NEIL ARMSTRONG

1966? after Gemini 11 (p. 18).

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Interlocutor, William Barry

F: You're on the first crew - the lead crew - of the first Apollo flight. Right?

10. Seven flights in X-15
19. "First to land on the moon is a happenstance, a coincidence."
p. 5: say he got a master's from Purdue (may be bad transcription).

A: No.

F: Back-up crew?

A: No, no connection at all.

F: Oh. All right. Is there any place you'd rather start than talking about the astronauts -- how they differ as individuals, I mean?

A: Oh, I don't know. People are a third-rank category of things interesting to talk about.

F: What are the first two?

A: Well, someone once said, Great men talk about ideas, good people talk about things, and everybody else talks about people.

F: What kind of people talk about things?

A: I'm paraphrasing a statement that I don't recall. And consequently I seldom enjoy talking about people either within our own group or outside...that however is - used to be the only thing that many publishers are interested in talking about. I don't think that's necessarily right, but they happen to think it's the thing that they can sell the easiest.

F: Well, you know, many magazines are coming up with ideas - like Horizon for example - it's essentially a magazine of ideas. Even the general circulation magazines like the Saturday Evening Post went through a series called Adventures of the Mind how life is is really doing the job of bringing together ideas, history, and/or art. There is increasingly an awareness of the world of ideas, but by and large the currency - the minds that people live are not lived with great ideas. Even the President is con-

cerned with people and mostly with people. Well, I'll tell you what. In reading or looking at everything that you've seen that has been written about the astronauts - what do you think has been missed. If you had been on the reporter's side, rather than on the "victim's" side, what would you be looking for to tell the people that read the material? Again, assuming that you have the insight and sophistication that you do have from having been on the inside of the whole operation?

A: Well, I think our business is the most exciting in history and I suspect that I would chose to talk more about the business - not the technical day-to-day sort of things which are more akin to hard news than they are to the ideas, but certainly the relationship of past and future. Of course not everyone is interested in talking about those sort of things, but some people are.

F: The things that you think that excite you.

A: Well, I suspect that the things that we learn in the next couple of decades will stand the better-than-average chance of opening up horizons that have never been contemplated before and it will shift our thinking about a lot of things that we take as rigorous now in the fields of agriculture or economy and certainly expanding geography from the surface of one planet to one of many, perhaps some theology and philosophy. Those sorts of things it seems to me are quite intriguing things that are worth talking about and worth exploring -- not haphazardly or not when our interview created an article in the same depth that one creates an article in hard news but rather in a dignified and thoughtful fashion. I think there's a lot to be done here. Of course you've seen a lot of such sorts of things done by other people, not by yourself. It may well be true that if we don't have the caliber of people that are required to do those things.

We certainly have the ideas and the interests -- it's not necessarily true that we have the capabilities to put those thoughts down in either in words on paper so that it makes a good story.

F: We could sit around and chew the fat on these things for hours and hours, but so many of the implications are fascinating. I do find the impact of people on those thoughts are great. Many -- (goes on to speak about philosophy when phone interrupts)

Did you get that??

A: No, I got it in Hawaii. It was made in Hong Kong. I was the communicator of Gemini III at Hawaii, and I took my wife along with me. We spotted that and brought it back as a souvenir as sort of a memento of the trip.

F: It's really handsome. It really is a handsome piece.

A: We enjoyed it and bought it and it fit in very well around here.

F: Did you build the house?

A: Yes.

F: What did you have in it that you wanted particularly? For your wife?

A: Well, I guess we wanted a house that could be lived in and would be and that's why we don't have a formal room -- we don't have any places in this house where it has to be polished all the time. We have this one big room that we all live in.

F: Do you call this what? A living room or family room or just don't call it anything?

A: Well, it's a living room designed for living and then we wanted a part of the house that was for me and for no one else and a part that was for Jan and no one else and I got the better of the part because my part for me is more extensive than her part.

F: What have you got in the part for you?

A: A study and a workshop both adjacent to the garage. The garage is a three-car garage not for three cars-for doing things like building something if the notion strikes me and having the room available to do it.

F: Building something substantial like a boat?

A: Not necessarily a boat but that size thing if I had the inclination.

F: Have you built anything in it?

A: I haven't built anything large though, no.

F: What do you build? What have you built recently? What are you interested in?

