An Interview with

LAWRENCE SCHOENBERG

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Conducted by Martin Campbell-Kelly

on

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Lawrence Schoenberg Interview

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Abstract

In this oral history Lawrence J. Schoenberg describes his personal and educational history and his subsequent career in the U.S. software industry. Following service in the U.S. Signal Corps, he held various positions with IBM, Litton Industries, CSC and Automation Sciences. With others he formed a software enterprise AGS Computers Inc. in 1967, serving as CEO until 1991. In 1988 AGS Computers was partitioned into two segments—software products and microcomputers—which were later sold to NYNEX and Merisel, respectively. Toward the end of the interview, Mr. Schoenberg describes his role in ADAPSO and its successor ITAA, of which he served as Chairman of the Board in 1982, and at various times president of the Software Products, Professional Services, and Systems Integration Divisions. He was very active in working with the Financial Accounting Standards Board (FASB) and the American Institute of Certified Public Accountants (AICPA) on behalf of ADAPSO. This oral history was sponsored by the Software History Center in conjunction with the Center's ADAPSO reunion (3 May 2002).

Preface

As part of its preservation activities, the Software History Center (SHC) worked with Dr. David Allison of the Smithsonian Institution's National Museum of American History and Dr. Jeffrey Yost of the Charles Babbage Institute to plan and conduct a number of oral history interviews of early software company founders and other key industry contributors. On May 3, 2002, in conjunction with SHC's ADAPSO Reunion meeting held in Washington, DC, SHC arranged for 15 individual interviews by historians well qualified by their knowledge and interest in computing history.

The following people were interviewed together with the name of their interviewer:

Bruce Coleman, interviewed by William Aspray
Richard Crandall, interviewed by Paul Ceruzzi
Gary Durbin, interviewed by Philip Frana
Martin Goetz, interviewed by Jeffrey R. Yost
Bernard Goldstein, interviewed by David Allison
John Keane, interviewed by Martin Campbell-Kelly
Ernest E. Keet, interviewed by Philip Frana
Frank Lautenberg, interviewed by Paul Ceruzzi
John Maguire, interviewed by William Aspray
Joseph Piscopo, interviewed by Thomas Haigh
Lawrence Schoenberg, interviewed by Martin Campbell-Kelly
Charles Wang, interviewed by David Allison
Robert E. Weissman, interviewed by Paul Ceruzzi
Lawrence Welke, interviewed by Thomas Haigh.
Sam Wyly, interviewed by David Allison

Each interview was tape recorded, transcribed and edited by SHC, the interviewer and the interviewee to ensure clarity and readability without changing style or flow. The original tapes along with the edited transcripts were donated to CBI, which placed the edited transcripts on the CBI website.

Martin Campbell-Kelly   This is an oral history recorded on May 3rd of 2002 with Mr. Lawrence (Larry) Schoenberg at the Monarch Hotel in Washington, D.C. So Larry, tell me a little bit about your background and your education.

BACKGROUND

Schoenberg: I grew up in The Bronx and as I always tell people, when you grow up in The Bronx you learn how to defend yourself early. The Bronx of course was not a difficult spot truthfully at that time. My parents were both educators. That probably didn't have that much impact on me other than that I tend to think sometimes in those terms and also I was one of the relatively few people at that time whose mother worked. So it probably did differentiate me. And I'm also an only child and I think the two together probably produces a somewhat different person. I was a decent but not great student, but I was very fortunate in that when I was in high school my parents knew the principal of the high school and although I feared for those kind of things, the positive impact of it was that I was one of the very few people who got a recommendation from the principal to go to college and I do suspect it was one of my first really fortuitous circumstances. So I wound up going to the University of Pennsylvania which was certainly a different world than the one that I had experienced before and it was quite expansive. And amusingly enough, another one of the people being interviewed was a classmate of mine at Penn.

Campbell-Kelly: Who is that?

Schoenberg: Bernie Goldstein. You know people always ask you about how going to school affected you educationally and I can't really say that it did much other than the most important way I guess which is that I learned to think, much more than I probably did before.

Campbell-Kelly: What did you study?

Schoenberg: My original major was economics, but my reason for the major was not really any great interest in economics, but that an economics major allowed you to take almost any course. So it allowed me the broadest possible leeway in the courses that I took, and I did take a very wide range of courses. The other thing that was unusual at Penn is that I was in the Liberal Arts School but the Economics Department per se was in the Wharton School, so I sort of traipsed back and forth between those worlds. As a matter of fact, as I remember, my classmates there were quite mixed as well.

Campbell-Kelly: So did that give you some business background, that education?

Schoenberg: I don't really think so. You know of course the best thing about background is when it is just that. You don't realize that it's actually learning for something in the future. I had no interest in business, did not have family in business and never assumed I would go into business at the time.

US ARMY SIGNAL CORPS

Campbell-Kelly: Tell me about your time in the US Signal Corps. Was that before or after or during college?

Schoenberg: When I graduated it was still the Korean War and I was drafted and it was a pretty bizarre couple of years in my life. I landed in the Signal Corps which was somewhat fortuitous because the Signal Corps did have some kinds of opportunities like having computers around, and I actually ended up accidentally doing some programming work there and I worked in some areas of intelligence. I came across a computer there and actually did a small amount of work on the Dysiac. I was assigned to a group in New Mexico.

Campbell-Kelly: So you weren't actually in Korea?

Schoenberg: I was never in Korea, no. My only foreign experience was that I was stationed in Southern New Mexico and we used to test rockets and every once in awhile a rocket would go into Mexico and we'd have to go and chase the parts to bring them back. So I crossed the Mexican border.

Campbell-Kelly: Did that experience give you an interest in computers?

MBA AT PENN

Schoenberg: Well I guess you could say it gave me an interest in computers but really what happened substantively is that when I got out of the Army I went to get an MBA at the Wharton School. I guess I was interested, if I had to define it, in doing some sort of research work. I did two years in one year, which was really not easy. I was really too young. I got my bachelor's degree before I was of age to drink and so I had never learned to drink and I still don't. At any rate, doing two years in one, you didn't quite get the same kind of experience in graduate school and also being a typical student I was a little lackadaisical about the job world. Actually, the people who know me would probably find this a little amusing, but I actually applied and was accepted to law school, and as those people know, I hate lawyers so it's a funny characteristic. But in the end I got married and I decided not to go to law school, and so I went looking for a job and the job I got offered was by IBM as a programmer.

Campbell-Kelly: Right. But accounting was your specialty, wasn't it?

Schoenberg: Well it was my major, but I really spent more time in statistics than accounting because I was working as a graduate student helping to teach a statistics courses. At any rate, even though I had done some programming I really didn't know what programming was until they gave me this aptitude test and they said you should be a programmer. And a programmer I became and happily so I might say.

IBM

Campbell-Kelly: What kinds of things were you doing at IBM? And where?

Schoenberg: I was working in New York City. Officially we were at IBM World Headquarters which was at 590 Madison.

Campbell-Kelly: What year was that?

Schoenberg: 1956. My actual offices were in several buildings around that area. A couple years later we moved to 425 Park but originally I don't even remember. We were in a building across the street from Bonwit Teller. I remember that because we used to watch the dressing rooms.

Campbell-Kelly: What sort of computers were you using?

Schoenberg: The 700 series. And I had some very interesting assignments. My first actual assignment came from my interest in the problems of debugging, coding and testing. It was to write a program that would be used every time you had a program error. The program was a memory dump routine, something that told you what the computer looked like at the moment you had the problem. The difficulty was we had no external storage so the impact of this was, everytime that you wrote the program, the size of the program destroyed part of the very thing you were trying to save. So they said to me, we want to see if you can write this program in under a thousand bytes of memory. I took this as a challenge and wrote it in 160 bytes of memory. In order to do this, you would have instructions which would read something as an eighty-character card buffer. It would read it and it would automatically step to the next instruction, so the computer didn't know it was really reading it from another card. So it would just constantly replace itself and replicate itself allowing me to get it done in this small space. The trouble was that it was so complex a coding and debugging problem it took forever for me to write it.

