Oral History of Peter Jennings

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Q: We're here interviewing Peter Jennings on February 1st, 2005, and we're here to talk to you primarily about your software Micro Chess and other things of that sort, your relationships with other prominent software industry folks, and we'd like to start with your early history, kind of get some background information on you, so let's start with kind of basic stuff, childhood, where you grew up, when you were born, that sort of thing.

Peter Jennings: Oh okay, I wasn't going to go back that far, but I was born in England and moved to Canada as a child when I was in school, and so I did most of my schooling in Canada, through high school, went to McMaster University, got a Bachelors degree in physics and went to Sagers [ph?] in York, got a Masters in physics, it was going to be a PhD but I dropped out, and went back to McMaster and got an MBA, so that was sort of my schooling. Prominent early things was I was a big science fair guy, so I was entering science fairs all through high school and winning them.

Q: What sort of projects would you enter?

Peter Jennings: Well the most significant one was a nuclear magnetic-- I've lost it.

Q: Resonance.

Peter Jennings: Resonance spectrometer <laughs>, which I built in my basement, and not everybody had one of those, which won me a trip to Europe and so, that was one of the school things. Also a ham radio operator, and that was a pretty significant part of my early development, was ham radio, which is where I got my Model 15 teletype so I could use it for computer IO.

Q: Did you dabble in electronics I imagine?

Peter Jennings: Oh yeah, from a very early age, I guess I stuck knives in sockets before we left England when I was a really small kid, and I fixed my first radio when I was seven, somebody gave us a short wave radio that didn't work, and I looked inside and I said "Those ones are all lit up but that one's not," and I went down to the drugstore, 'cause you could go down to drugstores in those days and they had tube testers, plug the tube into the tube tester and said it's no good, the guy sold me another tube for a buck or something from underneath the tube tester and put it back in and we had a short wave radio so I could listen to back home in England <laughs>.

Q: What did your parents do?

Peter Jennings: My Dad was a mechanic, my mother was a registered nurse, she's a registered nurse in quite a few different countries in fact, speaks many languages, born in Estonia, spent the war years in Germany and Poland and then moved to England, married my Dad.

Q: Do you think your interest in electronics and things of that sort was just sort of out of natural curiosity?

Peter Jennings: Yeah natural curiosity, 'cause by the time I was 10 I knew more about electronics than any of them <laughs>. But yeah, purely, I guess that person who gave us a short wave radio probably was one of those key elements and I grew up in Northern Ontario and at the time they were blasting a pipeline for natural gas, and the side effect of blasting was it was always blasting wire around, so we used to collect all these different colored wires, so I had lots of wire and batteries and things to play with and just that led to a natural curiosity.

Q: What fascinated you about the wire, was it the color or just something different?

Peter Jennings: No I wanted to hook batteries and light bulbs to it and made things happen <laughs>. Yeah, I can remember making a slide projector probably when I was about eight years old out of bits and pieces and magnifying glass and a light bulb and a battery and things like that.

Q: So as a kid were you more like the builder type, you would just kind of sit around building things to amuse yourself sort of thing?

Peter Jennings: Yeah, I guess I just liked to build things, especially electronics and things like that.

Q: So what was your first exposure to computers then?

Peter Jennings: Well probably reading about them, 'cause there weren't any computers around to actually look at.

Q: What year would that have been?

Peter Jennings: I built a digital computer with relays when I was about 11 years old, and that would've been in '61, and I can remember taking it to school and it was basically a binary counter, but did digital stuff. And then I built an analog computer, which is basically a slide rule, with pots that you could do multiplications and things probably when I was oh 13 or 14, something like that.

Q: What was the inspiration for your relay computer, how did you get that kind of information and knowledge?

Peter Jennings: I would've gotten it out of "Popular Electronics" or a book from the library, I used to go to the library and I read through all of the electronics books they had, so.

Q: By this time this is '61, you were in Canada?

Peter Jennings: I was in Canada, yeah, 11 years old.

Q: Can you tell me more about the relay computer?

