JG: The thing that's fascinating about it is that Digital
did contribute a tremendous amount of this as far as
software was concerned. And probably one of the most
significant... well, there are two as far as I'm concerned.
One is computer graphics, particularly the work we did on
the ITEK machine. Ben Gurley was up to his eyebrows in
that. We worked awfully close together on that. And I
came out of the same Lincoln Lab group that Tom Stockebrand
and Ken and so forth, I was in that group. And so was Ben.
And in fact, when Ken decided to make his company a
computer company -- you realize it was test modules and so
forth the first couple of years -- the first thing he did
after he made that decision was to hire Ben Gurley.
Because Ben was in fact, the talent behind the PDP-1 and so
on. And in fact I'd love you to include this, my great
honor as far as I was concerned was that Gurley hired me as
a consultant to help design the PDP-1 instruction set. And
I think I made a total of $250, but that was big money in
those days, let's face it. But getting back to Digital's
significance, computer graphics certainly was extremely
heavy stuff. We probably were one of the few computer
manufacturers in the beginning with the light pen right on
the CRT and all that good stuff. And the second thing was
the work that was done by the MIT Railroad Club. And
there's another historic session after mine that was given
on computer games. I don't know whether you've -- there's

a video on that as well. But the significant thing was
that the PDP-1 was used to develop, what did they call it?

BL: Space War?

JG: Space War, thank you, thank you. And that really was
the birth of video games. And not only the birth of video
games, but also it convinced people of other applications
that displays could be used for other than just displaying
values or displaying drawings like we were working on. And
I think that was extremely significant.

BL: Yeah, the PDP-1 even came with extremely high
resolution options, 4096 (?).

JG: Oh, yeah, we had some great shots. I drew the plans
of my house using the drafting machine that we worked with,
developed at ITEK. I mean it was a very significant thing.
And what happened was, just for your own -- well, you might
want to include this, the work that was done on the PDP-1
by ITEK and the company that I had at the time, which we
called Adams Associates, that was purchased by Control
Data. And Control Data took our software and made what was
known as the Digigraphics System on the Control Data
systems. And there was the beginning of the CAD/CAM
business and most of the major aerospace companies bought

one of those things and used it. But it was an extremely significant beginning. The other area that ought to be focused in on is process control. A lot of DEC machines are used for that and it was a major contribution.

BL: Was that dependent on the third party such as Foxboro coming in?

JG: Oh yes, absolutely. Digital didn't... See the thing is, and DEC and Ken had the right idea. I mean what he was encouraging was people like us and Foxboro and other people to write the software and he was providing the equipment, OK. And that's really how he wanted it. The only thing he wanted on his side of the fence were the basic utility programs and so on, and operating systems. And that was all right. I think the thing that I want to make sure gets into any history about Digital and its equipment was the significant strides that were made in the areas of software. Because the early PDP machines made it very easy to program. You know the IBM side of the fence, the UNIVAC side of the fence, they were punchcard operations. The early COBOL days and so forth, they didn't encourage on-line and real time applications at all. In fact, on-line and real time were the watch words of Digital, OK. But the fact is that the little papertape reader, flexwriter thing and so forth, you could get right down to start writing a

program pretty easily, whereas if you had to go through

departments, you had to submit... [BACKGROUND DISCUSSION]

JG: Time-sharing was very early in the game on a PDP-4.

And Ken and Harlan... you're covering Harlan Anderson in

this history, I gather.

BL: Yes.

JG: Have you interviewed him?

BL: I have not.   Jamie Pearson has.

JG: At any rate the... we were approached by a law firm

that was handling a law suit for the Transitron

Stockholders, the Transitron Corporation's stockholders,

and the Bachalaw Brothers who were the founders of

Transitron were sued by their stockholders for not

protecting or declaring that one of their patents was not

protected or something to that effect.   OK.   And the net

result was that the first time the Transitron stock went

down one of the stockholders discovered this --

[TAPE CUT]

JG: Well, they actually rented it to us. And the big first was that it was the first multi-terminal data entry application. And we actually had eight teletypes tied into communication lines going through the telephone net and coming back into the PDP-4. And we wrote a special operating system and so forth to do the timesharing and to actually handle each machine and so forth. So it was, in fact, the first multi-terminal timesharing situation. And it was used for, as they filled in the forms, we had these eight girls pumping away at the keyboards and they were doing data entry on this thing. And then afterwards we ran it to do verification on whether they were telling the truth, we were getting stock data that we had. We made a big fuss in the computing environment, community in those days. The only timesharing that was taking place at that time was Project Mac at MIT. And we were, a lot of our compatriots from Whirlwind and so forth were there. The people that came and saw the thing actually were so impressed that they encouraged us to go into business and form a timesharing company, and that's how we formed Key Data.

BL: Out of Adams Associates.

JG: Right. And we had formed this small corporation which we called Key Corporation, and changed the name to Key Data

when we became a timesharing situation. And we decided to go with a PDP-6, and in fact, the first software was written for the PDP-6. We had the very first on-line Fortran, on this PDP-6.

BL: You developed it.

JG: Right. We actually beat IBM. IBM was pushing fortran, and they came out later with an on-line Fortran, but we had one before that. And we also developed an on-line inventory control and transaction processing system on the PDP-6. OK. And what followed is really an interesting situation, because we couldn't keep the PDP-6 up for any more than an hour, and it would crash. And it went on and on like this for months. Jack Shields was our technician, and Jack would come over and try and fix the God damn thing. And what was happening and none of us knew this at the time, but the PDP-6 had a logical design error. We were the first PDP-6 to have three banks of 16K memory all working independently. See they had... a couple of significant things about the 6. Number one, it was the first third generation machine, OK, which meant it had memory protection and so forth. That's why we could ____ on-line Fortran, because it was the first time that someone could in fact, be in a timesharing environment and literally run a program that was not working correctly so

that it went wild and started running, it would not destroy
everything else.

BL: Destroy everything else, right.

JG: So you had to have memory protect for that.   But it
also did not have parity check.

