many operational aspects of work in Antarctica and future work in space are similar enough to make fullest use of the tremendous body of practical experience accumulated "down there" over the years. When they have sudden emergencies on the ice, their logistics system must respond just as quickly as ours will have to respond in space. And the scientists in those remote polar stations are just as vulnerable and just as dependent on the working of this long logistic supply system as an astronaut scientist would be in a space station. We just wanted to know how this interface between science and operational support looks and how it really works. We learned a great deal.

Now the question: how do we get from here to there? How do we get from the capability provided by the Apollo program to the kind of capability we shall need to realize a future in space of the type I have just described?

We can answer this in the abstract, or we can answer it in the light of today's realities and constraints. I prefer to do the latter, because it is these constraints which have provided the basic rationale for the Apollo Applications program.

This chart lists these constraints. First, our next step must be a logical one toward our longer range objectives in space. Next, because we are confronted with an austere budget situation for new starts in fiscal year 1968, we shall have to make maximum use of the hardware and resources provided by Apollo—and this includes capitalizing on the momentum of Apollo. One unknown in Apollo is that we really don't know exactly how many flights we will need before we are successful in meeting our objectives, so there may be some hardware left over from the mainstream Apollo program. If there is, we would like to employ this hardware immediately in the follow-on program. So it is highly desirable to convert this not-needed Apollo mainstream hardware as fast as the situation will permit to these follow-on objectives.

To summarize these first three points, we want to provide the greatest gain in space capability at the lowest possible additional cost.

This chart lists the objectives of the Apollo Applications program

A great deal has been said about what men "can" do in outer space, but in Apollo Applications we plan to address ourselves more and more to the question of what "should" he do. For example, is a man desirable as a maintenance man or does he just get in the way if you have him up there? Where can he really make a major contribution? For instance, it's pretty obvious that when it comes to measuring cosmic radiation in outer space, man doesn't have a built-in sensor to measure it, so his only function would be to bring up an instrument and read the instrument. Man really is not necessary for this kind of a job because we could much more easily telemeter the information down and read the instrument on the ground. But let's take another example. Any geologist can tell you that an untrained man can walk many miles in an area and find nothing, but a trained geologist might find a single pebble in that same area that is the key to the geological history of the whole area. In this case, man is very necessary with his ability to absorb information, correlate it with previous experience, and draw a conclusion. No computer can do this today and probably never will. We must learn those activities where men can really make a great contribution.