Brenda Laurel

Brenda Laurel, actress, research artist and UI pioneer is well-known for her innovative and zestfully expressed ideas on UI design, interactive media, videogames, vir-

Karen:

When did the connections between theatre, computers and human interfaces first occur to you?

Brenda:

From the beginning. I was immersed in theatre when I started working with computers in the late 70s. The first projects at the little company where I was working dealt with designing animated fairy tales—like Goldilocks and the Three Bears—on very low-resolution screens—fairly nightmarish. It always seemed obvious to me that there was at least a superficial connection. After spending a couple of years on the line as a software designer and then as a marketing guy, Alan Kay encouraged me to stop, step back and be rigorous about the connections I saw between the two domains.

What was your motivation for writing the book? What drove you to express this and who did you most want to reach?

What drove me was the frustration of being disturbed by interface artifacts that were invisible to other people. I couldn't get people to see this. It was very hard, in a casual conversation, to bring someone's attention to this invisible intermediary that is built into the interface. There is an indirection that computer people take for granted, because they're so used to it. I realized over the years, that to get people to see what I was talking about required more than just one clever example. So part of it was an attempt to find, by laying out my ideas as well as I could, conversation partners. Another part was just getting it out of my system, because my dissertation was based on structuralist poetics, and I needed to get done with structuralism so that I could move on and continue to have new thoughts.

You were with Atari during its heyday. There have been a number of objections to the first generation of videogames—that they are violent, that they appeal mainly to boys, that they do not contribute to computer literacy. What would be the components of an ideal videogame today?

The word "videogame" itself implies a genre. Just be aware of that. These days videogame means something that runs on a Nintendo or Sega Genesis machine, and it is distinct from a computer game which runs on a Macintosh, or a PC, or a network game that a bunch of different people relate to. And the word "game" itself comes into question. As the medium becomes more flexible, as people try more and more new things, you can start questioning the idea of a game as being something that has to have rules and a score and a clock to be interesting. What if, instead of thinking about computer games or videogames, we think about what people do that they would describe as playing with computers? If you ask the question that way, then you get lots of different answers.

In terms of gender, a product like Kidpix by Broderbund seems to work equally well for boys and girls. What's interesting is that Kidpix is not a game, but an environment for playing with certain tools and constraints. Some materials are prefabricated, like those little faces, but you also have the ability to formulate and arrange new structures yourself. You can create new materials by drawing them. It's cool, because there are all kind of "knobs," if you will, that enable you to select how much constraint you want and what level you want to work and play on. A person can interact with Kidpix on every level. It's not just a question of interacting on the level of plot.

I'm going through this because my notion of the 'ideal game' has changed over the years, both because I see more possibilities with the technology and because I've been watching

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children play, and thinking about how children play, and learning about that whole domain. Hand in hand with that, I've been discovering the notion of emergent form—which I wrote about in my book. That involves creating an environment in which people can choose a comfortable level of formulation for their materials—basically, how "pre-fab" they want stuff to be. You know, "Do I want to put on the cowboy costume, complete with gun and boots and spurs already made, or do I want to custom design my cowboy, or do I want to do something in between?"

Can this model extend to educational software?

Sure. The distinction between entertainment and learning is bogus. Somehow—because education is intended to have a serious outcome, it gets defined, at least in this culture, as a kind of work as opposed to a kind of play. Of course, we all know that work is not supposed to be enjoyable—having fun is not part of the deal. If you do, you're looked at crossways. [sighs]

You're sighing.

Well, the history of educational software is so frustrating. In general, the quality has been extremely poor, if you look at it from the perspective of how well it engages kids and how much they enjoy fooling around with it. It's certainly gotten better over the years, and there are two big reasons for that. One is that simulation became acceptable as a way of teaching. The other is that networking has begun to really change the landscape. When we get to the point where we start having biology MUDs and networks in which fourth graders are talking about Catholicism and the right to die, then you are starting to see the thing kick in properly. But the educational software community has always been in this horrible position of having to get adoptions by state governments by having to point to the specific aspects of a curriculum that their package was addressing. The blame starts to go to the commercial software producing community because there continues to be an opportunity to get rid of that whole set of constraints by selling learning products straight into the home market. But that is not the surefire megamillion that Strike Eagle 37 is, and the software producing community has been unwilling, with a few brilliant exceptions like Children's Television Workshop ten years ago and the new Broderbund with their new Early Learning line, to invest in products that speak to a child's curiosity about the world, because they are a higher risk in the marketing sense. And there is no more "knee-jerk" industry in the world than the computer entertainment business.