Campbell-Kelly: Was it mostly technical type of programming you were doing?

Schoenberg: It was all system software, but to help write applications.

LITTON

Campbell-Kelly: So you then moved on to Litton, was that the next work?

Schoenberg: That's right. It took me three years to discover that research programming was not the main core of IBM's business. It was sort of a shock when I discovered that and at first I thought about just moving out to a branch office and I don't know why I didn't. It may have been money for that matter. I looked for a job and I took a job for what was actually the Monroe Calculating Machine Company, which had just been bought by Litton Industries and I became the manager of programming there. And we had, one of the men at the dinner last night was talking to me about – I was amazed that he knew this computer –

Campbell-Kelly: A Litton Monrobot?

Schoenberg: Yes. That's right. We had a little computer and the space problem was the same. How do you develop a set of systems software? Although it was truly a general-purpose computer, we sold it for dedicated applications, so we had to go out and do the systems work and determine how to apply it to their particular problems.

Campbell-Kelly: So that would be 1959?

Schoenberg: It would be precisely 1959, correct.

Campbell-Kelly: That wasn't a successful machine.

Schoenberg: Well, I don't know how to answer that. They may have considered it a success within its own constraints. We sold a fair number of them. It's hard for me to even remember, assuming I even knew then what their plan was. The big problem there was that Litton was short of cash and so it was pretty obvious that they were restricting the development dollars that were going around, and it didn't take much to see that it couldn't last too many years. And it didn't, but I always say that in terms of learning, not technical issues but general business issues, it was definitely the best experience in my life, and the one that I got the least credit for in my whole life, because you know, having worked on that kind of computer was of no use on a resume, no one paid attention. But I learned how to interact with customers, how to define jobs. I still feel today that most of the successful projects that have ever come into existence in the software world have been successful not because of the computerization but because of the systematization. And I really learned a lot about systematization. So I was very happy there, but I could see that it wasn't going to go very far for very long. I don't know if I got the lead from the newspaper or whether someone told me. I think I was personally contacted by a guy named Carl Byam. Carl Byam had been the second president of Guide, which was the IBM users group for business as opposed to Share for scientific users. And he asked if I wanted to go to work at Computer Sciences Corporation.

Campbell-Kelly: That was in California?

CSC

Schoenberg: Yes, it was in California, but this office was in New York City, and I did go to work there and I was doing systems software, mainly for Univac when I was there.

Campbell-Kelly: What date was that?

Schoenberg: 1961. To make the story more amazing, many years later I had dinner one time with Bill Hoover who subsequently became the CEO of CSC. When I told him this story, he told me that he did not believe that CSCever had an office in New York. It had disappeared from their company history. It had been wiped out, totally.

Campbell-Kelly: Tell me about the CSC office. Just how many people worked there, what kind of projects were you doing?

Schoenberg: Well the CSC office was located in Manhattan and we basically did work on systems software. We also did some commercial applications. One of the things that was going on then, this was 1961, was the start of the time when people were having to deal with the problems of moving from one computer to another and we were looking at some automated tools for doing that. But ultimately most of the work came from projects related to what was going on in California. We were doing a lot of Univac III systems programming software. Univac had come up with a rather crazy idea, what I used to call a Chinese menu. They had two different software sets for the same computer because they started one and then another one was done.

Campbell-Kelly: What computer was that?

Schoenberg: Well it was a couple of them. It was the Univac III, the 1107 and the 490 if I remember right. I believe that was the number, I'm not sure. Long time ago. It was a very interesting company, an interesting time. This was before Fletcher Jones died so the company was almost exclusively in systems software.

Campbell-Kelly: Did you have a computer in the New York office?

Schoenberg: No.

Campbell-Kelly: How did you test your programs?

Schoenberg: We used the manufacturer's computers, which was pretty typical then anyway. I don't think they had one in California either.

Campbell-Kelly: Where was it physically located, the computer?

Schoenberg: Philadelphia.

Campbell-Kelly: So if you're working in New York, what was the process?

Schoenberg: Well, we basically went there, that's about it. There was one at NYU in New York too but we couldn't use that all the time. It really wasn't a great experience because it was a very confused working environment and I guess the parent company must have thought so too because they have written it out of their history.

Campbell-Kelly: How many people were in the New York office then?

Schoenberg: Not many, maybe ten.

PROGRAMMER PRODUCTIVITY

Campbell-Kelly: Just tell me a little bit about writing a program at that time. You would have used coding pads and they would have been punched on cards and they would have been physically taken to the computer.

Schoenberg: Yes, that's correct. Of course the first step is that you tended to write a flow chart, so we had these little plastic templates, and then you would write the code. And the big thing is there is a long turnaround cycle. You'd write the code and then it would get punched, and then you'd discover all the typos that you made, and so it could take a long time. It could take weeks before you had the code in decent enough shape so that you could actually start to test it. There were very few tools. We wrote, well by that time we were writing in assembly language, but earlier in some of the projects you really wrote in machine code. The big problem was that the consequences of making an error were much more serious than in a symbolic form. But both of them had tremendous start-up problems. In addition, there were almost no tools for testing and debugging. One of the projects that I worked on several times in my life was writing a test generator, a program

that would automatically generate data so that you could have some more organized way of testing. Then - even ten, fifteen years later - you'd develop a tool for testing. But these same tools would not be used when the program was updated, so there was no regression testing – no test that would retest what you had already done. So typically, you'd make a change and you would blow something that you weren't even thinking about. So the whole process of debugging and reverse compiling was of great interest to me. Why it interested me is I could be a very sloppy coder so I had more need for it than most people. Coding was very laborious and the procedure for testing was even more laborious.

Campbell-Kelly: Could you, from that period, just give me a sense of what was the programmer's productivity? How many instructions a day would a coder manage and what would have been the cost of a single instruction?

Schoenberg: That happens to be another subject that was a great interest of mine, so I actually studied it. The problem with defining how much code you produced was a definitional issue as to what was the start and the end of the project. Often the programmer would define it from when he gets some specification, but sometimes the programmer was the party who designed it, and sometimes he was only the implementer. And at the other end the question was, well was it when this module was done or when it was actually used. But the number we used to use was fifty lines of code a day. Now that doesn't mean we really did fifty lines of code a day. When ultimately you looked at the total number of lines that existed and you divided the number, you didn't come up to anything close to that. I had estimated in the mid 1960s, that it was costing us about four to six dollars to generate a line of code, but even there, there is the question of what is a line of code, because by that time we were at least working with something other than one to one relationships, although it wasn't huge. We weren't using COBOL or anything that generated a substantial number of lines per line. We had something we called Macros, anyway. But no matter how you looked at it, the cost of programming was in that magnitude.

I remember not much later looking at the costs. When we first started to move code -- to convert code from one machine to another -- we actually were able to get the cost down to about a dollar a line to convert it. But when you look twenty years later at the cost of writing code it hadn't changed much. The cost had risen clearly less than the inflation rate, but not a magnitude less than inflation rate. So maybe there has been a two or three times improvement. It's my belief that despite the fact that people sold tools that claimed to have increased productivity ten-fold and at least two generations of these which would mean at least a hundred fold, that if in fact over the twenty-year period there was a two or three fold increase, it was a lot. I'm not convinced that it was even that high. A lot of it was because nobody really recognized the magnitude of the interface problem. So system software, which was much better defined and had a much clearer beginning and end point, improved in quality infinitely more than application software, which had these terrifying interfaces. Not only did they have difficult interfaces but also they had user internal political ramifications in common. So that's why I have to believe that system software dominated application software at the time. It was just that people had totally unrealistic expectations in the applications software area that couldn't be realized.

