

ORAL HISTORY TRANSCRIPT

MICHAEL COLLINS

INTERVIEWED BY MICHELLE KELLY

HOUSTON, TEXAS – 8 OCTOBER 1997

KELLY: This interview of Michael Collins was conducted in Houston, Texas, on October 8, 1997, by Michelle Kelly and assisted by Paul Rollins.

Mr. Collins, the first question I'd like to ask you is how you became involved in NASA and how you became interested in it.

COLLINS: Well, like most of the early astronauts, I was a test pilot, and it was sort of a stair-step process. I went to the military academy, I went to West Point primarily because it was a free and good education. I emphasize "free." My parents were not wealthy. When I graduated from the military academy, there was no Air Force Academy, but we had a choice of going into the Army or the Air Force. The Air Force seemed like a more interesting choice. Then the question was to fly or not to fly. I decided to fly. To fly little planes or big ones? I became a fighter pilot. To keep flying the same or new ones? I became a test pilot. And so, you see I've stair-stepped up through five or six increments then, and it was a simple, logical thing to go on to the next increment, which was higher and faster, and become an astronaut rather than a test pilot. So that's how it happened. It was not that when I was a little kid I had aspirations of flying to the moon or anything like that. Actually, I did have aspirations of flying to Mars, but not the moon. But the path that led me to NASA Houston was a stair-step, you know, one little increment at a time.

KELLY: Can I ask you a little bit about your interest in Mars when you were a young boy? What was your interest and where did it come from?

COLLINS: I don't know. I think primarily it came from the old Buck Rogers and Flash Gordon, and when you were a kid in those days, when you went to the movies on Saturday afternoon, there was always a little short subject right before the movie, and usually they gave you a news clip, five minutes of the latest weekly news, and then sometimes there was a little science fiction blurb of Flash Gordon or Buck Rogers. Those are the names. I don't know that they went specifically to Mars. They went everywhere. They went to the Caverns of Mongo. I remember that. So, I'm not sure. Of all the possibilities, as I got older and learned a little bit more about our solar system, then Mars seemed clearly to be the most interesting place to go. So I would say some thin study of planetary science with a heavy overlay of Flash Gordon and whoever the other guy was.

KELLY: Can I ask you a little bit about your astronaut selection process and how you became involved in that?

COLLINS: Well, again, I was out at Edwards. I was assigned to the fighter test section at Edwards, and we were very much aware of the NASA program as it began, and we were very much aware of the fact that they were looking for test pilots, and so we were up to speed on all the paperwork. I mean, we knew when the next cycle was and so on and so forth. When the second group of nine was picked, I had just—I've forgotten whether I had not quite graduated from the test pilot—I think I had just graduated and gone down to fighter ops, and so I applied for that, and I didn't make that. I didn't have sufficient experience, they said. So then when the third selection in 1963 occurred, I applied again, and this time I was accepted.

KELLY: Can I ask you a little bit about that process and what you did to be able to be selected?

COLLINS: Well, it's kind of too late to do much of anything. By the time you've put your name on the application, your flying background, your educational background, they're pretty much set in concrete. You can do a little bit. I lived close to a hillside, which was like a treadmill, in that as it went up it got steeper and steeper, so I kind of prepared for the treadmill. I thought that was a big deal, you know, to be in good physical shape, so, by running up this hillside, which was like a treadmill in that the further along you went, the steeper it got.

And I did try to do some studying. I did try to do a little bit of studying on astronomy and space science. I think the most common thing people did at that time was read *Aviation Week* and those publications very carefully, because you wanted NASA to understand that you were very interested in what they were doing and you were interested to the extent that you had done whatever research was readily available.

KELLY: You mentioned some of the physical aspects. For instance, you were training on the treadmill. I understand that there were some other physical tests that they performed and some of the astronaut candidates at the time were not very happy with those. Can you explain a little bit about those and what some of their purposes were?

COLLINS: I think that applied primarily to the Mercury people. I think the emphasis shifted a little bit from the physical to the mental, if that's a fair way of saying it. I mean, I think the unknowns of space were such that when the first Mercury candidates were selected, people were legitimately or otherwise concerned about their ability to withstand vibration, high temperature, isolation, darkness, heat, and so they tended to emphasize those. By the time it got to the second and the third group, where I was involved with it, as I said previously, with both those groups I don't remember anything that was too horrible physically. What specifically did you have in mind, and maybe it will spark my memory?

KELLY: For instance, I read in one of your books you were talking about some of the Rorschach inkblot tests.

COLLINS: Oh, well, the psychological aspects of it. Well, I think that—I don't know what I think. That's a complicated subject. I think psychiatry is certainly a legitimate branch of medicine, and I would not want to fly in space with a psychotic or a highly neurotic person. On the other hand, I would not give too much credence to odd results, and I thought that some of them were kind of amusing, like the blank piece of paper, which I think I said I saw nineteen polar bears fornicating in a snowbank. And the question then is, why nineteen? Just an odd number. That kind of appealed to me somehow. Those are the kinds of things you're driving at, yes.

KELLY: I'd like to move on, then, to your astronaut training, once you were selected. What types of things did you do for your training?

COLLINS: You mean once I got here to Houston?

KELLY: That's right.

COLLINS: Well, you know already that what they did was they regarded the spacecraft or the body of space knowledge like a big apple pie, and they sliced it up, and they gave each one of us in the astronaut office a slice, and they said, "This is your slice." Mine happened to be the extra-vehicular operations and spacesuits and that kind of stuff. So in addition to having to learn a little bit about a lot of things, you had to learn a lot about those specific things, if that's what you're kind of driving at.

Obviously, to fly in space you have to have a certain knowledge of all the various aspects. You have to know that you're talking to the ground via Australia and Spain and Goldstone. You don't have to know how those antennas work or what frequency they're on or how many volts or watts or amperes or whatnots, but in general you have to have a very wide background knowledge, I think, to do your job well. Then in addition to that, we represented the astronaut office in our own area of expertise, and that was more difficult, I think—at least for me I felt it was more difficult—because you were going to meetings and saying to the engineers, "Yes, this is what we're going to do as a group of astronauts. This is what is going to be reasonable to ask us to do."

I was trying to guess years in the future what thirty people, myself plus the other twenty-nine in the office—I was making commitments for that group of thirty people for actions we would or would not take a couple of years in the future, and that's kind of a scary responsibility.

Did I answer that to your satisfaction or do you want to ask that question again, or do you want to go on to something different?

KELLY: Well, I want to know a little bit about what you did as far as your work in the pressure suit area, as well as the extravehicular activities.

COLLINS: Well, the newer pressure suits—not in all cases, but in some cases, they were tailored to my specifications. In other words, they were fitted. They were custom-fitted to my dimensions and I was a test subject for—I remember one competition between the David Clark Company, who had made the Gemini suit, and the ILC, International Latex, who ultimately made the Apollo suit, and then there was a third contender; it escapes me right now who that was [Hamilton Standard]. But anyway, I was the test subject for these three competing designs, and my input was certainly not the overriding one, but was an important

voice among that of the engineers in terms of fit and comfort and mobility and the other qualities that go into picking a pressure suit.