BL: So and memory, an error that was introduced would --

JG: In my estimation Ken made mistake by not -- he took a
risk and I think he was going for speed or cost, I can't
remember which.   But here was this 36 bit machine and so
forth that didn't have a parity check.   OK.   Now normally
you'd find an error pretty damn fast in a single bank
memory, because you know, if you've got a memory problem it
merely stopped, it didn't crash.   That was also true of two
banks which were interlaced, which they had.   But we were
the first to have three independently operating memory
banks, OK.   And what happened, and this was discovered
something like 6 or 8 months later when the Rand
Corporation ran into the same problem and Gordon Bell who
was the designer went out there.   And I think it was, he's
still with Digital, but he's the one who found the mistake,
the mistake was this, if one of the memory banks was not
accessed for 160 milliseconds or longer, the first time you

went in to get something in that bank you got garbage,
because the voltage level had dropped. The voltage level
would then come up and everything would be fine. So that's
why it was intermitted. Sometimes we'd reach in and grab
something that wasn't significant. And as a result it
wouldn't crash, and other times we would. Jack Shields and
company would come down and they'd throw their checkerboard
memory programs on and they couldn't find a thing. OK.
And so it was an extremely difficult situation.

BL: And so when parity checking it would always...

JG: If they did a parity check we would have found it just
like that. Because tremendous problems with both us and
Digital, and in fact it caused both companies a fair amount
of pain. It was the straw that broke the camels back
between Ken and Harlan. And it was the basis of... because
we had to turn the machine back. Here it is 1965 and we
turned $1 million dollars of computing equipment back to
DEC and said, it won't work. It doesn't work. And on the
basis of that Ken got so damn mad at Harlan who was in
charge of the PDP-6 that they got into enough of a fight
that they split. What happened to us was kind of sad in
that we went with a UNIVAC 490. But because we didn't have
memory protects, this was a second generation machine, we
had to go with the commercial application, with transaction

processing. And we didn't do anything as far as the on-line Fortran. One of my workers who was involved in the design of the damn thing actually left our company and went down to New London and formed a timesharing company down there and actually became a multimillionaire because of it. His name is Goldstein. I just saw his picture in another thing that I was looking through. But because we couldn't do the on-line engineering applications, the revenue for the timesharing company was slow and very shallow, whereas the projections for the on-line in real time engineering was going to be fast. And that caused both Charlie and I to literally have to lose our -- not our control, but the majority of our stock went into selling it to survive, and so forth. And ultimately before we were through we both wound up being employees of venture capitalists who wound up owning it. So it was a sad thing to have happen. But it was one of those quirks of fate. But getting back to Digital and what was contributing, timesharing also took place in other machines besides that. And the 6 ultimately turned out to be a fine timesharing machine and later became the PDP-10. And that was history. So between computer graphic, timesharing, process control, those are all big major items that DEC's equipment played great roles in.

BL: I'd like to go up to... because the 4th (?) is of
course applications.

JG: Pardon me?

BL: The fourth of course, would be software, specifically
applications, of which of course wps must be the first. So
you joined Digital in 1974. And --

JG: Well, as far as software contribution, process control
did all the software. I think it was the on-line and real
time aspects of the Digital machines really that made that
possible. Because the other machines were just too big and
cumbersome to be tied in there. So Ken's equipment and so
forth really opened the doors for computer graphics and
process control and timesharing. By 1974, I was still
president of Key Data, but by that time I literally was an
employee and there was a big scandalous situations which I
don't wish to talk about, but one of the stockholders
actually _____ the firm of our stock. And that
company that owned the stock was a venture... excuse me, an
insurance company. And they had a run on their system and
then in desperation they sold our stock without telling
anybody about it. And the result was that our market
maker, we were in trouble. And so our stocks had a tumble
and the idiots who ran the board in effect said, well,

we'll fire all the programmers and that will reduce

expenses and we'll just wait until we get stronger again

before we do anymore programming. And so when we fire all

the programmers I said, I'm going too, goodbye. And that

actually turned out to be the demise of the four (?)

corporation, because the idiot that took it over waited too

long to get the programmers back and wound up going into

Chapter 11. So when I got out of Key Data instead of just

looking for a job I did a study on what the next major

frontier was, and I interviewed 20 people, Bob Everett was

one of the first, and I think Ken was number six on my

list. And the interesting thing was that office automation

and word processing was what came out of all those

interviews. And when I interviewed Ken he said, we don't

know much about word processing but we'd like to find out,

and so they hired me as a consultant. I actually came in

as a consultant. And in December of 1974, they hired me in

September, and in December, just before the holiday, in

fact it will almost be... let's see, '74, my God, it's

almost 17 years ago now, I made a presentation to the

executive committee and in effect said, you have no choice

but to get involved in word processing, because it's going

to be the tail that wags the dog before it's through. It's

going to wind up being information processing, per se. So

Ken turned around and said, fine, you do it. And I found

it amusing in the engineering. He who proposes does. And

that's exactly what happened to me. I said, you should do it, and he said, go ahead and do it, So that was kind of fun. So they made me group manager for word processing. And in '75 we started and believe it or not, I had a product and it was announced in February 1976. So that was just something like 14 months. Fourteen months later I had a product, and it was a good product too, wps 8.

BL: Let me go back to what the competitive situation was. In your study why did you decide that word processing was going to be the tail wagging the dog and what was the competitive situation like at the time?

JG: At the time there were display processors, but most of them were wired logic. OK. And they really didn't even associate themselves with the computing world. All right. They were an outgrowth of office machines as far as people that had them, OK. I mean IBM was there, but in an electronic... a mechanical fashion. They did not have a display scope, OK. That is another story. There was this guy by the name of Lenny Hampman back in... let's see, back in the '60s, that's right. The White House, Johnson wanted a computer to do some form of text editing, and a proposal went out. And we and IBM submitted proposals. And IBM unfortunately won. But we had submitted a proposal with Digital, OK, I'm talking about Adams Associates. And

unfortunately we lost because we were so small. But that
became IBM's mag writer, with the tape and so forth. And
that came out of that effort, OK. So even way back in the
'60s we had done something like that. But the competitive
situation was, IBM had this Mag Writer, and there were
several, Remington Rand... no, wait a minute, Burroughs,
was it Burroughs? I'd have to go back and look at some
manuscripts. There was some office equipment out there,
and one of them even had a full page display, believe it or
not, but it was all wired logic. But all they had to do, I
wrote a... probably the first display editor on the TX0
back in '57, so I knew what the hell it was all about, and
I could see that a regular computer could do it that much
better. And so in the process of looking at all these
things, it was clear that a DEC computer was a natural to
pull this off. But it was also clear that the word
processor was the way to get the English, honest to God
English into the computer. And thereby introduce
information per se into the computer. And Digital was
already in the typesetting business, so it wasn't as though
they hadn't been doing this sort of thing. So what I
really discovered was the fact that people were now willing
to spend bucks to do word processing.

