Oral History of Nolan Bushnell

Interviewed by:
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Hsu: All right. Today is July 10th, 2024. I am Hansen Hsu here with Nolan Bushnell and to start with, we'll begin with where and when you were born.

Bushnell: I was born in Ogden, Utah, February 5th, 1943 and that was the start of the whole craziness.

Hsu: Where did you grow up?

Bushnell: I grew up mostly in the town of Clearfield, which had a couple of interesting characteristics. It was adjacent to the Hill Air Force Base. So I went to school with an awful lot of Air Force brats, and it was sort of halfway between Salt Lake and Ogden. So we had kind of two metropolitan areas that were, we thought they were big cities. They weren't that big, but big for us, and it was a good childhood.

Hsu: What were your parents' backgrounds and occupations?

Bushnell: My mother was a schoolteacher, and my father owned a construction company, and he did literally miles and miles of curb and gutter and sidewalk in that area.

Hsu: Any religious or political beliefs?

Bushnell: I was born and raised Mormon, and I became a heathen when I was 18. So it was my youth that was religious, but not my adulthood.

Hsu: Do you have any siblings?

Bushnell: Pardon?

Hsu: Do you have any siblings?

Bushnell: I have three sisters.

Hsu: What were your favorite subjects in school?

Bushnell: Probably math and science. Always been kind of a nerd.

Hsu: Okay. What sorts of books did you read or media did you consume?

Bushnell: Very, very heavily skewed towards science fiction, and I've often felt that science fiction sort of lubricates your brain as to what can be as opposed to what is.

Hsu: What were your hobbies growing up?

Bushnell: Say again?

Hsu: What were your hobbies?

Bushnell: I was a ham radio operator. I got my license when I was 10 years old, very young, and I'd say my hobbies were always somewhat technical. Ham radio, and then I got really interested in cars, and I think that I had a 1932 Model A Ford that I tricked out and learned how to weld and do all kinds of fun stuff. But I think that my childhood would be characterized by a lot of projects, and I think that's my adulthood as well.

Hsu: Were you entrepreneurial in a way as a child?

Bushnell: You know, I've asked myself that question, are entrepreneurs made or born? I think the answer might be yes. Wait, my first entrepreneurial experience was, my mother said at dinner one night, “We've got too many strawberries, we're going to have to give them away.” The next day she took me to the grocery store, and I noticed that they were selling strawberries for 50 cents a basket. So I went home and got all the baskets, filled them up with strawberries, sold them door to door for 50 cents, and in an hour, I'd make eight bucks, which in that world where my allowance was 25 cents a week, I was gob smacked with the amount of money, and maybe that was this thing that never let me go back and be just not an entrepreneur from then.

Hsu: I understand you also started a TV repair business?

Bushnell: That's correct. Yeah, well, you have a problem when you're into ham radio, because all the radios, the receivers and the transmitters, they're expensive, and so I had to figure out a way to augment that revenue so that I could get the radios I wanted, and TV repair seemed to be the right thing to do, and I had a little bit of a marketing problem, like who's going to let a 10-year-old kid work on their TV? I solved that by charging 50 cents for a house call in a world where the going rate for a house call was five bucks. But I could really charge them for the tubes.

Hsu: All right, so did you have any influential teachers, mentors, or role models?

Bushnell: Yeah, I actually think that Mrs. Cook, third grade, was that role model, and she basically had the magic science box back in the corner, and she would assign one student to go and play with this stuff and demonstrate it, and she assigned me to do it for the electricity. So I got to wire up the dry cells, and the switches, and the little lights, and the little motors, and I was hooked. I went home that night and set up a card table in the corner of my room and got every flashlight, battery, light switch, piece of wire, and I started to tinker and I never stopped.

Hsu: Who were your heroes growing up?

Bushnell: There was a guy that lived down the block who was a ham radio operator, and his name was Chet Ashby, and he taught me a lot about electronics at the time. Later on, I think I had some-- my debate coach was a clear mentor, and I think in high school, debate was really an important thing to get that skill. But I can think of a whole bunch of mentors that were important to me.

Hsu: Where did you go to college?

Bushnell: I went for two years to Utah State in Logan, Utah, and then I finished up in the University of Utah.

Hsu: How did you choose both of those?

Bushnell: Say again?

Hsu: How did you choose those institutions?

Bushnell: Well, I had a scholarship to go to Utah State. But the engineering department at the University of Utah was clearly superior, and I decided that if you were going to get a degree, you wanted to get as good a degree as you could. Plus, I was working at the amusement park at the time, and so proximity was important, because I needed to be there for the spring openings.

Hsu: Why did you choose to study engineering?

Bushnell: Oh, I just thought that engineering was the right thing for me. Ham radio, tinkering, electronics, TV repair, of course, engineering.

Hsu: So your formal major, what was it?

Bushnell: Electrical engineering.

Hsu: Yeah, okay, and who were the most important influencers in your life at college?

Bushnell: I had one professor that was teaching fields that was very, very important to me, and then, of course, Dr. [David] Evans, who was really at the forefront of video graphics. I think Dr. Evans would have to be the number one.

Hsu: Okay, and what was your first experience with a computer?

Bushnell: It was at Utah State, and it was with punch cards, and we just did some simple little programs to run it. It was an IBM 1620, which was a really crappy little computer. When I went to the University of Utah, they had a 90, 91, something like that, which was a Go Fast, much more important computer, and we would submit, again, Hollerith cards and get these reams of paper back.

Hsu: What was the first program you ever wrote?

Bushnell: I think the first program that I wrote was the solution of the quadratic equation, which was assigned to me. So I didn't think of that. I just had to do it.

