

An Interview with

WALTER BAUER

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Conducted by Arthur L. Norberg

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Charles Babbage Institute  
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Abstract

The interview covers Bauer's work at Ramo -Wooldridge and the formation and growth of his own software firm, Informatics General Corporation. Bauer joined Ramo -Wooldridge in 1954 and worked on various projects, mostly in software development, in the 1950s and early 1960s. In this context he discusses the proprietary nature of software and the development of the software industry. In 1962 Bauer, Werner Frank, Richard Hill, and Frank Wagner started Informatics General Corporation as a wholly-owned subsidiary of Dataproducts. Bauer discusses the corporate structure, business strategies, and products of Informatics General. He also notes changes in the software market from the early 1960s to the early 1980s.

WALTER BAUER INTERVIEW

DATE: May 16, 1983

INTERVIEWER: Arthur L. Norberg

LOCATION: Woodland Hills, CA

NORBERG: Today is May 16, 1983 we are in the offices of Dr. Walter Bauer, President and CEO of Informatics General Corporation for an interview. Dr. Bauer, in the interview with Robina Mapstone you did talk about activities at Ramo-Wooldridge, but several things did not get covered. We're interested particularly in knowing some of the other people and projects that you worked on in Ramo-Wooldridge. Can you reflect for a few minutes on how you came to Ramo-Wooldridge and what sort of initial projects you had to work on and who the people were, please?

BAUER: My time with Ramo-Wooldridge can really be divided into two phases and the latter phase is of more interest to our discussion here. I came there in 1954 as one of the first 100 employees and as their first experienced computer applications expert. I was given the responsibility of setting up the computer installation, which turned out to be a very big and a very extensive one. We quickly got to have one of the biggest computer installations in the southern California area and this was a place to be in the late '50s where all the big computing was going on -- Douglas, North American, Rand Corporation and those places; this was the hot bed of scientific computing in the '50s. In 1959, I changed over to the Ramo-Wooldridge Division. The earlier job was setting up the computer service with the Space Technology Laboratories or the Guided Missile Division -- it had different names at different times, which was a service group for technical computations. I switched over to the Ramo-Wooldridge Division in 1959, and that period from '59 to '62 was far more interesting from the standpoint of our subject matter here, which is software and the development of some of the historical aspects of software in the southern California area. We couldn't... Well, before I get into that, let me just mention that and make sure for the record that everybody understands that southern California in the late '50s was really the most important place for software in the country, no question about it.

NORBERG: Why is that?

BAUER: Well, it turns out that the most advanced software being done anywhere in the country was being done right here as a result of the large amount of money and the large amount of computing capacity that was being spent by the aerospace companies. The companies that I mentioned, Ramo -Wooldridge, Rand, Douglas, North American and Lockheed, were spending a lot of money on computing. They had the largest installations in the country; there was a spirit of comradery in exchange of information among those organizations. There were a few other good leading computer areas around the country at that time. I think Grumman back in the New York area and a couple other places around the country were doing advanced work, but the large amount of large-scale advanced commercial soft... well, mostly scientific but industrial, I should say, industrial large-scale computer software systems were being developed right here. It was kind of a recognized leadership of that and my organization at Ramo -Wooldridge was one of those. I can't say we were an extraordinary leader, but we were among the leaders, you know; we made our contributions.

Okay, so then I switched over still within Ramo -Wooldridge to the Ramo -Wooldridge Division. The names of the internal Ramo -Wooldridge organizations probably aren't very significant here -- but I switched over to the part of Ramo -Wooldridge which was engaged in the development of a large-scale data processing system which was very highly classified. Of course, the guided missile work was very highly classified, too. Ramo -Wooldridge had the contract for the first guided missile work and the systems engineering and technical direction of all of the people in the country working on the guided missile program. So we were technical leaders in the guided missile program. And then when I switched over to the other part, this was a large-scale program for handling information. I guess...I will assume that in the 22 years since that this is a declassified point of information, I think I'm safe in assuming that it's declassified. It was a system for handling information from observational satellites. The first observational satellites were being put into play in the early '60s and Ramo -Wooldridge had -- I've forgotten the contract name and number now - but we had the contract to develop the ground handling system for all of the information that would come down, the photographs and interpretation of the photographs and so forth, from those observational satellites. This is significant from a data processing point of view as I'll develop in just a moment. Am I on the right track now?

NORBERG: Yes, very well, yes, thank you, keep going.

BAUER: It was significant from a software point of view because we at Ramo -Wooldridge developed some of the first uses of computer controlled terminals and user friendly terminals, in the sense that a man would sit at a terminal or a console, really, and he would type information into the computer and the computer would respond and prompt him to do other things. Now that's something that 4 million people today are doing with their micro-computers. If you have a micro-computer, that's exactly what was going on. But if you peeled back the pages of time, in 1960 nobody was doing it. It was a totally new concept that you could talk to the computer and the computer would talk back to you. It was of very great importance for the project, because what was typically happening here was a photographic interpreter would be sitting at a console looking at a new photograph.

