new composition..." to go to a menu of composition templates in the Template Master.

The first card you will see in the Template Master is the Composition Template Index—a menu of templates, each represented by a miniature picture. Click on a picture to see the full template. On every template card is a button labeled "Click here to make a copy of this template."

Click on that button, and you'll be asked to provide a name of the new composition stack. Then after about 20 seconds or less, another dialog box pops up to tell you that your new composition stack is ready for use. Finally, you will be asked what disc side the composition will use, and you can choose "Side A," "Side B" or "Both." If you aren't sure yet which side you will use, click any answer; you can change it later by clicking "Set Disc Side" on the composition cards.

A composition stack has embedded in it all the instructions you need to play it. So you can copy your compositions to a floppy diskette, if you want. You don't need any other *Visual Almanac* software to play your composition.

How do I add object buttons to my composition?

You can bring multimedia objects from *The Visual Almanac* into your composition stack by creating "object buttons." These are copies of the multimedia objects that you can edit. The objects are retrieved from Select Lists in your workspace, so you will need to save or gather some objects there first before you can create object buttons (see "How do I save an object..." and "What's the quickest way..." sections above).

In a new composition stack, you will see three buttons along the bottom of the card: "Make a Button," "Set Disc Side" and "Go to Workspace." To retrieve an object from a Select List, click on "Make a Button." You will see the "Get a Multimedia Object" dialog box with a list of objects in the last Select List that you saved to or retrieved from.

Click on an object title (or shift-click to select more than one), and then click "Get" in the dialog box. The dialog box disappears, and the cursor changes to a closed fist, which indicates that you are holding on to an object. The title of the object you are holding appears in the message box.

Move the fist icon to where you want to locate the button, and click to place the button on the card. The button shows the title of the object and an icon indicates the object type (so that you know before you play it whether or not you'll be playing a movie, a sound or a still).

If you decide that you really don't want the object that the fist is holding, hold down the Option key as you click. You'll see an "X" in the fist to tell you that a button won't be created.

If you selected multiple objects, the fist will return, and you will click to place for each object you selected from the dialog box.

How can I get objects from different Select Lists for my composition?

If you want to retrieve objects from a different Select List, you may click "Choose a different Select List" in the "Get a Multimedia Object" dialog box. You'll see the "Choose a Select List" dialog box, which shows you all of the Select Lists in the open workspace. If you want, you may retrieve an object from a different workspace by clicking "Choose a different workspace" in the "Choose a Select List" dialog box.

What can I do with multimedia object buttons?

1. Click on the button to play the video; a spinning ball appears while the video plays. You may click again to interrupt the video.
2. Click and drag the button to move it to a new location.
3. Hold down the option key and click on the button (the cursor changes to the information icon), and you will see the "About the Multimedia Object" dialog box, where you can:

a. See the object title and description. Edit these (you'll change only this copy of the object, not the original data card) by clicking in the title or description field and typing.

b. Lock the position of the object button so it cannot be moved around. Click in the Lock Position check box; an "X" means it is locked.

c. Delete the object button by clicking on "Delete Button." You will be asked to confirm the deletion.

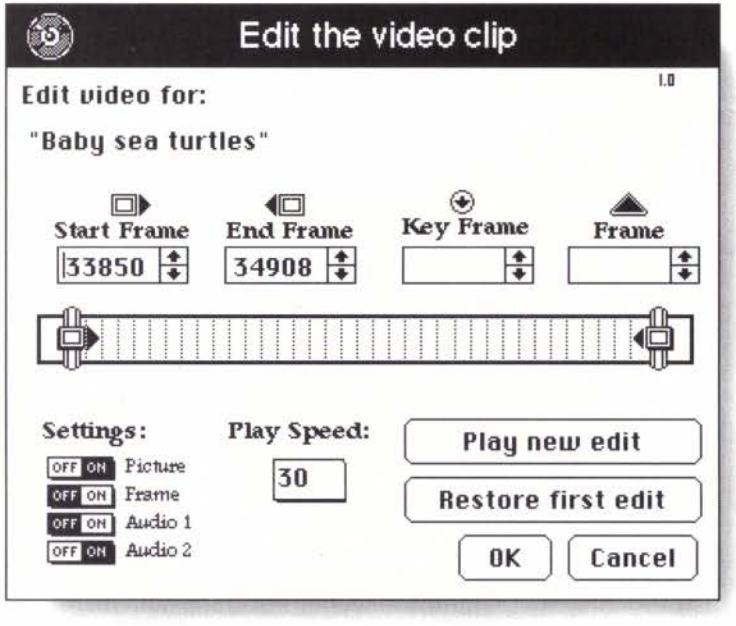
d. Restore the object's original title, description, and video edit by clicking on "Restore Data." You will be asked to confirm this first, because it will erase any of your edits, and you won't be able to undo this operation.

e. If you have used HyperCard to modify the button's appearance (e.g., you resized it to be a big square button), you can restore the button's original appearance by clicking on "Original Appearance." (See "Using the HyperCard Button tool to change object buttons.")

f. If the object has a movie or a sound associated with it, you can edit the video by clicking on "Edit video..." This is discussed in the next section.

How to edit a motion or sound sequence in an object button...

When you click "Edit video..." in the "About the Multimedia Object" dialog box, you will get another dialog box with a simple video editor called the "Edit the video clip" dialog box. It lets you change the start and end frames, the audio track, and the speed of the video.



To change the start and end frames:

Move the sliders along the bar. The left slider represents the start frame, and the right one is the end frame. The video will move along with the slider, so you can find exactly what frame to start or end on. Click "Play new edit" to see how your new edit looks. (This is trickier with audio-only clips, because you can't see the audio. You will have to guess where to start, and then click "Play new edit" to hear the result.)

The triangular frame marker shows you the frame that is currently displayed on the video monitor. You can click and drag that marker to move around in the video without changing your start or end frames. If you want to make the current frame a start or end frame, click on the icon above the start or end frame number, and it will move to the current frame. For example, if you want to turn a movie into a still frame, you could move the triangle marker around to find the best still frame, then click on both the start frame and end frame icons to move them to that frame.

To change a keyframe:

When you option-click on an object button to get the "About the Multimedia Object" dialog box, the object's keyframe is shown. For a movie, you can choose a keyframe in the "Edit video" dialog box. Click on the keyframe icon above the keyframe number window to set the keyframe to the current frame. A keyframe slider shows up, and you can move that around, just like you move the start and end frame markers.

To change the speed of the video:
Hold the mouse button down on the box labeled "Play Speed" to get a pop-up menu of play speeds, expressed in frames-per-second. Thirty frames-per-second is "normal" speed, and it is the only speed at which audio can be played from the videodisc. The higher numbers play faster, and the lower numbers play slower. Try a few out; select a speed, then click "Play new edit" to see the effect of different speeds.

To turn audio or video on and off:
The settings let you indicate which audio track, if any, is to be played, and whether or not to show the picture. For example, if you want an audio-only clip, turn audio track 1 or 2 on, and turn the picture off.

To display the videodisc frame number:
The frames button lets you turn on the frame number display on the video monitor, but that is just for editing use. Frame numbers are turned off when an object plays outside this editor.

To undo your edits:
There are two ways to undo your edits and restore the button:

1. Click "Restore first edit." This puts the markers back to where they were when you entered the "Edit the video clip" dialog box.
2. Click "Cancel." This restores the clip to its state when you entered, and then exits the dialog box.

To save your edit:
Click "OK." The dialog box disappears, and the object button will be updated with your new edit.

Can I undo my edits at a later time, or only during that edit session?

You can always restore the original object data—the title, description, and video clip. Option-click on the object button to get the "About the Multimedia Object" dialog box and then click "Restore Data." Do this carefully, as it will erase all of your edits, and you won't be able to undo this operation to get them back.

Can I combine objects in a single button?

In the workspace there is a tool that lets you "splice" multimedia objects together so that a single button click plays them in sequence. This tool is called the "splicer," and it's located in the "Composition Options" section of the workspace.

To get there, click "Composition Options" tab at the bottom of any workspace card. At the bottom are icons for three composition tools. Click on the splicer icon to go to the splicer card.

In the splicer, you retrieve objects from Select Lists, arrange them in a sequence, and then make a button that plays the sequence.

"Add an Object" in the splicer works very much like "Make a Button" in the compositions. When you click it, you'll see the "Get a Multimedia Object" dialog box with a list of objects in the most recently used Select List. Just as in the compositions, click on one (or shift-click on several objects), then click "Get" to bring them into the splicer. The objects will be added to the splicer list in the same order they were in the Select List.

The splicer list works just like a Select List: click on a title to select it, click "Play" to play it, "Delete" to remove it from the list, etc. You can also rearrange objects in the splicer list: Option-click and drag a title to a new location. (See the section on "What can I do with objects in the Select List"—page 166— for a discussion of the other functions in the splicer.)

You may also add pauses to the splicer list to show still frames for a certain length of time. Click on "Add a Pause," and the cursor changes to an hourglass. Move the cursor into the splicer list to the title of the object you want to insert a pause BEFORE, then click. A dialog box pops up to ask how long the pause should be. Type in a number of seconds (using numerical characters on the keyboard only) and click "OK," and a pause of that length will be inserted.

You can preview the sequence by holding down the Option key and clicking "Play" to play all of the objects in the list, including the pauses.

When you have the sequence the way you want it, type in a name for the button in the space provided below the splicer list, then click "Make a Button." In a couple of seconds, a spliced button with your title will appear below the splicer list. You can copy and paste this button into a composition stack to play the sequence.

You may continue to edit the splice. Just be sure to click "Make a Button" again so that your edits are recorded in the spliced button.

To get the spliced button into your composition, first click "Click here to copy the spliced button to the clipboard." This makes a copy of the button in the clipboard (you can't see it, but it's the Macintosh device for holding onto things you copy and paste). Then, go to your composition stack through the "Compositions Options" and select "Paste Button" under the Edit menu on the HyperCard menu bar. The spliced button will appear, and you can drag it around to where you want it. Then, select the browse tool from the HyperCard Tools menu to return to normal HyperCard browsing mode, where you can click on buttons to play them.

All about a spliced button...

- Click on it to play the sequence; a spinning beach ball appears while it plays; click again (and hold down the mouse button) to stop the video.
- Click and drag a spliced button to move it around.
- Option-click on the object button to see a list of the objects in the splicer. In this dialog box, called "Objects in this spliced button...," you'll see a list of the objects and pauses in the splice.

Here is what you can do in this dialog box:

To edit objects in a spliced button:

Select one of the objects in the list and click "Open." You'll see that object's "About the Multimedia Object" dialog box, where you can view and edit the title and description, as well as edit the video if it's a movie or sound object. (See "What can I do with multimedia object buttons," page 169, for instructions on editing buttons.)

To change the length of a pause:

Select a pause and click "Open," and you will get a dialog box asking you to enter a new value for the pause, in seconds. In this way, you can still change the timing of a sequence even after the button has been copied to a composition.

To delete the spliced button from your composition:
Click on "Delete Button." You will be asked to confirm the deletion first.

To remove an object or a pause from a spliced button:
Select it in the dialog box list and click "Remove Object." The dialog box disappears and the selected object or pause is removed from the splice. Do this carefully, as there is no way to "undo" this operation.

To return to the splicer for additional editing:
Click on "Go to splicer to edit a new copy..." You will be taken to the splicer in the open workspace, where the spliced button contents are loaded into the splicer. Here, you can add, delete or move objects and pauses.

If there are other objects in the splicer, you will be asked first if they can be overwritten.

NOTE:
When you return to the splicer to change a spliced button, you are working on a new splice. You will have to click "Make a Button" again to make a new button, and then copy that button back to your composition, where the old copy of the spliced button remains. You may want to delete the old copy after you have made a new one.

How do I access HyperCard tools and functions?

First you must display the HyperCard menu bar. Hold down the command key (⌘) and press the space bar. To hide the menu bar, repeat the procedure.

