INTERVIEWEE: John Postley

INTERVIEWER: Robina Mapstone

DATE OF INTERVIEW: March 12, 1973

Mapstone:

Why don't we start off by going back to UCLA, you know what your degree was and what happened after that, you're going to Northrop and then coming back to UCLA. Let's do a little bit of chronological history in that first area.

Postley:

OK, well, I got my degree, technically I got it in August of 1946 when-because I went of the Navy, the war and returned to get the degree. And then I went on to do some graduate work in the Business School. And after the graduate work in the Business School, I was offered a position at a new thing at UCLA called the Institute for Numerical Analysis which was a division of the National Bureau of Standards Applied Mathematics Laboratories, the West Coast Division. And I took that position, started work there in 1948. And, as I said before, I was the first person they hired [?] for that institute. It was on the UCLA campus and we were considered sort of members of the faculty non-teaching staff. We had the latest equipment of the day [?] . And we always got the first of everything on the West Coast. First thing that came out, first one that came out we got. At the same time, we were building a computer which turned out to be the one on the west coast, the SWAC, which stands for Standards Western Automatic Computer. We had no imagination [?] [laughter) That computer was ultimately operational. The original computer only had two hundred and fifty-six words of [?] tube store. They were supplemented by other things such as drums [?] It stayed operational. I don't remember when they moved it to the Engineering Building, the present Engineering Building, in the basement. And moving it was quite a job because the computer in those days was built into the building. It wasn't a thing that was in a cabinet that sat on the floor. So that was the beginning of computing. In those --INA--I think it is fair to say that we were clearly the center of computing activity in the Southern California area. All of the people who were also doing computing, or thinking of doing computing in those days, came to us,

knew us. Most of the aerospace people, Douglas, Lockheed, Rand. We gave seminars. We trained some of the early IBM people on a contract from IBM and IMA. So, I was the Assistant Supervisor for Computing, later Supervisor. That was only because I was the first one there. [laughter]. So, we had CPC's and things like that.

Mapstone:

What was the reason for establishing the Institute for Numerical Analysis?

Postley:

Well, who knows? I guess the--Bob Curtis at that time was, I guess, the head of the all the Applied Mathematics Laboratories and National Bureau of Standards in Washington. For a year he was also the Director of the Institute. We had a rotating Director. And we had some of the leading mathematicians of the day, especially, usually for a year appointment kind of thing. I remember it including such people as J. Barkley Rosser, [?] Curtiss[?] a Polish mathematician. George Forsythe,[?] who was from Oregon[?] and many others. You know, there weren't many people who were top people in the field in those days. It must have been more than half of them were at INA, of the people in the world.

Mapstone:

That's incredible. When did--what was Lehmer's contribution?

Postley:

Lehmer was a--one of the people who held the post of whatever they called it--Director for a year. And he was also the editor of a publication called Mathematical Tables and Other Aids to Computation. Perhaps he was later the editor. I don't remember the sequence. He was another great one. And the UCLA staff had a pretty outstanding Mathematics Department. Dave Saxon who was in the Physics Department was also Director too. And most of the top people, mathematicians and numerical analysts at UCLA were somehow either indirectly or directly associated with the Institute.

Mapstone:

I'm not too familiar with the kind of needs that _____ numerical analysis that would have been problems at that point.

Postley:

Well, computing at that time was mainly mathematical. That is to say the purpose of computing was to make mathematical computations and in order to do that you needed formulas and analysis so that you could reflect physical phenomena with mathematical formula. For example, we developed formulas to--for complex interpretation. We developed formulas to compute the flight path of early day missiles given its initial position and thrust and _____ , and so on. I remember one occasion when we were supposed to compute the flight path of missiles before they were fired at Fort. They were small missiles not like they have today. And we had developed the formulas and we ran it off in our machine, a CPC. We didn't do any useful computation on SWAC. And it was printing out and it became evident that according to the computations, the missile was going to go over the city of Oxnard, instead of out in the ocean, given the winds and all our...And we called them up and told them not to fire it. And they didn't. So, it was all kinds of...I did a job one time...in the ternary number system, space three number system, pure mathematical research...is it useful to compute in that number system? It is very difficult to compute [laughter]. ____ system on a CPC, I tell you. [laughter]. But we did it. Since I never heard anything more about the ternary number system, I assume that it was determined that it wasn't useful. [laughter]. And we did no accounting, nothing like that. All mathematics.

Mapstone:

Were you sort of working in allegiance with Rand or separate from them?

Postley:

No, no. We were a government unit. And they just came to us for advice. Not only Rand, but the other people I mentioned. You know, "We've got this problem. How would you approach it?" I think actually, they got more advice from the numerical analysts than they did from the computing people. I was a computing person, not a numerical analyst. Because they just didn't have that kind of mathematical capability in their companies. You know, "IF we want to simulate this, how should we go about it?" Not specific, but really just general discussions. Sometimes we were specific, but more __ general. There was no allegiance of any kind. The community of computing people consisted mainly

of numerical analysts everywhere at that time. As you know, computers in this country were originally built to do ballistic calculations, which the result was a big problem, and once we solved that, thats all we needed computers for. So, we just talked to each other. I used to publish papers on how to wire a board that would do certain things on a CPC.

Mapstone:

Oh, really, where did you…

Postley:

I had one that was published by IBM and we...I don't know where. Let's see. published one paper in Amtac and I don't remember what the subject was. About 1954, something like that. Some kind of numerical procedure in computers.

Mapstone:

Did the Institute have its own publication?

Postley:

No.

Mapstone:

So, you had to use external

Postley:

I had to use external

Mapstone:

I think you mentioned earlier that you were in computing--although you were a mathematician you were in computing science.

Postley:

I wasn't that good a mathematician. [laughter]. I mean I wasn't in that class, at all. These are world famous mathematicians.

Mapstone:

No, what I was curious about was the mathematicians did the numerical analysis work and then you

in computing. The mathematicians had to take this mathematics and get it into computing, computer language _____ so that you could get it into the machine.

Postley:

Well, translate it into ____ Right.

Mapstone:

And what were methods of doing this.

Postley:

Well, those machines had big plug boards. And big, that big. And we wrote down formulas and made mathematical expressions and then wired up things, a sequence of steps to do those functions, in the minute way of breaking down the process in terms of individual steps, very minute. It's somewhat equivalent to programming today, but not a lot. One of the purposes of these large boards we wired up was to bring it a little bit closer to what today we call programming. You didn't wire a plug board for each problem. You wired a board that was called a general-purpose board. And then you punched cards with those certain functions on the board to take place. We wired many...The object was always to include more functions and to get it to do them faster. With the same machine. Not with a different machine. We developed techniques for computing _____ directly. And automatically, so that all you had to do is save one of the _____ machines, the board you cause the machine to compute. So, then you looked at your formula and said, "Ah hah!" "I need that." So, you put in a card that causes that sequence of occurrences. It was somewhat primitive _____ . Actually, it was not functionally so primitive, it was just very slow back in those days.