NORBERG: This is a person I take it.

BAUER: A person, a photographic interpretation, a PI, as they call them in the trade. He would identify something that he thinks that he is interested in on the photograph. Then he would begin a dialogue with the computer -- the location, the latitude, the longitude location of this thing that he thinks he's interested in. Then the computer would come back to him and say, "Yes, we've seen something here before at that latitude" or maybe we haven't seen something. Then he would ask the computer the question, "What is it that we thought we saw last time?" So this dialogue between the photographic interpreter, the PI, the human, and the computer...and he was going into the data base to see what was seen. And since this covers a very, very large number of targets and subjects, you know, it could be tanks, it could be radar installations, it could be people, it could be buildings, airplanes, missiles, anything; it's a tremendously big and tremendously important data base and was considered to be -- and I don't know what's happened really in the last 20 years -- but it was then considered to be, and I'm sure it's still considered to be a very, very important technological capability. By now it's probably de rigueur -- everybody's doing it. But that was the development and it was that development which led to on-line systems, computer display, and on-line communication with the computer. I believe that we were if we were not the leader in that type of technology at Ramo-Wooldridge at that time, that we were among two or three leaders.

NORBERG: Do you recall how the specifications for this project were developed? Were you in on that?

BAUER: Well, the original concept was that there would be a very large amount of data and that it would have to be handled by specialized computer techniques. Somebody got that idea that computer techniques would be very greatly beneficial in the process of...

NORBERG: Do you recall how early that concept developed?

BAUER: I would say that dates back to about 1958, 1959. But the real mechanizing of them and doing the programming required and actually having sample programs that would do what we were talking about really didn't occur until about '60. Then it was all, even in the '60s it was '60, '61, it was all quite...well I can't call it experimental, it was developmental. Then of course, right as soon as we finished the software and all of the hardware then it was to go into production status and be deployed as a permanent part of the strategic air command. I think Informatics has a contract today, I might say parenthetically, at the Strategic Air Command, which is kind of a general follow on of the whole thing. I don't even really know what they do there in detail, but I think it's in the same general category. It is a contract we've had at Omaha for 15 years, I guess.

NORBERG: Who else worked on these projects at that time with you?

BAUER: Milt Moore, [who is now] chief executive office, chairman, president and chief executive officer of Quotron, was the overall division manager at Ramo-Wooldridge and all of this work generally fell under him. Bruce Jackson, who happens to be his executive vice president of Quotron was also one of the people. I'd have to search my memory for a few of the other names. I haven't thought about those people for a number of years. I was in charge of the software. Marvin Howard, Werner Frank, who were Informatics people or subsequently became Informatics people, were my key people there, were in the software development. Marvin Howard and Werner Frank, both software people from the early '50s, should be given a lot of credit for the development of this.

NORBERG: Let me approach that question from another angle and maybe more names will occur to you. From Ramo-Wooldridge, in the period of Bunker-Ramo, Ramo Wooldridge, in the period 1955 to about 1962 when Informatics began, do you recall any spinoffs from the organization?

BAUER: From the Ramo-Wooldridge organization?

NORBERG: Correct. People who went out and started their own companies either for hardware or software, but I'm particularly interested in the software side.

BAUER: There were none really of any significance I think Informatics was the first one of any significance at all. I'll leave it for others to judge whether we were significant, but I don't know that there were any.

NORBERG: Then the other half of the question would be who else was in software production at the time besides Ramo-Wooldridge?

BAUER: Well, I'm not sure if I really understand what you mean by software production. There were a lot of people doing software. Maybe this will help. There was a very significant program going on at Harvard at the same time. It had a slightly different emphasis, but some similarities. It was called Timesharing, or Timeslicing was even the first words that were used. Again I'd have to remember who the key people were, but in '60 to '62, there came to be at Harvard that first project where people said, "Say, we can have 15 or 20 or 30 people using the machine simultaneously. Isn't that interesting? We'll slice up the time, give each person 200 milliseconds of computer time and it will cycle through the 20 users real fast. And won't that be exciting. And of course, again, this is what we do all the time today. Millions of people literally now go to the Quotron terminal and find out stock prices, you know, essentially doing it simultaneously, although they are really doing it all in very highly time sequencing.

NORBERG: Well, how about Rand Corporation? Weren't they developing large software packages under contract for the military?