Campbell-Kelly: Did you do any applications programming at CSC?

Schoenberg: Yes. We did. I'm trying to remember what the projects were and I don't recall them. It certainly was not our area of expertise. But it was the start of that world. But because it was

before the IBM unbundling, there really was much less. At the time, IBM still, in the context of supporting the customer, did a lot of what we might have done and the customers did the rest themselves, or didn't do it all.

Campbell-Kelly: You started AGS Computers in 1967. Was there anything in between? Did you go straight from CSC to doing that? There was something in between I think, wasn't there?

DICK BRANDON

Schoenberg: Actually there were two things in between. The first thing that happened was CSC closed down the New York office and I was asked to go to San Francisco which in some ways I have always regretted not having done.

Campbell-Kelly: What date was that?

Schoenberg: 1963.

Campbell-Kelly: So you were only two years at CSC?

Schoenberg: That's all it was, right. What happened was, in 1963, one of the real original people in this field – who no one is going to do an oral history on because he's dead – was a fellow named Dick Brandon and Dick was truly one of the two or three first people in the application development area.

Campbell-Kelly: He had a firm, Brandon Applied Systems?

Schoenberg: Yes, he did, but this was before his firm. He had started up a group to do application development at MAI – Management Assistance I think it was called, which was an old leasing company. It was originally a tabulating service bureau; they leased punch card equipment. And I don't know the whole history but Dick left MAI and went to work for another person who was quite important in the early days, John Diebold. And John got much higher-level jobs than other people in those days and Dick was running this practice. And I had shared an office with Dick at IBM, several years before, and so Dick asked me if I would come to work. What I did is I did not go to work as an employee. I guess I really was one of those very first, independent contractors. And the project I worked on was for the Savings Bank Trust Company which was a bank owned by the commercial banks of New York, and we were basically doing an automated deposit system for them. At any rate, it was a very interesting experience but somehow or other I didn't feel quite comfortable there, though they certainly paid better than anybody else.

AUTOMATION SCIENCES

Campbell-Kelly: Did that firm have a name? What was it called?

Schoenberg: It was part of John Diebold Associates. And about that time, I met, through a fellow who ran an employment agency, a guy by the name of Marty White who had the original employment agency for programmers. He had a partner. I don't know what his partner's name was now. And he introduced me to a man named Roger Adair who I had never met, and Roger had

started a company called Data Temps I believe it was called. Data Temps was basically doing temporary help in the data processing area. I joined him as a partner and another man joined as a partner as well and we changed the name to Automation Sciences. And we started doing programming work. And in fact Automation Sciences ultimately went public. It died a strange death, quite a few years after I was gone from it. The first job that I got involved with was one for RCA; we were writing compilers for a computer that was really RCA's attempt to build a compatible computer to the IBM series, the business one. But in those days they were afraid that they couldn't legally do that.

Campbell-Kelly: That was the Spectra.

Schoenberg: Yes it was. It wasn't called that originally but that's exactly what it was. So having done some of the IBM software I was an ideal person to attempt to reverse engineer it. But I had difficulties with my partners. Well I'd rather not go on public record about why. So at any rate, I decided I should leave, and I did. And because we had one of these typical partner arrangements where they owned what I owned, I had difficulty getting someone who wanted to go into business with me. So I did two things. First I went to some clients and asked the guys who I knew there, whether they wanted to go into business with me. This produced absolutely no results.

STARTING AGS

Campbell-Kelly: How did it actually get off the ground?

Schoenberg: I had taken a contract to be the chairman of the computer science department in the Borough of Manhattan Community College in New York City and discovered how un-academic most people in colleges and universities were, and while doing that project I was talking to people about being my partner and one of the people that I spoke to was someone who had been my next door neighbor, well he wasn't exactly my next door neighbor but he lived in the same apartment complex in New Jersey where I did, and he was a salesman at the time for Standard Register Company. He called me up to ask me what I thought about his going into the Service Bureau business. And I said I didn't really like it but was he interested in doing what I was doing and he said he had no preference, so we joined together and he had a former college roommate whose family controlled a CPA practice in New York. As opposed to most very small CPA practices they had a lot of bigger clients because they were Austrian by history and so he had a fair number of Austrian and German clients who were big enough that they might want some computer work. As a practical matter that never worked out, but Joe Abrams and I hit it off very well.

Campbell-Kelly: So Joe Abrams was the neighbor?

Schoenberg: He was my neighbor. Well, one of the things is, having already spent a fair number of years in the consulting world and seeing that not everybody had the same sense of ethics that I perceived I had, it was a pleasure to deal with someone who was always straight-up and that you could rely on and trust. He was a very good sales person as well. And so we started the business together.

Campbell-Kelly: Just the two of you?

Schoenberg: Yes, basically it was just the two of us working. In fact it was only me because for the first six months Joe kept his other job, so it wasn't until September of 1967 that Joe actually became an employee of the company. And that obviously helped a lot because it was impossible to do everything. What was happening up to then was I was working on a contract myself for RCA. We were developing the emulators for the System/360.

Campbell-Kelly: Just you, one individual?

Schoenberg: Well I was in charge of the project. I was not the only person but, at any rate, we decided we would go out and we would hire a sales person. We hired a woman I knew socially through a friend of mine who had not been anywhere near the field but was definitely a sales type. And then slowly we started to hire both sales and technical people.

Campbell-Kelly: What was the firm called?

Schoenberg: AGS Computers.

Campbell-Kelly: Okay so just tell me a little bit about the name. A was for Abrams is that right?

Schoenberg: Right.

Campbell-Kelly: And S for Schoenberg.

Schoenberg: Right. The G was for this guy from the accounting group who was never involved in the company. The name was an accident. The way the name came about was I had given the lawyer a whole group of names, you know all these typical names with three initials, pick three, and we didn't get any of them approved by the state of New York so the lawyer actually picked the name. I was out of town, he picked the name.

Campbell-Kelly: So just remind me, what was the name of the G?

Schoenberg: Graf, Peter Graf. So at any rate we started the business and we were doing the kinds of things that were available to do which were some systems software, some applications. Among the very first projects that we did was one for US Lines that I remember best because I did it – it was one of the very first containerization programs – a loading, unloading and balancing kind of a program. But not that much later came the IBM unbundling and IBM unbundling was a very big issue because it opened up opportunities not just for software products but IBM itself changed how it did education. So for example when IBM started charging for education, it radically impacted the use of outside services because companies weren't used to paying for training. They weren't used to doing their own programming, so it exploded the market. Unfortunately, the country went into a recession not very long after that and so the combination of the two, when the recession ended, really opened up the opportunities.

Campbell-Kelly: So tell me a little bit about this. IBM unbundled in 1970 and you'd started in 1968.

Schoenberg: IBM unbundled before 1970.

Campbell-Kelly: First of January in 1970, but of course it was announced a year before. So tell me just a little bit about that three-year period.

Schoenberg: It was a tough period, a tough period.

Campbell-Kelly: Was there a lot of competition? What made it tough?

Schoenberg: Well for us, we were unknown, but everyone was unknown. It was hard to find someone who was interested. You know there was no natural network place to meet the people. IBM was not referring you to places, the economy was bad.

Campbell-Kelly: Was there difficulty in getting contracts or was it that you had to price them low or once you got a contract could you price it quite high?

Schoenberg: Actually that is a very interesting question. I don't really remember anything much about the pricing. I don't think there were any unusual pricing pressures. It was just you couldn't get the business.

Campbell-Kelly: How did you market the services?

