HYPERMEDIA

The coming age of interactive video-disc players will allow viewers to watch a movie at home and make decisions that change the course of the plot.

BY TOM WATERS

Some people think of TV watching as a completely passive activity, yet we couch potatoes know better. Mere passivity is all right, mind you, but what we really like is talking back to the box, flipping through dozens of channels by remote control, rewinding and fast forwarding the VCR. We like to interact with the set.

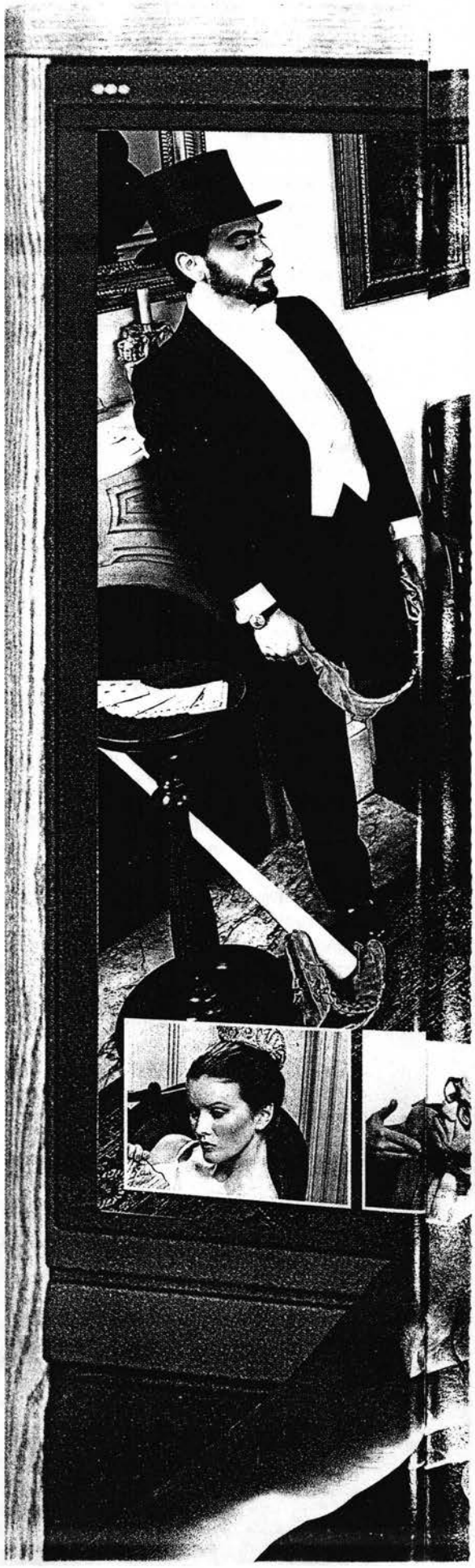
Critics and spuds alike will admit that these forms of interaction are a bit limited. It would be nice if while watching a baseball game, say, we could zap the set and instantly receive some statistics on the pitcher warming up in the bullpen, but all zapping is likely to get us today is some random heavy metal video. Many's the time we've found ourselves kneeling before the tube, pleading with video-bound villagers to try freezing the monster instead of electrocuting him, but to no avail; again and again we see the beast gain power from the electricity, burst his chains, and engage in behavior thoroughly unacceptable by village standards. If only they would listen, just once.

Well, someone is listening. Makers of consumer electronics, computers, and toys are now racing toward hypermedia. They'll soon make it possible for us to interact with video programs a little more meaningfully.

Naturally, different people have different ideas about what this interaction could be used for. Not everyone's vision is limited to thoughts of a better monster movie. Some look forward to murder mysteries in which the viewer is the detective and chooses which suspects to interrogate. Others foresee soap operas that allow the viewer to decide who sleeps with whom and which characters succumb to terminal diseases or boating accidents. Whatever the goal, however, the technological requirements are essentially the same: what's needed is a way to control the output of a video recording as easily and as flexibly as we can control the output of a computer.

The technology doesn't have to be all that complicated. Simply rigging a personal computer to a VCR would give you the basics of interactivity. If you absolutely need to participate in a monster movie, program the computer to give you a choice of antimonster strategies and then show the appropriate prerecorded clips from the videotape. Obviously, this arrangement has problems: if you really want to make the small decisions as well as the big ones, to respond to events on a minute-by-minute basis, you're going to have to spend a lot of time waiting for the tape to fast forward and rewind.