Mapstone:

But the concept was good?

Postley:

Yes.

Mapstone:

You mentioned that it was some time before useful work got done on SWAC.

Postley:

Yes. I would say that it didn't get done during that time that I was there. [laughter]. That's in '51.

Mapstone:

SWAC was completed

Postley:

It's a vague term--completed. [laughter]. It was dedicated, I think in '50, but it wasn't completed. I don't know when you can say it was completed.

Mapstone: So, you yourself were not a SWAC user?

Postley:

Well, no. I did program SWAC, in fact, I played a role in helping to design the order repetoire of the machine. I wrote programs before SWAC existed. And a few of them actually ran but not productively _____ as a test _____ . So, in the sense of production, no. In the sense of running test programs, yes.

Mapstone:

That's interesting. You were writing this sort of format for the way
the machine would handle information and were the engineers consulting with you and saying "Is this what you want of the machine? And shall we put it in? And was there a sort of relationship user and ___ .

Postley:

Yes.

Mapstone:

Because it is probably one of the earlier places where there was this kind of relationship. And then it seems that it got lost _____ .

Postley:

Actually, the engineers, I would say, took the lead, but they did consult with us. We would write programs in this fictitious machine, fictitious language, and then they would say, "Well, would like to have an instruction that does this which we don't have. We would like to add. It ended up there were

only sixteen instructions in the machine. There were modifiers which made effective _____ . So there was a reasonable ___ cooperation.

Mapstone:

So, the Institute was mostly doing aircraft type of work?

Postley:

Well, no not only aircraft. Well, it was doing, I guess, three things. One was building SWAC which was essentially a computer research kind of contact. The other one was actually doing computing with a very advanced punch card installation. And the third, and we also had what we called then, hand computers, and whole big couple dozen people running desk calculators, and doing useful computing for people. And the third thing was this mathematical, numerical research. Publishing papers and that sort of thing.

Mapstone:

And teaching?

Postley:

Well, the teaching was not officially a part of the Institute. People who were associated with it, some of them were also teaching. That wasn't a part of the Institute's role.

Mapstone:

However, the teaching that took place must have been very beneficial to the computing field.

Postley:

Yes. Well, it was more...I don't think there was much teaching in computers, it was more in numerical analysis.

Mapstone:

So then in the later winter of '48-'50, we had the analogue device at the Engineering Department. We had the Institute and was anything happening on campus as far as getting people educated into using computing techniques?

Postley:

No. I don't recall any courses of any kind.

Mapstone:

They came a little later

Postley:

Yes.

Mapstone:

OK. Now sometime after this you left the Institute.

Postley:

In '51 I left the Institute.

Mapstone:

And what was happening in 1951? What was happening at Northrup at that time?

Postley:

Well, I went there to head the Computing Department of what was then called the Special Weapons Division, now called Nortronics. And we were building a missile called the SNARK missile which had in it, I had nothing to do with the SNARK...The missile had in it a guidance system which was control the celestial guidance system. It was completely self-contained and controlled by telescopes it contained which looked at the star positions, recorded the positions and locked in on the stars and thereby controlled half of the missile. In order to do that it had to know where the stars were supposed to be with respect to things. And that was where the computer came in. It was prior to any flight which was scheduled for a specific time. To depart at a specific time. We would compute a flight pattern based on the star positions. And make a tape which was put into the missile guidance system. And then it took off and got internal control and referred to the tape which said that [telegrtelescope?] number 3 was supposed to look in that direction and see thus and so star. And then you have to move the platform first so that it is looking in that direction and seeing that star. So, we made those kinds of computations. We played around the rest of the time with research and all sorts of intellectually interesting things. We

built an analogue computer called a MADDIDDA, a digital differential analyzer actually.

Mapstone:

Yes, that's why I sort of lifted an eyebrow and was trying to remember which analogue computer.

Postley:

[?] differential analyzer. The first one that where the design was really successful. The largest available machine of the day was the CPC. There was one there which had every possible contraption available on it. And nobody used it but me personally. Nobody--in the world. Yes, it was a whole room and I had this computer. The reason for that was that if they decided they wanted to fire this missile, you had to compute the flight pattern right then. There was no way to wait. You have the whole company depending on have to have this tape or they can't fly the missile.

Mapstone:

So, you have this great big sort of

Postley:

It was sitting there 90% of the time. Every now and then the Air Force would send some people in and I would train them how to do this job. But most of the time it was just sitting there and I was playing with it. I actually built, personally with wires, soldered, and made it an internally programmed computer out of the CPC.

Mapstone:

You did? How did you do that?

Postley:

I published a paper on that.

Mapstone:

I'd like to get the paper. Can you refer me to it?

Postley:

No. [laughter].

Mapstone:

We'll talk about that later.

Postley:

It was published by Northrop. I think it was Northrop. Possibly I could find a copy that you could get a reference from[?] . I have one copy. So, you know that's the kind of stuff we were in. And we developed a technique...when I came to Northrop they were doing this on punch card machines. And I think it took fifty-six hours to compute one flight path. And when I left it took two.

Mapstone:

Hmm. That's quite a difference. How was this some of the work that Jerry Mendleson was doing?

Postley:

Yes. You know Jerry.

Mapstone:

Yes. That was[?][?]computer.

Postley:

That was SWAC. That was what took the card that we produced we put into SWAC and it did nothing but interpolate, so that instead of having to[?]points far apart in time and its distance interpolate. It was a quadradic interpolation. And Jerry designed the computer and he got a patent on it.

Mapstone:

Yes, I think he did.

Postley:

So, the output of QWAC was what we actually put into the missile. We had to compute the input which QWAC interpolated. I think it was the most special purpose computer ever designed. [laughter]. This guidance system--I don't know if it ever flew in a SNARC. It flew in an airplane. We used a B-45 which was the world's slowest jet plane. [laughter]. terribly slow. But we flew, I think, clear across the country totally on guidance from the guidance system. The guidance system worked great. The missile was no good. [laughter].

Mapstone:

Who were the brave people who flew that plane?

Postley:

Well, it had controls. I don't know. I never heard.

Mapstone:

They never sent you off?

Postley:

That's right, I never even saw--well, I did see one once. We had nothing directly to do with the Computing Department at Northrop which is another story in itself that I'm not qualified to comment. They did very interesting things. The guys later went to IBM and did more interesting things. They could never just plain buy whatever it was anybody was offering. They had to have special engineering. But we were a completely separate department in a different place, also in

Mapstone:

Yes. How long did you stay?

Postley:

Let's say, '51 to ...I guess I went to Hewes in '53.