Peter Jennings: Oh it was like a binary counter basically, it was a bunch of telephone type relays and so you could do things with it, and I remember the real trick with it was you could do a guessing game where you'd ask the person opposite to think of a number and the computer and you'd say is it odd or even and then you'd flip a switch and it would say the number. And of course that was straightforward just binary, there was nothing very special about it, but, you know, when you're 11 years old you call it a computer.

Q: That's pretty fancy.

Peter Jennings: Then the first real computer I ever used was a 1620, just like the one downstairs, and that was at the University of Waterloo, I had a science fair project, I needed to do some calculations. And I taught myself programming out of a McCracken's FORTRAN book, and I called up the university and I said I need to do some programs to analyze some of my nuclear stuff <laughs>.

Q: This was around your sophomore junior year in high school?

Peter Jennings: Yeah, I would've been 15, and there were no computers within a hundred miles of where I was that I was aware of anyway, and I called them and said, you know, I'd like to use a computer, and somehow got to the right guy and at that point they had just got their 360 and so everything had been moved from these old-- they had a 1620 and some other old IBM's to the 360, and they said come on over on a Saturday, and I went over on a Saturday, and I went into a room that was probably a little bit bigger than this, and there was a 1620 and the guy said "Okay, there it is," and left <laughs> and said "I'll come back about 4 o'clock and lock up after you." And fortunately there was a key punch and I punched up my cards and there were these little notes on the various switches saying "Push this next, push this next, push this next," and I sort of slowly worked my way through it and got it to read the cards and it was

just an amazing experience, that somebody would let a kid who knew nothing into a room with a computer and say "It's yours, go and do it."

Q: So by the end of that first day you had pretty much figured out how it all worked?

Peter Jennings: Yeah I think I had three punching errors in my card deck and it's real easy-- if you write programs on a computer you very good at debugging <laughs>, 'cause I'd single-stepped it in my minds so many times. So the program ran and printed out all this output and I got hooked.

Q: And before you actually went to use the computer had you read the FORTRAN book?

Peter Jennings: I read the FORTRAN book, yeah I had been reading the FORTRAN book for months, and learning how to program and writing programs out by hand and then executing them in my head, so that's basically how I learned to program.

Q: Did you have any other friends who were sort of shared the same hobbies with you growing up?

Peter Jennings: Oh sure, lots of friends with different aspects of the hobby, ham radio was-- I was very involved with a lot of people in ham radio, both my age and other ages, that's one of the fun things with ham radio of course is you talk to people and nobody cares how old you are. So I was a kid, I was writing articles for the ham radio magazine in those days but nobody knew I was still in high school.

Q: Which magazine was that?

Peter Jennings: QST, CQ, 73, all the ham radio magazines.

Q: Did you have any friends that also dabbled in digital electronics or building computers or had computer interests?

Peter Jennings: No computers wasn't the strong one, I had one friend who was very strong in math, and so he had a computer interest, but he was really a mathematician type, and he was doing advanced math in high school, we were a good bunch of kids doing interesting things in those days.

Q: When you entered college did you already have an idea in mind of what you wanted to study?

Peter Jennings: Oh I was going to be a physicist, there was no question, I mean I'd don't this nuclear magnetic resonance spectrometer, and I was doing research and things in physics and I was just going to dash to a PhD, I went there very quickly, I got my masters in four years and suddenly looked around. What happened then was one thing, I met a girlfriend <laughs>, and she was back in Canada at that point, I was down in the States working on the PhD, and I went into one of my prof's offices and he had this stack of resumes from people who had their PhDs and NASA had just lost a lot of funding and suddenly they were people with lots of experience on the street, and lots of PhDs out there and I was looking--

Q: So this was '67 maybe?

Peter Jennings: This was into the 70s, '71, and at that point I could see that all I was going to be was a post-grad fellow for years <laughs> and probably never make a whole lot at it, or somehow it just didn't seem that appealing, I looked at the other things I wanted to do and they required experience or an MBA. So since my wife, who became my wife later, was at McMaster that's where I went to get my MBA.

Q: I'm kind of curious, going back to this seemingly lack of jobs for highly educated PhD folks, what was going on at the time with the economy, was there a slump?

