

CONFIDENTIAL

24-25

COLLINS
(CONT'D)

there, but I have the feeling that I got a hell of a lot out of CMS-1. I liked CMS-1 and the instructors. It was sort of the backbone of my systems training. But I think it could have been a hell of a lot better if it could have been integrated into more of a real-world approach. If those people were familiar with the everyday operations of Mission Control: the downlink; what they have on telemetry; how you use the water boiler, not how you could use it but how you really are going to use it, that would have enhanced that training a lot.

ARMSTRONG

We had only a few hours on the launch vehicle, which is probably about right. It's fortunate that, because of the high reliability of the launch vehicle, we haven't had a requirement to know in depth a lot of alternate switches. In most cases, they are available to you anyway.

ALDRIN

Not too much you can do about them.

ARMSTRONG

There are some things, particularly in the S-IVB relight, that it's important to understand very well. If it works perfectly, it's going to run right in spite of you. But if there are abnormalities, it's very good to understand what the effect of those are. So some amount of time is required there. I think we hit that about right.

CONFIDENTIAL

CONFIDENTIAL

ALDRIN I think the DCPS did a very good job in relaying launch-vehicle peculiarities to us.

ARMSTRONG They did. The DCPS people do a good job in that area. They understand. They have kept very close to the launch-vehicle changes, and I think they have really been able to keep us better informed on important things to know in the launch vehicle than our formal Saturn briefings.

24.17 LUNAR SURFACE TRAINING

ALDRIN I think there were enough uncertainties about the one-sixth g environment to warrant the degree to which we used both WIF and the KC-135. Looking back on it now, I don't think the followon crews will need as much as we did. I believe that the more productive training would be with the KC-135. It would be nice to have a better simulation of the surface characteristics. That is the big shortcoming, I believe, of the KC-135. But one-sixth g is relatively easy to operate in. It doesn't take too much detailed training, I don't believe.

ARMSTRONG As far as the use of POGO, I think it's worthwhile. It takes very little time to go over there and train. From the viewpoint of the directorate maintaining the POGO and what its cost of operation is in terms of money, staff,

CONFIDENTIAL

all here of cost, esp. Collins

CONFIDENTIAL

24-27

ARMSTRONG
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et cetera, I can't say what the balance is there. If it didn't cost anything, there would be no question that the little bit of time that it takes to go over there and get that kind of experience is worthwhile. It's not mandatory. The KC-135 is unquestionably the best simulation of one-sixth g. It's got certain limitations as we all know. You can't do very much, and it's very expensive in terms of the amount of time it takes you to get a little practice.

ALDRIN

You're probably not going to remember them. I think the best time to do that is just at the beginning of the EVA.

ARMSTRONG

The one-g walkthroughs, of course, were the basis of our timeline planning. I don't see any way of getting away from that. You're going to do a number of those one-g walkthroughs, and you're going to develop your timeline and the procedures. There isn't another way to do it right now that's a good way.

ALDRIN

Yes. That's the only way to do it. You can't sit down.

ARMSTRONG

It's well worth it. We would like to have been able to do a few more had we had the time. I think that we do need to improve our facility for that job. We need to have a better LM, more accurate simulation of the LM.

CONFIDENTIAL

CONFIDENTIAL

ARMSTRONG
(CONT'D)

We need a better and larger area to work in. We need more topography and variations of environment to work in so that the simulations can be as good as you can reasonably afford on the ground. I think ours was less accurate in terms of its fidelity than we should have had to properly plan that. We should have as much flight-type equipment as we can in those exercises. It's going to result in an increased productivity of the time you spend in EVA.

ALDRIN

I think the Sun position relative to the spacecraft is extremely important. There are so many things in the EVA that are completely dependent upon the lighting conditions that you have, such as placement of experiments and the photography. We were prepared to do it in one fashion, assuming landing straight ahead. With little variations of that, we generally knew how we were going to approach them, but it was going to be a real-time decision for the most part. With the small amount of yaw that we had, it did perturb our operation to some degree. I think that the one-g walkthroughs ought to look at specific variations in LM orientation and touchdown.

ARMSTRONG

We didn't do much in the way of field trips. We did one geology field trip. We never could afford one which we

CONFIDENTIAL

CONFIDENTIAL

24-29

ARMSTRONG
(CONT'D)

thought might be particularly valuable for its scientific return.

ALDRIN

I felt for the most part that the trips we went on suffered a good bit from lack of realism. Maybe we just didn't get into this latter one, that we missed, soon enough. I think, based on some of the information that we've acquired on this flight, we'll be able to make many of the field trips a good bit more productive.

I think both SESL and the 8-foot chamber are valuable. It's hard to say that they are required. They do give you that additional confidence in the flight equipment. It would be nice to be able to operate in both of them, for example, with the OPS, and not have restrictions as we had in the SESL in not being able to use it. I'm not sure that the thermal aspect of the SESL tests is needed.

ARMSTRONG

Yes. It proved to be noninformative, which I guess was good, because it said we didn't have any problems. I agree with Buzz. The confidence that we got out of that was very good. I'm glad we did it. I'm glad that we worked with the flight equipment in there and, in a cursory fashion at least, as tests rather than walking

CONFIDENTIAL

CONFIDENTIAL

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(CONT'D)

up and down on a box. Not that it really taught us all that much. Again, it was just a confidence builder, and I think that we could probably do less in the future. It is important, however, for anybody in a surface activity to have a high degree of confidence in his ability to operate his equipment. That is what that gives you.

ALDRIN

In the SESL, I think it was more important to be exposed to the lighting than to the thermal environment. It was the only place that came fairly close to duplicating the wide variation of lighting conditions.

ARMSTRONG

Our briefings on lunar surface training were more give-and-take sessions on planning the various procedures and deciding the most efficient way to use our surface time. That's consistent with many other areas of the flight, I guess.

CONFIDENTIAL

CONFIDENTIAL

24-31

24.18 CONTINGENCY EVA TRAINING, KC-135 WIF, ONE-g WALKTHROUGHS

ARMSTRONG We did contingency transfer in the WIF and went through some procedures with that group. Since we didn't have to use it again, it fits in the insurance category.

ALDRIN There is such a wide variety of contingency situations that can come up. You can't train for all of them, and I think you have to cut short a few of the available possibilities and just say that if you have to face that one, you're going to take the time and work it out in real time. There are a wide variety of exercises - one PLSS; one OPS; two PLSS, sometimes with OPS and sometimes without; and transfer of hoses through the tunnel. You just can't train for all of them. Somebody has to sit down and try to work out procedures. I think you do need to take a good set of inflight contingency procedures that will handle the cases that may come up.

COLLINS You need at least one good long session inside the command module with all three crewmembers suited to go through where all the hoses are going to be; who's going to plug into what, when, and where; who's going to help who; and what the COMM situation is going to be.

ALDRIN That's true, but doing that in one g is rather unrealistic.