Hsu: So you spoke about Dave Evans. Can you talk about your general exposure to the computer graphics work being done at Utah?

Bushnell: Well, computer graphics in those days were really, really, really hard, and the guys at MIT who did Spacewar!, it was a vector-graphic display, and the vector graphics, it was basically a repurposed radar display, and so at that time, a vector-graphic display cost almost $30,000. So it was clearly not appropriate when you get a regular TV for 100 bucks. So I knew that if I was going to do anything, I had to do it with raster scan.

Hsu: Did you work with or meet Ivan Sutherland, Alan Kay, Ed Catmull, or John Warnock?

Bushnell: All of them.

Hsu: Jim Clark?

Bushnell: Yes. Well, there was a section which was sort of the computer graphics area, and they were all kind of hanging out there doing stuff, and because I was interested in it, I was hanging out doing stuff.

Hsu: So you were an undergrad while most of them were graduate students?

Bushnell: That's correct.

Hsu: Okay. So you were just hanging out, absorbing what they were doing?

Bushnell: Correct. I was a poser.

Hsu: But you were just sort of seeing what they were doing and absorbing the environment?

Bushnell: Correct.

Hsu: When did you first encounter Spacewar!?

Bushnell: It was at the University of Utah, and it wasn't a PDP-1. I think they had it running on a PDP-11. But then the Stanford AI project was where I really played it a lot, and I had a good friend who worked at the AI project, and we met playing Go, and the name was Jim Stein, and that was really when I decided that I had to do Spacewar! commercially.

Hsu: Okay. So that's a little bit later. We'll get to that. Okay. Earlier you mentioned that you worked at an amusement park. Can you talk about that?

Bushnell: Yes. I've often considered my life a series of happy accidents. That is, I went to work for the amusement park for all the wrong reasons. That is, I was making a lot of money selling advertising to the Campus Company, which was the student blotter, but I've had this habit of making big decisions that keep

me out of trouble, because I have long-term willpower, but really crappy short-term willpower, and so I felt that getting a job at the amusement park nights would keep me from spending all of my money dating and hanging out summer nights, and so working at the amusement park was to keep myself busy. But I found out that you could actually make some good money as well, and I was making a lot of money. I had a really nice apartment. I was putting myself through college. I was driving a 190 SL Mercedes. Life was good.

Hsu: How did that experience inform you on how the business of gaming works?

Bushnell: Well, I worked actually on the midway for two years, and then they promoted me to manager of the whole department, and that was what I called my MBA, and I was able to-- I mean, I had two arcades that were under my purview. So I learned the economics of the coin-operated game business. How much the coin-op games cost, how much they had to earn to be worthwhile, and all that was like market research for my ultimate game company.

Hsu: You mentioned you were also doing something at college, like a business at college.

Bushnell: Yeah, that was the Campus Company. I got a big piece of cardboard and put a calendar of events in the center, and then I sold advertising around the edge, and the economics were very simple. I would sell $3,000 to $4,000 worth of advertising, print up $500 worth, and give them away free at the beginning of the quarter of the semester, and so in those days, when you can make $3,000 three times a year per university, that was a lot of money.

Hsu: So you were doing this at multiple universities?

Bushnell: Correct.

Hsu: So which universities were you--?

Bushnell: Utah State, University of Utah, BYU, and Ogden.

Hsu: Okay, and did you have any summer jobs or internships?

Bushnell: No. Well, I'll take it back. Between my freshman and sophomore year, I worked at Litton Industries doing micro-soldering, and I guess that could be considered an internship, sort of.

Hsu: Did you have any other sort of industrial jobs around that time?

Bushnell: Well, before that, I worked with my dad on his construction business. So I knew how to finish concrete and muck cement.

Hsu: Okay, and what year did you graduate?

Bushnell: 1968.

Hsu: Okay. What a year. Did you go on to graduate school, or did you go to work straight out?

Bushnell: Straight to work.

Hsu: Okay, and what was your first job out of college?

Bushnell: I went to work for Ampex in Sunnyvale.

Hsu: Okay. How did you get that job?

Bushnell: I was an irregular graduate. That is, I graduated at the end of fall quarter. So Thanksgiving, I drove to Sunnyvale, and my wife's sister lived there, so we had a place to stay, and I just papered the tech companies there with my CV, and I actually had a goal. My grades were not great. I graduated last in my class, and you can look at that as being a slacker or getting the most efficient degree ever. Didn't get one grade more than I needed. But when you graduate, you go into the counselor's office, and he says, “Well, you're going to have to settle.” That's kind of fighting words to me, and so I determined that-- I believe that every system can be gamed, and so I knew what the highest starting salary of all the cum laude engineers were, and I just went in, and I just asked for $25 a month more, and I got it, and so that was really fun, because when I went back to the counselor, told him what my starting salary was, he said, “Did you lie to him?” I said, “No.”

Hsu: So what was it about Ampex that attracted you to go there?

Bushnell: That they gave me an offer. That's what I say, that my life was a series of happy accidents, and Ampex had the additional advantage that it was in video files. So I really, really sharpened my video skills. Like repairing TVs, I had some chops. But creating cameras and systems that created images, that was something that I learned at Ampex.

Hsu: I also read that you really loved Disney.

Bushnell: I loved what?

Hsu: Disney.

Bushnell: Yes.

Hsu: Could you talk about that?

Bushnell: Well, I felt that from the amusement park, I thought I had chops in the amusement park business. Electrical engineering degree. So I thought, oh, [Disney] Imagineering. That would be a cool thing, and I applied, and nobody came back to me, and I'm really glad.