PLACEHOLDER: landscape and narrative in a virtual environment

It depends where on earth one goes. Experiences are said to take place. One comes to know a place with all one's senses and by virtue of the actions that one performs there, from an embodied and situated point of view. The mind, observes naturalist Barry Lopez, is a kind of projection within a person of the place which that person inhabits; "Each individual undertakes to order his interior landscape according to the exterior landscape." The environment proceeds to record oúr presence and actions and the marks that we place there—this is a reciprocal affair.

PLACEHOLDER is the name of a research project which explores a new paradigm for narrative action in virtual environments. The geography of PLACEHOLDER takes inspiration from three actual locations in the vicinity of Banff National Park in Alberta, Canada—the Middle Spring (a sulfur hot spring in a natural cave), a waterfall in Johnston Canyon, and a formation of hoodoos overlooking the Bow River. Three-dimensional videographic scene elements, spatialized sounds and words, and a simple character animation have been employed to construct a composite landscape that may be visited concurrently by two physically remote participants using head-mounted displays. Features and objects found in the actual places are reassembled here to serve as venues for exploration and play. People may walk about, speak, and use both hands to touch and move virtual objects.

People's relationships with places and the creatures who inhabit them have formed the basis of many traditions and spiritual practices, as well as ancient stories and myths. The graphic elements in PLACEHOLDER are adapted from iconography that has been inscribed upon the landscape since Paleolithic times. Narrative motifs that lend expression to archetypal characters of landscape features and animals have been selected from aboriginal tales. Four animated spirit critters—Spider, Snake, Fish, and Crow—inhabit this virtual world. A person visiting the world may assume the character of one of the spirit animals and thereby experience aspects of its unique visual perception, its way of moving about, and its voice. Thus the critters function as "smart costumes" that change more than the appearance of the person within.

The people who visit PLACEHOLDER will change it. People sometimes leave marks in natural places—pictograms, petroglyphs, grafitti, or trail signs for example. In PLACEHOLDER, people will be able to leave Voicemarks—bits of spoken narrative—that can be created, listened to, and rearranged by anyone who passes through. The virtual landscape accumulates definition through messages and storylines that participants leave along the way. We hope that PLACEHOLDER will foster new forms of narrative play.

—Brenda Laurel
Rachel Strickland

Rachel Strickland Foreground) and Brenda Laurel interacting in the PLACEHOLDER project—a two-person virtual-environment system. The circles bounded by river rocks defined the optimal range for the Polhemus trackers used in the project. Participants were asked to remove their shoes so that the rocks would tell their toes when they were at the edge of the circle. The rocks, as well as the wooden stands for the head-mounted displays, also function theatrically to set the mood for the piece.

The Cave, with critters and voiceholders. Every participant began in the cave environment, which was modeled after an actual cave and hot spring in the Banff area and rendered traditionally (polygons without textures). In this view (Brenda's), Rachel is embodied in the foreground as a Spider.

Is that what you were getting at in the last chapter of your book when you described the demise of Atari?

It's easy to beat up on Atari. Atari is just the biggest example of what I think happened in the 80s in the videogame community. Computer games began as an utterly gendered phenomenon. It's not like somebody said, "Hey, I got an idea. Let's cut women out of the picture." It just was not a question that came up. When I started working at Cybervision in 76 and went to my first consumer electronics show in 77 in Chicago, people came from all over the floor to see "the lady programmer." I was dressed in a little turquoise lab coat with my name on the pocket. And I was a bad programmer. The only thing I was good at was translating numbers into Hex in my head. But I was a girl. I was, like, majorly weird.