The HyperCard menu bar gives you access to some basic HyperCard functions, such as going to the Home stack, or opening another stack.

How do I add new cards to my composition?

When you make a new composition stack, it has only one card in it. However, it's easy to add new cards with just a single HyperCard command from the HyperCard menu bar. Select "New Card" from the Edit menu, and a new card with the same background is created (or hold down the command key and press the letter "N" to make a new card).
The "Make a Button," "Set Disc Side" and "Go to Workspace" buttons will still be there.

Notice the arrow buttons in the lower right corner of the composition card. These let you step forward and backward through the cards in the composition stack.

How can I use HyperCard to customize my composition?

There are many ways you can use HyperCard to customize your composition stack. For example, you could use the Paint tools to add graphics, and the Button and Field tools to make additional buttons and fields. You don't need to know any of these things to make a composition, but the more you know about HyperCard, the more options you will have. *The Visual Almanac* has been designed to work well if you have no experience with HyperCard, yet HyperCard is always available. You can use it as you want. For many, *The Visual Almanac* will be a context for learning HyperCard.

The following suggestions assume knowledge of HyperCard. Refer to a HyperCard manual to learn how to use it.

If you do begin to customize your stack in other ways, here are some do's and don'ts:

- DON'T edit or modify the stack script of a composition. That's where all the control information for the composition stack is stored.
- DON'T edit or modify the object button scripts. That's where all the control information for those buttons resides. (Or, if you do want to edit these just to see how they work, make a copy of your composition first if you want to keep it the way it is before you try out this procedure.)
- If you create a new background in the stack, you can simply copy "Make a Button" to the new background, and it will work just fine. (Use the HyperCard Button tool to copy and paste the button.)
- You may also use the HyperCard button tool to copy and paste object buttons from one card to another in the composition.
- If you add an "openStack" handler in any card or background, be sure that it includes a "pass openStack" instruction so that the composition stack script still executes.

Can I turn an existing stack into a composition?

If you have a HyperCard stack that you want to enhance by using images from *The Visual Almanac* you can, but it is a lengthy (though simple) process, and there are a few caveats. We have made a button to copy and paste in an existing stack which will do most of the work for you.

In your workspace, click on the "Composition Options" tab at the bottom of any workspace card to go to the "Composition Options" menu. Then click on the "Composition Stack Converter" icon at the bottom of the menu.

On the Compositions Stack Converter card, click "Click here to copy the stack converter button to the clipboard" on the card, and the "Composition Stack Converter" button will be copied into the clipboard (just like the splicer button, described above). Then go to the stack you want to convert and paste the button (choose "Paste Button" from the HyperCard Edit menu).

Then click on "Composition Stack Converter" to start the process, which takes from 10 to 20 minutes. The button will tell you how far along in the process it is. When it has finished, you will see "Make a Button," just like in the composition stacks made from the Template Master.

CAUTIONS:

This button adds certain "resources" (like icons and dialog boxes and mini-programs) to the stack, which in unusual circumstances may conflict with resources already in the stack. This is particularly true if you are converting a commercial stack; the conflict may or may not cause problems.

ALSO:

The stack converter will REPLACE the stack script of the stack you are converting. In any case, you should probably make a copy of the stack you are going to convert, just in case you change your mind about all this later.

How do I quit *The Visual Almanac?*

The best way to quit HyperCard from *The Visual Almanac* is through the Superbutton. Click on the Options section, and then click "Quit HyperCard." A dialog box will appear, asking you if you are sure you want to quit. (This gives you a chance to change your mind; if you quit HyperCard, you will "lose your place" in *The Visual Almanac,* and you'll have to begin again from Home.)

If you don't have access to the Superbutton—from the Compositions, for example—hold down the command key and press the space bar to display the HyperCard menu bar. Select "Quit" under the HyperCard File menu to get out of HyperCard.

Or you can save time by holding down the command key and pressing the letter "Q." This will quit HyperCard immediately.

From the Main Menu, simply click on the Quit button in the upper right-hand corner of the card.

Can I look at other HyperCard stacks while I'm using *The Visual Almanac?*

Yes. From the HyperCard menu bar, select "Open" under the File menu. A dialog box appears with a list of other HyperCard stacks. Click on the title you want, then click the "Open" button to bring up that stack.

Or you can hold down the command key and press the letter "O." This will bring you directly to the dialog box of HyperCard stack names.

How can I get help?

For specific help or information on a card (except in Compositions), click the Help icon (the question mark) of the Superbutton. In most cases Help cards will appear "over" the card you're on. These special Help cards usually highlight and point to different functions and features of the regular stack cards you are using. When you have found the information you need, click "OK" to return to your original card.

If the information displayed does not answer your question, it is often useful to continue on to the next card; many questions may be answered as you "go forward" with what you're doing in a particular stack. While you don't have to rely on this method for help (you can always check the Companion, or go to the Orientation card for help in *The Visual Almanac),* it can be a good way to explore various features and get an intuitive feel for the workings of the *Almanac.*

How can I find out where an image came from?

- The data card for each object in *The Visual Almanac* tells who provided that object's image or sound in the text field labeled source.
- Source information is also recorded in the Collections Directory. You can find more detailed information about particular objects:

  1. Click "Object Index" on the Collections Directory cover card
  2. Highlight the name of the object
  3. Click "Source Information"

  This will bring you to the Source Information Card for that object. These cards include general information about the contributors themselves, with brief descriptions of organizations and individuals, including ways to contact them. To see a list of all of the contributors to *The Visual Almanac,* click on "Go to Sources Menu" on the source information card.

- You may also access source information through the Superbutton. Click on Superbutton "Options," and then choose "Video Controls" from the options menu. On the "Video Controls" dialog box, click "Get source info," and you will see another dialog box with object and source information about the image or sound that is currently displayed.

TIP:
Option-click the Superbutton, and you will go directly to the source information dialog box.

NOTE:
If the Collections Directory is not available on your system, in the Collections folder, you will not be able to access source information via the Superbutton.

- Finally, when you use the Videodisc Controller (available in the Video Controls dialog box) in the Collections Directory, it will have a button labeled "Get Info." Click this to see source information about the image or sound that is currently displayed.

Dialog Box Reference

This Dialog Box Reference explains some of the dialog boxes you are bound to see as you travel around *The Visual Almanac*. A dialog box either gives you information, asks for some or both. You have to respond to a dialog box (by clicking on the appropriate response) before you can continue. This section begins with an in-depth explanation of the Superbutton (briefly described in the Brief View).

The Superbutton 178
- Superbutton Map Card 179
- Superbutton Options Dialog Box 179
  - Video Controls 180
  - Videodisc Controller 181

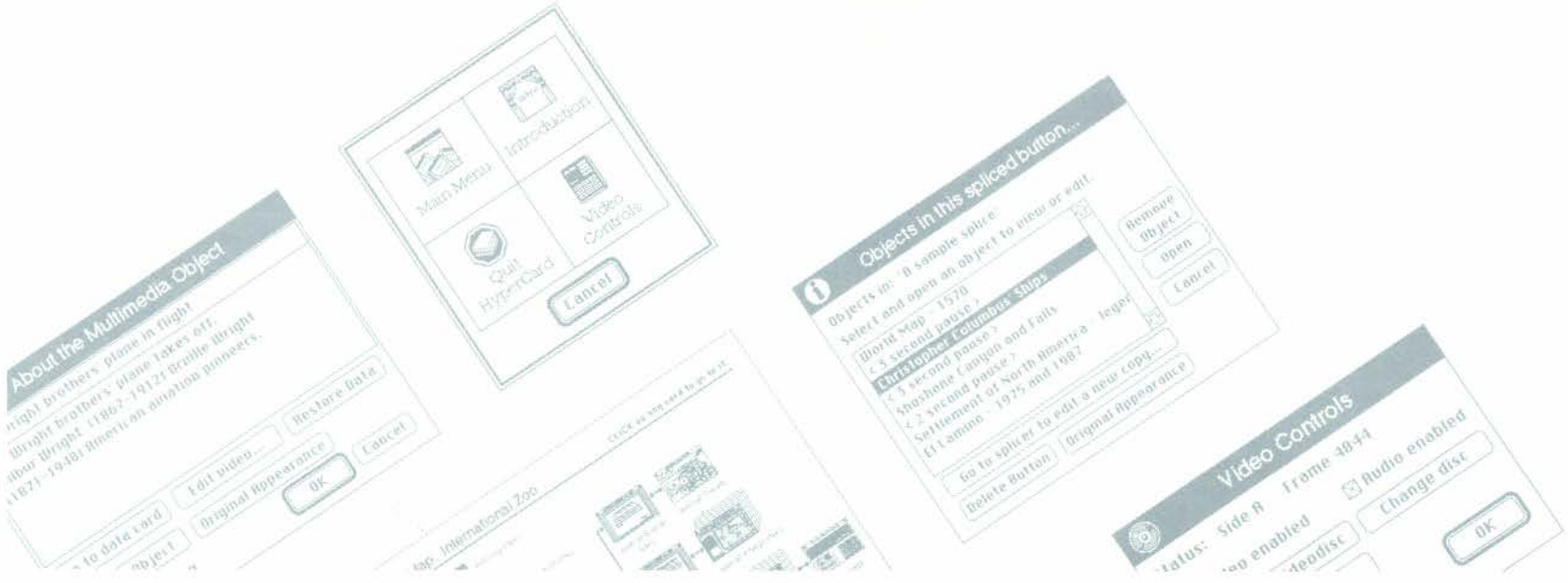
"Get a Multimedia Object" Dialog Box 182

"About the Multimedia Object" Dialog Box 183

"Edit the Video Clip" Dialog Box 184

"Objects in this spliced button..." Dialog Box 185

Troubleshooting Dialog Boxes 185

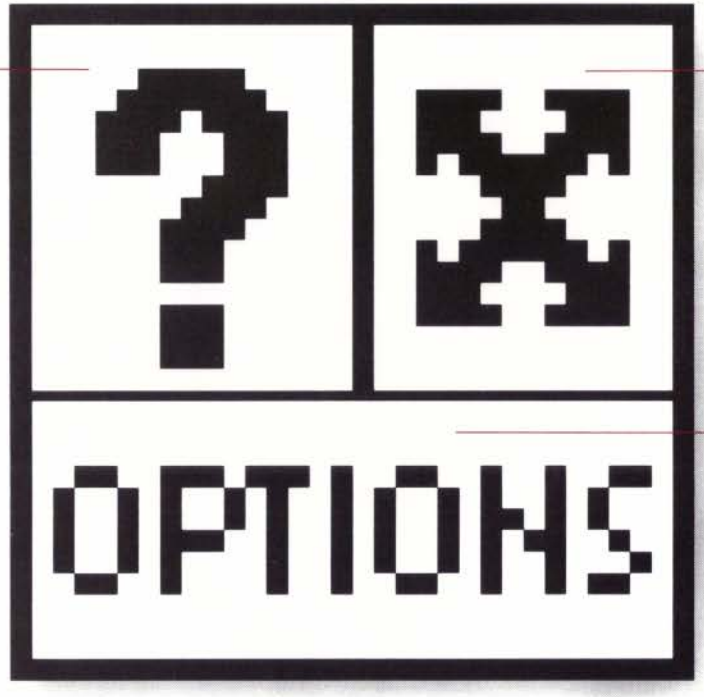


The Superbutton

The Superbutton is the major navigational device of *The Visual Almanac*. It appears on every screen (except the Sample Compositions).

The Superbutton appears on most cards, and is really three buttons in one. The three buttons allow you quick access to several different types of information.

Click the question mark to show a help screen. Click OK when you are through with that screen.