Peter Jennings: It was a bit of an economics slump and basically the government was defunding some of those kinds of programs and the net result was-- and the 60s was a time when there'd been huge encouragement to get people to go through and get degrees in the sciences and so there just ended up being a net surplus for a while, and I'm sure it didn't necessarily last for long and it was good timing for me as I was at that age where I was changing where I was going to go.

Q: Did you have any influences when you were in college that kind of shaped the direction that you eventually took, or anybody that inspired you?

Peter Jennings: The only influence I had in college was there was a computer available <laughs>, and so I mean I only ever took computer courses because that gave me an account that I could use on the computer and I used to get 100, in fact I got 110 percent in one of my computer courses <laughs>. But basically they let me do what I wanted to do, and so I spent most of my time like everybody else doing things other than what you were supposed to be doing, and a lot of that was writing computer programs for my own use, and ham radio related and things like that. I remember doing a satellite tracking program in 1968 to track the ham radio satellites and things like that.

Q: So you would take just basic computer classes just so you can get computer time?

Peter Jennings: Oh sure, I never went to classes anyway, computer or otherwise <laughs>.

Q: What did you do then?

Peter Jennings: I was very active in politics and student government and all those other things and social life etcetera.

Q: Anti-war rallies, that kind of thing?

Peter Jennings: Well in Canada we didn't have those <laughs>, 'cause we weren't in the war <laughs>.

Q: I thought you were still in the States at this point.

Peter Jennings: Yeah, that was before when I was in Canada, an undergrad, and I was fortunate that I just never needed to go to class, I always thought that took too long, I'm one of these people who learned out of books more.

Q: What was your first job?

Peter Jennings: Oh well that was easy, my Dad owned a gas station, so I started work when I was about 12 and worked at the gas station in summers for years and that's how I paid for all my electronic stuff, it was pretty important to have a summer job <laughs>, 'cause there was no extra money, it was earn your own and I worked all summers and lots of weekends and things like that, and it was 'cause I had lots of things I wanted to buy and it was mainly ham radio stuff.

Q: So where did you get your stuff, electronic stores like Radio Shack?

Peter Jennings: Oh it was mail order back then, poly packs and I think Tandy actually was one of the stores that you could get stuff from, there was no local, and then the local store that supplied the TV repairman and, you know, I got to be pretty well known down there.

Q: Would most of your mail order come from Canada?

Peter Jennings: No from the States, and that's probably a factor in my moving from Canada to the States, is that I had spent my entire life growing up there ordering things from the States, and so I always

sort of felt like I was connected to the US in a special way, and being very resentful of the fact that I had to pay duty and I had to pay more than everybody else for the same stuff <laughs>, so.

Q: What would have been your first technology related job?

Peter Jennings: I got a job in 1970 with a startup company called Auto Telek, and they were trying to build a flat screen display, like an LCD, only there were no LCD's in those years, and they actually had some functional prototypes, and so I built a modem for them, I designed a modem for them, and then I got involved in the--

Q: This is your early 20s now?

Peter Jennings: I guess I'd have been 20 when I did that, it was a student job. So they'd looked at my resume from the science fair things that I'd done and I designed a lot of electronic circuits before that, so.

Q: What kind of modem was it, like 110 blog, 300 blog, that kind of thing?

Peter Jennings: Well that's funny because this was one of these weird things, I didn't know anything about modems, they didn't know anything about modems, so they just said we wanted to build something so people could communicate from one place to another by telephone. So basically I just sat down and figured out a way to do that, it was one of these dumb things where this guy had a PhD that was supposedly my boss, and he didn't seem to know anything about the world, I actually started by they were located in Fort Erie, right across the border from Buffalo, and so they had a telephone line in Buffalo and a telephone line Fort Erie, and so I could actually make a phone call from Fort Erie to Buffalo back to Fort Erie, which was a good kind of a long distance call and then characterize the phone line <laughs>, I literally started at that level, and then based on characterizing the phone line worked out frequencies and things like that that one would create a modem with and then turned it into some kind of a digital modem, I don't really remember the details, much of it, but it was, you know, it was not much different. And I was very familiar at that point with the Bordeau [ph?] and teletype type things and so it was probably based on those ideas. I remember doing a phase lock loop with a whole bunch of transistors.

