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Brenda Laurel

Transcript of an interview
conducted by

Christopher Weaver

at

Computer History Museum
Mountain View, California, USA

on

10 January 2017

with subsequent additions and corrections

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Abstract

Brenda Laurel begins the oral history by recounting her education and training in theater, followed by a description of her subsequent career at Cybervision, Atari, Activision, Epics, Apple, and Interval. Laurel discusses her pioneering work in virtual reality interaction, project *Placeholder*, and the subsequent founding, rise, and fall of Purple Moon Games. She concludes with reflections on the current and future state of the culture of video game creation and the industry.

About the Interviewer

Christopher Weaver is a Distinguished Research Scholar at the Smithsonian's Lemelson Center for the Study of Invention and Innovation, Distinguished Professor of Computational Media at Wesleyan University and Director of Interactive Simulation for MIT's AIM Photonics Academy. He has contributed to over twenty-five books and publications and holds patents in telecommunications, software methods, device security, and 3D graphics. The former Director of Technology Forecasting for ABC and Chief Engineer to the Subcommittee on Communications for the US Congress, he also founded the video game company Bethesda Softworks. Weaver is co-director of the Videogame Pioneers Initiative at the National Museum of American History, recording oral histories and developing new applications for interactive media and public education.

About the Editor

Justin S. Barber provided transcript audit-editing, emendations, and supplementary footnotes to this oral history as part of his broader work into video game history and digital museology.

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Weaver: Brenda, for the record, would you please tell us your name and the date?

Laurel: My name is Brenda Laurel, and the date is January 10, 2017. Common Era.

Weaver: Thank you. I'd like to start at the beginning in terms of things that were influential in your life. If you wouldn't mind, would you tell us something about your early life? How you came to a love of theatre at a very young age?

Laurel: Sure. Well, some of my earliest memories were ballet and tap classes. I have some hilarious pictures of us all, our little outfits, doing goofy smiles. But I got hooked on performing very young as a dancer. I started acting in sixth grade, I guess, and that never stopped until the early 1990s. Yeah, playing make-believe. I was an only child in a Veterans Administration housing project in the middle-of-nowhere Indiana. [It was] actually a suburb of Indianapolis, which is close enough. One of the things I would do to keep myself busy was to get all the neighborhood boys to come and do plays. For example, we did a long version of *Snow White* where they were the dwarves. I made a set for them in the utility room with crystals and stuff. Then we would do wild plot swings like Snow White would get pregnant. This was before I knew anything about how that worked. I had a little captive crew. We did a lot of plays, cowboys and Indians and stuff.

I was standing in the hall for talking to much in sixth grade, a typical thing that happened to me, and the drama teacher came by. He said, "Why are you always out here?"

I said, "Well, I talk. I make jokes and stuff, and they always put me out."

He said, "You should come audition for a play. You should be doing this on a stage. Then you wouldn't have to do it in the classroom and get in trouble." That's sort of how the theatre thing started.

In terms of computers, you have probably heard me tell this story. When I was, I believe, twelve, my mother dressed me up as an ear of corn for Halloween. She had made this large suit out of chicken wire with puffy stuff. Then there were leaves that my arms were in and little eyeholes in the chicken wire. She was very excited that I would win the costume prize at the local shopping center. We got there at 7:30 and it was over. They had done it early. My mother, who was like a quick five feet tall, gets in high dudgeon. She grabs my little leaf and takes me down to the hardware store where the guy who was managing the contest works. She said, "This is my daughter, and she would have won! What are you going to do for her now?"

He said, "Oh, you're a wonderful ear of corn, and I'm going to give you a prize."

He walked me down the toy aisle, and he picked up this little plastic gray box. He said, "This is a computer." Well, it was a little baby ENIAC. He said, "It can answer questions. It can answer any question you want to ask it." Then he pulls out a pack of cards and he says, "Here are the questions right here."

You would put a question like, "What's the distance between the Earth and the Moon?" and you would turn a crank, which would flip the card over, and you'd get the answer.

I mean, I figured it out right away, but what I thought was interesting was that he had a pack that had all the questions someone would want to ask in it. I thought, "How the hell do you do that?"

Anyway, I got interested in computers then. I was reading about them in *National Geographic* and stuff, but I was not an engineering type. You have to remember that when I was in high school--I was a sophomore in 1965--Girls didn't take physics. They didn't take math past algebra if they ever wanted to have a date, you know. It was just not done. I had to learn calculus much later in my life. Little brown packages arriving at my door so that I could learn calculus. [Laughs.]

I think, in summary, the influences in my early life that really mattered were the theatre influences from my teachers, growing up an only child, and staging plays constantly. Doing a lot of story play, and then later on, kind of starting to kind of put that together in my early graduate school years with interactive theatre. [Laughs.]

The theatre business in graduate school in 1972, 1973 was a time when interactive drama was a very big deal. You had *Dionysus in 1969*, *Hair,* and Broadway shows where people were walking out into the audience and interacting with them. A friend of mine and I wrote an interactive version of *Robin Hood* that we staged around the lake in the center of Ohio State. The kids who came to the play went from station to—we did mansion staging, right— station to station where different scenes were unfolding. Depending on what the

kids did and said, the action would change. I can remember we had a blind audience for that show once. There was a big broadsword battle near the end between the sheriff and Robin Hood, and we worked very hard to choreograph it. The sheriff's men are sneaking up on him, and the blind kids were like, "Robin, there are guys sneaking up on you. You've got to do—." So, he had to improvise two-handed broadsword combat to respond to the audience input. It was pretty cool.

Anyway, at the time, I was playing around with interactive theatre, too. When my friend Joe Miller approached me to come work at his little new company, CyberVision, it was like, "Well, of course. I'm already doing this, kind of." But that, of course, opened a whole other kettle of fish.

Weaver: Well, what was CyberVision? Because you said that you met Joe Miller there, yes?

Laurel: I actually met Joe through my boyfriend. Joe was head of the Computer Science Club at my boyfriend's high school. He was gorgeous and smart. Can't ask for a better combination. He was working at Battelle Memorial Institute in 1975, 1976. He and I were out one night running around under the influence of something and he said, "You want to see where I work?"

We go into Battelle and he takes me through this maze of hallways and stuff to a terminal where images from Mars are painting themselves in pixel by pixel. I had a religious experience. I just fell to my knees and said, "Oh my god. Whatever this is, I want a piece of it."

A year later, he and another colleague at Battelle founded the company that was to become CyberVision Home Computer Company.

CyberVision was an 1802-based computer. Those were popular with NASA because they could withstand extremes of cold, for example. It connected to a television and it had an alphanumeric keypad. This is just like Heathkit time.[1] It's a bore. When we got our first units back from manufacturing, they had spelled words wrong on the labels. We had to ship it with, like, these typos. Anyway, Joe said, "Well, why don't you come do some interactive fairy tales."

I thought, "That's great. That's really trippy. I'll do that."

I was working there while I was working on my Ph.D. generals. We were inventing interactivity, in a way. I mean, you look back at 1976, 1977, interactivity is changing the channel. It's turning off the iron before you leave home. But interactivity as we know it now in the world of games and interactive computing was just not present. At least not in the technology environment. It was totally

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[1] The Heathkits, introduced in 1947 by the Heath Company, were sold as a consumer self-assembly electronics kit. Their first computer, released in 1978, considered somewhat primitive at the time, though reliable.

present in human-to-human behavior and human-to-nature behavior, but we kind of had to make it up. The CyberVision computer only had 2K of usable RAM. [Laughs.]

We were loading code from cassette tape, and, luckily, that meant we were able to speak character's lines. We would do an audio recording within little interrupts that would cue actions to happen on the screen. That was the bonus, but the downside was you could only squirt 2K in there. You had to have basically a converging node, because the player couldn't make a choice that would really influence the action. We didn't have enough memory to store those choices, even if we would have had an elaborate branching structure. You could imagine it was really frustrating. Just asking the question of, "What could this be? What is this thing called interaction?" was sort of the formative moment of my career.

Weaver: And how far did you take it at that company? In other words, did that company succeed? If it didn't succeed, to the best of your recollection, why? Because, as you said, you were pushing the envelope. What happened?

Laurel: Well, that's a really good question. It was sold through Montgomery Ward's. They sold 10,000 units. We thought that was amazing. Competition was starting to show up from the baby console business with Atari and other platforms. But I think essentially we were just all isolated in Columbus, Ohio, with very little capital and no sense of how we were going to distribute beyond this Montgomery Ward's deal. I've been a crash dummy so many times. This may have been the first time. But when we finally had to take that company out, one by one, everybody emigrated to California. Most of us ended up at Atari.

Weaver: Brenda, there were a few other little things in early life that I think are useful to better understand. You said that you were an only child. What were the expectations of your parents?

Laurel: I think when you're little, especially if you're an only child, you feel responsible for your parents' happiness, in a way. When they would disagree, for example, it's like, "It's my fault. What can I do to fix this? How can I help the situation?" As I grew older, they seemed to take such pleasure in my accomplishments. I felt a tremendous amount of pressure to succeed, and I did. I was valedictorian of my high school and my college classes. There were some costs to that. There was a lot of social isolation that just comes along with being a smart woman, and especially in the 1960s. There was isolation in that I had no siblings. I told you how I defeated some of that isolation by dragooning the neighborhood boys into doing plays with me, but really my reality was too small for my imagination. I lived in my imagination. More than anything, I think that's what led me to theatre and later what led me to computer games.

Weaver: Well, speaking of computer games, you had mentioned at the end of CyberVision that you were then bound for Atari. Now, I think that there was a

logic to that in terms of Joe Miller, wasn't there? In other words, how did you actually get to Atari? Then would you tell us about your experiences at Atari?

Laurel: Sure. Joe Miller and John Powers, the two founders of CyberVision, both came out [to California]. John is actually the one who recruited me to come to work at Atari. He got me in the door. The Atari 400/800 computers were just coming out. It was my job to think about software strategy for those computers. I eventually built a team of six or eight people, some of whom had been at CyberVision, to work on that problem. I'm going to get ahead of myself in a minute. [Laughs.] When Warner bought Atari from [Nolan] Bushnell, the culture completely changed.

Weaver: You were there when [Nolan] Bushnell was there?

Laurel: Only briefly.

Weaver: Well, yeah, but even briefly. What were those early experiences? If I remember correctly—tell me if I'm wrong—when you came to Atari, there were precious few women.

Laurel: Oh, yeah, and that didn't change with Warner. There were women at Atari, but they were in sales or market communications. There was one woman who was working actively as the programmer on the console side. There were a few other women in what they were calling software production, which is kind of where I ended up. When I got there, my first day there—and I think we were right in the transition where Nolan was leaving, and the Warner guys were taking over—and they showed me to my office that was a cubicle with no chair and a telephone on the floor. That was it. And my job was to just start thinking about how to populate this new computer platform with interesting software, not just games. Therein hangs a tale as well. I got a lot of pressure in the beginning from Ray Kassar and his boys to spend most of the budget for the home computer software effort on porting games from the console. There were two problems with that. One is that most of them didn't perform as well on the 400/800 as they did on the console. And second of all, we were not doing any kind of market differentiation. I got crazier and crazier and crazier. We're doing *Frogger, Dig Dug, Ms. Pac-Man*, and all this crap.

Finally, I went into the office of Roger Badertscher, who was head of the Home Computer Division. I said, "Roger, I can't stand it anymore. We're trying to differentiate a product. We have a video game machine. We're calling this a home computer. You see what Apple's doing? Look at all the things we could do." I'm writing on his whiteboard: word processing, personal finances, health and wellness, interactive stories. "There are all these things that we could be doing that we're not, and that's just dumb."

He said, "Your salary's doubled and you're reporting to me." [Laughs.] He was a great guy.

When I first arrived, going back to that moment of arrival, about a week in, I went to visit one of the marketing communication guys, who had a closed office. He had one of those big glass fronts from a *Pac-Man* game on his table. He's in a suit, and he pulls out this white powder and cuts me the longest line I think I've ever seen. He says, "Here. Snort this. It'll help you work better."

"What?"

I had no idea what cocaine was. I mean, in those days, drugs were drugs were drugs. I don't think any of us understood in the early days of cocaine how damaging it was. I mean, I had a friend at Atari who committed suicide because he was a cokehead. I got out of that really fast. The danger of it made itself present to me. I think there was an incident at CES that involved some excess that brought me to my senses. But CES will make you do just about anything to make the pain stop.

After two years of running the software strategy and producing side of the home computer, things had been looking bad at Warner. My boss, Roger, who was an engineer by trade, not one of the Warner guys, went to a meeting at Warner in New York. When he came back, he called me into his office and he says, "Brenda, it's stupid all the way to the top." It was like, oh, boy. We're in for some fun.