Fortunately, there are many ways to solve that problem. One solution is to run a single continuous video and confine the interactive capabilities to computer-generated graphics superimposed on the moving background. This basic approach is the one that will probably make it to market first: Interactive



PHOTOGRAPHS: TELEVISION, COURTESY SONY CORPORATION OF AMERICA; INSETS, BY STEVE COOPER; ARM, BY LILA HUBERT/THE STOCK MARKET

Vision, brought to you by View-Master—the people who make the three-dimensional viewers—should be available in time for Christmas shopping. It achieves a measure of interactivity at a rock-bottom price of about $130, and it's being targeted at kids aged three to nine, with programs based on *Sesame Street, The Muppet Show,* and such classic Disney characters as Mickey, Donald, and Pluto.

For your money you get a videotape, a piece of hardware in the form of a silver box, and a "controller," complete with joystick and buttons. The box is then wired between an ordinary VCR and television set, and the controller is plugged into the silver box. The child holds the controller, the tape goes into the VCR, and you're off.

Once the tape begins to play, the child gets to make choices affecting the action on the screen—whether to allow Big Bird or Olivia to sing in the shower, for example—by pushing the appropriate buttons. The tape then plays a specified series of images, which can be all video, all computer graphics, or a combination of both.

Although Interactive Vision's interactivity is somewhat limited, it should pave the way for acceptance of more expensive and versatile systems that use discs instead of tape. Discs can quickly move to any point in the program, enabling the computer to present an interactive movie with a minimum of interruption. Most of the interactive programs that have gotten past the experimental stage so far use 12-inch laser discs—the same format that failed to catch on as a vehicle for home movie viewing a decade ago.

Some interactive videos will let you plan an escape from alien invaders. But others will let you enter not just a character's actions but his thoughts.

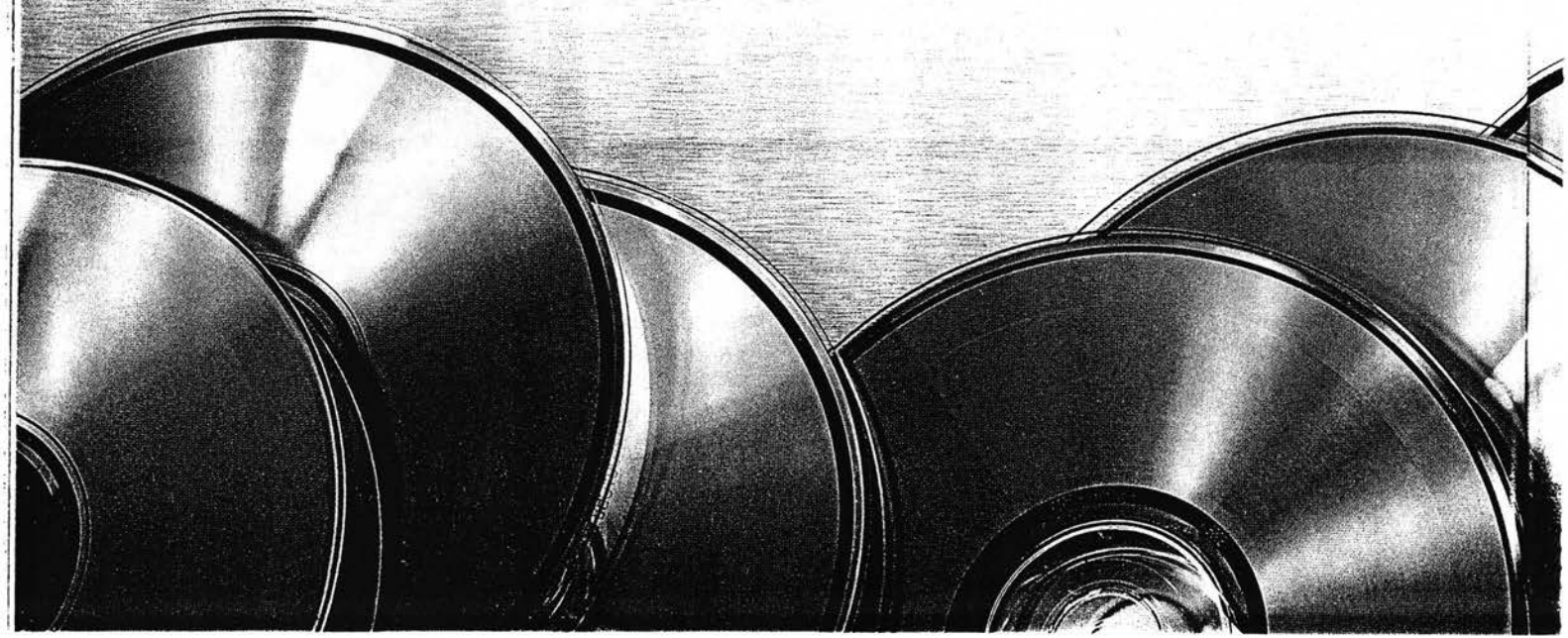
One approach to interaction with laser disc is exemplified by the animated *Freedom Fighter,* created by David Riordan and the 999 Game Group. It's a game found in arcades, and it's a true interactive movie. *Freedom Fighter* is based on *999 Galaxy Express,* an animated Japanese movie about humans who resist the takeover of Earth by androids. The laser disc contains footage from the movie itself and new footage drawn in the exact same style and quality as the original; in fact it was drawn by the original artists.