BAUER: Rand in the '60s, if memory serves, was kind of gradually moved into a different status. They didn't have a lot of money. They still kept a very active and important program, but they were no longer doing things in the forefront of computers. The individual people were in the forefront of commenting, studying, analyzing all of these new things. I can remember in the early '60s -- by the way this is a very interesting, you reminded me of something very important in computer history -- the Rand tablet was developed in the period from somewhere in the period and somebody would have to pin it down, '59 to '62. The Rand tablet is very, very interesting and significant, because in my view, the Rand tablet consisted of a person with a stylus sitting with a conducting plate and as he moved the stylus on the conducting plate, the computer would move the position of the stylus or the cursor on the scope. Why is that significant? All of the new generation of things that are occurring today that you've read about -- the mouse that Apple has, and that it's been announced the Apple III mouse is essentially moving the cursor by moving your hand and that was first conceived of and really done at Rand with what was called the Rand tablet. I'm only giving you very general aspects of it; other people could give you a lot more detail, pin down the dates, and so forth. But there is that connection, which kind of amuses me when I think about it. But to go back to your other question, Rand did not have a lot of money to do one big project. They had a continuing budget, so they didn't have the large amount of money that Harvard had...

NORBERG: MIT.

BAUER: So that was one single development that Harvard had and I think they got a big government grant. Then a little later on they got the General Electric Computer - I've forgotten the number of that computer. That upset IBM greatly. Then they developed the 360 model 62, I think, some number like that. It was aimed at timesharing. They developed it at the Mohansic Lab. But anyway, that IBM system was in response to this timesharing project at MIT that originally had the General Electric computer.

NORBERG: Are you thinking of the SAGE project at MIT?

BAUER: No.

NORBERG: Because that's also a big software...

BAUER: This was after the SAGE project. The SAGE project was really the late '50s, I'm now talking about the timesharing project, Tony Ottinger, I think was one of those.

NORBERG: That's right.

BAUER: And I'd have to search my memory for a few other names, but...

NORBERG: That's all right. All right, I'm drawing the conclusion here, then, Walt, that basically the only major people involved in developing software would be at Ramo -Wooldridge.

BAUER: No, I don't think that's a correct...

NORBERG: That's is outside of the major manufacturers, of course.

BAUER: Well, we have to modify that a little bit. There was an awful lot going on in the country in the early '60s in software of various types. I am talking about the particular technique of man-machine communication and man-machine relationships. We were doing something special and something very advanced in that line. We were really the only people doing that I think of any note or any substance. It was very much advanced and very much researchy at the time. The Rome Air Development Center took over this whole concept. They were the sponsoring agency for the Air Force for that project that Ramo -Wooldridge had. They took over all through the '60s and did a lot of research on these kind of man-machine systems and the associated technology, which should be mentioned also, which was called the Real Time Operating Systems keeping track of everything that was going on between the terminal and the computer. We, in fact, did a lot of work -- we Informatics -- from '62 to '68, we did a lot of work with

Rome Air Development Center in developing and researching and doing prototypes and so forth...

NORBERG: We'll come back to that. I'm glad you cleared that up, because I was becoming a little confused about the...

BAUER: There are a lot of people doing software and a lot of people doing very important software, languages, COBOL translators, FORTRAN with John Backus came out in about 1960, '59 you recall, COBOL came out in the '60, '61. People were very much interested in languages and translators and general operating systems, but there was this new niche that was growing, this new technology that was growing, and man-machine software was one of it. We at Ramo-Wooldridge, and, of course, the timesharing business. In the literature, by the way, let me just mention, Arthur, because if somebody hears this or reads this transcript in the years to come, because it was a classified project, we didn't get a lot of publicity. We couldn't talk at great length about what we were doing. But the ideas and the technology did grow and did get extended out to other projects in the '60s and I think the record would show that if we weren't one of the leaders there, if we weren't the leader, we were one of two or three people doing the first work on that man machine. I do strike a difference between that and the timesharing work that was done at Harvard.

NORBERG: If we look at some of the other people outside of the major manufacturers, the FORTRAN example that you gave is of course IBM for the most part, COBOL was done under the auspices of the Federal Government and the committee. Were there companies, people starting companies -- perhaps a better was to say it -- who were interested in developing software packages for sale to someone else? I don't mean to the public.

BAUER: No, oh no. That's a different subject. Let's clarify that. This software was technology being developed for particular application of the U. S. Air Force for an observational satellite groundhandling information system. It had nothing to do with products. Products didn't really occur on the scene. Software products is a very new, exciting thing. A new exciting subject from the standpoint of the history of information processing in software. We're not even on the subject...

NORBERG: No, I realize that I used the wrong words apparently. But who else was developing similar sorts of technology, to use your word? It doesn't have to be in the man-machine interaction. It can be in other areas as well.