The marketing team had a brainstorming session, and I was invited to participate. Davis Masten, who later became very important to me and was the CEO of Cheskin Research, Stewart Brand, and a couple other people were called in to talk about the future of computer games. That's when I met Davis. Well, Stewart says, "They're a fad like jogging."

Davis and I look at each other. It's like, "Dude, okay. Are you being ironic? Uh—." We never understood what that was about.

But at the end of the day, it became clear to me that the only thing that I was going to get pressed to do in the job I was in was to take more Hollywood licenses, deal with poor overloaded programmers, and try to pack more games onto this machine. The Grim Reaper was coming with pink slips.

I ran across the street to Alan Kay's office as he had just taken over as head of AtariLab. I begged him, "Please let me come over here. I have these ideas in my powerful brain." By that time, I was starting to think about what we now think of as VR [virtual reality]. Thank God, he lowered the plank and let me into the lab.

Funny coda on that, a year later, a memo comes out from Ray Kassar to Alan Kay saying, "I understand that Brenda Laurel is still employed here. This woman is dangerous. I thought she left a year ago." I have these memos.

Alan writes back, "Well, she was misguided. She's much more at home in research. We're taking care of her. Don't freak out," kind of stuff.

That was also the year that we ordered a Saturn V rocket for AtariLab to carry on off-planet operations for Atari. The purchase order got signed. [Laughs.] Alan added a pack of gum, I think. But some guys came over, my hand to God, looking for a launch pad space. I mean, it was just nuts. We really pranked them. Anyway, there were many good pranks at AtariLab.

Weaver: When you say things like that, it establishes that you were having a good time and imagination was rife at the lab. Are there any particular stories that you think would be worth sharing from that general time period?

Laurel: There are so many.

Weaver: Yeah. I mean, I think Rosanne Stone and others have written about certain unique stories that are probably worth preserving for posterity, I think.

Laurel: Yeah, Sandy Stone, Allucquére Rosanne Stone, wrote a book.

Weaver: Allucquére Rosanne Stone, right.

Laurel: *War of Technology and Desire*. She included a story; I guess this was kind of a crowning achievement. I should set the stage. Almost everybody in the lab, with the exception of me, Chris Crawford, and some hardware engineering people, were the last graduating class of the Architecture Machine Group. These guys all knew each other. They all became bigshots in their own way, and I was just this lowly Ohio State graduate sneaking in under the door. The only person who was in that kind of spot was Chris Crawford, who joined the company on the same day I did, so we have a lot to commiserate about.

Anyway, a group of the MIT Media Lab guys were upset that Alan [Kay] was away so much. You'd go to talk to him, and his chair would be empty. It was really annoying. Somehow we decided we'd hire somebody else to be the head of the lab. We started sending email from this candidate [who we made up], whose name was Arthur Fishel. I could give you his whole family's breakdown, but I won't. Anyway, he developed a voice on email. Then he needed a voice on the telephone because he had to talk to HR, so we got a Vocoder. I vari-speeded my voice down. Arthur had an English accent, and he had done things like invent squid jerky and he worked for the British Postal Service. He was kind of a little bit modeled on Nick Negroponte, too, so we made him look like that. I can remember when HR wanted his home phone number so that they could get a hold of him. I gave them Dial-A-Prayer in Boston. I was his voice on the telephone.

We decided we would do a live teleconference with this guy. We hired him. We got him an employee number. You just have to remember we're talking 1983.

We ran wires all the way down the length of the lab to the back room, set up our scene back there, and then the larger room in the front of the lab was where everybody was gathered for the weekly meeting. I played Arthur Fishel wearing Michael Neumark's clothing and a lot of facial hair, and it was a hoot. He was delivering sort of an inspiration speech to the gathered. Every time they'd cut back to me, they would change a poster behind my head, so I'd be in a different city. At one point, there was a terrorist trying to deliver a pizza that I nailed with a pistol. I don't even know where that came from. It was, like, too prescient, right?

Anyway, the guys in the main room were seeing this live teleconference. I was answering their questions, but we couldn't get them to believe that it was live. We could hear in the room there was just, like, "Nah, this can't be true." We had prepared a special treat for the woman who was Alan's assistant. She had been Miss Oklahoma or something ten years before. We actually acquired the footage and played that. Then I talked to her directly, and I think people started getting it. "Oh, my god. That's live. That really is somebody there with that funny British accent." Anyway, that constituted the construction of an artificial person across many media. We didn't set out to do that. We set out to be little pranksters, but actually that's what we did. I think it was really important for a lot of our careers, people who were involved in that little prank.

Coda, in the audience that day was Douglas Adams. He had become a friend of Atari. There was a big luncheon for him after the teleconference and I was seated next to him. He looks over and he sees a little piece of crepe hair on my face. He picks at it and he goes, "That was you, wasn't it?" It was like he was the only person, I swear, who got it. I'm notorious for doing drag at the Game Developers Conference, too. Being unrecognizable as myself. [Laughs.] I usually claim to be my brother Chuck, whom I don't have.

Weaver: It's not unimportant to remind people that this was at a relatively large public company. The prank actually withstood that live conference, didn't it?

Laurel: Yeah, it did. I think we just learned so much. It was an explosion of knowledge for us and how do you make up a person. How can you get twelve people to write the same style of email, you know? How does that process work? It was just a tremendous learning experience for me. It contributed a lot to my Ph.D. work later.

Weaver: One could almost consider it that it was like the earliest form of transmission of presence.

Laurel: [Laughs.] Yeah. Yeah, maybe.

Weaver: Which, of course, Nick Negroponte claims is his own, but that's—[2]

Laurel: Well, he's the father of us all.

Weaver: He is, indeed, the father of us all.

How did things go down at Atari? In other words, set the stage a little bit. The pranks obviously were very interesting for a number of reasons. They allowed some of the imagination to come out, the acting-out was actually useful, and that sort of thing. How was it for you as a woman there? In other words, early on in the industry—in the late 1970s or early 1980s—what were you going through? How was dealing with Alan Kay, for instance, in a different environment?

Laurel: Oh, yeah.

Weaver: By the way, I think Alan Kay is down on record—you can tell me if you remember it this way—as saying that in his illustrious career, Atari was his least productive period of time.

Laurel: [Laughs.] It's probably true. I mean, Warner was just such a goofball company. It was really hard to be taken seriously by them, but we had a nice budget and we got to play for two years. A bunch of ideas came out of that that went on to become great things. That's important.

Weaver: From the practical standpoint, Atari made its money on one or two very specific games that were crushing hits, which you might want to talk about. Having said that, when the larger parent company saw the way that things were both going, they wanted to improve the output of the goose, as it were. It would be very useful, perhaps, to talk about how they saw they were going to do that. Someone was trying to improve efficiency, right, in their concept of efficiency. But from the standpoint of the ground troops where you lived, how did that work?

Laurel: Well, I went through two radically different periods there. On the one hand, I was in management for a year and a half or two years. Then I was in the lab, which was entirely different. Over on the computer side, there were very few women, and at first, you felt special. You know, "I'm the only girl here." After about a year of it, it's like, "I'm the only girl here. Where's everybody else?" It's not like I wasn't used to seeing women not have opportunities in these spaces. It was such a relief to move over to the lab, because I bet it was half female. [Paul Alan] had brought in this whole class from MIT: Susan Brennan, Rachel Strickland. A great many wonderful women were there in that group. Rachel and I are still collaborators after all these years on a lot of projects. Also, Alan brought in artists. He brought in Michael Naimark and Rachel, who's also a video artist.

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[2] Nicholas Negroponte founded MIT's Architecture Machine Group in 1967, a combination lab and think tank which studied new approaches to human-computer interaction and created the MIT Media Lab in 1985 with Jerome Wiesner.

At that time, Scott Fisher was starting to become interested in VR, but he was coming from a background in stereoscopic imagery. A bunch of us were getting our little start of ideas. It was just the freedom to work on stuff, to communicate with each other, that was so inspirational about being in the lab.

I'll tell you about one project. We had a project with the Encyclopedia Britannica. I've run into them twice in my career. We were to do an experimental encyclopedia for Alan's idea of the Dynabook, which was the laptop computer concept. I got put on that project, and said, "Why don't we say there's an entry for a 'whale' and there's an Inuit interpretation, a Japanese interpretation, a scientific interpretation," and so on.

They hit the ceiling. It's like, "No. This has to be objective. There's only one truth." That set me off in some directions that showed up later at Apple. [Laughs.] Difficult clients, maybe, but wonderful ideas came out of that brew.

And Alan, because he wasn't there a lot, just gave us space and permission to try stuff. The fine tradition of the Media Lab, most of it was smoke and mirrors, but we got to try stuff.

Weaver: How did you end your time at Atari? How did it sort of go from there?

Laurel: The company had started its turn into death spiral within the first six months of my time in labs. They died pretty quickly, primarily because of E.T., but there were some other issues that brought the company down. Essentially they didn't believe that they were in a real business or that the business they were in wasn't any different from television, movies, or books. In television, movies, and books. Still to this day, people do not do adequate market research. They don't go out and talk to people, watch them and figure out what they like and extrapolate from what they do. I mean, these are all tools that are indispensable in the world of designing interactive media, as far as I'm concerned. I can remember when I was in labs, I used to go to arcades and watch kids play arcade games. Now, today I'd probably be arrested for hanging out at an arcade watching fourteen-year-olds. But I can remember this one time this kid was playing *Pac-Man.* I said to them, "Does this make you want to be a computer professional when you grow up?"

He looks at me and he says, "Lady, that's not a computer. That's just a stupid video game."

That kind of insight wasn't coming from any concerted effort on the marketing side. I think they died because they didn't believe in their product. They didn't understand who their customers were and what they wanted. They were all just in it for a joke. You know Kassar ended up on SEC charges. There was funny business going on at the top. The company just fell apart, but while we were in labs, we were insulated for some time from that.

Finally, they started laying off people in labs. That was like the fall of Saigon.[3] [Laughs.] I mean, when we were all, like, exiting the lab. This one guy had a property pass that he filled out when he came in to work that day. He had wax paper wrapped around a comb and he filled out the property pass for an Eventide Harmonizer.[4] When he came down the stairs when we were all laid off, he had this big fuckin' piece of machinery on his back, but he had a property pass. And there were people dropping televisions out of second-story windows into their trunks. It was just nuts.

It was a huge layoff across the whole company. We were very upset, because we were spoiled little brats. We weren't being realistic about what was happening with the business. I may have been the only person who was actually still looking at that side because it was such a dream come true to be able to work with all those smart people. It was easy to forget that there was a real company there. They went down, trailing flames of glory, and that was that.

Weaver: Do you think that, looking back, that one of the reasons that it failed is because there was, on either side, not enough appreciation for the difference between the company's desire for immediate application for current system products that they could sell instantly and the longer vision that the laboratory had in terms of what you were actually doing that was going to be critically important for things, but it wasn't instantly applied?

Laurel: Right. Well, this has been true for every lab I've worked for, and I've worked for a lot of them. The host organism makes promises; Atari being one, Interval [Research Corporation] later, Sun [Microsystems], the other places I've worked. They invest in the future by hiring people and giving them budgets, but as you say, they make no space for innovation in their business plans. This is endemic in the entertainment industry as it stands right now. For example, VR technology, the increased resolution of that stuff now in cheap mode could have happened a lot sooner if anybody was taking us seriously. The math is always about adoption and dwell time if you're doing a public space installation.

In general, even labs that are parts of active companies like Atari or Apple tend not to be able to persuade the company itself to envision the long term that they are actually supporting research on. It's just a conundrum. It happens over and over. At Interval, the whole company was founded by Paul Allen to innovate. He said it would live for ten years. Well, in seven years [demonstrates decline and failure], you know, because the grass was greener.

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[3] The fall of Saigon analogy refers to the sudden and total evacuation of US personnel due to the capture of the capital by the People's Army of Vietnam (PAVN) and the Viet Cong on April 30, 1975, marking the end of the Vietnam War.
[4] The Eventide Harmonizer (H910) was designed by engineer Tony Agnello in 1975 as a tool for pitch shifting, delay and feedback regeneration. It originally sold for $1,600.

Labs are wonderful places to work. A lot of terrific innovation happens there. I'm so grateful that I ended up in that part of the industry. It unleashed, later on, my critical thinking skills and my application of drama theory to what we were doing in interactive media. I'm glad I had the experiences, but I really haven't seen a company take its lab as seriously as it should.

Weaver: Well, prior to Atari sort of self-immolating [Laurel laughs], you had an opportunity, because you mentioned virtual reality. I think that's an important thread here. Based upon your experience, would you kind of explain a little bit more about your perception of virtual reality? For instance, people such as Jaron Lanier and others who are not well known today, because too many people are talking about God speaking to Palmer Luckey. [Laurel laughs.] In terms of reinventing wheels, what's your perspective on it? If I'm understanding you correctly, in the early 1980s or late 1970s, you were working in virtual reality?