Hsu: So what did you work on at Ampex? Also, what skills did you learn?

Bushnell: Oh, my first project at Ampex was to record data at 10 to the minus 15 error rate. I'm not sure if that's the right number. I don't remember. But we were recording digital information on videotape, and the problem with tape is there's a thing called dropouts. Whereas the iron oxide is not even, and that causes a dropout. So what you have to do is figure out ways to fix that, and that was my job.

Hsu: Hmm. Talk about some of the people that you met at Ampex.

Bushnell: Of course, probably the most important was my partner, Ted Dabney. He was my office mate. Larry Emmons, Steve Mayer, they became really an important part of Atari later on. There are two or three others that I can't think of right now, but Atari was kind of ramping up when Ampex was having some problems. So it was very easy to recruit the best and the brightest, and that was good.

Hsu: Did you know Larry Ellison at Ampex?

Bushnell: I did not.

Hsu: Okay, so earlier you mentioned that you were going to the Stanford AI Lab to play Spacewar! and you met a friend that you played Go with?

Bushnell: Correct.

Hsu: So talk about how you met him and how you got invited over to Stanford.

Bushnell: Well, there was a Go club that met every Wednesday night at the Tresidder Union on Stanford, and he was there, and I was there, and we played Go, and then he said, “Hey, would you like to play Spacewar! up at the AI Lab?” and I said, “Whoa, yes. I haven't done that since college,” and so we went up, and the AI Lab is up in the Stanford hills. It's kind of a creepy place. But it was really fun, and they had these huge computers there, and of course, they had a PDP-1, which was where the MIT guys did the Spacewar!

Hsu: His name was? I forgot.

Bushnell: Jim Stein.

Hsu: Jim Stein, okay. So you mentioned that sort of sparked your idea to make a version of Spacewar! Can you talk about how that idea came about?

Bushnell: Yeah, I think that from Ampex, I'd learned how to create digital video images a little bit, and I just got thinking, you know, maybe I can do this, and what kind of sparked it a little bit was an ad for a computer came across my desk that was $3,000 stripped down, and I thought to myself, $3,000, that maybe could work. But computers in those days were so damn slow. Video chews up information at such

a high rate that it was very clear that wouldn't work. So I kept de-stressing the computer by making these little circuits, and then I had kind of an epiphany one day and said, “Hey, let's get rid of the computer. I'll do it all with these little circuits,” and that was the breakthrough.

Hsu: I want to go specifically to exactly how did you combine the idea of the computer playing Spacewar! How did you know that turning that into a coin-op experience would work? Or what motivated you to put two and two together?

Bushnell: I knew the economics, from the amusement park, and I knew that people would put quarters into that machine, a lot of them, and I had pretty much figured out where coin-op machines at the time were selling for about $1,000, 1,200 bucks, and the parts, the bill of materials for the Computer Space was about $320. So it looked like there was a good margin there.

Hsu: So why the name Computer Space?

Bushnell: Well, that was really because I licensed it to Nutting. They named it, and their product before was called the IQ Computer, and so Computer Space was sort of in line with their brand.

Hsu: So how did you end up working with Nutting & Associates?

Bushnell: I had a dentist appointment, and I told my dentist what I was doing, and he said, “Another one of my patients works at a game company in Mountain View,” and so he introduced me, and I called Dave Ralston up, and he came out and said, “Yeah, this is cool. We'll license it.”

Hsu: Could you talk about the design of the cabinet?

Bushnell: Pardon?

Hsu: The design of the cabinet for Computer Space.

Bushnell: I did that in modeling clay on my kitchen table, and then Ted took it to a boat manufacturer, and he scaled it up, and I thought it was pretty cool, space-y.

Hsu: So what influenced the design?

Bushnell: I just wanted it to be round-y and space-y.

Hsu: By this point, you had already started a company of your own to make the Computer Space in partnership with Nutting?

Bushnell: Well, we had started Syzygy, which was our partnership.

Hsu: By we, you mean?

Bushnell: Ted Dabney and I. Ted Dabney and I had this company, and that was going to be the collector of the royalties.

Hsu: What year did you start that?

Bushnell: We started Syzygy-- Dave Ralston from Nutting and I met in February of 1970, and then we ended up taking Computer Space to this trade show in Chicago that fall.

Hsu: You and Ted?

Bushnell: Ted and I, yes, and then subsequently, I was sent all over the country to teach the distributors how to prepare them. Because this was solid state. It was brand new to them, and then I've often thought, occasionally, having done a deal with people who are totally incompetent is a real blessing, and Nutting were really a bunch of bozos, and I knew that I couldn't have my star with them. So I quit, which my wife was concerned about.

Hsu: So you quit Nutting?

Bushnell: I quit Nutting, and we really didn't have enough royalties to support ourselves. So I didn't quit Nutting until I had gotten a couple of contracts from Bally to build them a video game.

Hsu: Actually, at what point did you leave Ampex, and why?

Bushnell: I left Ampex the minute that Nutting hired me to be chief engineer.

Hsu: Okay.

Bushnell: I doubled my salary.

Hsu: What year was that?

Bushnell: It was 1970.

Hsu: Okay. Same year. How did you come up with the name Syzygy?

Bushnell: That was actually Ted, and he said it's the last S in the dictionary.

Hsu: What does that mean?

Bushnell: It has two meanings. One is it's kind of a sex act between plants, and it's an alignment of planets in a gravitational field.

Hsu: What was the original business plan?

Bushnell: The original business plan was to design games and license them to big manufacturers for royalty.

Hsu: So how successful was Computer Space?