BL: Was Wang yet a force?

JG: Wang was just getting started. They had a
mechanical... an electro-mechanical device. They did not
have a display. In fact the guy who started the word
processing, he and I shared a seat on the word processing
committee that was done in Washington during that same time
frame.

BL: So it was really in the air?

JG: In the air?

BL: The idea that word processing should exist as a
display and a computer...

JG: Yeah, it was almost heretical to think of a computer
company getting into the word processing marketplace. They
really didn't think of it. They thought of it as office
machines. And of course, IBM has an office division and a
computer division. And of course it was the office
division that had this thing, and so they didn't even think
in terms of a computer manufacturer getting into it. And
of course, Wang was really not a computer manufacturer.

BL: Calculators. Beautiful calculators.

JG: That's right, calculators. So it was kind of a gearing thing. But it was... it was so clear to me that the word processing was the way to go. And the very fact that we had done such good work in the typesetting side of the fence. So what I did quite frankly was under Stan Olsen who had that division, I got some key people who had been working on the typesetting side of the fence, two of which were Bob Travis and Rich Calini. Rich is no longer with DEC. Travis is technical director for Jeff Rudy's OSITE (?) group. Another interesting tidbit, Rickland, no, the guy who invented VisiCalc, Brickland? His name is Brickland. He was one of the programmers.

BL: Ed Brickland?

JG: No, I think it was Ned. I can find out. I'm just having a mental block as far as that. But he worked on the stuff as well.

BL: Now that was under the aegis of the PDP-8 group. And PDP-8 had the OS-8 operating system had just come into existence.

JG: No, OS-8...

BL: Probably in '73.

JG: No, what we did was we started on -- Irwin Jacobs, did you interview him at all?

BL: No.

[END SIDE 1 -- BEGIN SIDE 2]

JG: Dibol. Did you ever hear of Dibol?

BL: Oh sure.

JG: OK, Dibol was an application that was being pushed on the PDP-8. And they were selling it as the DS-310 system. What we did was we came out with a system that was both word processing and data processing. In other words, I took the very same configuration that Jake had, and we had our own... I think we used OS-8 as the... we used a kernel of OS-8 as part of our operating system. But we built the whole damn thing into one scene, and that was wps 8. But when we released our product we released it as both a word processing and a data processing system.

BL: That's right.

JG: Right. And it was called the DS 310 W.

BL: So it wasn't as if it were a layered application on top of OS-8?

JG: No.   I have some old stuff here.

BL: Well, in other words that allowed OEM's to use Dibol to develop applications that would be integrated with wps 8, right?

JG: Right.   And we introduced that thing as both a word processing system and a data processing system.   And literally it caused a lot of eyebrow raising, because they couldn't believe that someone would go for both a data processing and a word processing system in the same box. And in fact we were pressured into selling it separately shortly thereafter, and we called it the wps... what did we call it?   I've forgotten.   I've got a couple of things here that, this was a Business Week article back in June of '77 when we announced the... oh, it was the W... that's right it was the WS 100 word station.   In fact that's... we introduced word station and then ultimately we introduced it as work station.   So work station came out of this whole thing, interestingly.   Anyway, to make a long story longer, the word processing was announced in February, we shipped

in May, I think, and then we shipped a stand alone version

in September, and Citibank was one of the first there.

BL: '76 this is.

JG: Yeah. And we also tied another terminal into that and

introduced the concept on the two-terminal system, which we

call the executive... it was supposed to be the executive

and the secretary working on the same machine, and that had

shared files, believe it or not, and it was also possible

to run the data processing as well. So I think the total

tab was something around $30,000. So that was quite an

interesting beginning. And believe it or not it took me 19

months to get into the black. The difficulty I had was

really a strange one, and the difficulty was this. First

of all the word processing market was extremely

competitive. I was up against the office machines. OK. I

wasn't competing against computer manufacturers. My

competition was Wang and --

BL: Data Logic?

JG: Yeah, all those. Anyway, and here I was trying to

match feature for feature. We did a couple of things that

were extremely interesting, and I'd love you to include

this because I think it's extremely important. Number one,

we introduced the concept of a terminal emulator. And

using a terminal emulator we could in fact tie into a

computer and turn the word processor into a text

preparation device, that was also capable of being word

processing locally and then tying into a RISDIS machine,

for example, to do your data processing. So you could do

your data processing on the machine and turn around and do

your word processing locally and you could store stuff up.

We had what is known as CX, or character transmission and

that came out of the work that I did, believe it or not, 14

years earlier, back in 1957, a guy by the name of Bob

Sevelle, Bob Sevelle and I -- Bob Sevelle was at Digital...

went to Digital ultimately. But when we were both at MIT

we developed the Lincoln Writer, and the Lincoln Writer is

in that thing. But the thing that's interesting is that I

used the logic of the Lincoln Writer to design the CX

system on the word processing system.

BL: Did the Lincoln Writer use the terminal emulator?

JG: The Lincoln Writer was in fact a work station to the

TX 2 computer. It was an IBM model B electric typewriter.

It had a papertape reader, a papertape punch. And in fact,

here is the... I have a copy of that paper. But the thing

that was kind of fun about it was that 17 years later I

used it on the word processing stuff. Anyway, getting back

to the communications, we not only introduced the character transmission because we were doing that with the Lincoln Writer on the TX 2, so when I got my work station going I merely said, OK, I'm going to do the same thing for this work station. So we got this CX thing. And that enabled the workstation to become a terminal to data processing, and we pushed that very hard. The other thing we did was we used what we called DX to transmit files using again some old techniques that we had developed back at MIT. Sum checking so that you could do a simple sum check on a document.

BL: Plus embedded text characteristics.