A: Well, I've worked on parts of my airplane and not big pieces - small pieces and so on. I can't seem to find the time for all the things I'd like.

F: Tell me about your plane. I don't know anything about it.

A: I have a third interest in a Bonanza.

F: Uh huh.

A: It's a very convenient luxury.

F: What kind of things can you build for it or have you?

A; Well, it's mostly repair jobs and I've brought pieces of it in to work on. I had done a good bit of things. This house [redacted] burnt down - I don't know if you're aware of that - but I lost all my tools and so on. I haven't been able to replace all those yet so I'm not able to do the things that I'd like to do. The things that the house was intended to do.

F: How long ago did it burn down? '63 ?

A: It must have been three and a half years ago.

A: Yea, in the middle of the night.

F: Do you know what caused it?

A: An electrical short in the wiring.

F: What was the design - the same?

A: Yes.

F: Where did you live in the meantime?

A: Well, we rented a house a couple of blocks away while they rebuilt. It was convenient and the kids could stay in the same school. (one of the kids came in and the tape skipped)

A: '47 to '55 now and then.

F: Oh. Did you get a master's.

Doesn't say so on his questionnaire (20) which also says he went to U.S.C. for 5 years (?)

A: No, I got a ~~masters~~ bachelor's from Purdue. (got master's from Purdue in 1970, when orally interviewed on matter of his thesis).

F: Well, I got a bachelor's in aeronautical engineering from Illinois Tech. Now, I've got to turn around and do a story about the school and I don't really think it's that great a school. It's just lacking in the gung-ho sort of thing. It lacks something. But we moved to Lake Forest a year ago. I had worked and lived in downtown areas. In Washington I lived just five blocks up from the White House and in New York I lived within walking distance of work and then I moved back to Chicago after I got married and even then I could walk to the newspaper where I worked, so moving to the suburbs was an entirely new concept for me. But I don't have to go downtown everyday. It takes me twenty seconds to get to work. All I have to do is go into my office, and I can go anytime of day or night.

A: That's real convenience.

F: Oh, it makes all the difference in the world. It also means you always have the family around. When you were a kid, were you much of

tactile ?

handy man around the house? You know, say, the textile skills. How did they develop? Simply .. is it strictly woodworking that you do?

A: No, I've done some work with metal. I did a lot of models and so forth as a boy and I guess that's how that interest got started.

do did many astronauts

F: Did you design your own models?

A: Yes. It was the very "in" thing to do. It was unthinkable to build a model from a kit. When I got into competition model making it would just be unthinkable to use a kit. It just "wasn't done".

F: Yea, I used to spend hours doing the same thing. And I can't say my designs ever turned out well. Did you ever have any designs that turned out well.

A: Oh yes, I think so. I had some very fine flying airplanes. They flew from U - controlled speed. I did a good bit of that.

F: I read that you were in the Dinosaur system. How did that ever happen and well - I just thought you might be able to talk about that? Well let me get a quick question in. The guys that flew the X-15 were considered astronauts after they got to a certain heighth -- what was that heighth? (White was first astropilot - 310,000'

A: Oh, that's a story - I'm not sure that it's interesting enough to talk about it. The term "astronaut" was phrased , coined by NASA or the people that were involved in orbital flight or orbital flight objectives. The military somehow felt that they ought to have some comparable sort of thing but they shyed away from the term astronaut and I really don't know that I recall all of this very accurately however they thought that it would be a good idea to have some emblem on their wings that indicated that they were space pilots, so to

speak. And the - I think 50 miles was chosen because they had some pilots flying the X-15 and that's how high that could go and that was the only real opportunity -- it doesn't apply to anyone who goes above 50 miles. That term astronaut is restricted to only military pilots. So if a civilian goes above 50 miles in the X-15 they don't get that reward which is sort of ironic in view of the fact that the term came from the agency. It's really not worth - it's a unique thing and sort of funny in the business, but it's really does nobody any good.

F: Well, you were working for - was it NACA then?