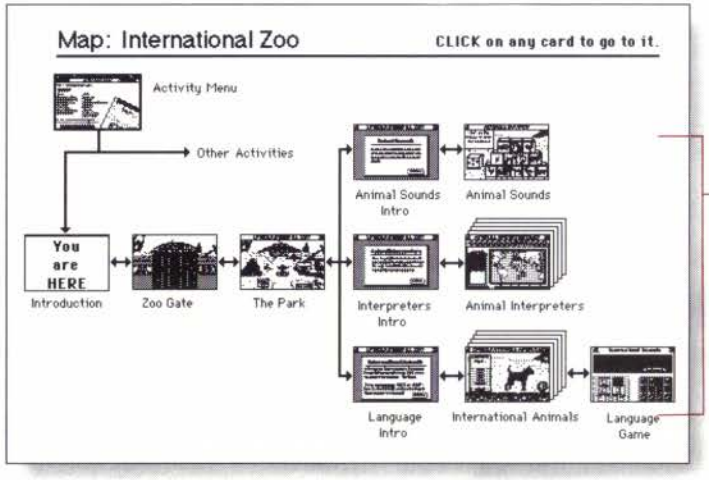


Click here to get a map that shows you where you are in relation to everything else (see next page for a description).

Click here to display the Options dialog box (see next page for a description).

Superbutton Map Card

The Map card shows you where you are. You get to the Map card by clicking the upper right part of the Superbutton. Use the Map to get around the Activities, Collections and the Workspace.



This is a map card from an activity, for example. Each stack has its own, unique map.

Superbutton Options Dialog Box

Click options for some choices in navigation and operation of *The Visual Almanac*.

continued...

Video Controls

The Status line shows the current status of the videodisc: depending on the state of the videodisc player, there are different status messages (see below).

Click here to initialize the videodisc. If the videodisc is running normally, this button is not needed, and is greyed out.

Click in the check boxes to remove the check mark and disable the video or audio; click in them again to enable the video or audio.

Click this button to eject the videodisc (for example, to flip to the other side).

Click here to go to the Videodisc Controller (see next page for a detailed description).

Click here to see the title, collection, chapter, and source of the image or sound that is currently being displayed.

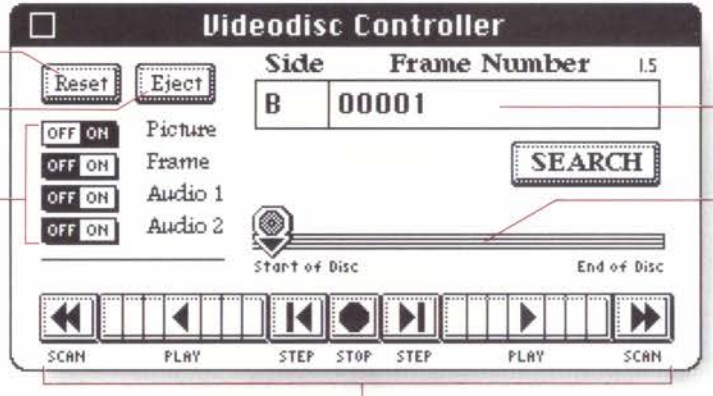
Video Controls Status Messages:

- "No videodisc player initialized" — The software doesn't yet know if there is a videodisc player connected. Click "Initialize videodisc" to tell it.
- "Player not connected" — The software has been told that a videodisc player is connected, but it cannot establish communication with it. Click "Initialize videodisc" to establish communication with the player.
- "Player is parked" — For some reason, the videodisc is not spinning. Click "Initialize videodisc" to start it up.
- "Video is disabled" — The videodisc player has been disabled, either by the software, or by you. Click the "Video enabled" check box to re-enable it.
- Side (A or B) Frame (number) — This is the "normal" status. It tells you which side of the videodisc is loaded, and the frame number of the image or sound that is currently displayed.

Videodisc Controller

The Videodisc Controller is like a remote control, it gives you direct control of the videodisc player. Use the controller to scan the videodisc. When you close the Videodisc Controller, you return to where you were before you clicked Options on the Superbutton.

The Videodisc Controller looks like this:



Click here to reinitialize the videodisc player.

Click here to eject the disc from the videodisc player.

Click here to turn the picture on or off, to turn the display of the video frame number on or off and to turn the sound channels on or off.

Type in a frame number and then click the Search button to go to that frame.

Click anywhere on this slider scale to go to a corresponding area of the disc. You can also click on the pointer and drag it along the control to scan the disc.

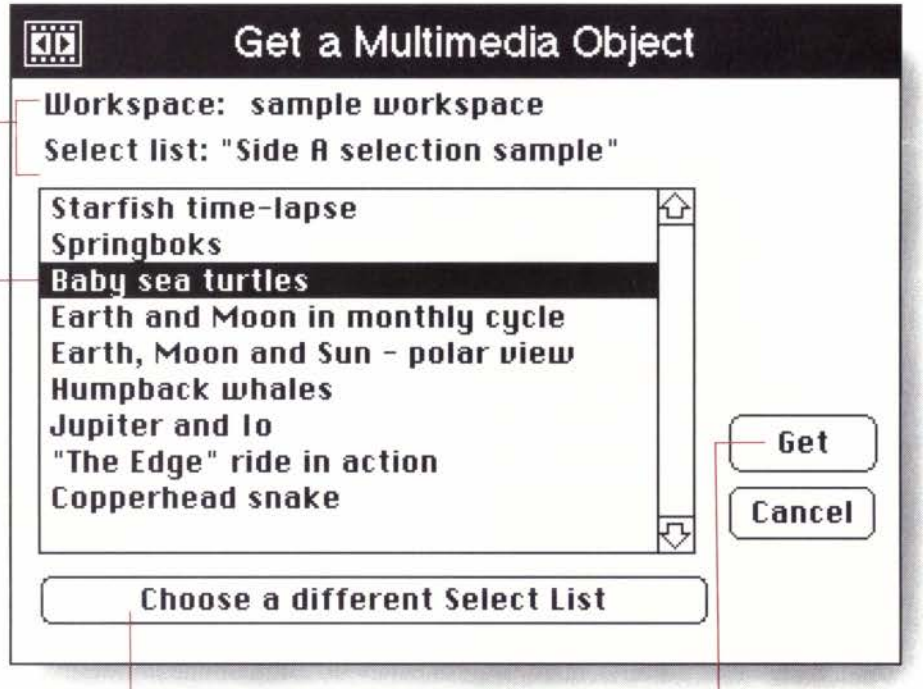
The buttons on this control work much like those on the videodisc player itself. Use them to play forward and backward through the videodisc at different speeds.

GET INFO

NOTE:
The Get Info button appears when the Videodisc Controller is used in the Collections Directory. Click on it to see the title, collection, chapter, and source of the image or sound that is currently displayed.

"Get a Multimedia Object" Dialog Box

This dialog box gives you the ability to select one or more objects from a Select List to place on your own composition card.



This tells you the name of the Select List you are looking at, and which Composition Workspace the Select List is in.

Click the title on an object to select it. To select more than one object to retrieve, hold down the Shift Key and click.

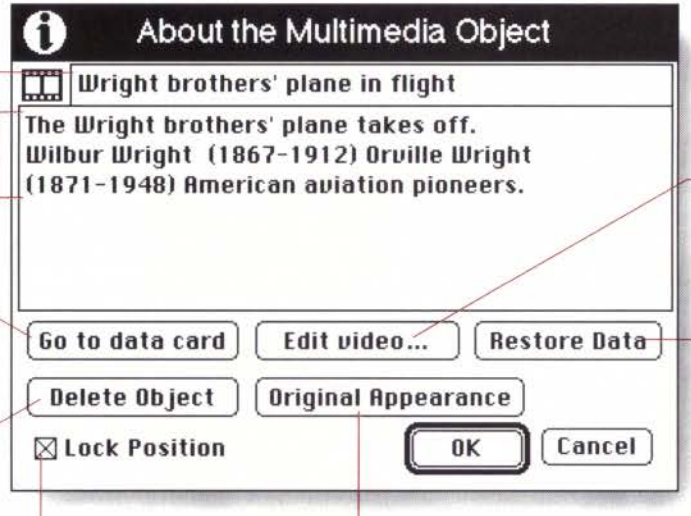
Click here to see a list of objects in another Select List in your workspace.

Click the "Get" button to retrieve selected objects, and turn them into buttons in your composition.

"About the Multimedia Object" Dialog Box

This dialog box shows you the title and description of a multimedia object. You can edit a button title or description, change the length of a motion or sound sequence or lock a button down on the card. Other functions are indicated by the names of the buttons.

To get this dialog box, hold down the option key and click a button that you've placed on your composition card.



To change the name of the button, type in new text.

You can also change the text in this description field.

Click here to go to the object's data card in a collection stack.

Click here to delete the object button.

Click here to go to the "Edit this video" dialog box (described in the next section).

Click here to restore the original title, descriptions, and video edit of the button.

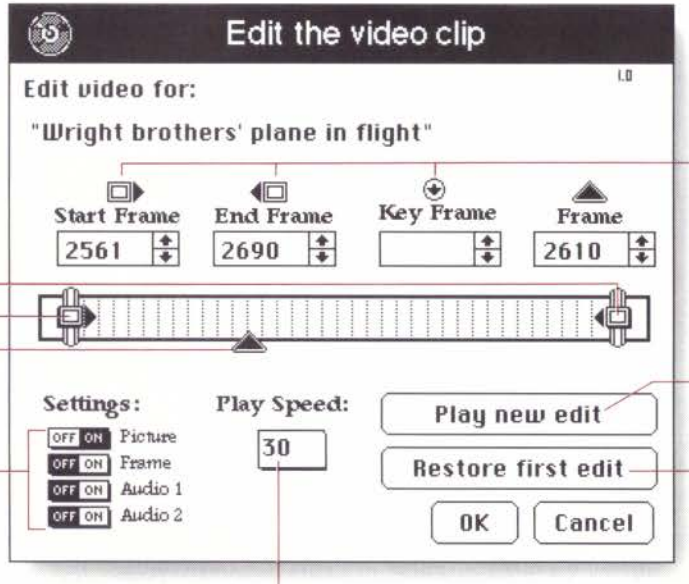
Click here to lock the button on the card, so that it cannot be moved by clicking and dragging.

Click here to restore appearance (e.g., size, style) of the object button.

"Edit the Video Clip" Dialog Box

You can use this dialog box to shorten the video sequence, change the speed at which the video is played or turn the sound channels for the video off or on.

To get this dialog box, click "Edit video..." in the "About the Multimedia Object" dialog box (see previous page).



Click here and drag the mouse to the frame at which you want the video to start or finish playing.

This mark indicates what frame is currently displayed.

Click these buttons to turn the picture, the frame number or the sound, on or off.

Click on these icons to move the start, end or key frames to the currently displayed frames.

Click here play the current edit.

Click here to restore everything to what it was when you opened this dialog box.

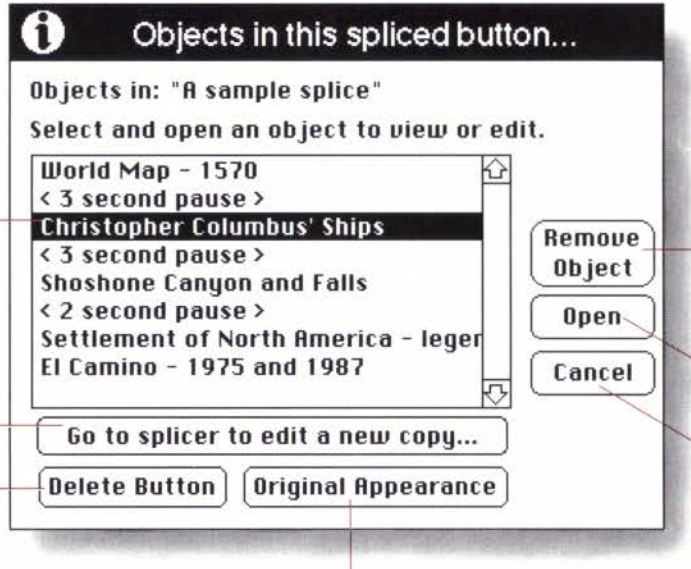
Hold the mouse button down here to change the speed at which the video plays. A menu of the possible speeds will pop up.