BAUER: Well, that is the technology that was most significant, outside of the related technology of real-time operating systems. They were all being done in the military at that time, or under military sponsorship really. The SAGE system, which you mentioned earlier, had an operating system and Project Lincoln and SAGE had operating systems technology. Also I think it's fair to say that if any of this, if this man-machine things were being done, it was certainly being done at Project Lincoln or Project Whirlwind and at Lincoln Laboratories, MIT. There was undoubtedly very significant work being done there. I don't remember any specific project. I've never researched that to know what specific projects were ongoing in the man-machine human-talking to a machine, but those would be undoubtedly ranked as significant. Beyond that I think you might...Rome Air Development Center in the '62 to '65 time frame, beyond that I think you would be hard put to locate any areas where much of that was being done beyond those places I mentioned.

NORBERG: When did you first begin to think you would leave Ramo -Wooldridge?

BAUER: In the fall of 1961 when I first...I thought I saw that software was going to be very important as a commercial entity. It was always important technologically, but software up to that point in time was not considered an important economic entity. People thought of software as something that you've got to have to make these computers to do what should be done. And you had to pay these technicians, these software developers, pretty good salaries, you know. But nobody thought of it in those days as a economic activity or as a business or commercial activity that somehow might someday be as important as and stand next to hardware as a business in technology in any sense.

NORBERG: Do you recall what gave you the idea that that might end up being the case?

BAUER: Well, I can't say. I can't relate any single thought, but it did occur to me and I've thought a lot about it

through the years, if you think about the process of programming, you come to the conclusion that the mental processes of computer programming are not dissimilar from the mental processes of designing the logic of a computer. There's a lot of detail; a lot of circuits that got to do the right thing; the signal has got to get to the right place at the right time, and you even write some equations to define the logic. As a matter of fact, many computers in the '50s were described in terms of a very large set of logic, Boolean, equations. I said to myself, "Gosh, you know, the process of doing all that is the same as programming. It's the same general type of mental process." Now, the difference occurs beyond that, with software you don't go on to mechanize all of your logical machinations. You don't realize them. In building a computer, you build circuits which do all this stuff, you realize what you've done through actual circuitry and hardware that you can touch and feel. You don't do that in the software, but that's the only difference. So it seemed to me, eventually, that difference -- the fact that you actually saw something there and could feel it and touch it -- that difference was going to become less important. The economic value of the human processes and the logical processes up to that point are still the same. Then of course, through the years, even in the '60s we saw, even in the very early '60s, we saw this period coming now, where we would have postage stamp computers. We clearly saw that in 1960. I can remember giving a talk at the Waldorf Astoria in 1960 where I was one of three people talking about the long term future. I was talking about the software aspects and somebody else was talking about the hardware. They were talking about these 10 dollar chips, postage stamp size things, and I was joking about the fact that it would still take us 500 man years to program one of them. So we saw even then that hardware was going to become more powerful and less expensive and the software was going to become a relatively more important part of the business.

TAPE 1/SIDE 2

NORBERG: Could you say something, then, about the people that you talked to about possibly starting a company of your own?

BAUER: Yes. I had some early conversations with Charlie Adams, who was a very important figure in the history of computers and the history of software, by the way. He had started Adams Associates. I think he probably put the

bug in my ear first about the idea that I might be a person that might do something in the independent software computer business.

NORBERG: What sort of interaction had you had with him before that?

BAUER: Just as a friend. I have known him as a software person. We were friends and had met each other at various conventions. It was a pretty small group, 200 to 300 people of the top categories of people really experienced and knowledgeable -- the old hands at the computers. We had known each other for, you know, 8 or so 10 years. But that didn't work out with Charlie Adams. So I began to get the idea that maybe I should start out in a different direction. I was convinced of two things. I was convinced that software was going to be an important economic factor in the future and I was convinced also that me and my management group, which I was conceiving of and thinking of at that time, could do as well as some of the other people that were in the business, that were doing. There were two or three other software companies at that time and they were starting out and they were doing quite well. They were developing interesting little businesses and I thought to myself, gee, we could do as well as they.

NORBERG: Who were they?

BAUER: Computer Sciences, Fletcher Jones. He was a young man and I thought I'd had more experience and I had just as much manager or sales capability. That was probably a wrong assessment, by the way, because he was a real whiz. But I felt, you know, that if he could do it, and he and his gang could do it, I and my gang could do it. There was Computer Usage Corporation. I just can't remember any more...they've disappeared out of sight, the two people that started that company. Later on Cuthbert Hurd became associated with Computer Usage after he left IBM. He was the board chairman and had money in it and so forth. He was a champion of that and then he lost interest in it and he severed all relationships with that in about 1970, '72 within that time frame. So that company just never got anywhere. But there were three companies active, CEIR...from the history of computer software companies this is an important observation Council for Economic and Industrial Research, Computer Sciences, Computer Usage Corporation. And then Informatics came on the scene.

NORBERG: You keep talking about "my gang". Who did you have in mind for "your gang"?