Anyway, computer games were invented by young men for young men. They discovered that their friends liked them. They began to swap. People like Nolan Bushnell and Al Acorn started to get smart about the fact that they could make money. It was a boy business from the get-go. There is nothing wrong with that. But it's so sad because these guys had products that were absolutely aimed at this young male crowd and they got good at selling to that crowd. They got good at doing the cover art, the Frank Frazetta metal-tits box art. They got good at putting together retail establishments with an ambiance that was optimized for teenage boys. Before they knew it, they had carved out a segment and steel-plated it. It was very difficult in the early 80s to get a company to look at a product that went outside of that demographic because they knew how to do it by then. Trying to do something different would raise questions like, "Where the hell are we going to put this in distribution? Girls won't go in these boy spaces. We can't depend on the arcade hookup, because girls don't go to arcades." And it all looked like too much trouble.

When I was working at Activision, Jim Levy, who was president and a pretty enlightened guy, said in 1986, "Let's get into the learning market. Let's do a line of learning products because we know that parents really care about how smart their kids are and how well they do in school." So I was hired as director of this new division of Activision to put together what we called learning and creativity products. We produced many titles— six or so titles were in alpha to beta stage after two years. But they never saw the light of day because the board of directors turned and said, "Off with your heads. What are you people trying to do here? We have a machine that works, that markets action games to boys. We don't want to take the risk. Never mind whether it's any good, we don't know how to sell this."

Are people working on an optimal interface design for both genders all at once? Or are they looking for an optimal interface design that would appeal to girls?

I've run across people who are doing both. Here at Interval Research, where I am a member of the research staff and project coordinator for a group that studies technology and culture, we are looking at it both ways. But I would not describe the quest as one for an interface that works just for girls, or for both girls and boys equally well. That's a dangerous thought. That would suggest that there's some meta meta metaphor out there like a desktop that is going to solve the problem. And it's really not. It's the design of the activity, of which the interface is a part. That is what we know we should be looking at. If the problem were as simple as a pink desktop, we would have solved it by now.

I don't mean to pound on the computer game guys. I don't mean to be unsympathetic or say that this is an easy problem. It's not. I am trying to describe how it was such a hard problem for them. Because otherwise you could look at this and say, "This is completely brain-damaged. How could these people walk away from half the market?" The most virulent sexists in Silicon Valley are not that stupid. This is not about sexism. This is about a combination of historical factors and a genuine confusion about what would work for a girl. We went through a silent decade here, and political correctness is still alive and well. It's still very difficult in some circles to even talk about sex differences, to even cop to the fact that they exists. So on the one hand, the PC community