Mapstone:

Did you ever have anything to do with the BINAC computer when you were with Northrop?

Postley:

No, I didn't. I wrote a couple of programs for the BINAC but that was in this other department. Jerry would know a lot more about the BINAC.

Mapstone:

Yes, but you did some programs for it? You know there is all kinds of mystery surrounding BINAC which I hope before long to get straightened out. Well[?] mystery. But, you know, it was delivered. It sat in the garage. It never was used and finally they started bringing it in and tried to get it to work. And from what I've been able to gather, both, because it was a double computer, both the machines were

never brought out and working together. Do you have any

Postley:

Yes, I vaguely remember...that sounds right.

Mapstone:

Did you run your programs on the BINAC?

Postley:

Again, not operational, just...I had all this spare time [laughter]. They just didn't fire missiles every day. So, I tried everything. We considered using BINAC to do the job that I did on the punch card machine, but it wasn't anywhere near reliable.

Mapstone:

You kind of need reliability to fly a missile

Postley:

Well, also we needed the computer now! Not say "Oh the computer is down...we can't compute it." the CPC which IBM came along and offered...we were going to buy a computer to replace the... I really kind of fouled them up because we cut them down from fifty-six hours to two hours and it got difficult to prove it further in those days. But people came along, and we looked at all the computers of the day to see which one we'd like about it. We looked at the ll0l and ll02 which I think was at that time in the CIA or somewhere you couldn't even get in to see it. No one was supposed to know it was there. And UNIVAC computers. And we looked at Ferranti computer in England and we looked at something else in England, I think EDSAC. And we looked at...IBM came along with a computer called the Defense Calculator which they offered to provide for $6,000 a month and we said "That's ridiculous. That's much too much money." That later became the 701 and they never sold it for even twice that much. [laughter]. We selected the Ferranti of all these computers, but the government wouldn't let us buy it, because it wasn't an American computer and it was defense work--whatever that meant. So, we didn't buy any. And they never did get a computer specifically for that job other than the CPC which stayed and stayed and stayed.

Mapstone:

The Snarc itself. Was that a successfully, whatever that means, completed missile? Could it be used or was it used?

Postley:

No, it wasn't used. I don't think it could have been used. It did fly, but I don't know if, I just don't know if they ever flew the Snarc with the guidance system. The guidance system flew. But I don't know if it ever flew in the Snarc.

Mapstone:

You mentioned that since you had all this spare time, you were doing all kinds of[?]things. Were any of these computers related, computation or program related?

Postley:

Oh, yes. Well, I made another a very high-speed plug board--the highest speed plug board at the time, general purpose plug board. And that was the paper that IBM published.

Mapstone:

This was your wiring of the board to make it into a

Postley:

No, that was different. That wasn't wiring a board. That was outside the board.

Mapstone:

OK can you explain that to me. How you turned your CPC into a stored program type machine.

Postley:

Well, you know a little bit about the COC. It had ten-digit registers, right. I actually wired up a channel of wires which I connected to the registers. And I had a stepping switch. The CPC had cycles and there is a cycle initial or whatever it was called. I don't remember-- some number of cycles a second, not very many. So, I had this stepping switch step through cycles. And every cycle it would move to the next position. This is a ten-digit position, so that it would automatically read out the lap register and then the next register and the next register and succeeding cycles. Now you gave it the impulse to read out.

Then if you put the instructions in those registers, they will read out. Since they are normal CPC registers, they can be modified and that was done too. So, it just operated with the, they were called ice boxes I guess. I don't remember the IBM proper designation. I don't know. I'm sure they were just always called ice boxes.

Postley:

I had four of them plus a 705, 605 which I also modified in some way, and I don't remember, slightly, not much. So that it wouldn't-- something about coming to the end of the sequence and would go back or something. I don't know. That was a very simple modification. Actually, got the wire for this by going back, and this was a which had wire. And electronics manufacturer. And I took it out of these reels [laughter]. I just took it out. I figured once that I took more than two miles of wire. They must have wondered what happened to all this wire. it wasn't for one of their projects. [laughter]. Well, it didn't cost much. It cost like fifty or one hundred dollars for the whole thing. Not counting my time.

Mapstone:

Did other people

Postley:

Nobody else ever used it.

Mapstone:

Nobody else ever used it or tried to modify their own machines?

Postley:

Not that I know of

Mapstone:

Because Northrop had a lot of CPC's floating around.

Postley:

Yes, but I'll tell you. We were very separate. We didn't even get along very well. We didn't have any time for those people. [laughter]. They didn't like us to exist and have a computer outside of their domain. We really object to their existence.

Mapstone:

A little bit of in house enmity.

Postley:

Yes. But we were, you know, we had this special requirement that they just couldn't satisfy. Because they would have to stop everything and run the darn missile flight path. In fact, we sometimes did other computing. I don't remember on what. At the computing center. Rather than using our own machine.

Mapstone:

Were you at Northrop through the switch, when Northrop sold to

Bendix and ...

Postley:

Oh, to the MADDIDA you mean?

Mapstone:

Well, the first MADDIDA was built by a group of people headed by Floyd Steel and then it spun off and CRC.

Postley:

Yes, right. Now that was before I was there.

Mapstone:

Well, yes that was before you were there. Then the Glen Hagen and another group of people actually built MADDIDA which we were talking about. And this was the one that went into production. And then somewhere along here Bendix bought that whole computing group. The computer portion of Northrop. Were you involved at that time?

Postley:

No. I don't even remember Bendix. NCR either NCR bought something, or a bunch of people went to NCR.

Mapstone:

Yes, NCR bought the CRC company.

Postley:

Which was a bunch of Northrop people[?]I was there during that period. And elected not to go to that group. We used to write programs for those computers[?] see what the best way to compute these flight paths.

Mapstone:

Was there any sort of method of writing the programs at this point, where people were interchanging ideas with other companies, with other people who were writing programs. I am sure were, I don't believe you were _____ programs at this point. In other words, was each company in the aircraft business just getting down and writing their own programs?

Postley:

Yes, there wasn't much to know. You just wrote the program in machine language. Later, I don't even remember if we used language now. We just used a basic thing. ACM began in those days and that was an exchange of something but then as now, its always been pretty theoretical. Tried hard to stay away from anything practical and succeeded admirably. [laughter].

Mapstone:

What made you break away from Northrop

Postley:

Well, I got tired of a--well not tired but I got the idea that I wanted to do--the future of computing was in the commercial data processing, not in this stuff[?] stuff. It's a pretty limited to compute flight paths for missiles all the time. [laughter]. Even the whole field of mathematics is really dominated by mathematics, not computing. So, Hughes, at that time, was going to go into the business of building a computer. Commercial[?] competition everyone else. So, I joined that project in 1953 as the head of programming in the Engineering Department. Which meant that I was the guy in charge of designing the over code for that machine. To this day, I have the only up to date manual, whatever that means, since the computer was never completed.