CONFIDENTIAL

CONFIDENTIAL

COLLINS

That may be, but instead of just getting a briefing on where the things are going to be, you ought to see them with your own eyes, particularly the geometry of the thing without the center couch in there, the locations of the hoses, and again, who's going to stand where and who's going to help who plugs into which hose when. Three men in there with pressurized suits who don't understand what's happening and can't talk to one another would be one hellacious mess.

24.19 MOCKUPS AND STOWAGE TRAINING EQUIPMENT

ARMSTRONG

The mockups and storage equipment were used extensively and, in general, they were satisfactory for developing the procedures. I think the place where they are short is particularly in the area where you're making connections to and from the spacecraft, operating several different life-support systems such as the EMU, OPS, spacecraft suit loops, and things like this. It's very important that you operate all those valves per equity and know why you are operating them in that manner. Our mockups do not do that. They are just knobs and you just do them. It's important to know why you are doing them.

CONFIDENTIAL

ALDRIN

It's unfortunate that operating gear weighs so much in one g. It's virtually unbearable to have that piece of hardware on your back for a long period of time.

ARMSTRONG

I think we have a lot of complex flights ahead of us in main-line Apollo and I think there are enough of them, enough possible contingencies, and enough training yet in front of us that it would pay to upgrade this area. Many people still have to learn all that hardware; its whys and wherefores.

24.20 PHOTOGRAPHY AND CAMERA TRAINING EQUIPMENT

COLLINS

I just think that gear ought to be available earlier. It's one of the things you can get done or at least get started on 3 or 4 months before the flight, and yet it's not available. It's another one of those late-arrival categories. I'm not sure whether it has to do with the quantity of the training equipment or the fact that we have to get one flight down before we can get around to providing for the next one. I think the familiarization with the cameras (taking them home and taking pictures while you're flying around the country in T38's) should be done early and not the last couple of weeks. From the flights that I have been associated with, it seems to me that it's always been the last month when that stuff

CONFIDENTIALCOLLINS
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magically appears and they want to talk to you about it and all that; it should be done earlier, I think.

ARMSTRONG

That gear should also include flight fidelity. It should have decals on it; we should be used to seeing the kinds of decals, exposure guides, and things like that that we are going to be using in flight. Those things never show on any of the training equipment. That should be included as mandatory.

ALDRIN

The LM photography is tied to operating in the vehicle in many cases, such as the surface photography with the 16 millimeter attached in various ways to the window bar, to the mirror mount. It looks to me like there is room for significant improvement in this area. I think we got into this a little late in the game. So much of the documentation of a flight depends on the photography. It looks to me like we could use some particular training sessions taking real film with flight cameras and the highest fidelity mockup you can create. I don't know how you would do it really - get the proper lighting conditions.

ARMSTRONG

We had a camera session after we had moved to the Cape, maybe a month before launch or so, where it was quite clear that all the photographic details had still not

CONFIDENTIAL

CONFIDENTIAL

24-35

ARMSTRONG
(CONT'D)

been incorporated into the flight plan, that is, all the thinking that's involved in planning camera placements, the things you want to take pictures of in the field of view possible in that attitude, and lighting on the subject so that you're getting the details. All that sort of thing needs to be worked out by the photo people rather than the crew. It should be done much earlier in the cycle than it is now. I suspect that when we look at all our films, many of them will show that we suffered from not really understanding exposure or lighting well enough over all situations. That's a weak area.

ALDRIN

I think the photography for power descent, power ascent, that sort of thing, should be worked right into the simulations. You ought to activate the camera in the LMS; take films. You're not going to come up with anything, but you get in the habit of doing this.

COLLINS

Somebody with a fair amount of experience and background should really be concerned that the pictures we bring back are of the correct events, and that they have been properly integrated in the procedures. I am sure that there are probably people over there in the photo lab that are vitally interested in that. Yet they're not in any way in the loop and probably properly so. They are not any

CONFIDENTIAL

CONFIDENTIALCOLLINS
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way in the flight-planning loop. If we don't feel like taking a picture or something, or if it doesn't occur to us to get it written into the flight plan, it just never happens. I mean there is really nobody who's responsible for the overall photographic excellence or the photographic planning of the flight.

If we happen to think about it and if we happen to personally ink it into the flight plan, then it will get done. And if we don't, then it doesn't get done.

ALDRIN

That's the way most of the photographic entries are, pen and ink.

COLLINS

Maybe we didn't spend the amount of time we should have studying that photo plan, but, again, I say if the crew doesn't take a particular interest in it and make sure that it's in there, then somehow it just doesn't get in there.

ARMSTRONG

Maybe there should be a responsible person for each particular flight. Maybe there is, but I can't tell you who it is on our flight.

Helmut Knehnel has to run his shop, though.

CONFIDENTIAL

CONFIDENTIAL

24-37

ARMSTRONG
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What I'm saying is the project engineer should be over at the lunar-surface simulations; he's up at the CMS, he's over at the flight-planning sessions, and he's trying to integrate all these things to assure that the right film and the right camera's in the right vehicle at the right time and it all plays.

ALDRIN

Just as an example, it doesn't seem to be a very professional approach to the handling of the 16-millimeter camera to tape it with a piece of tape in the focus to the infinity position. If you want to get it to stay in that position, put some screws in there to make it retain that position.

COLLINS

I think it's ridiculous that we don't have some sort of automatic exposure control or automatic light control, or whatever you call it. Commercial cameras are available where all you do is point and click and the thing is in the right exposure value. And there are even cameras available that have switches where you can have either a wide field or an average exposure value to give you a broad coverage. For example, if you took black sky against a white booster, it would average out the black sky and the white booster. It would give you the average value that might not be optimum for either one, but it would be

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

an average panorama. Then if you wanted to be specific and throw a little switch, which zonks a lightmeter down to a spotmeter kind of thing, you can either point it at the dark sky or point it at the booster. These things exist. It's easy to say, well, you can't qualify them, or the right company doesn't make them, or they're not rugged enough, or they won't pass the salt spray, and otherwise raise barriers. If that had been aggressively pursued, we would have right now in our hands an automatic camera that would take a hell of a lot better pictures than we are capable of taking, and we could have qualified the thing by now. I think that should be done, I really do.

I think they are pursuing it with Hasselblads, but, my Lord, they have been pursuing it with Hasselblads for years, ever since the subject first came up, and I just don't see any results. Yet we do carry great huge spotmeters whose utility is questionable, and we manage to develop and carry those frapping things. That Minolta spotmeter was not used during the flight. I don't know what flights have used it but I'd gladly swap it for an automatic light control in a camera. That 2-pound battery is nothing more or less than a handle crank; I'd gladly swap it for an automatic lightmeter built into the camera.

CONFIDENTIAL

CONFIDENTIAL

24-39

COLLINS
(CONT'D)

I think we really spend our time and our money going down the wrong road in that camera shop. There may be very real reasons why what I propose is impossible, but from what little I know of it, you ought to have the capability just to point and click and get the right exposure.

