Howard Birndorf

Interview conducted by

Mark Jones, PhD

In 1997

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Howard Birndorf

Howard C. Birndorf is the Founder of Nanogen Inc., and served as its Chief Executive Officer from December 2002 to July 2009. Mr. Birndorf Co-founded Nanotronics, Inc. in 1991 and served as its President. He served as President of Nanogen Inc., from January 2000 to September 2000 and as Chief Financial Officer from December 1997 to July 1998 and from September 1993 to October 1997. Mr. Birndorf was a Co-founder and Chairman Emeritus of Ligand Pharmaceuticals Inc., where from January 1988 to November 1991 he was President and Chief Executive Officer. He was also a Co-founder and Executive Vice President of Gen-Probe Inc., Co-founder and Vice President of Corporate Development at Hybritech Inc., Co-founder and Director of IDEC Pharmaceuticals Corporation, and was involved in the formation of Gensia Pharmaceuticals Inc. (now SICOR Inc.). From November 1991 to January 1994, Mr. Birndorf was President of Birndorf Technology Development, an investment and consulting company, and a founding Director of Neurocrine Biosciences Inc. He serves as Chairman of the Board and Director of FasTraQ Inc. He served as Executive Chairman of Nanogen Inc., from1993 to August 2009. Mr. Birndorf serves on the board of Hartraq. He was a founding Director of Graviton Inc. and a Director of the Cancer Center of the University of California, San Diego. Mr. Birndorf received a B.A. in Biology from Oakland University and an M.S. in Biochemistry from Wayne State University. Mr. Birndorf received an honorary Doctor of Science degree from Oakland University.

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INTERVIEWEE: **Howard Birndorf**

INTERVIEWER: **Mark Jones, PhD**

INTERVIEW: **Part 1 of 3**

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JONES: Were you pleased with the story in the New York Times?

BIRNDORF: You know, one of the things that got left out of that New York Times story was I really talked a lot about my father. It was my father I truly admired, my father was a very rare individual. He was not a shoe salesman, he was a shoe rep. He was a manufacturer's representative for a shoe company, so he sold wholesale to shoe chains -- chains of shoe stores. And he traveled, he made a relatively meager income, yet he provided for our family, and put us all through college -- three boys -- and you know, he went without to do it. He was of that school. My uncle, on the other hand, was a doctor, and I certainly admired him because I saw him in his office, and with his patients, and he was in my young eyes, godlike, in a sense. And he made a fair amount of money compared to my father. He and his family lived a lot better than my father and my family did, although we lived fine. I think I really did want to go into medical school because of him, because of seeing my uncle. But there was a part of me that didn't want to really acknowledge that, so I didn't start out as a pre-med, I started out as a social scientist, a political science major. For two years, I was a political science major. And then I switched my major my junior year to pre-med, and I took, you know, biology, organic chemistry, and whatever you take. And still, it wasn't really turning me on -- it fascinated me, but I didn't really think that I was -- I wasn't particularly turned on by it. I mean, I wanted to be a doctor, but I didn't think I wanted to have to do all the work necessary to be a doctor. And then I had this one professor who really sort of changed my life. I think it started in either my junior or senior year. He was a biology professor, and he took an interest, and I did what they called an independent study with him, and I did my own research, and that really turned me on. Doing something that nobody else had done before, original -- you know, for yourself. And that was very cool. I still talk to him, in fact, I got a letter from him yesterday, they're giving me an award at Oakland University. They saw the article and they're giving me an award, at both Wayne and Oakland. I'm going back in the summer to get these awards.

JONES: What was his name?

BIRNDORF: John Cowlishaw.

JONES: Is he still there?

BIRNDORF: Still there. He's a professor there. He sort of really got me interested in science, beyond medicine, I mean just science.

JONES: So, you're doing an independent study, and you're in the lab, and you enjoyed being there, and...?

BIRNDORF: Yeah. and it was on viruses, and it was cool, and it was real interesting to me. So, that's when I sort of -- I wanted to go to medical school if I could get in, but I didn't have the confidence that I could get in to medical school.

JONES: How were your grades?

BIRNDORF: My grades were average. I had, like a B average, but my test scores, the MCATs were not good, I mean, they were mediocre. I took the Stanley Kaplan course, I did that kind of stuff. I took them two or three times, and they, you know, improved a little bit, but nothing major. So, I was...I did have several chances to get -- one in particular, I was an alternate at Michigan State, for their medical school. And I went and I interviewed, I mean it's a story...I won't even go into that one. But I did not make the cut. I think part of me was actually happy I didn't, because, I really, in retrospect, I'm not sure I would have wanted to be a doctor. I just don't think it was what I really wanted to do. I thought I did though, when I was eighteen years old. Well, actually I was twenty-one years old. So, what happened then? Well my parents had said that they'd put me through undergrad, but that if I wanted to go on further, same with my brothers, and go to graduate school, that I'd have to finance it myself. And that they would help me out, occasionally, you know, a little bit, but not...they couldn't afford to pay for room, board, tuition, all that stuff. So, I applied to Wayne State to biochemistry and I applied for a scholarship. And I received it. I got a full -- you know they'd pay -- I got tuition, I got books, I even got a monthly -- a weekly? -- a stipend of fifty or seventy-five bucks a week. And so, I went and did that when I graduated, that was in September of '71 when I started in at Wayne.

JONES: And you decided on biochemistry because of your experience with your professor doing...

BIRNDORF: Yeah, I really like viruses and molecular biology. That was what really turned me on. And cancer. Well, I did that, I went and started there in '71, and I did it all of '71, and I did OK. I didn't really like it. You know, it was really the elementary classes I was taking -- it was a lot of memorizing, and Krebs cycles, and you know...

JONES: And not working at the bench...?

BIRNDORF: Yeah, and I didn't really like it. I didn't really do well at it. I did OK, you know, I kept a B average. And then the second year, I got a job at the Michigan Cancer Foundation, full time, while I was going to school, which did two things: one, it gave me some money, and secondly, I was really excited, interested in it, and it was right down the street, so I could do both. So, and they allowed me to have flexibility, so I could take my classes, and...

JONES: And this was a job as a lab technician?

BIRNDORF: Right. In the virology lab. And we were doing really neat stuff, and this guy who ran it was a Jesuit priest named Justin McCormick, who was a really neat guy. Very bright, and I had a pony tail, I was sort of a hippie at the time. You know, he didn't care about any of that. He was really pretty cool. And I was doing that, and I actually made an invention and I tried to get a company to try -- it was BioRad -- a company, I still see the guy who came out to see me about this. It was a method for purifying viruses, and I was using some BioRad stuff in a new way, and I was hoping that they would come and license it.

JONES: And what put you on to that idea?

BIRNDORF: I don't know. I don't remember. But I remember calling them, and this guy coming out to see me, and taking me out and buying me dinner, you know, this was like my first science/business thing. And they never called me backed. I was actually pretty disappointed. I thought that...Well, that was '72. And then I got a new graduate advisor, a guy named Bagshaw, who was a molecular biologist, and I changed advisors and went to him, and he was a nice guy, young, was more molecular biology than biochem, we set up a project for a master's thesis. It was interesting. I spent all kinds of hours in the lab. I'd go down and, I liked to work at night when nobody was around, so I could use the equipment, and you know.... So I spent a lot of time....I remember my friends were all pretty much amazed that I was spending so much time down at the lab, but I enjoyed it, I just enjoyed being down there doing my thing, doing my experiments, and...But I never felt myself to be a sort of real creative scientist, I was more of a technical...I could do the technical part really well. Technically, I could...It was funny because somebody went back and repeated my results and they all came out perfect, so I was good, technically. It was in planning and designing experiments, I didn't have the full breadth and scope, in my opinion, now, what was necessary. I'm not saying I couldn't have done it…

JONES: You didn't really have any interest in doing that?

BIRNDORF: Well, at the time I probably did, I thought I wanted to be a scientist, at least I thought I did.

JONES: And so, your looking down the road....Did you expect that you would follow the typical career path...?

BIRNDORF: Well, I think in reality, what I really felt was that I didn't know what I really wanted to do. I was doing this, I didn't know if this would be....I looked up to people who were scientists that I read about or met, you know, PhDs who worked at the NIH or stuff like that. But you know, when I think about what I was really doing -- I don't know what I was really doing, if I was really thinking that this was going to be my long-term career.

JONES: Well, let me ask you this, you had this idea with the BioRad thing. Were other people doing that sort of thing around, trying to commercialize?

BIRNDORF: Not that I remember.

JONES: So that was pretty unusual, to do something like that at that time?

BIRNDORF: I don't remember. Honestly, how long ago was this? This was in '72 or something like that, it's twenty-five years ago.

JONES: Well, let me just backtrack for a second here, your dad and your family, I mean, what kind of expectations did they have?

BIRNDORF: Well, I was from a Jewish family. In my family it was always, go to college, be a doctor, be a lawyer. I mean, that's part of the impetus behind my wanting to be a doctor was my family. You know, they said, you can do whatever you want as long as you're happy, but go to school, and become a doctor.

JONES: And there was never any particular emphasis on business, you know you should succeed?

BIRNDORF: Absolutely not.

JONES: It was more professional?