Laurel: In the early eighties, I started visualizing virtual reality. I had seen that what Scott Fisher was doing and some of the work that Mike Naimark was doing were kind of leading to that vision. It hadn't fully hatched yet. I mean, we knew about Ivan Sutherland's work and binocular displays and stuff, but it hadn't really coalesced into a tried-and-true thing until probably 1985 at NASA where Scott Fisher ran the VR lab there that was one of the first. Although Jaron Lanier takes credit for the data glove, the man who actually invented it was a guy named Tom Zimmerman. He was at the AtariLab. And by the way, his son was in one of my recent classes at UC Santa Cruz, which was just a hoot. There's a lot of misattribution in there. I won't bother with it. I don't think it really came together until the NASA experiments that Scott was doing. Jaron got involved as a supplier of hardware, and I think he did some software work too. But there was a whole team at NASA. Meanwhile, I was writing my dissertation.

After Atari ended, I spent a couple years at Activision as a producer, which I want to get back to because there's a good story there. Yeah, okay. Virtual reality. Can we take a cutback to Activision?

Weaver: Absolutely.

Laurel: After Atari came apart, I started looking around, thinking, "What the hell am I going to do next?" I was in this kind of heavenly lab, and now I have to go back to producing. I got a job at Activision, and it was kind of bad-to-ugly [laughs] in 1985 and 1986. I had had my first baby in 1985, so I started about six months after that. She was in daycare down the street. I had also written my dissertation with my baby strapped to my lap, reaching around to the keyboard. I finished my Ph.D. and I worked at Activision.

I was reviewing things yesterday [for this interview] and I can see so clearly the march of violent military video games building up in my system as a kind of toxin. Activision didn't do anything to help, but I had two magnificent experiences there. One was being the producer on the Lucasfilm game based

on the movie *Labyrinth*. I don't know how this happened, but the guy who headed up LucasArts Entertainment then was Steve Arnold, who I met in sixth grade. We had brought him out to work at Atari, so it all networked. They sent five of us to spend a week with Douglas Adams in London, who is, was, the funniest man in the universe. The silly thing about it was that other people would try to make jokes and stuff. You just don't do that with Douglas Adams in the room. It's like singing next to Pavarotti. You just don't. Anyway, we developed this crazy concept with him for the game. It was the closest teamwork I think I've ever had with designers, developers, writers, etc. It was a really nice mash-up of people.

The original screenwriter for *Labyrinth* was Terry Jones. They had taken most of his script and reworked it because it had naughty bits in it. I can remember we had a dinner at the end of this visit at some fancy-pants British restaurant where there were pellets of lead in the meat. Gamy stuff, but very "white-tablecloth-y". Terry Jones was there, and I was the host, so I bought some fairly good wine. We were sitting around having drinks, and Terry got exercised telling me how he lost control of the script. He pulls his jacket off and he's getting worked up, because he's a little dude. He's getting sweaty. The waiter comes over and says, "Sir, I must ask you to put your jacket back on."

He says, "I won't. It's not cold in here. I don't need my jacket."

"Now, I really must insist."

At which point he flips into, "I won't, and you can't make me." We're in that character now.

He gets up to storm out, knocks over the wine, which I'd paid like fifty bucks for. "Don't anyone pay the bill at this restaurant," raving in his female persona all the way out the door.

I'm looking at Douglas, who's looking profoundly sad at this point, because his friend has just done this scene. Well, the kicker is ten minutes later, Terry comes back. His wife is at the table. He says, "Can I have a few quid?" because he didn't have any money with him to buy dinner. He's looking at his plate, but it was too late.

Then there was a farewell party where I met Jim Henson and talked with him. He was such an enthusiast about computer games in the early days. He had been involved with *Labyrinth*, obviously. I didn't get to meet David Bowie. Damn! But as Henson was leaving the party, he brought out a large smoked salmon. He was standing there looking at Douglas and Douglas was looking at him. Finally, Douglas got it, said, "So long, and thanks for all the fish." So that was fun. [Laughs.]

Anyway, Activision was a hoot because of the Lucasfilm stuff. I got a little backseat view of Habitat, Maniac Mansion, and Monkey Island; stuff like that. Just being around those guys and being able to hang out up at The Ranch.[5] It was pretty fabulous.

Weaver: Did it change any of your views, in other words, whether above the line or below the line, in terms of the materials you were working on?

Laurel: No. I was a crash dummy again. Howard Rheingold and I developed a product called Dreamwork that was this terrific assistant for you when you wake up from a dream and are trying to remember it. That didn't fly with Activision. I made a deal with Ian-fucking-Ballentine to do the Space Shuttle operator's manual as a game, and even that didn't fly with Activision. They were going through the change to a new president, new CEO. He was kind of in the toilet with the company. There were all kinds of upheaval. But, again, no interest by these guys. Anything that has a humanistic glow around it, God-for-fucking-bid. You know, we need to have war games. We need to have shooters. There was a tremendous prejudice against the kinder, gentler kind of stuff that I wanted to do. It's not like I don't like a good shooter, but if you're going to show violence, you really ought to show the consequences. That wasn't happening.

I can remember in that little dry period between Atari and Activision. EA approached me to write a children's game. I said, "Well, let's do Hansel and Gretel. That's a really kid-friendly, kid-empowering thing."

The guy says to me, "Oh, we don't show violence." And I realized he was right. You can fly over things and drop bombs, but you didn't see the consequences in those early games. I think that's part of the toxic buildup that led to future explosions.

Weaver: Was it a rather ignominious leaving of Activision before you went to Epics?

Laurel: Oh, yeah. I told my boss, Dick Lehrberg, that I was pregnant with my second child. Two weeks later, I was fired. At that time, there was no legal defense. I tried to sue them. I spent every dime I had. I did not win. That was a pretty clear case of sexism, as far as I'm concerned, but I was the guy who was having all these crazy ideas down. Then [my daughter] Brooke came along, and I struggled along as a consultant for a while. Then I got involved with Apple on that research project, which was great.

Weaver: How did that occur? In other words, you mentioned how you got out of Activision. How did you get into Apple? What did you do?

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[5] Referring to Skywalker Ranch, the home of filmmaker George Lucas and retreat center for many of his production companies, including Lucasfilm Games, later known as LucasArts.

Laurel: Well, let's stop for a minute. After I left Activision and had my second child, my old friend Joe Miller from CyberVision, who was now at Epics, hired me ostensibly to save a couple of productions that were underway. As time moved forward, it became clear that the company was going down. At that point, my job was to wind down production teams, make people feel okay about themselves, make sure they got paid, etc. That was kind of a sad interlude.

Weaver: If you don't mind talking about it a little bit, how did it affect you? You were hired to do one thing, ostensibly, by your old friend, and you relatively quickly saw that it was really another thing. Were you cut out for that? Is that something you like doing?

Laurel: I'd only fired one person before that. I told my group at Atari in the product side that if anybody told me the ending of the second *Star Trek* movie, I would walk them out. This gentleman came in my office and said, "Spock dies."

I said, "You have fifteen minutes," and I walked him out. That's the only person I'd ever fired, so having to kind of lay people off is different. I'm sure I could be sued for that now, but, luckily, that was then.

I didn't feel betrayed at all. I'd do anything for Joe [Miller]. I love Joe. He was one of the most important people in my life. He passed away last year. When it morphed into this sort of turning-out-the-lights thing, we were just in it together, you know. I didn't feel like I'd been misled or anything. It was just what happened. I was more than happy to go through it with him and I learned a lot about how to do that part.

Weaver: Then what happened after Epics? How did you go from Epics to Apple?

Laurel: Let's see. I was riding the range as a consultant for a couple of years. There were kind of lean times after Epics, so we're talking end of 1987, 1988. I had friends who were in the Apple Human Interface Group, as well as my children's father, who worked in the Apple Human Interface Group. Joy Mountford was the head of it. She had the idea that it would be nice to edit a book about the work of all the researchers in the Human Interface Group. She obviously didn't have the time or inclination to do that, so she hired me to do it. That's how I got into Apple. At the same time, I was working on my first book, *Computers as Theatre*, and it came out about the same time. That was called *The Art of Human-Computer Interface Design* or something.[6] I got a view into all the user interface work and stuff that was going on in the Apple HIG, Human Interface Group. But on that book I had some fun. I added a few authors that weren't in HIG. I added Timothy Leary, with whom I had become good friends through Activision. I wedged in Nicholas Negroponte, which wasn't such a tough sell. I don't think I got Terence McKenna through the door, but there was a little fun had there. That's how I got in the door.

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[6] Laurel, Brenda; *The Art of Human-Computer Interface Design*; Addison-Wesley Professional; 1990.

Then Alan Kay was running a project in Los Angeles called the Vivarium. This was a project devoted to just looking at how education works for Kindergarten through 6th grade and trying to build curricula that would help students become more facile and literate about how to use computers. Alan hired me again as a consultant. I worked with Rachel Strickland again to do some research with kids to figure out if we could take lessons from how children play and how they tell stories. Essentially what is their narrative intelligence like and use those findings to inform the design of a kid-friendly programming language. We called the project *Coyote in the Playground*. I engaged the kindergarten teacher at my kids' school, this wonderful sort of Waldorf-y person who was really into storytelling. She let us basically borrow her class for a semester. We told coyote stories. I have a friend who's a storyteller who's worked with me on several projects, Lucinda DeLorimier. We told them coyote stories. They made pictures of coyotes. They made coyote cookies. They did all this stuff. They did little coyote plays.

Then we designed a set of sorts of petroglyphs that were pretty obvious what they were and asked them to construct stories just with the petroglyphs. What we learned was that the sort of driving linear progression that we think of as inherent in narrative intelligence is not there. It's not innate. I mean, so kids would say, "The man lived in the house. There were fish in the river. He shot his bow. Then the sun set." I mean, it was, like, not temporally linear. They were looking much more at relationships and depth, which kind of coalesced for me the notion that storytelling is a relationship and it's an environment. It's not just a through-pass narrative. Anyway, we delivered that to Alan. I don't know how much it helped. I think he learned something from it.

Then I worked on a project called *Guides*, my second encounter with Encyclopedia Britannica. Again, it was the Human Interface Group. They wanted to develop an experimental encyclopedia interface. It was the same guys again. By this time, I was working with Abbie Donn pretty regularly and Kristee Rosendahl, who later became head of the web team for Purple Moon. Going back to my old point-of-view problem with encyclopedias, what we did was to develop guides that were represented with video which had very different perspectives on the piece of the encyclopedia we were doing, which was westward movement in America, Manifest Destiny and all that crap. We had a pioneer woman, a trapper, and an Indian. Anyway, these characters would appear if you asked for one and tell you a story. If you were interested, you would get their links through the material. You could go back and get them to argue with each other. We shot boatloads of video and had a wonderful time. This was right around Knowledge Navigator time at Apple. People were dubious of agents, but I think we demonstrated that you could do that with video pretty well. I got the chance to give different kinds of navigational tools through information that were based on personal story, because it's important. History is really boring if it's just chronology.

Weaver: When those projects you just described ended, did you end your consultancy at Apple?

Laurel: Yeah.

Weaver: You sort of glossed over this, but was it non-accidental that Alan Kay from your former life had invited you?

Laurel: It was non-accidental. It was great. I felt very honored that he wanted to work with me again, and I always love spending time with him.

Weaver: Well, but clearly, knowing Alan somewhat, I think it's fair to say Alan does not suffer fools gracefully. Don't you think, to a certain extent, humility notwithstanding, that him going out of his way to invite you said something about your work under him prior?

Laurel: I hope so. I hope that's what happened. Let's say it is. [Laughs.]

Weaver: Yeah. Okay. I just wanted to get that on the record, because you had not said anything to mention that, so I thought I would.

Laurel: He changed my life so completely by giving me that job in labs. It completely redirected my dissertation, which I think is the first on interactive fantasy. I started working at the AtariLab on visualizing interactive fantasy by working with Ray Bradbury's story *Something Wicked This Way Comes*. I had the opportunity to meet him [Bradbury], so it was pretty swell. I attribute everything I've done in terms of VR, at least, to Alan Kay, because he gave me the opportunity to think big and encouraged me to think critically.

Weaver: You sort of alluded to this when you said that you and Chris Crawford were perhaps the only two who had not at one time, or another been touched by Media Lab.

Laurel: [Laughs.] Well, I think some of the hardware engineers, they were downstairs, and they hated it.

Weaver: Right. But do you think Alan brought a little bit of Media Lab to his lab?

Laurel: Absolutely. Oh, yeah. Nicholas [Negroponte] was deeply involved with all the hiring and stuff, and in a way, it was going to be Media Lab West, to a certain extent, because there was so much money in the budget. Nicholas was head of the Architecture Machine Group, and that became the MIT Media Lab.