JG: So that was DX. So between CX and DX we in fact had file transmission and terminal emulation on our early word processing stuff. And that became our lever as far as selling the stuff. And before very long, almost 80 percent of the word processing systems that we sold had a communications option on them. So we established that niche.

BL: That's interesting.

JG: So we actually began the concept of communicating word processing systems, and using it as a link to the computer to do both word processing and data processing together.

BL: Was that what customers were buying? Or was it simply that this capability allowed OEM's to develop special customized systems that would use these capabilities?

JG: The interesting thing was that the OEM's, the rule was, an OEM had to provide added value. All right. And I was always in hot water because my OEM's were not providing added value, they were just selling the God damn stuff period. And the very fact that the OEM could sell the word processor and have it tied into the DEC machine that he was also selling was that much more of a plus, OK. And so you know, we were always being challenged that we didn't have legitimate OEM's and so forth. But too bad.

BL: What physical group were you under?

JG: I was in Stan Olsen's division.

BL: Which was?

JG: I've forgotten the name of it.

BL: But it wasn't a product line.

JG: No, no. He had -- Marcus was in there, Julius Marcus was selling the government systems. And he had the telephone... he had the telephone, ATT and he also had government systems. Then Bob Lane had typesetting. And Jacob... and Irwin Jacobs had business, the OEM business line, OK, and then I had word processing, and that was it.

BL: In Merrimack?

JG: It was not in Merrimack in the beginning. It was down in Parker Street. We started, we didn't move to Merrimack, well, I moved to Merrimack along with the telephone group in September of '76.

BL: After you were shipping.

JG: Yeah, right. And we set up headquarters in what is known as the executive office building on route 3. Merrimack wasn't built until '78. In fact I have a picture of me somewhere breaking the ground with Governor Thompson and Stan Olsen.

BL: I'd like to see that photo. Stan and Mel and you breaking ground.

JG: I could show it to you. I'll find it before we're
through. In '78 we moved into Merrimack and that's when...

BL: Well, I was interested in the organizational structure
because it seemed that you were developing... hardly just
developing a piece of application software for a product
line. This was obviously very tied into... very much an
integrated system, a distributed office system and probably
the first distributed office system, than like a Wang
Writer...

JG: There was an interesting problem. And that was I had
this system and it was just great as far as being
integrated into a computer arrangement and so forth. But
the difficulty was that it was a stand-alone product group,
which meant that all the other groups, if their customers
wanted to use my stuff, I had to get credit for it. And
there was much gnashing of teeth as far as that was
concerned, because it was a natural thing that people
wanted that. So I was forever having negotiations with the
likes of Marcus and others, and in fact at some point in
time, I've forgotten exactly when, I actually surrendered
my OEM business to Jake, so that it would be all under OEM.
Ironically enough that did not turn out to be a good move
in that they didn't push it as well as they could have, and

I really should have kept it. But I was under a tremendous amount of pressure because I wasn't really an OEM, my OEM's were not adding value. And there was lots of gnashing of teeth about that so we finally had to surrender that.

BL: Jake... Jake was in COEM.

JG: Yeah, he was in charge of that. Interestingly enough, Jake and I were great friends and there was no problem as far as he and I sharing. It was the rest of the corporation that was getting upset because I wasn't a legitimate OEM situation. But that worked out OK, and we continued to sell directly to very large corporations and so forth. And in fact most of our customers were the larger corporations that were going for the more sophisticated word processing systems.

BL: OK, let's see, the first systems were the WS 100, the VT 278.

JG: The 78 came in '77 I believe it was. In fact this is a pretty interesting article. I'll let you have it so you can make copies of it, because it talks about some of the competition. It really says something quite interesting and that is that "most people agree that the word processing world and the EDP world are merging, but no one

really knows for sure how it will happen. The trend will

not be fully confirmed until IBM, the largest manufacturer

in both markets announce a product." Says Jeb Eddy, who

follows word processing at Data Quest. "And it will at

least be two years before that happens." But we were at

least two years ahead of the... in fact it was three

because the year before we were on the DS 2 10 W. That was

the first... the DS3 10W was the first... and by the way if

you are looking for photographs and so forth, I have a

great photograph of our first cover of our brochure, with

the DS3 10W and an old typewriter in the same picture, it's

a great shot. It's down at my office in Spitbrook if you

want to see it. But they in effect said, Gilmore's

stepping out on a limb doing all this, and so forth. It's

a great article. It's interesting. But you were asking

for sequence. The DS3 10W was the first product.

BL: And there was the PDP-8.

JG: Right. And then in the same box, it was the same box

was the WS 100 and the WS 102. The two served for two

terminals. OK. And that was all done in 1976. Then in

1977 we announced the WS 78 which was the father of the

DECMate. And that is the announcement of the WS 78 right

there.

BL: Oh yes.   Oh look, there it is.   Yeah.

JG: And that had two flavors.   It had the word processing which was WS and then it had the WD 78 which was word and data.   It was the WS 78 and the WD 78 came out.   And the WD 78 was going to be sold to OEM, and so they could in fact sell it as both a...

BL: A word and a data processing system.

JG: Now the interesting thing about it was that we were competing against the OEM group who had come out with the VT 78, OK, which was a completely different application with OS 8 on it.   All right.   And typical of paranoid Ken Olsen, you know, always have two people try and destroy one another, and they were selling and we had a couple of giant meetings or announcements together and so forth, but the competition was fierce as far as you know, why we were allowed to be a WD 78 and what we were in effect pushing was the Dibol.   So the Dibol was on our thing, and OS 8 was what was being pushing on the VT 78, or whatever.   So that was another significant thing.   I sold that thing at $14,000.   We were all... we, the rest of the word processing world, were all clustered around the $20,000 mark at that point.   In fact my basic word processing system at that time, the WS 100 was selling for something

like $18,000. When I introduced the $14,000 work station I

was the lowest priced word processing system going. And in

fact I remember one guy coming up to me and saying, you're

ruining our market, you're ruining our market. They just

couldn't believe we could sell it at that lower price,

which was kind of interesting when you think about it. But

that included the printer and so forth.

BL: I remember the Wang Writer coming out in '77, and I

was working in Boston. After two days of using it I

discovered, my God you can do anything with this. It's a

million times faster, you don't have that stupid interface.

