situation. High or low blood pressure was not seen with the exception of some postflight which is discussed in some detail in the appendix proper. Some high heart rates were encountered, but abnormal rhythms of the heart were not observed. No actual fainting in the postflight situation was encountered. Some changes in blood volume were detected. Some weight loss occurred, and some minimal calcium loss.

None of the mental aberration that had been predicted was encountered. No infectious diseases developed in flight. On balance the results showed up considerably different than originally predicted. It has been shown that the space-flight environment has been better for man than the biomedical community had thought it might be, and man, in turn, has shown better response.

Cost and Effectiveness of the Space Program

(From appendix E; Douglas Aircraft Co.)

Twenty years from now, assuming that the number of dollars appropriated for space applications remains constant, those dollars will buy only half the product—by weight—that we get today. Inflation is one reason for this, but the second reason is increased sophistication of the product. Thus, the dollar cost per pound of space hardware will increase.

At first glance, you might think this means that the space budget has to double in the next 20 years to maintain our present pace. But that is not the case.

When you examine the progress to be made in 20 years, it turns out that the product this industry can provide 20 years downstream will be about 50 times more effective than what it produces today. This will come about because of increases in payload effectiveness, and increases in transportation effectiveness. Some of this will be shown in our presentation today.

With the gross national product increasing, if you again assume a constant level of space appropriations, then in 20 years we will be spending only about half the percentage of gross national product that we are now spending for space. Thus, if we spend our space appropriations wisely, and new programs are timed to start in the proper sequence for cost effectiveness, then the years ahead will give us a much improved yield on our investment.

At present, the space program produces dividends mainly in the area of scientific experimentation, and the value of this is already increasingly apparent. This new technology already contributes to everyone's personal well-being, and to the general economy. But as the space program approaches the 20-year mark, we should reach the point where true commercial utilization of space will start to predominate, as opposed to simple Government utilization for experimental purposes.