BIRNDORF: Yeah, professional. Doctor, lawyer, who knows what else? You know, I don't remember them ever pushing me. I went through the sixties, I grew my hair long, I was involved in...I went to Woodstock, I was involved in anti-war protests, and stuff like that. Took a few drugs. You know....you can probably edit that. I was caught up in the times, you know in '68, I was a sophomore in college, it was right at the big time, and I took trips to California, you know, in vans, and did all that stuff. My parent were a little concerned about it, as were most parents, that I was, you know, this hippie, or something like that. And of course, there was a great generation gap at that time between kids and their parents. But my parents were actually pretty good about it. I think the thing that really changed everything was that my father had a massive heart attack in, in '73, September, I believe, August or September. He had a very bad heart attack and he almost died, but they brought him back on the table, and then he was recuperating during the last quarter of '73, and you know, when I think back about it, it didn't seem obvious at the time, but now it seems like, I had to get away, I couldn't stand seeing him like that. It was.... I had come out to California in '70 and '72 on trips in the summer, and I had just finished up my master's, I'd had my orals, my thesis was written, and I was actually doing work beyond that, but I didn't know what I was doing, I didn't know if I wanted to go get a Ph.D., or really what to do, so a bunch of friends of mine had moved out to

California because a guy from Detroit had started a business call 'Roots,' do you remember Earth Shoes? Well, this was called Root shoes, and they were....they're still around. They don't do the shoes, but they do leathers. This was an acquaintance of mine, but friends of friends....and these friends of mine had come out to California to open stores at Berkeley, and San Francisco, and Palo Alto, and they all left, and I was feeling pretty alone, and I'll never forget this day. It's absolutely true. I lived out in the suburbs on a lake, renting a house with some people, and Wayne is downtown, and the Michigan Cancer is downtown Detroit, and I had to drive in everyday, and I had this old Chevy car, and I'll never forget this -- It was Monday in either late December or early January of '75, early '74 or late '75. My father's heart attack was in '74, not '73, that's it. And I was driving in this big snowstorm, I remember exactly where I was on the freeway, at Wyoming on the John Lodge Freeway. I was looking around, it was snowing, and I was in this horrible traffic jam, and I just said to myself, 'I've got to get out here.' And that was it. I went in. I gave them two weeks notice at work, I went to Wayne and I told them that I was leaving, and within two or three weeks, I sold my car, I had about $300, maybe $400 dollars in cash, one suitcase and my dog. I got in a drive-away car -- you know what a drive-away car is? They pay you a couple hundred dollars to drive a car from Detroit to San Jose. My cousin came with me, and we just took off, and left. I had no idea where I was going, I had no idea what I was going to do, I knew I had unemployment benefits -- ninety-six bucks a week -- for a year, and I really, I was, how old was I? I was twenty- four, just shy of my twenty-fifth birthday. I'd never really been out of Detroit before, except for a couple of trips, and I just decided I was going to leave.

JONES: Now, at this time, you've got your master's, and you were sort of still there working toward your Ph.D...?

BIRNDORF: Well, I don't know. I don't even remember, I mean I know I was doing research, but it was sort of like, if I wanted to go get my Ph.D., I'd have to get...I don't remember if I was actually formally in a program, I don't think I was. It wasn't like I was walking away from a formal deal.

JONES: What was your thesis on?

BIRNDORF: Well, here it is....

JONES: What is this?

BIRNDORF: Brine Shrimp. Brine shrimp are pretty fascinating. They wash up on shore, they dry up, they desiccate, and they sit in these little balls for a thousand years, and then when you add salt water to them, they hatch, they come back to life. I also published a paper, it was in Developmental Biology. Bagshaw was my adviser. James D'Allesio, he was another graduate student. He did very little on that. A little bit of the data, but most of the data is mine.

JONES: Ever keep track of any of those people?

BIRNDORF: No, Bagshaw's gone. I tried, I was looking around, because you know, I got this letter from Wayne State, I got all this stuff. They've invited me, I've won this big award, I've got to go down there. They've been sending me all this stuff. All of a sudden, they saw that New York Times article, and all of a sudden I'm...You know, I never heard from them before that, well...so I'm going down to that. Oakland sent me a thing yesterday, I won this big...I just got this yesterday. So, I drove out to California, I got California, it was like mid-January '75, and these people were all working at these stores, they were making money, they had nice cars, they were renting nice place in Berkeley, so I just sort of hung out with them, took a little time off. Don't forget, I'd now been in school for seven years straight, working, and never had any real time off. So, it was sort of a luxury. I was collecting my ninety-six dollars a week in unemployment. And I helped out, and I got a little pay from them. I started looking around for a job. I applied for several jobs, UC-San Francisco, UC-Berkeley...

JONES: To do the same the same kind of work you'd been doing...?

BIRNDORF: Yeah, research assistant. I had several opportunities that I turned down for one reason or another, because I really didn't know what I wanted to do, I think, in retrospect. At the time, I didn't know that I knew that. I took a trip to Hawaii, I was in Hawaii on my twenty-fifth birthday, which was February 1975. I stayed there for about a month, and you know, then towards the end of the year -- I really didn't do much that yeahr. It was a year that forced me to think about what I really wanted to do, and since I didn't know, I ended up getting a job at Stanford, towards the end of the year.

JONES: And how did you fall into that?

BIRNDORF: I just went down there, I looked up the employment things, I don't remember exactly.

JONES: Did you know somebody there?

BIRNDORF: No. No. Just interviewed and applied for a job. And I got a job in the medical school in the department of oncology with a guy named Frank Stockdale, it was on a government grant, and I was a research associate or assistant, I don't remember what the title was. It paid, I don't know, maybe fifteen, sixteen thousand dollars a year, something in that range. No, it wasn't even that much, it was probably twelve, thirteen thousand. It wasn't very much. I rented a room in a house. I lived in the Palo Alto area. I lived in a house with a bunch of students. Well, first, I rented a room in this really weird house, with this guy who worked at Hewlett-Packard, or something, an engineer, and he had guns...I got out of that because he was really weird. I had my dog with me, so I had to have a place that would take dogs. Then I got into a really neat situation with four or five students, some law students at Stanford, and some other students, so it was like, you know, a student house. And we shared making food, and it was cool. I lived there for like a year. So, I got the job in late '75, and I left there in June of '77. I was there for a year and a half.

JONES: Where did you go from there?

BIRNDORF: I came down here.

JONES: Oh, so you met Ivor Royston while you were there.

BIRNDORF: Yes.

JONES: How did you meet Ivor Royston?

BIRNDORF: Just by chance. I was doing some stuff, Stockdale and our lab had a collaboration with another guy's lab named Ron Levy, who was upstairs, and Ivor was an oncology fellow at the time. He was an MD at Hopkins, and had come out there to train in oncology, and Ivor was in the lab putzing around himself, and we met, we struck up a friendship. I don't remember exactly when we met.

JONES: What kind of friendship was this? Did you guys see each other socially?

BIRNDORF: Yeah. I met his girlfriend, I became friends with his girlfriend and him, and then they broke up, but nonetheless, yeah, we became friends. I mean we didn't see each other all the time, but I'd go over to his house -- he had an apartment/condo and, you know, that kind of stuff...

JONES: And what was he working on at the time?

BIRNDORF: He was always interested in leukemia and lymphoma.

JONES: And this is now '77?

BIRNDORF: Yes.

JONES: When did you first learn about monoclonal antibodies?

BIRNDORF: It was some time in '76. This guy, Len Herzenberg had gone to Milstein's lab in the UK and had done a sabbatical there. And he learned the technique. And he came back, I don't remember exactly when, and he was doing this, and I went and learned how to do this from one of his people.

JONES: You went in and watched them do it?

BIRNDORF: Yeah, and then I tried to do it myself, and I learned how to do it, and I was working with Ivor, and Ron Levy, and Frank, we were doing all this stuff, and I was one the people who knew how to do this now. I don't remember if Ivor did it personally himself, but me and Ivor were talking about experiments we could do, and what kind of neat things you could do with this technology in terms of answering some questions for science. And you know, Ivor is a very infectious, have you met with Ivor? Ivor is a very exuberant, high-energy person, and this was, you know, twenty years ago, and he was in his thirties, yeah, his early thirties, and he was young and excited and infectious and he really also stimulated my interest, and I was, what, twenty-five, twenty-six, and he was about thirty, thirty-two, I think he's about five or six years older than me, at least. Anyway, we started doing this, and Ivor was sort of wrapping up, and through my time at Stanford, I met some very interesting people. This guy Ron Levy, for example, we ended up doing a company with him later, IDEC. And I met a guy named Joe Bertino, who's a real famous cancer guy, and I later on called him and he got involved in several companies as a consultant, and I met, you know, various people, being around the medical school. And then there was stuff going on there with people starting companies. I remember this guy named John Daniels, who was trying to start a company, I think it ended up being Collagen, Inc., which is a company that's been around. Anyway, we weren't talking about starting companies or anything like that, we were just talking about science, and

JONES: You know, Bill Otterson told me this. Tell me if there's any truth to this. He's talking about monoclonal antibodies, and what he said to me was, 'Ivor knew how to talk about them, but Howard knew how to make them?'

BIRNDORF: That's right. I was the technical guy; Ivor knew how to think about 'what could you do with them.' What ones did you want, and why did you want them. And I knew how to make them. That's exactly right. I mean, I was pretty stimulated, I was reading journals, I would go...I was trying to keep up with Ivor, I mean Ivor's a pretty bright guy, and I was trying, intellectually, to get into this, and I think I did to a certain extent. Anyway, Ivor was looking around for what he was going to do next, and he ended up interviewing and taking a job down here as an assistant professor, start-up position, at the U here, and one day he came to me and said, 'How would you like to come with me to San Diego, and set up and run my lab,' basically. And I said, 'Yeah. That sounds pretty good. Interesting. You know, I'd never been here. I had one friend down here, from high school, actually one of my oldest friends. And I'd never really spent any time in San Diego, but I really didn't like Palo Alto all that much. Very sterile, you know, if you had a nice house and everything it might have been nice, but as a starting... a student, if you will....In June of '77, Ivor had a truck that came and picked up his things, and I threw my meager stuff in there, I mean I had very little stuff. I had come down a month earlier, rented a house up I Leucadia, half of an A-frame. I'll always remember that day, oh, I had totaled my car, and had no auto, so I had to get an auto, so I bought this five-hundred dollar green Chevy Vega, and it was really an ugly green, too. And I got into the car with my dog, I still had the dog, and my suitcase, and the rest of my stuff was coming on this truck, and I drove from Palo Alto down here. I remember that drive through the Central Valley, and how hot it was, stopping to get my dog water at gas stations, and I remember getting through L.A.

and then coming through Pendleton and seeing the beach and smelling the salt air, and it was really cool. I'd just taken scuba-diving lessons in the Bay Area. I'd had my check-out drive earlier that year and so, one of the things I was really looking forward to was coming down here and diving. And I did, I dove for several years down here. So, I got to my house that evening, I got the key, I got in there, and I was sitting there -- it's right by Beacon's Beach, you know where Leucadia Blvd. and Neptune are, Neptune's the cliff road there, and I lived there for six years, till '82. I really felt I that I was off...