Bushnell: It did about $2.5 million in sales, which a successful coin-op game would be considered around $10 million at the time. So it was below the success threshold. But it was a nice little cash flow for us. So you shouldn't get greedy.

Hsu: At what point did you change the name to Atari and talk about how that came about?

Bushnell: That was in June ’72.

Jon Plutte: When did you change the name?

Bushnell: I changed the name in June ’72 when we tried to incorporate, and Syzygy was already used in California by a Mendocino candle manufacturer, and so I don't remember what number two was. But in those days with snail mail, you listed your first choice, second choice, third choice. Atari was my third choice, and it was a good choice.

Hsu: And what does Atari mean?

Bushnell: Atari means a polite warning. It also means, in Japanese, bullseye, jackpot, and then, of course, in Go, the warning.

Hsu: Right. So then after working with Nutting, you said you were going to design games for Bally and Midway?

Bushnell: Correct.

Hsu: So what was the next game supposed to be?

Bushnell: They wanted a driving game, and we had the contract from Bally Midway and one from Nutting. Nutting wanted a two-player Computer Space-so we signed up for that. Those two contracts gave us the cash flow to hire another engineer, Al Alcorn. That was the same day that I saw the Odyssey.

Hsu: The Magnavox?

Bushnell: The Magnavox [Odyssey], and the Odyssey I thought was an extremely crappy game. But when I watched people, they were kind of having fun with the ping pong thing, and so I thought to myself, hey, that's a trivial game. It's nothing. That was Al's first day, and so I assigned him that project: give me a ping pong game. It just got more fun and more fun, and it ended up being Pong, and that really launched Atari.

Hsu: How did you meet Al Alcorn?

Bushnell: He was my tech. Al was my tech at Ampex, and Berkeley Engineering had a plan for six months on at the university, six months in business as a technician, and so Al was my tech, and so was Steve Bristow. They alternated, and Al and Steve were incredibly capable, and so it was very easy for me to choose them as the guys I wanted to start with.

Hsu: You hired both of them in what year?

Bushnell: '72.

Hsu: Okay, and you hired them as technicians or as engineers?

Bushnell: Engineers.

Hsu: As engineers.

Bushnell: I think Al had graduated by then.

Hsu: Okay, so you talked about how Pong emerged. So originally it was just a practice project for Al, correct?

Bushnell: Correct.

Hsu: So how did that end up turning into a product?

Bushnell: It just kept getting more and more fun, and we thought, hey, this will maybe earn some money, and we put it on location, and that's where the story about the cash box totally filling up and not taking any more money comes in. That's a good problem to have.

Hsu: Okay, so that was at the tavern?

Bushnell: Andy Capp's.

Hsu: Okay. Yeah, so could you talk about that a little bit?

Bushnell: Yeah, there was a tavern that we used to go to called Andy Capp's Tavern. It was peanut shells on the floor, sawdust, barrels around, and coin-operated games, a few pinball machines, what have you, and so we knew the owner. When it came time to do a test, he said, "Sure, come on, let's go," and that was the real eye opener, because Pong earned so much money so quickly that it gave us the confidence to go into manufacturing for it. We had no factory. We had no systems. We were just making it up as we went along.

Hsu: Talk about how Pong came about.

Bushnell: Well, Pong was really a test project for Al, and it got so fun that the coin-op version just had to be done. But you remember, there are actually two stories for Pong. There's the consumer Pong as well as the coin-op Pong, and the consumer Pong was totally Al Alcorn's idea. He discovered this chip and he said, “Hey, this chip could do the whole thing,” and he did it, and it was, it was very, very successful. It really paved the way for the consumer market.

Hsu: How did the company change in response to the success of Pong?

Bushnell: Well, when we started, we didn't have systems. We didn't have procedures. We were just making it up as we went along, and slowly but surely, we started to do everything. Shipping and receiving department, how do you have production quotas, and how do you manage labor? There's a lot that goes into a factory that we had none of. But over a period of two years, we got most of it, and so it was kind of growing up at the same time that we were trying to figure it out.

Hsu: Why was Pong cloned so easily, and how did you deal with the competition from the clones?

Bushnell: It was basically, I like to say, we had a garage shop. So anybody with a garage shop could knock it off, and our patents hadn't been granted yet. In those days, it took three to four years to get a patent, and so we were just out and about. But we determined that we would out-innovate them. They could copy our old product, but they couldn't copy product being developed, and that turned out to be a successful strategy. We got known as the innovators, and pretty soon, all the copiers just kind of went away.

Hsu: Did Magnavox accuse Atari of stealing the idea?

Bushnell: Yes, yes they did.

Hsu: How did you respond to that?

Bushnell: Basically, I told them to go ahead and sue us, and what have you. But it turned out that my venture capitalists wanted me to settle. So I settled for a very, very positive outcome, and I think we had to pay them 50,000 a year for five years. Nothing, and yet, they went after all our competition, and it was really a good thing to weaken the competition, and it strengthened us.

Hsu: You mentioned your venture capitalists. Who were they?

Bushnell: Our venture capitalists were Sequoia, that's Don Valentine, and Mayfield Fund, Wally Hawley, and in some ways, they were my mentors as well. They really helped Atari become a sophisticated company.

Hsu: How did you get involved with Sequoia, and why did you need the investment from Sequoia?

Bushnell: Well, when a company is growing, they always chew up more capital than they create. We were exceptions for that, and so when we got into the consumer market, we knew we had to change our business model. In Coin-op, the distributors would pay us in 30 days. But with consumer sales, you'd ship to the department stores and Toys R Us in November, and you'd get paid in February. So that was a problem. We needed more capital for the next phase of growth.

Hsu: Talk about the process of creating new games beyond Pong. What was that process like?