KELLY: Did you put these suits on and just make recommendations from how it felt in doing various tests, or did you work closely with the engineers in its development from the early stages?

COLLINS: Well, yes and yes. In the particular competition that I had in mind was to pick the Apollo suit, and it was more of a formal process where, you know, I wore each suit for so many different hours under identical conditions and went through identical comparative tests, but then once that suit was picked, and before that suit was picked back in the Gemini program, yes, I did work with the suit development people, and they tried out new ideas on me, and I gave them my feedback and recommendations to try to get a pressure suit that was as functional and comfortable as possible.

Pressure suits are weird things. I mean, they have to do so much. They have to protect you from the temperature extremes, and they have to protect you from micrometeorites. So they have to be heavy, insulated, bulky, and then, even worse than that, they have to maintain, as their name implies, a pressure with a vacuum outside, and you've got to be pumped up like the tube in your car, and that makes them very rigid, and then all kinds of ingenious engineering devices come into play to take something which fundamentally wants to be immobile, wants not to change shape, like the tire on your car, and force it to have joints at the elbows and the wrists and the arms and the knees and the heads and the whatevers, so that you can move around and do whatever you have to do inside it while it still is maintaining this rigid pressure. So to engineer a suit properly is an extremely complicated task. You don't think so when you see some guy in a suit compared to the

complexities of a rocket, but in miniature, the engineering that goes into a suit is quite complex.

KELLY: Next, can I ask a little bit about the work you did on EVAs, or extra-vehicular activities, as well?

COLLINS: I did generic work on EVAs, like what it was reasonable to expect people to do and not do, but most of the EVA training was very specifically done by the people on a particular flight. Going back, the first EVAs, of course, were on the Gemini program: Gemini 4, Ed White [Edward H. White II], and then Gemini 9, Gene [Eugene A.] Cernan. I was the third one, Gemini 10.

Each of those was quite different, and different from the ones that followed, and the training that was done for those was done primarily by the guys involved specifically addressing the particular equipment they had and the particular objectives of their EVA and what they wanted to do. Ed White was just to get out and see what it was like. He had a small handheld maneuvering device and then come back in. With Cernan, I'm sure you know this from the records, but his thing was to put on a backpack and go trundling off, and that didn't work out too well.

With me, there actually were three EVAs, all quite short...The first one was just to stand up in the open hatch and take some measurements of stars, and then the second one was to use this handheld maneuvering device similar to the Ed White device and use it to propel myself over to an Agena, retrieve an experiment package from the Agena, and then the third was just a hatch opening to dump all the extraneous equipment that we no longer needed. So I did have the three EVAs, and I think they're all pretty well documented, so rather than my trying to just go through all that again, if you have very specific questions about them, I'd be happy to try to answer them.

KELLY: I actually do have one about the first EVA that you conducted. I believe you mentioned you stood outside of the hatch and took some measurements of some stars and other bodies, but you mentioned in one of your books that you got something in your eyes and your eyes started watering. Did they ever find out what that was?

COLLINS: You know, they never did, and I tell you, the guy who would be the best source for you on that would be John [W.] Young, because John's still here, he's still immersed in the technical details. But the method that we used on Gemini to purge the system, to absorb the exhaled carbon dioxide from your body, were canisters of lithium hydroxide. The stale air went through the lithium hydroxide and it came out purified. Lithium hydroxide is kind of, I think, a granular sort of material, and our best guess was that somehow lithium hydroxide had escaped from some canister and had gotten into the nooks and crannies of the system in the pipes and that there was some triggering mechanism having to do with depressurizing the spacecraft that caused that lithium hydroxide to start billowing up. It went through, and it can be an irritant, and that's what it was.

But to the best of my knowledge, they never established that beyond the shadow of a doubt. All I know is that I couldn't see and John couldn't either, and it was frightening for a moment, because the hatch on Gemini was not a very straightforward thing. In other words, you just didn't go "clunk, latch." I mean it was—you had to look up, and there were little levers and whichnuts that had to be fiddled with, and then you had to make sure that all your hoses and stuff were not going to get in the way, and then you had to come down in a certain way and you had to get your body underneath, your knees underneath the instrument panel and kind of ratchet your body down, and it was a tight fit. So it was the kind of stuff that, with practice, you found it became easy to do, but it was visually dependent and to try to do all that by feel rather than—it wasn't something you ever had trained to do or thought you would have to be doing anything by feel [alone].

So I could see well enough to do that after a couple of minutes, this thing cleared up, but, you know, the idea of being out there blind was, even though I was only half out, the problem was this goddamned hatch was opened and, as I say, it needed some visual help to get it closed again. So that's about all I can say about that.

KELLY: Sounds like it would be frightening.

COLLINS: Yes.

KELLY: To the best of your knowledge, did anybody else have the same [unclear]?

COLLINS: No. To the best of my knowledge, that was an isolated incident. No one every had eye problems, and they probably would have written it off as the two of us were imagining it or maybe it was just sweat in our eyes, except it happened to both of us simultaneously and slightly different. I don't remember the—again, you should talk to John, but the air I was breathing had gone through a process a little different from the air he was breathing. I was getting mine through an umbilical cord, he was not, and yet at the same time, this thing overtook both of us. So it was kind of weird, and, as I say, the best guess as far as I can recall, and it was never improved on, was that it was some kind of lithium hydroxide that had escaped. Maybe it had escaped from that particular canister that was installed at the time. Maybe it had escaped months earlier at the factory and, as I say, somehow was in the little crannies and crevices of the system and then somehow had been activated by the depressurization. I don't know. But ask John. He might know more about it than I do.

KELLY: My next question concerns your second EVA that you mentioned. You went out to the Agena to retrieve an experiment package. Can I ask you primarily some of the challenges and problems that you encountered while doing that imaging?

COLLINS: Well, the fundamental problem was, I guess, stupidity. We had not, in our designs, really thought through what happens to objects that bang together in weightlessness. Unfortunately, on this tape recorder I can't—I have to go through some body manipulations to explain what I mean, but maybe you can reconstruct. This chair is a one-dimensional replica of space. If I push against this table, you can see what happens: right away my body swivels. If I push this way, it swivels the other way. That's no problem because I'm anchored to the floor, and I can just swivel back and forth, it's very simple. But now, in space, where there's no anchoring, you not only rotate this way and call that yaw, you rotate in pitch, and you rotate in roll. So if I touch that table, I go off in some totally three-dimensional random direction. So as soon as I start doing that, I've got to stop, and so I grab, and then I go swinging back the other way with greater force, and I need greater force to stop that. Very soon you're just out of control.