Q: Was this ever turned into a commercial product?

Peter Jennings: No, they ran out of money.

Q: What was their flat screen technology based on?

Peter Jennings: Yeah, that was on it's kind of a photo-multiplier effect and they would have a technology which would create a very weak light and then a method of putting that onto another layer, which was a photo detector, which would create a brighter light, and it would work once in a while and that's sort of where I ended up with them is they moved me into the lab trying to create the cadmium sulfide with certain dopents in it that would be the right material for this photo-multiplier, and one day I created the right material, and then I spent months trying to make it happen again, and we never did figure out before they ran out of money what dust particle floated out of the air or some other thing caused this particular semiconductor to work so well. So <laughs> it was one of these odd things that started and ended. But then they ran out of money and they said "You can keep working but we won't be able to pay you," and that really wasn't too attractive to me.

Q: What other hobbies did you have growing up or was it all just electronics and ham radio?

Peter Jennings: Well electronics, ham radio, that was the key thing, I was a chess player as well.

Q: So you had an early influence.

Peter Jennings: I played chess and I was almost at the master level but--

Q: By what age?

Peter Jennings: In my teens, so I remember when I went to university, and the thing was chess just wasn't the sort of thing I wanted to be doing, but McMaster wanted to send a team to the North American championships and a high school friend was on the team and he said, you know, "That Peter guy's pretty good, he beat me at the last tournament I was in," and I guess they had a lot of respect for him, so they sent me off to the North American championships that year.

Q: So when did you first start playing chess, how did you learn?

Peter Jennings: Yeah, that's an interesting question, I learned out of an encyclopedia, I wanted to learn how to play chess so I turned to chess in the encyclopedia.

Q: How did you find out about it?

Peter Jennings: I guess everybody knew about chess and so I was just curious and I just learned all the moves and I taught my brother and then the two of us played chess. And then the first chess-playing computer I wrote, created, was using the teletype and a tape recorder, and I wanted to be able to practice

openings, and this would've been about '65 when I was about 15, and I created a system where you could type the move in and the tape would start to go through looking for a match, and when it found a match it would type back the response, and then you'd type your move and then it would find the match to the two of them and type the response. Very rudimentary computer opening player but it was just one of those things that you did early on that inspired you to do more later on.

Q: So this was on a paper tape then?

Peter Jennings: No magnetic tape.

Q: So how did you implement all that, it sounds really interesting, would it encode it in audio?

Peter Jennings: Yeah, it encoded it in audio and used a modem to turn it back into some sort of a digital signal and then I had a matching thing which must've been a little bit like a ROM that it would match up against, but once again I don't remember the details, I remember doing it and it's hard to remember exactly how that happened but I can remember doing it.

Q: So you obviously had to go in and program in a library of moves.

Peter Jennings: Yeah basically it was a way of accessing a list, and I would have a ladder of moves and if it matched the ladder it would print something out, or most of the time it wouldn't 'cause it only had a few moves in it.

Q: So say you started off by moving a pawn forward, was there a standard response that was always going to be the same for that particular move?

Peter Jennings: Yeah, it was an opening practice partner, is what it was <laughs>.

Q: And it would print its move on the teletype?

Peter Jennings: It would print pawn, "P-K4" onto the teletype, you'd type "P-K4" and it would type "P-K4" and you could select which of the first, you know, which opening you wanted to practice and then it was sort of like a flash card system I suppose.

Q: And the data that it printed out was also on the tape?

Peter Jennings: It was all on the magnetic tape, yeah.

Q: I guess that brings us to Micro Chess, was there any intervening chess systems that you did between that?

Peter Jennings: No there was nothing chess related, I worked at Gulf Oil, mostly doing computer things there, once again I was in marketing and finance but I used a computer and then I went to Comshare because they were a computer timesharing computer and I'd get more access to a computer, my job was sales <laughs>, and that's where I was when micro computers started to appear and I realized that's what I wanted to be doing, something with micro computers.