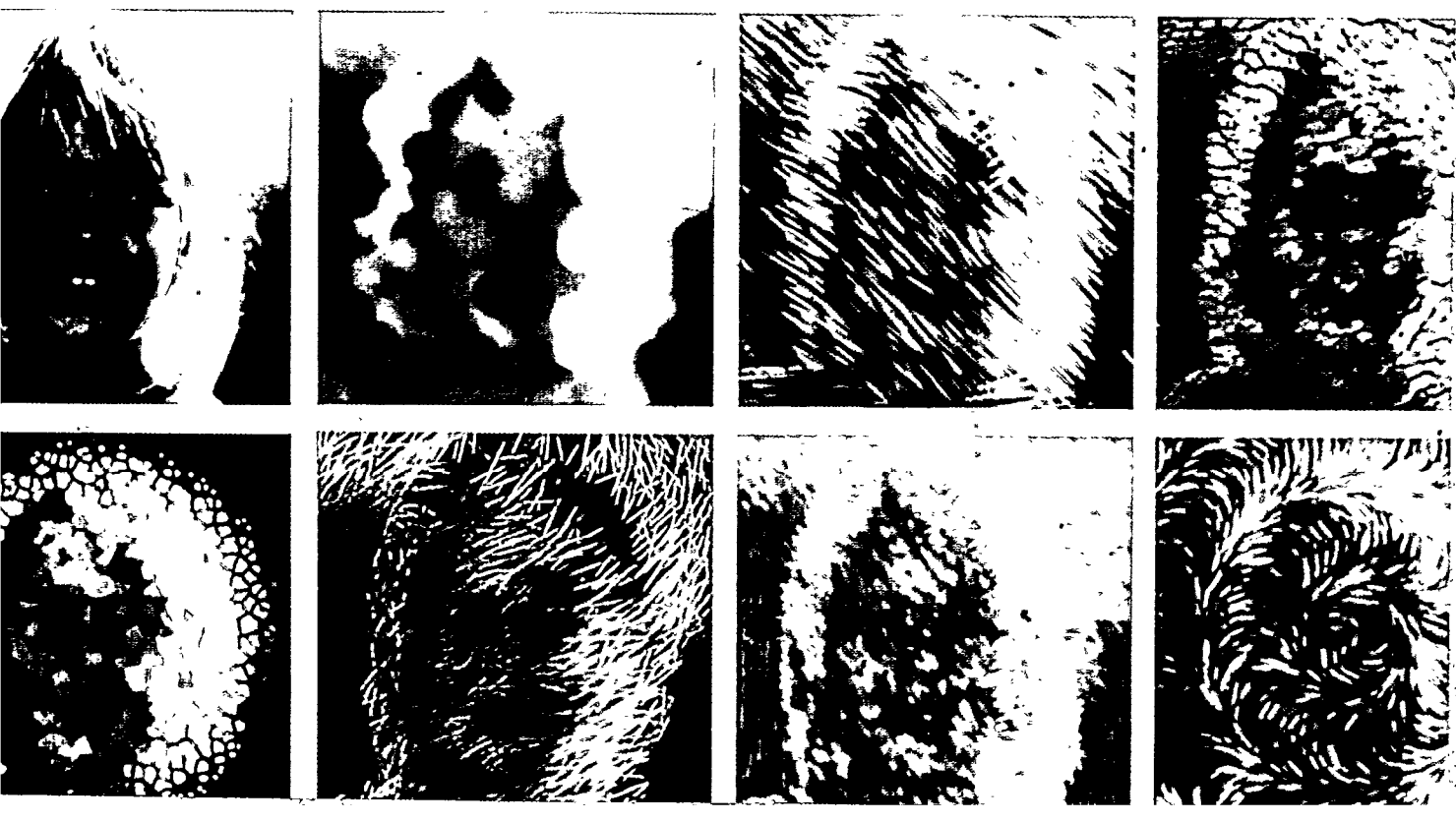
will cut your head off for even having these thoughts. On the other hand, if you talk to the hard-core toy design people about things like gender-free or gender-neutral toys, they'll just laugh at you. They shove you out the door.

Can you comment on what a good interactive videogame channel might be like?

In the early days of television, I remember my mom turning on live daytime shows and I had the feeling—and I believe that she had the feeling too—that we were somehow windowing into the wonderful ongoing live culture of America. As television has become less and less live and as we have all become more sophisticated, we no longer have this illusion that TV is a portal into some great American commons. It is, in fact, designed, canned, broadcast, and distributed for the purposes of creating desires that will cause us to part with dollars in the consumerist economy. We've completely debunked this naive idea that watching Sid Cesar was something that everybody in every living room was doing together and that there was this invisible community of us all.

When you get onto a computer network, suddenly that feeling—and it may also be equally naive, although I don't think so—of being in the living presence of other people is back. But now it's not like a mass culture event, like everybody watching the Super Bowl. It's more personal. People have names and faces—which may look nothing like them—but there is this opportunity suddenly to feel that you can pick up your mouse pad or phone or however you are interfacing—and be in the presence of a whole bunch of other human beings, any time, day or night, any place in the world. That is the fundamentally compelling thing about network communications.

The cable people are learning and quickly addressing the fact that they need to be able to support a lot of bandwidth back up the line, because people are interested in sharing things that have lots of bits in them, and hacking with each other. Interactive TV in the way that we understood it two or three years ago—as "Let's all vote on Jeopardy," or whatever—is dead. I would be amazed if too many people were still thinking about that. Now the interesting thing is finding the balance—just as we were discussing earlier in the context of a single game—between authored content and tools that allow people to author and distribute their own content. That is the winning combination. It's not just a binary thing either. There are a lot of activities where you are going to want to construct things out of prefabricated pieces, like slash video (a prevalent artform in fan culture)