Mapstone:

Do you? I would like to see that.

Postley:

It--we called it the Hughes Automatic Computer or HAC-- sometimes called the Hypothetical Automatic Computer. [laughter]. Actually, some of the components were constructed. It was a very unusual machine, in the sense that it was designed to handle very large files. Originally it was a drum machine which turned out to be a bad decision, engineering wise because IBM came out with Core during the course of our operations. Although UNIVAC stuck with drums for a long time after that. And it had tape loops, huge loops of tape, continuous loops which were slow access, but extremely large storage. It could handle a thousand[?]. I say all of that because there never existed a thousand of them, but the design provided[?] . And we had a manual[?] that like a manual of today.

Mapstone:

What happened to this machine?

Postley:

Well, when the General Manager, whose name slips my mind, you may remember, came to Hughes in 1955. I think he is still there, I'm not sure, Hiland, in a short time he, in about six months, he decided, more or less unilaterally, that it would require hundreds of millions of dollars, really, to get into this business and compete equitably with IBM[?] engineering and all the other aspects of it, marketing, and that that was not a good investment for Hughes. I think he was probably right. So, they cancelled the project. And people left. And some of them formed other companies or went to other companies. And those who[?] . And I could have gone to any of those places or stayed at Hughes. But back into the scientific or engineering type of constellation which I didn't want to do. But that is what happened to the project. Just the decision of the new General Manager that it wasn't a wise investment.

Mapstone:

As someone who had been, up to this time, involved in mathematical and scientific computing, what led you into the idea of going into the data processing side of[?] .

Postley:

Well, I had always been more interested in that. I actually entered that when I went to Hughes because that was supposed to be a business computer, a computer for business, not a scientific computer. In those days, you remember, there were special purpose computers. IBM had 704 for scientific work and 705 for business work. And there were a few people argued that there was a mix, but mainly they were separated. And I don't know. I had always been more interested. I just thought commercial application was more interesting.

Mapstone:

Did you study the market demands?

Postley:

No not formally.

Mapstone:

Because you were writing commands for business data processing as opposed to scientific and I suspect there is quite a difference, isn't there?

Postley:

Studying market demands in a market where they have never had that. You know, they know less about it than I do. When you are introducing something new, studying markets and demands, attitudes, well it's not negative, but I--its not very useful I don't think. It's just plain intuition is the main thing. And talking with other people whom you think know something about it, or who are able to convince you that they do anyway. I don't know, I think there were some people at that time who were beginning to be convinced that business had some very dependent on computing. But there just isn't that much mathematics around, being done, numerical else. So, you know, I was convinced then, and am, of course, still, that the interesting stuff would be done in business and the scientific types, the classical ACM types of the day had the feeling that data processing was trivial, nothing but card pushers in that field. Later on, in l959, I was the one who formed the first special interest group in ACM, of any. There were none before that. First at the local level here in Los Angeles, and then at the National level--first in both cases. And it was a special interest group for Business Data Processing which still exists today.

And that was a kind of a nod in the direction of maybe there was something to business but not a true recognition. I think they saw DPMA running away with all their members. [laughter]. That made them a little angry.

Mapstone:

That was the start of DPMA?

Postley:

No, no not DPMA--ACMA.

Mapstone:

Yes, OK, thats right.

Postley:

DPMA was already there and they were, and if I may be snide, and still are a bunch of card pushers. [laughter].

Mapstone:

Yes, we were just talking about the DCA and you had mentioned about Herb Grosch.

Postley:

Well, you said that Herb Grosch was going to speak at the DCA meeting this Friday. And that reminded me that Herb Grosch was the luncheon speaker at the first meeting of the special interest group for business data processing at UCLA in 1959. I had gotten Herb to agree to be the luncheon speaker, but nobody in the world believed he would show up because he was in Japan, and I kept getting these messages from Japan and from his home which was someplace in the eastern part of the United States. I don't remember where at that time. And never from him directly. Always indirectly through some mysterious wings. He showed up the night before. He was there and he gave his usual speech. And we had an excellent program. We had several hundred people at the first ever meeting. This was just for the forming of the local group which was to come first because the National people wouldn't move until they saw several hundred people and that made them move. In those days that was a lot of people.

Mapstone:

And it showed the ACM needed this because obviously there was a tremendous demand for gathering together business data processing people.

Postley:

So, yes, I jumped ahead in the story, but anyway I became convinced at that time that the interesting stuff was in commercial work. The subject matter was more interesting and varied. The problems were, the kinds of problems, aside problems, computing and mathematics, though there aren't very many mathematical problems, a few, and accounting--a lot of people aspects to it. this book has that name.

Mapstone:

May I see it?[?] People. Oh, Japanese. I don't know Japanese very well. Thank you. May I take a look at this?

Postley:

Sure. That was started--started to write that in about '58 and it was published in 1960.

Mapstone:

OK so the business computer at Hughes HAC was dissolved.

Postley:

Yes. Right. What they ever did the…, I have no idea.

Mapstone:

But you had done some pretty solid work in the programming side of it.

Postley:

Yes, the programming side. The engineering side was good from a, at the engineering level. There is a big difference between the engineering bread board kind of stuff and production. And no one knows[?] No one knows whether they could have successfully produced the machine. But the engineering was fine. It would have cost a lot of money. There is no question about it.

Mapstone:

Were assembler programs already part of the...

Postley:

Let's see. Assembler programs in the IBM area came in with the 702 and 705. And I guess[?] must have written some of the programs for they had auto coded 702 and 705.

Mapstone:

Was auto code[?] to the 701-speed code?

Postley:

Well, I think they probably learned something from them.

Mapstone:

But it was a sort of[?] .

Postley:

And FORTRAN was being designed in those days. Now that's a higher-level language which, of course, exists today. But it was being designed in the fifties.

Mapstone:

So, the early '50's was really the period where we started getting into a lot of activity in software?

Postley:

Yes. And UNIVAC was at that time taking the position that they shouldn't waste a lot of money improving the hardware because it was the software where the improvement was required. And they proceeded along those lines for some time. They were right, they were half right. The software needed a lot of improvements but you still can't sit on your hands with the hardware. They were the manufacturer that was most behind COBOL. IBM, of course, ignored COBOL for a long time[?][?] . So, in the '50's there was a lot of activity in various directions. Some of it was used to make scientific machines handle programs more easily. But since I wasn't associated with scientific machines like 704 I wasn't particularly familiar with[?] .

Mapstone:

There are some areas that I would like to get into and maybe ask you if you would like to talk about[?] . But in the area of software technology, I thought it might be good for this record to get into the

importance of interpreters, compilers, table driven processes, etcetera and then come down through that software technology.