BAUER: The three people that subsequently joined me, Werner Frank, and Dick Hill from Ramo-Wooldridge and Frank Wagner from North American Aviation.

NORBERG: Now had you people discussed this, say over cocktails, or coffee?

BAUER: Well, we had didn't discuss it for many months prior. I had thought about it and thought about who I might like to talk to. I remember one time telling Werner Frank and Dick Hill that I'd like to discuss a subject with them and at the end of the day we all got together and talked about it. They were kind of amazed and shocked. From that point in time until the time we did it was probably only about 6 weeks really. 6 to 8 weeks. So it went pretty fast. I didn't bring them into it until I was quite sure that I knew what I wanted to do and even how I was going to do it.

NORBERG: Do you remember the details about how you developed that plan?

BAUER: The first step was I would get together with them and we would say we want to develop a software company and in general terms we described the kind of business we would go into. And the next question was how do we get money and some sponsorship. At that time, venture capital was extremely difficult to get and I wasn't very adept at it or experienced at it I tried a couple approaches which didn't work and then I ran into Erv Tomash. So Erv Tomash is really a kind of a founder and a promoter of Informatics as well, because Informatics got started as a wholly-owned subsidiary of Dataproducts.

NORBERG: Could you describe that situation for me please?

BAUER: Sure, sure. I called Erv and I said, "Erv, I heard that you're going to start a new company and I'm thinking about doing that also. Let's get together and compare notes and maybe we can help each other somehow." He said,

"Sure." I'd known him for three or four years.

NORBERG: How?

BAUER: I was a big Univac customer at Ramo -Wooldridge with a big couple of very large Univac computers and he was my salesman. Erv was selling Univac computers in 1954 or '55.

NORBERG: Univacs or ERAs?

BAUER: Univacs; that was after ERA had become part of Univac. I think that happened in like '52 or '53 that ERA got folded into [Remington-Rand] and this was after. Erv got the assignment to be the salesman for all the West Coast, which was kind of an important assignment, because there was a lot of activity going on out here. I met with Erv one Saturday morning and told him what I had in mind. He almost immediately said, "Yes, let's do it together." Then I told him further what I wanted and what I expected in terms of some other arrangements. For instance, one of the things I wanted was I wanted to be assured that even though we were a wholly owned subsidiary of Dataproducts that we'd have a life and an image and a charter and a commission all of our own, separate from the Dataproducts interests. We visualized certain mutual backscratching but...

NORBERG: No, I asked why.

BAUER: Well, why, because I didn't want to become a department of Dataproducts. I wanted to start a company with its own thrust and its own interests and I didn't want to be thought of as just another department. I had visions of doing something special and different.

NORBERG: Then why throw in with Erv at all?

BAUER: Because I found no other way to get money. The market was going through one of those periods where the

market was very weak, the stock market was very weak; venture capital was very hard to come by and I probably wasn't very smart. And I guess another factor was it looked like a little safer way to proceed I could put my money into a bigger vehicle. My management group invested in Dataproducts. We got founders stock in Dataproducts even though we were running Informatics as a wholly-owned subsidiary. So that's how it all came about.

NORBERG: What sort of business did you want to go into, that is what sort of products were you going to develop or just exactly what was Informatics going to do?

BAUER: We were going to become suppliers. We were going to develop systems. Primarily, we were going to develop systems for large-scale computer systems, probably of a military nature. That was our first objective, because it was an area of business we knew quite well. We foresaw that as we got into that business and identified certain approaches and so forth that we might well spinoff certain of these technologies into proprietary software. Do you realize that in 1962 that was essentially a contradiction in terms: proprietary software. All software was considered up until 1962 to be in the public domain.

NORBERG: That seems strange to me.

BAUER: Yes, nowadays it seems strange. Literally, software up through 1962 was considered to be in the public domain. Everybody who developed a piece of software was only too happy and flattered to have somebody else use it. All through the late '50s and up through the '60s, the early '60s at least '62, '63, '64, not Guide but the other IBM organization, SHARE, the SHARE organization of IBM users, the word SHARE comes from exactly what they were doing, they were sharing software. When one of them got a piece of software, they would publish a book or publish it on a list, an accessions list, and say, "Hey, I've got something. Anyone of you guys want to use it now? I'll give you a little documentation; I'll help you use it." So immediately it was in the public domain. All of these things were floating back and forth. You bought a piece of software by paying 30, 40 dollars or whatever the amount was for a magnetic tape reel. That's all you had to do and you got a magnetic tape reel with that information on it. The information didn't cost anything at all. There was literally no such thing as proprietary software, proprietary meaning

in the sense that I own it, I'm going to use it only for my sole economic welfare.

NORBERG: Now why would that notion begin to develop in the 1960s, that is that there could be a proprietary nature to software?