Weaver: Right. Unless I'm missing something, didn't you go from Apple to then what ultimately was your involvement with Interval?

Laurel: Yeah. When I was finished with my project at Apple and I'd gotten my book published, I, again, fell back on consulting, found interesting clients, had stuff to do. I have some funny stories about that. I was giving a talk at an interaction conference in Los Angeles at the Beverly Hilton, and Timothy [Leary] was there, I remember, and John Perry Barlow, who was a songwriter for the Grateful Dead, was a friend of mine. He was there.

Weaver: John, now at Electronic Frontier Foundation.

Laurel: Yes, yes.

Weaver: Right? Just to establish the media nomenclature as opposed to his former life.

Laurel: Right. John was one of my [Grateful] Dead friends. He's not dead yet. Neither am I. Anyway, I was giving this talk in the Beverly Hilton about location-based entertainment, which was kind of a buzzword in the late eighties. I was bashing the sort of drive-through vacation idea and thinking about VR as well as just being present. Some of that came from my history just as a kid. Drive-by vacations of the Grand Canyon with my parents were just *excruciating*. I remember when I moved out to California, they were with me. They were in the car with me. I knew I was getting to the Grand Canyon, to the South Rim, so I stopped at a gas station, told them I had to pee. I went in there and smoked a big one. [Laughs.] By the time we get to the Grand Canyon, it's like, "Wow! This is so terrific," right? I actually got out of the car, because I was unruly. That was my strategy for breaking the fourth wall of the drive-by vacation. [Laughs.]

               Anyway, at that conference where I was giving the talk, John Barlow introduced me to David Liddle, who was chosen by Paul Allen to start Interval Research Labs, so David and I started talking. By that time, Rachel and I had put in a proposal to the Banff Centre for the Arts for a virtual reality project there. Very low-budget but it had been accepted. When I joined Interval, David decided to throw his support behind that VR project. Interval gave mucho bucks to the production budget in Banff, which caused kind of an eruption of jealousy from these lowly artists who though, "Well, you're getting a big check. We're going to watch and see if you misuse the Xerox machine." It was really too much Sturm und Drang, but it was essential because of the scope of the project.[7] It was a design statement.

               There were certain things that we felt necessary to demonstrate in the *Placeholder* project in order for our statement about what the medium could be and could do to come forward. The funding from Interval really helped us achieve that, but the Banff schedule got shrunk. We got into all kinds of binds there. We went through this really deliberate sort of Russian sleigh ride of

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[7] Strum and Drang refers to the 17th century German artistic movement in which individual subjectivity and, in particular, extremes of emotion were given free expression in reaction to the perceived constraints of rationalism imposed by the Enlightenment and associated aesthetic movements.

throwing out all the cool ideas we had, except for the ones that were essential. That was a really important learning experience for me. I think my now-husband, Rob Tow, who wrote a lot of the code for *Placeholder,* taught me that. But there's this painting—I think it's in Leningrad—of this woman in a sleigh, a tsarist dress. She's been throwing things off the back because there are wolves chasing her and she's got a baby. She's thinking about it, you know. [Laughs.] It's a really freaky picture. But that's what the Russian sleigh ride is. Rob did not get to have a mosquito fly around your head and drive you nuts in that piece.

Weaver: But tell us a little more about the Banff piece from the standpoint of the interactivity, the nature of media, and teasing out media. Just for the sake of the record, what was its larger purpose and how did you effectuate it?

Laurel: Okay. We skipped over teleprocess research, where Scott Fisher and I did a little company to work on research for remote presence in virtual reality. Maybe we should go back to that.

Weaver: Yeah, that sounds like it's right on key, yeah.

Laurel: I got a client during my consulting time in the late 1980s who actually was interested in funding some VR work. What? I kind of trolled Scott out of NASA, and we started this company with the help of Timothy Leary and Joey Ita. Now, Joey Ita was a little teenager who was taking us to raves in Tokyo and shit, but he and his family helped us get our first round of funding from a Japanese investor. I think their goal was to have us do showroom-type stuff. At that time, the hardware was so expensive, you couldn't get decent throughput in an installation. You had to be doing it for some other reason. It wasn't going to pay for itself. But once again, crash dummies. This was the dream team. Scott Fisher; Michael Naimark; Scott Foster, who invented, in large part, three-dimensional sound called the Convolvotron; Mark Bolas from Fakespace Lab; Rachel Strickland; and I were the main people. Oh, and Steve Saunders, who was an engineer at AtariLab. That was the first time I worked with him, I think. I've worked with him four times now. We're just like this bizarre intermarried group out here.

At Telepresence, I think the best stuff we did was we built some demos to show how the three-dimensional audio and stuff worked. We were running at a good clip. But we also made a documentary film called *Be There Here* that was demonstrating in a kind of filmic format what was possible. That actually won awards in Japan. It was Rachel's movie, essentially. She and I wrote the script together. I guess the experience we came out of that with was we didn't know shit about marketing, the cost of goods, or how that would affect us. We were babies about business. The first thing we should have done was to hire a CEO. This is a mistake I see people make over and over and over in the Valley. They've got the creative idea, they make the startup, they make themselves a CEO, and they blow it, like Skully Helmets, right? You've got to remember if you're an entrepreneur, you're probably not the CEO. Unless you really know

a lot about business, you really ought to get out of the way and have someone else do that job.

Anyway, we basically ran out of cash at some point. We had built a few demos and a lot of videos for Media International Company. We weren't going to make payroll. I told Scott, "I've got to go. I can't, in good conscience, sit here and watch people not get paid. It's not happening. I've learned enough from this adventure that I don't think that's going to change right now." We weren't seeing Moore's law, in fact, yet with VR headsets. He was not happy with me, but I felt that it was my duty to not be benefiting from a situation where other people were being crash dummies for no good reason. The *Placeholder* project was really kind of another run at the fence, if you know what I mean.

Weaver: Result is going to be the same.

Laurel: Yeah. In *Placeholder*, Rachel and I, we were looking at a VR world where 99 percent of what we were seeing out of Silicon Graphics [SGI] and the other companies that had any kind of VR interest was training stuff. The NASA stuff had been training for astronauts, primarily. Some of the stuff at SGI was training to be the driver of a big Caterpillar machine. There were a few fun things, but not many. They had very little depth. Our goal was to just exploit the hell out of the medium to show how much it could do if you weren't being so pragmatic about its use. Our belief was that, "This can be a context for art, it could be a context for joy, it could be a great context for play. Let's work on that." That started the initial framing.

We were also really interested, as we have perpetually been, in the relationship between landscape and narrative, or environment and story, if you want to call it that. But we had already done some filming in Zion and other projects that had to do with our relationship with the natural world. We decided we would try to capture some places around Banff doing different methodologies to test them in representing place. We made a connected three-world environment. The environments were connected by portals that you'd stick your head into, little spirals.

Let me give you a quick gloss of the experience. Is that good? When you arrived in *Placeholder*, you arrived in a [virtual] cave. There are petroglyphic animals talking to you. It's a pretty dim space. There's a lake in it and there are these floating rocks with faces on them that you can't quite figure what they are. The animals are pitching you. The crow is saying, "I see everything that shines and glitters. Come closer." You're getting these seductive messages, but you don't have a body yet.

Let me tell you why. One of the things we learned from looking at how people related to VR in those days was that men, in particular, called it an out-of-body experience. There was a big argument going on as to whether we were embodied in virtual space or not. Women would talk about taking their sensorium into a

new place. I don't mean to generalize, because I'm working from a small sample, but it seemed that there was some kind of gender stuff going on there. We wanted to make it very explicit that you had a body. You had to put on a body by sticking your head in it. It would change what you could do. If you were a crow, you could fly; if you were a snake, you could see into the infrared or something that kind of looked like that. You were embodied in a nonhuman form, which really got your attention.

Now you're in the cave. If you choose to be the fish, you put your head in the fish. Now your voice is kind of like that [demonstrates a higher pitched, nasal tone]. We're vari-speeding the voices of the characters as they talk so they have their own specific voices. You decide you want to stick your head in one of the portals. The cave that you're in was essentially acoustically modeled with three-dimensional sound. That's why it was dim, because we wanted to see how does that work? If we just build pretty much big polygon acoustic modeling in here with good binaural audio, does that work? It was quite persuasive.

I should say also that we collaborated with an improvisational theatre group in Banff. These guys, Precipice Theatre Company, were environmental activists. They did popup theatre, so we hired them to help us develop the characters and interactions in the game. The animals and scriptwriting came from those improvisational events that we had with the actors.

Okay. You stick your head in a portal and you end up at a stand of hoodoos. Now, this one is represented by video-dome tiles. You're inside a dome of tiles that contain video of the place. The problem is that if you're a crow, for example, you can fly out of that model pretty easily because it doesn't bonk you on the head. That had some of its drawbacks, but it still gave us an opportunity to see if you turned it into a faceted space instead of a 360 space, does that help with a sense of immersion. Strangely enough, I think it does. Of course, necessity's the mother of invention. [Laughs.] The computers we were working with then—and there were thirteen of them, including the number-one RealityEngine off the assembly line. Nintendo has probably ten times as much power as we had then. It was just to scale. On a good day, we were running, it felt, twelve frames a second, right?

The third world was a waterfall. One of the beautiful things about this project was the location scouting, by the way. We found a gorgeous waterfall in Johnston Canyon. Mike Naimark got involved and we decided to try capturing that space with virtual relief projection. He made a virtual screen the shape of the waterfall and then threw video on it in the world, so it was really going. I made my husband wear binaural earphones underneath it at about 360 PSI. It's a wonder he lived. But I wanted people to have the sound of the damn thing hitting them on the head if they walked through it, you know.

What we were trying to do was to demonstrate—oh, I should tell you about the voice holders. These rocks that are floating around, Russell Zeitner, Rachel's

partner, designed their UI [user interface]. When you see them, they have their eyes closed and their mouth closed. If you touch one, his eyes open, he says, "I'm listening." You can tell him a story. Then when you're done, touch him again. His mouth opens and his eyes close. That means he's got a story inside of him. I don't know why they're masculine. Sorry. "It." So they're floating around. They don't have gravity, unlike everything else in the world. One of the things that was so cool was that people began to make lattices. You know, like in improv you'll tell a sentence and the next guy tells another sentence and you build a story that way. Well, we got these arrangements of rocks that people who'd been in the world made that were pieces of stories that they'd put together. It was just—wow. This is emergent behavior from a set of simple rules, which is so profoundly important in design, especially in game design, so the fact that that happened was incredibly exciting.

What else can I tell you about it?

Smith[8]:   I've got a question. Could you just walk us through the hardware component of this experience so we understand what people were doing who would go in this world?

Laurel: The hardware that we used, besides the RealityEngine, which was the basis of it, was a Convolvotron, which was the three-dimensional audio production computer and several other production computers all the way down to a MacBook or something like one. There were thirteen computers in all, duct-taped together. We used the standard NASA-flavor head-mounted display, so pretty wide angle of view. Heavy, but we had six-year-olds in there, including my kids. They didn't have any trouble with it. We built it as a performance space. The other thing that was innovative about this was that it accommodated two people at the same time, so you could actually have somebody to play with. Hadn't seen that in VR yet, or at least not much.

We made these magic circles surrounded with stones in the room where we were producing this. The head-mounted display cable came down from the ceiling and there were little sorts of artsy coat-hook-like things to hang equipment on. The rocks around the circles actually were the range of the Polhemus tracking device that was giving information about where a person was in space. And we gave them two hands. The data glove thing just drove me nuts. One thing was typically you only had one hand. You had symbolic gestures. Direction of gaze was what was being used for direction of movement. We did a couple things. We gave people two hands. Steve Saunders, again, made these little things called "grippies" that were just measuring pressure. You didn't need digital articulation for the kinds of things you were doing. You had two, very simple hands. We took direction of movement from the pelvis and direction of gaze

from the head, which let you do this [demonstrates moving around]. Now all of a sudden you've got a body that can move gracefully in space and you can really have fun with kinesthesia. The way people feel inside as they're moving becomes important. And I think the sort of point-and-go UI that was common in those days is part of what made people feel disembodied in there, if that makes any sense. Building a hardware UI that let people just really be flexible was really important.

Perceptually, we also learned that when you go through a magic portal from one place to another, if it's a jump cut, people will lose it. They just hate it. They can't stand a jump cut. They get really disoriented. What we did was we inserted about a second and a half of darkness. You could see little blue glowing things on the tips of your fingers while you were in that transition. A lot of people looked at their hands for reassurance. The trick we did was the audio of where you'd been faded out and where you were going faded in. You had an audio transition basically in the dark. That let people arrive in the next world with their balance intact and without big perceptual disruptions. That's something I think everybody could learn from still, if you really want people to feel embodied.