Postley:

Gee. As I said, I was more involved from before '53 and after '53 with the 702 general five kind of thing. And after '55 when I went up to Rand, I still stuck on five a little bit of UNIVAC 2 but mostly centered on 5. Rand had the 704, later 709. But I didn't use the Rand computer. I was always doing something else[?] main computing that. We didn't have loaders in 705. We had auto color. We had IOCS and that's it. That's what we used. Who did you talk to? You talk to Frank Wagner. He'll the subject, at length. [laughter].

Mapstone:

Right.

Postley:

Have you ever met Hal Jud? He is in San Diego. But I'm afraid I can't tell you exactly where. He was an IBM guy at the time. He now has a consulting firm[?] He was one of the great advocates that you didn't need to[?] You could do everything faster and better with the 704.

Mapstone:

Oh, yes. Well, he and Von Neumann.

Postley:

And, uh[?] .

Mapstone:

I have one name. I don't know if it's one you also sort of…, and that's Mort Bernstein.

Postley:

Yes. Is he still at SDC?

Mapstone:

Yes.

Postley:

He's been at SDC forever. [laughter]. Yes, he[?]

Mapstone:

Oh. I have[?] you a little bit, but I think somewhere in this period you joined Rand.

Postley:

In '55.

Mapstone:

In l955. And what was happening at Rand and what was your?

Postley:

Well, the reason I went to Rand was because at that time they were forming another computing department that was not the main computing department. [laughter]. In the Logistics Department of Rand we had a computer department. At that time Logistics was held in good repute. It went down hill more recently, at Rand. But I was tremendously impressed with the man who headed it who happened to be an Englishman by the way. His name was Stephen Enke. He later was with Washington[?] . Very well-known economist[?] . You see, my technique, as it turned out by accident, is I never worked for anybody who knew what I was doing. Because I was always the top guy in computing wherever I was. This guy was a great economist. Didn't know anything about computing. So, it was with computing at Hughes. When they were building, they knew a lot about computers, but not about programming. And in Northrop, I was the only one who used the computer. And Jerry knew a lot about computers, but not that computer. He had never worked with that. Anyway, so Logistics was a very active area at that time. I suppose it is not technically business, but it is very businesslike, as opposed to mathematical. And we were worried about inventory control and record keeping and other such business type functions-accounting. And our job as[?]job is to advise ___ is to advise the Air Force in this case as to how to proceed. And the biggest things we had were more than advise. We actually played the leading role implementing the military system for the B52 worldwide inventory system for the B-52[?] city. And to the Air Force Base. And our people went there[?] went there to provide

basically, the management and the direction for implementing that system. We also found a need for a computer configuration that didn't exist at the time. ____ so, we negotiated on behalf of the Air Force with IBM and they did build a huge special device which was[?] Basically what we did was we took a standard 70 time with many tapes. I think it was twenty-two tape units and we supplemented it with another 70 time which had twenty-two tape units. And we built a special software which connected to the 705's on one side and to this disk files on the other side. Disk files were available on the 650 but not on the 705. So, we connected disk files and we had thirty-two of those. Two computers. Forty-four tape units. Thirty-two disk files and a ram ax[?] all connected on the same machine. We did world wide inventory control where you could get information as to the location of the spare part in fifteen seconds. In 1950 something 7 or 8.

Mapstone:

Is that written up?

Postley:

It must have been. Not by us. Well, it was written up in Rand papers. Rand was a little sensitive about papers [laughter]. Pentagon papers which was stolen from Rand. But that shouldn't be classified.

Mapstone:

OK that would have been '50?

Postley:

Sometime between '57 and '58.

Mapstone:

And it would have been

Postley:

Yes. A B-52[?] inventory[?] . Probably a whole slew of papers on it. I think perhaps that most significant one was one called Success Story. I remember the name of it because it was a

classical example of how if you had an automated system of sending people a notice when papers came out, they would be of interest to them. And that title you would never know. You don't know what its about. The title is Success Story. It is a very good title when you've read the paper. Because that is what it is about. It is about a success story with this system. But until you're with it, baby, you don't know what it's about, and so all kinds of automation, you know automatic systems for distributing papers or books, publications don't work when you use titles like that because you can't tell what it we like to pick out key words. But there are no key words in that. They have no meaning. So, I remember the title because of that.

Mapstone:

This system that you set up then was really a step forward in the technology of inventory control?

Postley:

Yes. And I think really more a step forward for the technology of large scale computing. That was a big computer[?]

Mapstone:

That surely was. I presume IBM.

Postley:

No, all they did was build the buffer--that's all and supply the standard _____ .

Mapstone:

And all the[?] writing the program.

Postley:

No, they didn't do that. The Air Force did the bulk of the work. But we played it out for them and provided supervisory personnel.

Mapstone:

What about programs for it? Was that after you started

Postley:

Programmers?

Mapstone:

Well, just putting this whole system so that it was in a

Postley:

Oh, that. Air Force did that.

Mapstone:

They did.

Postley:

Again, we were advisors. Rand, you see, is not really supposed to do anything operational. We are supposed to write a paper and say we recommend you do that and we go talk to them and have conferences and briefings and tell them why they aught to do that. And supposedly talk them into it. And then go away. But in this case we didn't go away. Because it wouldn't have been done. Later on we played a somewhat similar role in implementing the inventory system for missiles, Atlas missiles[?] We didn't play as big a role, partly because the Air Force people were better. And partly because they had the other thing as a model. But we did have a lot to do in[?] . And a[?] .

Mapstone:

Did other organizations get a jump on this idea and use it in one method or another, or was this really a one time

Postley:

That was a onetime thing. And that was all done essentially at the instigation of people of Rand.

Mapstone:

You said earlier that Logistics was very, very favorable, in favor because

Postley:

At Rand.

Mapstone:

At Rand and has now gone down hill

Postley:

I don't even know if they have one anymore--department.

Mapstone:

What would be the reason why?

Postley:

Well its[?] to economics. Well, nothing. I think just the momentum, the theoretical part of it is really economics, specialized form of economics. And the computing part has less and less need to be separate from the Computer Department. One fellow you probably have seen, you ought to see is Berry Bane.

Mapstone:

No, I haven't even heard the name. He was the head of the--what the heck was it called--Dr. Berry Blehn. He's the head of the computer--I think it is called Computer Sciences and Mathematics Department at RAND.

Mapstone:

OK, he is currently at Rand.

Postley:

Yes. He happens to be a personal friend of mine. He was not at Rand at the same time that I was.

Mapstone:

When was he at Rand? Do you know?

Postley:

No. I don't. A guy who has been there since 1804, I think, is Willis Wear.

Mapstone:

Yes. Willis Ware has been interviewed and I am going back to see him. _____ going to see him. But, what areas would I specifically be talking to him about?

Postley:

Well, I guess you are right. He might not know much about pre l960 stuff. Except second hand.