BAUER: Well, I think people saw naturally, it seems natural now, I don't know exactly when the first idea was triggered -- and we at Informatics were one of the first people by the way to do that -- that if you had a piece of software (only you had it) that you might sell it and rent it. The trick was that you needed a piece of software that 10 or 20 people -- in those days we were only thinking 10s and 20s -- 10 and 20 people could use that piece of software without much modification. You see, everybody in those days knew what they wanted and they wouldn't accept anything except exactly what they had specified. Everybody was an expert and nobody thought in terms of commonality or replication of exactly the same software that more people would use. I can remember my discussion with Computer Usage -- and I wish I could remember those two guys names in '64, '65 -- now the idea was beginning to take plant, it was beginning really to be planted and was beginning to grow in '64, '65. I can remember discussing it with them. Keep in mind that they were one of the four large computer software firms at that time. Their attitude was there will never be an idea as a software product. Now these were bright, intelligent people. It seems incredible now. Their thought was that everybody will want their own specified software. It will all be customized. There are no functions common, sufficiently common, through a wide segment of things. In Informatics, we categorically rejected that idea. That did not make sense to us. And we pushed ahead and thought always in terms of a product.

I can't say that in '62 we foresaw a product exactly. We did see the idea of proprietary software, but it wasn't long after that we first saw the fact that software would be bought and sold as a product like anything else. Up to '63, '64, the only thing this is so significant, I think, for the history of information processing -- so very significant; there are other significant events like solid-state hardware and all of those things and the new and going from electrostatic memory in the '50s to solid state memory. Now those are very, very important -- but the most significant thing in all the software I think, or one of the most significant events in all of software was the idea of a product, which is so pervasive and so important economically and technically today. The idea of a product. The only thing that occurred

in the area of 1960 to 1964, '63, '64, the only thing that was occurring in those days that at all resembled a product was that some of the oil companies were beginning to have linear programming problems. Some of the oil companies were beginning to and econometricians were beginning to see that they could use some of these things. I think they were starting to sell them. They thought of most of it as a service. We have this computer program here and we'll come and we'll help you with your computer. Now CEIR was doing a little bit of that. But in no sense of the word did CEIR have the concept of a computer program that would be sold to a number of people. '64, '65, and I believe that we at Informatics in '64, '65 were the first ones to do that.

NORBERG: Didn't the sale of such computer software require that there be a large number of machines and therefore a large number of users available in the country?

BAUER: Yes, and a large number of similar machines and users, because you were developing that piece of software for that given machine. Absolutely. The machine background was always very important.

NORBERG: Now if you look at Phister's data for 1960, he shows that about 5,000 machines were in use in the United States at that time. That doesn't strike me as being enough users to warrant starting a company at this time.

BAUER: Well keep in mind that our scales were commensurately lower, our visions, like I said 10 to 20. If there were 4 or 500 machines, if we could get 10 or 20 of those people of one category we could get 10 or 20 of those people using our software product. It looked like a big deal to us at first.

NORBERG: Did you start out with classified work or did it go into unclassified right away?

BAUER: It was mostly classified work. Keep in mind that the major business thrust of Informatics were these projects, mostly government projects. We began to now develop a side business, an additional business of software products with Mark III and Mark IV. Mark III was the predecessor of Mark IV. Mark IV is clearly regarded as the first significant sizeable software product in the world. Now, from the standpoint of the numbers just to clarify this so that nobody challenges that from the standpoint of numbers, ADR was selling Autoflow. Autoflow was something

that automatically dissected your program and produced a flow diagram from it. The big difference was that the Autoflow was a 5, 6,000 dollar product and Mark IV was a 30 or 40,000 dollar product. So from the standpoint of a dollar significance, Mark IV was much more significant than Autoflow was, although Autoflow had a large number of copies out.

NORBERG: Was there any thought that there might be a link to Dataproducts in terms of providing them with software?

BAUER: No. There was a link thought of considered that we would provide them with certain consulting services and indeed we did. They were in the rotating memory business and there were software implications to rotating memories that we dealt with.

NORBERG: How about the Dataproducts customers?

BAUER: No, because they weren't selling to the same customers that we were. Different animals. People were buying hardware in those days and people were buying Dataproducts hardware memory devices and printers to put on their computers.

NORBERG: What sort of capitalization was necessary in 1962 to start Informatics?

BAUER: We capitalized at \$20,000.

NORBERG: And then what sort of cash flow arrangements were necessary over the next few months?

BAUER: I think over the first year period of time we had a cash outflow of about \$80,000 dollars, which was getting a little worrisome and recorded losses of about \$60,000 dollars in the first 12 months. Then things started to turn around and we started making a profit. In the second year we had \$160,000 dollars of revenue and maybe \$20,000

dollars in profit and from there on it was good.