NOTE:
Sound for a movie can be heard only when the speed is set to 30 frames per second.

"Objects in this spliced button..." Dialog Box

This dialog box shows you a list of all the objects and pauses in a spliced button. In this dialog, you may open individual objects to see their description or edit their video. You may also edit the durations of individual pauses in the splice.

To get this dialog box, hold down the Option key and click on a spliced button that you have placed in your composition.



Click on an object title, or a pause, to select it.

Click here to go to the splicer in your workspace, where you can edit a new copy of this spliced button.

Click here to delete the spliced button from your composition.

If you have used the HyperCard button tool to change the style or shape of the button, click here to restore its original appearance.

Click here to remove the selected object or pause from the splice.

When an object is selected, click here to see the "About the Multimedia Object" dialog for that object.
When a pause is selected, click here to change the pause duration.

Click here to exit this dialog without making any changes.

Troubleshooting Dialog Boxes

Home stack is not *The Visual Almanac* Home.

Options: Proceed, Quit

This dialog box appears if you open a *Visual Almanac* stack directly, and HyperCard somehow uses a Home stack other than *The Visual Almanac* Home. Most of *The Visual Almanac* stacks will work without *The Visual Almanac* Home, but you will not have access to the Main Menu.

To restart with *The Visual Almanac* Home:

1. Click "Quit" to quit HyperCard.
2. On the desktop, double-click on *The Visual Almanac* Home stack.

Can't use the videodisc, no drivers present.

Options: Proceed, Quit

This dialog box appears in a Collection if the software for controlling the videodisc player is not available. The "videodisc drivers" for the Collections are in *The Visual Almanac* Home.

To restart with *The Visual Almanac* Home:

1. Click "Quit," to quit HyperCard.
2. On the desktop, double-click on *The Visual Almanac* Home stack.

This Activity (or Collection, or Composition) uses the other side of the disc.

Options: Go Back, Proceed, Flip Sides

This dialog box appears when you enter a stack which uses images or sounds that are on the opposite side of the videodisc. You may click Proceed, and then turn the video off if you want to continue without the images or sound.

To see the correct images:

1. Click "Flip Sides." The videodisc will be ejected.
2. Turn the videodisc over to the opposite side.
3. Click "OK" on the next dialog to reinitialize the player.

Can't find "Workspace Master."

Options: Look for it, Cancel

This dialog box appears when you are making a new workspace, and the master copy—the Workspace Master—is not in the Workspaces folder. Click "Look for it" to use the standard file dialog box to find it in another folder. Or,

1. Click "Cancel" to exit the new workspace operation.
2. Quit HyperCard.
3. On the desktop, copy the Workspace Master stack from a diskette or CD-ROM into your *Visual Almanac:* Workspaces folder.
4. Restart *The Visual Almanac* and try again.

Can't find the "Template Master."

Options: Look for it, Cancel

This dialog box appears when you are making a new composition, and the master copy — the Template Master — is not in the Compositions folder. Click "Look for it" to use the standard file dialog box to find it in another folder. Or,

1. Click "Cancel" to exit the new composition operation.
2. Quit HyperCard.
3. On the desktop, copy the Template Master stack from a diskette or CD-ROM into your *Visual Almanac:* Compositions folder.
4. Restart *The Visual Almanac* and try again.

Not enough disk space for new workspace (or composition).

Option: OK

You will see this dialog box if you are trying to make a new Workspace (or composition), and there is not enough room on your disk for the new stack. You cannot proceed. Your only recourse is to clear some space on your disk.

1. Click "OK" to exit the operation.
2. Quit HyperCard.
3. Delete some files from your disk to clear some room.
4. Restart *The Visual Almanac* and try again.

Can't find the Compositions Folder.

Options: Look for it, Cancel

This dialog box appears if the Compositions folder is not where it is expected to be. This may happen if you did not copy the Compositions folder to your disk, or if your workspace is on a floppy diskette.

If you do have a Compositions folder:

1. Click "Look for it."
2. Use the next dialog box, the standard file dialog, to open a stack (any stack) in the Compositions folder. This tells the software where the Compositions folder is.

Source info is not available — video is disabled *or* enable video and/or audio to get source info.

Option: OK

One of these dialog boxes will appear if you click "Get Source Info" in the Video Controls dialog and, for one reason or another, the communications link between the Macintosh and the videodisc player is broken.

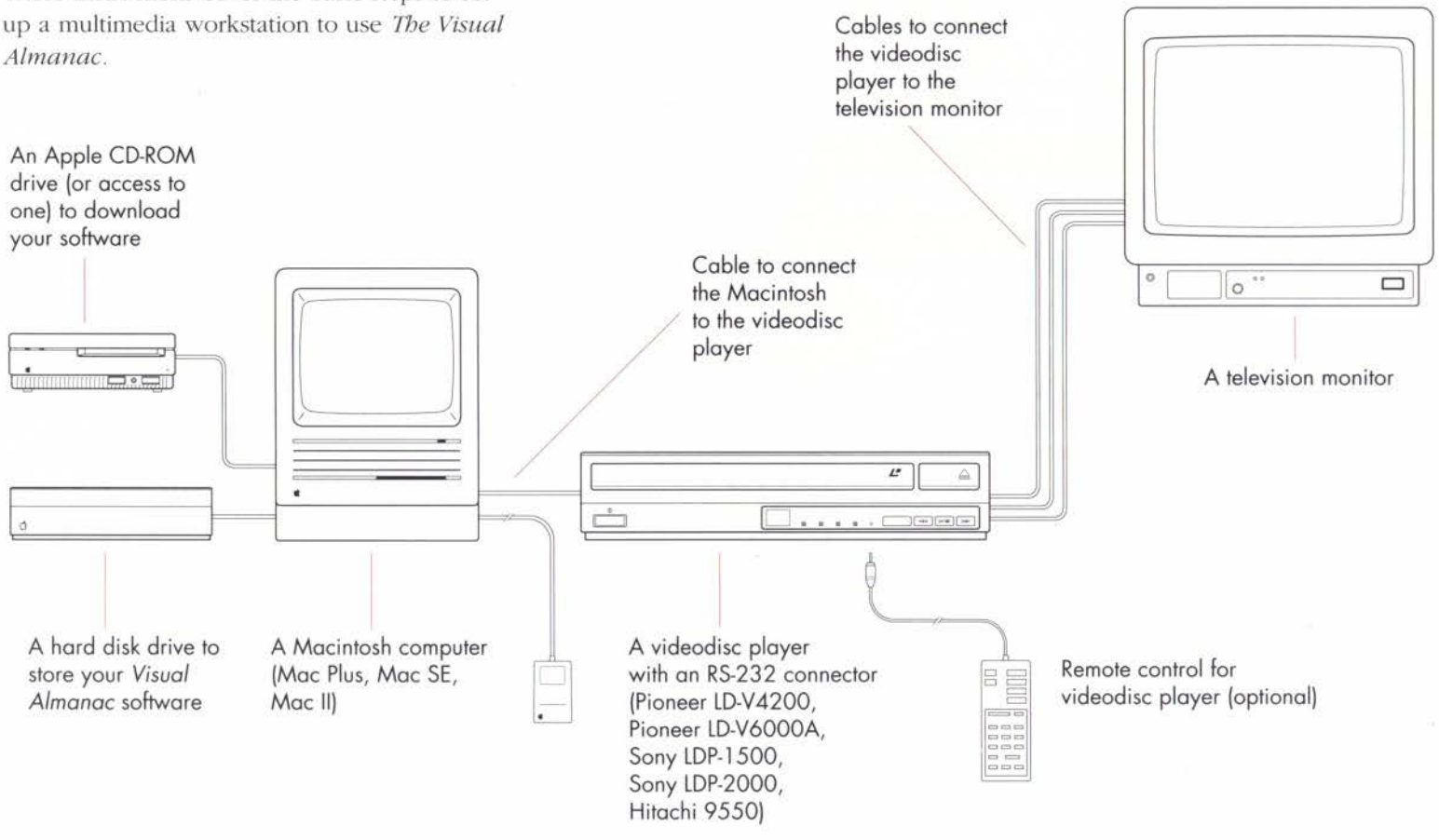
To re-establish communication with the videodisc player:

1. Click "OK."
2. Use the Superbutton "Options" to display the Video Controls dialog again.
3. Click "Video enabled" or "Initialize videodisc."

Setting Up Your Multimedia Workstation

The Equipment You Need

These instructions cover the basic steps to set up a multimedia workstation to use *The Visual Almanac*.

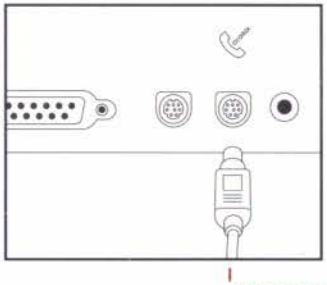


How to Connect Things Together

1. How to connect the Macintosh to the videodisc player

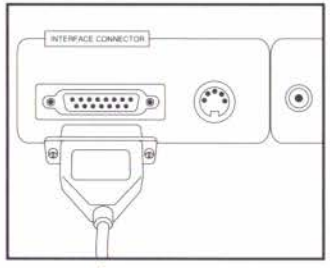
The cable that connects your Macintosh and your videodisc player is a custom cable for each player. It either comes with your player or you will have to purchase it from your videodisc player manufacturer. If you have any problem, contact your Apple representative. This example illustrates the set-up involved with a Macintosh SE and a Pioneer LD-V4200 player.

MACINTOSH



Plug the round connector into the "modem port" (the telephone icon) of the Macintosh.

VIDEODISC PLAYER

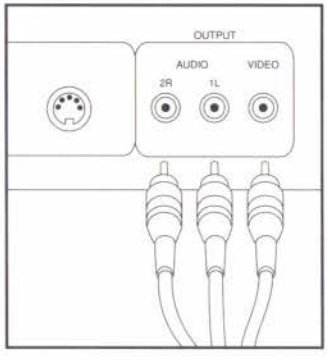


Plug the wide, flat connector (called a "DB"-type connector) into the RS-232 connector on the back of the videodisc player.

2. How to connect the videodisc player to the monitor

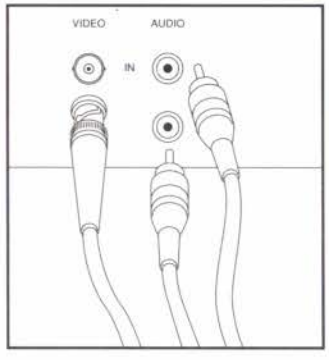
This is your normal videodisc setup. Follow the instructions in your owner's manual to connect the videodisc player to a television monitor. *The Visual Almanac* has two channels of sound. Some TV monitors only have one audio input connector. In this case, you will need a "Y" connector to combine the two audio channels into one.

VIDEODISC PLAYER



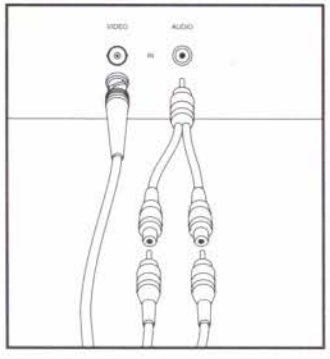
Plug one end of the cables into the videodisc player.

TV MONITOR: 2 AUDIO CHANCELS



Plug the other end of the cables into the TV monitor. This monitor has two-channel audio input.

TV MONITOR: 1 AUDIO CHANNEL



This monitor only has one audio channel. Use a "Y" connector as shown here.

Managing Your Software

The Visual Almanac software is on the enclosed CD-ROM. We are using the CD-ROM as a distribution medium, and recommend strongly that you download the software from the CD onto a hard disk. The reason we don't recommend running the software from CD-ROM is that the software will run very slowly, and some of it will not work correctly. You can also run most of *The Visual Almanac* stacks from a floppy disk.

To Download the Software from CD-ROM to a Hard Disk

- Connect the CD-ROM drive to the Macintosh (refer to your CD-ROM manual for directions).