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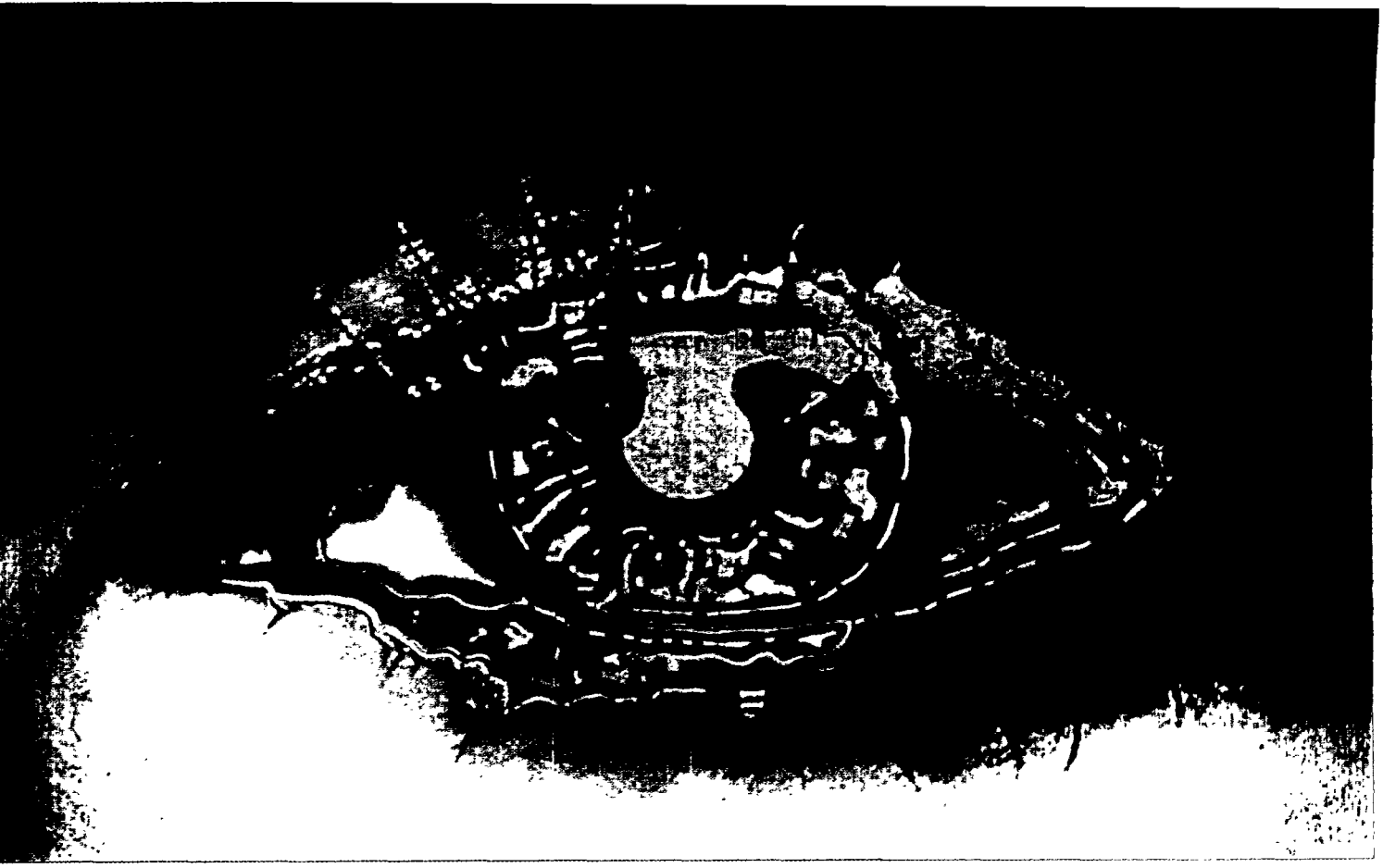

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that evolved with the advent of the VCR. Hard-core Trekkies, for example, hack together Star Trek excerpts to create episodes that never existed, and then trade them.

I find it unfortunate that many big players are currently seeing networks as alternative distribution mechanisms for standalone software. On the other hand, I understand, given the history of media, that a medium always imitates what preceeded it, before it can figure out what it is. So this is inevitable, and we should all be patient and just quietly keep working away on alternatives that we think are more interesting, until we have examples that we can show people that are so obviously cool that people fall down and say, "Why yes, now I've seen the light. Here's how I'm going to do it."

