October 20, 1981

Dr. Harris B. Shumacker, Jr.
7481 Holliday Drive East
Indianapolis, IN 46260

Dear Harry,

I have been remiss in responding to your request that I fill you in with regard to the first two open heart cases that Varco and I and a group of us did at the University of Minnesota in 1951. I had been hoping to be able to get to Minneapolis and to get the charts out so that I could be more accurate than I can be just from my memory. Now that it is obvious that you are in some haste to have this material, I am giving it to you as best I can reconstruct it from the publication of 1951 in the Annals of Surgery and from memory.

The patient operated upon at that time had blood pressure recorded with a mercury minometer, pressure transistors not yet being available to us. The rate of perfusion was governed by estimation of saturation of hemoglobin in the lobe of the patient's ear, using an oximeter devised by Earl Wood and manufactured by Waters Conhelly We learned postmorten that the combination of heparinization and the mild trauma of the oximeter had resulted in formation of a hematoma in the lobe of the ear so that reported saturations were very low and thus the perfusion rates reached as much as 2300 ml per minute in a 12½ kilogram child.

The second patient was done some three weeks later. This was a youngster of about the same age who had a well demonstrated interatrial septo defect of secundum type. We had spent a year devising the safety equipment of the pump oxygenator so as to preclude the possibility of pumping air into the circulation. This was based upon a series of cams and solenoids and had proven magnificently effective in the experimental laboratory. On the day in question, the two members of the team in charge of managing the apparatus unfortunately began the perfusion without switching on the power of the double control system of the reservoir. The consequence was that massive oxygen was pumped into the aorta with catastrophic results. Opening of the left atrium showed a simple defect which could be closed with four sutures as had been done repeatedly in the experimental laboratory.

On reconsideration of all the factors leading to this catastrophe, some measure of tension is understandable. A seprate circuit for the control mechanism had appeared essential to filling the apparatus intially without developement of bubbles in the bloodstream, but the real lesson lay in recognition of the fact that there must be one master switch which controls everything. The device, therefore, was modified after the group of us arrived in Brooklyn, and a much simpler -

Dale-Schuster pump was developed. WithOthis single change in the basic design of the apparatus, our first successfulcases were done in Brooklyn in 1955, a delay occasioned by delays in establishment of a laboratory in our new location and organizing a team of surgically thinking cardiologists.

I hope this gives you the sort of material which you would like to have, and I apologize both for the delay and for failing to get back to Minneapolishto go through the chart on the second patient in detail.

It was a pleasure, as always, to see you and Myrtie in San Francisco.

Very sincerely yours,