If you are downloading onto an external hard disk, be sure to connect it as directed in the disk's manual.

- Turn on the Macintosh.

When you have booted up, you will see the CD-ROM icon on the screen.

- Double-click on the CD-ROM icon to open it. You will see three folders:
  - *The Visual Almanac*
  - The CD Audio Toolkit
  - The Videodisc Toolkit
- Then, following Macintosh convention, click and drag *The Visual Almanac* folder onto the hard disk.

The Visual Almanac folder is all you need to run *The Visual Almanac*. We have included the Videodisc and Audio Toolkits as extras. The Videodisc Toolkit lets you control a videodisc with a Macintosh. Please note that *The Visual Almanac* software includes videodisc drivers, so you do not need to use any others. You might want to check out the Videodisc Toolkit for descriptions and instructions for setting up workstations with videodisc players other than the Pioneer 4200. The CD-Audio Toolkit allows control of audio compact discs in an Apple CD-ROM drive by a Macintosh. The Toolkit will be useful to you in general, as well as using *The Visual Almanac*, as we have included all of the sound from *The Visual Almanac* videodisc on the CD-ROM.

The Visual Almanac is a large software application... about 28 megabytes. If your Macintosh SE or hard disk has 20 megabytes, the entire *Almanac* will not fit on your hard disk. You may not want to load the entire *Almanac* onto your system. You can run much of it from floppies.

To Download the Software from CD-ROM onto Floppy Diskettes

Open *The Visual Almanac* folder and note that it contains HyperCard, a Home and four folders. You may click and drag separate folders or their contents onto your hard disk.

The Visual Almanac Folder

- **HyperCard 1.2.2:** To run *The Visual Almanac* you need to use this version of HyperCard.
- **Home:** *The Visual Almanac* software is HyperCard stackware and requires a home stack.

  The Visual Almanac Home contains special information and commands designed for *The Visual Almanac*, and a "Main Menu" to take you to every part of the system.

  Each of *The Visual Almanac* stacks is small enough to fit onto floppy disks. You may click and drag individual stacks onto a floppy disk.
- **Activities:** Fourteen ready-to-use multimedia examples made by Lab designers. You will see 17 stacks in the Finder because Playground Physics is a large activity that contains 3 stacks: Moving In and Out, Teeter-Totter and Rolling Ball.
- **Collections:** All the multimedia objects, organized into 12 collections (10 visual and 2 sound).
- **Compositions:** Some sample compositions made by the first users of *The Visual Almanac*. Your compositions will be stored here as well. This folder also contains the Template Master stack, which you need to make compositions.
- **Workspaces:** The tools for making multimedia compositions.

Alternatives to Loading All the Software

If you decide not to install everything onto a hard disk, you will want to know what you must install to make the *Almanac* work. You will need some combination of hard disk and floppy disks. Here are some guidelines.

The more software you install, the more flexible your system. If you have all of your software loaded, you can get to all parts of *The Visual Almanac* from the Main Menu. In the Companion, we assume that all of the software is loaded.

	If you load this onto a hard disk...	Then you can run from floppies...
The Bare Minimum	■ HyperCard 1.2.2	**The Collections Directory**—a single-stack index to the images of all the Collections. **The Activities**—each is an independent stack. You can make a floppy for each one and run them as needed. **The Compositions**—each is an independent stack. You will be able to fit more than one composition onto a single floppy.
A Little More	■ HyperCard 1.2.2 ■ *The Visual Almanac* Home	***All of the above plus...*** **The Collections**—each is an independent stack and will fit on a single floppy.
The Minimum for Making Your Own Compositions	***All of the above plus...*** ■ Compositions folder with the Template Master ■ Workspace folder with a workspace	***All of the above***
The Most Flexibility Without Loading All Your Software	***All of the above plus...*** ■ The Collections	**The Collections Directory** **The Activities** **The Compositions**

Multimedia Overview

Here are short articles on a few aspects of multimedia. When we gave demonstrations of *The Visual Almanac*, before it was finished, there were certain questions people always asked. These articles are brief answers to those questions.

What Is Multimedia? 194

What Is Interactive Multimedia? 195

Multimedia: Industry in Search of a Name 196

Macintosh, HyperCard and Videodiscs–
and *The Visual Almanac* 198

What Is the Multimedia Lab? 200

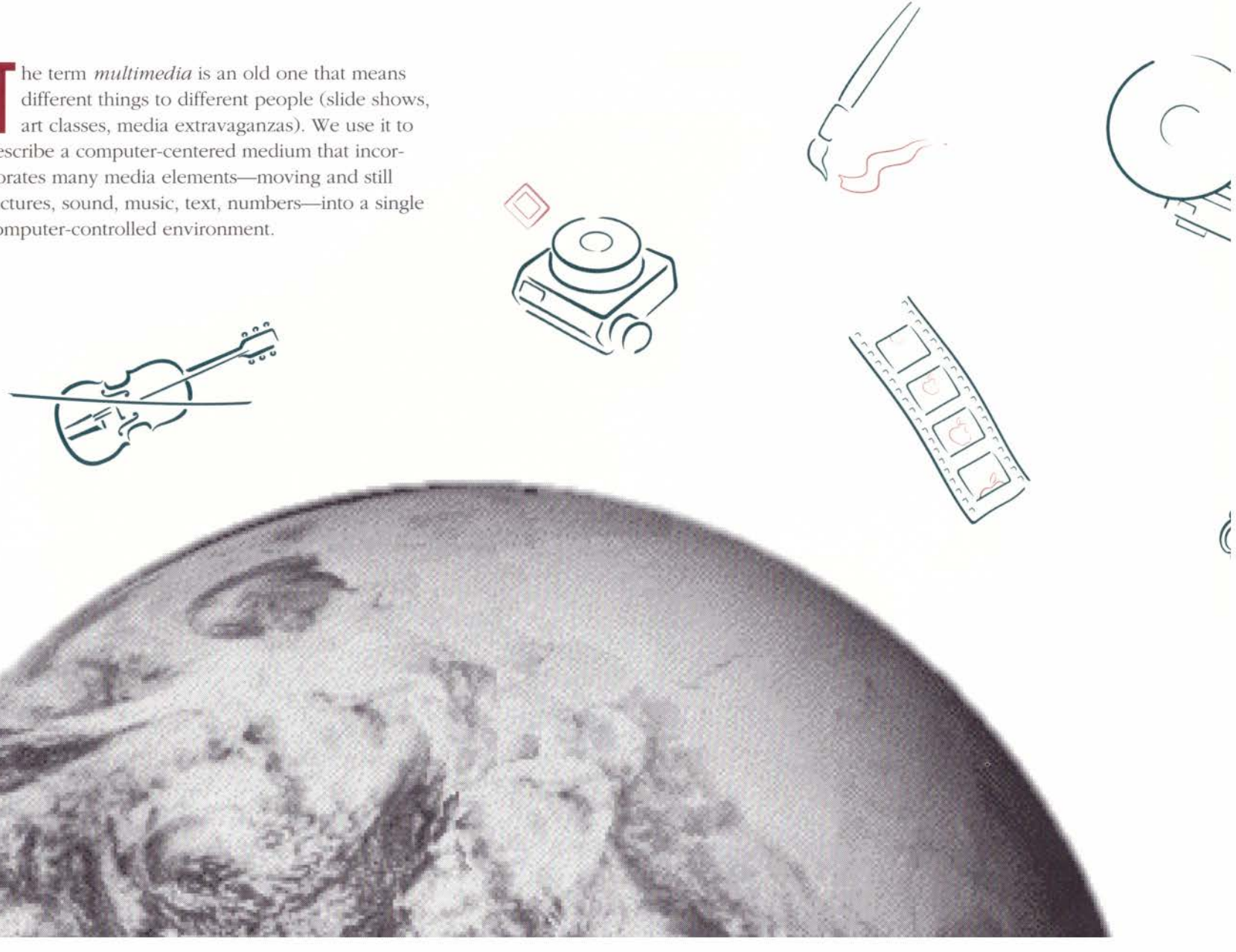
About Videodiscs 202

How Innovation Happens 204

A Little About Software 205

What Is Multimedia?

The term *multimedia* is an old one that means different things to different people (slide shows, art classes, media extravaganzas). We use it to describe a computer-centered medium that incorporates many media elements—moving and still pictures, sound, music, text, numbers—into a single computer-controlled environment.

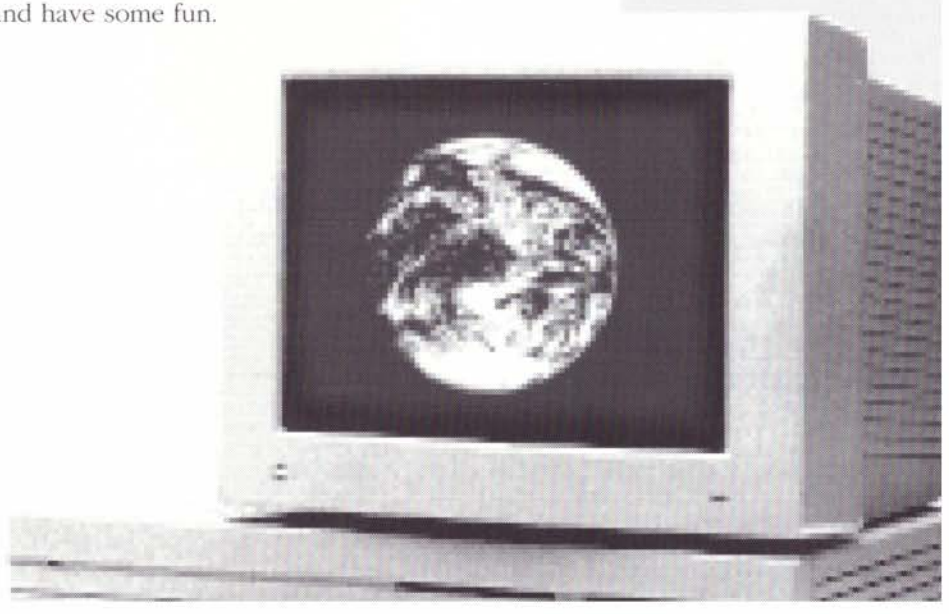


What Is Interactive Multimedia?

Interactive multimedia is multimedia with a significant difference: the user is not a passive consumer, but a creator and active participant. The term *interactive* carries with it the notion of involvement and open-endedness. You don't just respond to prompts; you browse, explore and make new things.

Computers have extended human abilities on many fronts. Word processing and desktop publishing have enabled even elementary school children to make professional-looking reports, and people who couldn't balance their own checkbooks now navigate spreadsheets and model various budget scenarios like accountants. But up until now multimedia has been in the hands of the technologists. Researchers and practitioners have been working for years to enable people to interact directly with visual media (photographs, film, video) as directly as they can, say, with books, words and numbers.

The problem has been technology. It was too complicated. Now the technology is advanced enough to be simple enough to put in the hands of the "content people." What used to require tons of equipment, years of programming expertise and a variety of production services around town can now be accomplished with a Macintosh computer, HyperCard and a minimum of computer skills. Because the technologies are now easy enough and cheap enough, the stage is set for casual, amateur multimedia exploration and composition. All we need to do is keep pushing the media's limits to accomplish what we imagined—and have some fun.



Multimedia: Industry in Search of a Name

The first problem with any newborn is "What shall we name the baby?" Interactive multimedia is a newborn industry of multi-names. Below is a list of ways to describe an ability to use a computer to control various media (sound, film, photographs, video, print). The different names derive from the different points of view of different professions. We list them here to make explicit the fact that many people are now talking about very closely related concepts in very different ways.

There are the "hyper" names. Hyper is a term that has come to mean "linked" in computer lingo.

- hypertext
- hypermedia
- hypervideo
- HyperCard
- hyper-TV

There are the media names. The salute here is to the fact that there is more than one medium involved.