I say "stupidity" because we had really not thought that through as well as we should. By the time we got to Gemini Twelve with Buzz [Edwin E.] Aldrin [Jr.], there were handholds and work stations. On the Shuttle, you see it in space. I mean, they don't go out without being anchored in two or three different ways. But we were stupid; we hadn't thought of that. So, the point is, I was going over to this Agena, propelling myself with this dorky little gun, which in itself was a very difficult thing because, again, going back to the pitch, roll, yaw, if you did not have a gun aligned absolutely through your center of your body, if you were off a little bit, then when you squirted the gun, instead of going that way, you would not only go that way, but you would start twisting and turning. You see what I'm saying?

So anyhow, I was using this little gun to get over to something, to grab something that had not been designed to be grabbed, and I'm in this bulky suit that I described before, it doesn't want to bend too well, I'm immobilized. I'm having a tough time as I'm going along, pitch, rolling, and yawing, trying to keep this dorky little gun through the center of mass of my body, and then I arrive at this goddamned Agena, which is not meant to be grabbed, and I've got to grab it. So, the first time I grabbed it, I went to the end of it, and it had a docking collar. Docking collars are built to be nice and smooth so that the probe that goes into them will be forced into them. They have smooth lips and edges on them, and that's what I was grabbing.

Well, I grabbed the docking collar. It wasn't meant to be grabbed, bulky glove, and my momentum is still carrying me along, so I just slipped, and as I went by, then I went cartwheeling ass over teakettle, up and around and about, until I came to the end of my tether, and then it swung me in a great big arc. So, again, unfortunately, on the tape recorder I can't wave my arms and show you where all these objects were, but Gemini was down below to my left, the Agena was up above to my right, and I'm off somewhere sashaying around between the two, and then finally I got the gun out and got it under control and came back.

I went back to the cockpit, and then John Young got a little bit closer to the Agena the second time, and when I went over to it the second time I was able to get my hand down inside a recess between the main body of the Agena and the docking collar where there were some wires, and grab some wires, and then I was able to get the experiment package off and so on.

KELLY: Sounds very difficult.

COLLINS: It was different. I mean, it was not clean analytical engineering. I mean, it was more acrobatics and a guy on a trapeze and stuff that you don't think about in the space

program. But, as I say, the fundamental thing was stupidity. It was that if we'd really given it more thought, we would have said, "Well, when you get over there what are you going to grab? And then what are you going to grab it with, which hand? How are you going to stabilize it? Where are you going to put your hand and your feet, and what's going to hold you in place? How are you going to go about doing this?" And then maybe the answer to that would have been, "Well, you can't. It's just not possible to do it," which would not have been a good answer from my point of view, because I wanted to go EVA. I wanted to do that thing. Or maybe the answer would have been, "Hey, you get Lockheed to install a couple of handholds on the front end of that Agena," and then it would have been a relatively simple thing. But we didn't think of it, or if we thought of it, maybe we thought that would cause the whole [EVA] idea to be canceled. Maybe that's what was the deep psychological root cause of our stupidity. I don't know.

KELLY: I understand now they do a lot of EVA training in an underwater tank.

COLLINS: Yes. No, they started that during Gemini, but later on. For Gemini 10, there was no underwater training.

KELLY: I was just going to ask you, then, what type of training did you have?

COLLINS: Well, we had the thing that I called the "slippery table." It was a highly polished metal surface about the size of a boxing ring, it was in one of these buildings around here, and then on it was something that looked roughly like a floor waxer, and then you stood on the floor waxer. The gimmick was that air was blown in so that the friction between the floor waxer and the surface was as close to zero as possible so that when you stood with your gun, your little maneuvering unit, and squirted air out, you could move across the boxing ring.

So what you could do with that thing was you could move forward and aft, left and right. That's two motions, or four motions, if you want to call it that. Call it move forward, one, back is two, left is three, right is four. So you've got those four things you can do. And then as you went, you could swivel, you could rotate, you could yaw. So you could yaw left, that would be five, and yaw right, that would be six. So you had those six things that you could do, but you could not pitch up or down, so you're missing seven and eight, and you couldn't roll left or right, so you're missing nine and ten. Oh, you couldn't go up or down, so you're missing eleven and twelve.

So, of the twelve things that you can do in space, and those are the only twelve things you can really do, you've got six—they call them "degrees of freedom," if you want to get technical. So you've got the three translational degrees you can move forward, backward, left, right, up and down, and then you've got the three rotational. You can pitch, roll, and yaw, two ways. Of those twelve options on the table, you could just practice six of them. So it wasn't a great simulation, but that was the source of our training, that was the best we could do.

Then we also did zero-G airplane, but it is not too helpful for tasks like that, because, as you know, it can only generate periods of something like twenty-eight seconds at a time, and you can't really learn too much twenty-eight—as a matter of fact, the zero-G airplane was probably trying to tell us something that we weren't smart enough to understand, and that was inside the zero-G airplane for those twenty-eight seconds of weightlessness, we were frantically trying to get all these tasks done, and in the process we were banging around and moving rapidly left, right, up, down, we were rotating, and it was kind of pandemonium, and we thought that these little jiggling motions were in part caused by inaccuracies in the trajectory of the airplane, that the airplane was maybe throwing us off a little bit left, right, up, down. So that instead of being everything nice and smooth and calm inside for that

twenty-eight seconds, your training sessions tended to be twenty-eight seconds of kind of spastic slashing around.

Well, it turns out that maybe that guy was flying that airplane perfectly and that this spasticity, if you want to call it that, was caused by what I was describing earlier, which was this reaction to every little motion. To every action there is an equal and opposite reaction. So what we were seeing, we should have paid maybe a little more attention and said, "You know, we're going to be banging around up there to the extent that we need some help in terms of tethers, lanyards, handholds, footholds, stickum on the knees of our suit, I don't know what." But those were the things that we didn't really think of.

KELLY: That's interesting. And I'd like to go back to how you were selected for a crew. I understand that you were selected as part of the back-up crew for Gemini 7.

COLLINS: Yes.

KELLY: Can you tell me a little bit about the selection process?

COLLINS: Well, I really cannot. I mean, Deke [Donald K.] Slayton and his assistant, probably, George Abbey, could tell you a lot more about that than I can. But, you know, you were just picked. I suspected that the fact that I knew Frank Borman, he and I were classmates at the test pilot school, Ed White and I were classmates at West Point, so for Gemini 7, you had Borman the commander of the prime crew, and then I was paired with Ed White on the back-up, you know, that might have had something to do with it. But on the other hand, it could have had absolutely nothing to do with it. I really don't know. I mean, all I know is I was tapped. No one ever told me, "You were picked because of A, B, or C." I really don't know.

I think there was probably—I hate to say this, but there might have been a clique within a clique in the sense that I think that people who were test pilots tended to maybe band together a little bit more because at that point we were starting to get in non-test pilot astronauts, and I think there might have been a little snobbishness, you might say, or a clique within a clique, where the test pilots tended to favor other test pilots. There could have been a clique within a clique within a clique where the Air Force people tended to favor Air Force and the Navy tended to favor Navy, but I don't know those things. Those are just wild speculations, and all I know is I never was given any inkling as to why I was ever picked for anything. I was just picked.

KELLY: Can I ask you, then, a little bit about your training for Gemini 7 and what types of things you did to prepare for that mission?