Mapstone:

Yes. I really try and keep my interviews to people who were there.

Postley:

Willis was there. Willis, however, at that time was much more in the engineering side and very little in the programming side. Since then, he has almost switched. And now he is some sort of[?] . Anyway, at Rand we spent our time advising the Air Force on how to proceed in a reasonable fashion. And we had[?] introducing computers into their operations in logistics again, not light computations[?] logistics. That's where I was. We worked very closely with[?] air material command and we worked with bases and depots[?]all around the country and Europe in order to see what they were doing and write papers and advise them on the whole procedure. The Air Force had the attitude of wanting to do very advanced scientific inventory control and our big job was to convince them that before you could do that you have to have mundane old data right in the file. Otherwise the mathematics was of no use.

Mapstone:

Rand really played a pretty significant role in the whole area of bringing computing to the people.

Postley:

Oh, yes. Rand was--well, Rand had no specific objectives and wasn't constrained to do that and make a profit at that. And a result--and a whole bunch of bright people--as a result it was able to work on advanced things and do extremely

Mapstone:

Did you know some of the people for instance, one name I think of is Cliff Shore.

Postley:

Not sure.

Mapstone:

Did you work at all with him?

Postley:

No. I never worked with him. In those days we used to have we all used to know[?] . And we knew

each other and we had seminars--in house seminars all the time. And there were Newell, Simon and Shaw were the people who did a lot of advanced work in [puristic?] computing and chess playing and stuff like that. Which, you know, is not very profit making, but its good from the standpoint of state of the art. Shaw was actually more programming-oriented person[?][?] and the other two were theoretical. I never knew what happened to Newell.[?] Herb Simon _____ the last I heard was at Carnegie Institute.

Mapstone:

Yes, I don't have anything[?] Shaw, of course, is here. I haven't seen him. So while you were at Rand this is the area you spent most of your time in.

Postley:

And again, writing papers on almost any aspects of computing. It was near the end of my period at Rand that I started this business data processing special interest group.[?] in '59 while still at Rand. And I started teaching a little at UCLA just on the
side.

Mapstone:

Oh, did you? And was this work involved with the program that Monty Phister was[?] .

Postley:

No. I originally met Monty Phister --I shared an office with him when he came here from Cambridge after he got his PHD. In fact, before he got his PHD I remember, we always used to think it was so funny Mr. Phister _____ . And one day the phone rang, and he picked it to say hello and the voice on the other end--Mary Anne's voice said, "Is Dr. Phister there?" We laughed for five minutes. She never got it, because we were in the office, you know. [laughter]. He had to call her back. So that was in '50 like 4 or something like that.

Mapstone:

So, you were teaching--when you were teaching

Postley:

No, Monty was always in the Engineering Department. And I was in the business side.

Mapstone:

Teaching computing methods--were there any methods?

Postley:

No, I was just giving a kind of survey course, anything I felt like. That's not the way UCLA looked at it. That is the way I looked at it. On systems, not programming. Systems and computers and software and that's it.

Mapstone:

Do you have any notes or…

Postley:

I never made notes, except very general outlines. Subjects to be covered, but I never kept them because the next time I gave a different course. I wanted to give a different course. And in those days' software was an each time sort of thing. I guess that was probably where while I ____ in there where I finally got the idea that that's wrong[?]and how I got into what I am doing now which is quite very different in a sense.

Mapstone:

Can you enlarge on that? Go into that?

Postley:

Well in l960 I left Rand because I became--well Rand is a great place. But I just became a little anxious in those days because the purpose of Rand is not to get anything done. Its just to provide advice and as I said we did get things done but we had to fight awfully hard even to be allowed to be involved. And I got tired of that. I wanted to get something done. And I furthermore had the idea that somewhere products and packages were the wave of the future and that it was ridiculous to write programs every time to do jobs which were very similar. Application packages, you know, like payroll, inventory, and

so, on were one thing which wasn't what I was interested in. What I was interested in was a general-purpose system that allowed people to produce programs without actually programming. And we set up a company which was unfortunately owned by others in 1960 to do that. To produce such a program. And we did produce a program in 1962 which was published in Datamation magazine in December 1962, called "GIRLS" which stands for Generalized Information Retrieval and Listing System. And it became evident in the course of that work and thereafter that most business data processing, now we say all--then we said most, really involves creating files of information on some need-- tape disks and updating it, pulling that information out, processing the information and coming out with something. Either reports or stuff on a terminal or new file or whatever. That's it. I just described it. Its nothing else[?] data processing. No high fluting mathematics or any of that stuff. Normal accounting like arithmetic. "GIRLS" was designed to do the second part of that, not to create the problems.
In fact, it was designed for Douglas Aircraft and it was designed to solve a problem which Douglas had in this almost unique way. Douglas had been computing from the beginning and they had many different kinds of computers. And everybody in Douglas, it seemed, had done some programming for those computers. Probably tens of departments, maybe even hundreds. No centralized control. No nothing. Just a bunch of guys. And they had created a heck of a lot of valuable data on tape and every time they wanted it off, they had to have a different programmer come in and figure out how this tape was configured and get it off. GIRLS was designed to read, to retrieve information from any tape that Douglas had. Any one of all those configurations and produce reports. And it did. It worked. It took us two years to do it--a year and a half. And we completed that, and it worked. It was a success, a roaring success. And it was used by Douglas because originally, we started out to have a 709 and then went to a 7090 and on up. But we retrieved from tapes that were made on a 701.

Mapstone:

Oh no.

Postley:

So, we--well anyway, it worked and--Oh, it was used until the mid '60's on the 7094 when Douglas

bought the system we have now. Late '60's. Well, after GIRLS we produced, we got the idea that this was not only a viable concept, but the thing to do. When we produced a system called a series of--we call them File Management Systems. The first three were called the Mark I File Management System, Mark II Management System, Mark III Management System, all for the 1401 which was a small computer with no operating system and so on. In 1964 our company was acquired by Intramatics and shortly thereafter the 360 was announced and we decided to start all over again and make a really good one for the 360, called the Mark IV File Management System, which we produced and delivered in 1968, January 1968. Since that time, we have had fourteen new releases of improvements, of that system the last of which, that is to say the most recent of which was in November of 1972. We now have six hundred installations in thirty-four countries. That's what all these pins are.

Mapstone:[?]

So GIRLS was the forerunner.

Postley:

GIRLS was the forerunner of all of that and Mark IV has been around in various versions and models and releases for five plus years and as a result of that I go to Europe and South America and that is where I was last week--South America. I go to Europe, South America and Japan rather frequently.

Mapstone:

So, you were really behind this in the field of management.

Postley:

Oh, yes, yes definitely.