- multimedia
- multiple media
- interactive media
- fluid media
- interactive multimedia
- desktop media
- integrated media

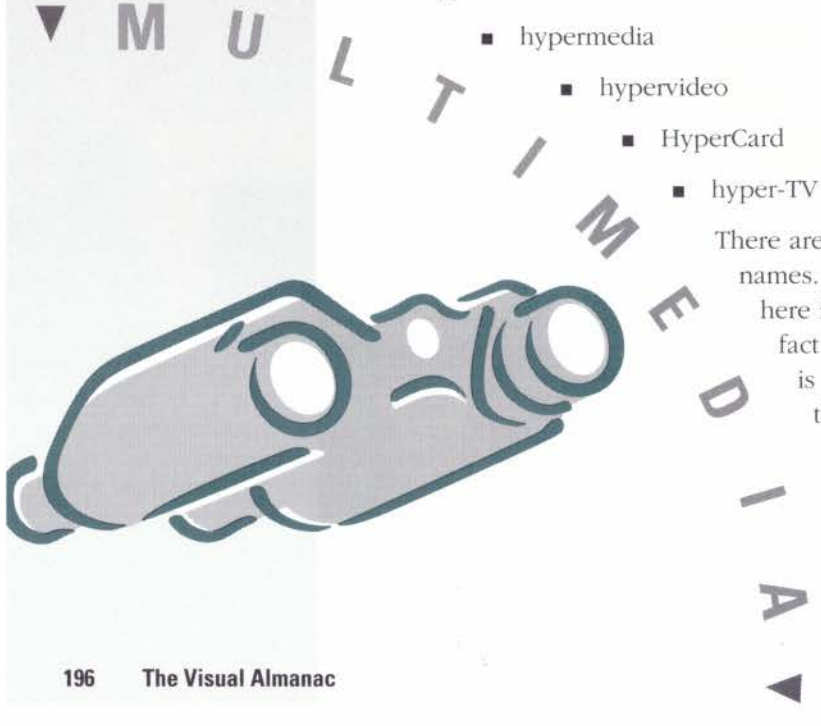
The video names. The focus here is on the addition of video to computers. Usually people in film and video favor this nomenclature.

- video computing
- desktop video

And, finally, some computer names.

- computer-centered medium
- new computer medium
- advanced multimedia computing

The computer names make it clear that the computer is at the center of the activity. Indeed, it is the computer that makes it all possible. At this time, *multimedia* is the most common name. We use it here and define it as a computer-centered medium.



HYPER TEXT

In addition to all these ways to refer to it, there are at least four different ways to think of multimedia:

- **It is a new platform.** A *platform* is the grouping of equipment needed for certain tasks. Multimedia brings together a new constellation of technologies and provides users with new opportunities in their computer platforms.
- **It is a new medium.** The combination of old "understood" media, like film, stills, sound, etc., and computer control and computer-centered text and graphics provides opportunities that allow a whole new medium of human expression.
- **It is a new experience.** Interacting with media is a radically new experience, and we have much to learn about how that experience can be used—in schools, business, entertainment, at home, etc.

- **It is a new industry.** Clearly the new platform, medium and experience that multimedia provides leads to many new business opportunities. There is no doubt that this is the beginning of an important new industry.

The Cherokee Indians say that you can't name something until you understand it deeply. If that's the case, there might not be a proper name for this set of experiences for years to come.

On the other hand, you may name something in order to express an ideal, a goal to strive for. In the Lab we currently favor the term *fluid media,* because it evokes two important goals we are working toward. One is to enable people to move with ease from one kind of medium to another (still to motion pictures, for example) and the fluidity that is available in expressing oneself with images and sound. The other goal is to help people become fluent in their ability to use different kinds of media both old (e.g., film) and new (e.g., interactive compositions) to communicate their ideas. We expect the day to come when instead of telling someone what you mean, you can choose to show him or her—with a drawing, a videotape, a multimedia composition or something completely new! We're betting that people can be as fluent in their visual expressions as they are verbally.

There might not be a proper name for this set of experiences for years to come.

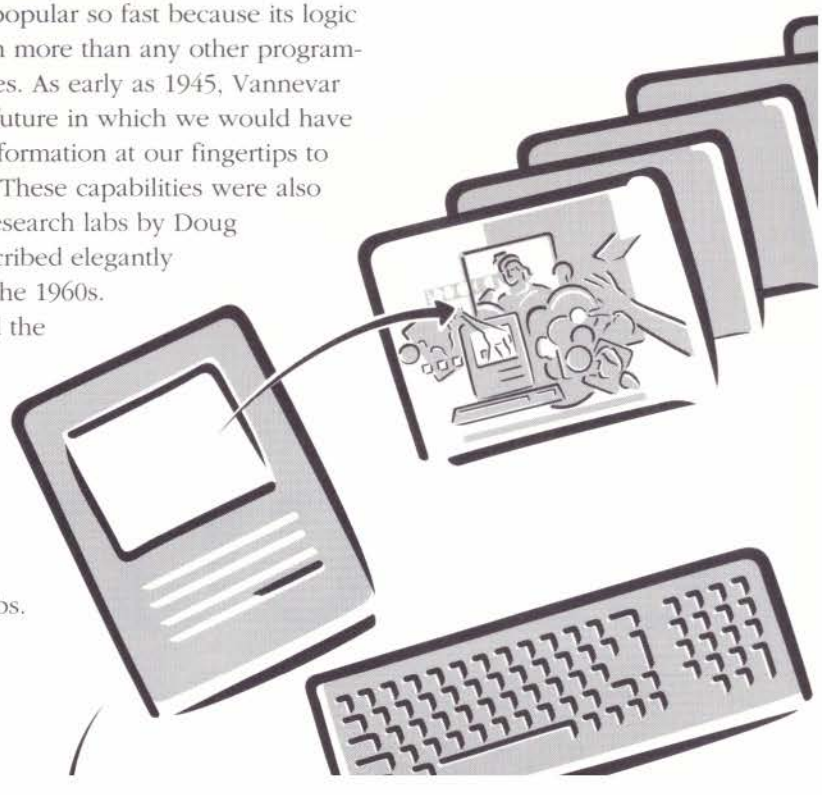
.teractive

Macintosh, HyperCard and Videodiscs – and *The Visual Almanac*

The Apple Macintosh computer is a "user-friendly, graphical" computer. Introduced in 1984, it made well-established traditions of user interface development available to personal computer users. It acknowledged the importance of human accessibility and good design. It also incorporated sophisticated typography, producing a look more akin to well-designed print displays than to typical computer terminal displays. The basic software architecture of this machine also encouraged graphical depictions as opposed to simple character displays, its rendering based on pixels rather than on alphanumerics.

Since its introduction, the capabilities of the Macintosh have been increased, as the Macintosh Plus, Macintosh SE and Macintosh II provide more memory, more storage capacity, and, in the case of the Macintosh II and Macintosh SE 30, faster microprocessors. Similarly, developments like the LaserWriter printer and the midi-interface have provided a range of new capabilities, from desktop publishing to musical composition. With each improvement to the Macintosh, the tools for the expression of ideas and for the display of information across a range of sensory media—paper, sounds and computer displays—have been enhanced.

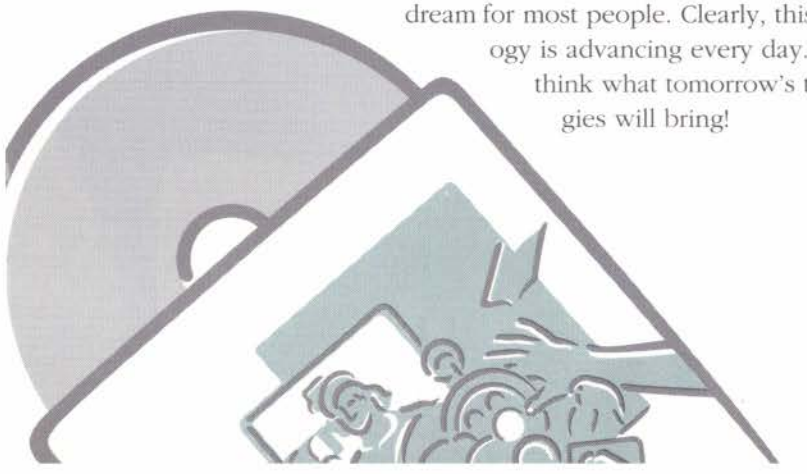
The introduction of Bill Atkinson's HyperCard in the summer of 1987 provided major extensions of computing on the Macintosh. A software product of Apple Computer, Inc., HyperCard adds at least two important dimensions to the Macintosh. One, it lets people link together large information sets in "hypertext" or "hypermedia" fashion—quickly, easily and nonlinearly. Two, its programming language, Hypertalk, is a very accessible language. It "blasts open" programming to such an extent that more people are programming today in Hypertalk than in any other computer language. It has become so popular so fast because its logic resembles our own more than any other programming language does. As early as 1945, Vannevar Bush described a future in which we would have a wide range of information at our fingertips to enhance thinking. These capabilities were also demonstrated in research labs by Doug Engelbart and described elegantly by Ted Nelson in the 1960s. And they provided the basis for extensive research and demonstration at the MIT Media Lab, Bank Street College, Brown University and other university labs.



Yet it was Atkinson's tool, now included free with every new Macintosh computer, that made these concepts available to the general public. HyperCard also allows average computer users to research these concepts themselves.

HyperCard is the central core of *The Visual Almanac*. Because software to control videodisc players and CD-ROM drives can be added to HyperCard, it is a natural tool for multimedia work. (*Note:* Other applications—including Authorware's Course of Action, Macromind's Director, and Silicon Beach's Supercard—also now include similar capabilities.) HyperCard has, for example, provided the search engine we employ for searching the Collections in *The Visual Almanac*. It is the backbone for all the Activities. And it is the basis on which we have built the tools in the Composition Workspace.

Obviously, videodisc technology is also key to *The Visual Almanac*. It provides a low-cost mechanism for displaying still imagery, motion imagery and sound under computer control (see "About Videodiscs" on page 202). We find it remarkable that this combination—Macintosh computer, HyperCard, videodiscs and *The Visual Almanac* materials we have produced and gathered—lets us all experience something that even five years ago was just a dream for most people. Clearly, this technology is advancing every day. Just think what tomorrow's technologies will bring!



What Would a Multimedia Experience Be Like?

"What would happen if you combined the traditions of movie making, graphic design, computer education, encyclopedia development, text publication, public television, computer workstations design, classroom teaching, library organization, entertainment and psychology? Could it possibly be boring? Would the results be something new? Would the results be significant educationally? Would they be entertaining? Couldn't they be all these things?

"What would 'multimedia experiences' be like? Will they be similar to the experiences of watching a finely crafted movie, writing a heartfelt letter, having a tantalizing conversation, visiting a great library, hearing a fine lecture, attending a symphony, listening to your favorite grandmother, viewing great old newsclips, playing the violin, opening a brand-new book you've been waiting for, browsing in your favorite bookstore, painting a picture, reading your favorite magazine, working at a flexible word processor or a spreadsheet, playing a great videogame, winning at Monopoly...?"

— Kristina Hooper
from *Interactive Multimedia*
Microsoft Press, 1988

More people are programming today in Hypertalk than in any other computer language.

What Is the Multimedia Lab?

Now that the first-level technology is available and getting better, the big question is: What should we do with it? This is where the Multimedia Lab comes in.