Schoenberg: The most expensive form of one-on-one selling. What we would do is we would run seminars; you know we would pick some subject that we'd know something about, run a seminar, invite what in those times were called MIS directors, but the same guy, whoever it is, the guy who had the glass house and then in the process, introduce yourself as someone who could do work for them. But it was a very slow tedious process. There were several firms around doing work then. In 1958 and 1959 there were a whole group of firms that were founded. We've mentioned CSC, but they were not the only company.

Campbell-Kelly: Computer Usage?

Schoenberg: Computer Usage was founded a year before that. There was a firm in New York called Computer Applications which was really the most powerful one in the New York area in commercial application.

Campbell-Kelly: That was Devries.

Schoenberg: No, it was not Jack Devries who started it. There were five men who started it and the CEO was a guy named Charlie Cooper. Devries joined some time later and ran a project at some government agency. It wasn't NASA, but it was something like that in New York. One of the interesting questions is: Why did so many of these companies get into so much trouble then. The ones that started in the 1950s tended to disappear. And it wasn't that they were any poorer or anything. They seemed to have grown to a size where they had a real infrastructure. When the recession came it was like the dinosaurs -- the big ones died, the little ones survived. So at any rate, by the late 1960s there was a definite market, but it was still substantively connected to the systems development market.

Campbell-Kelly: Did clients ever contact you and make requests for quotations?

Schoenberg: Yes. Of course it wasn't the best way to sell but that was the business you could get. I'm not saying that there was some extraordinarily formal process, but I remember writing a proposal a day for two weeks. Literally, I would personally put out a proposal a day. Let's say the job was for $10,000, something of that magnitude.

Campbell-Kelly: And how did you learn about such a job? Because they had circulated different suppliers?

Schoenberg: That or a sales person; it wasn't that we were unknown, it just that we weren't really well known.

Campbell-Kelly: Was it quite a local clientele?

Schoenberg: Yes, it was almost totally New York City, because that's where we were, and it tended to be applications that were connected to something we did before in an industry, because even then the MIS guys had DP associations, they had organizations so they shared who was doing what with whom.

Campbell-Kelly: Overall were you making more or less money as an individual than you had been before?

Schoenberg: Oh much less. One of the ways this really comes out is that I have three children. My third child, my daughter was born six years after my second son, so there's a nine-year total gap, and you can see the difference from my boys. Basically we weren't poor by any imagination but we had no real money and my daughter basically grew up when we had money. So you can really see the difference in expectation and history because of it.

Campbell-Kelly: So that's the early years, I guess it was treading water slightly and then unbundling made a big difference.

Schoenberg: Unbundling made a big difference and I think size itself does tend to produce more size.

Campbell-Kelly: So how big were you in 1970, how many employees?

Schoenberg: I don't recall the number of employees at all. Having looked not that long ago at some of the numbers we were probably, I think we were doing about a million dollars a year and at that time probably was getting fifty thousand dollars a person so probably about twenty people then.

EARLY AGS PRODUCTS

Campbell-Kelly: So you started to sell some software products at that time. There was a report generator and a test generator you were going to talk to me more about and also a data compression program. These sound like things that were Larry Schoenberg's projects.

Schoenberg: Two of them were. The data compression one was not. It was brought to us by a guy whom I had met many years before at IBM. What happened in data compression is that mass

storage was first coming into existence and though it was pretty big storage it wasn't big enough to hold the kind of files people wanted. So it didn't take much time before people read about some of the stuff going on at Bell Labs and the compression of communication messages.

Campbell-Kelly: Huffman codes?

Schoenberg: Yes, exactly. It was Huffman codes. And it was rather sophisticated stuff and it seemed so obvious to me that people should buy something like that but we had a terrible time selling it. In fact I don't know whether we ever sold it in the United States. I do remember we had three clients in Sweden of all peculiar things. Obviously one must have connected to the other. And it had a tremendous ability to take data because as Shannon proved long ago that there is a lot of useless bit level information.

Campbell-Kelly: That software product was called Express I think.

Schoenberg: Yes it was called Express.

Campbell-Kelly: The other two didn't seem to have a brand name in quite the same way.

Schoenberg: No, because what happened was they were -- as you pointed out -- my pets that I was trying to sell clients on. You know, even today and certainly then, what you try to do is to get some specific client to develop it for themselves so you can use it as a selling tool. The question as to what rights you were going to have afterwards was one of those very intriguing broad questions that Marty Goetz at ADR was dealing with. We weren't so concerned about using it as a product afterwards; we simply wanted to get our client to develop it because it was a project and it was something we were interested in.

Campbell-Kelly: And then you thought that if you could get one client to develop it then there was probably going to be other clients who would be interested as well. You could sell this same piece of software.

Schoenberg: No, see that's the gap question. Who really thought they could sell the same *software* again, because our experience had been that was not typical but the same *expertise*, yes. And so the question as to how close that would be to reselling the same product or the intellectual property rights were very unclear and I think they were unclear long after we were dealing with the problem. So we were more interested in finding ways to create business opportunities with parallel companies than we were in literally reusing the code.

Campbell-Kelly: The test generator sounds more like a tool that you would have developed for in-house use.

Schoenberg: That's true. I guess you could say in-house use. It was certainly developed for use on the projects we were working on. Defining that as in-house is a little different perhaps but yes, the problem was that we were constantly recreating the same things and anyone could see that in theory this code should be reused. There were issues of ownership which date back to the emulation question: could you do reverse engineering? It may seem hard to believe today, but there were serious questions in the legal community about one's right to reverse engineer many of these things. So, yes it was something that was related to improving our own efficiency in generating code

because obviously everybody claimed they had developed a lot of things to write more code efficiently. The only thing you could say is that when you looked at the pricing, the efficiency didn't seem to get reflected, and I didn't notice that they were making more money, so something was not happening that was being claimed.

Campbell-Kelly: Can I just summarize? Would it be right to say that the report generator and the test generator were really software assets more than products, but that the Express data compression really was brought in as a product?

Schoenberg: That's a very fair statement. It was totally brought in as a product.

Campbell-Kelly: And thought of as a product.

Schoenberg: And we sold it. It was marketed that way.

AGS OPERATIONS

Campbell-Kelly: Tell me a little bit about AGS. Can you paint a picture of what your daily life was like? You're the head of this twenty-person company and you have a partner, Joe Abrams. What did the two of you do? Did you share an office with the other people? Did you do your own coding? Just tell me a little bit about that.

Schoenberg: Well, Joe was basically the outside guy so he was out soliciting customers and handling the real action in the business. I was the guy back in the office. A typical day would probably include some time working on a proposal, some time maybe even programming, certainly talking to the people who were programming. And so there was very little time for what you might call business development ideas. What really happened was we stuck to our jobs each day, to get the job done. And we operated in that fashion until the very early 1980s.

Campbell-Kelly: The software industry is famous for having young staff who work very long hours and burn themselves out. Was that really a later thing or was life at all like that?

Schoenberg: No, it wasn't much like that really.

Campbell-Kelly: Was it more nine to five?

Schoenberg: Yes, but you always had some people who were obsessed with programming. I often tell the story of myself years earlier where one day, many years after I left IBM, I woke up in the middle of the night and remembered a bug. I actually could reconstruct a bug in a program that I hadn't looked at for five years and I went and I found out that it really did have the bug. So you know, to some degree you had people who could get pretty obsessed by it. But I would say it was not that way in our kind of company because we were really a commercial shop dealing with clients so the day was defined by the client. You know the way you got into trouble in our business was you took a job on a fixed price base and people would always say things like you just didn't do the job right and of course the truth was that the job was ill defined. Now that's our problem. But it was such generic problems that would drive you crazy and cause people to work long hours. We weren't overwhelmingly successful. I guess compared to the other people we were very successful. But it was really grinded-out hour-by-hour, day-by-day and I think for those of us who were in the business at

the time, it's hard to say you were driven by money. Clearly it had to be an element in it, but we were very independent souls and probably not very employable.