JG: You can put anything in there. It's interesting that

you came up with this, because when I was thinking of what

am I going to try and tell this guy, I said, as far as word

processing is concerned, what did Digital contribute? We

certainly contributed the word processing skills, OK, but

one of the things that I'm very proud of is the fact that

when I designed the word processing system I designed it so

that it was grammatically oriented as opposed to

geometrically oriented. And the concept of editing by

words and sentences and paragraphs was never done before.

BL: Obviously.

JG: OK, in fact they call me the father of the gold key.
OK, and I designed the numeric keypad was only a numeric
keypad, and I said, we just won't interpret them as
numbers. And we worked it out. And I remember designing
the damn thing on an airplane. I designed the whole damn
keyboard and concept on a flight in an airplane. I had the
damn thing finished by the time the plane gets landed. And
only Rich Calli (?) made one change to it, but what I was
looking for was a way to completely control the
manipulation through the text of using ... with a secretary
using just one hand to manipulate. I think I managed to
come up with 50 functions out of 18 keys because what I
introduced in that design was the concept of modes. You
were in an advanced mode or you were in a back-up mode or
you were in, - what the hell is the rest of them - white
keys all set up a mode. Ironically, the white was J.
Here's a photograph of the keyboard, here's the keyboard,
see. They used to kid me about the J. They said, - you
egotistical bastard, you put your initials in it. There's
a nice shot. These are all 78s. That was my contribution

BL: So that was the concept of modes. There were a lot of
other invasions. The stupid Wang and everything else up to
date was in insert mode and over-strike mode. You never
went in for that insert stuff, thank goodness.

JG: Fought it tooth and nail.

BL: Boy, was that awful.

JG: Actually what you're talking about is not insert mode but over-strike.

BL: They were always in over-strike mode, yeah, that's what I meant.

JG: I fought that and wouldn't put it in. And the reason why we did it was if in fact you made a mistake and stayed in an over-strike mode, you could literally destroy two or three sentences before you realized you were in trouble.

BL: I did that many a time.

JG: But introducing the concept of text as a string was the big thing as far as we were concerned. The rest of them were looking at the page as a form in over-strike mode. So you literally was filling out a form. We said, no. We said, we're going to introduce you to the concept of text as the string and we're going to introduce you to the concept of migrating through the document grammatically.

BL: Not geometrically.

JG: Right. And then later we, - I helped design this keyboard too - even though this is a Macintosh, this is the Digital keyboard. Bob Travis(?) and I designed this thing. And at that point I said, - we will introduce geometric editing with the arrow keys and now you got both.

BL: And that's the first time users will use this and discover you can.

JG: But I loved the idea of being able to back up sentence, sentence and paragraph, paragraph.

BL: You can really rip.

JG: Well, I think I made a little history on that one.

BL: All of these packages were stand alone systems but they could communicate with the host. That was unique too.

JG: Oh yeah, right, as a matter of fact they thought we were crazy. The other thing, when the 80 series, the WS80 and 81, 82, that was an extension of a WS100 into using the VT100 and not with great success.

BL: Then came a migration to PDP-11s.

JG: That's right, the ___ 11M system. I have a great
diagram here.

BL: Which was when?

JG: Believe it or not I announced the WS11 system at the
same time that I announced the 78 in ___.

BL: 1977.

JG: Yep.

BL: So that was based   [BOTH LOOKING AT PAPERS].

JG: Here it is, - "Digital Equipment Corporation as an
example just jumped head first into the WP market with the
announcement of its PT-78 System, CRG(?). We, at Digital
recognize the fact that word processing, data processing
are complimentary subsets of information ...". Was
embraced by the government. They really liked it. One
mistake that he made which truly was a sad thing but it was
understandable. Our guys deciding on putting our word

processing system on RXX11(?). That was a technical
mistake.

BL: It would seem that our 611M plus was the, obviously
the largest installed base and since the VAX was going to
become compatible with it, it looked like the future
growth.

JG: The reason why the RSX-11M, excuse me the RSX-11 was
chosen was because it was truly a, a multitasking
operation. RISDIS(?) was more of a character of
timesharing, very popular by my designers, Bob Travis and I
think Rich was still involved, they said, - what you really
want to do is take the key strokes off the machine so you
want to go on an intelligent terminal.

BL: Distributed processing.

JG: That's right, so they were on the right track. The
mistake was that we were ahead of our time and the problem
was that ...

BL: Everyone had terminals.

JG: Well, everyone had a dumb terminal and the other
problem was the skill as far as down line loading the

software to an intelligent terminal was not as pithy as it should have been. The problem ..

[END OF SIDE 2].

[JACK GILMORE, SIDE 3 CONTINUING].

BL: What happened to performance wasn't there.

JG: Using the RSK-11 system, we ran into more performance
problems than we would like to admit and it was supposed to
be able to sustain a tremendous number of work stations. I
think we were talking in terms of supporting up of 32 work
stations, which was phenomenal. But it took us a fair
amount of time before we reached a point where it could be
handled properly. The difficultly was transferring the
text back and forth in large enough chunks. And that all
had to be worked out. John Henning was fairly senior
software engineering manager now was one of the key guys in
that, making that damn thing work. But it eventually
became a ___ system. What we should have done, looking
back now, we should have gone RISDIS first and then tied
into RSX as well, in other words a dual push. But I had a
problem I wanted to bring up, the problem was - Digital's
success in the seventies. Here I was in a market that was
exciting and new and definitely growing. I doubled every
year, OK. And my profits were moving well from the
viewpoint of a new start-up situation. The difficulty was
that every one of the other groups was having a honeymoon
in the mini-computing world. I mean we were in fact the
mini-computing industry. And so every other product line

was making the profits that DEC was looking for, namely 22 to 23 percent. So the very fact that I was not in that same ballpark, I wasn't getting the seed money that I should have. I mean with a better visionary management I should have been given a tremendous amount of resources in order to really go for it, particularly once the word and data processing started to click. But I have to call it ignorance, the ignorance in those days was hey, you've been in business for two years, you must be... you should be doing 23 percent profit, you know. What's the matter? Everyone else is doing it.

BL: What was the relationship you had with central engineering?

JG: Not much, for the simple reason that I had my own engineering group and my own software group. I dealt with -- the people that built the equipment were out of central engineering.