Freedom Fighter puts you in the shoes of the last member of the human resistance. You must find and destroy the androids' stronghold, while defending yourself from attacks in alleyways, a baseball stadium, and a taxicab, among other settings. You see almost everything from the character's point of view—of course, the choices you make determine what that view is—and you must think quickly to decipher clues and complete your mission.

The game is designed to appeal to arcade denizens, and you will never successfully complete it unless your shooting skills have been polished by many long hours and pockets full of quarters. But you need more than a quick draw. "There's also a lot of information you're trying to pick up that you use at the end," Riordan says. "It's important to pay attention to things that people are saying to you and things that people are doing."

While the program's violent subject matter and simple plot are standard arcade fare, they are also typical of many action-adventure movies. Indeed, *Freedom Fighter* looks more like a movie than a video game: its creators did not draw exclusively on the expertise of game-industry hands but turned to filmmakers as well. And although this effort was animated, it could have been made as easily with live action. Riordan is already working on what he terms "an interactive soap opera."

A distinctly un-video-game-like laser-disc program is *A Different Train of Thought,* produced by Carol Strohecker of the MIT Media Lab. It recounts a train trip through Eastern Europe by an American woman. Unlike *Freedom Fighter,* its story cannot be altered by the viewer. Instead this experimental program continuously gives you the opportunity to look into the minds of the various characters, whose faces are shown in boxes at the bottom of the touch-sensitive screen. By touching a box you can cut to a short scene relat-



PHOTOGRAPH BY WALTER WICK

ing that character's thoughts or perceptions; afterward the main story line returns. The scene may be from the main story, as if the character is reminiscing or making plans. It may relate in some way to the scene from which the program has just departed. It could even be a view of the passing scenery through a window. Strohecker describes the program as a "movie about the different ways people think."

Interactive laser-disc programs like these are seen by limited audiences, but the time will soon come when a mass audience can sample the pleasures of hypermedia. The first disc-based consumer products will be introduced next March at the earliest, and they will use the smaller compact disc. The reasons are strictly commercial: the audio compact disc is identical to the laser disc except for its size. Unlike its bigger cousin, however, the compact disc is a phenomenal success. Consumers have come to love the shiny, high-tech disc with an unexpected passion. Therefore, the argument goes, interactive entertainment will be more successful on sexy compact discs than on sensible laser discs.

The first of these systems to arrive will be CD-I, or "compact disc interactive," a joint product of Sony and Philips, the Dutch electronics giant. The CD-I player will look like a compact disc player, but it will contain a very powerful computer processor. Control will be by a joystick. The idea is to give the system an unintimidating form. A CD-I player will probably cost around $1,000 at the time it is launched, but that could well come down to a few hundred dollars if the product catches on.