Campbell-Kelly: During the period we are talking about – late 1960s – I've read on good authority that there were around three thousand computer services firms in the United States. I guess in New York there may have been a hundred. Would that be right?

Schoenberg: I find it hard to believe there were three thousand firms and I would suspect that includes many that I wouldn't have considered as computer firms. I knew of the ones we competed with in New York, maybe there were five, so that probably says there were twenty.

Campbell-Kelly: And these were software contractors?

Schoenberg: Right. Maybe twenty. I mean I don't know. There weren't many individuals doing the work and New York was a very dominant place. It's hard to believe that New York wouldn't be a fourth or a fifth of the country because there wasn't much going on except in a few places. And those places tended to be where the big white-collar businesses were because AGS only did work in those days for white-collar industries, because they were 99% of the marketplace. You could actually find some people who were involved in manufacturing but, in New York, you just didn't come across them very much.

Campbell-Kelly: So if there were maybe fifty firms of your kind in New York, probably there would not be more than say five hundred to a thousand in the United States as a whole.

Schoenberg: I would think that that would be high, at the high end. And I've never seen any survey that showed me any other number, and it's true that you know even the trade association had numbers that were larger, but they were mixing very disparate kinds of operations. There were a lot of Service Bureaus processing data on punch cards. It doesn't really matter what they were doing it on, but it would have made it much more difficult to find them. And I would suspect that if you went back to the old ADAPSO records, assuming that they exist at all, you'd find how many people they could service. I remember going into the yellow pages considerably later, so we're talking the latter part of the 1970s, going into the yellow pages – I got the yellow pages from fifty cities in the United States – and I looked under various terms. The only terms I remember that worked were data processing services in the yellow pages. And I wrote a letter to every person in every one of those companies and a lot of them didn't even really exist and there were very few with any staff. I mean if I found fifty in the country and I'm not saying there weren't more firms, but fifty that I could readily identify and talk to or whatever. So I believe these were very small businesses and the whole thing was very, very small and it was small because the clients used it as backup, not as a primary solution to their problems and IBM was not really friendly to us because of their perception of loss of control.

AGS GOES PUBLIC

Campbell-Kelly: 1969 – that's AGS Computer's initial public offering. Tell me a little bit about that. That must have been a very good time I would think. That was really the height of the go-go market.

Schoenberg: Yes it was the electronics go-go time. It was a good time and the evidence of it was that we could go public. The question really is: Why on earth did we do it? And it's not easy to answer that. I mean it was some combination of ego and perception among customers.

Campbell-Kelly: Did it make you seem more credible?

Schoenberg: Certainly the cost of capital was de minimis so I don't say it was a mistake for us. It was probably good for us but it was a mistake for society. It didn't really do much for anybody.

Campbell-Kelly: So you and Joe Abrams were the principals. What proportion of the equity did you get as the founders?

Schoenberg: Well, there were basically three of us because Graf had a third of the shares too. We never cut him down on the shares, never did. So basically we owned 100%. The offering gave out 10% so at that time we owned 30% each.

Campbell-Kelly: So that you only brought in 10% for the new equity.

Schoenberg: Right.

Campbell-Kelly: Well how much money did it actually raise? Can you recall?

Schoenberg: I think just $350,000.

Campbell-Kelly: So that wouldn't even have bought a computer at the time.

Schoenberg: No, because we weren't into doing that. No, there really wasn't any substantive reason. And in theory at least all the things that people do it for now applied but they weren't needed nor intended.

Campbell-Kelly: And in fact it just actually would have made you a bit more vulnerable too. Well I guess if you all owned the shares it was not a problem.

Schoenberg: It was a non-event in most ways and being public is not as big a deal as people make it out to be today -- although with some of the regulatory issues I guess it is more of a problem.

Campbell-Kelly: Now, after IBM unbundled you said there were two factors in the early 1970s. One is that unbundling should have given you great business opportunities and the other of course is you really hit the early 1970 computer recession, which I guess is the worst the industry ever had.

1970-1971 RECESSION

Schoenberg: That's correct. In 1970-1971. I think it was over by 1972. One of the differences is that it was the only time in my whole business life that all sections of the economy were impacted. We've had plenty of recessions --blue-collar recessions, white-collar recessions. That's the only one in my personal business life, perhaps until this last year which is really beyond my business life, that everyone was affected. It was very dramatic and people who had expanded

seemed to be unable to adjust to it. So you had the demise of many of the earlier companies. It is somewhat reminiscent of the destruction of the dinosaurs. Not because they were dinosaurs but they were larger and somehow or other everyone from Computer Applications to Brandon went down. Some went down just slightly, Automation Sciences, even Computer Usage, although it didn't go down then it went down later.

Campbell-Kelly: Computer Sciences had a hard time.

Schoenberg: Computer Sciences was basically busted, they only survived because the government decided they needed them and kept them alive. So it was a very difficult time and the firms that did well in the ten years after that tended not to be the ones that had been the bigger companies going into that cycle. And you know, I can't say that I can explain it other than those who were biggest seemed to be unable to reduce in size.

Campbell-Kelly: So it wasn't really that you were lean and mean, it was more that the bigger companies had a lot of infrastructure.

Schoenberg: I don't know whether that's lean and mean. It could be lower expectations too. Expectations are intriguing. But all I know is that I could see that many of those people who I thought were good both professionally and as businessmen disappeared.

Campbell-Kelly: Some of the projects that afflicted Computer Sciences and CAI were computer utility projects which were very capital intensive.

Schoenberg: Yes, there were a few cases. Automation Sciences went down with a capital-intensive process. I don't remember why CSC went down particularly.

Campbell-Kelly: They had this Infonet project.

Schoenberg: Oh, they had the Infonet and of course there was Datran that took down Wyly. Yes that's true and that would be very understandable.

Campbell-Kelly: But yours was really a people business.

Schoenberg: Ours was a people business and the other businesses we just dropped. We had a small company in the optical scanning which we thought was a very interesting business – we just ended it. We were in the training business – we just ended it. We had the Express product which I thought was a great product – we just ended it. So it didn't have the same consequence to us, but you're right, several of them were highly capital-intensive or they got too involved, I thought, well, I'm not sure. I thought CSC got involved in some very big projects that they had big losses on. What invariably happened is that people who worked in the development area, people would say, "We know better how to build a system. We have all these wonderful tools. Therefore we will make more money if we do the job on a fixed-price basis." And unfortunately they didn't. I don't think most of those were caused by actually screwing up although the difference is in the mind of the beholder I suppose.

Campbell-Kelly: So you would not have been under a lot of stockholder pressure since only 10% of the equity was public.

Schoenberg: I don't remember anybody being under shareholder pressure. I don't think shareholder pressure was the issue at all.

Campbell-Kelly: Even with the other companies?

Schoenberg: Right. I don't think so.

AGS GROWTH IN THE 1970s

Campbell-Kelly: Tell me a little bit about the 1970s; it was a period of slow growth for AGS, is that right?

Schoenberg: It certainly was, compared to the kind of growth expectations that people have today. But from 1972 on I thought our growth was pretty substantive. And a lot of it was because we expanded out of our original market. We extended out of our market both geographically and functionally and by the end of that time we actually started to do acquisitions. Emotionally, I remember feeling that 1972 was very good, and by 1976 we thought of ourselves as successful.

Campbell-Kelly: Tell me about one or two of the landmark projects that you did in the 1970s -- this period when you were feeling confident and buoyant. Were there any particular big projects or was it lots of little ones?