A: Yes. In the Dinosaur, the early days. Dinosaur didn't start as Dinosaur. There was a lot of interest in what the next research vehicle would be after the X-15. The X-15 would be designed to be the first machine to be capable of looking into the hypersonic speed range, defined in those days as Mock 5 and above. Well, it was originally designed to Mock 7. It didn't ever make that because the weight went up a little and the engine performance went down a little, so it became a Mock 6 airplane. But even long before it had flown the thinkers were thinking well what should be the next phase and the area of interest was the high hypersonic speed range -- mainly the speed range from oh, 15-18 -- moreso than the higher speed ranges even because this was the area when the heating transients were the worse. Above that you were usually at altitudes and dynamic pressures where the heating wasn't as significant. Below that you the heating rates were falling off so the area of real interest was the Mock15 - 18 region and so the people thought that the next research vehicle should really be designed to do that.- to get up into

that speed regime somehow. Now there were a number of ways to do that. You could use a technique like the X-15 with a single stage vehicle with hydrogen fuel could have probably gone to Mach Mock 20 on interior fuel and covered this speed region very well. Now that particular kind of approach was never accepted and they decided rather to go with the vehicle that was the existing rocket booster technology. So they decided to vertical launch a vehicle from a launching pad and then separate the booster and then have an unpowered vehicle to glide back to this Mach Mock 15 - 18 region. This eventually became the Dinosaur project. It was a joint - Air Force - NASA project like the X-15 but in this case the Air Force had the overall technical responsibility as opposed to just the reverse effort in the X-15. But it was a joint effort and there people from both agencies involved in it, In the initial design went to a lot of contractors and finally settled down to two contractors who won this billing and the second was a combination of Martin and Bell who did a year extension continuation of the studies very much like the TFX. You remember it went two routes for a while with General Dynamics and the final contract was given to Boeing. And about this time the orbital flights of the Project Mercury were coming along and there was those people who thought really Dinosaur should be an orbital vehicle and it appeared to me that some individuals were so enamored with getting the vehicle into space that they forgot what purpose the thing was - mainly the Mach Mock 15 region and so on. Well, we changed boosters about 3 or 4 times in order to get more and more performance and of course it got heavier and need more weight and then you kept going through that cycle until it got to be a real

But was reversed & given to Gen. Dynamics ?

giant and somewhat less practical. It died a fitting death probably.

F: Yea, it was just cut out...or was it?

A: Yea, I think so but it was unfortunate because the basic thing they set out to do has never really been explored and now even some vehicles - unmanned vehicles that have been fired into this speed region since - Asset and Prime -- those programs. Still we don't know nearly as much as we should about this area of flight. And in many ways it's a shame because we probably could have gotten that information for the money we spent doing the program the way we did.

F: How did you happen to go to work for NACA or did guys at Purdue do that or did you go to ~~Louis and~~ Lewis in Cleveland - you know, was it something that you wanted to do?

A: Well, I guess I was most interested in the research airplane series. If you remember that was a series of airplanes built right after the war to investigate new configurations new high performance configurations. Of course the X-1 was designed to try sonic [redacted] wall and the X-2 was for more performance and the X-3 was almost the same configuration as the F-104 was but it was to look at the high wing loading, high fineness ration configuration. X-4 was a tailless configuration -- a transonic tailess . X-5 was the variable sweep wing and so on. They were all designed to look at the problems of flight and no production uses whatsoever. They were never intended to have any operational uses at all. And I was intrigued by that both from a pilot and then also an engineering standpoint and while I was finishing school I applied for a job at Edwards with NACA and they didn't have an opening but Louis lab did and they contacted me and asked whether I'd be interested in going to ~~Louis~~ Lewis lab and I discussed it at some length with Errol Irving

[worked with 204 fire review board]

Pinkel who is now a very famous crash and fire aviation safety expert. He talked me into going to work there. But it wasn't too long after that that an openimg was coming up at Edwards and they asked me if I'd like to transfer and well, I didn't have to think about that very long.

F: Are you the only pilot who's had time experience in both the X-15 and in Gemini or Mercury?

A: Yes. We do have another former X-15 pilot in training here - Joe Engel.

F: I kind of admit that I'm intrigued by the X-15 because I know so little about it and all the reading I've been doing has been about the space program. How many flights did youmake in the X-15? 25?

A: Oh no, only seven. I don't think anybody's ever made 25, but..

F: Were you in all of those seven exploring one phenomena or were you exploring a bunch of different ones?