JONES: You were in the same house until '82?

BIRNDORF: Yeah, and then I moved into another house in '82, and I've been there ever since. Fifteen years in May.

JONES: But that was a pretty big jump right. From the one house to the other?

BIRNDORF: Yeah, but it's still modest compared to my compatriots.

JONES: Is it?

BIRNDORF: Oh yeah, Ivor, you should see his place...Well, so anyway, I just thought that I was off on this fabulous adventure, you know. It was the second time in my life, now, that I'd moved from what I know to something totally unknown, and it was really just, taking a big risk. Which I didn't I just saw it as a big venture. And I just loved that. It's cool, it's just exciting to do something totally different, go somewhere you don't know, meet new people, you know, all that. And that's what I did, so I moved in June of '77. It was actually Fourth of July weekend, so I had some time off, a few days, and then we started to work. So I went down to the University and met Ivor, and we had this lab which was no bigger than -- it was probably half the size of this office. It was maybe a two-hundred sq. ft. lab, maybe a little bit wider, but not much.

JONES: This is at the VA?

BIRNDORF: Yeah, they didn't have any room. Ivor had to take the least attractive space because he was the new kid, and they didn't have any room, and we were up on the sixth floor, and our lab was literally 200-250 sq. ft. It had lab benches down one side, lab benches down the other, and that was it, we had a hood. And that was it. And so, we had no equipment, no supplies, so my first job was to start equipping -- they gave Ivor a start-up budget, you know where you could have some money -- you know you had to write grants, ultimately -- but in the first year, while Ivor was writing his grants and submitting them, they gavehim money to buy equipment and supplies, and pay me, and that's what I did. I immediately made lists out, went and got vendors, bought things, put them in the lab, set up the lab, and that was what I did at first, and then, as soon as I could, I started doing experiments.

JONES: Can you recall what you were working on then?

BIRNDORF: Yeah, monoclonals. Our whole thrust in this was monoclonals looking at cancer cells -- how to differentiate cancer cells, we did a lot of fluorescent microscope studies, we made monoclonals all the time, that was what I was constantly doing, keeping them up, and...

JONES: Was any of this stuff published?

BIRNDORF: I don't know probably not...some of it was probably published, I don't even know if I'm an author. Ivor would know about it, ask him. Anyway, that's what we did. I was there from July of '77 through October of '78, so another year and a half,

JONES: So, it wasn't long after you got down here that there was maybe an idea for a company in this?

BIRNDORF: No, it don't think it happened for a while. It didn't happen right away. I was here at least a year before we started thinking that way?

JONES: And what was it that made you start thinking that way?

BIRNDORF: I think part of it was, I was getting upset about my income. I kept pushing Ivor about my income. He kept trying to get me more money. And he was trying, as hard as he could. He was paying me some overtime, by this time I was making, I think my salary was fourteen thousand, and with overtime, I was making about sixteen thousand. And I was really trying...you know, I wanted a better car, I wanted something, by then I'm twenty- seven years old, I'm really starting to wonder 'what the hell am I going to do with myself.' This is sort of a dead-end job -- I've reached sort of the highest level of research associate, there's nowhere I can go in this without a Ph.D., either I have to go back to school, which was one thing I was really considering, to get a Ph.D. in science or change careers, or do something. We hired several more people in the lab, I was in charge of them, which gave me added responsibility so Ivor could pay me a little bit more, but he was totally bound by the university -- there were salary ranges, and so, there was only so much he could do given the situation. And I think that part of the reason that we came to this whole thing was because of my pushing, saying, 'Hey, I need more money. You know, I can't keep doing this.' So, I think we gradually evolved to this concept, well maybe we can make a business out of monoclonal antibodies. I don't think it was Ivor's idea, and I don't think it was my idea, I think it was a joint...it just sort of evolved, and do believe, in retrospect, that part of that evolution was my always pushing on how could I make more money. You know, saying, 'Ivor, I can't live like this, I need more money.'

JONES: So, it's your impression that he was happy with his position, his job, and the way things were going?

BIRNDORF: Yeah, he was on a fast track at the University. I mean Ivor's clearly an entrepreneur -- no question about it, but he hadn't been to that point. He was the head of his school's investment club or something -- he told me that. So, one thing led to another over that year, and I think we first met with Brook in May of '78, so I wasn't even there a year yet, so sometime between the end of '77, it was really after about six months, it was really the first quarter of '78 when we started. We were looking at it like, we could start a little business, Ivor would own a small amount, I would be the major business person, because Ivor didn't want to leave, he wasn't going to leave the university, and he would own a portion and I would work it. We were just thinking that we would make monoclonal antibodies and sell them to researchers. We knew that they might have diagnostic applications, we even knew that they would have therapeutic applications, but our initial idea of a business was not that -- it was really, 'Let's make and sell antibodies for research purposes.' There are companies -- we used to buy a lot of these research antibodies. That was thing that really stimulated this -- we'd buy them, and each batch was different, and they had different immunoreactivity, and we said, 'Gee, we could improve upon this with monoclonals.' We'd set up a little company, it wouldn't be that much money, but we didn't know where we were going to get the money, because I didn't have any money, and Ivor didn't really have any either. He had more money than I did, but he didn't really have any extra. First, we decided we'd write up a little business plan, so Ivor went out and bought this book called 'How to Start Your Own Business.' And he read it, and then he gave it to me, and I looked through it, and he wrote this four or five page business plan. I wrote two sections of and he wrote the rest of it. With this business plan, we tried to figure out who would fund this company. We didn't know. Well, this is to Brook, call it six pages. I don't remember if we made this before we met Brook. I know before we met Brook in May, I went back to Detroit and pitched this to several wealthy friends of my parents, I had friend in Chicago who was a doctor, he had friends who were commodities brokers, and I went and asked them if they would be interested. And this was all so technical and so wild that nobody really understood it. They didn't understand it enough. But basically, this was a follow-up to his letter, it gives an introduction -- what antibodies are -- and we had now expanded our, it's an antibody market, so we were thinking, still, selling antibodies that could be used in diagnostics or blood-banking and that kind of stuff, but this is still the pure antibodies. And we say, well, here's the technical method of producing hybridomas, and then we have the background of the founders, and than we had -- I wrote these two sections -- the market analysis and the competition section -- and gave them.

JONES: Now looking back at this now, do you think you had an idea of what you were doing?

BIRNDORF: No, well, it was all right. Then, patents, we talked about, start-up capital, staff -- which, the first year, would be headed by me, who'd be fully employed, you know, there was our operating budget. We wanted $178,000 for the first year.

JONES: Is that how much you were asking for when you went back to Detroit and Chicago.

BIRNDORF: Yeah. And you know, my salary -- I was going to get a $5000 raise to $20,000. And we had all these technicians. It was me and six other people total. Of the $178,000, $100,000 was personnel costs, we needed $25000 for supplies, we needed $22,000 for rent.

JONES: Where did you think you would locate it?

BIRNDORF: We actually found a place in the La Jolla Cancer Research Foundation that was for rent, and then equipment, so it was a very meager budget -- pretty tight. We had Hybritech, was the name, and equity and then there was a little analysis at the end. And so, that was the first business plan, and I'd taken it around and nobody was interested...You can turn this part off [tells about Colette Royston having dated Brook Byers; this embarrasses Colette]. So, we have with this meeting with Brook, and then he came down to San Diego, sometime after May 8th, and I don't remember whether he came down with Tom Perkins the first time, or if he came down alone. I think he came down alone the first time, and then he brought back Tom Perkins, but anyway, Brook was, I don't know, let's see, Brook's fifty-one, now, so this was '78, that was nineteen years ago, so fifty-one, forty-one, thirty-two. He came down with Tom Perkins.

[tape ends]

INTERVIEWEE: **Howard Birndorf**

INTERVIEWER: **Mark Jones, PhD**

INTERVIEW: **Part 2 of 3**

DATE: **March 10, 1997**

LOCATION: **San Diego, California**

BIRNDORF: I remember Tom Perkins, and we took them on a little tour of our little lab, and then we went and we had a meeting -- we took them to the airport, and we sat in the bar at the airport, and Tom Perkins offered us three hundred thousand dollars to start the company, which was a hundred and twenty-two thousand dollars more than we were asking for -- so, the first and last time anybody ever offered us more than we were asking for. And then we talked about who, the percent ownerships. It was going to be seventy percent for Kleiner-Perkins, and thirty percent, no, I forget, yeah, thirty percent for us, and Ivor got the lion's share of that. I ended up with five or six percent, I really don't remember. I was pretty upset about it because I thought that since I was the one that was leaving, Ivor was the one that was the M.D., he had the credibility, I was just this lab tech. In retrospect, it was pretty unfair. But, I didn't really have a lot to say in the matter. I was sort of locked in, you know. I didn't have a choice -- it was either do it or don't do it, and I didn't know what leverage I had at the time. I didn't feel like I really had much, although probably I had more than I thought I did. I remember calling Brook in New York and debating this with him over the phone, and I think I eked out one more percent but I still got a lot less than Ivor did. A lot less. He got three times as much as I did.