ALDRIN

I think the importance of documenting events was extremely well brought out in this particular flight in that we were too busy doing other things to tell exactly where we were in powered descent. The film was able to do this, but I think it did it in a marginal way. I don't believe that the mounting and the field of view that it gets in the right window is anything near what it should be to get documentation of the powered descent and the powered ascent. Another example is the problems that we had in docking. I think that that should have been documented using high-speed motion film from the LM. There is just no way of doing it.

COLLINS

I never used the spotmeter in the command module. Did you ever use the spotmeter?

ALDRIN

I looked through it for some interior settings. I put it on the Earth, but I don't think anything significant was learned.

CONFIDENTIAL

CONFIDENTIAL

ARMSTRONG We decided, based on the spotmeter reading, that we were probably one f-stop off when we got pretty far away. We had to open up one f-stop to f:8 from f:11.

COLLINS When was this?

ARMSTRONG When we were halfway out to the Moon, I guess. That's what your measurements indicated. I never used the spotmeter.

ALDRIN I take it back, I never used it. There's no doubt that an automatic device would be far superior to anything you get out of the spotmeter. I take it back, I never used it.

24.21 LUNAR-SURFACE EXPERIMENT TRAINING

ALDRIN I think we did quite a good job in having fairly high-fidelity equipment (solar wind, EASEP package) available. The only improvement I would suggest is that we try and gear it to the type of surface environment. The little problems that we ran into were associated with the interface of that gear to the soil conditions; examples are planting the solar wind and attempting to level the seismometer. This is going to be very true when we start getting into more complex exercises with the ALSEP. To do this on a linoleum floor is almost a waste of time;

CONFIDENTIAL

CONFIDENTIAL

24-41

ALDRIN
(CONT'D)

I think you've got to do it in realistic conditions by
simulating both lighting and surface texture.

ARMSTRONG

It would have probably been better practice to be on a more realistic surface. You probably would have consciously looked into those aspects more than we did on the level surface that we did most of our work on.

ALDRIN

Like the LEC operation, the big difference that you noted was the effects of the dust getting all over the tapes and cluttering up the cabin.

24.22 LUNAR LANDING - LLTV, LLRF, LLTV'S, AND LMS

ARMSTRONG

For the type of trajectory that was required for us to fly (with a long manual flight at the end), the LLTV was a most valuable training experience. Like all simulations, it's primarily a confidence builder to derive the required information from the information that's at hand. In the flight situation, the information that I used in the landing was primarily visual. It was augmented by information inside the cockpit that Buzz relayed to me. I did very little gage monitoring during the final descent, that is, below 300 feet. It is primarily an out-the-window job, picking a suitable landing spot and getting into it. The full-scale simulations are the only ones that do this - the LLTV and the LLRF. I would have to recommend continuing

CONFIDENTIAL

CONFIDENTIALARMSTRONG
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them both, at least until we have a few more landings under our belt.

I would suggest that more attention be given in the LLTV to changing your landing spot while you're in the trajectory.

ALDRIN

And how to deviate from an automatic trajectory and smoothly pick up what you want to do in the way of deviations.

ARMSTRONG

~~I believe the LLTV can do that job and do it safely.~~ That means that you probably have to do a few more total trajectories than we did in preparation for this flight. I suggest that a dozen is a desirable number — a dozen lunar trajectories in the LLTV. It takes about half a dozen before you're comfortably flying on a lunar trajectory, and after that, a couple of different deviations to different touchdown areas. The LLRF lighting simulation was quite interesting, but in retrospect, it's not a very good simulation of the lunar lighting situation.

In the flight, you see much more daylight, at least at our Sun angle (10-degree Sun angle). It was much more of a daylight landing situation than the simulation that was

CONFIDENTIAL

CONFIDENTIAL

24-43

ARMSTRONG
(CONT'D)

portrayed by the night lighting simulation at Langley Research Center.

ALDRIN

They essentially set up a situation where there was no available horizon. That certainly was available in the actual case.

ARMSTRONG

The LMS new model is really a fine addition to the simulator. If you could afford building a model for Apollo 12, so that their last 2 months of simulation would be going into the Surveyor site, then I think you would get a substantial improvement in your confidence level to get to the desired touchdown site.

ALDRIN

I think this is particularly true if they stick to the objective of going to that specific area. We have enough available information from the Surveyor itself to build that model.

ARMSTRONG

I know that's an expensive item to provide, but our experience with looking at the L&A of Site 3 indicates that you really can get a good understanding of that local area in your many landing simulations in the LMS.

ALDRIN

In looking back on the choices that I made with regard to my participation in landing simulations, I think they were generally correct. I don't think that I suffered by

CONFIDENTIAL

CONFIDENTIALALDRIN
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not being exposed any more to the LLTV. I think one session at Langley was worth the effort. I concentrated on manual use of the throttle and I think that's probably what future LMP's should concentrate on, also. I think Neil agrees that if we did have to execute a complete manual landing, it would probably best be done by the Commander concentrating on attitude control and voicing to the LMP what rate of descent and what changes he wanted. It appeared to be a very difficult task for one person to accomplish all of these. Whereas, when the tasks were split, and use was made of the instruments to manually control the throttle, and a fair amount of practice was made, use of that good performance could be anticipated by a manual throttle landing. For the most part, this can be done in the LMS.

CONFIDENTIAL

CONFIDENTIAL

24-45

24.23 GENERAL SUPPORT: PROCEDURES, SUITS, CHECKLISTS,
ONBOARD DATA, ET CETERA

COLLINS

As a general comment, our support was inversely proportional to the number of days remaining before the flight. We had poor support at first and later we had superlative support. I would have traded some of that last-minute support for some earlier support. To be more specific, early in the game, the flight-planning people, and the checklist people, and the command-module rendezvous-procedures people worked for three different bosses and lived in three different worlds. It was not until late in the game that John O'Neill was given the overall power and you could go to John or somebody he designated and say, "Look, I've got this problem. The checklist says one thing and the flight plan says something else and the North Americans have never heard of either one of them." That would get squared away. But early in the game, it seems to me that the checklist people sort of pointed the finger at the flight-planning people who responded by pointing fingers in return, and a lot of time was spent, you know, looking for a left-handed monkey wrench. You sort of wandered up and down the second floor of building 4 trying to find somebody who would really take the time and be interested in researching the problem and coming up with

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

a procedure technique. Late in the game, it was all
 amalgamated under John O'Neill and it worked as I think
 it should have worked from the beginning. I don't
 understand the breakdown in FCOD; I don't understand
 Ernie Dement's bailiwick as opposed to the flight-planning
 world. It seemed that much of the time, they were
 working at cross-purposes and it seemed like - I guess
 they get negative vibrations from the checklist world.
 I guess I have to say that I don't understand their
 problems fully and perhaps they don't understand my
 problems, but I don't enjoy making changes to procedures.
 It seems like the crew only does that when they feel there's
 some good need for it. And yet the checklist people seem
 to have the feeling that other flights have gotten by with
 this procedure and why can't you.