A: No, there were several areas of interest in those flights. I guess the most important of which was a flight control system development project which was only installed in one of the airplanes that was my airplanes. A special flight control system - very exotic, expensive, very interesting flight control system. One that has a lot of other application than flight control as the principle is now used in a lot of other applications for example operating machinery -- it's just a basic control system. It doesn't have to fly an airplane. It's called the self-adapted system, which means that it will have a certain output even when the input variables like changing around a lot and this is applicable to control systems that are maybe sorting logs or doing all sorts of mechanical tasks. They have certain inputs

and they - these inputs may be varied and maybe the temperature is going up and down or the size is varying and so on. But the output always must be the same and the case of the flight control system was the airplane response - in other words - no matter whether you were flying very fast or very slow you still put a certain input in the control system and the airplane responded the same way and it depended on Mock number or temperature - predictable output. The second thing of interest was that it was a self-healing system. It was a double system. In other words, a parallel chain of actuators of various sorts and some of these had variables in them. In other words, they were able to increase or decrease their gain or output. If the - if you had one side of the system get sick or squeaky or need oil or something - slow down. Then the other side would speed up and compensate for the sick part, so that even it one side quit altogether the other side would run up to provide the same output. So this was a high-reliability system because it was built and designed in such a way that you could have a lot of parts getting squeaky or needing oil or something along the way and still the output would need the same or even one may be completely dead and sticking it's feet up in the air and the output would still remain the same. It had a meantime between failures meaning average time that the system would predictably run before completely falling in a heap and not putting out an output at all for 276,000 hours, which is a very long time to keep running. Of course it was able to do this because it was sort of able to fix itself. Now this particular system was primarily electronic- that is the parts were electronic in nature. But it is a very interesting idea and one that has become more and more used in other

applications and I would expect to see this kind of idea continue to be exploited ~~and~~ in all kinds of gadgetry in which you're interested in having it keep running for a long time and not require maintenance of one sort or another every so many hours.

F: That is very interesting. I imagine that it's so expensive that it can't come into anything but very high cost industrial uses.

A: I think that's probably true only in the initial phases. In time a T.V. set, for example, might operate like that because you're just talking about a few extra transistors and a few extra wires. Most of the...once the idea is developed and the pieces for it are in mass production then the cost is not high. The cost of a T.V. set when it's being developed is exhorbiant ... I heard that National Video was a good stock because they were going to make the color T.V. tubes.. The really had the capability "locked" and so I think he bought some National Video - and the next day Motorola announced that they weren't going to buy their tubes anymore, they were going to produce. Finally the stock inched back up and inched and inched and he got to [redacted]....

(tape skipped here)

F: Well was there anything else you did in the X-15? What did -- how did you feel about the plane? Was the plane so unusually different to operate or was it just something so involved in the engineering that the layman couldn't understand it?

A: Well, it's a very good flying airplane, from the pilot's standpoint. Now there are areas that you can make it quite bulky - other airplanes might not fly there at all. This would, but it would fly poorly there. However, I never thought of the machine as a oh something that was good or bad -- it was a tool and if you ask a mathematician what he

thinks of his computer he'll tell you that it's a good or bad computer but he doesn't really think of it as good or bad. It's something that he uses and it may have some shortcomings but he gets around them. The same thing - he may be somewhat upset if you called him a computer operator. Similarly, research pilots - they're - would be a little bit chagrined if they thought they were just an airplane driver. They use the airplane as a tool to solve problems and they don't think of the airplane flying as a job. Flying an airplane is a way of doing the job, but it isn't the job.

F: The job is to appraise.

A: The job is to solve problems. Sometimes you find some new problems. If you do, then that's good, because then you have some new things to work on. As a matter of fact, I guess in the research business you usually find more problems than you solve. That's like perhaps the best thing about the business. You very seldom run out of work. One of the most difficult things is that you've got to choose between so many things that are interesting. You can't chase all these elements. You've got to pick the one that you want to work on. Now it's an unfortunate part of the space business - the kind of business we're in right now - that we're tied so much to schedules and people looking over our shoulders and so forth that you have very little time for chasing down any alleys at all. No matter how beckoning they might be and it's really frustrating at times. You think , gee if I could just spend a couple of weeks on this thing I might be able to find something to change the world. But you can"t do it. You can't afford to do it because you got somebody snapping at your heels to get over there and the© schedule is here and do this and do that and it's

the frustrating part of the business.

F: Well, it's part of the discipline also. When you become an engineer or research engineer it's what you buy. You buy that particular type of frustration -- and opportunity that goes with it. How do you feel differently about the Gemini spacecraft? Is it a tool or does it have a different sense to you?