JONES: Had you discussed this with Ivor before, when you talked about starting the company?

BIRNDORF: Yeah, we did. And it was funny how things changed as we got closer to it being a reality. At first Ivor said, I'll just take ten percent, you take ninety percent, because you're going to go do it. And then, as we got closer, it was, 'Well, let's do it fifty-fifty.' And then, when we got to the airport, he sure didn't argue, or say that we had a deal fifty- fifty. He let it go, and I was really angry with him at the time. I was pretty perturbed about it. I said, 'Hey, you said fifty-fifty, and now it's, you know, you get this, I get this.' But he didn't budge, and I didn't have a whole lot of leverage. I was making fifteen thousand dollars a year with a master's degree, I did not have the leverage to do it. I don't remember when this was, exactly, it was the summer of '78, and then, I remember another meeting where Brook brought all of his partners down, and we met at the La Valencia Hotel for lunch, and it was Gene Kleiner and Frank Caufield and Tom Perkins and Brook, and we had a lunch with them, Ivor and I. And then they were going to go hire some consultant to do due diligence on this whole thing, and they did that. I don't remember the name of the consultant now; they hired some guy, and he went off and did some sort of report for them on where monoclonal antibodies could fit in, and what they could be in the industry, and then we had a meeting up in San Francisco. Actually, the consultant was going to give his report. It was the day, it was October 18th, 1978. It was the day we were going to do the closing setting up the company, and in the morning, the guy was going to give his report, and in the afternoon, we did the closing. This is the closing book. Let's see -- it was three-hundred thousand -- they bought a dollar a share, three hundred thousand of preferred, and Ivor and I got one hundred and fifteen thousand, of which, I got thirty thousand, I believe, so he got eighty-five thousand, and I got thirty thousand. Anyway, they did a five to one split. It wasn't reversed, it was a forward split. It was a split, a real split. They just took all of the shares and multiplied them by five. Anyway, so this guy gave his presentation in the morning, and basically what he presented was that these things in not just research, but also in diagnostics and therapeutics. You saw the little business plan we wrote. We said they would be useful in diagnostics and therapeutics, but we were proposing, initially, just research products. And basically, he saw that these would be very good in diagnostics and/or therapeutics, and then that afternoon, we did this closing, the legal closing, in the offices of Pillsbury, Madison, and Sutro. Tom Sparks was the attorney that they had chosen. We also picked the law firm for patent law -- Lyon & Lyon -- and Tom Kiley...we were doing a lot of work down here, I'm remembering back now, we used to meet at Ivor's house, off hours, and Brook came down several times, and was helping me do budgets, and figure out what we needed -- no that was after, I'm sorry, I'm getting ahead of myself. My memory's not that good. Let's see. We did a little bit of that before the closing. Then after the closing, they handed me a check for three-hundred thousand dollars, and I flew back to San Diego, and I had this crummy old car, and I drove from the airport, and I ran out of gas on the way home, and I had this briefcase, I was clutching it, I had this three-hundred thousand dollar check in there. It was more money than I'd ever seen in my life. And Brook, the thing about Brook that's so fantastic is, he lets people do things that they've never done before. So like, he gave me this money, and I went and set up this bank account at B of A, and went in and just met this woman named Martha Demsky, who was an account executive there, and we set up this account with this three-hundred thousand. We had invested it, you know, like you do. I didn't know anything about this kind of thing, and Brook was helping me, sort of being my mentor on this. We had a number of meetings at Ivor's house with Brook and Tom Kiley, who was at Lyon & Lyon, who subsequently went to Genentech. And when he went to Genentech, they gave us a guy named Larry Respess, who then worked with me for fifteen years. He was with me at Hybritech, Gen-Probe, and Ligand, and he's still at Ligand. So, we had this report by this guy, it was very good. We did the closing, and I came down and started the bank account, and the next day was my last day at the VA, at the University, and we leased space, and we moved into that space. My last day was a Friday, on the following Monday, I went and it was just one lab that was empty, just lab benches, you know, and an office, and I got a desk, and a phone, and that was it. And there I am, it's a Monday morning, I'm in my new office, I've got a phone, and nothing else. I had the phone put on, I had the lease done on the space, I did all this stuff, while we were waiting, you know, we got the thing done, and I was ready to go, and I went in there and I immediately started ordering equipment and started interviewing people. We found out that there was this guy that might be interested in a job, a real bright guy named Gary David. I started interviewing him, and Brook interviewed him. Brook was acting president; I was vice- president, and Ivor was consultant. So, we did that, and I started hiring people, and ordering all this equipment and stuff...

JONES: How did you hear about Gary David?

BIRNDORF: I don't remember who told us about him. Somehow, through the grapevine we heard about him. He was at Scripps, yeah, I believe. [Actually, he had already left] And, he came on board. He was one of our first employees.

JONES: What were your criteria for hiring people then? Did you have an idea of exactly what this guy was going to do?

BIRNDORF: I don't remember that we knew exactly what he was going to do, but he had the right background. He was in immunodiagnostics, he knew a lot about antibody assays, that kind of stuff. He was not commercially oriented at all, I mean really. And he ended up staying at Hybritech until just about a year ago, or a couple years ago. So, he was there for almost twenty years, eighteen years or something. I remember hiring a bunch of people. We got up to about eight or nine people by the end of the year, so between October and the end of the year. I took my first business trip in December of that year, with Brook. We went to the East Coast, and went to Merck and various...we went around to some different places looking to...we wanted to talk to Merck about giving us access to hepatitis B surface antigen, so we could make monoclonals against it, and we went in there and talked to a guy named Bill Macalear [?], and another vice-president there, who's name escapes me. He was a real crusty old guy, what was his name? Anyway we couldn't get it from them, they wouldn't give it to us, but I found a way to get it from somebody else, and we got it, and that was out first demonstration, and actually, I did those fusion myself, because there was nobody else to do it, and it worked. Out of our first experiment we got monoclonals that were very specific to hepatitis B surface antigen. And this was all in the fourth quarter of '78. By the first quarter of '79, we had antibodies. So, we were moving along, and Ivor was coming over, and you know, consulting, and he'd come over, I don't remember once a week or twice a week, or whatever. We were trying to hire people, and then, we were looking for a president. They had told us that neither Ivor nor I would be president, that we would have to bring in an industry guy to be president.

JONES: Kleiner-Perkins said that?

BIRNDORF: Yes. They said it right when they did the deal. They made it very clear that neither one of us had the background or expertise to be president, and we agreed. I mean, I think we agreed. So, I was this vice-president, basically, of everything, and I was effectively the COO. I was running it all and then, somehow, Ted Greene got contacted, or they found out about him, I don't remember how they found out about him. Tom Perkins brought him in, and he had been thinking about setting up this company called Cytex or something, that was going to be a monoclonal antibody company. So, we figured we could two things by hiring him, one, kill a competitor, and two, get a seasoned -- he was a Harvard MBA, he had worked at Baxter-Travenol, he was a Mckinsey consultant -- that we could get a seasoned industry guy. He was about, at the time, about thirty-five. I was twenty-eight. He must have thirty-nine. And so, this was during the first quarter, we ended up hiring him, and he came aboard March 1st of '79. He was acting president. I was running the day-to-day stuff. Ted came in as president and CEO. Brook stayed chairman, and Brook was chairman until the end. He was always the chairman of the board. Now, that's the other thing: Ivor also went on the board. The board was Brook, Ivor, Tom Perkins, and Ted, initially, once Ted came on board. I didn't get to go on the board, which was also something that I was a little perturbed about. But, then Ted came on board, and we really stepped up, we were running out of money, we didn't have a whole hell of a lot of money, so we then did another round of financing and we brought in Sutter Hill, Dave Anderson, and he went on the board, and we brought in who else?

JONES: Is that when Pitch Johnson got in?

BIRNDORF: Pitch Johnson, Asset Management, and he went on the board, and who else? I think that might have been it. I don't remember really who else we brought in, and I think we raised about three and a half million dollars total. And then, we helped write a business plan. Ted wrote his first business plan then, which I have a copy of somewhere. Anyway, so we raised this money, and we started hiring people. One of the things that Ted did was he knew Tom Adams from Baxter, Tom had taken a job at Technicon, which was on the East Coast, he had just moved from here to the East Coast, and Ted managed to get him recruited, and he came on board at the end of '79, I believe. We were expanding, we were taking over more labs within La Jolla Cancer Research Foundation. I got permission to put a trailer, an office trailer in the parking lot, from the city, because we were having such growing pains.

JONES: No problem with the city, they receptive to that?

BIRNDORF: I don't even remember, I think they were...I don't remember. We got it done, though. Anyway, we hired Ron Taylor as head of operations, Jim Jungwirth as CFO, Tom Adams as head of R&D, Paul Rosinack as VP of sales and marketing. This was over time. Who else? David Hale came on board in 1981. Dennis Carlo came on board in 1980-81, therapeutics. We expanded the team out, Tim Wollaeger replaced Youngworth as CFO, Hale brought in Cam Garner at some point in the future.

JONES: What was the process of recruiting these people? Was it easy to get them to come?