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 pages of phone
 book (not important
 enough)*

ALDRIN

It seems to me that they were unwilling to meet us halfway.
 We had a different job to do, different hardware changes
 in the spacecraft, and different uses to make of the
 equipment.

COLLINS

Maybe it's an unfair comment, but I had the idea that
 their viewpoint was that it was good enough for previous
 flights and it's good enough for this flight, so don't
 bug us with changes.

CONFIDENTIAL

CONFIDENTIAL

24-47

ALDRIN

I agree with what you're saying, Mike. I think it's unfortunate that there was a division between the checklist people, the procedures-development people, and the onboard data. It seems to me that the procedures-development people should be the ones who also work with the handbook. They should start it and carry right on through completion, which includes onboard data. The sooner the crew can start training with data books that represent the best of your ability at that stage of training, the more they are going to get out of it. We had several new areas, and it appeared as though we were pioneering much of this in the areas of procedures development, and also in determining just how this was going to be presented to the crew and how you make use of it, and in distributing it around the spacecraft. We had to make certain decisions, and we tried one form and then another. I'm sure there are better ways of doing it than what we settled on, had many things been done before we got on the scene. I sure hope that followon crews won't find it necessary to make big changes.

ARMSTRONG

*Don't use
"center"
again*

We had five straight flights here on very close centers. Each crew has been obliged to get some procedures that work and stick with them, to settle on them close

CONFIDENTIAL

CONFIDENTIALARMSTRONG
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enough before the flight so that they could remember what they were. That meant to each and every flight, I'm sure, that there wasn't time to sit around and figure out which of several different approaches was the best. We had to take one that worked and stick with it, and in many cases, this resulted in choosing one that clearly wasn't the best, but it was one that worked. The next flight that came along was obliged, wherever possible, to take everything that the previous flight had been able to work out and to go with that. They had enough of their own new things to be concerned with; they had to choose one early that worked and go with it, and not spend too much time deciding which one was best. At the end of five flights here, the result is, I think, that we have the procedures for a lunar mission, about 60 percent of which are not the best ones to use. They are ones that work, but they are a long way from being ideal. We have a little more time before the next flight, and I hope that during that period, we can take the ones that are good and do that work and use those, but not hesitate to change those that are really marginal procedures. That's going to take everybody's cooperation to pick out the marginal procedures and to improve those to the level

CONFIDENTIAL

CONFIDENTIAL

24-49

ARMSTRONG
(CONT'D)

you would like to operate with for the rest of the lunar program.

It was an inevitable conclusion of the schedule that we
were forced to meet. Everybody had his nose to the grind-
stone to make the thing work. Now we just have to accept
the fact that the inevitable consequences of that situation
are that we don't, in fact, have the best of everything
at this point. This tends to be a lot of adverse comment,
and it really shouldn't reflect that, because the facts
are that when you look at it in the overall sense, it
did the job. It got us ready to fly and, essentially,
we didn't have any big open areas. In the overall sense,
it is damn good. I think we tend to be very self-critical
in this area, though, because we've all had our hearts
and souls in it for a year or so.

COLLINS

I try to put it in perspective myself and say that I
thought it was, all in all, an excellent training cycle
and very good use was made of our time. We had wonderful
support. In some cases, that support came very late, but
we had, I think, beautiful support - and I thought it
was extremely well worked out, considering the complexity
of the things we had to learn. I think that, just from
the CMP viewpoint, the proficiency of the CMP (all other

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

things being equal and they probably aren't) is just proportional to how much CMS time he gets. I thought that I was adequately trained but that I really wasn't particularly polished in any one area. I just didn't have the time to devote to each and every little slice of the pie. I tried to learn all the systems; I tried to learn all the procedures for burns, all the rendezvous procedures, and the navigation, but I will be the first to admit I was far from being an expert in any one of these fields. I don't see how you really can be an expert unless you have more time, more simulator time, to devote to it than I had. I think 400 hours should be a minimum. The only reason I bring this up is that I think some of our training plans say something around 200, 250 hours is sufficient. I don't really think that's true. Speaking from the command-module viewpoint, I don't think you ought to be launching CMP's with less than 400 hours of simulator time. I really don't.

SLAYTON

A lot of your time was spent developing procedures.

COLLINS

There's a lot of truth in that; there were some areas that I had to work but that had not been worked out before. Even if you deleted all those, however, I still

CONFIDENTIAL

CONFIDENTIAL

24-51

COLLINS
(CONT'D)

think a lot more than 200, 250 hours is required. You just take the pie and start slicing up the lunar mission; you take all those systems; all the malfunctions; the various mission phases; and the if's, and's, and but's of the various rendezvous. I don't think you could cram that into 200, 250 hours.

ARMSTRONG

I would guess that if you would look at the integrated simulations with MCC and total up the hours there, I would bet it's a significantly larger number than we used to think about per flight. It's because of the many phases of this complex mission; there are just so many phases and each has to be covered in fairly large amounts of time. It's good time, but you really can't count it towards your basic training for the mission.

COLLINS

You should go into those integrated simulations having all the basics behind you; that's just sort of the graduation exercise in a particular phase of the flight.

I just wanted to mention a minor point. I did fly a couple of entry sessions on the FOD's entry simulator, which is an awful-looking little thing on the third floor over in building 30 with a bunch of old Gemini

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

components and make believe DSKY's. However, it comes with ~~John~~ Harpold, who understands the entry math flow probably better than anybody else that I know around here. I think it is worthwhile to schedule just as I did, maybe two 2-hour sessions on that thing, and I don't understand why the CMS cannot do this. Harpold can crank failures, accelerometers, stuck accelerometers out of SPEC, and little internal failures into that simulator and show you how the computer would handle them - in most cases, how it would fail to handle them - and he has failure modes in his simulator that, so far at least, they have been unable to crank into the CMS. I consider that a worthwhile exercise. It would probably be even better to incorporate those failures somehow into the CMS - he has tried to do it but has been unable to do so. I am not sure whether it is the limitations of the interpretator or what it is, but I think that training was worthwhile.

*ans in yellow
pages of phone
book*

ALDRIN

We haven't covered one category about suited operations. We did a fair amount of suited training in both simulators, and I am certainly glad that we had that amount of time. I can't really identify many areas where suited operations in flight proved to be a big hindrance, but I

CONFIDENTIAL

CONFIDENTIAL

24-53

ALDRIN
(CONT'D)

think the sooner you can begin to integrate the total mission package with the data, the type of pens and pencils you are going to be using, where you are going to put them, and where you log all the data under suited conditions, means a higher fidelity training, and I was glad that we did as much suited operations as we did.

ARMSTRONG

Did you keep track of our suited operations overall? We spent much more time in those suits than I ever thought anybody could spend in preparation for one flight. Almost every day for 3 months before the flight, we were in that suit sometime during the day. It would be nice if you didn't have to spend that much time in the suit, and perhaps we didn't, but I guess we had a high degree of confidence in our ability to operate in the suits in the various environments. I think we probably spent more time in the suits than we had to. We did spend much more time in EMU CCFE, fit checks, and stuff like that than we should ever have had to. Seems like we did about 10 of those exercises, and every time they would change a little something on the underwear or something, they would want another fit check. We bowed to most of those and did them, but I would hope that future flights won't have that much instability in their configuration.