COLLINS: Gemini 7. Well, I did all the wonderful things you read about in all the training manuals and all the stuff you've gotten in answers from other people. Maybe you ought to ask that differently. What are you driving at specifically?

KELLY: I don't have any specifics. I do know that it was the longest mission at the time.

COLLINS: Oh, you mean because of the—well, Gemini 7 was fourteen days, and I think there were eleven different experiments or maybe eleven different medical experiments alone. There were a lot of different experiments in that. The doctors were very worried about the metabolism, what would happen to the body under—and they wanted to measure every ounce of food you ate before the flight, during the flight, and so on. The protocols for the medical experiments were quite complicated, and we felt sort of like guinea pigs rather than pilots. But we did the things that crews always do. I mean, we went to the factory, and we

spent a lot of time up at McDonald-Douglas in St. Louis, and we spent an awful lot of time in the simulator, as much time as we could. We did the normal training stuff.

KELLY: I understand that there is some sort of unwritten system where, if you were assigned to a back-up crew for a particular mission, you skipped a few [unclear].

COLLINS: Yes. I call it "the knit one, pearl two." So, in other words, if you were back-up for Gemini 7, that was your knit one, you would pearl 8 and 9, and then you would become prime on 10. There were exceptions to that, but I think in general that's the way it worked on both Gemini and Apollo, so that that is true, that from the day that I got assigned to Gemini 7, I was really kind of looking forward to Gemini 10 and trying to figure out what kind of a flight it would be and whether it would be a space walk, and the duration of the flight and what kind of rendezvous. Rendezvous was the biggest thing on Gemini, and so forth and so on. Yes, that was true.

KELLY: Interesting. Can I ask you if your training for Gemini 7 prepared you a lot for the mission on Gemini 10? Were there similarities in your training?

COLLINS: Of course, a Gemini spacecraft is a Gemini spacecraft is a Gemini spacecraft. There were variations. There were tailored pieces of equipment for each flight, but by learning the fundamental aspects of the Titan-II booster and the Gemini spacecraft, by learning those on Gemini 7, all that knowledge transferred over to Gemini 10. On the other hand, there were very specific parts of Gemini 10 that were quite different from Gemini 7, having to do with rendezvous, which was the most complicated part of the flight, and the space walk, the EVA, which was the second.

Can we take a quick break? [Tape recorder turned off.]

KELLY: I think—this is just off the record—I'll just try and talk about your rendezvous and docking and also on your missions, on the training on Apollo, both on the [unclear] performance crew and then also to Apollo 11, just your recommendations, what you consider your accomplishments and maybe the challenges have been throughout your career.

COLLINS: Oh, God, I don't have any idea about those things, but ask away.

KELLY: Okay.

COLLINS: As specific as you can get, and you probably, rather than—anyway, ask.

KELLY: Okay. Thank you very much. My next question for you is, I know that on Gemini 10 you, along with John Young, performed one of the first few rendezvous and docking missions. Can you tell me a little bit about the complexities of it and what types of training and classes you took to prepare you for that?

COLLINS: There were a couple of rendezvous on Gemini 10, and one of them was a relatively straightforward rendezvous, in that the Agena—let me back up. We rendezvoused with two different Agenas: our own Agena, call it Agena 10, and then a dead, inert Agena that had been used by the Gemini 8 flight, that had been up in the sky for a couple of months just sitting there. These Agenas were different in two respects. Agena 10 we could ask questions and it would answer. It had a transponder. So we could ask it, "How far away are you?" and it would tell us. The Gemini 8 Agena had dead batteries. Its transponder could not reply. So when we asked it questions, it would not answer. This meant that we could not find out how far away from the Agena we were. We had to just deduce our range by the apparent size of the Agena or the actual size. As it got bigger and bigger in our window, then we knew we

were getting closer, but that we had to measure or compute our distance by optical rather than radar means, and this was the first time this had been done, I think, and it made that second rendezvous more difficult, and it involved a lot of measurements on my part with a sextant.

So I would look through this instrument, and then I would, by seeing how big it appeared, I would then look on a chart and say how far away we were, and then by measuring how far away we were over a period of time, I could then calculate our closing rate, which we then compared with a closing rate chart to say, "Whoa, we're closing too fast," or, "Oh, we're not closing fast enough." So the fact that this Gemini 8 Agena would not talk to us via transponder made our life more complicated during the rendezvous.

KELLY: Can I ask you, I think you were given a call name, so to speak, by Mr. Young, and I think it was in connection with your rendezvous and docking. May I ask you about what that was, and a little bit about it?

COLLINS: No, no. Tell me. What are you driving at?

KELLY: I read in one of your books that you were called "Magellan" because of your [unclear].

COLLINS: Oh, Magellan. I forgot about that. Yes. Oh, yes. Well, see, there's so many aspects to this. The calculations which placed the Agena in one part of the sky and us, the Gemini, in another part of the sky, and the calculations that brought us closer and closer together, this navigating, if you will, had heretofore been done by the big computers on the ground, and the gimmick on Gemini 10 was that we were going to prove that we could be

autonomous, that we could, on board, make all the calculations that the ground normally made to bring our little part of the sky closer and closer to the Agenas.

Some of the people who were working in the Guidance and Control Division at the time thought that that was a wonderful thing to demonstrate, and they thought that the flight of Gemini 10 should be devoted exclusively to demonstrating various new navigational techniques, and they wanted to cancel space walks and anything extraneous to their navigational interest. We, the crew, on the other hand thought that a lot of this was baloney, that the things that they wanted us to investigate would never be used on Apollo, would never be applicable, and were technological dead ends that were perhaps useful for some engineer to give a paper at a symposium, but that really wasn't contributing much at all. So we kind of had a little tension between us.

These navigational engineers would say things like, "My God, do you realize you're like Magellan, out of sight of land for the first time in history! You're going to be up there all by yourself doing your navigating! You'll be all by yourself!" I didn't get it. I mean, I didn't buy it.

But anyway, somewhere along the line, John Young, who has a very wry sense of humor, started referring to me as Magellan because of that. [Laughter]

KELLY: I think that's an interesting story.

COLLINS: Yes.

KELLY: Moving on from Gemini, I'd like to work into Apollo and just ask you a little bit about your transition from Gemini to Apollo—I know that Apollo had started before Gemini was completed—and how you found yourself within the transition.

COLLINS: Well, I found some things the Gemini people were doing just because they were important to their own ego or amusement or professional development, and I just gave you an example of some of the navigational stuff that the Guidance and Control [Division], Gemini people, were pursuing that wasn't really relevant to going to the moon and coming back, but by and large, I think the—there was a tension between Gemini and Apollo. I think the Apollo people I would fault a little more than the Gemini people in the sense that a lot of the Apollo engineers tended to think that they had more of the answers than they really did, and they kind of looked upon Gemini as little guys playing around with their toys over in the corner but that, "Hey, we on Apollo know how it really should be done or is going to be done," that they kind of looked down their noses at some of the Geminis.