NORBERG: Can you reminisce, then, a little bit about what went on during that first year?

BAUER: Yes. Actually we decided on a strategy of selling mostly to... We were worried about the costs of traveling all over the country and trying to sell our services. So we adopted a strategy of selling mostly in the southern California area, which was a big mistake and that's why things went a little slowly. The minute that we started doing things on a national scene (well, I shouldn't say national, because we were just starting out), but the point is with Washington, D.C., contracts, Department of Defense contracts, directly to the Department of Defense, and to the Rome Air Development Center, once we got on to that approach then it was growth, growth, growth. We were really wasting our time while we had gotten several contracts in this area but we were moving much more slowly because we just weren't getting the sizeable amounts of business that we subsequently got a bit later when we went directly to the Department of Defense in the East.

NORBERG: So the early contracts would have been with Douglas and North American and places like that which had government contracts.

BAUER: Yes. We had a contract with Packard-Bell. They were doing computers. I think that was one of our first contracts. A little later on we got a contract with the NASA sponsored facility at Cal-Tech, Jet Propulsion Laboratory. We did a smaller percentage of our work there. Then we began thinking about nationally where we might sell our services. We got a large contract down at Houston with the NASA Manned Space Flight operation with Project Mercury I guess they called it. Then we got a contract with the National Military Command Systems Support Center, NMCSSC, and that was a continuation of some of the work we were doing at Ramo-Wooldridge, this man machine stuff, building the system. Always software, of course. And that got us started.

NORBERG: Did these contracts in southern California come as a result of knowing those people, that is through friends?

BAUER: Yes. Knowing and selling. We'd go to people we knew and where we thought we had some expertise that they could use. For instance, Packard-Bell was doing a stored logic computer. Stored logic never caught on, although it is a very, very important technological ancestor of a lot of concepts that are important today. Some of our people had software experience with stored logic computers at Ramo -Wooldridge and Packard-Bell happened to be building a stored logic computer. So we went over there and we got a contract with them for software for the stored logic computer.

NORBERG: How did the people at Ramo -Wooldridge feel about this that you had started a new business and here you were essentially competing with them?

BAUER: I didn't feel we were in great competition with them, although I must say, they were a little unhappy about it as people are always when people leave them. My thought was that I was a software person and they were hardware company and I wasn't really in competition with them at all for these sizeable contracts because they were interested in the hardware side of it. I was interested in the software side.

NORBERG: But yet Ramo -Wooldridge had been doing software development before.

BAUER: In conjunction with some of the hardware, but their primary thrust and interest was in hardware.

NORBERG: One other aspect of this is very important it seems that you have not mentioned and that is the accounting procedures and the pricing of such a project. In 1962, how would you make such decisions?

BAUER: Well, keep in mind the Mark III came on the scene about '64, Mark IV about '65, '66. That was a very interesting thing, because we sat in our conference rooms and we had Mark IV, which we thought was going to be a very significant thing that people would buy. By that time we felt quite confident that this was going to be a significant thing; we didn't know how significant. I can remember that we thought about prices that range from

\$15,000 to \$60,000. The advocates of \$15,000 said, "Look, you'll sell so many of them if you have it at that price", and the advocates of \$60,000 said, "Hey, we've got something important and treat it like the high quality product it is." Well, we ended up at \$30,000.

NORBERG: For which?

BAUER: For the Mark IV product.

NORBERG: But how about in the very early years, the first contracts, how would you decide on those?

BAUER: Oh, the custom contracts. If it was a time/materials, we'd set up our price just like a professional firm would, like a consulting firm would, mostly a multiple of the direct labor cost, three times the direct labor cost or something like that. We had an overhead structure.

NORBERG: And you would make some assessment of how long it would take?

BAUER: Yes. See there are two ways you can sell professional services. One as a fixed price. I'm going to bill you X, and X is precisely specified and I might bid a fixed price to do X for you. I see how many man hours in different categories it takes and I develop a price. The other way is I will give you 100 hours, or 100 man weeks let's say, 100 man weeks, of professional services to help you reach your goals and that way you price it on a time and materials basis, on a billing basis. Two different ways of doing it.

NORBERG: Did it make any difference whether customers bought, leased, or rented their hardware?

BAUER: No, not to us, not at all.

NORBERG: Somewhere in there Prudential became involved with Informatics.

BAUER: Equitable.

NORBERG: Equitable, sorry, I thought it was Prudential. Equitable.

BAUER: That was much, much later.

NORBERG: I'm not exactly sure what that was but it had something to do with the separation from Dataproducts didn't it?