CONFIDENTIAL

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ARMSTRONG

I think we have a tendency to reflect on what we did and to say that we made the right decision there. I'm not sure that we're in a good position to really judge.

There are several simulation areas that should be improved, some of which we've mentioned before. There is one other area I don't think we discussed, that of optics, and I think it's true in both vehicles, certainly in the LM.

7 The AOT optics characteristic limitations and constraints, such as lighting and sun shafting here and there, are not covered at all in any of our simulations, nor at any time do we actually get a very good opportunity to look through real optics and understand their limitations. I really think that we need some optics someplace that look at the real sky, the real constraints, the real illuminations, side lighting into the optics and things like that so that we can appreciate what you can and can't see. I'm not even sure that anybody agrees with me in this area.

ALDRIN

I agree with that. I think that for the surface alignment, I was quite surprised to find that four out of the six detents were unusable for the surface alignment. I wouldn't have thought that beforehand.

CONFIDENTIAL

CONFIDENTIAL

24-55

ARMSTRONG

They become very significant on some flights when you start talking about particular little details of the flight. Our mission simulators just don't cut the mustard in this area; they're going to tell you answers that are wrong. I can understand; I just think it's an inherent limitation the way those simulators are built, and I think we need to augment that somehow with some real optics with real lighting. I'm not quite sure what the best way to do that is, but I think you could do it with existing hardware, prototype or test hardware. You could get some of that stuff together and build a special simulation that would give people the opportunity to work, before launch, with some real optics and to mark on some real stars or something.

COLLINS

We've done that at MIT to a very slight degree. From the command-module viewpoint, I'd have to say that that sure would be nice to have but I can't think of any situation where a lack of that high fidelity training would make you come to a dangerous conclusion - maybe a wrong conclusion or maybe you might get tricked into thinking you could see the LM farther away than you really could or that you could see more star patterns than you really could.

CONFIDENTIAL

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ALDRIN

I think if we had to do P51's where your initialized identification would have to be done by the telescope, it would have pointed out many of these deficiencies.

COLLINS

That's right. I thought about saying that they ought to change the characteristics of the telescope in the CMS but I think if you had to do a P51, what you'd do is turn out all the lights inside the command module and, if necessary, put a bag over your head and take the 20 or 30 minutes to dark adapt. Now, you can tweak the CMS telescope to that same level but then all you've really done is wasted a lot of simulator time, because that means everytime you look out through the telescope, you have to wait 20 minutes before you can see anything. That's really all it means. So I don't know. I think in regard to the telescope part of it, the simulator should be left like it is. Concerning visual presentation of the LM as a little pinpoint of light in the sextant, for example, during the rendezvous sequence, that is unreal, but I'm damned if I know how you make that real. I just don't know how you'd do that. Maybe it's doable but that LM as it goes off against the lunar surface background gets smaller and smaller. It is one problem at 50 miles, a different problem at 100 miles, and a

CONFIDENTIAL

CONFIDENTIAL

24-57

COLLINS
(CONT'D)

little different problem at 120 miles. To have high-
resolution optics of that type seems to me to be beyond
our capability. I don't know how you'd do it

CONFIDENTIAL

25.0 HUMAN FACTORS

25.1 PREFLIGHT

ARMSTRONG I guess our only activities that fit in preventive medical procedures were disinviting the President and trying to slow down to a reasonable or, at least, acceptable pace in the last week or so. The Cape doctors kept an eye on us that last couple of weeks and I guess we didn't have any complaints there. They did a good job. We got through medical briefing.

ALDRIN I had a couple of conditions come up in the category of dental care and I thought there'd be plenty of time to get them taken care of but there were things that came up at the last minute and we were hard pressed to schedule those in. I would highly recommend that people really take a real close look at their own status as far as those things go and get those things taken care of as early as possible.

25.2 FOOD AND WATER

ARMSTRONG Comparing hunger sensations inflight versus two weeks preflight, I'd just say, in general, that I didn't have as large an appetite inflight as I would on the ground, but I thought it was adequate and I was able to eat enough.

CONFIDENTIALARMSTRONG
(CONT'D)

The food was palatable and all three of us kept our levels up satisfactorily, I think.

COLLINS

My appetite was off on the first 2 or 3 days of the flight, I would say. After that, it was close, if not equal, to my usual ravenous ground appetite.

ALDRIN

I didn't find any difficulty in generating a desire to eat.

ARMSTRONG

I agree with that.

ALDRIN

I think (laughing) in comparison with Gemini, it was good. There were times in Gemini when, of course, we didn't have enough time to do this because food preparation is a very time-consuming task. During the translunar and transearth coasts, there's plenty of time to take care of it; but, no kidding, it takes a long time to get these things ready. If you do have a lack of appetite, the tendency is just to forget about doing a lot of that stuff. But I didn't experience a lack of appetite at all on this flight.

ARMSTRONG

Comments on the taste.

COLLINS

In comparing food during preflight evaluation and inflight taste, I noticed no difference.

CONFIDENTIAL

CONFIDENTIAL

25-3

ARMSTRONG Acceptability of the foods. Well, just first make an overall comment that the new foods are significantly improved and welcome additions to the menu. I think, in general, it's a real aid to the normal day-to-day operations in the spacecraft to have pleasant menus and palatable meals.

ALDRIN I think that most people are aware that during translunar coast we did, for the most part, make use of the prepackaged meals. I guess partially because we knew they were more of a low residue and we wanted to avoid any complications with waste elimination that might interfere with the LM activities.

COLLINS In general, I thought the food was at least excellent or better. I thought a lot of hard work went in on the food selection. In general, I thought the quality of the food was extremely good. My criticism of the food revolves around the packaging. I think we waste too much time fixing it; and, for this particular flight, there was more food than three people could have eaten in 3 weeks. They really gave us a lot of food. I think they probably don't need to provide nearly as much. We had our normal three packages of food, plus this little

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

pantry arrangement which is very convenient and nice, plus we had a bunch of wet packs. I'd say we probably ate half the food onboard, - We had good appetites and we ate — I'd hate to say how many calories per day, but plenty per day.

ALDRIN

The one disappointing package, I guess, was in the wet packs. The turkey and gravy I thought was outstanding because it was moist. That wasn't the case with the ham and potatoes, nor the beef and potatoes. I thought that both of those were too dry and that the potatoes were not appetizing at all.

COLLINS

In general, I found that the sweet things were not as good as the others. This applied to the drinks as well as desserts. I touched very little in the way of desserts. On the drinks, I felt that something tart, maybe like limeade, would have been a nice addition — or iced tea or something like that.

ARMSTRONG

I agree. In general, I felt the beverages were too sweet.