Schoenberg: We tended not to have gigantic projects and truly I didn't think about it that way during the timeframe. But what really happened was that we grew with the marketplace and I don't think that we necessarily grew other than that way. We did accounting software for the brokerage firms - we did a lot of margin systems and back office systems. There were the computer manufacturers and we started to work on a lot of their system software. We did a lot of the original UNIX development at Bell Labs. We did a huge amount of work at IBM in development of parts of their operating systems. For example we did a big part of some of their security software. But basically they weren't our projects and so we were really part of this tremendous growth in the computer world itself, the white-collar world and the white-collar industries. Banking, brokerage and telecommunications were for the rest of our business lives the largest. Our largest client was AT&T/ Bell Labs. Bell Labs was the development arm for their computer activities, not just the pure research center. So UNIX was totally developed in Bell Laboratories. And the founders worked there. So we worked on a lot of projects of that sort. As I said, I don't think we ever thought of ourselves particularly as technology driven but naturally when you did that kind of work you were per force the people who could help implement those systems for clients. So, the big thing that drove the growth was the fact that the ultimate purveyors of the hardware -- which to us meant not only the computer manufacturers but the telecom companies -- started to use massive numbers of outside people. And if you were to go and interview the twenty largest services companies I could tell you right now, you will find the same three companies were their largest clients. Every place you go they will tell you the same companies.

Campbell-Kelly: Which three were they?

Schoenberg: They are going to tell you AT&T in some form, IBM, and Citibank. You're just going to hear them over and over again. And we used to say our greatest sales people were the

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people who handled these accounts. One of the amusing things that happened when I got involved with the trade association was I discovered that it was the same people these guys thought were their best sales people. Of course, we then discovered that it was more the client than it was the salesperson, and the growth of those businesses themselves, the extent to which they were reselling services. They started to sell things that they were creating and tremendously increased the business and so in the large cities, these kinds of businesses started to be very dominant.

Campbell-Kelly: Were you selling on time and materials or fixed price?

Schoenberg: Well we tried to sell on time and materials. A certain percentage of your work landed up on fixed price and some of it, I would say, we actually solicited on that basis but I'm not sure of that. We knew already how dangerous fixed prices were. But I remember some of our most successful fixed price jobs were successful because we had the most ornery son-of-a-guns leading the projects. We had one guy threaten to shoot the client. Literally. I got called in the middle of the night by this guy. I had to come out and sit with them because he was threatening to shoot the client. So I go out there and I say to the guy, what is going on? He says if we don't get this computer time now we're not going to get the project done. And so he got the project done. Ticked the client off no end, but he got it done. And that is the kind of person it took. But it doesn't lend itself to repeat business. In some ways this may be rewriting history. I'm not sure we really recognized that systems software was more do-able on a fixed price basis. But in fact it was. Much cleaner interfaces that defined what you were doing.

And you know, I point out that during the 1980s so many companies attempted to develop applications overseas. I'll bet we emptied out your homeland (UK) of programmers for a while there. And then everyone said, well why should we empty it out? Why don't we send the work over there? I can't tell you how few successful projects there were with sending the work out. Very successful bringing the people in, very unsuccessful sending it out. Why? It's simple: because the interfaces were much too complex to have it done remotely with the type of equipment we had then. Today it works better I assume because with the Internet you have much quicker interaction.

Campbell-Kelly: But I guess it would always work better with systems than with applications.

Schoenberg: I personally think it would.

Campbell-Kelly: Let's move forward to about 1980. Tell me how big was AGS at that stage, again in terms of turnover or number of people or some measure like that.

Schoenberg: We had almost $14 million in revenues in 1979. Incidentally, our market cap was $3.8 million so we traded at .22 times revenue and 7 times after tax profits.

Campbell-Kelly: How many staff?

Schoenberg: We finished 1979 with 300 employees. First of all under technical staff you could probably divide it by seventy thousand dollars a person and then figure that for every one of those, probably you have one overhead or sales for everyone, so you would take the number, multiply it, take the revenue and multiply it by about seventy thousand, seventy-five thousand and then add a third. Probably something like that and you would get a pretty good estimate.

AGS IN THE 1980s – GROWING BY ACQUISITION

Campbell-Kelly: Right. Tell me a little bit about what it felt like. How was it in 1980? You were now president of this firm? What was Joe Abrams doing?

Schoenberg: It was quite different – it was very different. What happened was, about 1982 we changed how we operated. Joe became the president and I became the chairman. And it was an accurate reflection of what we were doing. Joe moved out of sales, although that was always his baby, and started to actually run the daily operations. And I moved out of the daily operations and started to think about where the company was going. It's impossible to say whether this was a brilliant decision or simply the right decision at the right time, but it certainly worked for us. So, my day changed and I can remember, it had to be 1982 because I remember what company we had just acquired and how I went from going there all the time to not going at all. I basically didn't have anything to do with it. And I had come to realize that acquisitions were a very cheap way of growing.

The funny thing is although we were not in the software product business until 1981, it was the experience in seeing what was going on, maybe through ADAPSO, in the software product area that drove me to look at acquisitions because I had noticed that companies had a bad analytic evaluation of the cost of developing a product. Part of it was because of what I consider bizarre accounting. So that by the time they had the product they had already written it off, so they thought they had these huge margins, which of course is nonsense. So I noticed that the big problem was that nobody was taking into account failed projects. All of their analysis was built around projects that succeeded, which was not a large percentage of the projects. So I said to myself, who is paying for all these failures? And then I discovered there were all these guys developing products who simply never got anything for them and so it made me start looking at the economics of acquiring rather than buying and I could see that they were awfully good. And I can truly say that one of the things that we did was that we were the first company to believe that you could buy a company which had nothing but people who as they always told me could walk out the door every night. And I discovered that yes, they could walk out the door every night, but they don't and even if they do walk out the door, the clients don't walk out the door. And so the combination was pretty intriguing -- to notice that you could buy something with no assets, no assurance it would continue, and yet 95% of the business stayed with you.

I remember giving talks like that at the trade association and people didn't believe it. They literally didn't believe it for a decade. Unfortunately we did not have a high-priced stock to buy with. You know if we had had a high priced stock we could have really done damage because we could have bought everybody. But we did not have an expensive stock and we did not have an expensive stock for the same reason why we were able to do it. Nobody really put much credence in the whole idea. And you know I always say in business there are people who go to earn money and there are people who go to trade money. And we were earners. I mean our view was, would we make money from it, not, could we sell stock from it. And turns out that we were in the wrong end of the business. Selling stock was more desirable than selling business, but that wasn't where we were at.

Campbell-Kelly: It's a very interesting comment you made about an easier way of expansion is by acquisition rather than organic growth. There are two views of that. One is because developing a software asset is expensive and it takes time and so buying a company gives you an entry much quicker than you could actually grow that software. But the other thing that you expressed is that

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you are actually buying a customer base and an organizational knowledge. You're buying the knowledge of the people. Which worked best for AGS? Because you got some products?

Schoenberg: Both, but I would say more the expertise and the contacts than the actual product itself.

Campbell-Kelly: So that would be the custom software and software contracting.

CUSTOMER ORIENTATION

Schoenberg: I was even answering that in the context of when we got into the product business, because essentially you always did better when you could reflect what the customer wanted rather than what you wanted the customer to want. And it's not that I didn't make that error innumerable times myself because you know when you think you are smart and you're clever you say, "I don't care what the customer says, I know better ultimately." And you may be right in the purer sense of the word, but you are wrong in a business sense. It won't work. I remember one time correcting a client who made one of these absolutely idiotic statements proving he didn't know anything about software at all and I won, but I lost the contract. It was not much of a victory.