Weaver: You said this was a shared VR?

Laurel: Yes. Two people in headsets with grippies. They both were in the cave together at the beginning. They might wander off to different areas. Here's another gorgeous piece of emergent behavior, and I have this on video. My friend Sean White, who's now CTO of Mozilla, was one of our guinea pigs at Banff. I was trying to figure out how should people fly. I was asking people, "Well, how do you fly in your dreams?" People would give me the Superman thing and the hydrofoil thing.

I was like, "Oh, shit. How am I going to do this?"

Then this crow shows up flapping. It's like, "Oh, I get it. Flapping. Yeah, flapping works as a UI."

Later, we had to build a memory into the system that could then notice a flap and give it the parameters of what a flap was. I got to test that thing. At first, it was just like [demonstrates pumping arms up and down hard, 2 to 3 feet], and you're like six inches off the floor. They adjusted. I do one pump and I'm up above the world. Just a little bubble down there. I got to be the guy who tuned the wings. I got these magnificent muscles under my arms from flapping every day.

Anyway, we're at the waterfall and Spider is there and Crow is there. Sean is in Crow's body. He's been flying up to the waterfall, then strafing down and howling in his crow voice. Spider says, "I can't fly down the waterfall."

I, who am playing the Goddess, only intervene when there's trouble, right? My voice shows up as if it's coming from inside your head, which is a neat trick. I've always wanted to do that. It was fun. I said, "Well, can you guys do something about that?" She says, "A generous crow would share his body." I said, "That sounds like a good idea." Then I went off the air.

Sean sticks his head in a fish, releasing the crow body. Spider comes over and puts on the crow body, and now she can fly up to the top. We have emergent behavior of body swapping going on, another thing we had just never foreseen. We were so fortunate that we arrived at the kind of simple rules that would admit of interesting emergent behavior. That's another great example of it.

Weaver: What year was this?

Laurel: The Placeholder project happened in 1993, in the summer.

Weaver: Brenda, can you tell us a few more of the anecdotal stories that you think went into assisting you later on or being instructive later on in your life?

Laurel: Sure. Going back to the very early days, after my drama coach, or my drama teacher asked me to do a play, I went up to the stage one late afternoon when it was getting dark. There was just the ghost light on the stage. I had never been backstage in a real theater. There were these flats in the dark kind of backstage, and one of them had this big glitter-dust star on it. I love the smell of glue, so I was just sort of sniffing that thing. I opened my eyes and there's just this explosion of all these lights and colors. It was like, "I can be *anybody*. I can go *anywhere*," in the theatre. And that flipped my bit. I have existential stretch marks from the things I've done as a result of that wonderful burst of color and its ambiguity. It's warm. Hot media turned cool because I had my face in it. It was really fun. That's a youthful tale.

Another big influence on me was meeting and becoming good friends with Timothy Leary. When he left Electronic Arts, I became his producer at Activision. He didn't actually finish anything at Activision, but I was assigned to him. And the first time I went down to his house in L.A., he shows up in a pea-green Mercedes with no seatbelts and jumps out in a white suit like Tom Wolfe. He drives me up to his house, "Whirling and swirling up into Hollywood," he says. We get there, and Barlow's there, all my Deadhead friends, and Winona Ryder is making out with somebody on the couch. He was her godfather. He later took me to the premiere of *Dracula* at Grauman's Chinese, which was just amazing. I got to watch Gary Oldman watch his movie for the first time. It was neat.

Anyway, Timothy, first of all, we had a lot in common. I had experimented with LSD a fair amount in my youth, and also mushrooms. By the time I met him, of course, it was illegal. But he and I had a lot to talk about in terms of the sort of unique capability of LSD to give you a takeaway that you don't forget. If you're

just stoned or drunk or something, you can do stuff and not remember it. But with acid, if you have a big insight, it's going to stay there. It changes you. I never had a bad trip ever in my life. We had that in common.

But I was also, when I first met him, working on my book *Computers as Theatre*, the first version of it. I gave him drafts of the Ray Bradbury stuff and he just *loved* it. He blurbed it in *Harper's*. He said I was one of his favorite writers. He gave me great critique on the writing. He was an amazing editor. He was an incredibly smart dude. I went on tour with him when VR was really hot. It ended up being me, Timothy, Bill Gibson, and Bruce Sterling were kind of a posse that toured the VR circuit in the early 1990s. After the big Cyberthon thing and the whole hype of VR, we were on the road. Hilarious. We went to Linz for Ars Electronica. Timothy had to keep calling it "Hitler's hometown."

We would pass closed bookstores, and Bill Gibson would be peering through the window to see if his book, *Neuromancer*, was in there. We really had a time. We went to Tokyo and Barcelona. Timothy's daughter passed away the same week that my father did. We were on the road and I think we kind of developed a father-daughter bond, really. I spent a great deal of time with him long after I left Activision. I was there probably a week before he died. My opinion of the man is that he was incredibly bright. He was the target of a single-person pogrom hosted by the United States government. He lived an extraordinary life under great pressure and condemnation from a lot of people who didn't understand him. We sort of had that in common, although I in miniature next to Tim. But he was a bighearted guy and he was so—Barlow's word is "pronoic." He thought that the world was intending for him to have a good time. That good things were going to happen. He was so utopian about VR and the piece that he wrote in the book I edited for Apple. His vision of how the Internet, VR, and some other things were going to help really galvanized me in some of my ethical positions, even though I knew the road would be extremely hard.

Weaver: Are we ready for Purple Moon?

Laurel: Yes. There is the politics of Banff, but we don't need to go into it.

Weaver: Well, was it instructive for you in any way?

Laurel: It was. Yeah, it was.

Weaver: Well, let's talk about it, then.

Laurel: The Banff Centre hosted artists from various communities. For example, when we started, there was a First Nations guy who was building a sweat lodge in VR. What was happening was actually that they had computers and programmers in the basement. They would get this artist, whoever, to sketch out a vision and somebody else would build it. They weren't empowering these people to use the tools of production. I found that to be kind of reprehensible, but I understand

the squeeze they were in. Yet there was this sort of consolidation of power in the institution that I found very paternalistic. That's why I think they went nuts when I walked in with a million dollars, five hotdog scientists, and artists to help us out. It was like, "Damn. We can't control these guys. We're not in the driver's seat." That's okay. I love Sara Diamond. It's all good.

But after we finished *Placeholder*, there was kind of a debrief with some of the local scholars. There was a group of women who were Quebecoise ladies. I would describe them as separatist feminists. I am an equity feminist. I will always be an equity feminist. They got on me for using petroglyphs in this. They claimed it was cultural appropriation of First Nations people. I said, "Well, that's interesting. The petroglyphs are really kind of modeled on stuff at Chauvet—." Not Chauvet. We didn't know about Chauvet then. What's the one we did know about? The caves in the Massif Central in France. These were European images that inspired us. There was a little bit of Native American and a little bit of this. I explained, "No, we didn't go around here looking at your local petroglyphs. This is a mash-up of Europe and North America."

This woman says to me, "Well, that's even worse. You're relying on our ignorance."

That was like, "What? What? What?"

Later, at a conference in Canada the next year, people were so pissed off about both the appropriation issue and some of the gender issues that I brought up that there was an anonymous note on the bulletin board that I should be kicked out of Canada and never allowed back in. There was a real backlash from people who thought they were the caretakers of the Aboriginal folk and the caretakers of the artist, who could go do his pretty thing while somebody downstairs builds it. Damn, that's not enabling anybody. That's not empowering anybody. And I think that Banff has really changed over the years to be more welcoming of teaching people the actual tools. That was the first of many run-ins with the separatist feminist community. [Laughs.]

Weaver: Yes, and speaking of run-ins with the feminist community, it seems to be sort of a logical segue into what became your, at that time, kind of life's work, a culmination of so much of your professional and personal interests when you were at Interval. Now can you take us forward chronologically as best you can? How did it go from that with Paul Allen, Interval, and Liddle? How did that work for you? What did you do? How did Purple Moon get started? Who funded it? All of these wonderful things we need to know.

Laurel: Okay. When I joined Interval Research, David and I had lunch. I was one of the very early hires, but I had to finish another job I was doing. I didn't actually join for another six weeks or something. But as we spoke over the table, it became clear that we both had tremendous interest in the question of computer literacy for girls and the relationship between girls and technology. These were

the days when, in the computer lab at school, all the boys would be at the consoles and the girls would be sitting in the back. They were afraid to put their hands on it. We knew this. We didn't exactly know why, except for all the stereotypes around about females, math, engineering, and things. We decided that we were going to do a big project on gender and technology. I got to lead it and partnered with Cheskin Research. You remember I met Davis back at Atari. He and his wife, Christopher [Ireland], were running this amazing human-centered design research company. We partnered with them. Then Dr. Bonnie Johnson, who was also at Interval, got involved with us and my now-husband Rob. That's how the boar ate the cabbage.

The idea was to first just understand what the deal was. This is a historic flashback. No one should conflate this with the present. We're talking about a gender problem that is not largely solved, but at least progress has been made since things have started happening on the Internet, on mobile devices, and stuff. Our original goal was just to find out, to learn why don't girls like computers. Then that got a little more refined. It's like the observation that boys who were used to playing console games. If the computer wasn't doing [what they wanted], they knew that they could bang on the "Return" key eighty-seven times. They weren't going to break it, and something might happen. Girls were like, "I'm going to break it." We thought that understanding what kind of computer games we might make for girls would help bridge this divide, so that we got girls' hands on a keyboard and we got them engaged.

But when we started the human-centered research, a second goal for the project emerged. At this point we weren't thinking about forming a company; we were just doing research. We talked to about a thousand girls in eight cities, about five hundred boys, a hundred subject-matter experts from play theory to you name it, soccer coaches. There's a good story here. I was talking to a soccer coach in that early phase of interviewing. He said, "I have so much trouble getting the girls to pass the ball quickly." Then I realized it's because they stop and measure the social consequences of who they're going to pass it to before they pass it. Big insight. Turned out to be pretty important.

In the course of doing these interviews, we were looking at girls between the ages of eight and twelve. We brought them in in pairs. We would recruit for one to meet our screener criteria and then ask her to bring a friend. That did a couple of things. It gave us two opinions, but they also kept each other honest. I can remember a girl in Indianapolis, my hometown, we were interviewing this young lady who was all dressed up; Big curly hair and a bow. Her friend is down-dressed in sort of Gap gender-free clothing. By the way, those pairs would either exactly alike or not alike when they came in. The girl in Indianapolis says, "Well, I'm not really much into sports. I'm not a very active person."

Her friend says, "Oh, yeah, except that you're the number-one pitcher in the Girls' Little League in the city." That's a big example of how having that other person there kept these guys honest in interviews.

What we learned, one of the big findings of this massive amount of research was that girls between childhood and teenage-hood, tweens we call them, boys and girls, but girls, in particular, tend to be trapped by their own social expectations. They have this awful sense of inevitability about what they're going to experience with other people. Their place in the social hierarchy is pretty stuck. We also learned that, in general—and there are many exceptions, overlapping Gaussian distributions, please. We're looking at these. In general, when boys compete with each other, it's, "I whooped your ass. I can throw the ball faster." Done, you know. Nobody's pissed off. There's an inheritance tree. If I get higher status, my friends get higher status. But it's all pretty straightforward. There's not a lot of Sturm und Drang about it, generally speaking. With girls, it's entirely different. There tends to be an entirely different mechanism for establishing one's place in the social hierarchy.

What we discovered was that the main tools that we saw girls using to navigate social space were affiliation and exclusion. I went back and looked at all my primate books, my pygmy chimp books, and learned that this is what goes on in same-sex primate groups as well. That is to say, "If I pick your lice, maybe you'll like me and hold my baby" kind of thing. It's all about maneuvering, or, "I don't like her. Let's gang up on her." We see this pattern emerging from our data. Certainly not all the way through and not everybody, but girls tend to hang in groups of three and they take turns excluding one. This is common among young girls and it's common among women. I've seen it over and over. There's that kind of rehearsal space for affiliation and exclusion that goes on in groups of three. It's like a network. Social status is really determined by how many connections you have. One way to increase your status is to break a connection between a popular girl and another friend or to have another friend that makes you her equal in terms of your connections. It's a pretty rough world, that cultural trope, which, again, isn't universal, but it does happen. We saw it as a pattern.

What started to pull at my heart was beyond computer literacy. It was like, "These guys need emotional rehearsal space for who they're becoming. They need to not feel so inevitable about everything. They need to have other tools for thinking about what's possible in the world." The vision then became building games where girls could rehearse having different responses to social situations and making different choices. Maybe you want to cry, maybe you want to run away, maybe you want to scream, maybe you want to be nice. You could mouse over thought bubbles and figure out which way you wanted to go. It was a branching situation in those days. But you could play those games over and over and they'd never be the same. You could also make a choice, rewind, make a different choice and see what happened. For me, this was a profoundly important way to help these girls connect their lives together.