Q: So you seem to have just taken jobs, it didn't matter what it was as long as you had access to a computer.

Peter Jennings: I remember writing that down before I got my first job, that the first question I would ask the interviewer is do I have access to a computer <laughs>, because well to me it's just been the tool that amplified what you did and that's the way I treated it all the way through university, I used the computer as a tool for other classes and to me I guess I've always had a personal computer and I was always lucky that I had access to one, so no matter what I was doing I would find a way to use a computer to amplify what I could do.

Q: So talk about then how you first learned about these hobbyists, micro computers were coming about.

Peter Jennings: Well I suppose the same as everybody else, the first Altair, and the Mits computer, I was reading "Popular Electronics" or "E Electronics" every month so I was always following those kinds of things, and well I guess I probably hadn't paid much attention to it before the Altair but when the Altair showed up on the cover it was real and interesting, I thought it was very familiar with Mits at that point, and most people probably don't even know it had a product before the Altair but it did. They had a digital oscilloscope, which was no more than a series of LED's that would light or not light, as a serial, basically a UART [ph?] <laughs> serial signal would come in, and it would then leave this digital signal captured on the quote-unquote "oscilloscope." And they were selling that as a kit before they did the Altair, and that had been a "Popular Electronics" article.

Q: And they also had calculators.

Peter Jennings: That's true, they'd done some calculators.

Q: And some sort of telemetry things, 'cause that's of course in their name.

Peter Jennings: Yeah, so anyway when the Mits Altair came out I guess I noticed it but I didn't need a computer 'cause I had access to one where I was working and probably didn't have the money to buy one anyway. So I was interested but never quite got to the point of buying one of those computers.

Q: What was your impression, was it like "Wow," or was it just like "Oh neat but I've already got a computer?"

Peter Jennings: Yeah, it was neat but if I didn't have a computer I probably would've built one. My general thoughts are I tend to build things rather than buy them most of the time anyway <laughs>, so I might have but at that point we'd moved into a fairly small apartment so I didn't really have the room to do things and--

Q: You were married by this time?

Peter Jennings: I was married, yeah I was actually married before we finished school.

Q: And so what was different about the Altair from the one that appeared in the July '74 issue of "Radio Electronics," John Titus's?

Peter Jennings: Yeah, I was thinking about that before and I can't remember the name of it either, I can picture the cover.

Q: Why wasn't that as impressive or as interesting as the Altair?

Peter Jennings: Oh it had more switches on the front panel, and lights and things like that <laughs>. No it looked, and obviously I know a lot more now about how those pictures get taken <laughs>, but it looked real, whereas the other one looked more like a construction project. So I think that's probably-- it probably made it a more real type of thing. But I think for me the key was more when the KIM-1 came out in that it was affordable, and 245 bucks was a lot of money in those days. And so that was-- and the Altair had been a lot more than that and you knew you needed to buy more things to make it work, whereas the KIM-1, you got everything you need for that 245 bucks. So to me that seemed very real, and I mean I already knew before I bought it that I wanted to make it play chess, so I actually had thought about how one would start to program chess into a micro computer.

Q: So you were just thinking generically in terms of I could probably write a chess program on a micro computer, not specifically when you saw the KIM-1, the idea came to you?

Peter Jennings: Well the idea was sort of floating in my head of I'd like to do that some time, and I guess it had been floating in my head for many years, and since the early things I'd done in high school, and there was a "Scientific American" article on programming chess and I've been trying to find that and I'd like to find it 'cause it would help me put things in my own head as to when I read the article and where I was, but I'll have to go and find some back issues of "Scientific American." And I knew I had that article cut out and I'd kept it and I'd look at it from time to time and think about the problem, and around that time with the 8080, and of course there were lots of articles starting to appear in the magazines, "Popular Electronics," etcetera, and then the KIM-1 ad came out in "Byte" with that first introductory article about it. I think Robert Tripp wrote the one page article, you've probably seen it, I've got it here in this stack somewhere anyway. And I started thinking about okay, well could the KIM-1 do some of these things, but I was never really sure what a microprocessor was capable of, but having access to a Sigma-9 I wrote a simulator for an 8080 and a simulator for a 6502 and I started to write some little chess move things in these simulators and decided 6502 was probably a much more fun processor to work with. And since the KIM-1 was cheap I went down to Cleveland for the computer show and came back with my KIM-1.