A; Well, I think the thing could be a tool. It has in effect been operated more in an operational sense than a research sense, though. Somewhat different approach taken with this Gemini and Apollo. They are intended to get up there and work and not necessarily find problems. Now you do find problems but this in general is an irritation problems when you do, where to the research man it would be a welcome, new door opening. Since these carry experiments of another nature and not primarily oriented toward flight research why they don't do all they could in this regard but of course it's a very expensive business and you have to be quite careful on how you expend your flights.

F: Would you rather be in pure research leading to problem-solving on a theoretical level rather than applied research - I take it that the space program tends to be applied research seeking an operational mode.

A: I think to some extent it does and I guess I've always thought of myself as being more interested in the research aspects of the business but I would have to admit a lot of times you're just doing research without any schedule. You can wander around as much as you like in any field that you want. You oftentimes get stagnant for - you're working in a non-productive area that might be interesting and you're fascinated with it but you're really not moving foward as fast a s you should. The

pressure of a schedule does a lot of good in this regard. It keeps you from slowing down at these interesting areas and keeps you pressing ahead. Probably in the long run you make more progress in the same interval of time than you would otherwise.

(end of first reel of tape)

F: Is this is Neil Armstrong?

A: This is Neil Armstrong speaking.

F: What were we talking about?

A: Well, we finished whatever we were talking about.

F: The biggest problem which you may have is time. You were mentioning just the time to find to explore the problems you want. Other than working in your workshop, how do you use your free time? What do you do for recreation?

A: I'm a soaring pilot.

F: Is there anyplace to soar around here?

A: Houston is not a very good soaring location.

F: Ohio must have been, where you came from.

A: Ohio wasn't bad, but West Texas is very good for soaring. It's a fairly dry air over Texas and soaring is very good. As a matter of fact I was soaring yesterday, at Dallas.

F: Why do you like it?

A: Soaring is something that's very easy to do - very hard to do well. It's - it has the magic combination of requiring good equipment some luck, and much skill as you can gather together. Like some other forms of racing like automobile racing - the machine is important but the good guy usually wins. That's certainly true in soaring. It's very demanding, and it's mostly a mental sport. The motor skills of

operating the glider are not very important at all compared to mental requirements in trying to outguess the weather, primarily. And then second knowing the aerodynamics of sail planes is the thing that makes you fly them just at the proper speed in order to get the slightest edge on the competition.

F: Have you ever taken part in the cross-country competitions.

A: I've flown a good bit cross-country, yes. I'm not a very good soaring pilot, that is in my estimation. That is, I've never competed against the top contenders in the U.S. I would not think I'd be good enough to compete against them yet. In a few more years.

F: Do you own your own sail plane or do you rent them?

A: I have owned them in the past, I don't at the present but I'm looking.

F: What kind have you owned? What kind do you like?

A: Well the kinds I like I haven't owned, because they're too expensive, but I've owned 126's which is a standard climber. I wonder how familiar you are on soaring, but there are only (for two practical purposes) two classes in this country. There is the standard class and the open. Standard class has certain requirements on the configuration. 15's your span, your meter span, fixed landing gear, no flaps, and certain restrictions on the configuration. And then there's the open class where anything goes. There's no restrictions at all - except of course short of putting a motor on. That's not permissible. It turns out that most of the soaring in this country has been in the open machines. Now there are also some competitions held in the single class like they do in sailing where it's not restricted to a certain configuration but rather to a certain boat of a certain manufacture. There is a similar thing in this country although it's really only

limited to one kind. The most popular sail plane in the U.S. is the Schweitzer 126 built in Elyria, New York and there are enough of these around that they compete against each other to the exclusion of all other types, so they are solely for that manufacturer's model. And I've owned several of these sail planes. It's a medium performance sail plane. Great fun.

F: What's it's stall speed.

A: About 35. They vary from as low as 28 -- it depends on how they're balanced and rigged.

F: Is it relaxing for you or is diverting because it's still competitive or what?

A: It's very relaxing. You can't blame the mistakes on anyone but yourself. It's very quiet and you're away from anyone. It's great relaxation.

F: Do you smoke in them?

A: No, I don't smoke.

F: Thinking of all of these things as tools for you (maybe the sail plane is not a tool for you), but let's say the X-15 or let's say the Gemini spacecraft might have been...