The other big finding for us was that among the girls we talked to, there tends to be two spheres of how they think of themselves. They have an outward social life and they have an inner life that is much more personal. Over here in the social life they think of themselves as two or three years older and they play

ongoing narrative games about being in college and stuff. I'm looking at self-esteem in terms of my relationships with people. I'm looking at gossip, which is a big tool of the affiliation and exclusion equation, etc. There are these series of tools and traits of the social definition of oneself as opposed to the inner definition of oneself where it's not social. I was amazed. If I had designed the *Secret Paths* games myself without doing the research, I would have gotten it so wrong. It would have been like Secret Garden. We had all these theories about, well, girls like to nurture animals, etc. What we learned—and some of this was by giving them paper dolls and having them act stuff out—is that in their secret personal place, they don't want any company. They want animals to take care of them. They want to get secret wisdom from magical creatures or whatever. And their real self-worth is down there in that side as opposed to the sort of self-esteem shiny bit.

We were seeing these two aspects of development in girls that age that showed up in the data, so we made the decision then to use the same cast of characters in both series. In the outward-social-life series, the first game was called *Rockett's New School*. You're playing a kid on their first day in eighth grade, two years older than the target audience. You have to make all these decisions about who you're going to be friends with, what's going to happen, and you get to know people, etc. We did four or five titles in the Rockett series that were all about social development.

Then we used the same characters, but a different art style that made them look their age. Nobody had trouble, by the way, distinguishing the characters, even though they looked fairly different. Over here in *Secret Paths*, those were stories about—one of the characters would come in and she'd have a problem. "My father and mother are divorced. Dad won't come to the father-daughter dance with me and I'm devastated." If you decided to help that girl, you'd go on an adventure, a bunch of puzzle games. We shot footage in Zion for this, and other places. You'd find magic stones that have characteristics on them, courage, self-esteem, creativity, honesty, maturity, stuff like that, depending on what was laying around. You had to solve various puzzles in various environments to collect the stones. You put them in a virtual purple pouch. If you got all the stones she needed, you could go back, give her that, it turned into a necklace. Then we delivered in production style a folktale that was deeply engaging the subject. It might be something from five hundred years ago in Greece or a Lakota tale. We found these stories. After we started producing that product, I can remember girls just playing those puzzles as fast as they could to get to the story. They needed to hear the story right now, but they had to solve all the puzzles first, so it was kind of beautiful that way.

We were trying in this way to address the whole person with both of these series and to give a ground to talk about and make choices about stuff that often doesn't get verbalized and that kids think they don't have any choice in. And I was so proud of what we did and how we did it. I mean, we had some rocky roads in production that we can talk about. But I still get letters maybe once a week from

a girl or a mother. There's a Facebook group called "I Miss Purple Moon." This one woman wrote me a letter. She said she was home for Christmas and her cat was dragging this purple shoelace around. She picked it up and it said, "Purple Moon" and it all came back. She had a couple friends who were doing computer science in college, and she asked them to come over. She still had OS-9. They were playing the *Rockett* games, these boys, these men who had come home from school. She's writing to me saying, "It's so funny. I'm out here eating pizza and they're arguing about whose party to go to." Totally engaged in it, and they really liked the game. This makes me happy.

Often these girls will tell me, "Oh, I'm in media design now. I read *Utopian Entrepreneur.*"

If they haven't read *Utopian Entrepreneur*, I always send them a copy of the book so they can see how the sausage was made. It was very rewarding in that way.

Weaver: How did the sausage get made? Who funded it? How did it work? What did you do going in?

Laurel: At some point in the research process, David and I looked at each other and said, "There are products here. Let's find a partner in the software development side, game development side, and play around with the idea of making some games with these findings that we have by the way of human-centered design research", which is something I specialize in and treasure because of these experiences. The thing that we so often get wrong about it, if you have the privilege of actually talking to real people; which most companies still resist; you come back with a bunch of data, but you don't typically have time or tools to go through the analysis phase that gets you to findings and from findings to design principles. I'm a true believer in that traverse. I taught it every year I was teaching at Art Center in CCA [California College of the Arts]. I think it's an invaluable tool for designers. Anyway, that's that part.

David and I looked at each other and said, "There may be some games here."

David and I went looking for developers. We ran across a house called Convivial Design, which was run by separatist lesbians and staffed by pretty much the same deal. I was already a little bit sideways with them because I'm bisexual and I had a male at home in my life, and that wasn't okay. I was managing the project, but they wanted to keep it close to their breast. I can remember I went on a business trip and we had character sheets up all around the studio with the various characters so that the animators could have the models to work with. I came back, and I don't know if they were pulling my leg or not, but all these character sheets had turned into angry little dykes. [Laughs.] With mad faces, and the prom queen was in a wheelchair. They had put their whole political thing into this. I had to say, "You know what? We're going to look at the U.S. Census. I'm going to give you guys quotas. This is for everybody. If we've learned nothing

else, we have learned that to engage these kids means meeting them where they are, not where we want them to be."

From a separatist side we get, "Well, they're being competitive with each other, and girls shouldn't gossip."

And from the traditional side, it's like, "We can't have a kid talking about being offered a cigarette. We don't want our girls to behave in angry ways." There was shit coming from both sides of the gender-construction battlefield. That's why I knew we were just in the right place. [Laughs.] We were taking it from both sides.

And we were also getting praise from both sides. We beat *John Madden Football* the year we released the first *Rockett* game. We had more dwell time in hits than Disney.com for several months on our website, so we knew that we were connecting with our audience. It was a massive effort to get shelf space. We launched the year that Mattel launched Barbie Fashion Designer. We didn't get the intel, which is funny, because Paul, I think, was on the Disney board. There were interlocking directorates with Microsoft, Disney, and all those guys. We should have known. We didn't, so we faced that little bit of competition, which was fine. I mean, I was glad.

But I'll tell you why we came to market the same year, because I had to fire the development team in the middle of development. It got to the place where they were making me go in an office, close the door, and knock on it to come out. My need to be approved of by feminists was so strong that I actually took a lot of that abuse. But, push came to shove, they really didn't have the animation chops. Their demos were puppet shows. They demonstrated, slowly but surely, that they didn't have the engineering chops to get the work done. David was so unhappy that we had to separate from them. He did a bunch of negotiating with them on the side and I think they got some kind of settlement. But that set us back a year, because these people would not, didn't, couldn't do what we were asking them to do and didn't want to. They were making life kind of miserable for everybody. We lost a year to market finding another development team, which is a sad thing, but it's true.

Anyway, I believe that Purple Moon was a cultural win. A big one, because people remember it. The kids I talk to who are now young adults tell me it changed their lives. That stream of information has not stopped coming. For me it was a triumph. I was able to reach my hand across and do something that mattered to half the population and might change their relationship with technology in the future. These girls, once they'd get their hand on *Rockett*, they're off playing *Pac-Man*, you know. Now we're over the fear and they can start engaging in a more diverse set of games, which was a really good outcome, as far as I'm concerned.

The way the company ended was interesting. Paul Allen, the first time we showed him the website—this is after we'd spent $4 million on gender research—he looks at it and he says, "Can you do this for boys?"

It's like, "Don't make me slap you," you know? "Really? Are you kidding me? Hello. Everything's for boys. We're making something that's not for boys. That's why you paid all this money for all this research."

Anyway, we were having a board meeting. We were a quarter away from breaking even. We had shipped our eighth title. And they pulled the plug. Nancy [Deyo] and I were on the board, and then David and Noel. I think David's wife was on the board. She had invested in the company. Just out of nowhere, "We're taking you guys into Chapter 7," which is the bankruptcy from which no one reemerges. Now, we were in the middle of due diligence with Mattel for getting more investment, even though I hate Barbie with every fiber in my being. They did this in the middle of an investment round.

Nancy talked them into moving it back to a Chapter 11, but on the day that this information came down, Silicon Valley Bank froze our assets. It was payday, and I had like sixty people, 80 percent women, expecting a check. Nancy and I are looking at each other saying, "What do we do?", when we remembered that we had put down a quarter-of-a-million-dollar deposit on the office space and that it was at a different bank. The CFO and Nancy and I blazed over there, took that money out in cash, and paid everybody their last paycheck. [Laughs.] It was horrible to have to end it when it was so close to big success, you know? But at the same time, we behaved honorably to our employees. We learned a hell of a lot. I learned a lot about the kind of gender politics that I was going to be faced with for the rest of my life. I certainly learned a lot about little girls and kids and how they play. Whether it's soccer or a computer game, there are certain patterns that are characteristic. That knowledge stays with me and it informs the work that I'm doing now.

The grass was greener on the Internet side of the fence. In 1999, you could make money by investing in a company that had no business plan at all, right? If you're shipping real goods that have to be manufactured and stored, the maximum profit you could make and valuation you can have is 10x annual revenue. That wasn't true of the web, so they were all just going after greener pastures and we had to let go an entire studio of people. It was pretty heart-rending.

Then we held a wake for Rockett at my house. A lot of Irish whiskey was drunk, but that was good. My daughters had dressed Rockett with little feathery wings. We had dolls that went along with all these things. They had taken a string up to the upstairs room, so at the proper moment, Rockett ascended with these wings up to the ceiling and then Barbie came down. [Laughs.] But it was a real wake. I mean, there were big tears. We had spent four or five years together working on something that we thought was important and felt that the ending of it was

unfair. But business is business, money is money, capitalism is capitalism. [Whispers:] And maybe it's not the best idea.

Weaver: Looking back now, what could you have changed? Didn't it seem so dramatically unfair?

Laurel: You know, this was only my second venture, or third, in starting a company. This was a much bigger company than any place I'd ever worked before, so I didn't really understand the ropes when I got into it, especially about the investors. David used to talk about apartment cats. These are people who are— the investors were right there, and you don't have to go outside and catch mice. But our investors were Paul Allen, David Liddle's wife's firm, Ruth Ann Quinlan's firm, and some other Hollywood company that he [Paul Allen] was associated with. We were apartment cats. If I had been smart and stepped up to my own power, which I actually had in the situation, I would have for sure diversified the investors. I would have tried my damnedest to hold a majority on our own board with our own people. Now, you can't always have that. A lot of people don't, but if there's anything I could have changed that would have made a difference, it would have been that.

I guess the other thing was—I'll say this. My equity feminist self out looking for women developers backfired badly because I had not yet developed a kind of social criticality that I needed to handle the situation. That lost year to market would have made a difference. Those are things I learned. I also learned the value of a great CEO. I'm so glad I didn't try to do that job. We got Nancy Deyo, who was just fantastic. So, good lessons and bad ones, I guess.

Weaver: Let's talk about some of the bad ones, because I think that—and you've written about this before—there were certain things that you simply were not prepared for in terms of the people that you believed should be your biggest proponents. The ones who had the greatest criticisms were the ones who should have seen what you were doing, the benefit of it, and you couldn't understand, for the life of you, why they couldn't get it. I'd really like you to tell us that story, because it's so dramatically instructive.

Laurel: I don't know if it's a story. I guess I have a critique or lessons learned kind of thing to say about it. All feminists are not alike. I grew up in the bra-burning period, and, with a few outliers, that was pretty much an equity feminist movement. It quickly turned into a clash between equity feminists and separatists or dominator feminists who really want everything to go their way. They're going to be the boss. That's really different from being over here and saying, "Everybody gets an equal shot at realizing themselves and having joy." I wasn't aware of what I was walking into, I think, socially in that context. I was driven by this kind of blind, uninformed desire to involve women in the production process, not thinking that I needed to understand their culture. I was still in a place where a feminist was a feminist. Yeah, the Canadian girls had beat me up, but, hey, so what. I was shocked, really shocked, by the resistance I got from

those guys. By the way, they were using those very same tools of exclusion and affiliation to work on me.

Weaver: But what were they doing? In other words, not generalities. What were they actually doing? What slings and arrows were there?

Laurel: Constant arguments about the characters, which I've mentioned. Arguments about the behavior of the characters as well as their demographics. They resented me. They isolated me, which is about the worst thing you can do to an only child, right? Lock them in a room. Well, not lock, but you have to knock to come out. What? Why didn't I twig to that? That was insane.

When we finally did let them go, they left a little altar in the studio with half-incinerated photographs of myself and some of the other people on the management team, dead spiders, wads of dust bunnies, and a really nasty note. I guess I can imagine somebody feeling that way, but, yeah, I had a tremendously deep sense of betrayal. These guys, I presented the research to them. It's like you can't make everybody like you in these games and have them reach anybody, you know. What is your problem? I think it's a political stance that is not amenable to logic or passion in the way that I think of it. In other words, the heart chakra did not open from those guys.