But I thought the Gemini program, as it was advertised to be, truly was very useful in bridging the gap between Mercury and Apollo, that it was a bridge and that we learned things about rendezvous and other aspects, long-duration space walking, that were very helpful to Apollo. The two programs did have to be developed in parallel. You couldn't wait until Gemini was finished before you began work on Apollo, so Apollo did have to go off on its own way in some regards. It couldn't wait for Gemini answers. But the Gemini program was a little jewel, I thought, and the people who worked on Gemini, particularly the workers and the managers in St. Louis working for McDonnell, I thought, were superb, and when you transitioned from St. Louis to Los Angeles and you went from McDonnell to North American, I think the workers and the managers out there suffered somewhat by comparison. I think there was an arrogance initially in Los Angeles.

COLLINS: I think there was not the dedication to the extremely strong work ethic. I think there was a—I hate to be prejudicial against California, but I think there was kind of a "West Coast-ism" out there. They outgrew it, they got a lot better, but initially I think particularly

the West Coast parts of Apollo could have paid closer attention to Gemini and profited therefrom.

KELLY: In what sorts of things do you think they could have profited from Gemini?

COLLINS: Well, building a good spacecraft instead of worrying about whether you're going to get your camper up into the High Sierras for the weekend.

KELLY: And was that the type of attitude that was pervasive among the [unclear]?

COLLINS: I wouldn't say pervasive, but it was certainly there. It was certainly there. There was a "we know better" kind of an arrogant attitude on the part of some of the managers, and it was a laid back, "Well, we'll get it done one way or the other sometime somehow" attitude on the part of some of the workers...not compared, say, to...the United Auto Workers or a production line of automobiles or manufacturing radios or anything like that. I'm comparing it very specifically to those McDonnell people who were extraordinarily dedicated and very highly skilled.

KELLY: Can I ask you, then, going back to the Gemini program and reflecting upon it, what types of things do you think that the program itself learned? You mentioned, for instance, rendezvous.

COLLINS: Well...Gemini [wa]s what the propaganda said. It was rendezvous, long duration, and EVA, and those really were the things. I think, of the three, the rendezvous was the most important because the Apollo scheme, of course, was contingent upon getting the LEM back up from the surface of the moon and rendezvousing with the command module. So that was

very much in the back of our mind. You've got these two vehicles—I'm talking now in the mid-sixties when no one had been anywhere near the moon, we had this image of, "Hey, a couple of years from now a quarter of a million miles away, see, you're going to have these two vehicles sixty miles from each other on the back side of the moon where you can't talk to them, trying to get together." And that was a scary idea, and it required an awful lot of thought and testing and practice, and that was done primarily through Gemini.

KELLY: Moving along and going back to what you mentioned about the Apollo Program in its early stages, what types of things and problems occurred? We know about what happened with the Apollo 204 fire, but were there other events as well? Can you talk a little bit about that?

COLLINS: No. Have you got something in mind? Are you leading me in some specific direction? Because I'm not sure that I know a good answer to that. I mean, there are so many things. It's been so long and there were so many things, it was such a large and complicated program, but the wonder to me was—well, one wonder to me was that no Saturn V rocket ever blew up. I mean, that just surprised the pee-Willie—I don't know what to say about it, I can't put a nice word on it, but it really surprised me. I thought certainly with the Saturn 1, the 1B, and the Saturn V, surely one of those suckers was going to blow up, as it did in the Russian program, their moon rocket. They had horrible problems with the Russian moon rocket, and I'm not that surprised. When you have gigantic machines churning away at extraordinarily high temperatures and pressures, it's a real tribute to the engineering of [Wernher] von Braun's people, primarily.

KELLY: I think you were assigned in the beginning of the Apollo program to Frank Borman's crew.

COLLINS: Yes.

KELLY: I believe that was going to be the second Apollo mission. Is that right? It seemed a little confusing.

COLLINS: I'm not sure. The sequence of events kind of got shifted around. When I was first assigned to the Borman crew, I don't think we were going to be the second manned Apollo. We were going to be an extremely high-altitude flight, huge elliptical orbit way out thousands of miles from the Earth, but in orbit around the Earth, and I think we were maybe the third or the fourth manned flight. Then things got juggled and shifted, and [James A.] McDivitt's crew with the LEM got transposed with Borman's crew without the LEM. So Borman's crew ended up being the second, but I think at the time we were maybe the fourth. I'm not sure if that's what you were asking. Anyway, that's all in the records, that's all in the documents. What did you want me to say about them?

KELLY: I was going to then ask you what types of training did you perform to get ready for the Apollo mission, since it was so different from Gemini.

COLLINS: Well, again, more of the same, just everything that everyone is telling you. I spent a lot of time at the factory. We started to become specialized.

I'm getting a little out of sequence. At some stage in the Apollo Program, astronauts started becoming more specialized, and they became command module specialists or lunar module specialists or what have you, but on Apollo 8 we didn't have a lunar module, so we spent a lot of time out in Downey with North American-Rockwell, we spent a lot of time in the simulators, which were a problem in the early Apollo missions, because the simulators

were not working very well. In some ways it's easier to build a spacecraft than it is to build a simulator to imitate a spacecraft, and the development of the simulator has lagged behind that of the space hardware, and that was a problem for us training. We spent long hours, flew around like crazy from one place to another, had our wives angry at us because we weren't home, you know, that kind of stuff.

KELLY: I think at that time you were diagnosed with a problem with your back.

COLLINS: Yes. I had a disc come loose between two cervical vertebrae, and I had to have an operation where they take a little chunk of bone out of your hip and fuse two discs together. That kicked me off the crew and grounded me for a couple of months, and then when I returned to the selection pool, I guess you would call it, I happened to come along about the time for Apollo 11. So, let's see. The knit-one-pearl-two theory would have said—I wasn't back-up. I would have been—I don't know. Anyway, I ended up on 11.

KELLY: Almost a fortunate turn of events.

COLLINS: ...That's an interesting question, the historical importance of Apollo 8 versus Apollo 11. To summarize that, I think Apollo 8 was about leaving and Apollo 11 was about arriving, leaving Earth and arriving at the moon. As you look back 100 years from now, which is more important, the idea that people left their home planet or the idea that people arrived at their nearby satellite? I'm not sure, but I think probably you would say Apollo 8 was of more significance than Apollo 11, even though today we regard Apollo 11 as being the showpiece and the zenith of the Apollo Program, rightfully so, because that was President [John F.] Kennedy's mandate, to, as he said, land a man on the moon, not two or not a woman, but just a man on the moon. So that was the focus, and when that was done by

Apollo 11, then that naturally put Apollo 11 up on a pedestal, but, as I say, 100 years from now, historians may say Apollo 8 is more significant; it's more significant to leave than it is to arrive. That's all.

KELLY: I think that's a very interesting way of describing it. I'd like to go back a little bit to Apollo 8. I believe you served as Capcom on that flight.

COLLINS: Yes.

KELLY: I guess it would be the first Capcom to have told the crew that they were ready to go for TLI [Translunar Injection]?