Q: Besides the "Scientific American" article, the 70s was when a lot of advancement in computer chess was going on at that time, was that article the only thing that you knew of?

Peter Jennings: I wasn't really paying any attention to it at all, that was obviously just going off in a different realm from where I was, so it wasn't showing up in the things that I was reading about or I really was not attuned to any of the other developments.

Q: Did you know that other development was going on, did you suspect?

Peter Jennings: I knew people were doing things in universities or big companies, but it just sort of was so separate from what I was doing, and then of course the Fidelity Chess Challenger came out somewhere in the middle of while I was working on the KIM-1 version, so, you know, it became apparent that it was there.

Q: Jumping to the Fidelity, was that also 6502 based?

Peter Jennings: No, I don't-- actually I'm not even sure what it is, I'm sure it's not 6502, I think it's 8080.

Q: So you have your KIM-1 now, did you just immediately start on the chess program?

Peter Jennings: No, the first thing you did was learn how to write programs on the KIM-1 <laughs>, and I wrote a lot of little tiny programs that would do things and the first thing that really convinced me of the power of it was there was something, I think it was called "The Journal of Recreational Mathematics," and they used to pose problems to people, and they posed some problem, I don't even remember what it was, but it was to find something to more decimal places than anybody had ever done before. And I thought "Well that's kind of cool, I'm going to see if I can do that with the KIM-1." And I remember writing a program that would do that and it didn't have enough memory to store it, so I came up with an algorithm that didn't require storing the entire solution, and it would sit there and type out on this old Model 15 teletype numbers. And of course it'd start fairly quickly and then it got down to just once in a while it would type a number, but I just left it running for about a week and it typed up a few thousand numbers, and that was fine, and it was only a couple of months later that the solution was printed and I looked, and somebody had done this on some mainframe computer and I had more numbers than they did <laughs>, and I'd done it with a little KIM-1. And suddenly you realize okay, well it's a little tiny computer but you can run it 24 hours a day and it's all yours so you don't have to worry about getting time on it, this guy had, you know, got some time at night to run this recreational program at some university computer and so--

Q: That's very true, it took less power and you're right.

Peter Jennings: Yeah, so suddenly I guess that was a real key in thinking how powerful it is to have your own computer, as opposed to you're sharing some computer with somebody else or it's a work computer and things like that. And so somewhere, that's about the same time as I really started seriously working on the chess program, and I'd always wanted to start a company and get into business, and I knew it was probably going to be a mail order business 'cause I didn't have the capital to do anything else and even though I had the education by then, I mean I had an MBA so I was pretty familiar with marketing finance and how to do things, and looked into funding but decided that it made much more sense to own 100 percent of everything yourself, kind of it wasn't exactly an entrepreneurial place in the way Silicon Valley was. So I just decided that I would create a chess program and sell it, and then that became the goal, was to create Micro Chess as a product that I could then sell to people and made some assumptions that there would be enough computers out there that people would buy it, that that would be enough to create some income.

Q: Were you planning that it would be marketed specifically at KIM-1 people, or did you have an eye that it could be at different people?

Peter Jennings: No, I knew that that was really the first version and then it would go elsewhere and of course it was pretty obvious I was going to put it into a box and sell that as a box through somebody if I could so. So that was sort of part of that would be a business.

Q: You mean a box as in a package?

Peter Jennings: As in the Chess Mate which is what it became afterwards.

Q: So let's talk about Micro Chess and the KIM-1 and everything.

Peter Jennings: Uh-huh.

Q: Specifically, the technical aspects of the program, how you were able to fit an entire chess algorithm into 1K, talk about the algorithms you used, the strategy that you chose for the software to pursue, things of that nature.