How do you think VR is being affected by the history of video games? What do you think went wrong in the last couple of years with VR, or, what went right?

I don't think anything has particularly gone wrong. VR is going through its little developmental process. There are two reasons why the early stuff has been—surprise, surprise—flight simulation, bombing, fighting stuff. One reason is that the public venues so far have been arcade-like, where that is the content that is expected. So, it's no surprise that we continue in that tradition.

But the other reason is that the technology

itself came out of those kinds of applications for the military and this creates some interesting challenges. For instance, media conventions get set by early applications. So there is a convention in VR that a fairly formal pointing gesture lets you fly. If you're not careful, that kind of gesture becomes invisible to you. We think, "Oh yeah, we've got the flying problem solved. This is how you fly." Most early systems decided where you intend to go by looking at where your head was pointed. It aggravates a person's body to have to hold his or her head very stiff, to have to maintain tension in their arm and hold their fingers very stiff, trying to get the computer to recognize a gesture. And they can only use one hand.

If you believe in cerebral dominance, if you don't have both hands working, there are a lot of things you won't do, won't do well, or won't think of doing. This summer, at the Banff Centre for the Arts, in Alberta, Canada, I worked on a project in which we played around with some of these concepts. We asked: What if you want to use both hands? What if you don't need the whole hand? What if you really only need to know whether a hand is pointing or grasping? Then you don't need a data glove anymore.

We built a little device that was a $15 hack and put one on each hand. What if you track the head and the pelvis separately, and you let the pelvis tell you where the body is going in space and let the head look around any way it wants. Then we've given people back their necks and the ability to twist around. People using that system were reaching and stooping and peering and doing all sorts of very interesting things with their bodies and not in the stressed-out way that you see with the traditional interface.

Probably the crowning jewel was that you could become animal characters—a crow, fish, a spider, and a snake. You first find them in a Paleolithic cave, and then you could ride in them through magic portals to other worlds. In the very last minute, we decided we wanted the crow to fly. We all brainstormed about how you would really fly. It sure as hell wasn't going to be a pointing gesture. But everybody, when they dream about flying, has a different idea. Some people dive into the sky. Some do the Superman thing. Some flap. And some do the paper airplane thing.

"No wonder nobody's built a flying interface. It's very hard." But Rob Tow and Graham Lindgren kept hacking away at the question, "How could you recognize a flap?" When people got into the system, the minute somebody put "crow" on, grown men, little kids, women, boys, girls. they all flapped because it wasn't just about flying, it was about being a crow flying. This made the problem a lot easier, so, Graham, bless his heart, built me a flap and glide interface that was absolutely orgasmic. It was like you really flapped your arms and flew. It was great. My point here is that we wouldn't have gotten to that if we had taken for granted that, of course, in VR you fly by pointing.

The project was called Placeholder. Rachel Strickland and I got the original grant from the Banff Centre and billed it as an exploration in landscape and narrative in VR. When I came to work for Interval, I persuaded the president, David Liddle, to make Interval our corporate sponsor and a partner with Banff. The project ran on a half million dollars plus of computing hardware. It took us a year, if you count all the design and research time. There were nine computers in the loop. There were eight people working full-time for four months to build the thing. We did rigorous user testing. You couldn't have gotten funding to do an exploration like this from a commercial game company. There's not a chance in hell that a Sega or an Atari would fund this kind of work. I'm so grateful that I work for a company where we get to look out farther than that awful nightmarish product horizon, as happens in consumer electronics and the pop culture business.

Brenda, embodied as Crow, flies around the Hoodoos, with a Voiceholder and a Fish (not ebodied) in the background. The Hoodoos are a fantastical rock formation on a mountainside above the Bow River. They were photographed so as to produce a tiled sphere of images.

How do you think people will work and interact with computers in their everyday lives ten years from now?

Oh, that's a hard number. There's a theory that in ten years things don't change very much and that in 15 you'll barely recognize them. It's just an artifact of how old we all happen to be. It's likely that my kids in ten years will look back and say, "It was so goofy in those days. Computers were these little boxes with keyboards. And mother had them all over the

Spider (Rachel) meets Crow (Brenda) at the Waterfall.

house. And the one in the kitchen didn't even talk."