Mapstone:

Nobody had done the work or the

Postley:

Right. Right. Now Mark IV has increased in scope and power and efficiency and everything else so that it's area of application is similar to where you would use COBOL. But you can produce a program in about a tenth of the time, and it runs a little faster than COBOL. And it gives a lot more visibility

because what you write is much less and so it is easy to understand and modify and so on.

Mapstone:

So, you the programmer will write it--or whoever he is--do you record the program at this point?

Postley:

We don't like to--but some people do actually. [laughter]. The reason we don't is this. Mark IV is a forms oriented--you fill in forms anywhere from one up maybe four or five forms. Except for one part of Mark IV, --in COBOL, there is a correspondence between a COBOL statement and some number of machine language instructions which are produced by the COBOL compiler. There is a one to many correspondence. There is always a center, right. This COBOL statement you get those machine languages translated. Except for one portion of Mark IV, that is not true. You fill in a form and according to the combination of things you have written on this form, you may get any number of different programs. It does compile the program, but there is no correspondence--there are no statements on the Mark IV forms. For example, if you wanted to take a total of salaries by department, you put a mark in a box. Now depending on what else you wanted to take different programs would be created by the Mark IV. As I say, there is one section where it is somewhat like statements. But the rest of it is totally different. So, we don't like to call it a language in the sense that it corresponds to what you usually think of as a language.

Mapstone:

You mean, sort of like[?]I…is the programming language?

Postley:

Right. You don't need to know anything about computing to use Mark IV. I assure you a lot of people don't. [laughter]. One company, Ford Motor Company, has twelve hundred people in one place using Mark IV and very few of them are programmers. Most of them are people who have the problem--the problem, and do their own whatever you want to call it--program[?] in Mark IV.

Mapstone:

When you came out with Mark I, obviously it wasn't this sophisticated.

Postley:

No.

Mapstone:

But Douglas--you did GIRLS for Douglas--and did other people use GIRLS?

Postley:

No. Nobody else used GIRLS because it was written in a language which I don't remember the name of, which was written by Douglas for its 7090 computer. The 704 and the 7090.

Mapstone:

That's right. Douglas did their own programming always.

Postley:

What was the name of that language?

Mapstone:

Uh, oh, I have a[?]701 down at the[?]didn't follow anybody else's.

Postley:

I can't remember the name of it. But whatever it was, we wrote GIRLS in that language. And hence it wouldn't work on anybody else's computer.

Mapstone:

So that Mark I was now[?]

Postley:

Mark I was written and auto coded for the 1401. So was Mark II and so was Mark III. The original genesis of all of those was the same. It was for land use applications for state and local government. And Mark I was used by the city of Los Angeles and others. We used it for other purposes that had nothing to do with that because it is a general-purpose kind of thing. And Mark II was used by a number of cities in the mid-west and the east. And Mark III originally written for Alexander,

Virginia. It was similar but more powerful systems than the previous ones. Mark IV was a complete, start all over again, kind of thing. Well, even for the first release of Mark IV we had maybe five times as much money spent in the development as on all the others combined. Since that time, we've had probably ten times that much spent. Originally, we had the idea we were going to develop this Mark IV, finish it and start selling it and go on to develop something else. But they are very hot. We have continued to spend money in a slightly increasing rate every year since we've started--increasing--and we just keep improving the[?] You know it is like Chevrolet. They don't just say "Here is a Chevrolet. And now we are going to make something else." Every year they make a better Chevrolet and we want to get a better Mark IV.

Mapstone:

Are you at the same time putting energies into the possibilities of something else?

Postley:

We have new products. But Mark IV turned out to be far more pervasive, really, than we originally anticipated. We are now developing application packages in Mark IV.

Mapstone:

Oh, I see.

Postley:

So, it is not a separate effort. Because that gives you a great deal of power if you can use Mark IV, you the person who gets this application package, if you can use Mark IV to…Application packages people sometimes need to modify to their own use. Not Mark IV because it is a general-purpose thing. And it is like you are going to modify your Chevrolet. [laughter]. But where you go with it, you modify. It's the same--that's a good

Mapstone:

Somewhere along the line you must have felt some competition.

Postley:

No. Not really.

Mapstone:

Really? You have the market?

Postley:

Yes. Well, there is COBOL. In a sense, everything is competition. And we have this story we tell to people. You know, people have asked me at talks, "Do you have any competition?" We have no competition and we have every competition. And a classical story is we sold a Mark IV to a university and they came down to sight the contract and get it. There was competition for the funds between Mark IV and a new garbage truck. [laughter]. And we won. I can see it now. There must be a pile of garbage somewhere. No. COBOL is competition in the sense that it has the same area of application as Mark IV. There are things, you know, called COBOL Pre Compilers which shorten time to program COBOL. However, they have the disadvantage of not using the full power of COBOL and at the same time being limited to COBOL. Mark IV goes beyond. Its more powerful. Goes beyond it. IBM has one system which they brought out which was developed for--originally for military use. And fortunately, it is terribly cumbersome. It requires large machines. It is not as easy to use as Mark IV. And it is slow. There are a few installations of it but considering the aggressiveness and size of IBM, we don't really consider it competitive.

Mapstone:

What is that system?

Postley:

It is called GIS. Well, there are nowhere near as many installations. We have about three or four times as many as GIS. And yet we don't have three thousand people marketing either. By quite a long shot.

Mapstone:

One thing we forgot to cover was when we first started to talk about setting up this company to come up with what was best--I didn't get the name.

Postley:

The name of the company was Advanced Information Systems Company--AIS. There you are. That

cost ten thousand bucks spending money on that.

Mapstone:

So, you set up the company in l960?

Postley:

Yes.

Mapstone:

And who were some of the other people involved?

Postley:

The other principal was a guy named Bob Hayes. Do you know Bob Hayes?

Mapstone:

I know the name. Isn't he--OK you refresh my memory.

Postley:

Well, he is now with a company called Becker and Hayes in wherever they are. He lives here and he is parttime on the UCLA faculty. But he isn't really in the computer field. He never really was in the computer field. He is a mathematician. So he did do research, you might say. And I did the--you know, this is when I left Rand to get away from research and get something done. So, I did get something done part and he did the research part. He did studies for development center and approaches to this and that and the other-- mathematically based approaches and evaluations and things like that. And mathematical aspects of the information retrieval in which we had become active, library science, stuff like that. And I made the programs and did the specific part. That's all the principals.

Mapstone:

Yes. And then when did you become part of Intramatics?

Postley:

1964.

Mapstone:

Was Intramatics the name of the extant company?

Postley:

Yes. Intramatics was founded in '62.

Mapstone:

Alright to do what?

Postley:

Software.

Mapstone:

Software. So, they picked up your package?

Postley:

Well, yes. They picked up our company, whatever it may have included. In those days a package was nowhere as long lasting as they are today. And we were just finishing Mark II and we had a contract, which was actually signed after we were with Intramatics to develop Mark III. Not to develop it but for the first purchaser of Mark III. And as I said Intramatics was a general software company. And we were a much smaller group. I hate (end of tape one)

Mapstone:

I had just asked before are your packages compatible with other IBM machines?