This whole thing comes up hundreds of times in developing new products. I'm sure right in this group, we'll find people who will tell you, "Don't waste your time with customers, they don't even know what they want." And they are right. They are literally correct. But developing a product without the participation of customers is not likely to succeed. Either that or it will be the greatest success in history. Because without that customer input you cannot understand the context in which they are operating. It is not an independent product. So, even in product development there is this whole thing. Do you want to line up four clients to work on it? Well everybody could see that if you line up four clients you get paid, it's much more conservative, but you also don't get the product out because they argue. It's not that there aren't arguments on either side, it just seems like the overwhelming one in the end is, will the client accept it and use it and if they don't participate it's not that likely.

ACQUISITION EXAMPLES

Campbell-Kelly: Let's just try and explore this a little bit. I want you to give me an example of a product that you acquired and an example of a software contractor you acquired, so people will understand the kind of acquisition you made and how successful it was. Also what was the most successful product that you acquired?

Schoenberg: The trouble is that many of our acquisitions were not purely one or the other. By the 1980s many companies had already discovered the idea that the thing to do was to sell the installation of the product. I don't mean the physical installation but the modification of it to an environment. So we bought a company in New York that did work for the securities industry and they would get like two million dollars out of a license and then get six to eight million dollars to modify it which produced much greater margins than pure development companies would have.

But I think the most interesting one - it wouldn't be quite responsive to your question in that it isn't necessarily the most profitable one. We bought a company in Baltimore that had a very little niche in banking products, I mean really little. One of the ones I went to look at there was they had this

product which produced reports on compliance with the new laws requiring reporting of over ten thousand dollar cash payment. I looked at this program as a programmer, you know? I went in and I said this is a piece of crap. And I said to them why on earth do people buy this? So I ask the client, why did you buy this? We're charging them ten thousand dollars for something I could have written in an hour. And he said to me because the government requires that we say we have this function. Oh, and 5,000 others bought it. Now that was absolute nonsense but it was responsive to the specific needs at the moment.

One of the questions you broadly hinted about here was the question of how do you compete with Hogan and Anacomp? And my response is, what do you mean compete with them? We never saw them. Anacomp I think disappeared without ever selling anything. Hogan did have some sales. I'm not saying Hogan was wrong, in a way they were absolutely right. One should have a comprehensive system, but the customer wasn't buying it so we looked for little niches, the smaller the better, but ones where the customer says, we need it.

You know one of the most famous speeches that I ever gave was one in Japan. They had asked me to come and talk about why we made money when other companies in the field – this was early 1980s – were not making money. And I said because we don't service people with needs. We service people with money. And in the same vein, people have great difficulty even in defining what their needs are. So we simply said, we will allow the customer to tell us what he needs and develop services and products to match. In the professional services area what we tried to do was get more, first of all, more mass. There are clearly some critical mass issues. Nothing gigantic, but clearly until you got fifty people in an office it wasn't worth having. So the first issue that we had was simply buying companies in the area and we bought someone who subsequently became the head of ADAPSO as a matter of fact. Bought his company in New York. It was a very successful acquisition because it just gave us size.

Campbell-Kelly: And who was that?

Schoenberg: Software Design Associates, Jay Goldberg. We bought in other cities for geographic distribution. Geographic distribution didn't work quite as well because the same issues applied. You still needed size. But it was not uncommon. Here's a good story -- my son was just asking me about a week or two ago. We bought a company in Boston. Very nice guy. His name was Phil DePasquale. The company was PHD Systems, and it was our first acquisition. I don't know what we paid for it. I think we paid $400,000 or maybe a little more and because Phil's advisors had said he should take installment payments to reduce the tax, we actually never paid a dollar out of our own pocket. It was totally paid for by his own company. So after a couple of years I had dinner with him and I said, well Phil, what do you think about having sold the company? And he said, I'm thrilled about it. I'm thinking, this guy is not a dope. What on earth is he thinking? And he paid for it with his own money. And he says to me, well you forgot one thing. You gave me some stock options and they are worth much more than the whole purchase price was worth. Well my answer to that is, yes, it's true and I'm happy to have done it, but he couldn't have counted on that. It was not in that context part of the decision. I'm not sure what he should have done; maybe he shouldn't have taken the installment sale because you deal with a small company, who knows if you're ever going to get the money.

AGS LISTING ON NY STOCK EXCHANGE

Campbell-Kelly: In 1983 AGS got a listing on the New York Stock Exchange?

Schoenberg: Actually it was 1984.

Campbell-Kelly: Was that important to the firm? I guess you no longer owned 30% of the stock at this stage?

Schoenberg: Right, I think by that time I owned something more like 10%.

Campbell-Kelly: And you were issuing stock in order to make these acquisitions?

Schoenberg: Right. I don't remember at that precise date, but let's say 10-15%. First of all remember I had been spending my time more on the market and things of that sort. There were several reasons why we did it. I don't think it had any dramatic impact one way or other on the company, but it was useful for selling to clients who were gigantic companies themselves.

Campbell-Kelly: So it was just a bit of prestige and credibility I guess.

Schoenberg: It was a lot of prestige and I think it was the cheaper deal for our shareholders. The spread in the buy and sell price was about half on the New York Stock Exchange what it was in the over the counter market.

Campbell-Kelly: In 1985 AGS went into distribution of microcomputers.

Schoenberg: No, actually it happened in 1981.

SELLING TO DECENTRALIZED BUYERS

Campbell-Kelly: Okay, so tell me a little bit about how you moved into this?

Schoenberg: That was very intriguing. What was happening in the 1970s is that it was the start of the time when the computers in a user organization were moving from centralized control to much more decentralized control. Through the 1970s, pretty much all development in large companies was done by a centralized organization. By the end of the 1970s it had started to become a trend that people were going to decentralized development. The ultimate user was not some centralized shop but some decentralized department. In doing this it created a tremendous opportunity for business, but it also created a tremendous increased cost because there were so many more people to sell to.

I remember at one time, at New York Tel which was one of our larger clients, we had gone from five clients to five hundred potential clients in a two-year period. So we were using this very expensive direct marketing sales person calling on them and I could see that the cost per sale was rising astronomically and the costs for us to reasonably cover the client would be horrendous. So I started to look at alternative ways of selling. The first one I noticed was people doing telemarketing. And in fact I went on the board of a company which was called VM Software at the time and then became System Center, run by Bob Cook. I went on his board because I was intrigued by the fact that he was selling a product and had certainly substantively reduced his direct selling costs. But it

was a systems software product and it was hard to see exactly how we could use this because ours was a commercial development business.

So I came across someone who was doing distribution of hardware and that model is sort of the agent model; we used a distributor model which was also a model being used by the early software products companies overseas. And so I got into the business not because I was interested in the business, but because I wanted to learn more about their method of selling, which was really telemarketing and what's more they already were an independent sales agent. Well we paid a million dollars in 1981 and within a year that business was doing ten million dollars. The largest competitor -- who I had met because I always try and organize a trade association type of thing -- called up and said they were considering selling and would we buy. So he told me the price which was five million dollars. The company was doing twenty five million at the time and I said yes. I didn't even discuss it. And within three years it was doing a couple of hundred millions of dollars. Now it's true, use of revenue in that kind of business is not the best measure. But the fact is, what happened was it took off on its own, independent of my ideas. I never was able to very much adopt their methods to our selling, in fact to this day I don't think there is very much selling in our traditional business other than the direct sales model. But I was very fortunate, and as I often say, the trick is to ride the winners and let the losers go, and we found a winner.

Campbell-Kelly: You never went into microcomputer software though?

Schoenberg: Actually we did in some small ways. One of the very first software products companies that we bought was a project management company, I remember going out to San Diego because there was a company out there that had a product very much like it – it had very sophisticated project management software which they were selling. And this company wanted to sell their microcomputer software for one hundredth of the price and I said, who cares? And the guy who was running the business unit says, we can't make money doing it, and I said, well we'll have to change the way we do business and I never won the battle. And we didn't buy the product. I wouldn't say we never had any micro products but we never had any mass-merchandised products. We had some that were on that platform but they were still priced in a totally different way.