Peter Jennings: I mean obviously I knew right away that the amount of memory was pretty limited.

Q: 1K right?

Peter Jennings: 1K total, it's a little over 1K, but it's just 1K.

Q: Was there a possibility of expanding the memory easily, was that ever a thought?

Peter Jennings: At that point there was no expansion available, that was in the first year and later on expansion boards became available.

Q: But it still had the expansion port on the side right?

Peter Jennings: It had an expansion port but there were no memories available, there was no motherboard to plug memories in, all that came a year later.

Q: This was 1976 correct?

Peter Jennings: Yeah.

Q: So at that point RAM was still probably pretty expensive?

Peter Jennings: And if people were using the KIM-1 they weren't going to have it, the majority of people who had a KIM-1 that's what they had, was just the KIM-1. So I mean I never thought about it in terms of

could I put it on some bigger computer, I really at that point was saying "Okay this is what I'm going to do," and so I treated the problem that way and looked at okay, how do you store the positions, how do you store the moves, how do you do it with the minimum amount of memory, how do you store the tree of what you've created, and--

Q: So how did you do all those things?

Peter Jennings: <Laughs> Well I decided--

Q: As much detail as you can remember.

Peter Jennings: Yeah, you're asking me to remember things from 1976 now. Well I know I didn't store the whole board, because it was simpler to just store the number of pieces, there are fewer pieces than there are squares on the board, and then what I would do is I would make a move, so I would only store the tree of moves and moves would always be done in a certain order, so you always knew that you could sort of start with this move, then go to that move, then go to that move, go through a sequence of potential types of moves. So the order of how moves would be generated was always the same. So you could then go through one move at a time and I would store the first move and then I would reverse the board and then just give it to the computer, give it to the program in the same way that it had looked at the first position, so all I had to store at that point was the position and one move. So the amount of storage was kept pretty small and you were basically giving it back to the computer and saying "Okay, reverse the board," see what that does until you've lost something or you've gained something and analyze that against the algorithm and give it a score.

Q: So the computer wasn't really looking at the board per se, it was looking at the move that had been made and calculating.

Peter Jennings: No that went back into a board, obviously it would then-- its method was to say "Okay, how many attacks are on the queen, how many attacks are on the other pieces," and then if you take something what would be taken and all of those sorts of things were part of the algorithm. But basically it's generate a move, evaluate a score for that position, and then continue to do that one move after another.

Q: How did you do your scoring 'cause it seems generally there's a point value assigned to each piece?

Peter Jennings: You start with exactly the same thing, one point for pawns and two points for knights, three points for bishops, five for rooks, that's exactly where it started.

Q: Did that score system come out of the "Scientific American" article or was that something that you?

Peter Jennings: All chess players know that, yeah, so you already know that okay you would trade knights for bishops but you wouldn't trade them for rooks, all of that that was just general chess knowledge.

Q: I'm not a big chess player myself.

Peter Jennings: Okay yeah, so that part is known, and of course you adjust that if the computer doesn't necessarily want to use those exact same values, but you adjust that for knowing whether you're going to lose material, but the next question is what position is better and then for that you look at things like-- and that's where a lot of things came out of this not my system book, where he says it's valuable to have rooks on open columns and you want your queen to have mobility and you want you king to stay back at the beginning of the game but go out at the end of the game, and all those sorts of things. And so I just tried to figure out which were the most important ones, assign values to them and in the minimum amount of code figure out what I could see on a chess board.

Q: How much intelligence were you able to put into the program then, did it have any like special capabilities beyond just the straight computing scores and things like that?

Peter Jennings: Well do any chess programs <laughs>, it's not a learning program, but it has an algorithm and it makes moves and makes trial moves in its brain and compares them with each other and then saves the best one till it gets to a point where it says okay, I've tried enough.

Q: What I'm getting at is did you have enough room to put any things in where you would recognize certain positions and know that the best move would be such, instead of going through a slide?