COLLINS: Yes. I can remember at the time thinking, "Jeez, there's got to be a better way of saying this," but we had our technical jargon, and so I said, "Apollo 8, you're go for TLI." If, again, 100 years from now you say you've got a situation where a guy with a radio transmitter in his hand is going to tell the first three human beings they can leave the gravitational field of Earth, what is he going to say? He's going to say something like—he's going to invoke Christopher Columbus or a primordial reptile coming up out of the swamps onto dry land for the first time, or he's going to go back through the sweep of history and say something very, very meaningful, and instead he says, "What? Say what? You're go for TLI? Jesus! I mean, there has to be a better way, don't you think, of saying that?" [Laughter] Yet that was our technical jargon.

KELLY: What was the feeling in Mission Control at the time when they were able to do that, when you relayed that information to them?

COLLINS: Well, space flight is such that you're hardly ever—not until the thing splashes on the water and the parachute collapse around it, not until then are you allowed the luxury of relaxing. So the fact that it had done this wonderful thing, that it had gotten going to escape velocity, that it was leaving the Earth, you couldn't sit back and pat yourself on the head and say, "Isn't that wonderful. We've done that thing." I mean, this is just another little link in the chain. So your whole attitude is looking forward, "Jesus, what next?" I won't say that it added to the feeling of tension or apprehension, but it certainly did not diminish it, the fact that it was on its way. "Oh, my God, it's on its way. We can't just bring it back. It's got to go do its thing." So I think how to put that in perspective, it was just a feeling of a greater awareness of the larger responsibility that this flight, the chunk that they had bitten off, that we were actually leaving and going. You know, it was venturing off into a new area. It was scary in that way.

KELLY: It sounds quite significant as well. You were a very big part of history in that respect.

COLLINS: Yes.

KELLY: I'd like to move on a little bit to Apollo 11. I have so many questions I'd like to ask you, although I'm sure you've been asked everything that can possibly be asked.

COLLINS: I think so, but you could still fool me. I'm here to be tricked. Go ahead and try.

KELLY: No, you're not here to be tricked.

COLLINS: No, I'm kidding. I'm kidding.

KELLY: I apologize in advance if I'm too repetitive, but I'd like also to use this as an opportunity for you to talk about some things that maybe you feel haven't been talked about before and that maybe are relevant to [unclear].

COLLINS: Sure. Go.

KELLY: But my first question is, what was training like, knowing that you perhaps were going to be the first crew to land on the moon?

COLLINS: I tend to compare Apollo 11 with Gemini 10 because those are the two flights that I made, and I put Gemini 10 in the context of being certainly an important event, but sort of like an important sporting event, maybe, say like a championship middle-weight fight or something like that. It was important, but there it was.

Apollo 11, on the other hand, was taken out of the sporting event category and put in the category of not even a national event, whereas Gemini may have been more national, Apollo could have international implications, and it was obviously—it sounds trite and hackneyed, but it was a historical milestone. It was of importance to the people of the world, I think, whereas I don't think Gemini necessarily was, not to all people in the world. I mean, certain people either didn't know about it or didn't care about going to the moon, but it was of some importance to people in virtually every little corner of the globe, and I felt that very keenly, and I felt that in a negative sense as well as a positive. The negative was, hey, don't screw it up. I mean, I felt a tremendous feeling of, you know, I could make some stupid little mistake and just make the whole program look ridiculous in the eyes of the whole globe. So I felt a heightened feeling of responsibility and worry because of the responsibility. I guess that's how I felt about the training of Apollo 11.

KELLY: It sounds like you also had a heck of a lot of simulator time. Did you find that you spent most days in preparation in the simulator or were you doing other activities?

COLLINS: Oh, all the above. You do the usual thing. You go to the Cape for various reasons. You go to the factory for various reasons. You go get your pressure suit done. There are simulators here in Houston and at the Cape. At the Cape, you do a lot of testing inside the actual spacecraft. Here in Houston, you go to a lot of meetings on your flight and how you're going to accomplish this and how the flight plan is going to be written up and so on. But then, as you point out, the simulator is probably the backbone of your training, and there are simulators in Houston, simulators in the Cape, and we spent as much time as we possibly could in both places in the simulators, yes.

KELLY: Did you feel that you were, in a sense, working very closely with your crew and working as a team and tracking a little bit more than you had in the past?

COLLINS: Yes and no. Actually, on Apollo 11, no, there was not the unified training that there had been on previous flights involving only one spacecraft, because Neil [A. Armstrong] and Buzz were in the LM for extended periods of time while I was in the command module by myself for extended periods of time. So our training was bifurcated, if you will, and I spent hours and hours by myself doing my aspect of training. They spent hours and hours by themselves. It was true, we came together as a threesome, and there were certain aspects of our training, the launch and the recovery and so on, that we did as a group of three, but I had the feeling I spent more time away from them than with them during the latter phases especially of Apollo training.

KELLY: And can I ask you how you felt about that?

COLLINS: I feel fine about it. I don't have any little hidden agenda or hidden feelings about Apollo 11. It's one of the questions I get asked a million times, "God, you got so close to the moon and you didn't land. Doesn't that really bug you?" It really does not. I honestly felt really privileged to be on Apollo 11, to have one of those three seats. I mean, there were guys in the astronaut office who would have cut my throat ear to ear to have one of those three seats. I was very pleased to have one of those three. Did I have the best of the three? No. But was I pleased with the one I had? Yes! And I have no feelings of frustration or rancor or whatever. I'm very, very happy about the whole thing.

KELLY: In fact, I did read in one of your books, you said that you felt such a connection with the command module itself that you almost had a feeling to write on it. Can you talk about how you felt in interacting with this is your home around [unclear]?

COLLINS: Yes, my happy little home, Command Module 107. I know I said bad things earlier about the workers and the people out in Downey, California, who assembled it. Now I should say some good things about them, because as time went on, those command modules got better and better and better, and by the time they shipped 107, I mean, it was a wonderful machine in really superb condition, and I thank them for it.

KELLY: Did you find that you actually had an attachment to it in a certain respect?

COLLINS: Yes. I think you do get attached to—pilots get attached to airplanes, I know that. I have at home an oil painting of an F-86, Serial Number 525231, and that's my number. I mean, I flew that airplane for a couple of years. I flew it from California through Greenland and Iceland, to Europe, I was in a gunnery meet, won a gunnery trophy flying it. So I think it

is very true that pilots do get attached to pieces of machinery, and in that sense, I did get attached to Command Module 107.

KELLY: Can I ask you a little bit about events surrounding Apollo 11? I guess after your launch, I think you referred something to the effect of the Russians putting something around the moon, and I think it was eventually called Lunar 15, if I'm not mistaken. They mention in some of the books that I've read something to the effect that Mission Control was really worried about how it might interfere with your mission.