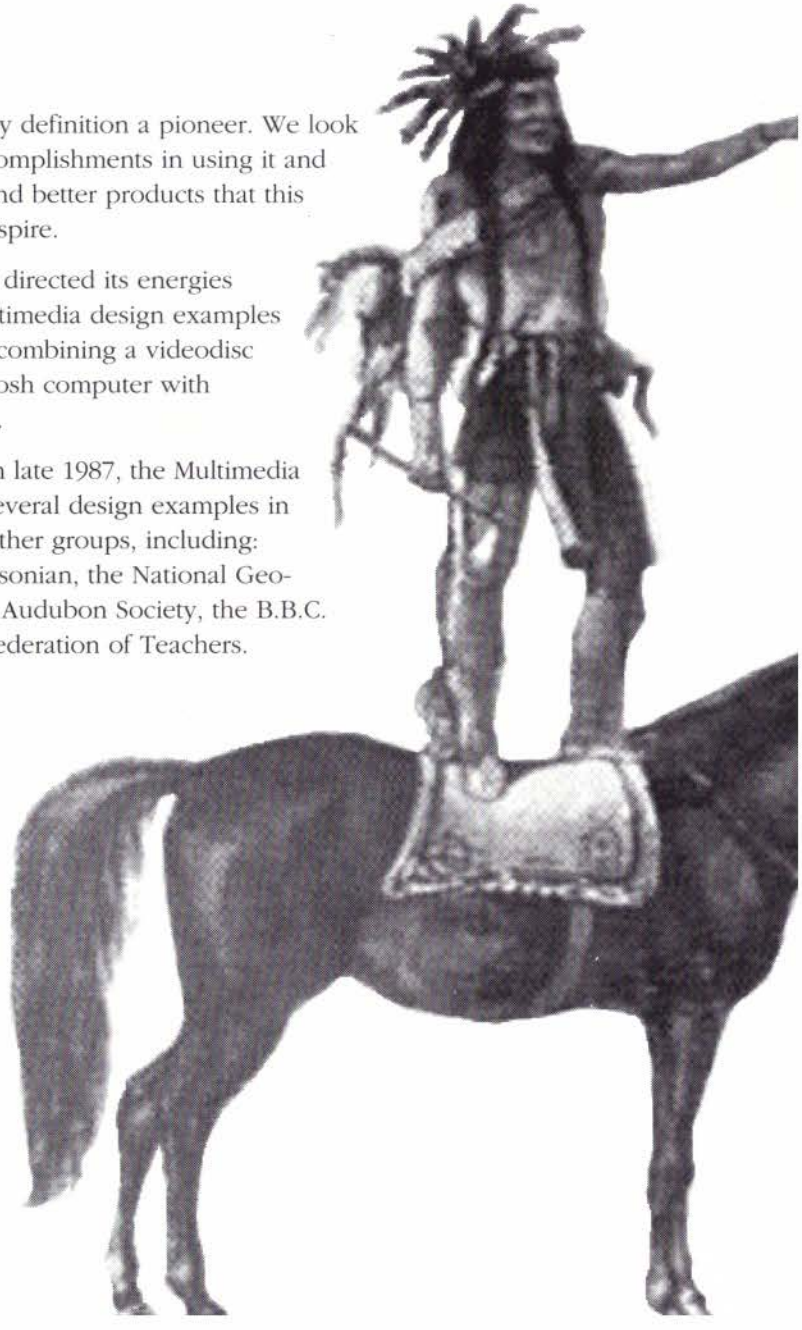
The Multimedia Lab was set up to realize a vision: to enable people to create powerful "experiences" through available computer technology. It is also concerned with driving the design of future technological advances through the creation of design examples for demonstration and products like *The Visual Almanac*.

The role of the Multimedia Lab is like that of a scout. Our mandate is to go beyond accepted boundaries, explore new territory, figure out a good place to set up camp and organize basic provisions. We establish an outpost and start spreading the word to potential pioneers. The pioneers come with the intention of settling in. We stick around for the transition, but then we're off to find the next outpost.

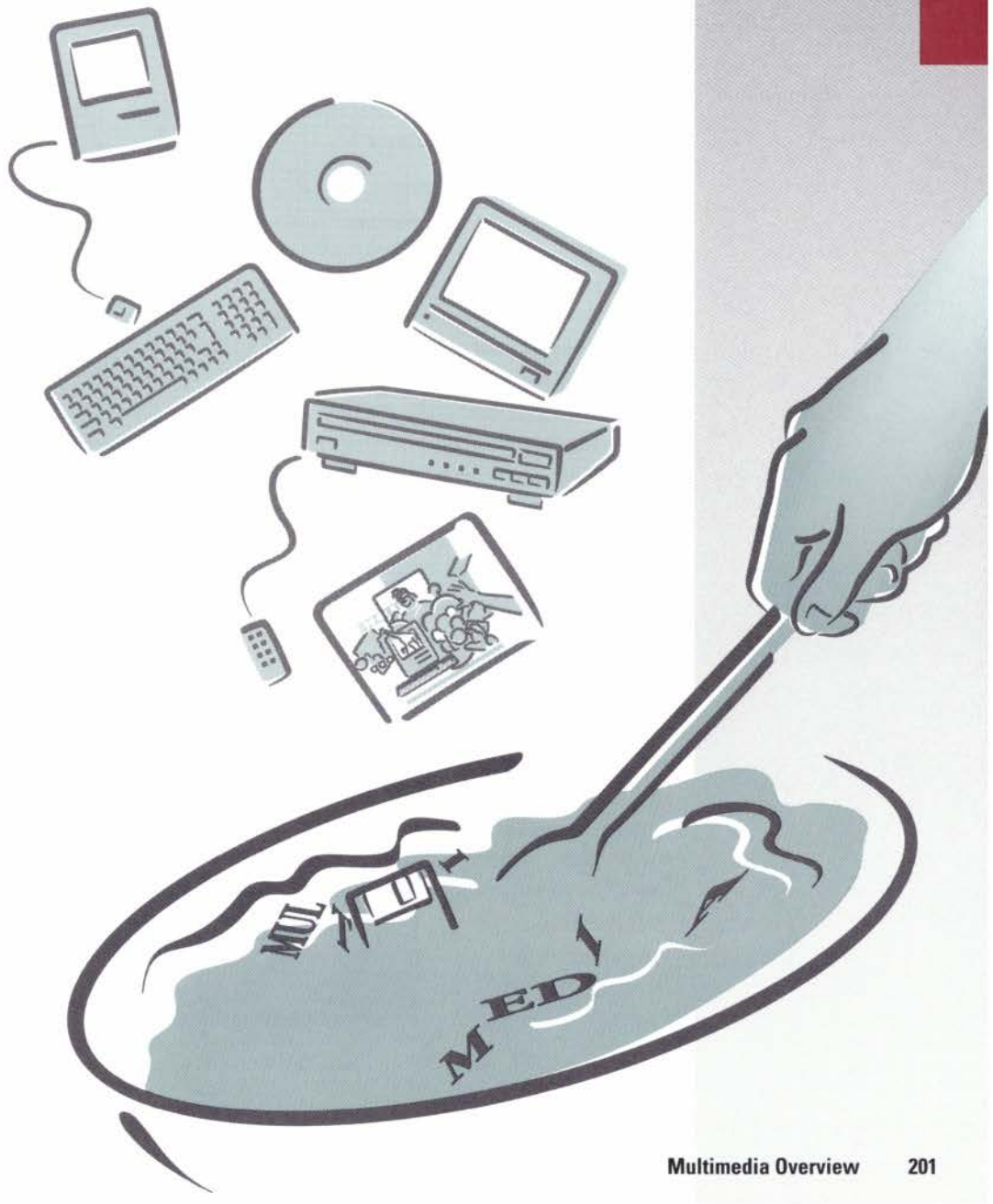
Obviously, a thing needs to be invented before it can be improved upon. It is the Multimedia Lab's job to take the first step, and it is the job of those who follow to make improvements. Because you are reading this Companion and will use *The Visual Almanac*, you are by definition a pioneer. We look forward to your accomplishments in using it and to seeing the new and better products that this development will inspire.

The Multimedia Lab directed its energies toward creating multimedia design examples for educational use combining a videodisc player and a Macintosh computer with HyperCard software.

Since its inception in late 1987, the Multimedia Lab has produced several design examples in collaboration with other groups, including: Lucasfilm, the Smithsonian, the National Geographic Society, the Audubon Society, the B.B.C. and the American Federation of Teachers.



Our conviction at the Lab is that everyone can be a multimedia composer. We are sure that, given the right tools, a person can gain fluency, in fairly short order, in computer-centered *multimedia production*. Our job has been to create the right tools. Now to prove our point, we have two choices: Bring thousands of people into the Lab, or send the Lab into the world. For obvious reasons, we have decided to export the Lab... at least a streamlined version of it. *The Visual Almanac* is the result.



About Videodiscs

Why Did We Pick Videodiscs for *The Visual Almanac?*

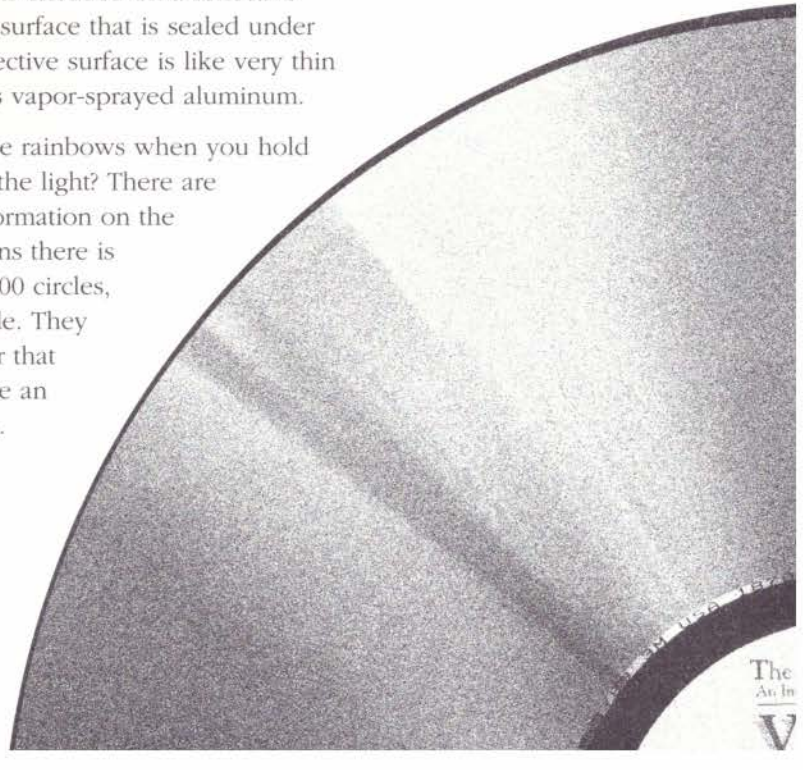
We chose to use videodiscs because of all available media at the moment, they provide the most flexibility, the only low-cost flexible source of moving imagery and the best random access (the ability to go quickly to any single frame without having to view intervening frames) to visual materials on a low-cost platform. You can also choose different ways to view their content. You can casually skim the material, at the normal speed of 30 frames per second, or you can carefully view it frame by frame. And, finally, videodiscs are durable; the image doesn't wear out.

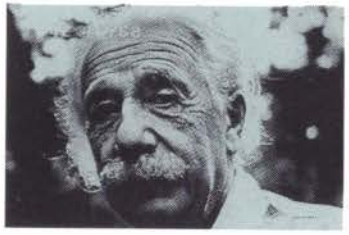
What Is a Videodisc?

The videodisc looks like a big compact disc and it is based on similar laser encoding schemes. It is also quite similar to a phonograph record. Like a record, it is "read only," which means that you cannot record onto it, as you can with video or audio tape. It is called an "optical storage medium" because of the way information is put onto the disc and read off it with light. A laser beam is the videodisc's equivalent to the phonograph needle. But, unlike a phonograph needle, the laser has no physical contact with the disc. Information is read off the disc by reflecting a microscopic laser beam off a track.