BL: Not the software.

JG: Right. I had my own software engineering group. And we turned out stuff ten times faster than, in fact I was talking to someone just recently and they said, you were the biggest slave driver that ever existed. Simply because

I was an ex-programmer myself and I knew what could be accomplished, and I just went for it. But the guys did beautiful work.

BL: I'm making a connection. You said, geez, we didn't get enough funding. What happened was, central engineering got the funding. I mean that's why.

JG: The number of programmers I had should have been being increased, particularly when Wang started to double theirs. At one point, certainly when we came out we were ahead of Wang. And then Wang started really working on their system. And they turned around and they... I found out that they had something like 38 programmers and I had eight. OK, and they were going 90 miles an hour. And so I felt bad about that. But the other thing that I was trying to allude to here is that in making... in going for the 11, getting on the 11, what really should have happened was a bigger investment in both RISDIS as well as _____. And that didn't happen.

BL: But then it evolved, as soon as the VAX came out, you had wps on the VAX.

JG: It took a long time for wps plus to come out.

BL: That's right.   That didn't come out until '83.

JG: Right.   We started working on it in 1980.

BL: Didn't Skip Walters...?

JG: Skip was not using....

BL: I thought he used that in the first version of the
Charlotte package.

JG: No, what he used was an ASCII edit-on (?) that was
reasonably simple.   And we developed a thing called wps,
which was a straight ASCII editor (?), OK.   And that was
done in DECMail.   I was deeply involved in DECMail.   And I
designed the specs for what we called wps, w p s.   In fact,
my license plate is DEC WPS.   And that was what was running
on the VAX.   The WPS.

BL: So that's what Skip used in the Charlotte package?

JG: Skip did not begin with a gold key editor.   Skip was
using EDT, which was not... which was just --

BL: A VAX text editor.

JG: And with none of the word processing... right the gold key system was not on the early thing. We finally convinced him to go that route, and they did it. And they used the wps editor, which we had in DECMail as well.

BL: Why did it take so long to get wps plus out?

JG: That's a tough story.

BL: Was central engineering involved or something?

JG: What happened with wps plus was they wanted to go to a system that was written in the language that could be ported to any system that they wanted. And so the engineering group decided to build a compiler called KOALA. The answer to your question is that wps plus took so long because of KOALA. They decided to use these guys to design KOALA first. And then it was going to be so easy to write the editor for the VAX that was also going to be capable of being ported to any other operating system because KOALA was going to be portable. And so they spent almost 18 months to 2 years designing KOALA before they wrote one line of code for wps plus. And when they finally did write wps plus it was written in KOALA and it was so slow it was like mud. And the first version of wps plus was terrible. The other thing was that the team that was working on this

wanted to do something better than a DECMate, and they
resented my even convincing them to go the gold key route.
They did not want to do that. I fought tooth and nail to
get them to even emulate the capabilities of wps 8, all
right. Those early years in the '80s were miserable. They
really were. And the people that were involved in the wps
plus in the early days were really giving me a bad time.
And it was ego. It was nothing more than ego. They did
not want to be looked upon as just fine tuning or improving
something that was done before. Their argument was that
wps 8 was a failure because it did not become the full word
processing system that it should have. OK. And that's the
second story to tell. But because of that they said it
must be wrong. Well, it wasn't wrong, and I kept saying
that your people will fall on a sword as far as the editing
technique of gold key editing, and they really didn't
believe me. They wanted to go strictly arrow key,
geometric. But I managed to win. And before we were
through wps plus started to gain in performance and so
forth. Dennis Soloke came in around, I think it was '84
and took over the wps plus effort and saved it. He and a
guy by the name of Ken Riley, between the two of them they
turned wps plus around and they've got it so that it was
respectedly respondent and so forth. And I had by that
time established a liaison with the still existing wps 8
engineering and we would have meetings where we were trying

to our utmost to get them to be as compatible as possible. But again it was this crazy paranoid technique of having opposing efforts always going at it, and I hated it. And ironically enough the wps 8 guys could move faster than we could, and so they were always one-upping us. We introduced, by the way, the concept of macro keys. That was a contribution that we came up with.

BL: You said there is another story on why wps 8 didn't become an integrated system. Why was that?

JG: Well, the WS 200 was the next major word processing system after the 11 M and the 78s, OK. What we decided to do was to use the more powerful PDP-8E that had been put together. And we figured out that we could put as many as 8 VT100s onto an 8 and have a time sharing system. And that turned out to be a magnificent machine, my pride and joy. In 1979 we had a WS 200 that literally was time sharing and file sharing with, and even security (?). All In One still hasn't got it. They still haven't got decent in file sharing. They're just about getting it now. OK. The 200 was also my coup de gras as far as Wang was concerned. I broke even matching a Wang system with a four terminal WS... we used to call them WS 224, or 228 and so forth. And the 200 stood for the system, and the middle number was the number of printers, and the last number was

the number of terminals. And so you could have as much as a WS 248, I think was in there somewhere. My WS 214 was an even price match against Wang. After that I took them to the cleaners and we were ready to really attack Wang and go at it.

BL: That would compete against their OIS.

JG: Right. And then unfortunately some bad things happened. And the bad things that happened were that we made the mistake of sitting down and putting a long range plan together in 1979. And the first plan I made was operating as a stand alone word processing group, and I came up with a five year projection of something like, I remember it as though it were yesterday, I think it was $250 million. So in five years I was going to be $250 million... I think we were around $60 at the time. Then I said, that's operating as a stand alone word processing group. What if we in fact turned around and gave up our role as a product group and --

[TAPE CUT]