BIRNDORF: No, it wasn't easy because we were, you know, this little rascal start-up, big plans, but you know, we were running out of money again. I remember we raised seven and a half million from Hillman Company, and they went on the board, a guy named Steve Banks. This was now like '80-'81. I think it was one of those rare situations where we really had a group that clicked. There was a magic at Hybritech that I've never seen since at any of my companies to the extent that it was there, I mean, I've seen some of it, but we used to have TGs every Friday, and it was a rare mix of people that all clicked pretty well together. The lower level people, the mid-level people, and the upper level people, all started clicking, and there was this real sense of urgency there, there was a collective sense of us against the world there. It was really quite a magical place. It was a blast. I mean we had the best times. I sort of found -- you know, water seeks its own level -- I sort of found my niche, you know, first I was VP of everything, then he'd [Greene] hire R & D, and then I was VP of everything except R&D, and then he'd hired finance, and then I was VP of everything but finance and R&D, and then operations, so I sort of found my niche with corporate development. I started going out and in-licensing antibodies from other places, other technologies from other places, and talking to other companies about doing corporate development, you know, corporate deals with us, so I started traveling a lot. I don't remember what year it was, maybe 1980, I traveled some thirty weeks out of the year, I mean I was really...I had one six week trip to Europe, I remember. So, I started going all over the world, and this was great for me. I had never been to Europe, I had never been to Japan, and all of a sudden, I'm off on these trips, and the first trip I took to Europe was this really long trip. I was there for weeks and I was there alone. It was really cool. You know, in time, the travel becomes much less attractive, as you get, you know...but for me, this was wow!, this was the coolest thing. And I was also in charge of our scientific advisory board, and I would get them all together. I would plan the meetings and things like that.

JONES: What would they do?

BIRNDORF: Well, we had our first meeting in La Costa. I don't remember what year it was, probably about '79 or '80, and we brought in, we had this group of SAB guys, and Brook came, and I was there, and our scientists were there, and we had like a two day meeting, and we had a banquet, and it was just a blast. We told jokes, I'd get up and tell a joke, and it was just a lot of fun.

JONES: And none of the companies you've started since then have been quite the same?

BIRNDORF: No, I don't think any one of them has been the same level. They've had magic, some of them more than others, but Hybritech had a star of its own. I've never seen anything like that.

JONES: Do you think that has something to do with the times? It was just so new?

BIRNDORF: I think part of it was that, yeah, part of it was that we were new, we were the first biotech company in San Diego, really. I mean there were a couple of other minor things going on here, but...we were growing in leaps and bounds, we were pushing to get a product out on the market, and we got our first product on the market in, I think it was '81, IGE, and...

JONES: And what was that exactly?

BIRNDORF: It's a test for allergy. It's a general test to see if you come in with symptoms of a cold, say, they can take your blood and say, 'Ah, there's IGE in your blood. That means you're having an allergic response, it's not a virus, or, you know....Quite a few. I don't remember them all. CK-MB, this and that, we made inventions -- this TANDEM assay invention, that was a big patent lawsuit that we ended up winning.

JONES: And you used that for most of these products?

BIRNDORF: Yes.

JONES: And when was that patented?

BIRNDORF: In '79.

JONES: That early?

BIRNDORF: Yeah, '79. Ted's an inventor on that, and Gary David.

JONES: And Tom Adams, right?

BIRNDORF: Tom Adams wasn't even there yet, when that was filed. Tom Adams made a number of improvements to it, but I don't think Tom was there when the original concept was developed. I could be wrong about that. That's right, don't forget that we were funded on technology that was non-proprietary. Monoclonals antibodies could do it with immunity, basically anywhere in the world, because Kohler and Milstein didn't patent it, and it was fundamentally public domain technology. And there were start-ups that popped up, Monoclonal Antibodies, Inc. started up, and others, Centocor started up, so you had to establish a proprietary position of some sort. And we did it in assay technology, and in proprietary antigens, there are proprietary antibodies -- I went out and licensed antibodies from Harvard, from here, from there. You know, that's what I was doing a lot of, getting antibodies in. And we actually were selling antibodies at one point, a research mode, you know, to try to get some revenues.

JONES: So, you did this before you got the first big money, the first three million?

BIRNDORF: You know, I don't remember, I honestly don't remember. I think it was probably after. Somewhere here, let me see if I can find that. We made our first...we were going to sell hepatitis B surface antigen, and I was sort of in charge of putting this all together, somewhere

I kept this, I saw it the other day. I printed out the labels and spelled hepatitis wrong. I kept some of the labels of this just to save a momento of those years. Here was one of the first Kleiner-Perkins brochures when we first did the thing with them. I've got stuff on napkins...Here was a Gen-Probe napkin, I've got some other napkins here from other companies. Progenx business plans....Here's the business plan, joke, joke, joke, hunting trip, joke, over the years, I've collected these jokes that I fax...Here's a review of that book in the Wall Street Journal...Brook sent me this a long time ago....Here's the original Gensia business plan

JONES: You were on the board there?

BIRNDORF: Yeah...Here, I gave a talk, they called me doctor at Stanford...Here's the Gen-Probe start up thing...another thing about me, when I left Gen-Probe. This was Ligand. This is the original document from Ligand. I had a bunch of photographs from the early days...but I can't find them, unless my secretary has them. I have this whole folder full of photographs.

JONES: Now, you're VP of corporate development, making all these deals, adapting to life as an executive. What was that like that, learning that process? Did Brook help you with that a lot?

BIRNDORF: Well, he helped me in the early days, you know, I was never really good at taking order. One of the problems that I've always had is that I resist authority, you know, part of it is, I think I can do it better, which may or may not be true, but I've always been tough to manage. Ted Greene and I were always butting heads.

JONES: Do remember over what?

BIRNDORF: I don't remember specifics, but we never saw eye to eye. I didn't really like working for him. I tried to be a team player; on the other hand, I didn't personally like it. So, you know, I did it from, he came on in March '79, '80, '81, it was just very busy, but he and I did butt heads about things. One of the problems was, I came on at a very low pay. I started at twenty-thousand dollars, and then he'd bring these guys on at sixty, seventy, eighty, ninety thousand dollars, but I'd never catch up. I'd get these little raises and I was real resentful that I was doing the same work as everybody, but I wasn't getting paid. So, I had a lot of problems with him about that, about my pay, I was real money conscious. I remember, I bought my first new car, actually I had bought one when I was younger, a VW, but this was my first new adult car, a Honda Accord. I bought in, it must have been about' 80. And I used to pick Ted up at his house, sometimes, and we'd drive in together, and stuff. I remember talking about Japanese cars, and stuff like that. Anyway, it was a real nice little car. The first time I had a decent car. Anyway, we butted heads, and things were getting bigger, and then we had a therapeutics division, and a diagnostics division, and we started having all these meetings with companies like, we had these big meetings with Merck, we thought Merck might want to buy us, and we had all these big high-level meetings, and then of course, Lilly came after I left, but I just started getting disenchanted with my role. I wanted to have a more active say in things. You know, I wanted to do my own thing really, so in '83, I believe, is when Dave Kohne came over to Hybritech to show us this new technology that he had developed, this ribosome RNA thing, and Tom Adams and I believed that it was something worthwhile, and we went to Hybritech and said, 'You should do this.' And the decision came down, 'well, we're in antibodies, we shouldn't be in probes, it's too defocusing,' that kind of thing. Probably the right thing, so we petitioned the company to see if we could go do this ourselves. We went to the board and basically they said, OK, and they actually invested in it, as it turned out, in the final analysis. I think they put two million dollars into it, and Adams and I went...I left, I think May 1st, 1984, was my first day at work at Gen-Probe. That was really tough leaving Hybritech, really tough.

JONES: Because it was your baby?

BIRNDORF: Yeah, that was really the toughest thing I ever had to do in corporate life, was leaving that company.

JONES: How much of this was finding a new technology that you thought should be developed, and how was it simply getting antsy to get out and do something on your own?

BIRNDORF: Well, it was big risk. I was with a good company. I was already a millionaire. At some point, Hybritech went public, and Dennis Carlo always tells this story about how we were flying back from the East Coast or something, we were on the plane, and all of a sudden, I got up in the middle of the plane, and I started pacing back and forth up and down the aisle. And he said, 'What's going on? What are you doing?' And I said, "I just realized I'm a millionaire." It was on paper, of course, but it was the fact that, all of a sudden, my stock was worth something, I don't know what it was, a million and a half dollars or something like that, and I was nuts. I mean, all of a sudden, it just hit me that my dream had come true, I was a millionaire before I was thirty years old, and it just blew my mind. It hit me, the realization that I had a net worth of a million and a half dollars or whatever it was.

JONES: So, had did that change your life in practical terms?

BIRNDORF: I bought a house. I had been living in this A-frame for six years in Leucadia that I rented when I first came down here with Ivor. I rented the downstairs for five years, and finally the people move out upstairs, which was the nicer unit, and I was there for six years. I bought the house I'm in now -- I've been in the same house now for fifteen years, in two months -- I bought that in 1982, in May of '82. And it was much more money and far bigger than I had ever intended to do, and I sold some stock, and I bought this house. So things really did change for me. I bought a BMW, you know, I was becoming a consumer. And part of my motivation always was, really, to achieve some financial success.

JONES: And then after the first million, you retained the drive to make more?