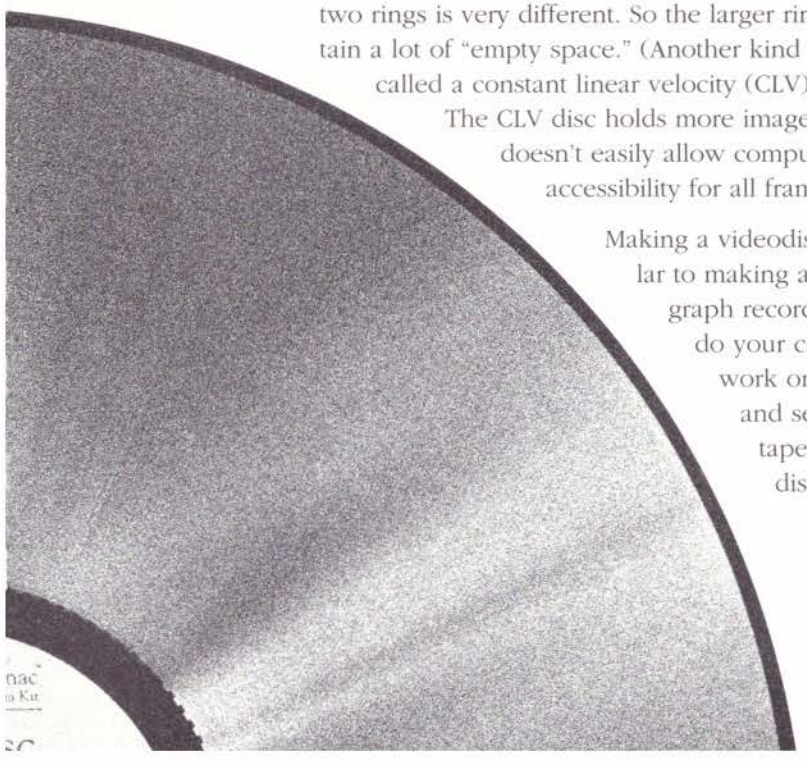
Videodiscs don't wear out. If you pick up a videodisc and look at it, you will see there is a protective plastic coating on top. All the information is encoded on a reflective surface that is sealed under this plastic. The reflective surface is like very thin tin foil—indeed, it is vapor-sprayed aluminum.

Wonder why you see rainbows when you hold the videodisc up to the light? There are 54,000 pieces of information on the videodisc. That means there is a spiral making 54,000 circles, or rings, on each side. They are so close together that they refract light, like an embossed hologram.





Unlike a phonograph record, the videodisc starts playing from the innermost circle. Frame number one is the smallest ring; frame number 54,000 is the outermost ring. *The Visual Almanac* videodisc is a constant angular velocity (CAV) disc, which means that the disc always goes at the same speed and that each image occupies one ring around the disc. One side of a CAV disc stores a half-hour of video. The fact that each image is one rotation of the disc makes random access possible. The image at frame 1 is no bigger than the image at frame 54,000, but the size of the two rings is very different. So the larger rings contain a lot of "empty space." (Another kind of disc is called a constant linear velocity (CLV) disc. The CLV disc holds more images but doesn't easily allow computer accessibility for all frames.)



Making a videodisc is similar to making a phonograph record. You do your creative work on tape and send the tape out to a disc presser. The disc presser sends you back an exact replication on disc. There are also "write-once optical disc recorders," which let you make videodiscs by yourself. We use write-once discs in the Lab to get a quick sense of what we want to do. After that we make "check discs." (These are in the standard format for videodisc players; write-once discs are not.) When everything is checked and approved, we make final discs. The final discs are made by the replicate method, where a master stamper is made and discs are stamped out.

You may be wondering what the difference is between a videodisc and a compact disc (CD). They are similar in that they use the same technology, they don't wear out and they are both read by a laser. An obvious difference is that CDs are smaller. Another difference, impossible to see, is that videodiscs (like phonograph records) store analog signals by convention, whereas information (sound, text or images) is stored digitally on CDs. CD-audio discs store digital audio signals. These are widely available in record stores replacing phonograph records during the last few years. CD-ROM discs also store data digitally. Both hold about 550 megabytes. The data is usually text or simple graphics, though people are working to provide movies in this format.

▼▼▼

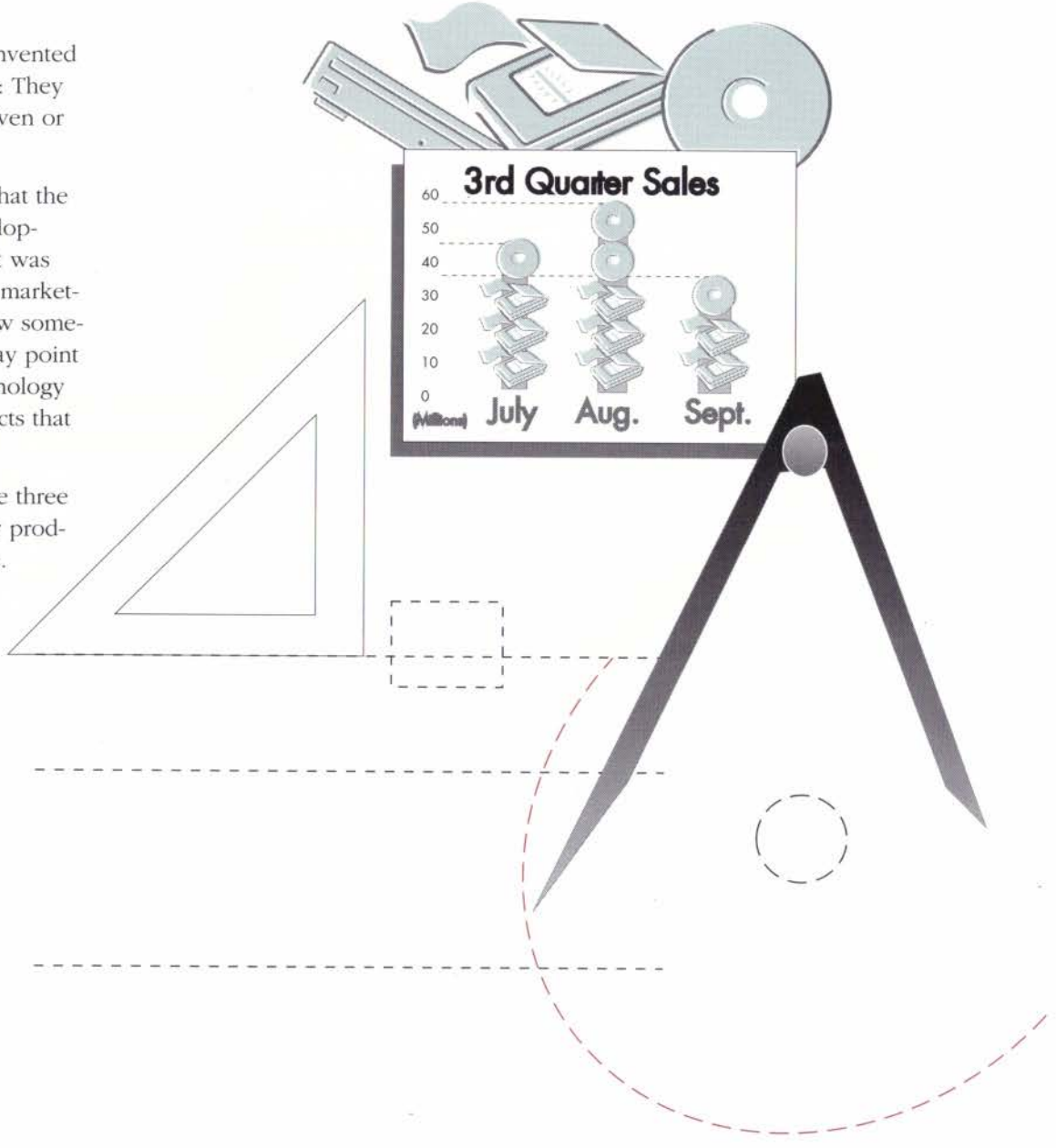
The fact that each image is one rotation of the disc makes random access possible.

How Innovation Happens

Products in the Information Age can be invented or designed in at least three major ways: They are either technology-driven, market-driven or design-driven.

If a product is *technology-driven,* it means that the use of some new technology led to its development. *Market-driven* means that the product was developed to fulfill a perceived need in the marketplace. When designers create a vision of how something ought to be or ought to work, they may point the way for the development of a new technology to make that vision concrete. We call products that emerge in this way *design-driven.*

However, no rigid boundaries separate these three avenues of product development, and many products are the results of combined approaches. But any way you look at product development in this highly innovative and competitive era, it *is* driven!



A Little About Software

Any program that tells a computer what to do is called software, but software comes in different physical forms. If you've had anything to do with computers in the past ten years, you are probably familiar with floppy disks. (Note that "video-disc" is spelled with a "c," and floppy disk has a "k." "Disk" is short for "diskette.") The Macintosh floppy disk is a 3.5-inch-square piece of plastic that is neither floppy nor a disk. But if you look inside the small metal shutter, you can see something brown there that is floppy material. Information on a floppy disk is stored magnetically. Each Macintosh disk holds 800,000 bytes (800K) of information. Its nickname is "floppy," as in "You need to put a floppy in the disk drive before you start to work."

A hard disk is another way to store software. The Macintosh SE often has a built-in 20-megabyte (20 million bytes) hard disk. You may also have an external hard disk drive, which connects easily to the Macintosh. Because of their greater storage capacity, hard disks are faster and easier to use than floppies. You can switch from an activity to a collection with a couple of clicks of the mouse, instead of physically removing one disk and putting in another. Therefore, it makes sense to transfer (*download* is the "techie" term) your software onto a hard disk.

CD-ROMs are another way to store software. They have been around a few years and will soon be prevalent. CD-ROMs store about 550 megabytes of information. As with floppies, you can download the information on a CD-ROM onto your hard disk. They are very convenient as a distribution medium and are becoming a standard for publishing large amounts of data. *The Visual Almanac* uses CD-ROM for distribution only. You must download the data from the CD-ROM (using the CD-ROM drive attached to your Macintosh) onto floppy disks or hard disks for use.

CD-ROMs can also be used to run programs with your computer directly from a CD-drive. Of particular interest in this area lately are "mixed-media" CD-ROMs that combine data and digital audio on one disk. This combination lets you control high quality audio presentations. *The Visual Almanac* software has not been designed to run optimally from a CD-ROM. It should be transferred to floppies or hard disk for use (see the section "Managing Your Software" on page 190).

Epilogue

Computers can assist us in doing many things. They can help us keep track of inventories and manage our stock portfolios. They can provide us with online dictionaries and easy access to available databases of information. They can help us gain access to data available from remote sensors, and they can help us manage our environments.

Unlike most of our technologies, however, computers can also serve as a tool for our minds. They can help us to think more effectively. And they may well be critical in helping us to zero in on important new issues to address. Thus they help us do things we have done before more efficiently, and they let us accomplish things we have never done before. As the world changes, they may allow us to handle complexities we haven't even imagined yet!

The Visual Almanac has been designed to be a thinking and learning tool. It provides an example of the kinds of learning possible when one has ready access to a wide range of audiovisual materials, as well as the tools to manipulate and present them. We hope that as we gain experience in working with these kinds of materials, we will be able to represent the world in new ways—and begin solving problems.

In one sense, *The Visual Almanac* is a grand experiment. Until now, these kinds of representational and presentational tools have generally been available only to professionals (in movie-making and graphic arts fields, for example). They typically have been used for entertainment, not for conceptual experiments or educational inquiry into complex topics. And whatever their use, most of us have been passive viewers rather than active participants.

In another sense, *The Visual Almanac* represents a humble beginning and will be most impressive only when the multimedia technologies and the multimedia presentation industries mature and expand. My expectation and hope is that pioneering product/experiments such as *The Visual Almanac* will become quite ordinary in the home, office, and classroom of the future. I fully intend that my children will take my work for granted.

Whatever the future of this class of presentation, I do hope that you have fun and learn a few things playing with the *Almanac*. I also hope that *The Visual Almanac* will provide you with an example to show your friends and colleagues in order to demonstrate some of your own ideas which were difficult or impossible to explain before.

Kristina Hooper
December, 1989

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Karen Duthie and Adam Zakin (who did all the production for this book) died in Nepal on the road from Kathmandu two weeks before this book was published.

The Companion was their last work and a great testament to these innovative and creative people.

We will miss them.