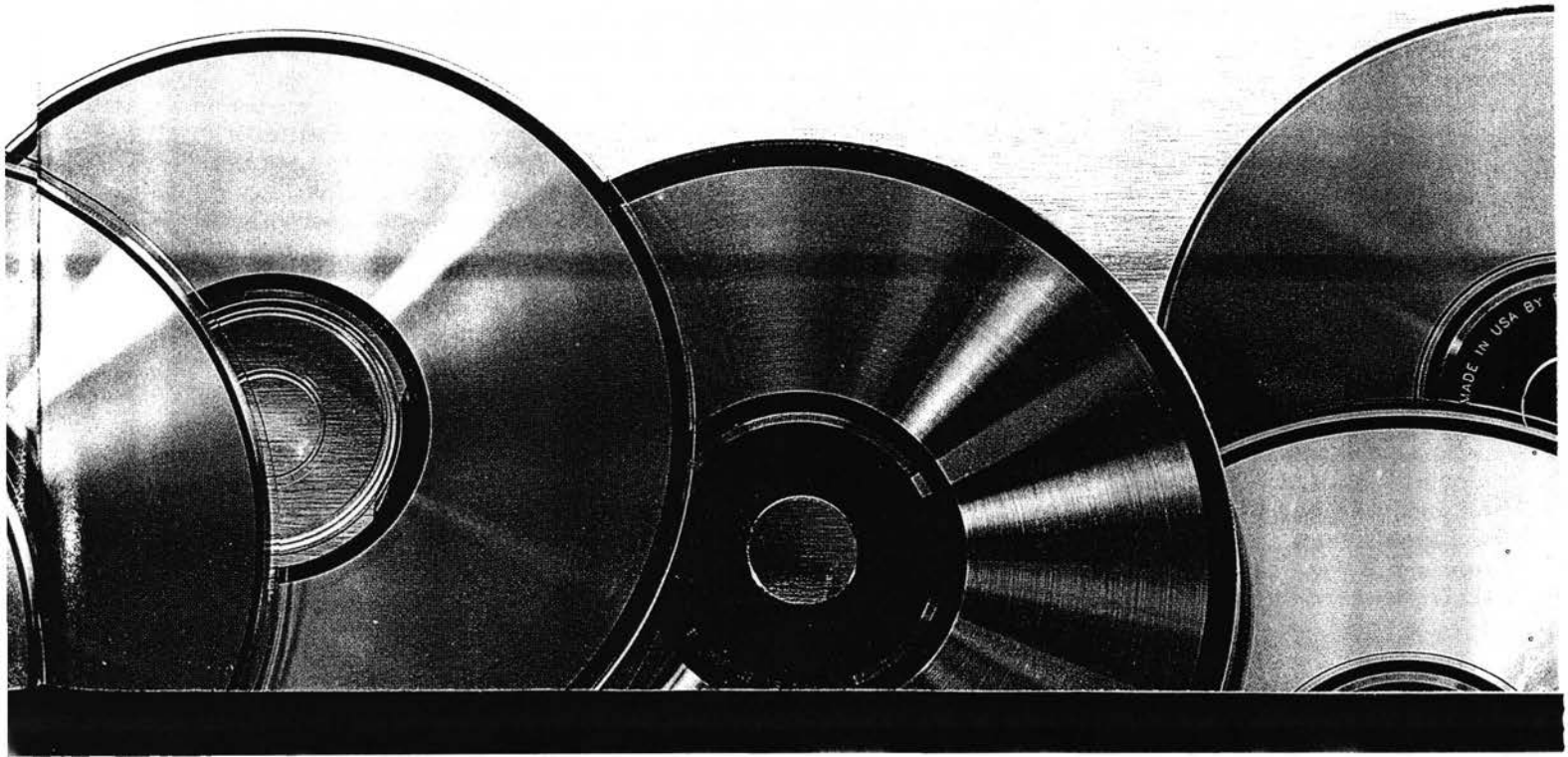
CD-I's sound is high-fidelity, but its motion video is no better than current VHS standards and must be confined to parts of the screen. That's because the rate at which data can be taken off a compact disc—170,000 bytes per second—is much lower than the rate necessary for full-screen motion video. The compact disc's output can't all go to video either; it must also carry the audio signal and any computer instructions needed to run the program. These conditions led CD-I's designers to limit image size and resolution in order to get the signal down to 150,000 bytes per second.

CD-I compensates for its limited motion video with its good audio and full-screen stills, the capacity to run and display text, and other features that make it particularly well suited for electronic reference books and other collections of information in various forms. Accordingly, many of the initial programs will be educational. One will be the *Academic American Encyclopedia*, from Grolier Electronic Publishing. Another will be an adaptation of Arkady Leokum's *Tell Me Why* books, from Interactive Production Associates. "These are answers to questions like, Why is the sky blue? and What is a meteorite?" says company president Peter Bloch. "They're each about a minute long and presented in a simple, entertaining way, one that the kids—who are all into video games—will enjoy. A lot of the programs being developed for CD-I are educational entertainment."

CD-I's limited video capabilities have not deterred producers from trying to create a movielike look for their programs. "You can create a graphic environment like a living room and put a TV set into it that can occupy up to half the full screen," says Bloch. "In that TV set—in that window—you can run full motion video." Bloch also expects to use "clunky animation," which has a lower frame rate, a range of colors, and moving figures in front of still backgrounds. Yet another approach may combine the partial-screen video with stills to simulate a moving full-screen picture. "We'll be using some tricks from the early days of movies," says Riordan, "like a foreground prop, with something moving behind it. We'll use some video, some still, some digital animation, mixing and matching."