Bushnell: Well, we basically were throttled not by what we wanted to do, but what we could do. The technology was still pretty primitive, and so, what we did is, ball and paddle games, pretty easy. So we kind of went through that with Quadra Pong and Rebound, which is a volleyball-like game and that sort of thing, and then we did Breakout. I assigned Breakout to Steve Jobs and Wozniak, and they did it, and did a great job on it, and, Breakout turned out to be a mega-win as a new game, and, of course, our driving games became extremely important to us.

Hsu: How did you meet the two Steves?

Bushnell: Say again?

Hsu: How did you meet Steve Jobs and Steve Wozniak?

Bushnell: I met Steve Jobs probably the day after he was hired. Al Alcorn hired him, and the story goes that he showed up in the front lobby and said, "I'm not leaving until you give me a job." We were looking for techs, and so it was not a hard thing. The following day, he came into my office and said, "You guys don't know how to solder." He had a circuit board, and he says, "That's a cold solder joint, that's a cold solder joint." He says, "It may look okay now, but in a week or a month, it'll fail," and he was right, and so I said, "Can you teach my people how to solder?" He says, "Yeah, I can." I said, "Will you?" He said "Sure," and that was our interface.

Hsu: So how did you end up assigning Breakout to Steve Jobs?

Bushnell: Well, we had started this thing where engineers could decide which projects they worked on. Nobody wanted to do Breakout, because they thought ball and paddle games were over, and it was a ball and paddle game, but with a twist.

Hsu: So you had come up with the idea?

Bushnell: I did.

Hsu: Okay. So the basic idea of Breakout, that you had basically designed the way that game worked?

Bushnell: Correct, and I actually did it in the sand on the beach at Waikiki, and I just had this idea of a game that was-- there's an interesting thing that happens in games called completeness. People like to

clean things up, and so Breakout had that metric, where you bounce the ball, clean it up, bounce the ball, clean it up. That's satisfying.

Hsu: How did you come up with the idea for cleaning the bricks and eliminating the bricks with the ball?

Bushnell: I don't know. Sometimes when you get an idea, you know what the provenance is, and sometimes you don't. I basically had lists and lists and lists of games that were kind of in two columns, two piles, things that could be done now and things that couldn't be done yet.

Hsu: So you would just generate ideas for games?

Bushnell: Correct.

Hsu: Okay, wow. What was Kee Games?

Bushnell: Kee Games was a marketing plan. In every city, there were two major distributors, and one had the Atari line, the other one didn't, and I saw them as being a potential threat because they were looking for somebody to dislodge Atari. So I decided, why don't I create my own competition, Kee Games? And so I created this fabric of a story in which Joe Keenan, Kee Games, who was my second in command, left and started Kee Games.

Hsu: So he was at Atari originally?

Bushnell: Yeah, and then we took the number two engineer, the number two manufacturing guy, and we put them to Kee Games. Their objective, this was six weeks before the AMOA, was they had the single job of choosing the distributors that weren't Atari distributors. I just wanted to fill that gap, and it worked.

Hsu: But eventually, Kee Games was absorbed back into Atari?

Bushnell: Correct.

Hsu: Can you talk about why that happened, and how?

Bushnell: Well, the coin-operated game business was full of gossip, and I used to say, I can talk to four distributors on the phone and be lied to by every one, and I'll know exactly what's going on in the industry. So what I would do is, I leaked that we were suing Kee Games for theft of intellectual property. A month later, we've settled that lawsuit, and we've settled it for a piece of Kee Games. A month later, we've settled that, and they need some money, and we're going to buy some more of their shares. Oh, gee. All of a sudden, we've got the majority shares. Maybe we just should put us back together again, and that's what we did.

Hsu: But why?

Bushnell: Well, it's more expensive to run two companies than to have one, and we kept the brand. Kee Games was a good brand. But we integrated it back so that we had one engineering team, one factory. It was the right thing to do.

Hsu: But the distributors didn't mind at this point? How did that work?

Bushnell: It was a thing where Kee Games had a successful game at the time, and so I said, do we want to keep exclusive distributors, or do you want the Kee Games line as well as the Atari line? They all opted for that, and so we broke the stranglehold of unique distribution.

Hsu: And what were some of Kee Games' most popular games?

Bushnell: Probably Tank, Rebound. I think Tank was the big one.

Hsu: Okay. Talk about the acquisition of Cyan Engineering.

Bushnell: Cyan Engineering was actually a construct that I had. Two of my best engineers were Larry Emmons and Steve Mayer, and they wanted to get out of the rat race of Silicon Valley, and so I told them, “Go to Grass Valley, and you can be my skunkworks”. That's what we did, and then later on, it just seemed like the right thing to acquire the whole thing, and they were the architects of the 2600.

Hsu: So talk about what happened between you and Ted Dabney.

Bushnell: I loved Ted, but he became a problem, and the problem was that he could not be-- he would come in and make decisions in departments that he shouldn't have and screw things up, and it was really a problem. So I decided to buy him out, and I did. But in the early days, he was a very, very important part of the company, and I'll be forever grateful, and I felt like I treated him poorly.

Hsu: What was his contribution?

Bushnell: Well, the Computer Space cabinet. He did a lot of the analog work on Computer Space. He also did a lot of the sound work on Computer Space. He was the guy that put Pong on test.

Hsu: At Andy Capp's?

Bushnell: At Andy Capp's, and I think that he really was partially responsible for us getting involved with Sears. I think he made some phone calls.

Hsu: Oh, okay. Actually, talk about that deal with Sears. What was that for, and how important was it?

Bushnell: It was for Pong.