ALDRIN

I think that we can go still further than we have in the line of the canned spreads going on either bread or toast. I just didn't experience any difficulty at all in zero g

CONFIDENTIAL

CONFIDENTIAL

25-5

ALDRIN
(CONT'D)

taking a spoonful of this and spreading it out. As
long as the material that you're using is relatively moist,
it stays together. It doesn't have a tendency to run off
and go all over the cockpit. We had tube spread in the
LM, and I think we could have used that type of a prepara-
tion in the command module, along with more of the
canned variety. Of course, the canned variety presents
a problem of disposal afterwards. It'll certainly have
to be reckoned with. I'm not sure how you make use of a
pill or disinfectant with cans.

ARMSTRONG

The spoon-bowl items were fine; intermediate-moisture
fruits, sandwich spreads, and breads were all used exten-
sively. In general, I liked the pantry approach. I
thought the approach where you went in and selected those
items that you would enjoy for that meal and assembled
your own menu was a very pleasant operating mode. I
enjoyed that, if you could handle your diet satisfactorily
that way.

ALDRIN

I think it would be a good idea to package the pills
along with the spoon-fed packages — either that, or
have some different, more convenient way of dispensing
them. After meals, you gradually dispose of things as

CONFIDENTIAL

CONFIDENTIALALDRIN
(CONT'D)

you're consuming them, and you don't want to have to get up at that point and float down to the pantry to get the pills out to pop one of them in the bag.

COLLINS

I don't know. The business of disposing of all the waste packaging, putting pills in, and all that is very time-consuming and creates a huge volume of waste. Really, the way to do it is to use the pill, then wad everything together, tie the little packet as tightly as you possibly can, and wrap some tape around so that it stays in a small-volume, high-density package; however, this is time-consuming.  It would really be nice if you could have something like a commercial garbage disposal where you could just take all this stuff and cram it in, turn a crank, pull a switch, and have it all sort of ground up and disinfected and spit into a stowage compartment. 

ALDRIN

Either that or some sort of an airlock where you could take this refuse and put it in the airlock and dump it overboard.

COLLINS

Right. But the packaging, getting the food reconstituted, and then doing something with the other packages were the biggest drawbacks. Breakfast would have been improved, I thought, if they had some scrambled eggs, which I know

CONFIDENTIAL

COLLINS
(CONT'D)

they have in the lab. I just don't think they have gotten around to putting them on the flight menu, but it would sure be a good idea if they did have some of that. It would be a welcome addition to breakfast.

ALDRIN

In the right-hand seat, I found it convenient to take some of the Velcro that was on the food packs and put it on the scissors. I just found that with the scissors at the end, the cord was just a little bit too unwieldy. That brings up another point. When you put those scissors and things like that in the pockets where you have the dosimeter and a few other things the pocket just doesn't seal right. You move around a little bit and pretty soon you're missing a flashlight, you're missing a pair of scissors, and the dosimeter is off somewhere.

COLLINS

That's exactly right. Now, these inflight coveralls are carefully tailored garments and a lot of engineering has gone into them and they are almost half as good as the summer flying suit. You don't have the problems like that with the summer flying suit because they have zippers in all pockets and you are accustomed to using them.

ALDRIN

Do you care to say a few words about snaps, Neil?

CONFIDENTIAL

ARMSTRONG There ought to be a law against snaps. I think that if I were preparing for this activity, for further flight, I would take just a piece of cloth and sew a bunch of little pockets and separators in, and then have a place for all the little odds and ends that you like to keep handy, like your scissors, tooth brush, spoon, pencil, and a bunch of things like that — keep it in one pocket.

ALDRIN One for each individual and a reasonably convenient place for each crew station to mount that sort of thing. There is one now in the LEB and it's a little bit too large.

ARMSTRONG That would have helped keep track of all those little loose items that are just personal necessities. As recorded on previous tapes, we were periodically losing some piece of equipment, a toothbrush would be gone; a camera back, a monocular, or some tape recorder would be drifting around the spacecraft somewhere and it would be a matter of going on a big search to find it.

COLLINS The area behind or above your head in the left-hand couch and the right-hand couch is a convenient area, because it is an uninterrupted bulkhead space very sparsely covered by little patches of Velcro; that was the place where we wanted our cameras, monoculars, and tape recorders. If

CONFIDENTIAL

CONFIDENTIAL

25-9

COLLINS
(CONT'D)

there were a couple of spring clips up there, built to be the width of the Hasselblad or if there were more Velcro in that area, it would be a lot more habitable. The doggone camera was always floating around, because there was never enough Velcro really to plaster it up against the wall.

ALDRIN

How about a comment on the coffee?

COLLINS

The coffee was a little disappointing; I don't know what was wrong with that coffee. It wasn't a good brand or the coffee was very tasteless — not tasteless, but it just had a peculiar taste. It didn't taste like coffee. I like instant coffee; I drink it at home all the time.

ALDRIN

It was pretty hot.

COLLINS

The water was hot; now I don't know what it was, but the coffee just wasn't very good.

ARMSTRONG

only a little!

In general, the water wasn't that good. There was a little chlorine taste to it. I found that I drank a lot of cold water instead of the other beverages that were available and I enjoyed it. There was some gas in it. There are some engineering improvements that can be made in the filters, but I think that's possible.

CONFIDENTIAL

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COLLINS

It's well worth carrying those filters. You need them. You might put on the tape that it would be nice to have a fingernail clipper onboard the spacecraft. I don't know where the best place for it is, but it would be very convenient to have in case you rip off your fingernail or get hangnails. At present, there is no tool available that will reach that area.

25.3 WORK-REST CYCLE

ARMSTRONG

I guess overall, with a few exceptions that were just discussed, the work-rest cycle on this particular flight was reasonably good. We were essentially operating on Houston time. We were getting our simultaneous sleep periods and essentially it was during the sleep period here in Houston.

ALDRIN

All of us elected to have Houston time on our watches and I think it was unfortunate that we didn't have the flight plan also geared to Central Daylight instead of Eastern Daylight. At the top of each page, we had the corresponding time for Eastern. It would have been an improvement, I think, if that had been Central.

CONFIDENTIAL

CONFIDENTIAL

25-11

COLLINS Yes, I think they figured that the crew was on Cape time so print local Cape time; but, really, we were on Houston time in our minds. It's a small point.

ALDRIN I'm sure the Control Center would have preferred it the other way, too.

COLLINS Sure.

ALDRIN I had anticipated considerably more difficulty with getting adequate rest, especially the first day. But it didn't turn out that there was much of any problem at all. I thought the sleep stations were very comfortable and the temperatures seemed to me to be very pleasant. I think coming back we noticed that it was getting a little cooler.

ARMSTRONG It was a little warm in the daytime. It was a little cool, particularly at night, on the way back.

COLLINS I think it is important somehow on these lunar flights to get yourself in the frame of mind where you regard the first couple of days of flight as just preliminary to the lunar activities and somehow you talk yourself into relaxing, taking things easy, and getting adequate sleep the first 2 or 3 nights so that you don't arrive at the Moon already tired when the peak activities begin.