Again, it was my blindness saying, "Oh, females are better than males for the purpose of building girls' games." Not true. Wasn't true. The designers were females, but the engineers were mostly males. That's where the skillsets were. And I was not being realistic when I made that first call. But Davis has my back on that one, because he made it with me. [Laughs.] But I would have looked harder at that culture. I would have looked harder at myself and my own need to feel accepted by a certain group of people.

This may be irrelevant, but when I first came to California, I was in a relationship with a woman. We went to the first California Women's Music Festival. We had been to the one in Illinois, the one in Michigan, and California was starting to have one here. We arrived at the grounds the day before because she was making a documentary about one of the bands that was playing. There were these ropes. This section is for people with mastectomies; this section is for people with mastectomies who smoke; this section is for transgender people who drink. It was just cut up into these little squares. Something smelled really wrong about that baby. It was just not okay in any way.

Later on, Linda and I were in the campground and some of the bikers came in. They were having a conversation in an open space and one of them said, "Well, we've promised childcare at this festival, but we don't want any boys in the concert area. I think we should take all the boy children and put them in this windowless cabin with some kind of caregiver." And before I knew it, I hit her in the jaw, and she went down. Problem was I had my thumb tucked in, so that

was not smart. Then we ran away, got back in our tent, and hid. I had just duked a biker. I didn't know I had it in me, really, but I was just so furious to hear that.

Later that night, we were videotaping the band and interviewing them. They were great. When the festival opened the next morning, they came in with kids on their shoulders, boys and girls, down the main aisle. You could hear about two hundred motorcycles start, you know. [Laughs.] I should have learned something from that. That was in the eighties. But I still didn't really grok the incredibly complex topography of feminism.

When the critiques started coming in about the games, I didn't feel bad at all. I felt like we'd really won. If a guy from *The New York Times* is saying, "I don't understand why somebody would play this," this is good. We gave these games cooties so that your brother wouldn't play it. Pronounce it lame and you'd never put your hands on it, right? It was *not* for boys. Boys didn't like it. They didn't get it. It wasn't in their sweet spot, the kinds of things they like to play at that age. That was good: a bad review in *The New York Times* and a good review in *Ms.* magazine with a little barb or two. The press was all over the place about these games, but the thing that was important was that everybody was noticing that there was a new sheriff in town. Barbie didn't have to be the only female role model in our entertainment universe.

There had been a Barbie game produced at Activision back in 1986, I think, that you had to get ready to go out on a date with Ken. The game mechanic was throwing marshmallows. There was a fad back then of throwing marshmallows in public places. I was talking to the programmer about it. He said, "Well, we know girls aren't very good with trajectory, so we're giving them these little, light, slow, puffy marshmallows to throw."

It was like, "Oh, my god. What? What?"

They put it in some TRS-80 [Tandy/RadioShack, Z80 microprocessor] man store where nobody's going to buy it, then everybody pronounces that girls won't play computer games. That was the end of the conversation until Her Interactive, ourselves, and some other people started showing up in the landscape. It was a self-fulfilling prophecy in a lot of ways. It was a tough row to hoe from both sides, but I stand by the work. I think the players would say that too.

Weaver: Just speak to that for just a moment, because when, again, you write about the website, you write about the modalities of which even you were not aware in terms of the fan base. On the institutional and administrative side, you're being closed down. Your food is basically being removed from the table. What was happening the other side in terms of the players, the user side? What did they perceive?

Laurel: Kristee Rosendahl led the web development team. One of the things we did there was allow kids to publish articles in the school newspaper of Rockett's

school. We could incorporate some of those story materials or some of the conflicts that they were surfacing, so it was a real conversation, in a way, with the fan base. Henry Jenkins is the person who taught me how important fans are. That a fan needs to be able to appropriate and repurpose characters, situations, etc., which is why you've got so much slash video in the *Star Trek* universe, for example. It's the business of personalizing the material. Disney hates it. Paramount hates it. But there it is. It turns out to be incredibly important if you're going to have fans. That was another reason why we were so urgent about meeting these kids where they were, about listening really hard to the stuff they surfaced in interviews about what was difficult in their lives, what was joyful in their lives, and how did they play with each other. That was just incredibly important.

In my mind, Barbie is this hegemonic figure that dictates the structure of social and personal femininity in a very narrow, oppressive way. That toy and other toys like it, you know, the "pink aisle," has been an instrument of the repression of girls in our society. And you could say the same thing about the boys' toy aisle, really, when you look at it, all these taboos. Boys are not supposed to be interested in dolls and clothing and stuff. Yet 30 percent of the users of Barbie Fashion Designer were boys. The reason is because it was constructive play. Now, one of the things we discovered is that girls' constructive play is narrative construction. They're always building the backstory, typically. That was another clue about how to design the games. Anyway, now I'm wandering.

Weaver: No, it's perfect. You're going back to the users' side, why it was so important to the users. Your users gave you feedback at the time that you were being forced to close for failure—

Laurel: I know. I know.

Weaver: —and it's very important to talk about your users.

Laurel: Well, the website, as I said, it was popular. We did some innovation there. We had a panic button that would capture any kind of trouble. We got kids' parents to register them with true names. We did a lot of things to protect that little community on the web. When we got shut down, we went over to the Red Hat guys and asked them to just put up a goodbye screen, because it was such a shock. We had designed a "We have to leave. We're so sorry" screen that went up on the front page of the website.

Well, a couple weeks later, we discover that almost three hundred girls have registered for the website without knowing it was closed, because other girls who belong to the website brought them in through the side door. They were merrily going along with the website and playing, not knowing. They didn't see that screen. They got in behind that screen. There was a lot of sadness, I think, among the player base. There was a lot of email and letters sent. But it's okay.

We did it, you know? We did that thing. It got out in the world. It made a difference in some people's lives.

Weaver: Did anyone take up the mantle, take the baton?

Laurel: Mattel finally bought the intellectual property and drove a stake through its heart. Mattel did that with almost all of the girls' games companies that were threatening their Barbie franchise, acquire and kill.

Weaver: Wow.

Laurel: Then, like a snake that's eaten something too big, right, they had spent so much money on these acquisitions. They couldn't afford to service their own brands, and their whole Interaction Division went down. They had to start outsourcing. And Jill Barad got her ass fired, which is good. There was a culture war going on in the industry, you bet, and Mattel was throwing their weight around. They had so much material for boys, too, that went into the computer game retail environment that they owned the shelf space. One of the things we did was to design a girls' section that could include anybody's brand that somebody could just plug-and-play at retail. That was one way that we got our stuff into the store was to address the larger problem: How do you get people to see it? Notice it? Aggregating it seemed like a good idea, and it was. It's just that Mattel aggregated differently. [Laughs.] There was a de' Medici kind of aggregation that happened there.

Weaver: How raw were you afterwards? In other words, why didn't you climb back up on the horse?

Laurel: Well, first, I was devastated. I was really kind of crippled with grief for six months. In fact, I started writing a very angry book, and then burned it and wrote *Utopian Entrepreneur* instead. It took me a while to get emotionally recovered. By that time, I had been consulting at ArtCenter College of Design in Pasadena and doing curriculum design with them for what would become the graduate media design program. I went down there and got hired as the chair. I spent six years commuting to L.A. every week and had a little apartment, but I needed to do that. It was like, there's got to be value in everything I've learned in this long, complicated life that I can pass along to students who are interested in doing media design. My trip was design research courses, but we also had terrific people in interaction design and graphic design. It was the first trans-disciplinary design program that I know of. After six years at ArtCenter, I got hired away by CCA to do the same thing. That turned into a political nightmare for other reasons. But I was also at CCA for six years as chair of a graduate design program.

Then I fooled around a little bit, went to UCSC, taught in their computer science program in the game curriculum. It's funny, they had promised me a tenure-track job on the basis of my fabulous life and many books that I'd written. Well,

when that job came open, the new chair of the new Game Division said to me, "You can't apply for this. You don't have any peer-reviewed papers."

It was like, "Well, I have five books. I've given a thousand conference keynotes— what?" I kind of left there pretty heartbroken too.

Then I turned my attention to VR again. I realized, you know, I'm an independent scholar. I have a lot to say about this. I've learned a lot. I have a lot of good questions about VR and augmented reality. I can still participate in this discourse, and maybe I'll get lucky and be able to partner with somebody who wants to help make something that's been in my brain for twenty years in one of these media. I've sort of gently retired. I think when I turned sixty-five, it's like, "I can be done now. I can do what I want." I've done more scholarship in the last year than probably the last twenty, because I was working the whole time. I've also learned to knit better.

I haven't given up, and I still have a voice. I think I have a pretty strong voice in the community, in the interaction design community, but also in the whole discourse around gender, technology, games, and game culture. As long as I can feel that I'm still contributing to that scene, I feel that I have value to the industry. And I'm not bummed out that I didn't do more with my life. I think I did a whole lot with my life, and I'm still doing it, so, fine. Anything I can do to pass lessons along to this entrepreneurship-crazy valley we're in is going to be useful. Startup or else is kind of a bad idea. I just want to keep being a contributor to the culture, to the discourse, hatching new critical theories, and trying stuff out. But I'm not doing it under the gun anymore, and that's great. I got my first Social Security check last week at sixty-six, so unless Trump kills it, I guess I have an income.

Weaver: Okay. Is there something that I've not asked you that you'd like to say?

Laurel: In the future, games are going to continue to be a huge part of our culture. We also need to recognize that the word "game" is a misnomer. Many of the interactive experiences that we have are fun, they're play, but they don't have scores or timers or the typical stuff that a game would have. They're just interactive experiences. This is going to be more apparent as we move into a world that includes VR and AR easily at our reach. I think that challenges that are facing us right now, one of the big ones is doing a smooth traverse from VR to AR. In other words, let's say I'm in a natural environment. I'm using AR to look around at plants and identify them or see their root systems or whatever. If I walk up and put my forehead on the tree, I want to gracefully go in there and look at its vascular system. Even in pragmatic applications, the need to switch gears is going to be a big deal. Working on those transitions I think is an interesting and important thing to do.

I think we ignore the culture of games at our peril as a society. You've heard people say, "Oh, boys playing violent games, it just makes them soldier-ready. It

makes them more violent." Well, if that's true, which I doubt, but let's say that's true, how about if we model civility? Will that leak out? Will that change the way people behave? You know, if *a,* then *b.* Might as well see if that works. There are social challenges coming up for us that we can meet and rise to. Addressing civility is a big one.

My personal mission right now is really tinged by a desire to connect technology and the natural in a graceful way. Primarily to raise awareness about this beautiful place where we live and the things that may be threatening it. Also, to just extend our capability space with all these wonderful new tools. Let's be sure we put some of them, at least, to a use that connects us with the world we live in. Connects us to each other in positive ways, or we're goners. The consumerist entertainment spectacle runs our lives, so if you want to resist that and go be a luddite, fine, but you're not changing the world. You have to get your hands dirty. Nobody thought of the telescope as "other," but we still think of computers as "other." Having their own language that they speak in the genres that they have to do. That's not true. We have *massive* new capability spaces. The trick is to figure out how to connect what we do with them, at least some of the time, to some notion of the public good. That doesn't have to be painful. It doesn't have to be fish oil. That could be a really delightful thing. As long as I keep working, that's going to be what I'm paying attention to.

Weaver: What aspects of video games do you consider or view as significant properties? Not the property itself, but the aspects of video games. What do you consider significant in them?

Laurel: Significant problems.

Weaver: Properties.

Laurel: Properties. Okay.

Weaver: Yeah, as in elements.

Laurel: Yeah. The major thing is what I would call the principle of action. You have to be able to make a significant difference through your choices and actions. A difference that has consequences in the storyline. Being involved in that is also the way the sensorium is accommodated. For example, the Vive interface is not bad, but when the new VR stuff started coming out and they had console interfaces. It's like if you're not a console queen and you can't see; you're not going to be able to use it. Plus, you are not expressing your body. The whole point of this is being embodied. I think those are two really important elements that you cannot superimpose [in] a narrative effectively on a video game. You can shove players around into making interesting choices, but you can't dictate the story. That's even more true in VR. When I hear things like virtual storytelling, I want to tear my hair out. It's that kind of appropriation of VR that happened back in the day that had a lot to do with killing it, except in some

academic institutions. It's like the term "turbo". We start attaching it to everything. VR movies? Sorry. It's not VR. That's a 360 movie. Let's call it what it is. Okay, I'm on a rant. Significant interaction is good support for our sensorium in whatever format we're using.

There was this big discovery around, I don't know, 1986. People were working their brains out trying to figure out how to make intelligent non-player characters using various forms of AI. I'll speak to *Habitat* because I know it better than *Neverwinter Nights.* [9] When *Habitat* showed up, what the Lucasfilm guys discovered was that, "Hey, if you've got other human beings in here, that's even better." [Laughs.] When you look at the kinds of choices and the range of choices that people can make, action becomes much more rich when it has a social component. That's not to say that every game needs to be social, but it's an opportunity space that we haven't yet figured out how to use as well as we might.