The other big event in home interactive entertainment will probably be the introduction of DVI, or "digital video interactive," from Intel, which should be supplying manufacturers with the necessary microprocessors for home sets by early next year. It is the most advanced of the systems, can handle full-screen motion video, and is considered by many to be the ultimate in recorded interactive media. "In terms of technology, it's probably the most promising," says Riordan. "It seems to make the most sense." The speed of DVI's specialized microprocessors gives the program designer the ability to control every pixel in the image. The range of effects this makes possible is practically unlimited.

The heart of the system is a method



Above: *The Erl King* laser disc starts with a woman singing Goethe's poem, but it never proceeds the same way twice. Left: Touching the screen can call up scenes only obliquely connected with the narrative.

for compressing the digital video signal to the point where it can fit on the compact disc while still maintaining a reasonably good picture. "That's the trick," says Intel's DVI marketing manager Richard Stauffer, "to preserve good quality when you have to compress that much." Image compressors are commonly used in fax machines and satellite transmissions, but they have generally been too slow for video, too expensive, or both.

Intel's engineers had to come up with a decompression method that would run in real time on a relatively small machine and add as little cost as possible to the consumer. Their solution, essentially, was to have the compressor compare each two successive frames in the movie and encode only the information needed to turn one into the next. When the disc is played back, a special microprocessor chip does the comparatively simple job of converting the data to a standard digital video signal, and another chip converts the digital code to video output, adding any special effects called for by the program's computer code. The two chips are the heart of the DVI system, and Intel is now seeking to bring down the cost of producing them.

Intel is still only beginning to explore the possibilities the digital format opens up. A demonstration program shows some remarkable effects, though. The screen is divided into four parts. One corner shows a moving video. Another shows the same image warped onto the surface of a sphere. In a third corner is a simulation of a camera panning over a still picture—a feature that could be very useful for movie backgrounds, especially since the still image can be shown with finer resolution than the video. Finally, the fourth corner shows high-quality computer graphics.

Ultimately, the four images could be knitted seamlessly into one. "You could have a motion-video person moving in front of a background, which could be either motion video or a still," says David Ripley of Intel. Computer graphic animation could also be added to create a sort of *Roger Rabbit* effect.

Another way of combining these features is used in a test program devised by the software publisher Mediagenic. The program is a flight simulator, which reaches a higher level of realism than computer-game flight simulators by warping real pictures around computer graphic shapes. For example, while a computer-game flight simulator gives you a box to represent a building in front of a blank blue sky, DVI can superimpose a still picture of a building's facade onto that box, then put a real picture of sky behind that. This combination of the flexibility of computer graphic animation and realism may prove to be one of the medium's most popular capabilities.

It's far from certain whether *Freedom Fighter, A Different Train of Thought,* or *Tell Me Why* represents the future of interactivity. There are many other possibilities, and it's likely that the new medium will take a course that no one anticipated. A good example of a laser-disc entertainment program unique to the field is *The Erl King,* produced by Roberta Friedman and directed by Grahame Weinbren; the program has been seen in art museums around the country.

It begins with a woman singing Goethe's poem *The Erl King,* set to music by Schubert. Using a touch-sensitive screen, the program can travel to a wide range of related material, including psychoanalytic discussion of the poem, an English translation of the German spray-painted on old cars, and an enactment of the story. There is also footage of a gospel group singing "Get Me Heaven on the Line," and there is other material whose connection with Goethe's poem is not always immediately apparent—such as recitations of folk stories that few users would realize are those on which the poem was based. You can only guess what will happen when you touch the screen. The connections are freely associative, and they are the true subject of the program; they allow a multitude of ways to organize information. The program is even rigged to hinder your getting the same footage twice.

Although *The Erl King* is a big hit with museum visitors, people in the interactive entertainment business found it quite confusing when Weinbren described it at a recent convention. Nonetheless, Weinbren believes that ultimately programs like his—though perhaps with more commercial subject matter—could prove more interesting to people than gamelike programs. "I don't think people always want to be able to make choices," he says, "as if they were in a restaurant with a menu. I think that they would rather respond to the video."

Sooner or later, they will. ❑

PHOTOGRAPHS FROM *THE ERL KING* BY GRAHAME WEINBREN AND ROBERTA FRIEDMAN

Associate editor Tom Waters wrote about computer chess in last month's issue.