CONFIDENTIAL

CONFIDENTIALCOLLINS
(CONT'D)

Maybe this is belaboring the obvious, and maybe all crews know this and will think about it, but this is something that we talked about; I think it is kind of a frame-of-mind thing. I think you can talk yourself into either getting all excited and burn up a lot of energy in anticipation or, on the other hand, you can talk yourself into relaxing and taking things easy. Personally, I felt that having flown once before was very helpful to me. I had been up there in zero g before and I wasn't spending all my time pondering the wonder of it all. I was in a familiar place and I was willing to pretend the flight hadn't started until along about the time of LM separation. I think this is important for these flights with extended lunar-stay times, particularly when the crew is flying a flight for the first time. Somehow they ought to talk themselves into a proper frame of mind and get good sleep and arrive at the Moon in a rested condition.

25.4 EXERCISE

ARMSTRONG

We all did a little bit of exercise almost every day. We used either isometrics or calisthenics in place or the Exer-genie. The Exer-genie worked alright. It got a little hot and stored a lot of heat, but it was acceptable.

CONFIDENTIAL

CONFIDENTIAL

25-13

COLLINS If you got a good workout on the Exer-genie, it got so hot that you couldn't really touch it. I don't think that is any kind of problem; I just mentioned it.

ARMSTRONG Any other comments on exercise?

COLLINS I had the idea that it was worth exercising on the way home and maybe not worth exercising on the way out.

ALDRIN During the lunar-surface activities, it didn't appear to me that preconditioning in any extensive degree was required. Now, if you were going to take 7 days to get there, it might be a different story. Certainly, with the activities that you have in one g, you are not going to deteriorate that appreciably in 3 days.

COLLINS Well, I felt better in the water when I was first back in one g and stood up in the lower equipment bay. I felt a lot better on this flight than I did on the Gemini flight. I am not sure what to attribute that to. If I had to guess, I would say maybe having the suit on in Gemini and having it off on Apollo — having already stored a lot of heat when I arrived at that point on Gemini and being cool and comfortable on Apollo; maybe it had something to do with exercise or the increased volume inside the spacecraft — I don't know. But I

CONFIDENTIAL

CONFIDENTIAL

COLLINS
(CONT'D)

felt a lot better and I felt in much better shape this flight than I did on the Gemini flight.

ALDRIN

It goes back to what you said before. I think the fact that you have been there and have been exposed to a landing on the water and seas that are not calm as can be — I think having been through it once — the second time does make it a good bit easier.

COLLINS

Maybe that's it. But I can remember a heaviness in the legs on Gemini. I could just visualize those legs being ^{filled?} pooled with blood. It seems like the old heart just wasn't capable of pumping things uphill as it usually was. I felt heavy in the legs, and sort of loggy, and I didn't feel very good. This flight, I didn't notice it at all.

ALDRIN

I think the difference in the space available inside the cockpit enabled you to move in a fairly regular sense and that just wasn't true in Gemini, where you were sitting and didn't get the opportunity to stretch your legs out.

COLLINS

I couldn't stretch all the way out in Gemini. My head hit, or my feet hit first.

CONFIDENTIAL

25.5 INFLIGHT ORAL HYGIENE

ARMSTRONG Generally, I can say that we didn't have any problem there. The toothbrushes and toothpaste worked fine. Essentially, we followed the normal pattern just as we would on the ground. As a matter of fact, not in just that area, but in as many areas as we could — eating, sleeping, normal habits, workdays, and so on. We tried to follow a normal pattern as we would on the surface. I think that contributed to the fact that we felt good the whole time, felt rested, and were able to do a good job.

ALDRIN I thought the toothpaste was pleasant.

COLLINS Yes. I brushed my teeth twice a day and everything was normal in that regard.

25.6 EYE-PROTECTIVE DEVICES

ALDRIN In the category of sunglasses, I found that they were of considerable use in Gemini; however, in the command module, I didn't see any use for them at all. Now, they may have been of more use in lunar orbit. In the LM, there were times when we had our helmets on most of the time.

ARMSTRONG I used the sunglasses for a while, early in the flight, and then chose not to use them anymore.

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COLLINS

Yes, I think they are questionable. I would not suggest deleting them. Some people use sunglasses extensively. I know some people, whenever they go outdoors, clamp sunglasses on their eyes and maybe those people would do the same thing in spacecraft. I don't use them very much on the ground. I only use them when driving a car, but other than that, I rarely use them.

I would like to go back to light attenuation under sunglasses. On Gemini, we had a window shade with a Polaroid circular filter in it. I thought it was a little jewel. I tried to get that added one time to Apollo and the CCB turned it down. In retrospect, I certainly couldn't say that that's something that you absolutely have to have, but that would surely be nice for window number 2. I don't know if you all remember; but, during rendezvous, you have to look at something bright. It's great because you have this little circular Polaroid section that you just rotate to any angle you want to get any degree of light you want. It would be a very useful addition, I think, to this storage list. Now, I can't say that it's necessary or mandatory, but in a nice-to-have category. I'd sure swap my sunglasses for that light attenuator any day. The reason is that, when you

CONFIDENTIAL

CONFIDENTIAL

25-17

COLLINS
(CONT'D)

put the sunglasses on, you not only attenuate the outside light (which is desirable) but also attenuate the inside light, which is undesirable. With the screen on the window, you can filter as much light as you want and still read all your gages with complete clarity. If you put sunglasses on to block the outside view, it also blocks your inside view. So I guess that's my little speech in favor of that sort of light filter. It would be nice to have. Speaking of window shades, this may not be the best place to bring it up under human factors, but I like to have my sleeping accommodations dark, as dark as I can get them. Certainly the window covers were good, but they weren't as good as they could have been. They were quite difficult to install and I don't know what the reason for that was. We fit-checked them and I don't recall any difficulty fit-checking them on the ground. They were very tight, but not nearly as tight as they were on flight. We got more exercise wrestling with the window shades than we did out of the exerciser, I believe. <Every night, we had a 10-minute yell-and-scream-and-swear session, and jump up and down trying to force the window shades into place.>

Why not an eye mask?

ALDRIN

And they still ended up leaking a certain amount.

CONFIDENTIAL

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ARMSTRONG It looks like it might be advantageous to have a cinch-down mechanism on those window shades that had a higher mechanical advantage than the ones that are on there now.

ALDRIN Yes.

ARMSTRONG The ones that are on there now require a tremendous amount of force to engage.

COLLINS They require a tremendous amount of force to jockey into position where the lever would fit over the top of them. Then they require an awful lot of additional force to get the lever over center.

ALDRIN It might be interesting to note at this point that, in regard to the spacecraft lighting, I think while we were all asleep was the only time that we really made use of the back lighting and the EL lighting. Maybe this is enough reason for it to have it readily available, so that you don't have to flick on the floodlights, but other than that use, I don't think it's required.

COLLINS The EL light?

ALDRIN Yes.

CONFIDENTIAL

ALDRIN Very nice, very pleasant to look at, but we just didn't need it, I thought.