BIRNDORF: Yeah. What's enough? I mean, I don't know. I'm still driven by that, by making money, I'm still driven by having toys and nice things. It's not as much anymore, though. It's different. How cars can you have? How many houses can you have? It's not the same anymore. I really do the things I do now because I really like them, and because it's still a real thrill to put something together and get it to work, and get the money, and the people, and the deals, and everything, and get public, and that really is personally what motivates me now. The money is nice, and it comes, but it's not the same as it was then. But that's one of the reasons I did Gen-Probe, was Hybritech was public, I was not getting much more stock, I felt really like...at the time, they had this thing where you could do what they called a junior common stock, so we did this thing that was called series C common or something like that, and I got like fifteen thousand shares of this thing. It wasn't very much. I remember that there were x number of shares, and everybody got a little piece, and Ted got the huge piece, and I was pretty perturbed about that. It just didn't seem like I could any farther, really. I had what I had at Hybritech, and that was really all that I was ever going to get. I'd get little pieces, but...and I was making, not even a hundred thousand dollars a year then. My salary was low, so part of it was also money motivation, to make more money as salary, and to now start...I saw what I could do at Hybritech in making, it wasn't just me obviously making that stock worth money, but the fact that I had started the company, received founder's shares...One of the mistakes I made, in my opinion, is that throughout, up until this company, really, at Hybritech, at IDEC, at Gen-Probe, well, Gensia, I never worked at, I just helped put it together and was on the board, same with Neurocrine, I just helped put it together and was on the board, Ligand was another mistake -- I never put my own money into it. I just took founder's shares and then shares for being an operating person, and even though I made a lot of money, I could have made a lot more if I had put my own money into it?

JONES: You just didn't want to put it at risk?

BIRNDORF: Well, I guess so, I just always was under this 'use other people's money,' and get what you can get on the cheap, but people have asked, they say, 'Look, you've made all of these successful companies, why aren't you up with Bill Gates,' I mean not that much, obviously, but 'why aren't you way up there ?' And it's because I never did risk my own money. I never felt like I was comfortable enough to do that because I didn't think I had enough. I was always worried that, you know, part of my...my own insecurities where I needed to keep something in the background. And this company, I've risked a lot of money in, and if it hits and we go public, I'll make a lot more than I've made in any of the other companies. We're being wooed right now to make a public offering, you know, I don't know if we'll make it this year, but hopefully we will.

JONES: Well, was Ivor involved with Gen-Probe?

BIRNDORF: No.

BIRNDORF: Then I started Gen-Probe with Tom Adams and Dave Kohne. Dave Kohne was the scientist who had the technology. He was at various places. At the time we met him, he had his own little lab, but he had been at Scripps and Salk. But then, we started IDEC, Ivor and Bob Sobol and I put together a business plan, and I worked with Bob Sobol, who's an MD who worked with Ivor at UCSD, and we put together this plan and we took it took Brook, and Brook funded it, and then we merged it with another company and that is what IDEC became today. IDEC's doing really well, I was on the board for the first five years, and then I left the board, but I never -- [checks the NASDAQ sticker on a laptop] 27 5/8 this is near one of it's all time highs, it's doing really well. Ivor and I were involved in that, and both he and I were on the board there. Now I was qualified to be a board member, and I was on the board for five years. He was on the board for I think six years. He's not involved with them anymore, either. I was not an employee of IDEC, either. And neither was he. He was on the advisory board. But then the rest of the companies, Ivor was not involved with, not to any great degree.

JONES: So, how did you start Gen-Probe? There were the three of you, and you're using your experience from Hybritech -- this is how you do it?

BIRNDORF: Yeah, sort of a cookie-cutter formula. We went and did it, and Gen-Probe was a very tough technical challenge. Tom Adams was, you know, the president, and I was executive VP. I went on the board, and he went on the board, and we got other board members, and Brook was on the board, and then we ended up selling that company to Chugai in '89.

JONES: I want to get in touch with some people at Stanford, you mentioned Len Herzenberg....

BIRNDORF: Yeah, he's still there, but I didn't really know him. Ron Levy's still there. I worked sort of in his lab, and he's the guy who had the other company that we merged with IDEC, Biotherapeutics, Inc., or something like that. I don't remember. Ron Levy. Frank Stockdale, who I worked for is still there, and I see him occasionally, when I go up there.

[tape ends]

INTERVIEWEE: **Howard Birndorf**

INTERVIEWER: **Mark Jones, PhD**

INTERVIEW: **Part 3 of 3**

DATE: **April 11, 1997**

LOCATION: **San Diego, California**

BIRNDORF: Ivor and I hired a lab tech that worked for me in 1978, I guess, late '77, early '78. He was a real holier-than-thou kind of guy, and he went to Ivor and told Ivor that I wasn't working hard enough, and this and that. I remember this big confrontation in Ivor's office. He accused me of coming in late or something, and I turned to Ivor and asked, 'Is everything getting done?' And Ivor said, 'Yes.' So I said, 'I rest my case.' So nothing happened, but he tried to undermine me -- he was a real jerk. Anyway, we went off and started Hybritech, and then in '79 or '80, he shows up one day at Hybritech with an attorney. He told us that he thought we had stolen things from the university, technology or cell lines. I don't even remember what it all was. There was this one T-cell antibody that we were trying to work on, and we had a deal with the university. We were talking to the university about licensing it, or something, I don't remember, but he didn't know that. And he basically threatened that he would go to the university and tell them if we didn't give him money. So, we basically told him, 'Take your best shot,' you know. He ended up marrying Ivor's secretary and then went to medical school. Then about ten years later, he was trying to do a residency in radiation oncology, and my good friend, Stanley Order, who was the head of radiation oncology at Johns Hopkins, called me up and said, 'Howie, there's a guy here that's applying for one of the two residencies, it's a very prestigious position.' He said, 'There's lots of applicants and we only take two positions a year. This guy looks really good, but he says he worked in Ivor's lab, but he doesn't list you or Ivor as a reference. Do you know the guy?' I said, "Stanley, do me a favor, will you? Blackball him.' And he did. And I said, 'Try to let him know that it comes from me.' Revenge is always a dish eaten better cold. The guy was clearly sour grapes or something. After he did that thing with me, all of a sudden Ivor calls me and says, 'Come down to my office.' I go down to his office, and there's John sitting there, and he never came to me personally, he wasn't man enough to do that. And then he tried that, I call it extortion for lack of a better term, but that's what it was. We told him, "Go ahead, do what you have to do. We didn't do anything wrong. We didn't steal anything, and if that's what you think, go ahead. Go to the university.' And nothing ever came of it. It's funny you know, when things are successful, people come back and...I mean, I'm still in a lawsuit, I'm being deposed next week for Gen-Probe, about some little thing here, Center for Neurological Studies, claims that the Kohne patent was really developed on their dime, and they have a right to it, and they want all this money, and stuff. You know, this is almost fifteen years later, thirteen years later, or something. They didn't come in thirteen years. They claim they didn't know about it, but

JONES: When you learned of David Kohne's technology, he had this patented already?

BIRNDORF: I think he had applied for a patent, yeah.

JONES: He came and gave a talk at Hybritech?

BIRNDORF: No, but you know, this is all subject of a law suit right now, so I really can't talk about Dave Kohne, and this whole thing, because I'm being deposed, and all this stuff, and the last thing I need is for something to come out in some public document. So I really would rather not talk about Dave Kohne and the originations of Gen-Probe until all this is settled.

JONES: OK, well maybe we can talk just in general terms. When you did meet Dave Kohne...

BIRNDORF: Dave Kohne came over, and we met him for lunch, he was just...let's skip this part.

JONES: Maybe sometime down the road?

BIRNDORF: Yeah, because this is exactly what all the lawyers are trying to figure out -- when did I meet Dave Kohne, and, you know, I have my own recollections, and they're my recollections, what I think is the truth, and there are all these people saying that Tom Adams met Dave Kohne before, so there's a bunch of bullshit going on. [Howard stops the tape to talk about Dave Kohne off the record -- doesn't like him, thinks he's greedy. Accused Birndorf of conflicts of interests because he was sitting on the boards of other companies, etc., which is, says Birndorf, 'something that happens all the time.']

JONES: At the time you were thinking about starting Gen-Probe, was this the first instance in which something came along, and you thought well, we could start a company with this?

BIRNDORF: Yes. I had never really considered it before that. And the main reason was that Tom Adams, and I highly respected his technical judgment, really said that he thought this was a good idea and that it would be the basis of a company, and I must admit that I was much more swayed by his decision than the technology, and everything else. Because, you see, from my point of view, I don't view myself as necessarily a -- you know, I can understand technology, and I can assess technology, and I have done a good job of assessing it in the future, since then -- but at that point, I didn't know that much about the market for DNA probes, for example. I learned a lot about it, but I wouldn't say -- what I considered my forte at that time was getting things done, going in, getting the lab set up, getting the people hired, getting deals with corporate partners, you know, that kind of stuff. Tom was the thinking guy, and the technology guy, and I was the 'oomph.'

JONES: Was there talk about doing it inside Hybritech?

BIRNDORF: Yeah, we went to Hybritech and said, 'You guys should do this,' and they said, 'No, it's defocusing.'

JONES: Who said no?

BIRNDORF: Well, at first I believe it was Ted Greene who said it. Tom took it to Ted and Ted then went and talked to people, and said, 'I don't think we should do it. It's too defocusing, because we're in antibodies, and that's probes. And we're trying to therapeutics and diagnostics, and...,' and he was probably right. It would probably have been too much for Hybritech to put under their belt at that time.

JONES: But he didn't want to lose you guys -- or maybe he was more concerned about Tom Adams?

BIRNDORF: He didn't have any problem losing me, but he didn't want to lose Tom Adams. But in fact, there was some stuff going on with Tom Adams at the time. What happened was -- Tom is like a thinker, he's not a very -- what's the word I'm looking for? He's not a very... [Howard turns off the tape again to tell me about Tom Adams -- at the time of Gen- Probe, he was going through a messy divorce, had a drinking problem; his ego gets in the way, he isn't satisfied to do what he does best -- the technical stuff -- doesn't listen all the time, wants to be president, doesn't want to hire the best people; Dennis Carlo didn't like reporting to him; look at what's happened at Genta, etc., etc.]

JONES: Did you take other people with you from Hybritech to Gen-Probe? Bob Wang?