BAUER: No, not directly, no. We spun off from Dataproducts in the period '66 to 1970, or '66 to '69, in that time frame. We were totally separate from Dataproducts for a couple of years when the Equitable thing came along. And to be very short about it, because it is of very little historical significance really, in my view at least, it's kind of important for the history of this company, but it doesn't have implications in history. The stock market was very flat; nobody was interested in publicly owned computer services firms. We decided it would be a good idea to go private for awhile to plow back our profit and emerge in the '80s as a very significant software, 100 million dollar, software company. And we had gotten associated with Equitable because we had together developed a joint venture company with them prior to that. We decided to put the joint venture company, which was called Equamatics together with Informatics, call it Informatics, and become a wholly-owned subsidiary of Equitable.

TAPE 2/SIDE 1

NORBERG: Was the corporate structure of Informatics typical of these other three software firms which were here in California at the same time?

BAUER: I think so. You know the people were different and I think most companies develop an organization around the particular capabilities and interests of the people and not vice versa. So, I would say yes.

NORBERG: How about spin offs from Informatics?

BAUER: There aren't any huge ones. There are no companies of very large size now that were started by... I wish I could say proudly there were as a matter of fact.

NORBERG: Does the name California Computer Products mean anything?

BAUER: Yes, I was on their board, but they were a hardware company and nothing to do with software, nothing to do with Informatics really. The only thing it did with Informatics was I was on their board. No, I can't say there were. Very recently, in the last two years, two young fellows -- I didn't even know them -- down in the organization, started a company called Softsel, which is the largest distributor of micro-computer system software. They're doing 100 million dollars of business suddenly... if you're going to call that a spin off. Spin off to me means when some of the higher ranking people leave you and go and start a company. There haven't been many of those.

NORBERG: For the last few minutes that we have, could you say something about the changes in the market for software over time, that is from '62 to '82 say?

BAUER: Sure. It all got started about '65, '66 -- this business of software products. It was almost nothing until then, literally nothing in terms of revenues. And many, many people believed that the concept of the software product was either nonsense, in other words it wasn't a concept, or that if it was a concept, it had very, very limited approaches, very, very limited consequence or implications. People had developed compilers and so forth and maybe had sold them a little bit, but a very, very minuscule amount of revenue from those. But people did see, when certain things like Mark IV and Autoflow came along, people did see that there was a product here, that there was yes a product that a number of people could use. But they felt, yes, a thing like Mark IV is appropriate, but there aren't going to be very many of those. They were very begrudgingly said, "Well, yeah, that one's an example of something that I guess is useful and some people would find it useful, but I don't see that this is going to have big ramifications. There are

still people who want specially designed programs." For instance, in the period '65 to '70, people began to think that systems software, compilers, other kinds of productivity tools, programmer productivity tools that will help you write programs faster were probably going to be okay and there were also some operating systems maybe that were beginning to be sold and considered and sort programs and those kinds of things in that period of time. But nobody through the '60s thought that anything like an application program would ever become a product. Isn't that incredible today as we sit here in 1983 and say people thought -- and I can show you my books. I've got some books that show you our strategy sessions, where we said, "Hey, someday there's going to be people who will buy a standard type of general ledger and a standard type of accounts receivable and payables package, and up to that time, up to 1970, there wasn't one sold. I think it even took maybe until 1972, there was no market at all for that type of thing. People were convinced that a general ledger was something that had to be customized, if you were going to do it on a computer. They didn't see that standardization.

NORBERG: But wouldn't it require the expansion of terminals in people's offices before they would be thinking in terms of a general ledger?

BAUER: No, you can use a general ledger without a terminal that isn't necessary. It makes it a lot better and nicer to use. You can put it in through cards or tape or whatever, and indeed in those first systems you probably did put them in that way. And that really opened up a totally new concept of the software product when people said, hey, in addition to all of those technical things like sort programs and operating systems, and now we can begin to sell the standard application programs like a ledger, receivables, payables system.

NORBERG: What sort of factors do you think changed people's minds then?

BAUER: Two things. One, the products got better. The products got so that you could tailor them a little bit. The example I always use is some people like to have a 13 week quarter and others like to deal with months and so forth you could have the same product do the month to month or four week months. Some people like a four, four, three quarter, and some people like to go by months in their quarters, for example, on a general ledger, and you could have

a little flexibility in the program. The program could adapt to a few little customizations or a few little particular likes of the customer. But more importantly, people began to say, gee, I can buy this product for 50,000 dollars, or I can set my programmers to work on it and design it and it'll cost me 400 dollars. They began to get that through their heads, the economic leverage of the software product. And I might have a few little things that I would like about if I did it myself better, than if I bought it as a product, but those differences are so unimportant that...

NORBERG: Did marketing change, then, for software packages, in say 1970?

BAUER: Well, marketing began, you know. Just bigger. It just took another spurt forward. We began now to get marketing people who understood applications, as opposed to just marketing people who understood technical data processing.

NORBERG: Thank you very much.

END OF INTERVIEW