Hsu: The home Pong?

Bushnell: Consumer Pong, and what happened is that the year before, the sporting goods department had a pinball machine for 300 bucks, and they sold out, and the sporting goods department in the winter, particularly in the Midwest, they didn't get into skis. That was a little too esoteric. But it was home ping pong tables and home pool tables, and the buyer thought, hey, pool tables are in bars. Pinballs are in bars. Pong is in bars. That probably makes sense for the consumer market, for the rumpus room, the rec room, and so they came out, and they gave us a great big order.

Hsu: I read that you also tried to sell to other distributors at the New York Toy Fair.

Bushnell: Correct. That was actually before we got hooked up with Sears, and what we didn't know is that the toy business at that time didn't feel like they could sell any toy that was more than $29, and we were at $79. So we sold zero.

Hsu: What was the culture of Atari like in those days?

Bushnell: I think that it was a pivotal time. We tried to make it an absolute meritocracy. We didn't care how you came to work, when you came to work, how you dressed. As long as you got your job done, that was good, and I think that there was a lot of work hard, play hard going on, and that kind of permeated the Silicon Valley culture as well.

Hsu: Was it also like a flat structure?

Bushnell: Very.

Hsu: Okay.

Bushnell: So it was a very flat structure where we tried to have minimum links from the CEO to the line worker.

Hsu: So how did that, the organization and the culture of Atari, influence Silicon Valley as a whole?

Bushnell: Well, I think that it influenced it a lot because it was picked up by Steve Jobs, and so it became part of Apple's ethos, and Atari, part of our ethos, and that all by itself, people looked around and said, “Boy, they're doing really well, and they have this kind of weird construct,” and I think that led to copying and the embracement of a lot of that. I saw a manifesto that I wrote in, I think, ’73 or ’74, and it's like right out of the hippie notebook.

Hsu: Were you influenced by the counterculture?

Bushnell: Yes.

Hsu: In what way?

Bushnell: Well, we were all posers. We all had our hippie costume that we'd dress up in and go up to Haight-Ashbury on the weekends and pose as hippies, even though we were doctors, lawyers, merchant chiefs, and I think that you could not be alive in those days without having some of it rub off on you.

Hsu: Could you talk about the gender dynamics at Atari?

Bushnell: Well, in our manifesto, we said no discrimination based on age, gender, religion, national origin. So we tried to have it very egalitarian. We've had women who've said that Atari was the most egalitarian place that they'd ever worked and the best. I think that there was a certain amount of promiscuity that was going on, but that was just the times.

Hsu: So did you really have hot tub parties?

Bushnell: Yes, we did.

Hsu: Let's see, we covered that. How did you deal with-- so what was your view of the growing arcade business in Japan and how did Atari influence that, and how did that influence Atari?

Bushnell: Well, we started the company in Japan and violated almost every corporate law they had, like we took suitcases of money to rent a space and we wanted to build games over there, and we did, and then all of a sudden the regulatory thing came down on us and so we had to sell. We sold it to Namco Bandai, Namco at the time. Namco was a kiddie ride manufacturer. They'd never been in the video game business before. So we put them into the video game business, and it turned out that Breakout was the major domo. It was the OG for arcades in Japan, and so the very first game that Namco did, they'd made millions and millions, and so they went from a dinky little kiddie ride manufacturer to one of the bigger video game manufacturers.

Hsu: So they were making the Japanese version of Breakout?

Bushnell: Correct.

Hsu: Okay. So Steve Jobs offered you the opportunity to invest in Apple.

Bushnell: Correct. Yeah.

Hsu: And your decision was?

Bushnell: To not do it, which I've regretted. I could have had a third of Apple for $50,000. Good deal. But I felt that Jobs wouldn't have made a good CEO, and the guy that did make that investment was Mike Markkula and he acted as a mentor, which I couldn't have because I was busy with other things. So maybe without Mike Markkula, Apple wouldn't have been successful. At least I tell myself that when I'm not crying.

Hsu: Okay, we covered that. Okay, let's talk about how did the Atari VCS come about?

Bushnell: The Atari VCS was a natural extension. We were doing, we did a [consumer] Pong game and then the following year we did a Super Pong, and we knew that individual games at $70 was not sustainable, and at about the same time, a microprocessor called the 6502 came along and it was just strong enough to be able to do a video game if we had enough glue parts around it, and so that was what Grass Valley was charged with -- the games before were not von Neumann architecture. That is, they had no software. They were just state machines, and so the challenge with the [VCS] 2600 was we wanted a game console that was a von Neumann architecture so that we could change the software and change the game, and Joe Decuir and Steve Mayer and Larry Emmons, they just did a tour de force in that design.

Hsu: Were you involved in the development of that at all?

Bushnell: Just from a strategic overview, and I saw it as it was developing, and as I remember, I was concerned that they only had 128 bytes of memory, and I thought they should do more than that, and they said we couldn't hit the price, and I said, “By the time we get into the market, the cost is going to come down,” because you could see the cost per bit dropping exponentially. But I lost that one, and I think had they listened to me, I think they'd have gotten an extra couple of years out of the 2600.

Hsu: What needed to happen to mass-produce the 2600?

Bushnell: We needed to raise about 3 million bucks, and we were planning to take the company public, and then the market kind of went sideways on us, and so we thought a corporate partner would be good, and we talked to Warner Communication. They said “We'd like to buy the whole company,” and I've often thought that I was tired and that if I'd just taken a little vacation, I wouldn't have sold. But I kind of liked the idea of taking my last final and then going off into the sunset for a while. So I sold.

Hsu: Were there benefits to being part of Warner initially?