A: Oh, it is in some respects, but probably not quite to the degree that the more pure research vehicles are.

F: The Apollo spacecraft and the Appolo programs - as much as I know them - seem to be to test the machine and not for scientific experiments. You're not going to be photographing the stars or looking for radiation belts or anything like that. It's to test the machines ....

A: Initially that's true, and the idea is to get up to the moon in as short a time as possible. However, later versions of the Appolo will be a lot of experiments.

F: Just thinking of the experimental bit makes me think of the news on the radiation this week. Did you read the news story that some individual -- Dr. -- oh, whose name and affilliation I've forgotten... said that the radiation levels in space are considerably higher and though he would consider them harmful to himself he doesn't know if astronauts would because astronauts are highly motivated and wouldn't care about the risks involved..."Did you read the story at all?

A: No, I haven't read that story. I have been following our own radiation progress but I don't know what he's based that on -- I guess by and large our measurements in flight have shown the levels to be lower than predicted -- as a matter of fact, we've had to bias all our mapping downward to some extent. There's no question but what it's something that must be considered and treated with caution but I really don't believe that we will have significant problems with radiation doses on the Apollo flights.

F: He may have been thinking of some fairly high altitude radiation levels which ...

Conrad & Gordon

A: We of course in Gemini 11 [redacted] were quite a bit interested in this because of high altitude orbit, because we're very careful to position that in such a way that the perigee of the orbit was over on the side of the Earth where the South Atlantic anomaly is -- where the magnetic field dips in close to the Earth and they expect high radiation out of it and the high part of the orbit over at the part where the magnetic field is quite far away from the Earth. We thought we knew quite well what sort of readings we could predict and it turned out we were still high then. I think that perhaps the earlier measurements were made somewhat closer to the time when the nuclear blasts were made in orbit

and there's been a greater decay over the past several years than they might have predicted from that. I think we'll know better maybe after a few more flights. If we can actually pin these levels down. In the Apollo program -- many of the guys talked about how they feel about the first lunar landing -- whether it has a romantic or a historical or a scientific significance or all three. And then we got to talking about the post lunar landing (after the first) and some guys feel that the flights after the first lunar landing have an equal significance, perhaps in the scientific sense if not in the historical sense. However much they wanted to be involved in the historical event, there was some compensation in the scientific phases to the other lunar landings. How do you feel about it? Or do you feel about it one way or the other? Just looking at Apollo and your involvement in it do you take sort of matter-of-factly whatever chance you have to be the first lunar flight or do you say, Look, it's going to be important no matter what it is?

A: I guess there's some thrill to being first to do something and most of our guys in the program so far have been the first to do something, just because there's so few of us and so much to be done for the first time. Of course the first to land on the moon - why that's a considerably bigger thing- but I would probably have to agree with those that said in this feat who the person is is sort of happenstance. The fact is the whole program by design and by detail is theproduct of a lot of people's efforts and the one who is first to - will be a matter of coincidence than plan. It's not the same sort of thing as when Lindbergh crossed the ocean. You know, he was fitted by himself and he and a couple of people down at Ryan did the whole business and he was the

first to do this particular exploit and based on his own ideas and his own techniques and his own accomplishments. That's not the sort of a thing this is. This is the product of the desire of a whole society to do something. And there will be people who are identified by name to do it, but in this case it won't be the same. I suspect that there will be so many more "firsts" in this area now -- first to land on Mars, first to go to the astroid belt, first to whiz by Jupiter and so on -- all this sort of thing. Those names will go in history. It's certain. But ...

F: Another question -- comparison, sort of. How are the people involved in research at Edwards different than the people here? Or are they different?

A: Well, a lot of them are the same, because they've worked both places. There's a good bit of transfers from there to here. I don't really think there's an appreciable difference in the people. I think there's some difference in what the instructions from their superiors are. Mainly it's a difference in how the space program is managed from Washington versus how they look at the research program from the aeronautical engineering approach. It's just sort of a different approach.

F: Have you in the Apollo program coming up prepared yourself for it in any way other than the office -- you know, the classic thing of John Glenn back in Mercury running up and down the beach -- you know. But I thought that you might be doing something mentally or phsically that is not demanded of you.

A: Oh, we don't have many things that are demanded of us. We sort of have a good deal of choice.