BIRNDORF: Bob Wang didn't go right away. Yes, he came, but I don't remember how long it was. I mean, we were under a specific covenant not to take people from Hybritech, I mean, that wouldn't have been fair, unless we talked to them, and it was, you know, sort of approved. Ultimately, there were some people that came over, Larry Respess, Bob Wang, I don't remember who else. There were probably some more, but not many.

JONES: Then IDEC starts in 1985...

BIRNDORF: Yeah, IDEC was another deal with Ivor. Ivor came to me with a guy named Bob

Sobol, and Ivor wanted to know if I would help Bob Sobol set up this company. Because Ivor is the idea guy -- he doesn't really get involved in the details like setting up head counts, setting up budgets, finding spaces, that sort of stuff. So, I started helping them, and that was at the very, very beginning, so I was a founder. So, it was me, Sobol, and Ivor, and we went to Brook and we tried to get Brook to invest, and he finally did. Then, we merged it with this other company that was Ron Levy and Rich Miller from Stanford. They had BT something or other. So, we had two facilities. So there were like five founders.

JONES: Did you leave Gen-Probe to do that?

BIRNDORF: No, I went on the board. I never worked at IDEC as an employee.

JONES: After that, did you start to think, this is what I really like to do, start companies?

BIRNDORF: No, actually, I saw the economic value of starting companies and getting founder's stock. And doing it with the right group of people, and good ideas. And how you could raise money, how you could put together a team -- you didn't even necessarily have to be in the company, you could be on the board. I didn't really make that much money from IDEC. I got four percent of the company originally. I remember arguing with Brook about that. He didn't think I should get that much. You know, there's only so much to go around. They're really tight, the VCs, about that. But I ended up with it, and I went on the board. I was on the board for five years, so I earned my keep, but they did reverse splits and everything, and I ended up with about 50,000 shares of IDEC, which, you know, at one time, was worth about one and a half million dollars or something like that. Today, it would be worth just over a million dollars. So, you know, that was a nice gain, but it wasn't a huge, gigantic, you know, I didn't make millions on IDEC.

JONES: And you were still at Gen-Probe at the time, which was not a happy place to be?

BIRNDORF: No, it was happy then. Oh yeah, this was at the beginning, things were really cooking, Gen-Probe was...the technology was moving, things were fine then. In '84, '85, things were great. It really started, for me, to fall apart at the end of '86 and '87. We went public in October of '87. Meantime, in '86, I helped to start Gensia. The two entrepreneurs came to me, Paul Laikind and Harry Gruber, and they wanted to get my advice about this deal. I think I still have the original business plan that they gave me. I saw it in here the other day....[looks through the drawer again]. I saw this the other day, one of the original things -- here it is. This is April 2nd, 1986. It says received by Tom Adams, but they sent it to me. I don't know why. Oh, I know, we shared a secretary. So this is their CVs, and here's the executive summary [laughs]. This is gene therapy. Yeah, see they were looking at something totally different.

JONES: Than what they're doing now?

BIRNDORF: Yeah, they have Compound Q, which turned out...Well, now they're doing something totally different. None of this stuff ever worked. I mean, it worked, but they screwed up the clinicals so bad. Anyway, this was the first document. So, they came to me, and I thought it was a good idea, especially the cardiovascular stuff. I took it to Brook, and I remember, we had a dinner, me, Brook, and these two guys at Mille Fleurs in Rancho Santa Fe, and Brook offered to do the entire deal.

JONES: That's unusual, right?

BIRNDORF: Right. To fund it for sixty percent of the company -- I don't remember the exact total -- but he offered to do the deal and they turned him down.

JONES: Why?

BIRNDORF: I don't remember their reasoning. They were afraid, I think. They were afraid.

So, it ended up being...We had the first board meeting over my kitchen table. There was a guy named Dick Schneider from 3i, at the time. Another guy that he and I -- whew. This is a personality driven business, as you can imagine. Dick Schneider, a guy named Jim Blair from Domain. Now Schneider works with Blair, he went over to Domain subsequently, but at that point, he was at 3i. I was involved, and I brought in KP. KP came in. I went on the board, I was a founding board member, and they funded it as a syndicate as opposed to just KP. And I think those guys look back and they probably regret that decision.

JONES: Well, they got out OK, didn't they?

BIRNDORF: Nah, Paul Laikind, I just saw him about two weeks ago at this Bill Otterson thing, and he's still there. I just sold out my entire position of Gensia this morning, the rest of it. I mean I've held it for eleven years, and I just figured, you know, there's just no sense. Maybe Hale will pull it out, but I don't have time to wait on him anymore. It's been at four bucks for years. It did a three for two split and then went as high as fifty bucks, or something. So, it was a high flyer. It had a billion and a half market cap. They have raised so much money over the years. David Hale is a really good guy. He's a really nice person. He's a very hard worker. But he got very much distracted. He was on too many boards, too many charities, too many YPO, too many political things. He was just spread all over the map. I kept telling him. I said several times at board meetings that I thought that was the case. But nobody listened to me. They were all afraid that they would piss off Hale if they told him. So finally, they asked me -- it was time to redo the board -- and they asked me to go off the board, and I dodged a big lawsuit by doing that, it was great. Anyway, it wouldn't have been personally to me, but.... So, yeah, they came to me, I turned them on to Brook, I went and met with some of their scientists, and this and that, and you know, I took them to Brook, and then he offered them the deal and it didn't work. So we formed this syndicate with Domain and 3i and Brook, and I don't remember who else was in it, and we started the company in '86, and I was still in Gen-

Probe, and I got some stock, and then I bought some, too, and what else? The same deal, I went on the board, and I was on that board for five, six years, as well.

JONES: And shortly thereafter, Progenx, right?

BIRNDORF: Right. What happened with Progenx was Adams and I really started not getting along in '87, and they brought in this guy, Bologna. He and I always got along. I didn't always agree with him, but then with Dave Kohne, and the board, and....So, my job was to do corporate deals. We hadn't done a really good corporate deal yet, at Gen-Probe. I went on this trip in mid-'87 to Japan, and saw about, I don't know, ten, fifteen companies, and one of them was particularly interested -- Chugai. So, I started negotiating with them. I went back in September and we started talking about a deal. Another factor in this whole thing was, in June of '86, I came down with chronic fatigue syndrome.

JONES: Working too hard?

BIRNDORF: Who knows? Who knows what causes that? It was really weird. It took me like months -- I have a whole file here from that, of me trying to figure out what the hell I had. It was really -- your memory is all fucked up, and you feel like your head's packed with cotton, and you feel like, removed from the world, and that was putting a big strain on me, and I took most of November of '86 off and went to this like, health resort, and just stayed there for a month, and that helped. I gradually started getting better. And then in '87, I was still affected, but not that bad. I still, even now, have an occasional day where I feel chronic fatigued. But for the most part, I don't feel it anymore. Anyway, I had that. That was really causing me some difficulties, but I stayed, and I worked. I was trying to take off as much time as I could, but I was still working. Anyway, I went to Japan, I did this thing, and then I started negotiating with Chugai, and I got into a very close personal relationship with the guy. I mean, we really had a very close personal relationship, the Japanese guy who was my counterpart.

JONES: What's it like doing business with the Japanese?

BIRNDORF: It's all based on that. So, because I had such a good relationship, in late '87, I don't remember if it was October, November, somewhere around there, we had an off-site, and we hired this guy Newt somebody or other, who was the dean of a business school at UC-Irvine or one of these UC campuses. And we had this off-site that was more like an encounter group with all of the management. It was up in Laguna Beach, and it was -- Adams and Kohne got on my case so bad that I finally said, 'Fuck you guys, I quit.'

JONES: So, you didn't go back?

BIRNDORF: Well, I went back. It was like November. My last day was...I quit as of the end of the year. We had this big thing with the board and everything. I stayed on the board, but I couldn't work with those guys anymore. I was sick of them. It was just so ridiculous there. But they needed me to do the Chugai thing, so they hired me as a consultant, and I stayed and I went to Japan and closed the deal in April of '88. So we closed this fifteen million dollar -- three million a year for five years -- deal with Chugai. Which was really a good deal for them, for Gen-Probe. Well, it was good for both. And that was what led into them buying the company. Obviously they had a relationship with us. And I took Bologna there and introduced him when we were trying to sell the company and got him set up, and then he did the sale. I won't take credit for that, but I think my relationship with them really did help. So, I was leaving at the end of the year, '87. December 31 was my last day, and of course, it was very melancholy. They gave me plaques, and all this bullshit, and Brook calls me up and he says, 'You know, I started this little company with some technology we licensed out of Scripps. This guy named Henry Niman, it's a diagnostic technology, it's looking for oncogene proteins in blood and urine,' and stuff like that. And it was with Drew Senyei, Dick Schneider, and Brook. And he called me up and he said, 'Would you be interested in just being the start-up president for one year?' And I said, 'Yeah, why not?' It was the first time I'd been a president.

JONES: And you were serving on boards, but....

BIRNDORF: Right, I was on IDEC's board, I was on Gensia's board, I was on Gen-Probe's board, and I don't know what other boards I was on. I might have been on some other boards at the time, I don't remember. And so I said, 'Yeah, OK,' and you know, he said, 'You've got to take a low salary because it's a start-up.' So I agreed on, I don't know, a hundred grand salary. And at the same time, they were recruiting Tina from Hybritech to be director of research there. So, I remember my last day at Gen-Probe was December 31, and I went to Europe for a two week vacation with my then wife. We went skiing with some friends, and we came back, and I started the 16th of January 1988 at this Progenx, is what they called it, and it was this guy Henry Niman, and he had taken this whole group out of Scripps, this whole group of about eight to ten people. They had rented space over at General Atomics, so we had some labs, and little offices and stuff.