COLLINS: No. I think that was baloney. I mean, the chances of one object hitting another launched from two different parts of the Earth going in two different, separate trajectories around the moon, different angles, time phasing, one thing and another, the chances of those two machines colliding are much less than the chances of one of the two of them getting hit by an asteroid, for example, and I don't remember anybody getting all in a swivet because we were going to get hit by an asteroid or meteorite or whatever. So I think it was a public relations or a political necessity, perhaps, to voice some concern about collisions. I think they sent—didn't they send Borman to Russia or something to work out details? You know, that was all pretty much, from a technical point of view, eyewash.

KELLY: I'd like to ask you a little bit about once you returned from Apollo 11, because I'd like to talk to you more about Apollo 11 itself. It seems so well documented that [unclear].

COLLINS: Yes. Yes. Yes.

KELLY: But I'd like to ask you about what happened during your—I guess it would be your landing, recovery, once you got into your BIG garments, the Biological Isolation Garments.

COLLINS: Yes.

KELLY: And into the mobile quarantine facility. What was it like to go through that?

COLLINS: Well, for one thing, I always felt like that BIG business and the recovery business was a huge gap in the planning for Apollo. Now, I don't know how you would do it any differently. I certainly couldn't improve on it, but, on the one hand, you've got rooms full of scientists saying, "We're not going to have one germ brought back from the moon. We don't think there are any germs up there, but should there be, we ain't gonna expose the population of the Earth to these germs." So they have all these procedures.

But then look at it this way. Suppose there were germs on the moon. There are germs on the moon, and they come back with Aldrin and Armstrong on their clothing, in their lungs, whatever, all these germs get breathed out. The command module is full of lunar germs. The command module lands in the Pacific Ocean, and what do they do? They open the hatch—you've got to open the hatch—and all the damned germs come out, right? They contaminate the whole Pacific Ocean! Then you're got these three guys in there. There's stuff on these suits, these BIGs. I mean, it doesn't make any sense. It was a huge flaw in the planning.

But anyway, getting back to the BIGs, they had no ventilation system. They are extremely hot. That was a hot day out there, and we were warm anyway. So I can remember thinking—we got out of the command module in the BIG, no problem. We got into the raft, had a little trouble getting the door closed on the command module, and I went back and closed the door. Then the helicopter picked us up, and then we had to go back to the carrier, and all this time we're getting hotter and hotter. I don't know about the other two guys, but I'm getting hotter and hotter, and I can remember thinking, "I'm giving these guys

thirty seconds, I'm getting out of this goddamned suit. I don't care how many bugs there are coming with me," you know. And that was about it. I was getting to the end of my tolerance, thermal tolerance. My visor was all sweated up. I couldn't see where I was going. We got out of the helicopter, could see hordes of people. I'm waving and stumbling along. I don't know where I'm going, can't see, hot, tired. I wasn't ticked off; I was very pleased.

But anyway, then they got us inside the house trailer, the MQF...and they closed the door, and then we got all our germs out inside it, then it was okay from then on.

KELLY: I heard you mention something about keeping the mice healthy.

COLLINS: Well, the whole thing with the LRL, Lunar Receiving Laboratory, they had a colony of I don't know how many white mice, and they exposed them to the moon rocks and to us. Had there been some strange malady, maybe these mice's grandparents had some genetic defect or something, I don't know, but had the mice all sickened, jeez, I hate to think about it. We'd be in that building today. [Laughter]

KELLY: Can I ask what it was like in the MQF, Mobile Quarantine Facility, once you were transferred?

COLLINS: It was fine. I mean, it was a happy little home. These people are there. There were three of us plus two. We had the doctor and the engineer, John [Hirasaki]...Anyway, Bill Carpentier was the physician and John [Hirasaki]...Anyway, we were there, five people happy as clams to be in a confined space. It's not that confined. It's like living in a trailer for—we were in it for, I don't know, a day? That's about all. So it was no problem. We had gin on board, had steaks. [Laughter]

KELLY: There you go. [Laughter]

COLLINS: What the hell? I could have stayed in there a lot longer. That was fine. And a hot shower. That was the main thing, really, because I love hot showers, and, of course, there's not one on the command module. I was grubby and glad to be back. Hot shower, gin, and steak. Wow!

KELLY: That's all a man can ask for.

COLLINS: Now, if someone had said to me, "You can have either a hot shower or a gin martini or a steak," it would have been easy to say, "I don't want the steak." But the choice between the gin martini and the hot shower, I don't know what I would have done. It would have been close, very close.

KELLY: Then I think you proceeded on to the Lunar Receiving Laboratory here in Houston?

COLLINS: LRL, yes.

KELLY: Can I ask how long did you stay there and what types of things--

COLLINS: I believe the rule was—we had to be in isolation, I believe, twenty-one days from the time we left the moon. So if you subtract the transit time back and the MQF time—I just don't remember anymore, but it seems like my numbers must be wrong, because I have the feeling we spent eight or nine days in the Lunar Receiving Laboratory. It must have been longer than that, or maybe I don't remember the quarantine period, but I want to say there

was a twenty- or twenty-one day quarantine, but it doesn't seem—I don't know. I've forgotten.

KELLY: From what I've read, they said twenty-one days from the time of the lunar landing.

COLLINS: That sounds like what I just said, but somehow—because then from that you subtract four days and another five. So that would have been sixteen days in the LRL. It doesn't seem like it was that long. Maybe it was. But again, it was fine. No problem. We had comfortable rooms, good food. We had to write post-flight reports anyway, so it wasn't as if some horrible injustice had been done to us or anything like that. It was fine.

KELLY: It seems that after that, I'm sure you were swamped with press conferences and photo opportunities and a trip around the world to meet various dignitaries.

COLLINS: All those things.

KELLY: What was that like, and how did that impact your work as well as your outlook on what you had done?

COLLINS: I don't know. That's an interesting question, but I don't know the answer. Well, let me see. In the first place, everything worked on Apollo 11 so extraordinarily well that we didn't really have any embarrassments or anything to conceal from public scrutiny or anything to worry about, so it was very easy in terms of press conferences or talking to people. How did it go? Well, fine. Everything was great. So that part of it, it was very easy that way.

On the other hand, it does get tiresome. I get very tired, not so much anymore because—well, for a whole variety of reasons, but in those days I got tired of being asked the same things over and over and over and over and over and over and over again. And that's hard to explain, because you can see it in people's faces. They meet this guy who just came back from the moon, just came back last week or last year or last decade, and it doesn't matter too much. They've never met anybody that's gone to the moon before, and they say, "What was it like?" you know, all excited, and the guy says, "Oh, God. It was great, terrific." You can tell that the guy is bored out of his skull, and that person must think--you can see it in their eyes, "What kind of a person is this person? He's just come back from the moon. He's not even excited about it?" It isn't the fact that he's not excited about it, it's the fact that he's been asked that same question ten million times and he can't stand it anymore. It's hard to explain to people.

KELLY: I understand it.