Peter Jennings: None of it was based on any general position, the opening-- it had an opening book, but you had to tell it what opening book you wanted to play, so you wouldn't just play anything and it would follow you in a book, because of the 1K memory you basically said "Okay, I want to play Leroy Lopez," and you would put that in from the tape and, or type it in, and then it would play through eight moves or something of opening.

Q: So how big was that library, the opening move library?

Peter Jennings: Oh I provided people with a few, but basically you can go to any chess book that's got openings in it and bring up a library of openings. So you could type in-- you could put in your own openings, so.

Q: There was a way to code it in?

Peter Jennings: Exactly, yeah. So anybody could start a game with a given opening. Now if you didn't it would just drop into the middle game the same as any chess computer does even today, and that's one of the things that distinguishes one computer from another, how many openings it has available to it and how long it will stay in the opening, and if not it goes into its middle game type analysis and it starts to analyze positions.

Q: And so how long did it take before the first version was pretty much done, from like start to finish?

Peter Jennings: Well, I mean obviously the first version, it went through iterations on what at the time seemed like a slow pace, but when I look at how much I accomplish these days in a couple of months <laughs> it seemed like I did all these things very quickly. But I basically started in May trying to make it play chess and it really didn't take much to have it follow the rules of the game so that it wouldn't make mistakes in moves that were illegal. But then the real question was working on strategy and basically all I would do is I would come home from work every night and I would sit by the KIM-1 and play chess against it, and every time it made a really dumb move I'd go through the code and figure out why it made that mistake and then I would a change and that was an iterative process and you did that for about six months and at the end of that time it played as well as it could in 1K of memory.

Q: Did it ever beat you?

Peter Jennings: Oh I make mistakes too, sure, and it won its first real game against a human, which was over at a friend's house, a guy named Jim Butterfield who you'll run into all over the place with PET and before that KIM-1 thing.

Q: Oh he wrote "The First Book of KIM."

Peter Jennings: He wrote "The First Book of KIM," and at some point, I can't remember I found out about his name, I think from Rick Simpson at MOS Technologies who I was talking to from time to time and he said "Oh there's this other guy in Toronto who's doing stuff with the KIM, you should give him a call." So I called him up and he said "I hear you've got a KIM, and, you know, I've got a KIM," and I guess he didn't belong to the computer club, we had a computer club in Toronto which was called Trace, the Toronto Regional Association of Computer Enthusiasts, but they were mostly an 8080 crowd, but I used to go to

their meetings and we'd discuss things. So anyway I called Jim Butterfield and said "Let's get together some time and, you know, play with our computers," <laughs> and I guess I was the third person who already called him, so the three of us got together and he had done at that point his Super Tape program, which was one of the big things for KIM, was it sped up the time that you could save and take things off the audio tapes, which was clearly important to do, and he discovered you could speed it up quite quickly and get maybe three or five times as fast. And so we were trading little algorithms and things like that and I'd said, you know, "I'm working on Chess." So that became the thing and let's try it, so we set up the board, and this third person whose name I've totally forgotten at this point, but knew how to play chess but obviously wasn't a very good player, played against it and the KIM won and that was really exciting to see it win. 'Cause, the other thing, against me, I never knew because it actually ruined my chess game, because I spent all this time playing the KIM-1 but I always knew what it didn't know, so I wouldn't trap it by playing things that the computer didn't know about, I would, you know, sort of avoid that kind of a strategy. And so in some ways it was interesting to see what would happen when it played a real person.

Q: Did it ever surprise you when you were playing it or did you always understand?

Peter Jennings: Oh sure, sometimes it would take me hours to figure out why it'd make a stupid mistake, you'd say "Well I know it shouldn't do that, 'cause I've programmed it not to do that <laughs>, why is it doing this?" and then I'd have to go through and look at all of the values I'd assigned to various things and try to decide what part of the position was overrated that it thought was so important but it was going to give something away and maybe I'd be wrong, maybe I'd be trying to correct something where it really had found something devious to do to me that I didn't recognize.

Q: Do you think there were times then when it actually did something surprising in a good way then?

Peter Jennings: Oh I'm sure, yeah, yeah, lots of times.

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