JONES: How did they get hooked up with the VCs?

BIRNDORF: Brook was cultivating Richard Lerner. Richard Lerner is the head of Scripps Research. Richard apparently came to him and said, 'I've got this hot technology, it's ready to be commercialized.' The real deal was, they just wanted to get this guy Henry Niman out. This guy was just a flake -- it turns out. I didn't know that. So these guys negotiated this deal. They paid Scripps half a million dollars in cash with ongoing royalty obligations, and for that, they got these patent applications, Henry Niman, his group, and four hundred antibodies that had already been made came over to the company. So, Tina and I started at the same time, mid-January of '88, and we started, you know, hiring people, getting equipment, you know, there was some equipment there, and we were ordering equipment and hiring people and everything else, and we're going along and we're going along, and this guy, Henry Niman, he talked a language called Nimanese, we called it, because he talked and talked and talked, and you tried and thought you understood it, maybe, but then, when he was finished, you'd go back and say, 'What did he say?' We had to buy this big hundred thousand dollar camera, where, basically, he'd run these samples on gels, and he'd get a bunch of bands. And he thought you could get a pattern recognition of these bands and diagnose disease or, he even said he could tell the difference between male and female sex from pregnant women's' urine, things like that. But it became very obvious very quickly, like after three to five months, I knew that this shit didn't work. I mean, he used to argue and say, 'See that band there?' And we'd all go, 'Where? There is no band there.' And he'd say, 'Yeah it is.' I mean, it was crazy. I kept thinking what the fuck, you know, what are we doing here? And even if it did work, how are you going to make it into a product? Is everybody going to have to buy this hundred thousand dollar camera? We couldn't standardize it, one gel to another. We tried putting markers in -- Tina was doing a great job with this -- but both of us came to the conclusion that this wasn't going to work. And I was trying to figure out what the hell to do. So, in the meantime, I had met Ron Evans, socially. My neighbor invited us over for dinner and Ron Evans was his friend, and he and his wife were there. So, we met, and talked and this and that. So, I called him up, and I said, 'You know, can I come over to the Salk Institute, just to see what the hell you're doing over there?' So, when I got over there, he said, 'You know, I've got some stuff that's really good and it's ready to be commercialized.' So he and I talked and we ended up doing a deal with the Salk, and I licensed his technology exclusively from the Salk Institute, and I signed that deal in November of '88. By that time, I had hired Larry Respess, who was tired of Gen-Probe, too. He had come over. So, it was me and Tina and Larry. Larry had been with me at Hybritech, then came to Gen-Probe, then came now to Ligand, to Progenx. So we decided to change everything, change the name...I remember I had a meeting with the VCs, all the VC investors, there was some meeting downtown at what's now, you know, the curved towers, what is that downtown, the Marriot? Yes, the Marriot. I remember trying to convince them to do this deal because they couldn't how we were going to make this into a business. I said, 'What we're going to do is, we're going to take these receptors, we're going to put them into cells, we develop high through-put screening, and it's going to be a drug discovery company.' I said, 'These receptors are good for all kinds of things.' We've got the sex hormone receptors for women's' disease and cancers, we've got the glucocorticoid, the mineralocorticoid receptors that are good for inflammation, we've got the retinoids, certainly they're using it for wrinkles and stuff like that, acne. And then we're using vitamin D receptor, who knows what that's good for, cancer, the androgen receptor for prostate cancer. There were all kinds of things that this stuff was good for. There were cardiovascular applications, we had ApoE receptor, and things like that. Actually, I don't remember if ApoE was one, we had various cholesterol regulating receptors. So, I convinced them, and we were running out of money. I don't know how much the first round was, but we were gradually chipping away at it. I convinced them that we should do it; we signed the deal in November, and then we did, basically, a new round of financing at the same price, so it was a restart, but nobody would pay a premium for it. We brought in Tony Evnin at Venrock and he went on the board, and I don't remember who else came in on that round, but I think we raised four or five million dollars, and we basically started hiring new kinds of people. We told Henry Niman to go find a job. He got a job at the University of Pittsburgh. He's still there. He's still trying to do this stuff. That's when we started Ligand. We changed the name; we did a contest about names; we came up with Ligand, and used it. That was the start of Ligand. The start of '88, we started Ligand. We moved into the new building, where they're still at right now, in '89 or '90.

JONES: Biotech start-ups are not like big pharmaceutical companies or academic labs, they're different. How do you make them work?

BIRNDORF: Well, first, you've got to believe that the science works, because if you don't see what the science can do, and you don't firmly believe...I mean, some people have said, 'If you put together the right team, it doesn't matter what they're doing. They'll make it work, even if the original stuff doesn't, they'll find something that does.' And that's probably true. But from my point of view, I always start with the science, and if I believe in it, then I can raise the money because I can tell a good story to the investors, and I have a group of investors that have been with me, you know like Bob Curry has been in four companies, Drew's been in two, Brook's been in seven.

JONES: All of them?

BIRNDORF: Yeah.

JONES: Over time, has the kind of due diligence that Brook does for your companies changed?

BIRNDORF: No, for this company....He was very leery about Nanogen at first. They didn't understand it. We couldn't explain it to them well. It's difficult to explain, especially early on. So, he sent down this guy, a consultant of theirs to do diligence, and he highly recommended it, so they invested, but I took it to them first and they passed on it, and I took it to Drew, and Drew went in it with me, and then KP came in.

JONES: And that made a big difference when Drew came in?

BIRNDORF: No, not so much. I think that then we were better able to go back at them and show them better stuff and convince them to come in. But nonetheless, you know, it's really, I can't answer your question because I don't know how to put it in words. You know, there's no set formula, how you do it. You just do it.

JONES: How about working with the scientists? Do you have problems?

BIRNDORF: There's always problems with the scientists. Scientists are unrealistic when it comes to business. They don't understand it. They're not good at it necessarily. Some are, some aren't. It's like anything. It's difficult to explain to them sometimes the economics. A lot of them are greedy. They think their idea is worth the world. They want unreasonable...you know, it's better to have a small piece of a big pie than a big piece of a small pie is one of the clichés that's been used over the years, but it's true. Some scientists are in it just to get their ideas put into practice, you know. They don't really care about the money. They just don't really care about it. And others are some of the greediest sons of bitches you ever saw. Dave Kohne was one of the greediest. He came into my office and pounded his fist and said, 'Don't ever think that I'm not interested in money.' Even though his whole facade was the old scientist driving the old VW bug, he was a greedy son of a bitch. And of course, he'll probably say the same thing about me. He thinks I tried to screw him out of fifty thousand dollars once, so he has this big thing about it, but....I can't answer your real question about 'how does it work?' It works, that's all I know.

JONES: So you make it work, but you're always working with different people in different situations....

BIRNDORF: Yeah, sometimes it's harder than others. You know, it depends on assembling a group of people that work well together. I'm not an easy person to work with.

JONES: And why is that?

BIRNDORF: I'm demanding, I don't suffer fools lightly, I'm abrupt, people say that I wear my heart on my sleeve in the sense that they always know where they stand, when I'm happy or not happy. I don't consider myself a great manager of people, in fact, those kinds of things, really, I hate having to deal with, somebody's who's unhappy about something. What I really like is the action. You know, going places, doing things, getting things done. Accomplishing something.

JONES: Over the years, how hard have you worked at this?

BIRNDORF: Oh, the way I work, it goes like this. At different stages of a start-up, you work a lot harder. Right now, I'm working my ass off, the last year I've been working my ass off. The first couple of years at this start-up, I didn't have to work that hard, because there's a lag phase between when technology is being developed, there's a lag phase before you can actually get data to go out and do things with. So, at the beginning of a start-up, there's a flurry of activity, and then, for me, there's a big lull, like for a year, where I do stuff, but it's not, I mean, I don't have to work eight hours a day, seven days a week. Yet, this week, I've put in like sixty hours already. Not including today. I was in Chicago one day, I've been all over the place. So, at this point, right now, my girlfriend's ready to leave me because she says I have no time for her, business is everything. And right now, it is. I've got no choice. I've got sixty people here that depend on me doing it. I'm leaving Sunday morning to go to Baltimore. I'll be in Baltimore on Monday and Tuesday. I mean, I'm all over the place. I'm going to Europe next month, I'm going to Miami, I'm going here, I'm going there, so right now, I'm putting in sixty to eighty hour weeks, but a year ago, I wasn't working this hard. I probably put in some twenty hour weeks. It's raising money, it's doing corporate deals, it's looking at technology acquisitions, it's looking at potential mergers or acquisitions, it's all kinds of things.

JONES: In small start-ups like this, do things get pretty tense when the money starts to run out?

BIRNDORF: You know, since I've been through it, I always know that, in the worst case, as long as we have something good, in the worst case, my venture investors will never let it go under. They've got too much to lose. So, I may have to do a diluted round, or a down round, which is never fun, but in the worst case, you now that they're there, and they're deep pockets. That's one of the good things about working with someone like Kleiner- Perkins, is that they have never let any company run aground.

JONES: Did you come close with Progenx when that wasn't working?

BIRNDORF: Yeah, I suppose that came close, if I hadn't found the Evans technology. That probably would have gone -- well, we would have found something else, I mean, who knows? I went out, I purposely went out, on my own, to try to find something else. I wasn't necessarily looking for the Evans technology, but I found it, and it turns out, that's one of the best technologies I ever found. It's very broad, we have the world locked up in the patent position. Having Larry there was absolutely -- Larry's a genius at that. And you know, these things aren't necessarily me. It's the people that I bring in. If I bring in the best people, I get the best results. So the key thing there is hiring people that are as good or better than you are. A lot of people won't do that. I can name a couple of presidents...[phone rings] Birndorf.

END INTERVIEW


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