Weaver: What elements of gameplay or user experience should be considered when we talk about preserving the cultural legacy of games?

Laurel: In general, most of the innovations that have been made in user-interaction design have come from the game community. I think part of its legacy is, for example, the brilliant way that direct manipulation is used in some of the early games and is now very present. That was an idea that Shneiderman and Norman talked about, but it wasn't really instantiated until video games came along and started doing it in any meaningful, sexy way, at least. There's that legacy of innovation in user interaction—I hate the word "user"—human-computer interaction—that's really important.

There's a legacy of sexism that we need to understand if we're looking at this historically. Video games, they were funded by young men, they were written by young men, and they were sold to young men. It was the perfect vertical integration, right? We need to remember that that's how this thing started, and that people who changed it really had to push.

Weaver: As someone who values objects and artifacts, particularly in relation to connected virtual worlds in some tangible way, what do you think of the proliferation of distributed games and the move away from games as a physical medium? Do you think there's going to be a subset of the community that'll keep physical game objects in circulation much in the same way that vinyl LPs have had a new renaissance?

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[9] *Habitat* is a massively multiplayer online role-playing video game [MMORPG] developed by LucasArts, which was beta tested from 1986 to 1988. It is the first attempt at a large-scale commercial virtual community that was graphic based but never commercially released in full form. *Neverwinter Nights* was the first commercially released multiplayer online role-playing game to display graphics and ran from 1991 to 1997 on AOL [America Online].

Laurel: I think board games are starting to have a renaissance right now. We've seen card games recently that are really good, Mary Flanagan's games, for example. I don't think board games are going away anywhere. I do think that as we get better at creating persuasive environments and good physical interfaces, there will be less of a sense of alienation in a mediated digital social environment than there is now. We still haven't come to meet the human body where it is. The human voice where it is. There's the potential there to make things a lot better.

Weaver: Do you think that the physical preservation of game-related objects is important for understanding the bigger world of games?

Laurel: When you talk about objects, what do you mean? Controllers?

Weaver: I mean, when I say "physical," game-related objects, so, in other words, conceptual swords or things or artifacts that one has. Is that something that we should be preserving in terms of understanding the bigger world of the genres, etc.?

Laurel: I think so, and there's a couple of reasons. One is that there's some really bad examples of UI design that are around these objects, the primary one being inventories in adventure games. What we've learned is that if you have to go to your inventory to find something, your flow is interrupted. That's really not a good way to take care of it. Looking at the UI challenge is an important reason to keep the artifacts around, but also I think the amount of symbolism that's packed into the visual representation of objects of games is worth study. Many of them speak a thousand words and are only thought of in the context of one little piece of gameplay, but you learn a whole lot about the design sensibility and the values. Just looking at the evolution of armor for female characters in games is interesting. It's like kind of looking at the evolution of underwear from Queen Elizabeth forward, which I used to teach as my first day in Theatre 100. But they've gone from these, like, metal bikinis to some pretty interesting stuff, now that we have more women graphic designers working in the field. That's something to look at because it speaks to the larger gender issue.

Weaver: Right, right. But from a museum's standpoint, worth preserving.

Laurel: Worth preserving like Frank Frazetta's worth preserving. I don't agree with the way he treats females, but he's a magnificent artist and a great snapshot of the time in science fiction.

Weaver: Got it. What are your thoughts on emulation for museums and libraries who want to provide access to older video game content?

Laurel: I think that's a great idea. I know Bruce Damer's done a lot of work on that. There's work that's been done here. If you can restore the operating system and get stuff to run, I think it's really important. You really can't understand a game from watching a movie of gameplay.

Weaver: Right. The underpinning of that question, of course, is you feel comfortable as a game designer, if you're the public, playing a game through an emulator if you don't have the original available to you or it would be too fragile to—

Laurel: Yeah.

Weaver: Okay. Fine.

Laurel: No, because it's the gameplay experience that we want to study. It doesn't really matter if you're running it on the original hardware.

Weaver: Fine. Okay. You don't feel as a social scientist that that would somehow pervert the import of understanding what that person is doing in terms of affecting the play?

Laurel: No. I think you have to be really careful, though, in how you design the emulator so that you're not exceeding the capabilities of the original platform.

Weaver: Fair point. Very fair point. Okay. What steps are necessary for us to preserve the virtual world? In other words, do you think that preserving the contextual materials created by the player community is just as vital to the understanding of the virtual world as the preservation of the software itself?

Laurel: Absolutely.

Weaver: Okay. Societal impact of games. Can you talk a little bit about the influence of video games on other art forms such as the visual arts, music, film, etc.?

Laurel: Oh, I think there's been a tremendous influence in video as a medium. We're seeing some of the techniques that have been used in video game design showing up in experimental video. We've seen the medium of games being appropriated by, for example, the transgender community, which is very strong right now in alternative games. I don't know if that's answering your question.

Weaver: Well, I mean, of course. It is answering the question, because it's your perception of the influence, which I think is what the question is all about.

Laurel: Okay.

Weaver: Do you see any parallels between the virtual economy and the real-world digital economy that gave rise to Bitcoin and similar digital asset systems?

Laurel: No.

Weaver: Okay. In your opinion, what's the educational imperative of the video game industry?

Laurel: The need to get educated about diversity and user populations. The need to get up close and personal with players or potential players. They have to put their finger on the pulse of the culture.

Weaver: When you talk about this in terms of the culture and being sensitive, you're not just talking about gender issues. You are also talking about issues of disability, etc., I assume.

Laurel: Yes, for sure. And violence.

Weaver: Fine. Now personal philosophy. They may have changed, but what do you consider the driving motivations of your life?

Laurel: [Laughs.] It was implanted in me early that I needed to succeed at something. I think I made the decision to move from theatre to computer games—there was a coincidence there, but I also decided that theatre was just like a crapshoot. There was not a way to have a kind of meritorious experience in the theatre. I really wanted to have children, a life, and not eat cockroaches for breakfast, so I made that decision and did community theatre instead at night. But the theatre has been an abiding influence for me. The ability to inhabit, embody someone who's a character. The trick in acting is to shine the flashlight in your head until you find Lady Macbeth, you know. It's not to go out here and make it up. I mean, one of the reasons why *BioShock Infinite* is such a powerful game is that you are forced to live inside the skin and make choices of people who aren't like you, so it's a terrific way of learning what the other experience is.[10]

Weaver: If you could ask another person related to the industry, not necessarily in the industry but related to the industry in some way, a question, whether the person is alive today or not alive, who would that person be? What would your question be?

Laurel: This is going to sound a little crazy. Douglas Engelbart was a friend of mine. If I could ask him a question, I would ask him what the experience of life has taught him about handling anger and loss.[11]

Weaver: Okay. What has notoriety meant to you? What I mean by that is has it given you a greater freedom of expression or has it basically forced you to live up to impossible standards?

Laurel: Oh, I think I totally have greater freedom of expression. The experiences I have had have taught me how to stand up, how to be present, and how to really kind

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[10] BioShock Infinite is a first-person shooter video game developed by Irrational Games and published by 2K Games in 2013. The game's setting is based on historical events at the turn of the 20th century, such as the 1893 World's Columbian Exposition, and the concept of American exceptionalism, while also incorporating influences from more recent events at the time such as the 2011 Occupy movement.

[11] Douglas Carl Engelbart (January 30, 1925 – July 2, 2013) was an American engineer, inventor of the computer mouse, and an early human-computer interaction and Internet pioneer.

of not care about the noise around me. If I've got something going on that I believe in and others believe in it, too, then we're going to go do that thing if we can. I feel like I've grown up as a result of the life I've lived in the industry.

Weaver: Now we're going to talk for a minute about the future of the industry as you see it. Do you think that advancements in graphics and processing have made video games any more of an art form?

Laurel: Yes and no. I mean, it depends on who's designing the game. Certainly, people have greater palettes for digital design that approach making art, so that's wonderful. But I also think one of the trends in graphics in animation and video games is the photorealistic impulse. In a McLuhanesque sense, it's too hot for a game. It gets in there and fries your dendrites. What you want is a softer, more impressionistic environment that pulls you in to be an active participant in making that world. The story that emerges from playing a game or going through a VR experience is the story of your traverse. It's not the story the designer wrote in there. It's the story of your traverse through that world, and hopefully it's going to be different every time you go in it.

Weaver: Do you think that having more powerful tools has made better games?

Laurel: Generally, yes. Processing power and graphics cards and stuff like that have made a big difference in the capability space. Where we're lagging is in what we do with the capability space.

Weaver: Do you think that it may have made certain kinds of people, designers, programmers, artists, etc., more lazy, in other words, that they're so powerful now that you can be lazy in terms of whatever you would consider the soul of it, the art of it, etc.?

Laurel: I don't know any lazy game designers. The guys that I met who were working on their Ph.D.'s at UC Santa Cruz are always pushing the edge. Right now, I think the focus is on artificial intelligence again, but they're never going to be satisfied.

Weaver: What more do you think can be done to enhance storytelling in games?

Laurel: I think it's important to understand what stories are and where they come from. The difference between drama and epic, for example, is germane here, if you want to go all critical theory. An epic or a narrative that is told to you, as in a storytelling like Homer's epics and stuff, it's extensified in time. It can take eight pages to talk about one second in somebody's life. There's all this elasticity and stuff, but it's fixed in a particular way. In reader response theory, you have essentially less opportunity to make any kind of significant choice in a narrative, right? You're just going to interpret things one way or another. When you talk about stories in games, you have to understand that that represents a time-displaced collaboration between the designer and the player. If it doesn't include the player as authorially active, it's not doing its job.

Weaver: How do you think that the latest innovations in VR are going to contribute to the development of video game storytelling or video games themselves?

Laurel: Video game storytelling, once again, is the journey through the game of an individual, so it's co-constructed. We can do crazier stuff with VR. We can experience a broader range of environments and situations in VR. I see its use more as an amplifier of our understanding of what's around us, but that's my mission. Did that answer your question?

Weaver: Yeah. I think it answered the question.

Laurel: Okay.

Weaver: Do you see any parallels today in today's indie development industry and the very early industry when you were developing early games?

Laurel: Oh, sure. I think people are saying, "Well, what if?" in a healthy, empowered way again.

I mean, that's all we were doing, right? "What if?" "Let's try this." "Hey, what do you think?" "Can I get a snake to lip sync? Yes, I can." That's a trivial example, but, yeah, okay. I think I've said what I meant to say. Let me see if I can say it a different way, if you would like me to.

Weaver: No, no, no. I mean, the most important answer was, quite frankly, the first couple of words in the sense of it's just really your impression about do you see this as being parallel to what we used to do in terms of one or two people now can make a game—

Laurel: Yeah.

Weaver: —right, as opposed to if you look at the track of massive numbers of people, etc.

Laurel: Well, the difficulty, of course, is publishing.

Weaver: Agreed.

Laurel: We still have that hurdle.

Weaver: Right. So, here's the last question, and it's a compound question.

Laurel: Uh-oh.

Weaver: What did you believe that you were originally doing at the time that you got into the business? And now with the luxury of hindsight, what do you think you actually achieved?

Laurel: [Laughs.] Well, that's an easy question. All I wanted to do was make a bigger playground for my imagination. As I got older, it also became a space for exercising humanistic values. And I don't think that's antithetical to fun. Does that answer your question?

Weaver: Yeah.

Laurel: Okay.

Weaver: That's it.

Smith: I've got one.

Weaver: Okay.

Smith: Where, in your opinion, do you think we are in terms of the long march towards some form of gender equality here in 2017? How do you think these types of technologies in gaming have contributed to where we are and where we're headed?

Laurel: It's a really good question. I think we're about to experience a major backslide in gender equality because of the politics of the moment. I must hope that this doesn't survive past, at worst, four years. We're in the middle of a big backslide right now that has to do with politics. It's interesting to me that the general public came along pretty quickly and gracefully around gay rights and same-sex marriage, and yet we still have these wild resistances to female self-empowerment, like healthcare, for example. I think that it is going to become clear, if we make it through this next couple of decades, that women in positions of leadership have unique things to offer that can really help in the situation we're in. We're good negotiators. We tend to be good negotiators, emotionally sensitive beings with—sorry, there are studies that say we have maybe a little more social intelligence going on. These are skills that are world needs right now. I hope we get to the place where we start using them. I think a lot of the customs of discrimination will drop immediately from the landscape when we have enough women in leadership positions in the world.

Weaver: Is there anything you think that we missed that you'd like to put on the record?

Laurel: All done.

Weaver: We're good.

Smith: Thank you, Brenda.

[End of interview]