SELLING AGS

Campbell-Kelly: In 1988, you split AGS into two and sold the two halves. Tell me a little bit about the background. Was this really you moving into retirement or what was happening?

Schoenberg: No. We were among those people who always said -- as a response to all these people not selling who should have sold -- if someone came in and offered us a high price, we'd sell, and that's exactly what happened. NYNEX walked in the door, said they wanted to buy, and they didn't want the micro-distribution business for bizarre reasons because they claimed it would violate their agreement with the government not to be a manufacturer. It was part of the AT&T divestiture issue. So we did it. I think my partner Joe was ready to retire. I was more ambivalent. I was enjoying myself after all. I didn't have any real responsibilities. It was a very pleasant, successful time.

BECOMING A DIRECTOR

Campbell-Kelly: So what happened after that? That would be 1988 and you'd been a director of lots of companies.

Schoenberg: Well I decided that my second career, the wind down thing, would be to be a director of public companies and I did it quite successfully. And I think it worked exactly the way I wanted.

Campbell-Kelly: And always as an external director?

Schoenberg: Yes. That's not quite true but as a practical matter it's accurate.

Campbell-Kelly: Can you tell me about a couple of the companies that you have been a director of – just to give us a sense of the kind of things that you achieved or the way in which you helped these other companies. Were they small companies or large and those kind of questions?

Schoenberg: I think in retrospect you start to realize how little impact a director has and what's really important as a director is that you can choose who the CEO is although even that's not true in most companies. You can only choose if there is a problem, and that you can only deal with very broad long-range issues. But the first one I went on was VM Software which became a New York Stock Exchange company and got sold to Sterling Software which has now been sold to Computer Associates. And I felt that in a lot of ways because I had run a company and because I knew the industry I would be very useful and often was in trying to explain what was going on in the external world. I have been a very active director in most companies and I do think that one of the things that I have added is an external view; companies tend to be very inward looking no matter how much they try to do otherwise. And only directors really have that view, and directors, although they may do very little, at least are more credible to management than non-directors. I've been on the board of SunGard for many years which has been a wonderful experience. Of course anytime you are on the board of a company that succeeds it's wonderful. I can't claim any of the credit for it, but I will say that I was a perfect director in many ways for them because they ran their business so much like I ran mine, very decentralized -- don't worry about the inefficiencies in specific places because they are nothing compared to motivating people. So I think, my understanding that people drove these companies and to understand that a certain level of inefficiency was a cheap price to pay for giving people room to make mistakes was highly desirable. I landed on the board of course of a distribution company which turned out not to be a good solution.

Campbell-Kelly: That was Merisel?

Schoenberg: Yeah. Mainly because the business kept getting more and more competitive and as businesses get more competitive the margins go down and the room for action becomes much more limited. They got totally dominated by the manufacturers who cut them left and right. If they had focused more on the customer rather than on the manufacturer, which seems sort of obvious in retrospect, they would have done better. I have basically been on companies of that type. I was on an insurance company board for a while which was interesting but I couldn't provide the same kind of value to them that I might for someone else. One of the things I had been so involved with when I had been at the trade association is, I believe I was the only person who was ever the president of more than one section. I was actually the president of three. I don't think anyone was ever president of even two. So I became very involved with its external affairs, which is funny considering I was the inside guy originally in my own company.

ADAPSO

Campbell-Kelly: When did you become chairman of ADAPSO?

Schoenberg: 1982.

Campbell-Kelly: What sort of contributions do you feel you made?

Schoenberg: Well I think the biggest contribution – I can't find any way of quantifying it -- but I do believe that I was someone who always felt that by supporting other companies in the industry I was supporting myself. This is not an overwhelmingly common attitude. I heard Luanne Johnson say last night or this morning, how amazed she was to discover that people, her direct competitors, would tell her things. And I feel that I was a major part in encouraging that kind of environment in the association by doing it myself. I brought in a lot of professional services firms and one of them, Dave Campbell of CTG, often tells the story about how he met me. I went out to fight for him in New York State because the sales tax people attacked. Now you could have argued that if he had gone out of business I would have been better off. I argue we all would have been worse off. I think this was the biggest contribution I made.

Campbell-Kelly: Do you think that was really partly because these were quite good times, weren't they, the early 1980s? Would you have felt so inclined to help competitors in 1971?

Schoenberg: I don't know about 1971, but this was the mid-1970s when that happened so it wasn't that good. Yes of course, nobody operates the same way under stress as they do under good times.

Campbell-Kelly: You were also CEO of AGS Computers at the same time so that's a busy life.

Schoenberg: Yes, but remember I said that by 1982 I had moved out of the daily operations.

Campbell-Kelly: When you took a more strategic role…

Schoenberg: Right. And it worked well for the company as well because it gave me a chance to see a broader perspective.

Campbell-Kelly: That would have been not possible if Joe was not looking after the shop?

Schoenberg: That's true. It would not have been possible.

IBM RELATIONS

Campbell-Kelly: Larry, tell me a little bit about your relationships with IBM over the years. As a competitor and, of course, as an employee. How tough were they in the marketplace? Sometimes they were helpful I think.

Schoenberg: I think my relations and my company's relations were better than most. Obviously having been an employee and having a lot of friends there over the years, I had a much more positive feeling about the company than perhaps other people did. I actually threatened to sue

them right after the unbundling. What happened was, they had given some contracts to Computer Usage to do some work on the System/360 and my concern was that by training them I would be thrown out of the market. So I said: you must provide us with equal training. I didn't get a response back at all. Intriguingly enough, a month after that the guy who had been the man I wrote the letter to at IBM went to work at Computer Usage. I thought, oh, this is a problem. But in the end they provided training for everyone. We then tried to use them. We had some very exotic projects -- pretty amusing stories about the use of technology in hard areas like stockyards. We had a contract for air-conditioning the Holland Tunnel.

Campbell-Kelly: What date was that?

Schoenberg: Early 1970s. If you think about the problem it was sort of an amusing one where you keep blowing the air back and forth. At any rate, we were trying to use IBM equipment and at the time they had a Series/1. And the operating system was a disaster so everyone in our company was furious because we were losing money, the customer was unhappy and the only thing I can say is that IBM must have realized that, because within a few years they gave us some wonderful contracts. There is no way of knowing whether it was payback or not payback, I just don't know, but you sensed it was. IBM, despite all the fights and battles, was very professional, everything was high level. Sure, they could compete by what some of us considered to be unfairly, but you always felt that on a human level, on a personal level, that they were professional. That's not what we all feel about some of the others today when there are battles. But it was always ambiguous with IBM because they were both a client and a competitor. They were also people who could control your fate because they could not only affect their business with you but they could affect their client's business with you if they wished to. So there were always these multiple relationships but I would say in general they were very good.

Campbell-Kelly: But you developed software for RCA for a competitive machine in the 1960s. Did that make a black mark for you?

Schoenberg: I don't know. It would be a wonderful question to ask someone at IBM. You couldn't sense that particularly and remember IBM is the company during a lot of that time that went to great lengths to see that you didn't work just for them. Their lawyers were lunatics about that kind of subject, I think inappropriately. So my guess is maybe someone was annoyed but pretty far up. You're right because having worked on the emulator, there weren't very many people who could have worked on that sort of thing. You would have had to have a very deep knowledge of how the IBM hardware worked from a programming perspective but I never heard of any black mark.

Campbell-Kelly: Okay, Larry, I really enjoyed our talk. Let's go have a cup of coffee.

Schoenberg: No, I want to interview you!