JG: Attack it from a different angle and give the word processing license to all of the other 17 or 18 other product groups. And we did a calculation, assumed that we

would have one DEC salesman and one what we called MSR, a
marketing support rep who taught the word processing. If
we could have that two person team in every sales unit in
the company within a year, our projections for five years
were $500 million bucks. So I went rushing up to Stan
Olsen and said, wait until you see what I've got as a plan.
And he said no. And the reason he said no was it meant
surrendering the word processing revenues to all the other
groups. And I said, the answer is to become a marketing
arm operation and let the other guys sell the word
processors, and he wouldn't do it. And we had a big fight.
To top it off he was convinced that the WS 78 was the only
way to go. And he said, I also want you to cease and
desist with the WS 200 system. I couldn't believe it. He
really didn't like that system. He was convinced that the
work station was the only way to go. And I said, I don't
disagree with you that the work station is ultimately going
to be it. But I said, time sharing word processing systems
are not going to quit for another ten years. Look at it,
we've still got them. And I said, my WS 200 with eight
systems can take Wang down. And he said, well, I don't
agree with you. So we had a big fight. And I actually
tried to pull the group out from under him and move it to
Marcus's group, who had his own division by that time.
Unfortunately, Marcus didn't have the balls to fight it, to
fight that hard. And I lost the battle, and the net result

was that I can remember he came down and he said, you know, if you want to continue to be the group leader you've got to give up the WS 200 and concentrate strictly on the 78. And I said, I have to shave every morning. I said, I'm not going to give up something that's a clear winner. So with that I went into engineering and became the _____ manager for the effort on the VAX. And he unfortunately, did a couple of things wrong. One of them was if you remember the WS 80 had a VT 100 as a terminal, and that was a great success as far as engineering was concerned. When he put together one of his first DECMate I's, one of the engineers, who's now dead, convinced him that they could save some money by modifying the logic so that they could come in with the equivalent of a VT 100 for a lot less money. And so when they put the DECMate I together it wasn't a real VT 100, OK. It had a different chip. And it did not have...

BL: That's right, it had some incompatibility.

JG: It had enough incompatibility that you could not operate in VT 100 ANSI mode in CX.

BL: You had to use VT 52 mode.

JG: That's right. You're a wonderful audience. And I
didn't catch it because by that time I was over on the
other side. Had I stayed there I would have stopped it,
because I knew that our communicating capabilities had to
have the full thing.

BL: Because the VT 100 became the most popular terminal.
And that was the standard that every other company was
using.

JG: Stan thought that he was going to be able to pull it
off with this cheap copy of the VT 100. And unfortunately
he wasn't that technically oriented, whereas I was and
would have caught it. And if I had been told about it I
would have fought it, OK. In fact I would have stopped it.
The net result was that he came out with his DECMate I
absolutely convinced that he had a winner, and he should
have had a winner, because we had the communicating word
processing system locked up solid. So he put in a big
push, spent a tremendous amount of money and the DECMate I
fell flat on its ass because it wouldn't do the job of
communicating properly. And what happened instead was that
we had a competitor called Word 11 who had put a version of
word processing on the RISDIS system, and that was what was
being... when the DECMate I couldn't do the job the other
groups, and mind you, he's still trying to operate as a

product group rather than sharing his stuff with the rest.
So what happened was that Word 11 started being embraced by
these other product lines, our own product lines.

BL: Especially the technical ones.

JG: That's right. So Word 11 finally got a push in. I
even, in my engineering role, I even tried to get Word 11
to be purchased by us. And in fact, DEC Word was in fact a
deal between Word 11 and us, OK. And an attempt to get
something on the RISDIS system made sense. But had the
DECMate I been able to communicate properly it would have
taken off like a bird. But the other thing that was a
disaster was that the WS 200 could have gone on for another
six years, because the WS 200 was a magnificent adjunct to
a RISDIS system. And the other thing that was fascinating
about it was that the WS 200 could have been a magnificent
piece of peripheral equipment to the VAX, because it didn't
need to have word processing up there because it had its
own processor so that you could share the bigger file... It
was a disaster. I really felt bad about it. And Stan
ultimately lost so damn much money that his brother eased
him out.

BL: Well, there's also a distribution channel too by
keeping your own product group and going to this business
center as your primarily outlet for the stand alone.

JG: Yeah, the concept of the computer store and a few
other things...

BL: The sales reps weren't really out there selling
DECMates were they?

JG: That's right. That's right. The other product lines
had no interest in it.

BL: The other product lines weren't getting the credit.
It was a major mistake. And ultimately it became, finally
when Stan left and Buzz Brooks made a crack at it, and then
another guy, Jack Smith brought it in. But ultimately it
became part of the... it was opened up to everybody, and
that was the beginning of All in One. And wps 8 stuff fell
into line. That's why we didn't make the market we should
have. And it was fundamentally part of the philosophy at
Digital as far as I'm concerned, in that your goals and so
forth were such that wearing a corporate hat was not the
thing to do. You see, I had a funny background because I
had already been a chief executive officer of a corporation
of my own. So I had the bigger picture, and I knew what

you had to do in order to win. And sometimes that meant
that you had to surrender your own personal goals for the
good of the corporation. Ken didn't foster that kind of
thinking. He wanted, and still -- I won't go into it --
wanted individual soldiers. And you know, if three of them
went after the same marketplace and two of them fell by the
wayside, the third was bound to win. Unfortunately that
didn't work. The sad thing was that the early PC activity
was a perfect example of that disaster. But that's the
negative side of the thing. There were a lot of... we
missed a great opportunity as far as that word processing
marketplace. Now the good news is that with the All in One
system and finally getting wps plus into the All in One, we
finally did beautifully as far as getting into the office
business. But we could have made it even a deeper
situation had we not had that... Those first five years in
the '80s were terrible. And it shouldn't have happened.
That's what I was alluding to.

BL: It's so funny that the success of All in One came just
about perfectly by accident. And that all the strategies,
well, Stan's strategy and the PC strategy didn't work.

JG: The thing that helped All in One interestingly enough
was the fundamental design that we came up with in the
first place because Henry Onconner was smart enough to push

DECMate II's. The DECMate II fortunately had the correct
terminal in it, OK, because by that time I was fighting mad
that it wasn't -- I still had enough of an ownership
feeling that I made sure that that happened.

BL: There was an interim machine, the VT 278, that also
had the VT 100 compatibility. It was like a DECMate with
VT 100 emulation, right?

JG: Well, the 278 was just an upgrade situation. I'm
trying to think about... The 278 and ultimately the
DECMate II were both machines that helped make All in One a
success, for the simple reason that you could use CX and DX
quite nicely. And that got around a lot of the problems.