Bushnell: Very, very sparse. I thought there was going to be more than that. Like share IP, Superman pinball, things like that. But the big problem with Warner is they thought of themselves as a record company. Not a record player company, and so their whole idea was to build cartridges, and that was it. Not realizing that the technology was getting long in the tooth every year, and to me, the crash in ’83 was totally predictable. I've often said it was suicide, it wasn't homicide. Warner just screwed it up.

Hsu: Were you involved in this strategy for creating games for the VCS?

Bushnell: Not so much. I'd sort of moved on by then. We called it the VCS first, Video Computer System, and then we called it the 2600, and then we called it both, and then we called it neither, and it was one of those things where we liked the VCS, Video Computer System. But people tend to gravitate to the 2600, and I don't know why.

Hsu: Talk about the structure of the company and what the divisions were.

Bushnell: We had coin-op video. We had coin-op pinball. We had consumer hardware, and we had consumer software.

Hsu: Okay. So consumer hardware made both the VCS and the home Pong?

Bushnell: Right.

Hsu: Okay.

Bushnell: Yeah, we tried several things that were marginally successful. We did a stunt cycle for the home, which was not great, and we did a video pinball, which wasn't great, and then we did video music, which was horrible. But you've still got to try things.

Hsu: So those were all made by which division? Which division made those products?

Bushnell: The consumer hardware.

Hsu: Okay, let's see. Talk about starting Chuck E. Cheese. Why do that? When did you start Chuck E. Cheese and why?

Bushnell: I started Chuck E. Cheese actually before we sold to Warner, and the economics were quite clear. We were selling coin-op games for 1500 bucks, and during their life, they'd have 30,000 to 50,000 in coin drop. So it was clear to me that I wanted to be on the other side of that equation. But I didn't want to compete with my customers for bar space or arcades in malls. So I thought, I just want to have a standalone arcade and we'll serve food. Then I went to Disneyland and saw the Tiki Room, and I said, "Ah, we can do that for entertainment," and that, again, was a bit of a copy because the most successful pizza parlor was a thing called Pizza and Pipes, which had a deconstructed theater organ all around on the walls, the drums and the tambourines and everything, and I thought, that's not sustainable, but I think I can build stuff for that, and again, the guys in Grass Valley put together the first one. We installed it in, I think, August.

Hsu: Where was that?

Bushnell: August of '76.

Hsu: Okay. In what location?

Bushnell: In this Town and Country mall in San Jose. It was an old Dean Witter office, and the day we opened, we knew it was too small.

Hsu: Is that where Santana Row is today?

Bushnell: What?

Hsu: That mall?

Bushnell: Yeah.

Hsu: Okay.

Bushnell: Yeah. Well, it's Santana Mall, I think.

Hsu: Yeah, Santana Row.

Bushnell: Santana Row, yeah, but it was torn down a long time ago. So that was cool. When I sold to Warner, they didn't want to be in the food business. They thought that was the curse of death, and so they sold it to me for maybe one of the best deals. It was already doing a half a million dollars a year in margin. They sold it to me for half a million dollars total, $100,000 a year for five years. So I was positive cash flow day one.

Hsu: Who helped you create Chuck E. Cheese?

Bushnell: I think that from a technical side, it was the Cyan Engineering up in Grass Valley. The business was done by a guy named Gene Landrum, and he figured out the pizza formula and the sausage and all that, and he was the first president of Chuck E., and did a bang-up job.

Hsu: Where did the name come from?

Bushnell: It's actually kind of a funny story. The Chuck E. Cheese name came from my marketing department, and what happened was, I didn't think my engineers were good sculptors, and so I bought a sculpted head and costume from an amusement park show, and I thought it was a coyote, and the code name for the business was Coyote Pizza. Well, I called up and I said, how's the coyote coming? Engineering said, "It's not a coyote, it's a rat." And I said, "How do you know?" They said, "Well, it's got a big pink tail." And I said, okay. So instead of Coyote Pizza, it's Rick Rat's Pizza." Well, the marketing department said, "It's a restaurant. You can't name it after a rat." So I said, "Well, can it be a rat? Sort of like Mickey Mouse, but we can de-emphasize the rat-ness?" They said, "Yeah." I said, "Well, what are we going to call it? Think about something." And the next week, they came to me all smiles, and said, "we've got the perfect name. It's a three-smile name", and I said, "What's that?" "Chuck E. Cheese. You can't say it without smiling three times." So that was it.

Hsu: Nice. Can you talk about the creation of the 800 and 400 computers?

Bushnell: Yes. Atari was working on a personal computer and that was another reason that I chose not to invest in Apple…I felt that it would be a conflict of interest. The 400 was meant to be cheap, because one of the big expensive things at that time was a keyboard, and a chiclet keyboard was a fraction of the

cost. The 800 was really, really good, and we sold a lot of them, and it was our entrance into the home computer market.

Hsu: So talk about Ray Kassar and him coming on as CEO.

Bushnell: Ray was probably the biggest mistake Warner ever made. He had no clue about what was going on, and he was erudite, and he basically destroyed the culture and led the company to the 1983 disaster. A lot of talk about the worst game cartridge ever. Well, that was totally because of Ray. He signed the deal with Spielberg for E.T. in August. At that time, to do a good game on the 2600 took six months. But in order to make the numbers, they had to be ready to ship in November. So September, October, November. That's three months when the minimum was six months, and Howard Warshaw was the only guy that thought he could do it, and he created a good bad game, and it was all Ray's fault.

Hsu: So what decisions did you disagree with? How would you have done things differently?