Postley:

Well, we originally designed Mark IV which was[?] a product which makes a distinction which has meaning to us anyway package a product and we sell what we feel[?]…its an ongoing thing for more than five years that's been happening, so it is fair to say we will do as we have done. Anyway, it was originally designed for 360. To take advantage of the new type of architecture, operating systems and so forth. However, over the years we have produced models of versions of Marks IV which do run on other machines which are similarly conceived. One is the RCA Spectra 70 which is now called UNIVAC series 70[?] the seaman's machine in Europe. And we are now developing Mark IV for the UNIVAC and 97. But even within 360, there are many different machines. And operating systems which are very important to us. We now run on thirteen different operating systems, including one for

the model 67 which was 3667 which is a different machine. We run under the virtual operating systems which I didn't count on at that time. ____ we now have a separate version. Our versions are different. So, we can run on about 80% of the world's computers. But not on the ones that are really very different architecturally from the 360. And, of course, there are some good ones. Like Burroughs. like UNIVAC 1108, control data we don't. NCR we don't.

Mapstone:

What about the earlier

Postley:

Oh. Now they ran only on for--they were strictly programs for that machine. On the 1401 or the[?] 704, 990, 94 --they are all the same. They didn't have the operating system problem in those days. And even on the 1401 we didn't even use the IOCS. We wrote our own.

Mapstone:

Was it easier before you had the operating system?

Postley:

Well, I don't think you could do computing as we do today without an operating system. There are just too many things that not enough people would know how to do that are done by the operating system.

Mapstone:

So, for instance, Mark IV could probably not have happened as is as effectively?

Postley:

No. We probably could have done it because, you know, we're professionals and in the field. But the normal computer user doesn't have people who can write programs and do what the operating system does. We did do it in the earlier versions. We wrote the what are now the operating system program[?] into the system. They are better _____ they were incorporated. One of the design characteristics of Mark IV is that it does run under the normal operating systems when you need to change or modify. So, you can run it like a normal program.

Mapstone:

Going back a little bit now, who could you recommend as maybe one or two, I don't really think I should get into too many people--I was just wondering, who in the field of business data processing, maybe from another angle you could recommend for me to talk to.

Postley:

Well, I can give you the name of a man who was in the field of business data processing and very prominent in it, but he isn't any more. His name is Al Zipf in the Bank of America in San Francisco. He is now a senior vice president, I believe[?] of the bank and not connected with that field but he would remember the old days. There was a guy with Pacific Mutual here in Los Angeles on the UNIVAC, what the heck is his name. A fellow by the name of van Oosten with Allstate Insurance.

Mapstone:

How do you spell his last name?

Postley:

van Oosten, I think.

Mapstone:

And he is where now do you know?

Postley:

Well, now, I don't know. Then he was with Allstate. They were in some place like Oshkosh. [laughter]. But I believe they have moved.

Mapstone:

Is there anyone you can think of that is in the area? I do know about Al Zipf. We are having a terrible time contacting him because he is just so--he is all over the world.

Postley:

I know.

Mapstone:

I was just wondering if there is anyone locally you might have.

Postley:

This guy with Pacific Mutual is such a guy, but I can't think of his name. [laughter]. That's helpful. Well, they were very early in the use of computers for business on the west coast. They had a big UNIVAC.

Mapstone:

Maybe I can track it down.

Postley:

Yes, maybe you can track it down. If I heard it, I'd know.

Mapstone:

Well, you know, if you think about it give me a call or drop a note. I'd like to interview a few people in the area because up till now I've tended to be a little bit hardware oriented and I want to get into the software and the uses you know.

Postley:

_____ get into the busines[?] I'll tell you a guy who has done some interesting pioneer work in the use of computers in medicine, by the name of Willard Dixon at UCLA. Dr. Willard Dixon. If you care to mention to any of these people where you got their names, its fine with me.

Mapstone:

Great, that really helps. Uh, UCLA Medical School--medical applications, is that right? How early did he or any particular--start getting into the medical applications of computers, do you know?

Postley:

No.

Mapstone:

OK. I sort of tried to get a feel for how the shift went from predominance of hardware to software.

Postley:

Well, I think maybe it began with the emergence of the languages like FORTRAN and COBOL.

FORTRAN more especially because IBM was fully supported by FORTRAN and thats[?] beginning of programming. And then I don't think--the things that happened were fairly minor until finally the 360 came out and that was its major development because the 360 had as part of the machine, part of the package an operating system which completely removed from the of the programmer a lot of stuff that he had been programming before, or that nobody had been programming and that people hadn't been doing. Scheduling, IOCS and so on.[?]____ all kinds of things. And with 360 there were thoughts in the beginning of how many people would use the operating system. Today I don't know of anybody who doesn't use the operating system. Not a single--there must be somebody. But I don't know them. Not in business. In fact, until recently I thought there was nobody who didn't use some high-level language until I came back from South America. And I ran into several people who are still programming 360 in assembly language. I couldn't believe it. I couldn't believe it. This really is.

Mapstone:

Why are they doing it?

Postley:

Well, there is one banking application which does require assembly language because you don't do the normal functions. And that is to read and convert magnetic checks into computer files. And it has to be done fast because the checks go fast. And the programming languages such as COBOL do too many other things which preclude the possibility of doing it as fast as the check reader goes. So that one application is the only one in the world that I know of, in business, which requires assembly language programming. But, given that, there is one completely dif--[?] several people we visited, but in particular one bank that does everything in assembly language, the 1910, the[?] systems programming[?] job security or something _____ . I couldn't believe it. But anyway, I think a too big shift for COBOL and FORTRAN and then the 360--Grace Hopper, I assure you people have heard of her in the east, was then and still is, a big advocate of the importance of software. In fact, we were[?]Grace Hopper is the only luncheon speaker we've ever had at our user _____ group meetings. We just had the one just had it was number thirteen _____. They are now every six months and so I go back a number of

years. And she was the only luncheon speaker we have ever had and she was extremely complimentary of our Mark IV.

Mapstone:

But she is the only luncheon speaker you've ever had? You don't normally

Postley:

Don't normally have luncheons. We have three-day meetings, with lots of speakers, but not luncheon speakers. She is the only luncheon speaker we have ever had. And she spoke[?] very favorably about Mark IV and its contribution.

Mapstone:

Well, she is one of the[?] I guess, if you have to give the pioneer field button that people would give it to Grace Hopper.

Postley:

In[?] COBOL and business areas the guy who did FORTRAN

Mapstone:

Oh, Backus. Yes.

Postley:

Yes. We have to give him

Mapstone:

Oh yes. Most definitely.