The idea of discrete devices that you sit down with and have textual interaction with is just a quaint little historical artifact that will go away. I agree with Negroponte when he says that computers will vanish into the environment. Alan Kay has been of that mind, as well. In other words, they'll be in so many places and so ubiquitous that we won't notice them.

What do you think of the way virtual reality was portrayed in the movie Lawnmower Man?

I like Brett Leonard a lot. He's a good human and I think he was genuinely trying to sound a cautionary note. Listening to people talk over the years about VR, I've learned that when they are afraid that people are going to become addicted, what they're really saying is, "I have seen the potential for addiction in my own or my children's habits with television and with Nancy Drew novels." It is simply the latest thing that a person might become addicted to. VR is not different from any other media that people are addicted to in its ability to addict. When a new medium comes along, it brings it back to our attention.

Do you think that the same is true of the link between VR and pornography?

Yes. It brings it back to our attention. We mustn't forget that pornography utterly drove the VCR business. It may have driven the calendar business too. But the oldest examples of representational art that I found working on my project this summer were 32,000-year-old sculptures that were highly erotic. Erotica is not new news.

There is currently a collaboration and confluence of ideas between Hollywood and computer people. It seems to go back to when techies became involved in special effects. Do you see that happening in the reverse direction with Hollywood influencing CDs and multimedia products?

Oh sure. IBM has a new joint venture, Digital Domain, that's devoted to looking at the future of multimedia. James Cameron, the guy who directed Alien, is one of the three key players. Multimedia, at least in its early days, seems to be about visual images and moving images. Repurposing moving images seems to be the charter of the Paramount New Media group.

Of course, Hollywood has a lot to offer just in that superficial way, but the expertise involved in producing special effects that has been developing over the years in places like Industrial Light and Magic and XAOS is at a deeper level and will be much more valuable to us. It is not even because these guys are so good at producing special effects, but because they have been so good at making tools like morphing. As we move into an age where people want to make things for each other, you can imagine that having XAOS's nifty water effects on your palette would be highly valued. In five or ten years, if processors get more powerful and cheaper at the same rate that they have for the last 15 or 20 years, doing that effect on a very inexpensive computer would be a no-brainer. When you start seeing deals like the Silicon Graphics-Nintendo alliance, you can see that this is coming right down the pike. Right now, it's the Hollywood content makers that are getting touted by the media as the people who will take the camel through the eye of the needle. But I actually think it's the toolmakers, as we move through the 90s, that will be playing the key role.

In your book you write: "Speech without prosody is simply words. Intelligence without passion is simply rationality. As we ponder our collective evolution, we see that passion is the prosody of intelligence." Can you elaborate on this?

What I'm saying is that it's entirely appropriate to let the things that we get really passionate about be the things that we apply our intelligence to. In other words, my investigations are driven by not a rational, logical, stepwise investigation of a problem in a thorough or scientific way, but by what I get really excited about, for better or for worse.

I describe myself as a research artist. I do art in the sense that I'm really interested in representing point of view and building representations that allow people to have feelings. I see that as a valid way to drive research.

Karen A. Frenkel, an author and science writer specializing in high technology, has written feature stories for a number of magazines including *Communications of the ACM*. Now, as Producer, ACM Special Projects, she is making a documentary on women and computing.
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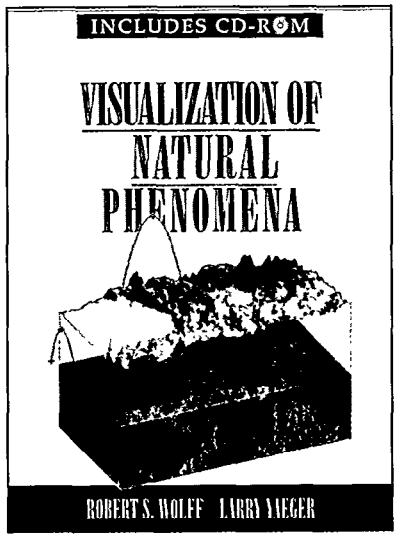

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