COLLINS Block I used to have floodlighting alone. You'd have to look at a vehicle with floodlighting alone under a lot of different circumstances. If I remember, Block I used to have shadow areas where the struts would get in the way between the light source and the gage and things like that. I'd sure hate to go back to that kind of a lighting scheme. It's nice to have the EL.

25.7 UNUSUAL OR UNEXPECTED VISUAL PHENOMENA

ARMSTRONG Okay, visual phenomena have already been discussed.

25.8 MEDICAL KITS

ARMSTRONG One comment here is that it was pretty clear that the medical kits were not carefully packed. The pill containers blew up as if they had been packed at atmospheric pressure. The entire box was overstuffed and swollen. It was almost impossible to get it out of the medical kit container.

COLLINS I ripped the handle off as a matter of fact, trying to pull it out.

CONFIDENTIAL

ARMSTRONG That was even after we cut one side off the medical kit so it would be less bulky so we would be able to put it in the slot. I think that's just evidence of less than the required amount of precaution in packing.

ALDRIN I guess we have never really covered the distasteful area of bowel movements.

COLLINS Why don't you cover that?

ALDRIN Well, from my standpoint, I had anticipated having a bowel movement before the LM activities. And the night before, I spent an hour — 2 hours trying to squeeze out something and it was almost useless. What I accomplished was such a small quantity it certainly wasn't worth the effort. Mike sort of indicated that we probably should discuss this area further and there may be some better way of handling waste material than with the bags. It certainly is messy and it's distasteful for everybody involved to do it in that particular fashion.

25.9 HOUSEKEEPING

ARMSTRONG In general, it's a continual load. There are always things to be done, equipment to be stowed, windows to be cleaned, air filters to be cleaned. There is a continual,

CONFIDENTIAL

ARMSTRONG
(CONT'D)

never-ending bunch of chores to be done, which is desirable in some ways, I guess. It keeps you busy on the translunar and transearth coasts. A lot of those areas are required just because of the approach taken toward that particular design, as a lot of the construction in the cockpit — all the stowage equipment — gets put together and assembled in Erector Set fashion. That takes a lot of time and leaves a lot of stuff out. In general, I think it's an area that can still use a lot of improvement.

ALDRIN

I think the idea of having an individual kit where you can place things in individual packages is much better than that large one. And I'd like to see continued effort along this line to come up with better ways of interim stowage.

ARMSTRONG

We used the new stowage that was devised after Apollo 10 and it worked okay. There is probably more equipment available there than you really need, but it worked.

25.10 SHAVING

ARMSTRONG

We did shaving onboard and didn't have a lot of real good luck with that. For some reason or other, we let our whiskers get pretty long before we tried that and found out it was an hour's job to shave.

CONFIDENTIAL

ALDRIN

It takes a lot more water than you'd think ahead of time, and getting water on your face is not too easy a task. You can get some to accumulate on your fingers in a thin film and then get it on your face, but invariably it's going to start bubbling and get all over the cockpit in various places.

ARMSTRONG

The only difficulty really was conditioning the beard for shaving. Handling the equipment was no problem and there was no problem with shaving cream getting away from you. It wasn't that kind of a problem.

ALDRIN

Well, it did use up a fair number of tissues to keep wiping it off.

COLLINS

Now, in one g, what you do when you get all through shaving is to bend over the bowl, you take water, wipe it all over your face, and all the bits and pieces of hair go down the sink. But the way we were doing it, when you got through, they were all over your face; then you had to wipe each and every one off. It was sort of hard to get them off. For hours afterwards, they were scratching and itching.

CONFIDENTIAL

CONFIDENTIAL

25-23

ALDRIN

I think if I had it to do over again, I would have shaved once before the lunar operations.

ARMSTRONG

Yes, I think it's better to shave more often.

ALDRIN

It was a little bothersome putting that COMM carrier back on again and having a chinstrap going across underneath.

CONFIDENTIAL

26.0 MISCELLANEOUS

26.1 MEDICAL REQUIREMENTS

ARMSTRONG We had some and I'm not quite sure why.

COLLINS What do you mean?

ARMSTRONG Well, we had to keep the sensors on and try to get data.

COLLINS I don't see any requirement for that in the command module. I really don't see any requirement for sensors at all. You just have a bunch of extra claptrap, complexity, and power drain, -

ARMSTRONG In general, I think each person should feel like he understands his reaction to various kinds of medications that might be required before flight. I think it's unfortunate when you have to do that kind of stuff in the last week or two before the flight. That should all be done very early in the training cycle so that's no problem or concern to you at that late date.

COLLINS I agree. Another thing is that, it appears to me, we should have pills in two categories — those that we can take without obtaining permission, and those whose use requires inflight permission. And I'd put the motion-sickness pills in the former category. In other words,

CONFIDENTIALCOLLINS
(CONT'D)

the point where the motion sickness is. According to the doctors, at the first onset of any symptoms, you should be taking pills. If that's true, I think you should just go ahead and take one without having to go through the rain dance of calling the ground, getting permission, and then having a big conversation go out to the world about how you are; in fact, are you going to throw up or are not? If the pills are safe, then I think we should be given credit for having the judgment to decide whether to take one or not.

26.2 PAO REQUIREMENTS

ARMSTRONG

I don't guess we had any comment there. We thought our preflight requirements shortly before launch were excessive.

ALDRIN

I think we all feel about the same way about having that press conference conducted here through the glass. It would have been far better to have done that sort of thing earlier. I would think that, that late in the training is too late to be conducting that sort of press activity. I don't think we created a good impression, particularly by the way we went about the protection.

COLLINS

I felt like all three of our press conferences were bombs.
I really did. I guess we have nobody to blame for that

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26-3

COLLINS
(CONT'D)

except ourselves. I just felt like they were dull and boring, and that very little useful information was interchanged.

ALDRIN

I agree with that. (I think that the TV inflight should be something that depends on the crew's desires.) I think the more successful ones that we had were ones that were spontaneous, where we just started showing things around. Then the ground, I guess under the supervision of people in our office, can monitor what is received and then ~~release what is appropriate rather than having TV scheduled at certain times and going out live.~~ I prefer not to handle it that way.

26.3 MQF OPERATIONS

ALDRIN

Put wheels on the thing, so you don't have all these problems of people pulling it around from one position on the carrier to another. I guess they're in the process of thinking about this anyway.

ARMSTRONG

We recorded a lot of comments on the MQF design while we were there. Basically, the operation of that piece of equipment was satisfactory with few people at hand.

ALDRIN

We noted that the table was awkward in its location. It was awkward to move around and took up a lot of additional

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26-4

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ALDRIN
(CONT'D)

space. The windows need to be enlarged if they're going to be used for that type of public-affairs activities. I guess the communications to the outside were relatively good.

26.4 LRL OPERATIONS

COLLINS

I want out.

ARMSTRONG

I guess we don't have any comment there. So far, they've been going as well as you can expect.

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27-1

27.0 CONCLUDING COMMENTS

NONE

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