COLLINS: Yes. But the trip around the world was very, very interesting. I think all of us felt—I certainly did—very honored and fortunate that they put a whole big airplane at our disposal, the back-up Air Force One, a big Boeing 707 that had a whole crew. There were three of us and our three wives, some people from NASA Headquarters, Julian Scheer, the public affairs guy, and some others. It was a small and friendly and compatible group. We got to go places and do things that normal people are not privileged to do, and it was a privilege.

It was very tiring. I don't know, there's something about being on edge and having to go through receiving lines and remember people's names, and meeting kings and queens, and making speeches, and flying all night and then doing it again the next day, there's something very tiring about that. I mean, I was physically ground down by the end of—I think it was

twenty-eight cities in thirty-three days, or thirty-three cities in twenty-eight days, or something like that, but by the end of it I was very tired. But on the other hand, I couldn't criticize five minutes of it. It was a wonderful opportunity.

KELLY: It seems that after that people wanted to name so many things after you, and you had your signatures just written out by a machine, I think, through a NASA office, even. One question comes to mind, going back to Apollo 11. Right at the time of the launch, they came up with the idea of having a plaque put on the LM with everybody's name on it. I heard that you didn't know about that, that your name had been signed to it. Is that true?

COLLINS: You know, the machine you're talking about, called the Autopen, and the astronaut office certainly had them, and if you check the signatures on that plaque, "We came in peace for all mankind," you'll find that the three of ours—I don't know about Richard Nixon's, but the three of ours are autopenned. What we knew about it and didn't know about it, my recollection's not too crisp about it. I recall that we knew something, there was going to be some kind of plaque, and they were kicking around what it should say. Now, I remember that after the landing, I can remember talking to Julian Scheer about it. Julian's a wonderful guy. Are you going to talk to him? Is he on your list of people to talk to?

KELLY: I'd like to add him to it.

COLLINS: You should. You should. He's a wonderful guy. He has a wonderful sense of humor, and he was in the middle of this from a PR point of view. I can remember Julian was one of the guys who worked out the wording, "Here men from Planet Earth landed and when we came, blah, blah, blah, July of 1969 A.D., we came in peace for all mankind." I think Julian wrote that, or one of his people did, and then he had to clear it with the White House.

He was over there talking to somebody on the Nixon staff, and they said, "Well, I don't see anything in there about God. You know the President's big on God." [Laughter] So you ought to ask Julian about that.

But before the flight, see, we were so beset with technical details, that if someone had said, "Hey, we're going to put a plaque on the LM," we'd have said, "Fine."

"It's going to have your name on it."

"Fine."

"It's going to say this."

"Fine. I don't give a damn. Give me something important."

So even though it may seem important from a historical or public affairs point of view, it did not loom large. [Its wording couldn't kill us.]

KELLY: One of my questions for you is going to be to ask you if you have any ideas of other people that we can interview and people that you think are important to the history of the—

COLLINS: Well, I'd sure put Julian on the list. Off the top of my head, he's the only one I can think of. You would know better than I, I think. I don't have any—no.

KELLY: I think he might be a good addition [unclear].

COLLINS: He's a good fellow. You ought to talk to him.

KELLY: My next two questions concern mostly what you think about your career, both at NASA and otherwise. I'll just ask you, first of all, what you think your accomplishments were and especially what your greatest accomplishments were.

COLLINS: I have no idea. Accomplishments. Well, Moltke the Elder...One of the Moltkes, who said, "Luck, in the long run, favors only the able." And that's kind of what I believe. I believe a lot in luck. I think there's a tremendous amount of just being the right age. Look, Armstrong, Aldrin, and Collins were all born in 1930, okay? That's a question of being in the right time. Now, being in the right place has to do with their backgrounds and how they became pilots or whatever, but there's an awful lot of luck, and I feel that I've been very, very lucky in my life to be in the right place at the right time.

On the other hand, I'd have to say, as Moltke did, in the long run, if you seem to be very lucky, maybe you're doing something right also. So I think to be successful is a combination of luck and skill, and that's what I feel in my life. I mean, I don't feel I'm any bloody genius or have any extraordinary ability, but I'm a stable person and I don't have a lot of weaknesses. In other words, if I go to school, I do about as well in math as I do in English. I'm diversified, if you want to put it that way, and I think that's been a help in the jobs that I have had. I'm not explaining this very well.

But what are my accomplishments? I don't know. I've been in the right place at the right time, and I've been able to do a good job when those opportunities were presented to me. Now, someone else can maybe do a hell of a lot better job. I'm not claiming that they couldn't. But what I'm saying about myself is, I'm stable and I'm diversified and I'm not narrowly focused. I'm not extraordinarily good in one area and extraordinarily bad in the other. I'm kind of even, even steven.

KELLY: I think that's very modest.

COLLINS: No.

KELLY: I'd like to ask you, then, what you think the biggest challenges you encountered in your career were.

COLLINS: I don't know the answer to that either. The biggest challenge. I don't know. Again, going back to this being even or—that's not the word I'm searching for, but coming from a broad base, I felt that I was not as technically sharp as perhaps some of the other astronauts were, and I think one of the challenges for me was to make sure that I learned and retained and remembered and learned and relearned and pounded in my dull skull all the technical odds and ends and bits and pieces that I needed. So I thought one challenge was mastering this gigantic pile of machinery that is the Gemini spacecraft, the Apollo command module, or whatever. That was a big challenge to me, and I felt I probably was not natively as well equipped as some of the other people were for doing that. So that was one challenge.

Then later on, in other jobs, the challenge, of course, is less technical detail than it is being an astronaut. It's more people; I mean getting along with people. So I think my biggest challenge, as for almost everyone, is trying to evaluate people and hire good people, fire bad people, get along with people, managing people, all those things. And I tend to do okay on that. I've made some big blunders people-wise, but I tend to do okay on that. As I say, I'm a balanced person. I'm not extraordinarily strong and extraordinarily weak in one area or the other, but I'm balanced, and that's about all I know.

KELLY: I appreciate that. I'm going to have one final question for you, and I will try to make this short. I'm just wondering what your thoughts on the future of the space program are and where you think NASA should remain.

COLLINS: Well, I'm not—boy, and I just made a big speech about how balanced I am, and now I'm going to contradict it and say I'm unbalanced, because I'm Mars, Mars, Mars, and

Mars. I've always been Mars. Before I went to the moon, I was Mars. After I came back from the moon, I hoped that we would be Mars. [Vice President] Spiro Agnew, God bless him, tried to push a Mars program. Tom Paine liked Mars. [President] George Bush wanted to go back to the moon and on to Mars. I think the really interesting thing in the future is Mars.

If you need an International Space Station as a stepping stone to Mars, okay. Frankly, the International Space Station kind of bores me, like it does the American public. I'm not sure that you really need it, but it looks like we're going to have it, so I'm certainly not going to resurrect that argument. Going back to the moon? I'm not in favor of that because I think it's a gigantic sinkhole of money, time, and talent, and that going back to the moon will create as many problems as it solves and will delay and delay and delay Mars. I'm pro-Mars. That's all I can say.

KELLY: Thank you, and I want to thank [unclear] I just want to tell you I appreciate the fact that you've written such well—

[End of interview]