[END SIDE 3 -- BEGIN SIDE 4]

JG: Well, Word Perfect is definitely the -- Oh, by the
way, another thing that I'm extremely proud of as far as
accomplishments in the wps plus, operating primarily as a
technical advisor and so forth, I pushed for the scientific
and engineering word processing, and in fact, devoted at
least two years of my life making that happen. And wps
plus was the first word processing system to come out with
a real winner as far as the scientific word processing
capabilities.

BL: Actually Word 11 did that too. That was their
original niche.

JG: Yeah, but we beat them. Oh, here's the picture. That
was the system that was competing with All in One, and
lost. That had file sharing by the way. I was on the
DECMail side of the fence pushing it. I have a great shot
that I can't find, which maps out the whole damn... all the
products and when they came out and so forth. I have it
somewhere, but I haven't found it yet. If I do, I'll send
it to you.

BL: What do you think of DEC Write?

JG: I was not happy with DEC Write. We should have taken
the Gold project. There was an editor that was dubbed gold
that was going to be the desktop publishing version of wps
plus. And a great debate ensued and finally a decision was
made to go outside and buy Frame stuff. And interestingly
enough again the vision was that desktop publishing and
word processing was far enough apart that you know, you
needed a desktop publisher and you needed a word processing
machine.

BL: That was always the assumption.

JG: Yeah, and that was a dumb thing to do.

BL: In retrospect.

JG: Absolutely.

BL: But it didn't seem dumb at the time?

JG: I felt that if you had both wps plus and this new Gold
and it was written by the same guys and so forth, you know,
it would be kid brother and big brother, OK. But I don't
know whether they had enough confidence in the people that
were proposing Gold or not. I can't tell why they made the
decision, but they essentially decided that by going out
and buying something they could get it faster. And it
didn't take them any sort of time by any means. And they
came out with a very awkward user interface.

BL: What did?

JG: DEC Write. DEC Write's first version was horrendously
difficult to use. They certainly did not want to emulate
the Gold Key, that was clear. And there are people who are
just now coming around saying, well, it's starting to be
OK, version two of DEC Write has a reasonably decent

interface. MS Word, on the other hand, and Word Perfect both had the vision or the accident to emulate from a word processor to a desktop publishing capability. I mean you can do anything with MS Word that you can with DEC Write and then some. And Word Perfect on the Macintosh and on other things, on the PC is just as good as DEC Write. So I got involved a little bit. I tried to talk them into putting wps plus in there and that was a mistake as far as they were concerned, Mail Merge and so forth. This was a desktop publishing thing and this wasn't going to be that. And ironically enough, MS Word sells a great deal of stuff because it's got a fine mail merge, as does Word Perfect. So those are things that I was unable to win on. And you asked my opinion, and my opinion is this, that senior management just weren't willing to take a look at functionality as an issue. I mean they just kept thinking that certain pockets were enough, right. Interestingly enough, what I do today is I'm director of a thing called VCA Technology, which is a vector comparative analysis methodology that I've designed over the last several years. And it came out of my frustration as far as getting to senior management with the right story about products. I had it in spreadsheet form as early as '84-'85. But throwing numbers at people wasn't enough. Now this is the kind of thing that, well, I don't want to take it out of the wall, but I actually can show you the capabilities

between various products using vectors, OK. And you can

drill all the way down from the top score all the way down

to the most minute thing just like that. OK. And it's

been fairly strongly accepted by the new software group.

In fact, they've just issued a statement saying that you

use QFD for the design of your system and you'll use VCA

for your competitive analysis. And we're making it a

product as we speak. And it's coming out, are you ready

for this, it's coming out on the Macintosh, on MS Windows

workstation PC, and on the UNIX workstation. I didn't even

put it on VMS. So that's what I do today. I'm having a

ball for myself. I wrote all the code, this time I wrote

it all myself. I went back to being a programmer.

BL: Full circle.

JG: Full circle. I wrote the whole damn thing myself.
And it works very well.

BL: Well done.

JG: In fact I just got an award from -- here it is here.
[TAPE CUT] The net result is that my recommendations were

tinted with radical as far as a lot of people were

concerned. And so I wasn't listened to as much as I

probably should have been. Eventually just by tenacity I

managed to get certain things done. And I'm not saying
that I was the only person pushing that by any means, but
it took longer than it should for things to happen in those
days. Now one of the things I see this serving as a VCA
(?) is that this is a way to bring detailed information up
through and onto the desk of the senior manager without all
the pain and briefing that one needs to be able to show why
product A versus product B versus product C should cause
the design and building of product B. I mean if I had VCA
in 1984, you would see wps plus books on the bookstands in
the computer sections today. Because an interesting thing.
In 1984, I showed all the word processing systems, and they
were clustered as far as time versus functionality. And
we, by version two of wps plus were right smack in the
middle there. We were not way out in front, but we were a
respected peer along with Word Perfect and Wang and all the
rest. In 1984. Then management made a terrible decision.
It decided to freeze the functionality of wps plus and they
used the resources to develop PC All In One. OK, now
there's nothing wrong with PC All In One, but it was
robbing Peter to pay Paul. If I had had VCA (?), I think I
probably could have convinced people that you can't stand
still. I mean plotting these numbers, I used to white
knuckle myself as far as trying to show these people that
you couldn't just do that. But there was still this air at
Digital that because it was Digital it could sell no matter

what. And why the hell do you need this function and that
function, Jack, you know, we've got enough. You're always
asking for more. Yeah, but the other guy's got it. Aw, so
what. So what, right. Word Perfect, what the hell. You
know, those are just two little kids out of the University
of Utah, where the hell are they going? The result was
that PC All In One for other reasons didn't make it. But
in the meantime wps plus had been frozen for almost two,
three years. And by the time they got back into action...

BL: You ended up falling way behind.

JG: We had lost the momentum that we could have had. And
it was really sad. Now I don't want that to happen again,
and fortunately, Bill Keating is a great believer in this
stuff and so is David Stone. And I don't think that we'll
see that kind of stuff again. New England Electric is a
company that just tried VCA as an experiment, and they came
back and said, we just had to make a major decision and we
could never have made it without VCA.

BL: Great.

JG: So it's new stuff, but it's going to hopefully prevent
managers who are not technically oriented to make their own
mistakes.

BL: I will bring this material to Jamie. She should return it to you by mail, interoffice mail here?

JG: Sure. Interoffice mail is fine. Whatever.