Bushnell: I would have immediately started working on the 2600 II. I felt that by the time we started marketing the 2600, the cost of memory had dropped by two orders of magnitude, maybe three, and so in the early computer days, you either had faster clock time or more memory, and more memory was easier and better, and you could just do a lot of stuff. The whole difference between the 2600 and the Namco Family Com was memory.

Hsu: Oh, you mean the Nintendo [Famicom]?

Bushnell: Yeah.

Hsu: Okay. What was AtariTel?

Bushnell: AtariTel was my attempt to do a video telephone. It was before Zoom, before all that, and I felt that if we had just a postage stamp-sized picture, that we could refresh it every maybe five to ten seconds, and that was kind of a stop-action video phone.

Hsu: Could you comment on the developers that left to start Activision?

Bushnell: Yeah. It was very obvious that they weren't going to get their fair share under Ray Kassar, and so they just left, and Activision became successful, and they were good. I mean, David Crane and those guys, they were really good. They were great engineers.

Hsu: So any last thoughts on the 1983 video game crash?

Bushnell: Well, I think that everybody lost money during that crash, and it wasn't until Nintendo with its Family Com [Famicom], four years later, that all of a sudden people were saying the video game business is dead. It wasn't dead. It was just hurt, and so when the Family Com [Famicom] came along, the possibility of a rebirth was instantaneous.

Hsu: So when did you leave Atari, and why?

Bushnell: I left Atari in 1979. That was three years after I sold, and I just felt that I wasn't being listened to, and Chuck E. Cheese was growing, and I needed to attend to that.

Hsu: Did you keep up with the video game industry afterwards?

Bushnell: I did, and I did a company called Sente. I had a seven-year noncompete. So as we got close to that seven years running, I started a couple little companies that could give me a rebirth into that.

Hsu: Did you keep up with Atari or its later incarnations under Jack Tramiel?

Bushnell: Yes. I did a game for Atari under Jack. And then after it went to Infogrames, I followed that, and I actually tried to buy Atari from Infogrames in the late ’80s. A French public company for a hostile takeover is really tough, and now, Wade Rosen, who is the current CEO, is really a good guy, and he's doing all the right things to bring Atari back. I’m currently an advisor to the company. For several years, before Wade, Atari was controlled by people who were only interested in lining their own pockets.

Hsu: Talk about what happened to Chuck E. Cheese in later years.

Bushnell: Chuck E. Cheese had a few startup problems. I left in 1983 and haven’t closely followed it. But at one point It was purchased by Apollo, a private equity firm. Of course, it lost money during COVID, but it appears to be back now and growing.

Hsu: So after you left Atari, you started a technology incubator?

Bushnell: I did. Catalyst. Catalyst Technologies was my technology incubator, and there I started a lot of companies, one of which was Etak, which was the first automobile navigation. If you use Google Maps, that's based on our technology. I did ByVideo, which was in some ways a precursor to Amazon. It was a shopping channel, and AndroBot, which is where I lost a lot of money. Shame on me.

Hsu: So how influential was Etak, or how successful was it?

Bushnell: Extremely. I think I ended up selling it for almost a half a million bucks. Which was a lot of money in those days.

Hsu: So Etak existed from...

Bushnell: Say again?

Hsu: Etak existed in what years?

Bushnell: ’84, ’85, ’86.

Hsu: Who was it sold to?

Bushnell: Rupert Murdoch. News Corp.

Hsu: You also started a computer animation company?

Bushnell: I did. Kadabrascope. I found out that you can't make money on computer animation if it takes more than a day to render a frame, and that's what it was taking us. We had a Go Fast PDP-7/86, and it was better at heating the room than it was mashing the stuff. There's actually an interesting story there. Steve Jobs came to me and said, “I've been offered Pixar. Should I do it?” I said, “Only if you can render a frame in less than 15 minutes,” and he said, “I can do it faster than that. I've created a thing called a render farm where I take a whole bunch of computers and link them together, and separate the tasks, and it's really good”, and that's kind of how a GPU works today.

Hsu: And so then...

Bushnell: So Jobs did it and invited me to the premiere of “Toy Story.”

Hsu: Okay, and in later years you've also done some education related ventures?

Bushnell: Yes, I still am. Turns out that video games and education are really powerful together. I like to say that if you are diagnosed with attention deficit disorder, if you put that same kid in front of a video game, he won't blink for an hour. So it's misdiagnosed, and so I'm creating a series of games that are really, really fun, and educational, and I think that's the sweet sauce.

Hsu: What's your latest venture?

Bushnell: Exodexa. That's the educational game company.

Hsu: Okay. Talk about the legacy of Atari as a company and as a brand.

Bushnell: Well, I think the legacy of Atari as a brand and as a company, the OG, the original guy, is always a special place. Nobody can take that away, and even though it was sort of abused for a while, I don't think it's lost much of its cachet. But do you want to have a company that is mired in nostalgia? Or can it be positioned to be at the forefront of the future too? That's what we're kind of struggling with. I'm on the advisory board for Atari and we struggle with that.

Hsu: Could you reflect on your career and the impact that you've made from Atari through all the other companies that you've started?

Bushnell: Say that again?

Hsu: Reflect on your career and the impact that you've made in the world.

Bushnell: When I'm asked that, I always like to answer, I don't know, I haven't finished yet. The last chapter isn't there. I think that my impact, the most important one, is it's kept me from being bored, and I think boredom is the driver of most things forward. What I like is to do new things, solve new challenges, and I think on my RIP, you could say "He led an interesting life."

Hsu: If you have one word of advice that you would give to a young person today, what word would that be and why?

Bushnell: Try. Don't give up. Don't let them say no. That's more than one, but try.

END OF THE INTERVIEW

